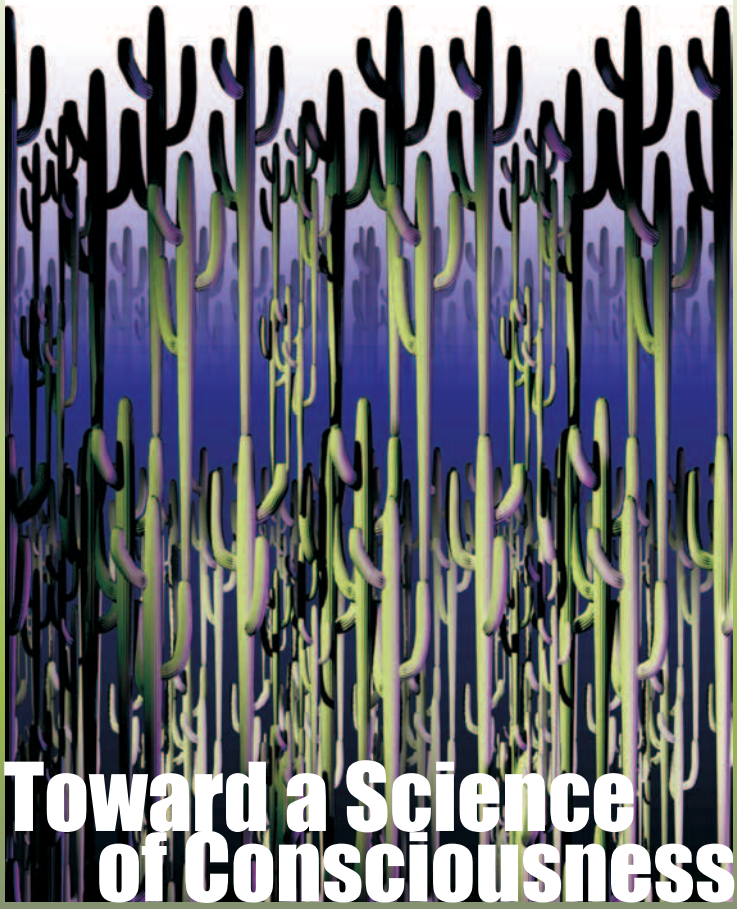

Toward a Science of Consciousness

April 9-14, 2012 Tucson, Arizona
www.consciousness.arizona.edu

The University of Arizona

Center for CONSCIOUSNESS STUDIES

Toward a Science of Consciousness 2013

March 3-9, 2013

Dayalbagh University
Agra, India

10th Biennial

Toward a Science of Consciousness

April 9-14, 2012

Tucson, Arizona
Loews Ventana Canyon Resort

Sponsored by

The University of Arizona
Center for CONSCIOUSNESS STUDIES

Contents

WELCOME

Welcome to Toward a Science of Consciousness 2012, the tenth biennial international, interdisciplinary Tucson Conference on the fundamental question of how the brain produces conscious experience. Sponsored and organized by the Center for Consciousness Studies at the University of Arizona, this year's conference is being held for the first time at the beautiful and eco-friendly Loews Ventana Canyon Resort Hotel.

Toward a Science of Consciousness (TSC) is the largest and longest-running interdisciplinary conference emphasizing broad and rigorous approaches to the study of conscious awareness. TSC brings together various fields approaching the issue of consciousness from different perspectives, orientations and methodologies. These include neuroscience, philosophy, medicine, quantum physics, biology, psychology, anthropology, artificial intelligence, contemplative and experiential traditions, arts, culture, humanities and others. Cutting edge, controversial issues are emphasized.

The 2012 Conference will include 11 Plenary or Keynote Sessions (30 speakers), 24 Concurrent Sessions (120 speakers), 2 Poster Sessions (more than 200 presenters), 3 Art/Tech/Health Demos (19 exhibitors), 10 Pre-Conference Workshops, a Forum on Eastern Philosophy and Consciousness, and an evening workshop with Deepak Chopra.

Social Events include: the Tuesday Opening Reception, a Wednesday music and comedy interlude (Club Consciousness), optional Thursday Side Trips and Conference Dinner, traditional Friday night Consciousness Poetry Slam/Zombie Blues and Talent Show, and the Saturday closing End-of-Consciousness Party. Over 700 participants are expected from 50 countries on 6 continents and 500 abstracts were submitted for this conference.

The first TSC conference was held in 1994 in Tucson and has been held subsequently in Tucson in even-numbered years, alternating with co-sponsored international TSC conferences: in collaboration with groups in various locations around the world : 1995–Ischia, Italy; 1997–Elsinore, Denmark; 1999–Tokyo, Japan; 2001–Skövde, Sweden; 2003–Prague, Czech Republic; 2005– Copenhagen, Denmark; 2007–Budapest, Hungary; 2009–Hong Kong, China; 2011– Stockholm, Sweden. The 2013 TSC Conference will be held March 3-9, 2013 in Agra, India in conjunction with Dayalbagh University.

The TSC Conference and Center for Consciousness Studies wish to thank the Program Committee, in particular Co-Chairs, David Chalmers (Australian National University, Canberra) and Stuart Hameroff (The University of Arizona, Tucson). Program Committee members: Hakwan Lau (New York University), Uriah Kriegel (The University of Arizona), and especially CCS-TSC Assistant Director Abi Behar Montefiore for her conference management and editorial direction.

We are grateful to SBS web guru Ed Xia and the team at Arizona Health Sciences Center BioCommunications: artwork/illustration David Cantrell, graphic design Roma Krebs, and web support Michael Griffith.

We also thank the University of Arizona Department of Anesthesiology: Steven J. Barker, Chair; Tawnya Tretschok, Administrator; Ericka Moore, Business Manager; and Marjan MacPhee, Administrative Associate. Special thanks also to Dr. Hameroff's colleagues in the UMC surgical operating rooms.

We thank our original sponsor the Fetzer Institute, and the YeTaDeL Foundation which has faithfully supported CCS and TSC for many, many years. We also thank Deepak Chopra and The Chopra Foundation and DEI-Dayalbagh Educational Institute/Dayalbagh University, Agra India for their program support.

Special thanks to:
Czarina Salido for her help in organizing music, volunteers, hospitality suite, and local business donations – Chris Duffield for editing help – Kelly Virgin, Dave Brokaw, Mary Miniaci and the staff at Loews Ventana Canyon – Ben Anderson at Swank AV – Nikki Lee for AV recording and filming support – Stephen Whitmarsh, Sky Nelson, and Vanda Mikoloski for Comedy and Music – The Zombie Blues Band (Michael P and the Atomic Gadgets) – DJ Buttafly – Flam Chen – Nick Day (Conscious Pictures) – Sascha Seifert (Mouna) – all the volunteers especially Will Reid, Antoan Lee, Jason Canfield, Jesse Bettinger, Uriah Bennett, Josh Horner, Naama Kostiner, Gadi Sosa, Maureen Seaberg, Neil Theise, and Christer Perfejell – Wendy Zeng and Sastry Bhamidipati for additional Pranahuti Aided Meditation sessions – Hasmukh Taylor and Jeremiah Per Dahlgren for the special Raja Yoga sessions.

To all of our Presenters, Speakers, and Participants ...we thank you.

Sponsors
- The Center for CONSCIOUSNESS STUDIES
- YeTaDel Foundation

Exhibitors
- The MIT Press
- Oxford University Press
- Journal of Consciousness Studies

Eastern Philosophy Forum Sponsors
- India Society of Southern Arizona
- DEI-Dayalbagh Educational Institute
- The Chopra Center

On behalf of Program Committee
- Stuart Hameroff. Co-Chair
- David Chalmers, Co-Chair
- Hakwan Lau
- Uriah Kriegel
- Arlene 'Abi' Behar Montefiore

Center for CONSCIOUSNESS STUDIES

CCS Director, Stuart Hameroff, MD, Anesthesiology, Arizona Health Sciences Center
The University of Arizona, College of Medicine

Associate Director and Co-Chair of the TSC Conference
David Chalmers, Professor of Philosphy, Australian National University, Canberra

CCS Assistant Director, Abi Behar Montefiore, Center for Consciousness Studies
email: center@u.arizona.edu | www.consciousness.arizona.edu

Toward a Science of Consciousness 2012

PRE-CONFERENCE

Ten Pre-Conference Workshops (see list on page 7)
Monday, April 9, 2012 – 9:00am to 6:00pm
Tuesday, April 10, 2012 – 9:00am to 1:00pm

Eastern Philosophy of Consciousness full-day Forum | KIVA Ballroom
Monday, April 9, 2012 – 9:00am to 5:00pm

Neuroscience of Enlightenment Workshop/Dinner
with Deepak Chopra, MD, FACP | KIVA Plaza & Ballroom (tickets required)
Monday evening April 9, 2012 – Dinner 5:30pm to 7:00pm
Monday evening April 9, 2012 – Workshop 7:00pm to 10:00pm

2012 CONFERENCE

Several types of presentation sessions makeup the conference:
Pre-Conference Workshops and Forum, Plenary Sessions, Concurrent Sessions, Poster Sessions, and Art/Tech/Health Demos.

Finding Your Way around the Conference
A map of the Conference site appears on the inside back cover.

Conference Opening | KIVA Ballroom
Tuesday, April 10, 2012 – 1:45pm
(Plenary 1 Begins)

Plenary Sessions (see INDEX on pages 19-21)
Tuesday, April 10 – 1:45pm to 4:10pm
Wednesday, April 11 – 8:30am to 4:10pm
Thursday April 12 – 8:30am to 12:50pm
Friday, April 13 – 8:30am to 4:10pm
Saturday, April 14 – 8:30am to 1:20pm

Concurrent Sessions (see INDEX on pages 22-29)
Tuesday, April 10 & Wednesday, April 11 & Friday, April 13 – 4:30pm to 6:35pm

Poster Sessions (see INDEX on pages 30-41)
Wednesday, April 11 & Friday, April 13 – 7:00pm to 10:00pm

Art/Tech/Health Demos (see INDEX on pages 42-43)
Wednesday, April 11 & Friday, April 13 – 7:00pm to 9:30pm
More interactive than concurrent sessions, the Art/Tech Demo sessions demonstrating art, media, sculpture, and experiential techniques with PowerPoint presentations, body and canvas. The 2012 Conference features Art/Tech/Health Demos, Video Game Play, and Second Life Exhibitions.

Toward a Science of Consciousness 2012

SOCIAL EVENTS

Welcome Reception at KIVA Plaza
Tuesday, April 10, 2012 – 7:00pm to 10:00pm
Meet outside at Kiva Plaza to mingle with food and drinks with special entertainment by Flam Chen.

"Club Consciousness" Comedy & Music in the Grand Ballroom, Salon B
Wednesday, April 11, 2012 – 9:45pm to 11:00pm
Vanda Mikoloski, The Conscious Comic / music by Sky Nelson and Stephen Whitmarsh

Poetry Slam/Zombie Blues in the Grand Ballroom, Salon A & B
Friday, April 13, 2012 – 9:30pm to 12:30am

9:30pm	Warming up with the Atomic Gadgets
9:45pm	The Conscious Comic
10:00pm	Poetry Slam
11:00pm	Zombie Blues Band TSC'ers jam with the Atomic Gadgets
11:15pm	Performances of ZB with back up from the Atomic Gadgets
11:45pm	Atomic Gadgets – Music and Dancing

As in previous conferences, this is a Poetry Slam/ Zombie Blues talent non-reality show. TSC attendees are invited to recite an original poem on any topic related to consciousness to a cheering and sometimes jeering audience.

Following the poems, attendees are invited to perform one or more verses of the Zombie Blues with musical accompaniment by the Atomic Gadgets. Write your own verse to add to the original soulless lament:

"I act like you act, I do what you do, but I don't know what its like to be you.
What consciousness is... I ain't got a clue....I got the Zombie Blues."

Daily Morning Pranahuti Aided Meditation Sessions | Santa Rita
Facilitators: Sastry Bhamidipati and Wendy Zeng
Wednesday April 11 – 7:45am to 8:45am
Thursday, April 12 – 7:45am to 8:45am
Friday, April 13 – 7:45am to 8:45am

Daily Morning Raja Yoga Sessions | Sabino
Facilitators: Dr. Hasmukh Taylor and Jeremiah Per Dahlgren, ERYT
Tuesday, April 10 – 8:00am to 8:40am
Wednesday, April 11 – 8:00am to 8:40am
Thursday, April 12 – 8:00am to 8:40am

End-of-Consciousness Party | KIVA Ballroom and Plaza
Saturday night April 13 – 7:30pm to ???
This is a TSC Conference tradition. Enjoy food, drinks/cash bar, and music in the indoor/outdoor setting of the beautiful KIVA Ballroom and Plaza overlooking Tucson mountains and city lights.

Toward a Science of Consciousness 2012

OPTIONAL

Side Trips (tickets required)
Thursday, April 12, 2012 – 1:00pm to 5:00 or 6:00pm
All tours depart from the meeting room lobby near the Grand Ballroom Foyer.
Tours include: Sabino Canyon and Mt. Lemmon combo, Sabino Canyon hiking tour, Desert 4-Wheeling, and Biosphere2.

Conference Dinner | Loews Ventana Canyon Flying V Bar & Grill (tickets required)
Thursday, April 12, 2012 – 6:30pm to 10:30pm
Regional Southwestern-inspired grill cuisine with spectacular views and fresh mountain air nestled at the base of the breathtaking Santa Catalina Mountains and was once the site of the famous Flying V Ranch.

ADDITIONAL

CEU CREDITS
The Conference has been approved for 5.2 CEU's from the University of Arizona. Participant application forms available at the registration desk.

PRESS/MEDIA
- All press must apply for credentials and complete an online registration form
- No filming/podcasting without permission
- Contact: Abi Behar Montefiore 520-247-5785 center@u.arizona.edu

HOTEL AND SHUTTLE CONTACT NUMBERS
Loews Ventana Canyon Hotel
7000 North Resort Drive, Tucson, Arizona 85750
Phone: (520) 299-2020 Fax: (520) 299-6832
Toll Free Reservations: 1-800-234-5117
reservations help: mminiaci@loewshotels.com

Airport Shuttle Company
Arizona Stagecoach Shuttle 520-889-1000
Discount Code UACCS

Overflow Hotels
Embassy Suites at Paloma Village 520-352-4000
Westin La Paloma 520-742-6000
The Lodge at Ventana Canyon 520-577-1400

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Pre-Conference Workshop Locations

Monday April 9, morning 9:00am - 1:00pm

- Forum: Eastern Philosophy of Consciousness – 9am to noon (Paavo Pylkkänen, PhD; Menas Kafatos, PhD; Sukhdev Roy, PhD; Prem Prashant) / **Kiva Ballroom**
- Pranahuti Aided Meditation (Sastry Bhamidipati and Wendy Zeng) / **Santa Rita**
- The Survival of Consciousness After Death Hypothesis: Implications and Applications (Julie Beischel, PhD and Mark Boccuzzi, et. al.) / **Grand Ballroom, Salon A**
- Neuroscience of Music (Alexander Graur) / **Coronado**
- Cross Modal Consciousness-Synesthesia [part 1] (Maureen Seaberg and Neil Theise, et. al) / **Rincon**

Monday April 9, afternoon 2:00pm - 6:00pm

- Forum continued (1-5) / **Kiva Ballroom**
- Exploring Frontiers of Mind Brain Relationship [part 1] (Saulo de Freitas Araujo, Julio Peres, and Alexander Moreira-Almeda) / **Grand Ballroom, Salon A**
- Cross Modal Consciousness-Synesthesia [part 2] (M. Seaberg, and N. Theise et, al.) / **Rincon**

Monday April 9, evening 5:30pm - 10:00pm

- Deepak Chopra, MD, FACP Dinner/Workshop: Neuroscience of Englightenment
  5:30pm - 7:00pm Optional Dinner / **Kiva Plaza**
  7:00pm - 10:00pm Workshop / **Kiva Ballroom**

Tuesday April 10, morning 9:00am - 1:00pm

- Philosophical Overview of Theories of Consciousness (Uriah Kriegel and Joshua Weisberg) / **Grand Ballroom Salon G & H**
- Quantum Consciousness Update (Stuart Hameroff, et. al) / **Executive Board Room**
- Functional Neuroimaging of (Un)Consciousness? (Steven Laureys) / **Grand Ballroom, Salon B**
- Exploring Frontiers of Mind Brain Relationship [part 2] (S. Araujo, J. Peres, and A. Moreira-Almeda) / **Grand Ballroom, Salon A**
- Pranahuti Aided Meditation (S. Bhamidipati and W. Zeng) / **Santa Rita**

	CORONADO	RINCON	SABINO
8:00am - 6:00pm	**Pre-Conference Workshop REGISTRATION in the Grand Ballroom Foyer**		
9:00am - 1:00pm	**Introduction to the Neuroscience of Music** A. J. Graur	**Cross Modal Consciousness: The World of Synesthesia** Full-Day Workshop [Part 1] M. Seaberg, Modr. N. Theise, Modr. D. Kish – L. Simpson N. Kostiner – J. Padgett L. Goode – A. Schultz C. Simmonds-Moore	
1:00pm - 2:00pm	LUNCH – at the Loews Ventana Canyon Cafe (or location of your choice)		
2:00pm - 6:00pm		**Cross Modal Consciousness: The World of Synesthesia** [Part 2]	
5:30pm - 7:00pm	**"Sunset Buffet"** (purchase ticket for this event at GENERAL REGISTRATION) **Optional DINNER with Deepak Chopra at KIVA PLAZA**		
7:00pm -10:00pm	**"Neuroscience of Enlightenment"** **Evening Workshop with Deepak Chopra in the Kiva Ballroom**		

SANTA RITA	EXECUTIVE BOARD	KIVA BALLROOM	GRAND BALLROOM, SALON A
Consciousness Transformation through Pranahuti Aided Meditation S. Bhamidipati W. Zeng	**Conference Manager/ Press**	**Eastern Philosophy Forum** Full-Day Forum [Part 1] *9:00am - 12noon* P. Pylkkänen M. Kafatos S. Roy P. Prashant	**The Survival of Consciousness After Death Hypothesis: Implications and Applications** J. Beischel M. Boccuzzi and guests
		LUNCH 12noon - 1:30pm	
		Eastern Philosophy Forum Full-Day Forum [Part 2] *1:00pm - 5:00pm* P. Pylkkänen M. Kafatos S. Roy P. Prashant	**Exploring Frontiers of Mind-Brain Relationship** 2-Part Workshop [Part 1] **Continued Tues., April 10* S. de Freitas Araujo S. Hameroff J. Peres A. Moreira-Almeda

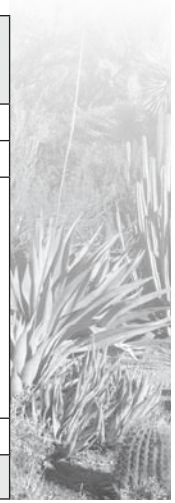
TUESDAY, April 10, 2012 | PRE-CONFERENCE WORKSHOPS

	KIVA BALLROOM	GRAND BALLROOM, SALON A	GRAND BALLROOM, SALON B
8:00am - 9:30am	**Pre-Conference Workshop REGISTRATION in the Grand Ballroom Foyer**		
10:30am - 5:00pm	**General Conference REGISTRATION on the KIVA Plaza**		
9:00am - 1:00pm		**Exploring Frontiers of Mind-Brain Relationship** 2-Part Workshop [Part 2] **Continued from Mon, April 9* S. de Freitas Araujo J. Peres A. Moreira-Almeda	**Functional Neuroimaging the (Un) Consciousness?** S. Laureys
1:00pm	**END of Pre-Conference Workshops**		
1:00pm - 1:45pm	LUNCH – at the Loews Ventana Canyon Cafe (or location of your choice)		

TUESDAY, April 10, 2012 | CONFERENCE OPENING | PLENARY SESSION 1

	KIVA BALLROOM	EXECUTIVE BOARD	GRAND BALLROOM, SALON D
1:45pm - 2:00pm	**CONFERENCE OPENING – in the KIVA Ballroom**		
2:00pm - 4:10pm **PLENARY SESSION 1**	**Plenary Session 1: War of the Worldviews** *For details, see Plenary INDEX on page 19.* D. Chopra L. Mlodinow M. Kafatos S. Blackmore		
4:10pm - 4:30pm	break		
	For details, see Concurrent INDEX on pages 22-24.		
4:30pm - 6:35pm **CONCURRENT SESSIONS 1-8**	**Concurrent Session 2:** **Higher Order Theories**	**Concurrent Session 6:** **Biology and Consciousness**	**Concurrent Session 1:** **Panpsychism and Neutral Monism**
6:35pm - 7:00pm	break		
7:00pm - 10:00pm	**WELCOME RECEPTION at KIVA Plaza**		

SANTA RITA	EXECUTIVE BOARD	GRAND BALLROOM, SALON G & H
Consciousness Transformation through Pranahuti Aided Meditation S. Bhamidipati W. Zeng	**Quantum Consciousness Update** S. Hameroff and guests	**Philosophical Theories of Consciousness** U. Kriegel J. Weisberg



CONCURRENT SESSIONS 1-8 | WELCOME RECEPTION

GRAND BALLROOM, SALON E	GRAND BALLROOM, SALON F	GRAND BALLROOM, SALON G	GRAND BALLROOM, SALON H	GRAND BALLROOM, SALON I
For details, see Concurrent INDEX on pages 22-24.				
Concurrent Session 7: **Foundations of Quantum Mechanics**	**Concurrent Session 3:** **Agency and Emotion**	**Concurrent Session 4:** **Attention in Psychology and Neuroscience**	**Concurrent Session 5:** **First Person Methods and Phenomenology**	**Concurrent Session 8:** **Science of Meditation**

WEDNESDAY MORNING, April 11, 2012 | PLENARY SESSIONS 2-4

	KIVA BALLROOM
	For details, see Plenary INDEX on pages 19-20.
8:30am - 10:40am **PLENARY SESSIONS**	**Plenary Session 2:** **Searching for Consciousness** M. Boly I A. Zadra I G. Mashour
10:40am - 11:10am	break
11:10am - 12:35pm	**Plenary Session 3:** **Attention without Awareness** R. Kentridge I J. Prinz
12:35pm - 2:00pm	break
2:00pm - 4:00pm	**Plenary Session 4:** **Fractal Consciousness** B.Jade He I P. Walling I S. Hameroff
4:00pm - 4:30pm	break

WEDNESDAY AFTERNOON, April 11, 2012 | CONCURRENT SESSIONS 9-16

	KIVA BALLROOM	EXECUTIVE BOARD	GRAND BALLROOM, SALON D
	For details, see Concurrent INDEX on pages 24-27.		
4:30pm - 6:35pm **CONCURRENT SESSIONS 9-16**	**Concurrent Session 10:** **The Self and Unity**	**Concurrent Session 14:** **Evolution and Free Will**	**Concurrent Session 9:** **Dualism and Modal Arguments**
6:35pm - 7:00pm	break		

WEDNESDAY EVE, April 11, 2012 | POSTER SESSIONS & ART/TECH/HEALTH

	GRAND BALLROOM FOYER	GRAND BALLROOM, SALON B (20 MIN. SESSIONS)
	For details, see Poster INDEX on pages 30-36.	
7:00pm - 10:00pm	**P1 Poster Sessions** 1.0 Philosophy 2.0 Neuroscience 3.0 Cog Sci/Psychology 4.0 Physics/Biology 5.0 Experiential 6.0 Humanities	**A1: Art/Tech Demos** 7:00pm - 7:20pm H. Taylor 7:20pm - 7:40pm S. Loeth 7:40pm - 8:00pm J. Gluck 8:00pm - 8:20pm F. Meissner 8:20pm - 8:40pm N. Kostiner 8:40pm - 9:00pm R. Shapero 9:00pm - 9:20pm G. Foster-Gluck 9:20pm - 9:45pm N. Day/S. Seifert
9:15pm - 10:00pm	break	
10:00pm - 11:00pm	**CLUB CONSCIOUSNESS in the Grand Ballroom, Salon A & B** (cash bar)	

GRAND BALLROOM, SALON E	GRAND BALLROOM, SALON F	GRAND BALLROOM, SALON G	GRAND BALLROOM, SALON H	GRAND BALLROOM, SALON I
For details, see Concurrent INDEX on pages 24-27.				
Concurrent Session 15: **Altered States of Consciousness**	**Concurrent Session 11:** **Agency and Emotion**	**Concurrent Session 12:** **Neural Correlates of Consciousness**	**Concurrent Session 13:** **Cross Modal Perception**	**Concurrent Session 16:** **Science and Spirituality**

CATALINA BALLROOM, SALON J	CATALINA BALLROOM, SALON K & L
For details, see Art/Tech/Health INDEX on page 42.	
A2: Art/Tech Video Game Play J. Gackenbach D. Doyle G. Garvey J. Martin E. Murzyn	**A2: Art/Tech/Health Second Life Exhibitions** R. Geer T. Walters F. Rubin

	KIVA BALLROOM
	For details, see Plenary INDEX on page 20.
8:30am - 11:00am	**Plenary Session 5:** **HOT/NOT: Higher Order Theories of Consciousness** D. Rosenthal N. Block H. Lau V. Lamme
11:00am - 11:30am	break
11:30am - 1:00pm	**Plenary Session 6:** **Identifying The Brain's Awareness System: Lessons from Coma and Related States** KEYNOTE: S. Laureys
1:00pm - 1:15pm	LUNCH
	NO CONFERENCE SESSIONS UNTIL FRIDAY MORNING: FREE AFTERNOON and EVENING
1:15pm - 6:00pm	**Option SELF-ORGANIZED WORKSHOPS**
1:15pm - 5 or 6pm	**Optional SIDE TRIPS** (purchase these based on availability at GENERAL REGISTRATION) **Buses leave from Grand Ballroom Meeting Room Lobby (main bldg)** optional: Box Lunches Fee Purchase
5 or 6pm - 6:30PM	break
6:30pm - 10:30pm	**Optional CONFERENCE DINNER –** at Loews Ventana Canyon Flying V Bar & Grill (purchase ticket for this event at GENERAL REGISTRATION) (cash bar)

FRIDAY MORNING, April 13, 2012 | PLENARY SESSIONS 7-9

	KIVA BALLROOM
	For details, see Plenary INDEX on pages 20-21.
8:30am - 10:40am **PLENARY SESSIONS**	**Plenary Session 7:** **Echolocation and Consciousness** D. Kish | L. Thaler | C. Moss
10:40am - 11:10am	break
11:10am - 12:35pm	**Plenary Session 8: Feeling the Future** KEYNOTE: D. Bem
12:35pm - 2:00pm	break
2:00pm - 4:00pm	**Plenary Session 9: The Explanatory Gap** K. O'Regan | A. Jack | P. Goff
4:00pm - 4:30pm	break

FRIDAY AFTERNOON, April 13, 2012 | CONCURRENT SESSIONS 17-24

	KIVA BALLROOM	EXECUTIVE BOARD	GRAND BALLROOM, SALON D
	For details, see Concurrent INDEX on pages 27-29.		
4:30pm - 6:35pm **CONCURRENT SESSIONS 17-24**	**Concurrent Session 18:** **Philosophy of Perception**	**Concurrent Session 22:** **Space, Time and Scale**	**Concurrent Session 17:** **Phenomenal Concepts and Phenomenal Knowledge**
6:35pm - 7:00pm	break		

FRIDAY EVE | April 13, 2012 | POSTER SESSIONS & ART/TECH/HEALTH

	GRAND BALLROOM FOYER
	For details, see Poster INDEX on pages 37-41.
6:30pm - 9:30pm	**P2 Poster Sessions** 1.0 Philosophy 2.0 Neuroscience 3.0 Cog Sci/Psychology 4.0 Physics/Biology 5.0 Experiential 6.0 Humanities
9:30pm - 10:00pm	break
9:45pm - 12:00am	**POETRY SLAM/ZOMBIE BLUES in the Grand Ballroom, Salon A & B**

GRAND BALLROOM, SALON E	GRAND BALLROOM, SALON F	GRAND BALLROOM, SALON G	GRAND BALLROOM, SALON H	GRAND BALLROOM, SALON I
Concurrent Session 23: **Education and Consciousness**	**Concurrent Session 19:** **Foundations of the Science of Consciousness**	**Concurrent Session 20:** **Disorders of Consciousness**	**Concurrent Session 21:** **Sleep Dreams**	**Concurrent Session 24:** **Nonlocality and Consciousness**

GRAND BALLROOM, SALON C (25 MIN. SESSIONS)	CATALINA BALLROOM, SALON J, K, L
For details, see Art/Tech/Health INDEX on page 43.	
A3: Art/Tech and Health Demos 7:00pm - 7:25pm A. Baldwin 7:25pm - 7:50pm A. Alfaki 7:50pm - 8:15pm P. Brugnoli 8:15pm - 8:40pm J. Illundain-Agurruza 8:40pm - 9:05pm E. Trousdale 9:05pm - 9:30pm A. Graur	**Continuing A1 and A2 Art/Tech Demos from Wednesday, April 11** *(see Art/Tech/Health INDEX for Wednesday Evening on page 42)*

	KIVA BALLROOM
9:00am - 11:30am	**Plenary Session 10: Time & Brain** M. Gur E. Isham R. Gruber G. Lee
11:30am - 12noon	break
11:30am - 1:00pm	**Plenary Session 11: Consciousness and Hallucinogens** R. Carhart-Harris K. MacLean
1:00pm - 4:00pm	LUNCH and FREE TIME
4:00pm - 8:00pm	Note: Self-Organizing Post-Conference Workshops (in Coronado, Bill's Grill, and The Corral) or Hiking, Tennis, or Golf.
8:00pm - ???	**END-OF-CONSCIOUSNESS PARTY on the KIVA Plaza and KIVA Ballroom** (cash bar, music and food)

INDEX TO PLENARY SESSIONS

PL 1 – PL 11

Plenary Sessions Tuesday-Saturday, April 10-14, 2012
(PL 1 Tues. – PL 2-4 Wed. – PL 5-6 Thurs. – PL 7-9 Fri. – PL 10-11 Sat.)

Keynote Speakers: PL6 & PL8. All Plenary Sessions will be held in the Kiva Ballroom. Eleven plenary and keynote sessions will be presented to the entire 2012 conference audience.

Tuesday, April 10

PL1: War of the Worldviews

Tuesday April 10, 2:00pm to 4:10pm at KIVA Ballroom

- **War of the Worldviews: Primary Consciousness Versus Materialism** Deepak Chopra, MD, FACP (Carlsbad, CA) **[56]**
- **The Scientific Worldview** Leonard Mlodinow (Author; Physics Faculty of California Institute of Technology, Pasadena, CA) **[64]**
- **What do Physics and Metaphysics have to say about Consciousness, Future Science, and the Emergence of Holism** Menas Kafatos (Chapman University, Schmid College of Science, Orange, CA) **[59]**
- **War of the Worldviews** Susan Blackmore (University of Plymouth, Psychology, Plymouth, United Kingdom) **[55]**

Wednesday, April 11

PL2: Searching for Consciousness in Sleep, Coma, and Anesthesia

Wednesday April 11, 8:30am to 10:40am at KIVA Ballroom

- **Brain Connectivity in Disorders of Consciousness** Mélanie Boly, MD (Belgian National Fund of Scientific Research (FNRS), Liège, Belgium) **[110]**
- **Sleep Mentation and Sleep EEG during Adult Somnambulism** Antonio Zadra, Marc-Antoine Labelle, Mathieu Pilon, Jacques Montplaisir (Universite de Montreal, Centre for Advanced Research in Sleep Medicine, Montreal, Quebec Canada) **[168]**
- **Consciousness in the Operating Room** George Mashour, MD (University of Michigan, Anesthesiology, Ann Arbor, MI) **[127]**

PL3: Attention Without Awareness?

Wednesday April 11, 11:10am to 12:30pm at KIVA Ballroom

- **Attention Without Awareness** Robert Kentridge (University of Durham, Psychology, Durham, United Kingdom) **[149]**
- **Attention as the Mechanism of Consciousness** Jesse Prinz (City University of New York, Graduate Center, Philosophy, New York, NY) **[151]**

PL4: Fractal Consciousness

Wednesday April 11, 2:00pm to 4:10pm at KIVA Ballroom

- **Scale-Free Brain Activity** Biyu Jade He (NIH/NINDS, Bethesda, MD) **[142]**
- **Rapid Sampling of Brainwaves Clarifies Fractal Nature of the EEG** Peter Walling, MD, Kenneth N. Hicks; Miguel Uh (Baylor University Medical Center, Anesthesiology and Pain Management, Dallas, TX) **[234]**
- **Fractal Brain Hierarchy, Consciousness and Orch OR** Stuart Hameroff, MD (The University of Arizona, (Anesthesia/Psychology); Center for Consciousness Studies, Tucson, AZ) **[111]**

Thursday, April 12

PL5: Debate: HOT or NOT

Thursday April 12, 8:30am to 11:00am at KIVA Ballroom

- **Conscious Awareness, Unconscious Perceiving, and Overflow** David Rosenthal (CUNY Graduate Center, Philosophy, New York, NY) **[49]**
- **Two Forms of Higher Order Theories of Consciousness** Ned Block (New York University, Philosophy, New York, NY) **[42]**
- **A Higher-Order Statistical Decision View Accounts for Apparent Phenomenological Overflow** Hakwan Lau (Columbia University, Psychology, New York, NY) **[48]**
- **Scientists Reveal: People Have Conscious Sensations Without Knowing It** Victor Lamme (University of Amsterdam, Psychology, Amsterdam, Netherlands) **[47]**

PL6: KEYNOTE:

Identifying the Brain's Awareness System – Lessons from Coma and Related States

Thursday April 12, 11:30am to 12:50pm at KIVA Ballroom

- **Identifying the Brain's Awareness System: Lessons from Coma and Related States** Steven Laureys, MD (University of Liège, Coma Science Group, Cyclotron, Department of Neurology, Liège, Belgium) **[112]**

Friday, April 13

PL7: Echolocation and Consciousness

Friday April 13, 8:30am to 10:40am at KIVA Ballroom

- **Sound Vision: The Consciousness of Seeing with Sound** Daniel Kish (World Access for the Blind, New York, NY) **[153]**
- **Echolocation in People** Lore Thaler (Durham University, Psychology, Durham, United Kingdom) **[156]**
- **Echolocation Behavior Provides a Window to the Mind of a Bat** Cynthia Moss (University of Maryland, Psychology, Baltimore, MD) **[154]**

PL8: KEYNOTE: Feeling the Future

Friday April 13, 11:10am to 12:30pm at KIVA Ballroom

- **Feeling the Future: Recent Experimental Evidence for the Anomalous Anticipation of Future Events** Daryl J. Bem (Cornell University, Psychology, Emeritus Professor, Ithaca, NY) **[307]**

PL9: The Explanatory Gap

Friday April 13, 2:00pm to 4:10pm at KIVA Ballroom

- **How to Make a Robot That Feels** Kevin O'Regan (Centre National de Recherche Scientifique Institut, Laboratoire Psychologie, Paris, France) **[36]**
- **Why Don't Psychopaths Believe in Dualism? The Role of Opposing Brain Networks** Anthony Jack (Case Western Reserve University, Cognitive Science, Cleveland, OH) **[34]**
- **Non-Compositional Panpsychism** Philip Goff (University of Liverpool, Philosophy, Liverpool, United Kingdom) **[33]**

Saturday, April 14

PL10: Time and Brain

Saturday April 14, 9:00am to 11:30am at KIVA Ballroom

- **Conjunctions in Time But Not Necessarily in Space Underlie Perceptual Unity: Sensory Perception Shows That "Wireless" Communication May Be Used to Integrate Between Separate Brain Loci** Moshe Gur (Technion Israel Institute of Technology, Biomedical Engineering, Haifa, Israel) **[181]**
- **Saving Free Will from Science** Eve Isham, William P. Banks, Pomona College; Joy J. Geng, UC Davis (UC Davis, Center for Mind and Brain, Davis, CA) **[79]**
- **Experimental Evidence that the Flow of Time is a Perceptual Illusion** Ronald Gruber, MD, Richard A. Block, PhD (Stanford University, SUMC, Stanford, CA) **[180]**
- **Subjective Duration** Geoffrey Lee (UC Berkeley, Philosophy, Berkeley, CA) **[30]**

PL11: Consciousness and Hallucinogens

Saturday April 14, 12noon to 1:20pm at KIVA Ballroom

- **How do Psychedelics Affect the Brain to Alter Consciousness?** Robin Carhart-Harris (Imperial College London, Neuropsychopharmacology Unit, London, United Kingdom) **[131]**
- **Psilocybin and Personality Change – What Do Increases in Openness Tell Us About Potential Mechanisms of Action and Therapeutic Applications?** Katherine MacLean (Johns Hopkins University School of Medicine, Psychiatry/Behavioral Sciences, Baltimore, MD) **[297]**

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Afternoon Concurrent Sessions – 4:30pm to 6:35pm
Tuesday, April 10 | Wednesday, April 11 | Friday, April 13

Concurrent talks are 20 minutes each, with 5 minutes for questions. There are five speakers per session, covering focused areas of the same theme. LCD projectors and laptops available. The following list consists of the Section Number, Session Name, Order of Speakers, Corresponding Abstract Index Number and the Building/Room Location.

Tuesday, April 10

C1: Panpsychism and Neutral Monism

Tuesday April 10, 4:30pm to 6:35pm at Grand Ballroom, Salon D

- **The "Sharpness" of Consciousness and the Argument from Continuity** Michael Blamauer (Department of Philosophy, University of Vienna, Vienna, Austria) **[5]**
- **Varieties of Contemporary Panpsychism** Keith Turausky (University of Texas at Austin, Austin, TX) **[10]**
- **Panpsychism, Emergence and Physicalism** Anand Rangarajan (Computer Information Science, University of Florida, Gainesville, FL) **[9]**
- **The Knowledge Argument Redux** Sam Coleman (Philosophy, University of Hertfordshire, Hatfield, Hertfordshire United Kingdom) **[6]**
- **Galen Strawson and G.W.F. Hegel on the "In-itself," the "For-itself," and Consciousness** Robert M. Wallace (Oro Valley, AZ) **[11]**

C2: Higher Order Theories

Tuesday April 10, 4:30pm to 6:35pm at KIVA Ballroom

- **On HOTs and HOTIEs: Higher-Order Thoughts, Indexed Essentially** Josh Weisberg (Philosophy, University of Houston, Houston, TX) **[52]**
- **HOT Theory and the Prefrontal Cortex** Rocco Gennaro (Philosophy, University of Southern Indiana, Evansville, IN) **[44]**
- **Why H.O.T. Still Bests Self-Representation: A Counter-Example to the Self-Representation Theory of Subjective Consciousness** Craig DeLancey (Philosophy, SUNY Oswego, Oswego, NY) **[43]**
- **Higher-Order Theories of Consciousness and Subjective Appearance in Empty Higher-Order Representations** Paul Bernier (Philosophy & Religious Studies, Universite De Moncton, Moncton, NB Canada) **[41]**
- **Experiential Awareness: Do You Prefer It to Me?** Miguel Angel Sebastian (Barcelona, Spain) **[52]**

C3: Agency and Emotion

Tuesday April 10, 4:30pm to 6:35pm at Grand Ballroom, Salon F

- **Relating Consciousness and Control** Joshua Shepherd (Philosophy, Florida State University, Tallahassee, FL) **[82]**
- **The Neural Correlates of Emotion as Suggested by Alexithymia** Bill Faw (Psychology, Brewton-Parker College, Mount Vernon, GA) **[135]**

- **A Defense of the Comparator Theory of Phenomenal Agency** Christopher Howard (Tucson, AZ) **[78]**
- **Subject to Error: Is Anarchic Hand Syndrome a Counterexample to Immunity to Error through Misidentification?** James Dow (Philosophy, Hendrix College, Conway, AR) **[174]**
- **Lessons about Inner Experience from a Soldier with Symptoms of PTSD** Chris Heavey, Neda C. Raymond, Russell T. Hurlburt (Psychology, University of Nevada, Las Vegas, Las Vegas, NV) **[187]**

C4: Attention in Psychology and Neuroscience

Tuesday April 10, 4:30pm to 6:35pm at Grand Ballroom, Salon G

- **Both Consciousness and Access are Gradual Phenomena** Tony Cheng (Philosophy, CUNY Graduate Center, New York, NY) **[148]**
- **Awareness of Attentional System and Spatial Judgments** Jean-Paul Noel, Anthony Mefford; Lauren N. Hecht (Gustavus Adolphus College, St. Peter, MN) **[150]**
- **Attention Generalizes Unconscious Perceptual Learning** David Carmel, Marisa Carrasco (New York University, New York, NY) **[147]**
- **Phenomenal Consciousness without Access?** Christian Stevens (Philosophy, University of Guelph, Toronto, Ontario Canada) **[152]**
- **That was Definitely in My Awareness: Recognizing (Un)Straightforward Descriptions of Inner Experience** Stacy Reger (Psychology, University of Nevada, Las Vegas, Henderson, NV) **[189]**

C5: First Person Methods and Phenomenology

Tuesday April 10, 4:30pm to 6:35pm at Grand Ballroom, Salon H

- **Left-Handed Inner Experience: What It Can Tell Us About Method in the Science of Inner Experience** Russell Hurlburt (Psychology, University of Nevada, Las Vegas, Las Vegas, NV) **[188]**
- **Life's 'Luminous Halo:' Virginia Woolf's Fictive Depiction of Consciousness** Sheridan Hough (Philosophy, College of Charleston, Charleston, SC) **[320]**
- **Convergent Phenomenology** Bruce Mangan, (Cognitive Science, Institute of Cognitive and Brain Studies, Oakland, CA) **[269]**
- **Consciousness, Goedel and the "I-it" Structure of Experience** Jonathan Shear, Neil Sims (Philosophy, Virginia Commonwealth University, Richmond, VA) **[76]**
- **Inner Awareness V. Empirical Introspection V. Phenomenological Reflection** David Woodruff Smith (Philosophy, University of California, Irvine, Irvine, CA) **[271]**

C6: Biology and Consciousness

Tuesday April 10, 4:30pm to 6:35pm at Executive Board Room

- **Chemical Synthesis of Microtubules: An In-Vitro Study in Progress** Pushpa Sahni (Chemistry, Dayalbagh Educational Institute, Agra, Uttar Pradesh India) **[245]**
- **The Possibility of MAPs as Quantum Logic Gates in Neuronal Microtubules** Saatviki Gupta, Stuart Hameroff, MD (Dayalbagh Educational Institute, Delhi, India) **[235]**
- **Implications of Brain Cell Mechanosensitivity for Consciousness Research** Richard Harrington (The University of Arizona, Tucson, AZ) **[141]**
- **Taking Hints from Protozoans – Did Microtubule-Related Plasticity Evolve Jointly with Consciousness?** James Beran (Richmond, VA) **[246]**

- **Chromophores, Quantum Coherence, and Microtubules: A Theoretical Investigation of a Quantum Mechanism of Signal Propagation Along a Microtubule** Travis Craddock, Jonathan Mane; Douglas Friesen; Jack Tuszynski (Physics, University of Alberta, Sherwood Park, Alberta Canada) **[241]**

C7: Foundations of Quantum Mechanics

Tuesday April 10, 4:30pm to 6:35pm at Grand Ballroom, Salon E

- **Consciousness, Rainforest Realism and the Implicate Order** Paavo Pylkkänen (University of Skovde/Helsinki, Skövde, Sweden) **[202]**
- **Horizons of Knowledge: Universal Complementarity Across All Levels of Scales in a Complex Universe** Neil Theise, MD, Menas Kafatos, Fletcher Jones Endowed Professor of Computational Physics, Chapman University, Orange, CA (Pathology and Medicine, Beth Israel Medical Center of Albert Einstein College of Medicine, New York, NY) **[232]**
- **Tackling the Hard Problem: A View Behind the Scenes of Matter Provides Valuable Clues for the Development of a Theory of Consciousness** Joachim Keppler (Department of Physics, Science Consult, Roth, Germany) **[199]**
- **Strange Enough? Ontological Singularities, Closed Time-Like Curves and the Hard Problem** Uziel Awret (School of Quantum Computation, Trinity DC University, Falls Church, VA) **[192]**
- **Mind-Matter Relations in Dual-Aspect Monism a la Pauli and Jung** Harald Atmanspacher (Theory and Data Analysis, Institute for Frontier Areas of Psychology, Freiburg, Germany) **[191]**

C8: Science of Meditation

Tuesday April 10, 4:30pm to 6:35pm at Grand Ballroom, Salon I

- **Meditation-Induced Bliss Viewed as Release from Conditioned Neural (Thought) Patterns which Block Reward Signals in the Brain Pleasure Center** Patricia Sharp (Psychology, Bowling Green State University, Bowling Green, OH) **[288]**
- **Experiences and Effects on the Mind by Meditation on the Subtlest Object: A Phenomenological Study** Sastry Bhamidipati, Wendy Wandan Zeng (Imperience – Pranahuti Aided Meditation Research Center, Fremont, CA) **[276]**
- **Effects of Meditation Forming a Collective Mind on Decision Maker Groups Concerning Risk and Investments** Saverio Bellomo, Prof. Giovanni Di Bartolomeo; Prof. Stefano Papa (Science of Communications, University of Teramo, Italy, Albuquerque, New Mexico) **[275]**
- **A Spiritual Psycho-Physical Higher-Order Quantum Theory of Consciousness** Sukhdev Roy (Physics and Computer Science, Dayalbagh Educational Institute, Agra, Uttar Pradesh India) **[203]**
- **Exploring Loss of Self-Referential Narrative and Awakening: A Research Subject's/ Collaborator's Journey** Gary Weber (Port Matilda, PA) **[179]**

Wednesday, April 11

C9: Dualism and Modal Arguments

Wednesday April 11, 4:30pm to 6:35pm at Grand Ballroom, Salon D

- **The Hard Problem Problem** William S. Robinson (Iowa State University, Ames, IA) **[38]**
- **How to be a Type-C Physicalist** Adrian Boutel (Philosophy, Christ's College, Cambridge, London, United Kingdom) **[16]**

- **Introspective Invariance and Introspective Ignorance: Undermining the Modal Arguments for Dualism** Kenneth Williford (Philosophy, The University of Texas at Arlington, Arlington, TX) **[21]**
- **The 2D Argument Against Non-Materialism** Richard Brown (City University of New York, LaGuardia, Brooklyn, NY) **[17]**
- **Psycho-Physical Dualism and Subject-Object Duality (A New Argument for Psycho-Physical Dualism)** Stephen Barker (Philosophy, University of Nottingham (Philosophy), Nottingham, Nottinghamshire United Kingdom) **[15]**

C10: The Self and Unity

Wednesday April 11, 4:30pm to 6:35pm at KIVA Ballroom

- **Partial Unity and Bayne's Switch Model of the Split-Brain Syndrome** Bernard W. Kobes (Philosophy, Arizona State University, Tempe, AZ) **[72]**
- **Consciousness and Existence** Gordon Knight (Philosophy, Religious Studies, Iowa State University, Ames, IA) **[62]**
- **Personal Identity and Uploading** Joseph Corabi, Susan Schneider (Philosophy, Saint Joseph's University, Philadelphia, PA) **[70]**
- **The Mind as a Kantian Whole: A Marriage of Neo-Associationism and Neo-Emergentism** Allan Combs, Stanley Krippner (Transformative Inquiry, California Institute of Integral Studies (CIIS), Santa Rosa, CA) **[171]**
- **Exposing Neuroscience's Closet Dualism: A Conceptual Analysis of Neuroscientific Studies of Consciousness and Free Will** Liad Mudrik, Uri Maoz (Biology, California Institute of Technology, Pasadena, CA) **[65]**

C11: Extended, Embodied, and Social Consciousness

Wednesday April 11, 4:30pm to 6:35pm at Grand Ballroom, Salon F

- **Attention and Enactive Intentionality** Michael Bruno (Philosophy and Religion, Mississippi State University, Mississippi State, MS) **[85]**
- **The Space of Consciousness** Crystal L'Hote (Philosophy, St. Michael's College, Burlington, VT) **[103]**
- **Towards a Second-Person Neuroscience of Social Cognition** Tobias Schlicht (Philosophy, Ruhr-Universite Bochum, Philosophy, Bochum, Germany) **[144]**
- **A Cognitive Model of the Sense of Embodiment in a (Rubber) Hand** Glenn Carruthers (ARC Centre of Excellence in Co, Macquarie University, Sydney, New South Wales Australia) **[97]**
- **The Extended (Emotional) Mind: Evidence from Infants** Joel Krueger (Philosophy, University of Copenhagen, Copenhagen, Denmark) **[102]**

C12: Neural Correlates of Consciousness

Wednesday April 11, 4:30pm to 6:35pm at Grand Ballroom, Salon G

- **A Neural Correlates of Creativity: fMRI Study for Japanese-Syllogistic-Riddle (JSR) Solving Tasks** Yoshi Tamori, Akimitsu Okumura (HISL, KIT, Hakusan-shi, Ishikawa Japan) **[184]**
- **Anesthetic-Induced Separation of Cellular Registration from Behavioral Recognition of Olfactory Sensory Processing** Yan Xu, A Samuelsson; P Tang (Anesthesiology, Pharmacology, University of Pittsburgh School of Medicine, Pittsburgh, PA) **[120]**
- **Falsifying Computational Theories of Consciousness in the Olfactory System** Andreas Keller (Philosophy, CUNY, New York, NY) **[119]**

- **The Evolution of Visual Illusions: The Relationship of Primary Visual Cortex Volume to Illusory Size Perception in Primates** Michael Proulx, Alexandra A. de Sousa, The University of Coimbra (Portugal), University of London (UK) (Research Ctr in Psychology, Queen Mary University of London, London, United Kingdom) **[254]**

C13: Cross Modal Perception

Wednesday April 11, 4:30pm to 6:35pm at Grand Ballroom, Salon H

- **The Experiences of Creative Synesthetes – From Lady Gaga to Saturday Night Live's Darrell Hammond to Actor Geoffrey Rush and Beyond** Maureen Seaberg (Author, Staten Island, NY) **[329]**
- **How Thoughts Feel: The Cross-Modality of Cognitive Phenomenology** Christian Coseru (Philosophy, College of Charleston, Charleston, SC) **[86]**
- **When Perception Goes Crossmodal** Tamar Weber (Philosophy, UCLA, Los Angeles, CA) **[93]**
- **Visual Bias in Consciousness Studies: Why Philosophers Should Pay Attention to Auditory Perception and Music Listening** Jenny Judge (Faculty of Music, St John's College, Centre for Music and Science, Cambridge, Cambridgeshire United Kingdom) **[332]**
- **An Account of the Distinctiveness of the Phenomenology of Experiences in Different Sense Modalities.** Michael Arsenault (Toronto, Ontario Canada) **[84]**

C14: Evolution and Free Will

Wednesday April 11, 4:30pm to 6:35pm at Executive Board Room

- **Fossil Records in Geological Evolution History and Emergence of Consciousness** Anand Mohan (Registrar, Dayalbagh Educational Institute, Agra, Uttar Pradesh India) **[253]**
- **Exploring the Role of Gap Junction Synchrony in Evolution of Conscious States** CM Markan (Physics and Computer Science, Dayalbagh Educational Institute, Agra, Uttar Pradesh India) **[132]**
- **Hallucinations as Adaptation: Divine Voices, Visions, and Autoscopy as Neuropsychological Vestiges** Brian McVeigh (East Asian Studies, The University of Arizona, Tucson, AZ) **[158]**
- **Free-will: The Vehicle Between Unconscious Desire and Intuitive Consciousness** Vineeta Mathur, Dr. K. Maharaj Kumari (Chemistry, Dayalbagh Educational Institute, Dayalbagh, Agra, Uttar Pradesh India) **[81]**
- **The Tyranny of the Prefrontal Cortex** Jeremy Lent (San Rafael, CA) **[113]**

C15: Altered States of Consciousness

Wednesday April 11, 4:30pm to 6:35pm at Grand Ballroom, Salon E

- **The Relationship Between Ego Development and Persistent Non-Symbolic Experience** Jeffrey A. Martin, Allan L. Combs, California Institute of Integral Studies (Hong Kong Polytechnic University, Harvard University, Newport, KY) **[170]**
- **The Neuroscience of Vipassana Meditation: Why and How?** Stephen Whitmarsh, Mark Leegsma (Computer Science, Radboud University, Nijmegen, Netherlands) **[145]**
- **Towards a General Theory of Self-Transcendence** Albert Garcia-Romeu (Institute of Transpersonal Psychology, Los Altos, CA) **[303]**
- **The Neurobiological Correlates of Meditation, Mindfulness and Trance States** Julio Peres (Institute of Psychology, University of Sao Paulo, Sao Paulo, Brazil) **[115]**

- **A Neurotheological Approach to Understanding James Joyce's Concept of Epiphany and Related States of Wajad and Turiya with Some Reflections on the Radhasoami Faith** Gur Pyari Jandial (English Studies/Faculty of Art, Dayalbagh Educational Institute, Agra, India) **[335]**

C16: Science and Spirituality

Wednesday April 11, 4:30pm to 6:35pm at Grand Ballroom, Salon I

- **Are Science and Spirituality Compatible? Bridging Chopra and Mlodinow's "War of the Worldviews"** Stanley Klein (Optometry, UC Berkeley, Berkeley, CA) **[61]**
- **Brain and Physiological Activity of Sender and Receiver During Local and Remote Periods of "Spiritual Transmission"** Arnaud Delorme, Dean Radin; Leena Michel; Rael Cahn; Cassandra Vieten (Ions (Petaluma), CERCO, UPS-CNRS, Paul Sabatier University, Faculte de Medecine, Toulouse, France) **[309]**
- **Cosmic Consciousness Hierarchization: Analytic, Experimental and Experiential** Prem Saran Satsangi, Vishal Sahni (Dayalbagh Educational Institute, Chrm, Advisory Committee on Education, Agra, Uttar Pradesh India) **[286]**
- **Perception, the Buddha-Nature and the Brain: A Challenge to Neurotheology on the Dynamics of Spiritual Meaning** Jonathan Weidenbaum (Liberal Arts, Berkeley College, New York, NY) **[341]**
- **Integration of Aparavidya, Paravidya and Personal Inner Experience for Consciousness Research** Ranjeet Kaur Satsangi, Dr. Sona Ahuja (Pedagogical Sciences, Dayalbagh Educational Institute, Agra, Uttar Pradesh India) **[284]**

Friday, April 13

C17: Phenomenal Concepts and Phenomenal Knowledge

Friday April 13, 4:30pm to 6:35pm at Grand Ballroom, Salon D

- **Phenomenal Demonstratives** David Pitt, (Philosophy, California State University, Los Angeles, CA) **[92]**
- **A Dilemma Concerning Phenomenal Knowledge** Jesse Butler (Philosophy and Religion, University of Central Arkansas, Conway, AR) **[22]**
- **Kripke's Stubborn Modal Argument** Daniel Shargel (Philosophy, CUNY Graduate Center, Brooklyn, NY) **[19]**
- **Should Physicalists Be Phenomenal Concept Theorists?** Pär Sundström (Philosophy, Umeå, Sweden) **[20]**
- **Consciousness and the Form of the World** Benj Hellie (Philosophy, University of Toronto, Toronto, Ontario Canada) **[7]**

C18: Philosophy of Perception

Friday April 13, 4:30pm to 6:35pm at KIVA Ballroom

- **Experiences of Absence** Anna Farennikova (Philosophy, University of North Carolina at Chapel Hill, Cambridge, MA) **[88]**
- **Speech Projectivism** Justin Olaguer (Philosophy, University of Houston, Houston, TX) **[91]**
- **Internalism and the Phenomenology of Perception** Chad Kidd (Philosophy, Auburn University, Irvine, CA) **[101]**
- **The Perceptual Consciousness of Moral Properties** Parker Crutchfield (Philosophy, Arizona State University, Tempe, AZ) **[87]**

C19: Foundations of the Science of Consciousness

Friday April 13, 4:30pm to 6:35pm at Grand Ballroom, Salon F

- **Consciousness in an Inactive Brain: How Neural Theory Permits Violations of a Dominant Assumption in the Science of Consciousness** Bernard Molyneux (Philosophy, UC Davis, Woodland, CA) **[106]**
- **Report Skepticism and the Neural Correlates of Consciousness** Benjamin Kozuch (Philosophy, Cognitive Science, The University of Arizona, Tucson, AZ) **[63]**
- **On the Metacognition of the Phenomenal Qualities of Experience** Ken Mogi (Sony Computer Science Laboratories, Tokyo, Japan) **[175]**
- **Integrated Information: Functional Consciousness or Biological Qualia?** Anthony Peressini (Marquette University, Milwaukee, WI) **[107]**
- **Visual Imagery in the Absence of V1 Activation** Berit Brogaard (Philosophy, University of Missouri, St. Louis, MO) **[118]**

C20: Disorders of Consciousness

Friday April 13, 4:30pm to 6:35pm at Grand Ballroom, Salon G

- **Cognitive and Non-Cognitive Reactions in Humans with Altered States of Consciousness** Panchalingam Suntharalingam, Dr. Clive Thursfield (Birmingham City University, Birmingham, West Midlands United Kingdom) **[300]**
- **Prenatal and Postnatal Exposure to Nicotine and Tobacco Smoke: Risk for Disturbances of Consciousness** Martha P Fankhauser, Richard J Harrington (Pharmacy Practice and Science, The University of Arizona Colleges of Pharmacy and Public Health, Tucson, AZ) **[169]**
- **Recovery of Consciousness (Early Psychological Neurorehabilitation)** Svetlana Gusarova, Natalia Ignatieva, Olga Maksakova (Rehabilitation, Burdenko Neurosurgical Institute, Moscow, Russian Federation) **[123]**
- **When the Body's Louder than the Brain: A Case Study of Trauma Processing by a Patient in Coma and Semi-Conscious State Utilizing Cognitive, Emotional and Sensory Resources of Significant Others** Candace Crosby (Missoula, MT) **[122]**
- **Getting Delusions Right** Verena Gottschling (Department of Philosophy, York University, Toronto, Ontario Canada) **[89]**

C21: Sleep and Dreams

Friday April 13, 4:30pm to 6:35pm at Grand Ballroom, Salon H

- **Dream Formation as a Psychological-Biological Self-Organizing Narrative** David Kahn (Psychiatry, Harvard Medical School, Cambridge, MA) **[165]**
- **Video Game Play As Nightmare Protection** Jayne Gackenbach, Mycah Darlington; Mary-Lynn Ferguson (Psychology, Grant MacEwan University, Edmonton, Alberta Canada) **[164]**
- **Sleep As An Inverted Consciousness** Simon Peimer, Jack Ringler MD (Berkshire Sleep Disorders Ctr., Berkshire Medical Center, Pittsfield, MA) **[114]**
- **The Coming of Aliveness in Felt Sensing and its Role in Experiential Psychotherapies** David P. Glanzer, Annmarie Early (Eastern Mennonite University, Harrisonburg, VA) **[302]**
- **Dreaming of World of Warcraft: Video Game Elements in Dreams** Eva Murzyn (Psychology, University of Derby, Derby, United Kingdom) **[166]**

C22: Space, Time and Scale

Friday April 13, 4:30pm to 6:35pm at Executive Board Room

- **Orch OR Model of Consciousness: Experimental Evidence Part I** Markus Maier (Psychology, University of Munich Germany, Munich, Germany) **[224]**
- **Information Fractalization in Consciousness and the Sentyon Postulate: From Brain Activity to Conscious Molecules** Erhard Bieberich (Instit. of Molecular Medicine, Georgia Health Sciences University, Augusta, GA) **[129]**
- **From Agile Business to Business in the Relativistic Realm** Arsh Dayal, Vishal Sahni (Faculty of Engineering, Dayalbagh Educational Institute, Agra, Uttar Pradesh India) **[208]**
- **Retrocausality: A Naturalistic Framework in Mental Monism** Peter Lloyd (Metronexco Ltd, London, England United Kingdom) **[104]**
- **Cerebral Bihemispheric Coherence and Source Localization for the Brains of People Who Experience Magnetic Field-Induced Sensed Presences** Kevin Saroka, Michael A. Persinger (Laurentian University, Behavioural Neuroscience Department, Sudbury, Ontario Canada) **[116]**

C23: Education and Consciousness

Friday April 13, 4:30pm to 6:35pm at Grand Ballroom, Salon E

- **Consciousness Studies in the Academy: Progress Report on Work Being Done at Mainstream and Alternative Institutions** Ed Sarath, Joseph Subbiondo, President, California Institute of Integral Studies; (University of Michigan, Program in Creativity and Consciousness, Ann Arbor, MI) **[361]**
- **Bringing Undergraduates to Consciousness** Robin Pappas (Center for Teaching and Learni, Oregon State University, Corvallis, OR) **[360]**
- **Adding Consciousness to Teaching Effectiveness Using a Systemic Approach** Sarup R. Mathur, Raj Kumari Kalra, Faculty of Education, Dayalbagh Educational Institute, Agra, India (MLF Teachers College, Arizona State University, Tempe, AZ) **[358]**
- **Puzzles about Consciousness for Kids of All Ages** Iris Oved, Students from St. Gregory School (The Paradox Center, Tucson, AZ) **[359]**
- **A Correlational Analysis of Physical, Mental, Emotional, Spiritual, Social and Self Consciousness** Sona Ahuja, Prof. Ranjeet Kaur Satsangi (Pedagogical Sciences, Dayalbagh Educational Institute, Agra, Uttar Pradesh India) **[94]**

C24: Nonlocality and Consciousness

Friday April 13, 4:30pm to 6:35pm at Grand Ballroom, Salon I

- **Using Remote Viewing to Describe Future Events: Eleven Experiments in Retrocausation** Courtney Brown (Emory University (Political Sc, The Farsight Institute, Decatur, GA) **[308]**
- **Photonic Measurement of Apparent Presence of Spirit Using a Computer Automated System** Gary Schwartz (Psychology, The University of Arizona, Tucson, AZ) **[313]**
- **Research on Mediumship and the Mind-brain Relationship** Alexander Moreira-Almeida (School of Medicine, Federal University of Juiz De Fora, Juiz De Fora, MG Brazil) **[305]**
- **Nonlocality, Intention, and Observer Effects in Healing Studies: Laying a Foundation for the Future** Stephan Schwartz, Larry Dossey, MD (Brain, Mind, and Healing, The Samueli Institute, Langley, WA) **[312]**
- **Quantitative Electroencephalographic (QEEG) Profiles of Remote Viewing (RV): 6 Week Randomized Control Study on Psychic (PSI) Development and Functioning** Mandy Scott, M.A. Persinger (Psychology, Laurentian University, Sudbury, Ontario Canada) **[314]**

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4.0 Physical and Biological Sciences

- **Internal Persuasion, Narrative Medicine, and the Neuroscience of Consciousness** Marianthe Karanikas (English, Missouri State University, Springfield, MO) **[260]**
- **The Invisible Bridge of Consciousness: Traversing Between the Mind and the Universe with Intuition** Sari Roth-Roemer, Ondre Seltzer (Arizona Medical Psychology, PLC, Scottsdale, AZ) **[262]**
- **The Role of Consciousness in the Origin and Evolution of Life** Allan Emren (Nuchem Research AB, Tollered, Sweden) **[264]**
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5.0 Experiential Approaches

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- **Spiritual Consciousness: The Real Path** Satgur Chetna, Aradhana Sawhny, Nirakh Bal (Engineering, Dayalbagh Educational Institute, Agra, India) **[277]**
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- **Interspecies Healing through Musical Storytelling** Yvonne Dardenne (Hayward, CA) **[294]**

- **Role of Ethical and Spiritual Values in Enhancing Consciousness** Madhulika Nemani, Nemani, Somayajulu; Cohly, Hari Har Prashad (Panacea Systems Inc., Johns Creek, GA) **[298]**
- **Evidences and Measurements of Consciousness from Science and Spirituality: An Analysis** Soam Prakash (Department of Zoology, Dayalbagh Educational Institute, Agra, India) **[299]**
- **Morphic Resonance and Inherited Memory: Healing from Trans-Generational Trauma Using the Systemic Family Constellation Process** Dan Booth Cohen (Systemic Constellations Conferences and Education, Inc., Needham, MA) **[301]**
- **Higher Levels of Consciousness** Hans Mohan (Electrical Engineering, Dayalbagh Educational Institute, Agra, Uttar Pradesh India) **[316]**

6.0 Culture and Humanities

- **Consciousness and the Conception of Salvation: A Comparative Analysis of Jainism and Radhasoami Religion** Poornima Jain (Sociology and Political Scienc, Dayalbagh Educational Institute, Dayalbagh, Agra, Agra, Uttar Pradesh India) **[318]**
- **Consciousness of the Self in T.S. Eliot's 'Ash-Wednesday' A Mystical Approach of the Poet** Namita Bhatia, Mr. Soami Das Bhatia (Facilitator,Theology, S.B.N. Girls P.G. College; Facilitator, Theology, Dayalbagh Educational Institut, Agra, U.P. India) **[319]**
- **Echoes and Reflections of Spiritual Consciousness in the Poetry of American Transcendentalists and British Romantics of the 19th Century** Santosh Kumari Srivastava (Women's Polytechnic, Dayalbagh Educational Institute, Agra, Uttar Pradesh India) **[322]**
- **Essence of Spirituality in the Ragas of Hindustani and Carnatic Music Systems** Gunti Binathi (Music, DEI Dayalbagh Educational Institute, Visakhapatnam, Andhra Pradesh India) **[331]**
- **Towards 'Spiritual Intelligence': The Bhagvadgita as a Narrative of Eternal Consciousness** Bani Dayal Dhir, Arsh Dhir, Prem Lata V (Department of English, Dayalbagh Educational Institute, Agra, Uttar Pradesh India) **[334]**
- **Consciousness & Spirituality** Tanoj Kumar, Manoj Seth (DEI Educational Institute Dayalbagh, Agra, Uttar Pradesh, India) **[336]**
- **Decision Support System for the Teachings of Bhagvad Gita and Radhasoami Faith** Dharampal Satsangi (Centre for Consciousness Studi, Dayalbagh Educational Institute, Dayalbagh, Agra, Uttar Pradesh India) **[337]**
- **Consciousness 'A Perspective' from the Point of View of the Youth Solution for World Peace Process** Guru Mehar Tatavarty (New Delhi, Delhi India) **[339]**
- **The Science of Consciousness Creation is a Manifestation of the Supreme Consciousness Evolution, Process and Divisions of Creation Religion of Saints Radhasoami Faith** Parmeshwar Rao Tatavarty (Mentor,Post Graduate Diploma, Dayalbagh University, New Delhi, Delhi India) **[338]**
- **Intuitive Consciousness or Consciousness in Plants?** Shikha Verma, Asha Juneja (Theology, Dayalbagh Educational Institute, Navi Mumbai, Maharashtra India) **[340]**
- **Echo and Narcissus: Phenomenol Experience for Whom?** Paul Nugent (Rensselaer Polytechnic Institute, Lenox, MA) **[342]**
- **Collective Consciousness** Gurpreet Satsangi, Satgur Chetna,Arti Saney (Science, Dayalbagh Educational Institute, Agra, India) **[343]**

P2: Friday Evening – Poster Session 2

at Grand Ballroom Foyer

1.0 Philosophy

2.0 Neuroscience

3.0 Cognitive Sciences and Psychology

4. Physical and Biological Sciences

5.0 Experiential Approaches

6.0 Culture and Humanities

ART/TECH/HEALTH DEMOS

A 1 – A 3

A1: ART/TECH DESIGN DEMOS

Wednesday April 11, 7:00pm to 10:00pm at Grand Ballroom, Salon B

- **The Mystery of the Wave Function (psi) Resolved** Hasmukh Taylor (Director of Yoga, Philosophy, Pranava Yoga, Orlando, FL) **[204]**
- **The Fundamental Energy Theory – FET (Specific Qualitative Vacuum Energies) and the Theory of Everything – A New Understanding of Reality** Steen Loeth, MD, Birgitta Therner; Arnold Therner; Andrea Moellenkvist PhD; Leif Pettersson (New Cosmic Paradigm NCP, Skoevde, Sweden) **[223]**
- **Contemplative Artistic Practice** Jeffrey Jon Gluck (Palo Cedro, CA) **[326]**
- **Curing Chronic Diseases by Rewriting the Life Calendar – Removing Subconscious Energetic Signatures Makes a Trauma Just an Experience** Folker Meissner (Chairman, German Academy for Energy Medicine and Bioenergetics, Koenigswinter, Germany) **[226]**
- **Getting Past Negative Thought Patterns through Holistic, Psychological and Meditative Techniques** Naama Kostiner (Haifa, Israel) **[279]**
- **Expanding the Nature of Storytelling** Rich Shapero (TFIM, San Mateo, CA) **[321]**
- **{event(dimension):}** Geneva Foster-Gluck, (Sugar Beast Circus, London, United Kingdom) **[325]**
- **The Road to MinDville: Consciousness goes to the Movies** Nick Day, Sascha Seifert (Conscious Pictures, Sebastopol, CA) **[323]**

A2: ART/TECH DESIGN DEMOS – VIDEO GAME PLAY & SECOND LIFE EXHIBITIONS

Wednesday April 11, 7:00pm to 10:00pm at Catalina Ballroom, Salon J, K. L

A2: Video Game Play:

- **Video Game Play as Nightmare Protection** Jayne Gackenbach, Mycah Darlington; Mary-Lynn Ferguson (Psychology, Grant MacEwan University, Edmonton, Alberta Canada) **[164]**
- **Transitional Spaces: Consciousness, the Imagination, and the Avatar-Mediated Experience** Denise Doyle (School of Art and Design, University of Wolverhampton, Wolverhampton, West Midlands United Kingdom) **[324]**
- **Pushing the Boundary: Dissociation and Virtual Worlds** Gregory Garvey, (Visual/Performing Arts/Game, Quinnipiac University, Hamden, CT) **[186]**
- **The Relationship Between Ego Development and Persistent Non-Symbolic Experience** Jeffrey A. Martin, Allan L. Combs, California Institute of Integral Studies (Hong Kong Polytechnic University, Harvard University, Newport, KY) **[170]**
- **Dreaming of World of Warcraft: Video Game Elements in Dreams** Eva Murzyn (Psychology, University of Derby, Derby, United Kingdom) **[166]**

A2: Second Life Exhibitions:

- **Exploration of A New Tool for Understanding the Dynamics of Consciousness** Richard Geer, Gerry Marr, MA, MFT; Linda Lott, RN.; Sonya R. Hardin, PhD, RN, NP-C, Professor of Nursing, University of North Carolina, Charlotte, NC (Star Journey/Cosmic Design Publishers, Walnut Creek, CA) **[216]**
- **Singularity Sanctum** Tonietta Walters (NoumenArt Center for Applied Aesthetics, Lyerly, GA) **[330]**
- **An Analysis of My Anomalous Experiences Spanning a Lifetime** Fiammetta Rubin (Naturopathic Educational Services, Philadelphia, PA) **[293]**

A3: ART/TECH AND HEALTH DEMOS

Friday, April 13, 7:00pm to 10:00pm at Catalina Ballroom, Salon J, K, L

- **Does Practicing Reiki Alter the Electromagnetic Field of Heart and Hands of Practitioners?** Ann Baldwin, William Lee Rand; Gary E. Schwartz (Physiology, The University of Arizona, Tucson, AZ) **[236]**
- **Cardiac Neurons Firing Preceding Cortical Neurons Firing by Variable Time Equivalent to Rp Before Conscious Act** Amna Alfaki, MD (Pediatrics, Omdurman Islamic University, Kharoutm-Omuduman, Sudan) **[138]**
- **The Use of Clinical Hypnosis in Palliative Care: The Experience in a Skilled Nursing Unit Care Home (SNU) to Discover the Benefits of Consciousness Expansion** Paola Brugnoli, MD (ICU/Anesthesia; AIST Italian Association for the Study of Pain Therapy & Clinical Hypnosis, Trento, Italy) **[292]**
- **Slicing Consciousness: A Pedagogical and Theoretical Integration of Consciousness Studies, Zen Buddhism, and Swordsmanship** Jesus Ilundain-Agurruza (Philosophy, Linfield College, McMinnville, OR) **[221]**
- **The Epiphany of Love – The Law of Vibrational Equality** Donna Trousdale (The Power of Synergistic Living, Santa Monica, CA) **[230]**
- **A Clinical Case of Insomnia Due to Tinnitus, Treated with Music Integrative Neurotherapy** Alexander Jon Graur (University of Torino, Pavarolo, Italy) **[258]**

TAXONOMY/CLASSIFICATION

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- 1.01 The concept of consciousness
- 1.02 Ontology of consciousness
- 1.03 Materialism and dualism
- 1.04 Qualia
- 1.05 Machine consciousness
- 1.06 Mental causation and the function of consciousness
- 1.07 The 'hard problem' and the explanatory gap
- 1.08 Higher-order thought
- 1.09 Epistemology and philosophy of science
- 1.10 Personal identity and the self
- 1.11 Free will and agency
- 1.12 Intentionality and representation
- 1.13 Miscellaneous

2.0 Neuroscience
- 2.01 Neural correlates of consciousness (general)
- 2.02 Vision
- 2.03 Other sensory modalities
- 2.04 Motor control
- 2.05 Memory and learning
- 2.06 Blindsight
- 2.07 Neuropsychology and neuropathology
- 2.08 Anesthesia
- 2.09 Cellular and sub-neural processes
- 2.10 Quantum neurodynamics
- 2.11 Pharmacology
- 2.12 Neural synchrony and binding
- 2.13 Emotion
- 2.14 Sleep and waking
- 2.15 Specific brain areas
- 2.16 Miscellaneous

3.0 Cognitive Sciences and Psychology
- 3.01 Attention
- 3.02 Vision
- 3.03 Other sensory modalities
- 3.04 Memory and learning
- 3.05 Emotion
- 3.06 Language
- 3.07 Mental imagery
- 3.08 Implicit and explicit processes
- 3.09 Unconscious/conscious processes
- 3.10 Sleep and dreaming
- 3.11 Cognitive development
- 3.12 Artificial intelligence & robotics

- 3.13 Neural networks and connectionism
- 3.14 Cognitive architectures
- 3.15 Ethology
- 3.16 Self-consciousness and metacognition
- 3.17 Temporal consciousness
- 3.18 Intelligence and creativity
- 3.19 Miscellaneous

4.0 Physical and Biological Sciences
- 4.01 Quantum theory
- 4.02 Space and time
- 4.03 Integrative models
- 4.04 Emergent and hierarchical systems
- 4.05 Nonlinear dynamics
- 4.06 Logic and computational theory
- 4.07 Bioelectromagnetics/resonance effects
- 4.08 Biophysics and living processes
- 4.09 Evolution of consciousness
- 4.10 Medicine and healing
- 4.11 Miscellaneous

5.0 Experiential Approaches
- 5.01 Phenomenology
- 5.02 Meditation, contemplation & mysticism
- 5.03 Hypnosis
- 5.04 Other altered states of consciousness
- 5.05 Transpersonal and humanistic psychology
- 5.06 Psychoanalysis and psychotherapy
- 5.07 Lucid dreaming
- 5.08 Anomalous experiences
- 5.09 Parapsychology
- 5.10 Miscellaneous

6.0 Culture and Humanities
- 6.01 Literature and hermeneutics
- 6.02 Art and aesthetics
- 6.03 Music
- 6.04 Religion
- 6.05 Mythology
- 6.06 Sociology
- 6.07 Anthropology
- 6.08 Information technology
- 6.09 Ethics and legal studies
- 6.10 Education
- 6.11 Miscellaneous

Abstracts are listed in order of subject-matter category.

1.0 Philosophy

1.01 The concept of consciousness

1 Consciousness and Behavior, Behaviorism Revisited Sara Bizarro <sarabizarro@yahoo.com> (Lisbon University, Lisboa, Portugal)

Behaviorism defended that scientific psychology should do away with concepts like the "mental" and "consciousness" and focus of observable behavior, these notions where not only defective because they weren't observable, but where considered unreliable fictions. The study of behavior would in time do away with the need for these archaic concepts. Today, "consciousness" and "internal mental states" are again a respectable subject matter of psychology and philosophy of mind, but just as before we seemed to "throw away the baby with the bathwater" by banishing "consciousness", now we might be doing the same thing in the other extreme, the concept of "behavior" is now being ignored. I will suggest that the notions of "consciousness" and "behavior" can be re-united in an original and fruitful way. **P1**

2 Phenomenal Consciousness, Self-Consciousness and Animal Suffering Jorge Goncalves <jorgalvesenator@gmail.com> (Philosophy of Language Instit., New University of Lisbon, Lisbon, Estremadura Portugal)

In this lecture I will confront Antonio Damasio's theory (exposed in his last book "Self Comes to Mind") with the criticism it received from Ned Block. The latter holds that Damasio does not distinguish the concepts of phenomenal consciousness and self-consciousness and this has two kinds of consequences. One is that it cannot satisfactory explain certain mental states (dreams, vegetative states); the other is that it has harmful consequences for animal ethics. I maintain that to compare the two theories we can only rely on our pre-theoretical intuition of consciousness. Thus, I argue that the Damasio's theory combines more with our intuitions. One of the reasons is that the cases that Block describes as "phenomenal consciousness without access consciousness (and without self-consciousness) are best explained as being cases of mind without consciousness. Damasio's theory can also explain those referred cases which are theoretically problematic. Moreover, Damasio has a threshold model (an expression of Barry Dainton), something that Block seems to ignore. This model fits well with the intuitions and neurological knowledge that we normally have on animal consciousness. Damasio's core self and his theory of emotions and feelings allows us to understand why we feel compassion for animals. Therefore we are able to develop an animal ethics, which does not mean that we are required to do so. So even though Damasio does not solve the mystery of consciousness, he should not be the subject of Block criticism's. References Block, N. (2010) What was I Thinking? New York Times November, 26 Damasio, A. (2010) Self Comes to Mind Pantheon **P2**

3 The Concept of "Geometrical Feeling" as a Basis for Consciousness Definition Michael Lipkind <michael@lipkind.info> (Molecular Virology, Kimron Veterinary Institute-Molecular Virology, Beit Dagan, Israel)

Irreducibility of consciousness to the established physical fundamentals, which is most expressively manifested by the free will and mental causation phenomena, looks like a violation of the physical laws (psycho-physical gap) that has led to proclaiming the 'Hard Problem' of consciousness (Chalmers, 1994). Thence, the consciousness' analysis beyond the strict physical grounds has become a challenge for induction of fresh counter-intuitive ideas. In this respect, the field concept characterized by the physical action-at-a-distance as opposed to the chain-like diffusion-based chemical reactivity is a new approach for consciousness theorizing. However, the existing field-rested theories of consciousness based either on the electromagnetic (EM) field, or on hypothetical abstract fields irreducible to the physical fundamentals have not saved the situation: The EM field-based theories cannot solve the "Hard Problem", while in the irreducible field-grounded conceptions, the proposed fields are vaguely (if at all) characterized, this leading to emasculation of the formal meaning of the field notion. The suggested theory of consciousness is based on the concept of an "extra ingredient" as a new basic fundamental additional to the existing physical fundamentals (mass, space-time, and charge), that is expressed by the postulated field strictly formulated as irreducible, vectorial, repulsive, anisotropic, and species-specific. The concept of "geometrical feeling" suggested as a novel "protophenomenal fundamental" is defined as a feeling of a non-congruence between the dynamic configuration of the postulated abstract field and its "physical realization" expressed by the respective actual distribution of the corresponding living system's intracellular molecular substrate "filling" the field-determined abstract form. Consequently, any cell of any living species possesses the "geometrical feeling" representing protoconsciousness, while the human brain potentially possesses the consciousness per se, and between these two poles there is the whole multitude of all the species with their own kinds and degrees of consciousness. Such phylogenetic development of consciousness is reflected by the respective ontogenetic (embryonal) development (primordial consciousness). Thus, the proposed "geometrical feeling" is considered as a basis for definitions of protoconsciousness, primordial consciousness, and the consciousness per se. The conception of the vectorial biological field by A.G. Gurwitsch (1944, 1954/1991) was a principal theoretical foundation for formulated axiomatics of the proposed novel fundamental. **P1**

4 Consciousness & Perception Manoj Seth, Tanoj Kumar <mks280@yahoo.com> (Marketing, Benara Metrab Ltd, Agra, Uttar Pradesh India)

The world's physical aspect eludes us completely and always will because of what it means to know and to be a "self" that knows. The external environment does not have an appearance yet our minds give it one. The world as it is represented in our minds is at times dull or colorful, soft or hard, heavy or light, large or small, noisy or quiet, hot or cold, far or near, fast or slow but these representations are nothing like what the external world is. We assume to know what the physical world is on account of our representations of it. We process representations of things, not the physical things themselves. We are imprisoned within our minds in such a way that the true quality of the physical world eludes us. We perceive only one aspect of the physical world and that is its functional aspect, which is intangible. Our notions and "selves" are isolated from the material world by being mental products of our brains. Our thoughts, the objects that we "see," the words that we hear or those we think and our "selves" are only just temporary computations in our brain. They are passing experiences in a virtual realm of representation. All the elements of our minds, our "selves" and our consciousness originate from the specificity of relationships in the physical brain. Notions held in patterns are in a virtual realm. All that we consider to be our thoughts, knowledge, perceptions and also every aspect of our "selves" are intangible patterns in the substrate. If the organization of the substrate is disassembled as happens in death, then thought, knowledge, perception and self all disappear because they only existed in the specificity of the brain's organization. The external world, as it is represented in the mind, also emanates from the organization of relationships in the brain. Representations of the environment in the mind cannot convey what the environment is. It is not possible for us to have a true notion of what it is to be physical. **P1**

1.02 Ontology of consciousness

5 The "Sharpness" of Consciousness and the Argument from Continuity Michael Blamauer <michael.blamauer@univie.ac.at> (Department of Philosophy, University of Vienna, Vienna, Austria)

In my presentation I will defend the intuition that consciousness is "sharp" – both ontologically and conceptually. By "sharpness" I mean that there are no borderline cases of consciousness. In this defense I will focus on two essential characters of conscious experience: (1) minimal selfhood and (2) phenomenology. Sharpness of consciousness is an essential premise of the Argument from Continuity (AC) with respect to the generation problem of consciousness, therefore AC will provide the scope of my presentation. AC is based on the assumption that evolutionary processes run smoothly, and hence that there are no developmental leaps in the process of increasing complexity from simpler life forms to persons like us (this with respect to phylogenesis as well as

to ontogenesis). The generation problemamounts to considering consciousness as a fundamental feature of reality (additionally to e.g. fundamental physical features) (Cf. Seager 1999, Chalmers 1997). By merging AC with the last assumption we arrive at the following argument: consciousness is an irreducible feature of our reality; conscious subjects like you and I are the descendants of much simpler life forms; because the evolutionary process runs smoothly, these much simpler life forms were already conscious subjects as well. More formally, the argument runs like this (Cf. Kraemer and Sayward 1980): P1: B's are the descendants of A's; P2: B's have X; P3: X is a fundamental property; P4: There has been a smooth transition from A's to B's; C: A's have X. This line of reasoning naturally pushes towards panpsychism in that it concludes that the origin of all things is the same and that consciousness must have already been present at the very beginning of the evolutionary process. The argument has been mentioned and discussed by several authors, both past and present (Cf. e.g. James 1890, Seager 1999, Strawson 2006). The simplest objections to this argument would be either (1) to argue that consciousness is a feature of subjects gradually gained in the process of their evolution which is tightly bound to the increasing physical complexity of their nervous systems or (2) to deny the smoothness of the process and assume that consciousness is a feature that suddenly appeared at some point in the evolution of man. Objection (1) implies that consciousness is vague; Objection (2) calls for a definition of the exact point at which consciousness appears on the world stage. Both objections point to a further implicit premise of AC: P5: Consciousness is neither vague, nor is its appearance arbitrary. After setting up this scope of discussion I will analyse and defend P5 with special focus on objection (1) and show that AC is sound (Strawson 2006 has already discussed the implausibility of objection 2). I will thereby argue that P5 is tied to two essential aspects of consciousness – minimal selfhood and phenomenology – which are both immune to thinking of them in terms of gradual growth. In my presentation I will especially focus on the character of "minimal selfhood". **C1**

6 The Knowledge Argument Redux Sam Coleman <s.coleman@herts.ac.uk> (Philosophy, University of Hertfordshire, Hatfield, Hertfordshire United Kingdom)

I present a novel theory of phenomenal consciousness: a representational theory of consciousness coupled with neutral monism. The key move is a distinction between consciousness and the qualities we apprehend in consciousness, a distinction I approach via a re-reading of the knowledge argument. Imagine that consciousness of a perceptual state is in fact implemented by having a higher-order thought (or percept, I talk in HOT terms for simplicity) that represents the perceptual state. Then Mary can know exactly what her consciousness of the rose's redness will consist in ahead of time, and needn't be surprised by this aspect of what happens to her. However, what will still clearly escape her scientific analysis (running the argument as Jackson intended) is the "quality" of the red that will figure in her conscious experience. It seems that noamount of purely physical information suffices to capture the quality of red. Thus the knowledge argument functions perfectly well as an argument against physicalism even in this revised form. Even when we allow that there might be a physicalist analysis of consciousness itself, there still appear to be elements of the world that escape physicalism. Specifically, the nature of phenomenal qualities – those qualities we apprehend in consciousness – elude the physicalist story. Mary won't be able to deduce what "experiencing red" is like, because she won't be able to deduce what "red" is like (construed as a property of experiences). As I interpret it, the knowledge argument redux suggests the ontological basicness of phenomenal qualities: they are irreducible to physical properties (as conventionally understood). If we now permit the idea that phenomenal qualities might exist without being experienced, we open the door to a neutral monist metaphysic. On this view the structural account of the world given by science, in particular physics, is filled out by irreducible intrinsic qualities, of the kind we apprehend in phenomenal consciousness. The material world, then, is a world of quality instantiations possessing causal/relational profiles as described by physics. These qualities can exist in non-mental contexts, as when constituting most of the universe's matter. But when suitably arranged as a brain, the qualities can become conscious. Thus in themselves they are neither mental nor physical, hence this is neutral monism. To complete the account we need a metaphysics of consciousness. It seems that consciousness will be implemented by some "relation" of qualities to other qualities. I survey two candidate relations. On a HOT model

consciousness will be implemented by higher-order representations of perceptual states. What gives this neutral monist HOT the advantage over physicalist versions is that it takes phenomenal qualities as basic, and only need explain the awareness of such qualities. Another relational theory of consciousness is inspired by James. The central notion is of a web of qualities constituting one's conscious field at a time. Co-consciousness is qualitative interpenetration: each quality instance featuring in the field carries traces of, or is informed by, the rest. This might help explain how the various qualities in phenomenal consciousness are "given together." **C1**

7 Consciousness and the Form of the World Benj Hellie <benj.hellie@utoronto.ca> (Philosophy, University of Toronto, Toronto, Ontario Canada)

In the contemporary materialism/dualism debate, both sides are partly right: materialists are correct that the content of the world is entirely material; dualists are correct that the world is not exhausted by its material content. Both are mistaken in thinking that the world is exhausted by its content: my stream of consciousness is not part of the content of the world, but is rather the unique form of the world. This Carnapesque doctrine has strong phenomenological support as well as a number of theoretical advantages over dualism: it respects transparency, provides for a coherent account of acquaintance, accounts for knowledge of other minds without collapsing into a priori physicalism, and does away with the unintelligible concept of a 'phenomenal property'. **C17**

8 Psi-Psychism: Explaining Consciousness Without Magic or Misrepresentation Colin Morrison <csdm1@o2.co.uk> (Cupar, Fife United Kingdom)

The existence of subjective experiences like blue, pain, sound, warmth, coldness, happiness, touch, etcetera is still regarded as a mystery by most scientists who have bothered to think about it. However, the majority of those scientists do not tend to treat it as a very important mystery as far as understanding the nature of matter is concerned because it is widely assumed that these mysterious phenomena are only produced by brains, and therefore contribute very little to the universe as a whole. On the other hand, those same scientists will usually accept that brains are composed entirely of ordinary matter – substances made of the same elementary particles as everything else – and that the processes by which they react to sensory inputs are fully understandable in terms of interactions between those elementary particles that also occur in most other material substances. Consequently, those scientists must believe that something "utterly astonishing" – something akin to pure magic – happens when those elementary particles come to be pushed around by electric signals coming from, say, an optic nerve: They must believe that nature recognises the biological origin of those signals and causes their variations to be accurately represented in an entirely new and appropriate phenomenon: blueness (or greenness or redness or greyness – but not pain or hardness or middle C). This paper takes the opposite – and far more scientific – view that all our experiences are themselves made up of suitable properties of elementary particles (just like the neural activity that gives rise to them), and that the adaptation of certain of these properties to encode certain data (colours for visual data, for example) is a product of evolution by natural selection. Although this view is exactly what a scientist should expect in our current state of knowledge, its implications are extraordinary: Not only does it require us to accept that there are almost certainly other consciousnesses in other parts of our brain, but it entails that the very elementary particles of which all matter is made are, in a literal sense, experiencing things (though not thinking about them like you and me). In this paper a theory is developed that identifies, for the first time, what those experiential properties of elementary particles do, and shows how human consciousness emerges as a bi-product of the way natural selection would adapt those effects. It provides a highly plausible explanation for the main unexplained features of our minds; and unlike other theories of consciousness, it does not require any magic or the denial of the very reality of the only things (subjective experiences) that we know for certain to exist. Most importantly, though, it is found to be possible to defend this explanation of consciousness by an argument that is entirely objective. That argument demonstrates that the proposed theory is more likely to be correct than any incompatible alternative position; and its objectivity ensures that this conclusion is not biased by intuition-based judgments. **P2**

9 Panpsychism, Emergence and Physicalism Anand Rangarajan <anand@cise.ufl.edu> (Computer Information Science, University of Florida, Gainesville, FL)

Panpsychism and emergence are two popular foundational approaches to the hard problem of consciousness. Both approaches appeal to many for precisely the same reason: they represent palatable alternatives to more exotic approaches such as (full blown) idealism and interactionist dualism while seeking a distance from most forms of physicalism deemed unsuitable for tackling the hard problem. Emergence typically assumes that consciousness "pops out", usually at a certain level of complexity, while panpsychism pushes experience all the way down because of the difficulty in locating such a level of complexity at which consciousness can be said to emerge. This description suggests that panpsychism and emergence are utterly at odds with each other. Despite this, recently efforts at rapprochement have begun, perhaps driven by their common affinity to physicalism. In this work, we begin by carefully delineating where panpsychism and emergence stand vis a vis physicalism with the expectation of not only aiding synthesis efforts but potentially going beyond both approaches as well. Most forms of physicalism face the problem that their accounts can proceed without being accompanied by experience. While philosophers such as Stoljar have suggested that the hard problem is a reflection of our ignorance of the physical ultimates, this is ultimately unsatisfying unless a positive account is given. Unfortunately, these ultimates, if they exist, are Rumsfeldian unknowns that are known to be unknown and we cannot expect to easily arrive at them. However, we can examine panpsychism and emergence for flaws in the hope that these will reveal the outline of the inscrutable ultimates. Panpsychism faces the combination problem – or the relationship of the macro-experiential to the micro-experiential, whereas emergence faces the complexity problem – or the specification of a level at which subjects pop out. When we examine both approaches for flaws, we find, much to our surprise, a common flaw: the inadequate treatment of compositionality. We find it very hard to conceive – most likely due to the unitary nature of experience – of macro-subjects composed of micro-subjects and we have found it difficult thus far to map a mid-level subject to a quantitative measure of complexity. We argue that both drawbacks are indicative of basic flaws in the treatment of compositionality. We began with the assumption that flaws in panpsychism and emergence provide clues to physicalist inscrutables underlying experience. If compositionality is related to such an inscrutable, then we can ask the following questions: Can a fundamental compositionality – accompanied by experience – be compatible with physicalism? In particular, does fundamental compositionality run afoul of causal closure and/or does it fit within a spatio-temporal process picture of physicalism? We examine possible answers to both questions taking care to demonstrate exactly how a fundamental compositionality forces us to modify standard pictures of physicalism. In closing, while it appears that panpsychism – with emergence pressed into service of the combination problem – may indeed become the standard bearer, an intriguing alternative – physicalism with a fundamental compositionality – is waiting in the wings to be fleshed out. **C1**

10 Varieties of Contemporary Panpsychism Keith Turausky <bickbyro@gmail.com> (University of Texas at Austin, Austin, TX)

After spending the better part of a century in philosophical exile, panpsychism has recently seen something of a resurgence in the philosophy of mind. With an eye toward the hard problem (i.e., the putative emergence of the mental from the physical), contemporary panpsychism holds that consciousness simpliciter —not self-consciousness, emotion, desire, belief, cognition, or even really awareness as known in the human case, but bare subjective experience—is a fundamental force of our universe, intrinsic to literally everything. The view remains highly controversial, reluctantly accepted even by some of its most prominent advocates. As such, panpsychism has not yet been robustly developed as a theory of mind. Indeed, it might not be apparent to all observers that there are at least two, and arguably three, distinct strains of panpsychist thought in philosophy today. Some views hold that consciousness is as inherent in matter as mass, while others are more restrictive, limiting subjective experience to either informational/computational or biological systems. In this presentation, I shall examine the similarities and differencesamong these views, as well as arguments for and against each. Special consideration will be given to what might be called the Chalmers/Strawson Divide: a cluster of important conceptual tensions between two

of the most influential voices in the nascent panpsychist "movement." Largely unexplored in the literature, these tensions microcosmically reflect larger debates in the philosophy of mind, and may pose a significant challenge to the project of establishing a consistent and viable theory of panpsychism. Finally, I will offer some tentative suggestions for the development of a more robust theory of panpsychism. **C1**

11 Galen Strawson and G.W.F. Hegel on the "In-itself," the "For-itself," and Consciousness Robert M. Wallace <bob@robertmwallace.com> (Oro Valley, AZ)

Galen Strawson's conclusion in his 2010 TSC talk, "A Metaphysics for Panpsychism," was that "the in-itself is the for-itself (Ansichsein ist Fuersichsein)," and consequently "panpsychism is true." In this paper I present G.W.F. Hegel's original conception of the relation between the "in-itself" and the "for-itself," Ansichsein and Fuersichsein, which are concepts that Hegel introduced and developed systematically in his "Science of Logic" (1812-1814). I show that if panpsychism is a doctrine about an ultimate reality conceived as a "stuff," Hegel is not a panpsychist, because he doesn't conceive of reality as a stuff. But his metaphysics of consciousness achieves what panpsychism achieves, and perhaps more effectively. Omitting the notion of an underlying stuff, as Hegel (following Plato, Aristotle, and Plotinus) does, enables him to avoid panpsychism's "problem of combination": how to relate the underlying stuff's "micro-psychism" to the experience of consciousness by macro-entities like ourselves. Rather than postulating a stuff that already somehow embodies the complexity of consciousness and object, Hegel (and Plato et al.) locate this complexity within reality's "proceeding from" and "returning to" simplicity. This proceeding, return and simplicity are implied already in the idea of reality, which (Hegel suggests) must be what it is by virtue of itself, and not by virtue of its relations to anything other than it. So it can't have parts, which as relata would be un-"real." How does this simple reality relate to the everyday "realities" (colors, objects, etc.) that are defined by their relationships to each other? To avoid being itself another relatum, it must include them. "Proceeding" and "return" are metaphors for how this inclusion works. The reality that is what it is by virtue of itself, rather than by virtue of its relationship to anything else, is what Hegel refers to as the "in-itself." He shows that in order to be what it is purely by virtue of itself, it must be self-related, or "for itself." As the process of "return," this self-relatedness involves consciousness. In this way, consciousness for Hegel, as for panpsychism, is a feature of reality as such. But rather than a fundamental stuff, this reality is the process of proceeding and return. Proceeding and return also explain the seemingly paradoxical irreducibility of "qualia". To reduce an experience to a mere brain state is to destroy it. But this is true of everything: "proceeding" always diminishes reality. Whereas "return," through conceptual specification and thought, increases reality. So experiences are no special mystery. Plato/Hegel "idealism" doesn't take mind or ideas to be the fundamental stuff (as, say, Berkeley does). Rather, it shows that it's only through consciousness, mind, and ideas that full reality, that which is what it is by virtue of itself, can be "returned to." This is a generally unrecognized systematic solution to the problem of consciousness. My presentation of Hegel in this paper draws on the detailed reading of Hegel's "Science of Logic" and "Encyclopedia" that I presented in my "Hegel's Philosophy of Reality, Freedom, and God"(Cambridge U. Press, 2005). **C1**

1.03 Materialism and dualism

12 Chalmers' Conceivability Argument, Health and the Cartesian Gods Felipe Gustavo Alves Moreira <felipegustavomoreira@yahoo.com.br> (Philosophy, Boston College, Brighton / Boston, MA)

My presentation will have three parts. In the first section, I will present David Chalmers' (2010) latest formulation of the conceivability argument. I will show that Chalmers distinguishes three ways to differentiate conceivability. According to him, conceivability can be (a) either prima facie or ideal, (b) either negative or positive, and (c) either primary or secondary. Furthermore, Chalmers also distinguishes possibility as primary (1) and as secondary (2). Chalmers uses all of these distinctions to formulate his conceivability argument. The latter stands formally as follows: (i) P&~Q is ideally negative / positive primary conceivable; (ii) if P&~Q is ideally negative / posi-

tive primary conceivable, P&~Q is 1-possible; (iii) if P&~Q is 1-possible, P&~Q is 2-possible; (iv) if P&~Q is 2-possible, materialism is false; thus (v) materialism is false. While P stands for the conjunction of all the microphysical truths of our world, Q represents an arbitrary conscious phenomenal truth. "Why show resistance to Chalmers' conceivability argument?" is the question I will raise and answer in the second section. Dawkins' (1993) account of faith as a disease will be my starting point in this section, and I will rely on passages of Rorty (1993) and Dennett (1992, 1998) to formulate four distinct notions of intellectual health, namely health as foundationalism, health as pragmatism, health as scientific conservatism and health as Sisyphean rationalism. Then, I will argue that it is plausible to believe that the reason one might have to argue against Chalmers may depend on assuming a concept of intellectual health as our health treatment. Finally, I will endorse health as Sisyphean rationalism and claim that one should show resistance toward Chalmers' conceivability argument because the latter is not the best philosophical way to guarantee this kind of intellectual health. In the third section, I will reject Chalmers' conceivability argument second premise. In order to do so, I will compare Chalmers' and Descartes' positions. I will show that there are three different conceptions of God in Descartes' works: evil God, mad God and good God. Evil God leads to skepticism, and mad God lead to the idea that man's epistemic conceivability powers will never completely capture the metaphysical facts. Only good God guarantees that one's clear and distinct conceivable epistemic ideas correspond to metaphysical facts. Chalmers does not argue for a good God, but he still needs something capable of accomplishing good God's task of guaranteeing the passage from epistemic conceivability to metaphysical possibility. According to Chalmers, modal rationalism could fulfill this task. However, my first goal is this section will be to show that by pragmatically adopting modal rationalism Chalmers seems to be pretending (or "making believe") that a good God exists. This decision makes Chalmers' argument appear to be like an unsuccessful attempt to achieve health as foundationalism. Thus, I will reject modal rationalism. My second goal in this section will be to show that by pretending that a mad exists one may take a philosophical stand more compatible with health as Sisyphean rationalism. **P1**

13 Unveiling the Mask: Three Centuries of Materialistic Mind-Brain Metaphors and Analogies Saulo Araujo <saulo.araujo@ufjf.edu.br> (Psychology, Juiz de Fora, Minas Gerais Brazil)

Materialism is as old as philosophy itself. In its most general sense, it is a metaphysical thesis according to which matter is the ultimate foundation of reality, i.e., everything that exists is material and can be materially explained. However, since there are several conceptions of matter, different forms of materialism emerged over time. The objective of this study is to analyze a kind of materialism present in contemporary philosophy and science, which argues for a brain-based explanation of consciousness and mental phenomena in general, promising for a near future the long-awaited solution to the mind-brain problem. However, a closer look at this new form of materialism reveals that, rather than a real explanation of these phenomena, it offers a series of metaphors and analogies that have been renewed since the eighteenth century. Accordingly, this new form of materialism seems to be only a new disguise for old hopes. **P2**

14 A Simple Proof of Mind-Body Dualism Marcus Arvan <marvan@ut.edu> (University of Tampa, Tampa, FL)

This paper provides a new argument for mind-body dualism, an argument that I (audaciously) take to comprise a proof. I show, first, that due to their structural nature, all physical facts and properties – no matter how complex – can clearly be described accurately in ordinary language, using ordinary words, at different levels of abstraction. I then show that phenomenal properties of consciousness are clearly not describable in ordinary language at any level of abstraction, but can only be pointed to or labeled. It follows that phenomenal facts and properties are a fundamentally different sort of thing than physical facts and properties: phenomenal facts and properties are simple, intrinsic, and beyond any possible physical description. Finally, I show that this argument is immune to any physicalist reply. **P2**

15 Psycho-Physical Dualism and Subject-Object Duality (A New Argument for Psycho-Physical Dualism) Stephen Barker <stephen.barker@nottingham.ac.uk> (Philosophy, University of Nottingham (Philosophy), Nottingham, Nottinghamshire United Kingdom)

I offer a new argument that mental states – qualitative states involving qualia and intentional (representational) states – cannot be physical or functional states of the brain/nervous system embedded in its environment. The argument emerges from general considerations about the nature of reality and the knowing-subject's relation to reality. In particular, I argue that what makes psycho-physical dualism so difficult to maintain is our assumed background metaphysical orientation to reality. This orientation is the ontological conception of reality. In ontology we are driven by Occam's Razor with respect to questions of existence. Occam's Razor is an explanatory principle. Ontology's explanatory project is to find the inherent natures, the basic building blocks, of all things. As such, ontology assumes a deep principle about reality, which I call PIN. PIN: If something exists it has an inherent nature. By "inherent nature" I mean the nature – be it intrinsic, relational, structural, or primitive – that makes a thing what it is. (Inherent nature is close to, but not identical to, essence.) If you accept PIN and the success of physics, then physicalism is deeply compelling. For you, the inherent natures of everything should be specifiable in physicalistic terms, and so psycho-physical dualism becomes unattractive. I argue that PIN is intimately linked to a conception of how the knowing-subject interacts with reality. The researcher thinking about reality, assuming PIN and engaging in ontology, is implicitly accepting a conception of how they cognitively interact with their subject matter. Roughly, they assume their cognitive system functions like a mirror. Less metaphorically, they assume: ER: A thinker O's capacity to think about entity/entities x depends on x (or things in terms of which x can be defined) having informational impact on O's cognitive system. ER and PIN go together like lock and key. You are committed to ER for all entities x quantified over iff you are committed to PIN for all such x. Here's the reason (in outline): If you accept ER then relative to the function of the cognitive system, all things are inherent to reality, and so, must in themselves have inherent nature. And vice versa. I argue that neither ER nor PIN is a necessary truth. I describe an alternative conception of cognitive function wherein ER doesn't always hold. In particular, it fails for thought about properties, that is, the semantic values of predicates and nominalisations thereof. Otherwise, ER holds. Call this alternative view Non-ER. If you accept Non-ER you are committed to a very different view of reality and mind. It's a substantial (non-deflationary) metaphysical position, according to which some beings have inherent nature and others don't, and nothing has ultimate inherent nature. Physicalism as an ontological position cannot be maintained because ontology as an explanatory project is undermined. Arguments for physicalistic reduction or elimination of the mental no longer work. We are committed to psycho-physical dualism but not of any familiar kind, since the ontological background in which dualism is typically maintained is absent. **C9**

16 How to be a Type-C Physicalist Adrian Boutel <aetb2@cam.ac.uk> (Philosophy, Christ's College, Cambridge, London, United Kingdom)

The paper advances a version of physicalism which combines the "a priori entailment thesis" (APET) with the analytic independence of phenomenal and physical vocabularies. The APET is the claim that, if physicalism is true, the complete truths of physics materially imply every other truth a priori. If the APET is true, physicalism implies the in-principle possibility of "cosmic hermeneutics": a Laplacian demon knowing all the truths of physics could deduce, by modus tollens, every other truth. Analytic independence is a popular physicalist explanation for the apparent "epistemic gaps" between phenomenal and physical truths. If the two vocabularies are analytically disjoint, Mary's inability to deduce phenomenal truths from her scientific knowledge, and the conceivability of zombies, can be explained without positing an ontological distinction between the phenomenal and the physical. It might appear that the physicalist cannot endorse both analytic independence and the APET, since the demon's deductions would require there to be analytic connections between the vocabularies. To show that the two theses are consistent, I begin by defending the APET in a way that, unlike several previous defences, does not appeal to analytic connections. I argue that implications from the complete truths of physics to phenomenal truths cannot be a posteriori. Such implications are – according to the physicalist – necessarily true. But

they cannot be Kripke-style a posteriori necessities, since – also according to the physicalist – the complete truths of physics fix any relevant a posteriori facts about the reference of terms. (The physicalist might claim that truths about reference are also implied only a posteriori by physics, but that merely introduces a further a posteriori necessity, starting a regress.) In the end, the physicalist's only alternative to accepting the APET is to endorse unpalatable "brute" a posteriori necessities. However, I then show how the physicalist can turn the tables. If physical facts do fix the facts about reference, the demon can exploit its complete physical information to bridge the gap between the two vocabularies, by deducing when phenomenal and physical terms co-refer. The demon can then proceed to infer phenomenal-physical identities by simple disquotation. The result is that cosmic hermeneutics could be possible even in the absence of analytic connections between phenomenal and physical vocabulary. This opens the way for a "type-C" physicalism which accepts in-principle deducibility (and so avoids brute necessities) while still appealing to analytic independence to explain why non-demons find it impossible to see phenomenal-physical connections a priori. The argument does not purport to establish physicalism; deductions by this method will only be possible if it turns out that phenomenal terms do in fact have physical referents. The argument also assumes (first against and then in favour of the physicalist) that reference is a physical matter. In the last section I suggest that the physicalist about consciousness can accommodate anti-physicalism about reference, by giving the demon knowledge of any non-physical truths about reference; its deductions can then proceed as before. **C9**

17 The 2D Argument Against Non-Materialism Richard Brown <onemorebrown@gmail.com> (City University of New York, LaGuardia, Brooklyn, NY)

The two-dimensional argument against materialism is at this point well known. What is perhaps less well known is the 2D argument against non-materialism. In this presentation I will discuss the 2D argument against non-materialism – as well as some common objections – and try to draw some meta-philosophical morals from the dispute. We start by conceiving of a world where there are creatures physically identical to you, or I, which are conscious in just the ways that you, or I, are but which are exhaustively composed of physical elements. I call these creatures 'shombies'. If shombies are conceivable then they are possible and if shombies are possible then non-materialism is false. The argument is valid and so seems to present a compelling case against non-materialism. Some philosophers use this argument to put pressure on the link between conceivability and possibility. If both shombies and zombies are conceivable, and only one can be possible, then conceivability is an imperfect guide to possibility. I don't take this strategy. I grant the link between conceivability and possibility. What this means is that is one of these cannot really be ideally conceivable. Zombies are, for many philosophers at least, prima facie conceivable. What about shombies? Shombies are at least negatively conceivable. There is no obvious contradiction in thinking that consciousness is purely physical. In addition it seems to me that we can coherently imagine a scenario where consciousness is physical and so there is a case that shombies are conceivable in the positive sense. We can, for instance, imagine a 2D analysis of 'consciousness' that treats it just like 'water', where it has a necessary secondary intension and a contingent primary intension. We can then extend the scenario to imagine that we come to be convinced that the primary intension actually picks out something physical (so it's 2-necessary that consciousness is physical). It is sometimes suggested that to conceive of shombies one must conceive of the possibility of a necessary truth, but this is mistaken. When we conceive of a shombie world we conceive of one possible world where there is consciousness, our physics, and nothing else. We do not have to conceive of that being true in all possible worlds. The necessity of identity is a further step in the argument, which relies on the truth of the axiom of identity. Finally, it is sometimes objected that the conceivability of zombies shows that shombies are inconceivable. But here we come to an impasse. One side insists that they really can conceive of zombies, the other insists that they really can conceive of shombies. Unless we are prepared to attribute irrationality (or disingenuousness) to the opponent we must assume that intuitions about conceivability are theory driven. The upshot is that we do not yet know a priori whether physicalism or property dualism is false. The way we will come to know is a posteriori even if, ultimately, an ideal reasoner with all of the relevant facts and true theories could know it a priori. **C9**

18 Why it Doesn't Matter to Metaphysics What Mary Learns Martin Roth, Robert Cummins; Ian Harmon <martin.roth@drake.edu> (Drake University, Des Moines, IA)

The Knowledge Argument of Frank Jackson has not persuaded physicalists, but neither have their replies dispelled the intuition that someone raised in a black and white environment undergoes a genuine cognitive gain when she emerges and sees colors for the first time. A satisfying response to the Knowledge Argument and its kin thus requires an account that explains how genuine cognitive gain can result from having a new kind of experience or phenomenology, but in a way that makes it clear why the explanation of the gain has no interesting implications for the metaphysics of consciousness. This paper proposes such an account: Mary's cognitive gain is the result of a common phenomenon in which something new is learned as the result of finding oneself in a position to exploit a representational resource in a way that was not previously possible. To show this, we first describe a cognitive gain scenario – learning what Beethoven looks like – in which the cognitive gain is achieved by seeing a black and white picture of him. Crucial to the scenario we describe is that accessing the picture does not involve or require introducing any kind of experience or phenomenology that pre-release Mary lacks. We next show that the cognitive gain in this scenario is genuine: in using the picture to learn what Beethoven looks like, one accesses representational contents that cannot be accessed via other kinds of representations. This follows from the thesis of representational specialization: because different schemes of representation have different propriety contents, representations from different schemes are not inter-translatable. Although we can describe a picture, and we can draw a picture from a description, information is lost in converting one format to the other. We then address the case of Mary and argue that, while her first seeing red does involve a new kind of experience or phenomenology, this may be significant to cognitive gain only insofar as it provides or involves opportunities for exploiting representational resources that she has never exploited before. To think that the new experience or phenomenology associated with Mary's cognitive gain has implications for physicalism, we have to assume that you can limit experience in certain ways without limiting knowledge of the physical. This might seem plausible if you assume (i) that limiting experience isn't limiting representational resources or opportunities to exploit them, or (ii) that the physical must be fully representable with limited representational resources and opportunities. Assumption (i) is implausible. Moreover, (i) is not available to the advocate of the Knowledge Argument, since that argument assumes that Mary gains new knowledge on emerging from her chromatic quarantine, and this is surely because she then able to exploit her ability for color vision to generate representations she could not previously generate. Assumption (ii), as the history of science shows, is hopeless in its full generality: our access to the physical has depended essentially on the development of new representational resources (fractal geometry, telescopes) and new opportunities to exploit them (electron microscopy, the Hubble telescope). **P2**

19 Kripke's Stubborn Modal Argument Daniel Shargel <shargel@gmail.com> (Philosophy, CUNY Graduate Center, Brooklyn, NY)

William Lycan (1974) argued that Kripke's modal argument relies on the claim that awareness of pain is essential to pain. Defenders of standard higher-order theories of consciousness such as Lycan and David Rosenthal consider the awareness of pain to be a property distinct from pain itself. Lycan concludes that Kripke's argument falls apart once the possibility of unconscious pain is accepted. By making such a focused critique, Lycan can defend materialism without disputing the rest of Kripke's popular metaphysical and linguistic proposals. I will argue that Kripke's argument is more durable than is widely acknowledged. The higher-order critique is successful against Kripke's argument as he presented it, but it is possible to adjust his argument so that it is compatible with the possibility of unconscious pain. As a result, this line of attack is not adequate to defeat Kripke's argument. I will argue that it cannot be defeated without a fundamental critique of his views from Naming and Necessity. According to Kripke, when an individual claims to imagine the occurrence of A without B, he or she might really be imagining the epistemic mediator of A occurring without B. However, since pains lack an epistemic mediator, the ability to imagine pains without c-fibers shows that pains are not c-fibers. Lycan argues that, Kripke's claim to the contrary, pains do have epistemic mediators, so the Modal Argument is neutralized. Even if

Lycan is right that pains are epistemically mediated by higher-order states, Kripke could redirect his attack to those mediators. What about the awareness of pain? According to materialists it too is identical with some type of physical state or other. Let's call those physical states D-fiber firings, for lack of a better term. The identification of awareness of pain with D-fiber firing raises problems parallel to those we had with pain and C-fiber firing. It seems as though we can imagine having an awareness of pain without any D-fiber firings, which gives us a prima facie reason to deny that awareness of pain really is D-fiber firings. So the question arises, is awareness of pain itself epistemically mediated? Materialists face a dilemma. If they hold that awareness of pain is not epistemically mediated then Kripke immediately wins. If you seem to imagine having an awareness of pain without having D-fiber firing, then that really is what you imagine, and it really is a possibility. The other option is to claim that our awareness of pain is also epistemically mediated. Perhaps it is mediated by a third-order representation. This proposal only postpones defeat. The same move that Kripke makes concerning pain, and could make concerning awareness of pain, he could make yet again for third-order awareness of pain. Either third-order awareness has no epistemic mediator, or it does have one. In one direction lies immediate defeat, and in the other a vicious regress. **C17**

20 Should Physicalists be Phenomenal Concept Theorists? Par Sundstrom <par.sundstrom@philos.umu.se> (Philosophy, Umea, Sweden)

According to physicalism, consciousness reduces to some physical phenomenon. But if this is so, why does this reduction seem to us more problematic than other theoretical reductions (like the reduction of water to H2O, of liquidity to loose molecular bonding, or of heat to rapid molecular motion)? Why do we find in the case of consciousness, but not in the other cases, an "explanatory gap", or "intuition of distinctness," or "appearance of dissociability" or "conceivability of distinctness"? One possibility is that we find the reduction of consciousness problematic because we currently lack an adequate understanding of consciousness and its physical basis. We don't yet understand these phenomena well enough to appreciate the transparently necessary connection between them (Nagel 1974, McGinn 1989, Stoljar 2006). The "phenomenal concept strategy" (Loar 1990/1997, Hill and McLaughlin 1999, Balog 1999, Papineau 2002) offers an alternative suggestion. It urges that our current understanding of consciousness and its physical basis is adequate. Or at any rate, the worrying peculiarities about the reduction of consciousness (the explanatory gap etc.) are not accounted for by whatever understanding we might lack at that level. Instead, we find the reduction of consciousness problematic because of our special, first-personal "concepts of" consciousness. While these concepts are adequate to the phenomena, they are special and it is their special character that accounts for the worrying peculiarities of the reduction of consciousness. I argue that the phenomenal concept strategy is not promising. The argument takes the form of a dilemma. I assume (provisionally) that enlightened people currently know the "entire essence" of whatever physical phenomenon consciousness turns out to reduce to, "if" physicalism is true. (The assumption is provisional, and turns out to be dispensable.) Given this assumption, the dilemma is, in brief, that a phenomenal concept theorist cannot (a) happily accept, nor (b) happily deny that phenomenal concepts are associated with knowledge of the "entire essence" of consciousness. (a) is ruled out because there is reason to believe (from other cases) that in that case the reduction of consciousness would be "transparently necessary". (b) is ruled out because there is reason to believe (from other cases) that the reduction of consciousness would in that case be (not transparently necessary but) "unobjectionable". It is crucial to the dilemma that our first-personal concepts of consciousness are "correct" in the sense that they contain no error. But for present purposes this is unproblematic to assume, as it is an essential component of the phenomenal concept strategy (see above). Concerns closely related to the dilemma are addressed in some defenses of the phenomenal concept strategy (e.g, Loar 1997, McLaughlin 2001, Balog 2012). But the dilemma is not avoided by any suggestions made in these passages. Or so I argue. The dilemma is directed at the phenomenal concept strategy, not at physicalism. Other versions of physicalism may still be promising, as far as this argument goes. **C17**

21 Introspective Invariance and Introspective Ignorance: Undermining the Modal Arguments for Dualism Kenneth Williford <williford@uta.edu> (Philosophy, The University of Texas at Arlington, Arlington, TX)

I assume that our concept of a real kind is adequate to the extent that it captures the kind's essential features and that phenomenal consciousness is a real kind. I argue that the concept of phenomenal consciousness is arrived at via generalization from introspection. Roughly, we notice what generic or determinable features of consciousness appear in all our introspected conscious experiences, and we take this invariance as a prima facie mark of their essentiality. Candidate essential features include intentionality, temporality, subjectivity, qualitative character, and unity. Although the essentiality of each (save perhaps qualitative character neutrally construed) has been challenged, it is certainly understandable how one might find it difficult to conceive of consciousness without them. There is thus a close relationship between introspected phenomenological invariance and our modal intuitions here. If a property of consciousness seems introspectively invariant, it will be hard to conceive of consciousness without it. If a property does not invariantly appear to introspection (or invariantly fails to appear), it will be easy to conceive of consciousness without it. I argue that this relationship between invariance and conceivability explains why it is so easy to conceive of zombies, etc. Since introspection does not reveal brain processes (etc.), we have no problem conceiving of consciousness existing apart from them and vice versa. But we can be confident that conceivability implies possibility here only if we have good reason to believe that our concept of consciousness captures all of the essential features of consciousness. But given that our concept of consciousness comes from our introspective grasp of its apparently invariant features, we can be confident that the concept captures all of the essentials only if we can be confident that all of them are introspectively accessible. I argue that that they are not all introspectively accessible. Briefly, if we have introspective access to all of consciousness's essential properties, then we have access to the categorical grounding property in virtue of which we have such access; but we do not have introspective access to this grounding property; therefore, we do not have access to all of consciousness's essential properties. Therefore, there is at least one introspectively inaccessible essential property of consciousness. Now, if the accessibility of all of the essential properties of consciousness is not itself grounded in an essential property of consciousness, then it is possible that some conscious beings contingently have such access while some do not. But this would also undermine the conceivability-possibility principle in this domain, for we have good reasons for thinking that we do not in fact have such access and no good reasons for thinking that we do. Hence, given our account of their phenomenological origins, we cannot trust our modal intuitions about consciousness when it is a matter of properties that we have no introspective access to. I close by noting our systematic tendency to regard introspective absence of appearance as the indication of a real absence (cf. Armstrong 1968); this is what gives our modal intuitions here their illusory strength. **C9**

1.04 Qualia

22 A Dilemma Concerning Phenomenal Knowledge Jesse Butler <jbutler@uca.edu> (Philosophy and Religion, University of Central Arkansas, Conway, AR)

Understanding the nature of phenomenal consciousness is a central goal of contemporary study of the mind. Through numerous developments, it has become increasingly clear that achieving this understanding is directly dependent upon understanding what kind of knowledge, if any, we have of phenomenal consciousness. I argue that we currently face a dilemma with regard to this knowledge. Owing to the pervasive failure to understand phenomenal knowledge in terms of already-recognized kinds of knowledge (propositional, ability, and acquaintance knowledge), I claim that we have reached a dead end and must either a) eliminate the concept of phenomenal knowledge and the host of concepts and issues it has given rise to in the debates surrounding consciousness or b) develop a clear conceptualization of phenomenal knowledge that is irreducible to other kinds of knowledge and captures the unique epistemic character of our presumed knowledge of phenomenal consciousness. More formally, the argument I propose is as follows: 1) Phenomenal knowledge (PK) either falls under an existing model of knowledge (M) or it does not (~M). 2) If M, then

PK is a kind of propositional knowledge, ability knowledge, or knowledge by acquaintance. 3) If ~M, then PK either does not exist (~E), or exists as a unique kind of knowledge that is categorically distinct from other kinds of knowledge (E). 4) PK is not adequately understood through any of the existing models of knowledge. 5) So, ~M. 6) So, either ~E or E. 7) If ~E, then PK should be eliminated from philosophical and scientific discourse concerning the mind. 8) If E, then PK requires a new model of knowledge that adequately characterizes its unique epistemic properties, as distinct from propositional knowledge, ability knowledge, or knowledge by acquaintance. Clearly, premise 4 is the most contentious component of the argument, so the core of my presentation will be devoted to its defense. I will also address the pros and cons of the two horns of the dilemma, giving some (noncommittal) preference for the second. **C17**

1.05 Machine consciousness

23 Towards Machine-Generated Stream of Consciousness. An Explanation How Non-reductive Consciousness can be Engineered as Long as it is a Natural Process Piotr Boltuc <epetebolt@gmail.com> (Philosophy, University of Illinois, Springfield, Springfield, IL)

If the stream of consciousness is a function of animal brains, we should be able to understand how brains generate consciousness. Detailed understanding of how consciousness gets generated would require specifications of that process. With such specifications, we should be able to undertake a project of engineering a machine with sufficiently similar specifications to be able to generate the stream of consciousness. It is too early to say whether such machines would need to be carbon-based, and therefore bioengineered, or whether they could be developed in other substances, such as silicon, but it is clear that stream of consciousness is not a computational function. Hence, stream of consciousness is not a program, as AI experts tend to presume, though we may be able, eventually, to program a robot able to build a generator of consciousness. The above engineering approach to first-person consciousness holds whether consciousness is based on quantum effects, microtubulae, thalamic oscillations, dialogue of hemispheres, what not. Even if brains are just receptacles of consciousness spread in nature (or cosmic energy) Chalmers-style such receptacles could also be engineered. The only view incompatible with the engineering thesis is the soul theory of consciousness. **P1**

24 The Koch Tononi Test of Consciousness: A Better Turing Test? Michael Cerullo, <cerullmc@ucmail.uc.edu> (Psychiatry and Neuroscience, University of Cincinnati, Cincinnati, OH)

In a recent article Christof Koch and Giulio Tononi proposed a new series of tests to decide whether a computer experiences consciousness. The tests, which we will call the Koch Tononi Test (KTT), involve complex image recognition. One version slices an image into several parts, randomly shuffles them, and then asks how the image fits back together. Another version requires finding an object inserted into a scene out of context or incorrectly placed. If the computer fails at the task then it is judged to lack consciousness while an entity that passes the test (human or computer) is presumed to have conscious experience. The authors stress the KTT's simplicity and speed compared to the traditional Turing Test (TT). The KTT is very similar to a form of Reverse Turing Test (rTT) familiar to anyone using the internet: The Completely Automated Public Turing test to tell Computers and Humans Apart, better known by the acronym CAPTCHA. The most common CAPTCHA requires the user to correctly type a set of fuzzy numbers and letters to prove they are real (conscious) humans as opposed to spamming software. However, there are several versions of CAPTCHA that involve visual recognition tasks very similar to those proposed by Koch and Tononi. For example, one CAPTCHA, called 'click the cat,' requires choosing an image of a cat out of a series of pictures. Another, IMAGINATION CAPTCHA, requires the understanding of semantic information from a group of distorted images to discern where one image begins and another ends. CAPTCHA tests are becoming increasingly more difficult as spamming software improves and serve as a good incentive to improve AI. One could well imagine the KTT being the next generation of CAPTCHA in the not too distant future. Yet it seems unlikely the KTT will be the ultimate unbeatable weapon in this arms race. The history of CAPTCHAs suggests that once an rTT is operationalized programmers seem to be able to beat the test. The

software developed will be similar current specialized programs (e.g. the chess program Deep Blue) and will seem a poor candidate for conscious (or at least human level consciousness). Given these limitations of the KTT a natural expansion would be to increase the complexity of the test. Users would have to use increasingly sophisticated semantic knowledge to correctly answer the increasingly complex questions and could be asked more questions based on their answers. Taking the limit of this process of increasing complexity we are left with a modified version of the original TT. The only difference is that users will now have a more modern hypertext interface rather than the original basic text screen envisioned by Turing as they try to convince the judge they are conscious. Again taking the limit of complexity in the KTT the series of increasingly complex test programs will need to be replaced by a human judge. Therefore the KTT is not an improvement on the original TT and when expanded to be a better test becomes equivalent to the TT. **P2**

25 You Might Be Smart But You're Not Conscious; The (Artificial) Intelligence Fallacy of Attributing Mentality Ida Hallgren <idahallgren@hotmail.com> (Department of Philosophy, University of Gothenburg, Gothenburg, Sweden)

Mechanisms used when attributing mentality produce perceptions of certain entities as conscious. Short exposure to interactive computer programs may produce an illusion where the user perceive mentality and contemplation of computers many times smarter than ourselves may evoke fear of how these super-computers would treat us humans (Copeland, 1993). Concern has also been voiced regarding the treatment of and moral status of Artificial Intelligence (Bostrom & Yudkowsky, forthcoming). I will argue here that such moral concern for AI is a result of an over-attribution of conscious states triggered by context-dependent perspective taking. It is conceivable that features commonly associated with intelligence, e.g. language, abstract thinking, and rationality, could appear in artificial systems without any associated conscious experience. In other cases we have reasons to ascribe conscious experience, and some degree of moral status, to creatures lacking complex intelligence. The double dissociation between intelligence and conscious experience shows how attributing intelligence is not a good reason for attributing mentality, yet this is the association we tend to make. Empirical evidence points to increased tendencies of taking the perspective of "the other" when primed in a low-power perspective (Galinsky et al. 2006). In arguing for the strength of such tendencies one may also borrow support from Hume's intuitions about the activation of sympathy being enhanced when we consider people whom we perceive from a lower-power perspective. Reflecting on intelligent systems seems to produce an automatic response where we over-attribute mentality to smart machines. Such beliefs will also gain additional force from the development of human-like robots, likely to trigger our neural person-networks (Farah & Heberlein, 2007). Our reasons for committing to attributions of mentality to intelligent artificial systems should be critically examined. Future super-smart systems will not somehow automatically and mysteriously gain conscious awareness. Until there is evidence for the possible existence of conscious rather than intelligent artificial systems we will have no reason to worry about moral treatment of robots. The willingness to attribute moral status to robots is a symptom of the fallacy described here. **P2**

1.06 Mental causation and the function of consciousness

26 Redressing the Notion of Function for Consciousness Studies Bhausaheb Biradar, Narayanan Srinivasan <bhausaheb@iitb.ac.in> (Centre of Behavioral and Cogni, Centre of Behavioral and Cognitive Sciences, Allahabad, Allahabad, Uttar Pradesh India)

The present notion of function in natural sciences is interwoven with and parasitic upon the physical and physical structure, thus disallowing any talk of the former sans the later. Such characterization of function renders intractable the problem of finding a function of consciousness such that consciousness makes sufficient evolutionary sense. This paper has a twofold aim. In the first part we argue why the present notion of function is inadequate for the enterprise of consciousness studies, while also making a meta-scientific point about the narrowly constituted notion of function in natural sciences. In the second part of the paper we offer a revised and principled notion of function, delineate its defining characteristics and argue for its general superiority

over the present notion of function. We then show how the mystery of evolutionary function of consciousness is immediately rendered intelligible in light of the revised notion of function. **P1**

27 Conscious Intention: A Response to Wegner's Theory of Apparent Mental Causation Hannah Bondurant <hannahbondurant@gmail.com> (Wildwood, MO)

Cognitive science has recently supported and popularized the idea that perhaps free will is an illusion. With his theory of apparent mental causation, Daniel M. Wegner in particular proposes that our beliefs about intention and the control we exert over our actions are actually based upon other factors and usually occur retroactively. Since many of our actions are determined and preformed outside of awareness, the cause of said actions could then be difficult to locate. Part of Wegner's argument lies in his assumption of brain activity and corresponding behavior as conscious and controlled or outside of awareness and unintended. I propose that consciousness and control are two different categorizations in how we define processes, with the former containing various levels that are possibly irreducible. This could allow us to retain our sense of free will in spite of current research as we can still be considered the guiding force in our actions, even if done so unconsciously. Implementation intentions and cognitive-behavioral therapy are empirical examples of willing conscious thought to eventually overtake an unconscious, unintended reaction. This does not mean that our sense of awareness is unnecessary or extraneous. Additional studies, such as those involving brain waves, demonstrate that people can cause a change in the body with conscious attention. These findings raise concern for physicalists. Many cognitive scientists believe in the mental supervening on the physical. When the effect of consciousness and intention can be seen both in brain scans and behavior, the physicalist must account for the cause. Reducing human qualities such as creativity and rational thinking to mere neurological firings seems too far a stretch for even the cognitive scientist. While the cause of one's action is not a homunculus, it may be more than just the pathways within the brain. To assume such only looks at the human being on a micro level and ignores the individual. **P1**

28 How Does Mental Causal Power Emerge from Physical Realization? Yao Wen Hsieh, Allen Y. Houng <zechsxie@gmail.com> (National Yang-Ming University, Institute of Philosophy of Mind and Cognition, Taipei City, Taiwan)

The sense that our mental states are capable to cause other thoughts and actions is our natural intuition and it guides our everyday thinking and activities. However, how the mental causation to be possible while presupposing physicalism still remains an unsolved puzzle. The most famous argument to reject the idea of mental causation is Jaegwon Kim's well-articulated "Causal Exclusion Argument." In this argument, Kim clarifies that mental properties are not higher-level, but higher-order, properties. That means mental properties are not constructed, but abstracted from their underlying physical properties. Consequently, he concludes that mental properties can be and should be reduced "functionally" to physical properties and possess no genuine causal power. This conclusion is obviously against our common sense of mental causation. And furthermore, as Kim himself admitted in his book, his theory is impotent to deal with the problem of qualia. There are many philosophers trying to reject Kim's argument and save mental causal power. What they are looking for is a theory that can preserve (or reduce) mental causation and meanwhile explain the mind-body relation and reply to the question about qualia. Nevertheless, there has not been any decisive theory that can fulfill this goal. One of the most promising and comprehensive theories is the one suggested by Sydney Shoemaker in his 2007 book, Physical Realization. He uses a "Subset Account" to explain the relation between a realized property and its realizers. His theory plausibly declares that mental properties have their own particular causal profiles. The theory can also provide us a clear picture about how a mental property being realized by its composing microphysical states of affairs. But in my opinion, Shoemaker's theory still cannot give a good account of the special characters of qualia. He argues that qualia have their own causal profiles can be inferred from the fact the relation of qualitative similarity and differenceamongst experiences are functionally definable. However, I think this notion is too rough to convince most philosophers and it needs more elaboration. To support that mental states, including qualia, genuinely have causal power, I hold an emergentist view. Shoemaker makes emergent properties to be compatible with his theory by introducing a kind of micro-entities, which have latent power. Emergent properties are not predictable before their realizers combined together just because their composing entities have that latent power, according to Shoemaker. I do not think this claim actually solves the problem. Thus, here I will argue that only when we put structural properties and system complexity into consideration can we begin to understand emergence. I will modify Shoemaker's theory by integrating structural properties into it, and make it support emergent theory in a more explicit way. I think this modified theory not only preserves all the merits of the original theory about saving mental causal power, but also gives us a better understanding about how the plentiful characters and the novel causal power of qualia could be emerged. **P2**

29 Towards a Better Understanding of 'Causation' and 'Explanation': An Analytical Approach to the Most Prominent Positions within the Philosophy of Mind II Richard Koenig, Alexander Mirnig <richard.koenig@stud.sbg.ac.at> (Neurodynamics and Signaling, University of Salzburg, Salzburg, Austria)

There is a considerable variety of different philosophical positions pertaining to the mind-body problem within the science of consciousness research (e.g. eliminativism, analytical functionalism, interactionism, epi-phenomenalism and else). A clear and understandable categorization of these positional approaches might be very helpful to promote the communication and identification of the essential features that discriminate the different views behind these approaches. We have previously presented a new framework for categorizing the landscape of philosophical aspects based on elementary set theory and first order predicate logics (see TSC, 2011, Stockholm). Here we expand this work, adding two further steps to our previous concept. First, we provide a closer inspection of causality claims between neural and mental processes. We focus on statements such as '...causally produced by...', '...downward causation...' or '...causal interaction...'. Based on a Bayesian causal graphic approach as previously suggested by Pearl (2009), we make suggestions how empirical correlations might become causally interpretable and demonstrate the necessary conditions, e.g. causal Markov conditions, for this intention. The second step involves a systematic discrimination of so called 'explanations of consciousness' and we attribute different values to explanatory approaches in general, validating their usefulness in the view of their formal correctness and general tenability. Causal inference in statistics: An overview. Judea Pearl (2009), Statistics Surveys 3 (September) pp. 96-146; Towards a Better Understanding of 'Consciousness': An Analytical Approach to the Most Prominent Positions within the Philosophy of Mind. Conference: Toward a Science of Consciousness 2011, Stockholm University, Sweden **P2**

30 Subjective Duration Geoffrey Lee <geoffrey_lee@berkeley.edu> (UC Berkeley, Philosophy, Berkeley, CA)

There is much anecdotal evidence that time can appear to slow down (or speed up) for an individual under unusual circumstances such as extreme stress. We also know that duration illusions, such as those associated with the "Oddball" effect, can be produced in a laboratory setting (e.g. Tse et al (2004)). To adequately formulate empirically testable theories of these phenomena, and to understand the experience of duration and time's passage philosophically, we need to clearly articulate the different senses in which duration experience might be warped, or contain a subjective element that is independent of the objective durations of events being perceived. I'll discuss the relationship between various different ways of conceiving of "subjective duration". It is tempting to think of the stream of consciousness as literally flowing by at a certain rate, with subjective duration as the relevant measure of flow. On this picture, a duration illusion would consist in a temporary warping in the fabric of consciousness, resulting in material flowing more quickly or slowly through the window of awareness than it would normally. I will explain why this is a bad picture of what is happening, and how to better conceptualize the phenomena in question. Tse, P. U., Rivest, J., Intriligator, J. and Cavanagh, P. (2004). Attention and the subjective expansion of time. Perception & Psychophysics, 66(7), 1171-1189. **PL10**

31 Consciousness in Decision Making in Business Gaurav Sharma, Mr. Shobhit Maheshwari <gauravsharma11.dei@gmail.com> (Management, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Consciousness is a state of mind which is developed by awakening of the mental faculties. It's the awareness of one's own existence, thoughts, surroundings, etc. Consciousness is an essential state of mind which is needed for "Better Worldliness", may it be family, working place, play groups or any other social and business organization. As the major objective of any business is to earn maximum profit, therefore it is essential for any business to carry out the decision making process consciously. It does not imply only profit of the organization but also the well being of its work force. Consciousness of both the employer and the employee is required to meet the objectives of the organization. Present paper tries to examine the effect of consciousness in decision making in business organization. The study will be based on secondary source of data, however pilot survey will be conducted in Agra city. **P1**

1.07 The 'hard problem' and the explanatory gap

32 Goodbye, Hard Problem: Consciousness is Fundamental J. Kenneth Arnette <jkarnette@hotmail.com> (Philosophy, University of Memphis, Memphis, TN)

David Chalmers has identified the core issue in consciousness studies, the crucial question to be answered, which he called the hard problem of consciousness. To paraphrase: how can matter – regardless of the degree of complexity of its organization – generate something so radically different from itself, namely, thought, ideas, subjective experience, and consciousness? On a strictly qualitative basis, it is a puzzle that the most tangible, least ephemeral thing we know 'matter' could generate the most ephemeral, least tangible thing we know – consciousness. It seems that in a fully material world, biological mechanisms would proceed on their own, without any accompanying awareness or subjectivity. Obviously, this statement of the hard problem reflects the status quo assumption that the brain does generate the mind and asks how that can be accomplished. But just as obviously, one could make the opposite assumption, that matter does not generate consciousness, and the hard problem dissolves (although other problems ensue). Chalmers' own response to the question he posed has been called naturalistic dualism: consciousness has a natural ontological status equal to matter-energy and spacetime, the two other basic components of the universe, and cannot be reduced to the workings of these two. It is irreducible, but not supernatural. Thus, the brain does not generate consciousness or subjectivity. This view fails to say what consciousness is, beyond irreducible and natural. It neither offers nor explains a mind-brain relationship. It fails to address the relationshipsamong the three basic entities cited above. I propose instead that we turn the entire problem backwards: consciousness is the most fundamental thing, and everything else is literally constructed from it. The starting point is Einstein's famous equation relating energy to matter (E = mc2). This equation makes both quantitative and ontological statements. One is that matter is merely a condensed form of energy; matter is constructed from energy. Contemporary string theory suggests two forms resulting from this construction. So at some point shortly after the Big Bang, energy condensed into matter and the less tangible became the more tangible. Thus, dissolution of the hard problem of consciousness can be accomplished by taking this relationship one step back. I posit that energy is a condensed form of consciousness, analogous to the energy-matter relationship, so that consciousness:energy::energy:matter. This concept has advantages: (1) it is logical in that this is the order of tangibility of the three substances; (2) it is easier to envision a constitutive consciousness-energy relationship than a reverse relationship in which matter produces consciousness; and (3) it incorporates this part of relativity in a consistent, logical way. Consciousness is thus the primordial substance; self-awareness and subjectivity are two of its essential aspects, irreducibility a third. When consciousness condenses into energy, it loses this awareness. Therefore self-awareness is not to be found in the realms of matter-energy and spacetime, yet all of this is ultimately constituted of and constructed from consciousness. The relationship between my conception and those of some modern philosophers, and new problems arising from this approach, will be discussed. **P1**

33 Non-Compositional Panpsychism Philip Goff <philgoff1@gmail.com> (University of Liverpool, Philosophy, Liverpool, United Kingdom)

It is commonly thought that anti-physicalism sets itself in opposition to the onward march of scientific progress. But modern science began with Descartes taking the mind out of the physical world, which enabled him to give a completely mathematical account of what remained. We should not find it surprising if a picture of the physical world which began with the removal of mentality turns out not to be able to account for mentality. Once the project of reducing consciousness to the physical is abandoned, we can begin trying to reconcile the information afforded to us by natural science, with the information afforded to us by our immediate acquaintance with conscious experience. It is at this point that serious metaphysics will begin. Panpsychism, the view that consciousness constitutes the intrinsic nature of fundamental physical entities, looks to be the most elegant, economical and theoretically satisfying way of reconciling these two sources of information. However, it suffers from the notorious "combination problem": subjects of experience don't seem to be the kind of thing that can combine to form larger subjects of experience. I propose a radical "non-compositional" form of panpsychism, according to which composite subjects of experience simply do not exist. This view turns out to have a number of virtues and – apart from its strangeness – seemingly no vices. **PL9**

34 Why Don't Psychopaths Believe in Dualism? The Role of Opposing Brain Networks Anthony Jack <tony.jack@gmail.com> (Case Western Reserve University, Cognitive Science, Cleveland, OH)

In a theoretical paper linking the attribution of phenomenal consciousness to moral cognition, Robbins and Jack (Philosophical Studies, 2006) predicted that psychopaths would not perceive the problem of consciousness. New experimental evidence is presented which supports this claim: in a group of undergraduates it was found that support for a naturalistic view of the mind is positively correlated with the primary psychopathic trait of callousness. It appears that, at least for philosophically naive individuals, belief in mind-body dualism is driven by feelings of empathetic concern for others. Work in cognitive neuroscience suggests a broad division between two brain networks essential for understanding the physical and the mental: The analytic network is built around and upon brain areas involved in attention and spatio-visual processing. It is engaged by a range of analytic tasks, including logical, mathematical and mechanical reasoning. The empathetic network is built around and upon brain areas that receive visceral inputs from the body and which are involved in emotional self-representation and self-regulation. It is engaged by tasks that involve empathetic perspective taking. Many studies from numerous laboratories support this view, that different brain areas are involved in thinking about minds and thinking about machines. However, recent evidence suggests these networks are not only distinct, but are also mutually inhibitory. Engaging one network actively suppresses activity in the other network. In other words, there appears to be a biological limitation on our ability to simultaneously engage in mechanical reasoning and empathetic perspective taking. We can think about people using the analytic network, however when we do then we view others dispassionately, as mechanical objects that may serve instrumental purposes. This contrasts with thinking about people using the empathetic network, which is associated with an emotionally connected view of others, as objects of moral concern. The different ways of thinking about people afforded by the two networks is illustrated by imaging studies of dehumanizing and anti-social cognition, as well work in moral neuroscience. Experiments on the neural basis of moral cognition demonstrate that competition between these networks determines response to some moral dilemmas. Greater activation of the analytic network is associated with a willingness to intentionally harm someone in order to achieve the best overall outcome. Greater activation of the empathetic network is associated with refusing to perform such an abhorrent action even though the overall outcome will be worse. Endorsing a naturalistic worldview involves agreeing with the view people are *nothing but* machines. Such a view may be read as implying that people can be best understood using the analytic network. If the view is interpreted in this way, then empathetic individuals are likely to feel uncomfortable, since the analytic network suppresses empathetic perspective taking and feelings of moral concern. This sense of discomfort will not arise for individuals that lack empathetic concern for

others. So, why don't psychopaths believe in dualism? Their world view is not distorted by a sense of moral concern for others. **PL9**

35 How Does Consciousness Overcome Combinatorial Complexity? Reji Kumar Karunakaran <rkkmaths@yahoo.co.in> (NSS College, Pandalam, Kodumon, Kerala India)

Mind is a complex information processing mechanism which causes consciousness – the processed information content of mind. Models are the basic units of information processed in the mind. Comparison is one of the operations that causes consciousness. When we compare two models, the problem of combinatorial complexity comes into picture. In this paper we describe the way our mind overcomes the difficulty of combinatorial complexity and its consequences. **P1**

36 How to Make a Robot That Feels Kevin O'Regan <jkevin.oregan@gmail.com> (Centre National de Recherche Scientifique Institut, Laboratoire Psychologie, Paris, France)

Usually "feel" or, as philosophers often call it, "phenomenal consciousness" or "qualia", is considered a "hard problem" in consciousness research. There seems to be an "explanatory gap" preventing us from giving a scientific account of feel. I show how the "sensorimotor" approach (O'Regan 2011), by redefining feel as a way of interacting with the world, overcomes this problem. Though counterintuitive at first sight, the sensorimotor approach has the advantage that it brings phenomenal consciousness into the realm of present day science. I shall illustrate how it additionally opens new experimental paradigms and makes new predictions in domains like sensory substitution, pain perception, color perception, and body awareness. If we complement the sensorimotor approach with the notion of access consciousness, which is generally thought also to be accessible to science, then it becomes clear that there is no theoretical obstacle to making a robot that feels and is conscious. O'Regan, J.K. (2011) Why Red Doesn't Sound Like a Bell: Understanding the feel of consciousness. Oxford University Press, New York, 211 pp. **PL9**

37 An Epistemic Framing of the Ontologic Explanatory Gap: A Knowledge Trilogy Robert Pusakulich <pusakulichr@bellsouth.net> (Psychology and Psychiatry, Memphis VA Medical Center, U.TN (ret), Memphis, TN)

This presentation offers bridging for the seemingly intractable "explanatory gap" between subjective mind and objective brain. Attempting that requires reframing of the ontologic "hard problem" of conscious mind as an epistemic, and perhaps, "not-so-hard problem". Conscious mind is consistently associated with physical brain. So what can and does the brain do to become and be a conscious organ? Physical as it is, it seems unlikely to generate a nonphysical ontology. Never-the-less, it seems to do something very akin to that in the case of conscious mind. In what kind of activity is the brain then engaging? Active brain is known to create and harness a variety of functions that are contented by distinct kinds of "knowledges", including emotion, perception, motor skills, memory, and language. Moreover, the brain seems to possess an executive knowledge of "agency", reported by its possessors as knowledge of and with "self-awareness": an apparently conscious knowledge. Here it is argued that such a knowledge, i.e. a knowledge that is, in effect, a self-referencing, knowing of the knower, is a sufficient basis for a wholly epistemic "self" in a wholly ontologic brain. So considered, the "explanatory gap" can be treated as an epistemic boundary between radically different kinds of knowledges, rather than a gap between radically different ontologies: one knowledge being subjective and private; the other, objective and public, i.e. "first person", and "third person", respectively. These two brain generated knowledges are posited to belong to an actual set of three: (1) the internal personage of consciousness; (2) the known nature of the external world; and, (3) a belief in the consciousness of other people. Accordingly, they are a trilogy of brain- knowledge domains: a first person subjective; a third person objective; and a "second person" social. The first person subjective is knowledge of conscious awareness of self-entity or agency. It is knowledge of "Iam". The second person "social" is the knowledge that accepts other people as possessing like conscious minds, It is knowledge of "you" and "they". The third person objective is the knowledge of things and events considered external to us and to all other conscious persons. It is knowledge of "it". These three discrete knowledges demarcate an epistemic phenomenal consciousness in a larger epistemic context of social awareness of like persons, and objective understanding of the external world. In this epistemic array subjective consciousness is a brain generated knowledge plexus, requiring no ontology other than that of a material brain. How then does material brain "channel" the consciousness of epistemic mind? It is argued here that the natures of brain and mind are "neutral" as to their respective compositions and constructions. Their ontologic monism is that of a material disposed to be a knowledge generated consciousness; and where that consciousness is concerned, that monism is neutral regarding its ontology and its epistemology, i.e. its brain and mind natures. It is a monistic neutrality of a brain and a mind that are the same conscious thing. **P1**

38 The Hard Problem Problem William S. Robinson <wsrob@iastate.edu> (Iowa State University, Ames, IA)

What makes the Hard Problem (HP) specially Hard is our lack of understanding of how to approach its solution. But this very feature may suggest that it is a conceptual error to regard the HP as a genuine problem.The Hard Problem Problem (HPP) is the problem of establishing the genuineness of the HP. Solving the HPP stands in contrast to dissolving the HP, i.e., denying that there is an HP that can have, or needs to have, a solution. The present paper aims to solve the HPP by explaining two principles, identifying conditions under which they could be found acceptable, and arguing that if they were accepted, they would satisfy us that there have to be episodes of qualitative consciousness of the kind we experience, given that there are neural events of a kind instantiated in our brains. Since we do not now have sufficient background to accept these principles, we do not now have a solution to the HP, but since we can understand the possibility of finding them acceptable, we do have a solution to the HPP. One Principle is the Offsetting of Complexity by Continuity (POCC), which is directed at the HP in the form, Why is there consciousness at all? This principle is suggested by the fact that qualitatively conscious events all have at least temporal continuity (and some have several, e.g., temporal and spatial continuity), and the observation that continuity is a kind of simplicity. If a particular kind of high-complexity property were found to be present in all neural causes of instances of qualitative consciousness, the offsetting of that kind of complexity in the cause by continuity in the effect could come to be regarded as a general, and fundamental, law of nature. J.J.C. Smart identified a difficult question that would remain even if POCC were accepted. Supposing it is granted that members of a certain class of neural events will cause instances of phenomenal qualities; Why does a particular neural event in that class cause the particular quality in a conscious event that it does? This question can be answered by a Minimum Arbitrariness Principle (MAP) and some plausible assumptions about the structure of properties. MAP says that, so far as possible, proximate effects of closely similar causes are similar. The paper explains these principles and their plausibility in further detail. It also identifies generality as central in analogous cases of explanatory satisfaction, and argues that POCC and MAP have a degree of generality that is comparable to principles that apply in such cases. If that is right, then we have a solution to the HPP, even though a solution to the HP awaits discoveries that would lead to actual acceptance of the principles, not merely the plausibility of their possible acceptance. **C9**

39 Hard Problem Derived from the Easy Problem by Projection Operators and Possible Neural Correlates John Strozier <john.strozierccs@yahoo.com> (Science, Mathematics & Technol, Empire State College/SUNY, Sedona, AZ)

I present arguments that the Hard Problem of consciousness (Chalmers 1995) for first-person subjective visual experience, can be analytically described in third-person terms. Therefore the Hard Problem for visual experience is, in fact, an easy problem. A first-order model of the visual world is constructed in the brain by current and past (held in memory) first-person sense data using analytic techniques. First-person sense data is information gathered by the senses and transmitted to the brain, and should not be confused with 'first-person subjective experience' – the essential distinction being between the actual data input through the senses to the primary visual cortex, VI, verses the subjective experience of that data. Also one should include as first-person sense data, accessible third-person accounts/descriptions of the world from those organisms that have a 'theory of mind" (see Gordon (1996)). The key point in this paper is that parts of the brain

act as projection operators (Dirac, 1982) on the world model(s) producing 'first-person subjective experience'. In particular, the projection operators project 'outward', giving the illusion of a 'slice' of the brain model directed 'outward' thereby evoking the subjective aspect, 'what is it like', for that visual experience. Differences between the projection operator projected data and the most current first-person sense data are used in a negative feedback cycle to improve the accuracy of the world model, and a positive feedback cycle to accentuate those objects in the visual field that need immediate attention. Neural correlates are proposed and described in a logical format – for example: feed-forward and feedback loops between the neural layers in the cerebral cortex. These layers would include those that receive first-person sense data, those that build the world model, and those that project outward through the world model and create the differences that are then fed back to adjust the world model. Analysis also shows that reportability acting on first-person subjective experience approximates the inverse of the brain model operator acting on the first-person data operator – a rather remarkable result that makes sense as it indicates,among other things, that the optical reciprocity theorem is satisfied, and that combining reportibility with subjective experience yields social interaction and a faithful representation of the real world through Science. Mathematical analysis of the above arguments will be given. In addition, this 'inward, outward' model of visual data and experience accommodates the properties of both "presentness" and "transparency" (for a discussion of these terms see Welshon, 2011) and suggest explanations for blindsight and other visual disorders. To summarize, the 'hard' problem of consciousness is reduced to an 'easy' problem; as 'subjective phenomenological experience' can be analytically generated by neural projection operators on the world models that are initially constructed from first-person sense data. To demonstrate these ideas, a computer program was written, and will/can be used as a demonstration. The computer results confirm that a first-person subjective experience is quite useful (but not always necessary) to the survival of the computer creature in an artificial 'world' of prey and predators. **P1**

40 The Elephant in Every Room: A Proposed Theory of Multisense Realism Craig Weinberg <whatsonster@gmail.com> (s33light.org, Durham, NC)

Multisense realism defines a new approach to bridge the Explanatory Gap between neurological observation and first hand conscious experience. This is a hypothesis of consciousness, elementary physics, and ultimately cosmology which requires no belief in non-ordinary reality yet which honors the full spectrum of the psyche and self. It consists of new interpretations of established scientific and common sense observations rather than a contradiction of them. It is proposed that consciousness, rather than being either a metaphysical epiphenomenon of matter, or a Cartesian dualism alongside matter, is more like a frequency range within a continuous spectrum which includes both subjective and objective phenomena. Rather than a simple graduated continuum like the electromagnetic spectrum, it should be conceived of as an 'involuted continuum' which twists into an interior and exterior topology like a Mobius strip. The common denominator (the strip) is the sense which arises from through symmetry, similarity, circuity, and divergence between the various nested perspectives on interiority and exteriority. Sense is the underlying primitive. That is what the cosmos, and we ourselves are "made of"". Not mind or matter, but the capacity for the two to be both separate in one sense and the same thing in another. Sense is a universal dance of presentation and representation. Without either subject or object – there cannot be a sense of 'reality' or realism. Realism arises from this involuted continuum between opposite ontological expressions. http://s33light.org/SEES for more information. **P2**

1.08 Higher-order thought

41 Higher-Order Theories of Consciousness and Subjective Appearance in Empty Higher-Order Representations Paul Bernier <paul.bernier@umoncton.ca> (Philosophy & Religious Studies, Universite De Moncton, Moncton, NB Canada)

It has been acknowledged, in the literature, that so-called higher-order theories of consciousness leave open the possibility that one be in a second-order state representing oneself as being in

a first-order state which does not actually occur. Focusing on Rosenthal's version of that theory, Ned Block (Analysis, 2011) has argued that this possibility shows that the higher-order thought theory is incoherent. To avoid this incoherence, Block proposes that the occurrence of a higher-order thought is sufficient for the state it represents actually to occur. In this talk, I argue that the possibility of empty higher-order thoughts, together with a plausible assumption, entails a vicious infinite regress of higher-order states. I suggest that the most plausible way to avoid this problem is to endorse a version of the so-called Self-Representational theory of consciousness. According to Rosenthal (Analysis, 2011: 434), while it is true that a higher-order thought (say that one is in a certain sensory state S) entails that there is something it is like to have this second-order thought, this does not entail that a higher-order thought is sufficient for the first-order thought that is about to actually occur. Rosenthal's reason is that 'there being something it is like for one to be in a state is simply its seeming subjectively that one is in that state' (2011: 433); and it can be the case that it seems subjectively to oneself that one is in S while one is in no sensory state whatsoever. It is, however, hard to deny that when it subjectively seems to oneself that one is in a sensory state S, one is actually in a conscious state. In other words, to use the terminology which motivates higher-order theories of consciousness, its seeming subjectively that one is in S is something one is conscious of. But, granted that no first-order sensory state occurs then, on a straightforward understanding of the higher-order theory, this entails that one must also be in a third-order state representing its seeming to oneself that one is in state S. On the assumption that the higher-order theory leaves open the possibility that the content of higher-order thoughts be false, it is thus left open that the content of that third-order state also be false. This triggers a vicious infinite regress. If, however, we accept Block's claim that the occurrence of a higher-order thought is sufficient for the state it represents actually to occur then, arguably, such a regress does not arise. Block states his claim thus: 'a reflexive conscious state is one that is phenomenally presented in a higher order representation of it.'(2011: 428) It is unclear, however, whether this claim should be interpreted as a version of the Self-representational theory of consciousness, according to which it is the very reflexive first-order state which fulfills the higher-order function of representing itself, or whether this function is fulfilled by a further numerically distinct state. For reasons I develop in the talk, the former interpretation is preferable to the latter. **C2**

42 Two Forms of Higher Order Theories of Consciousness Ned Block <ned.block@nyu.edu> (New York University, Philosophy, New York, NY)

Much of the criticism of higher order theories of consciousness has derived from the fact that the most influential versions of the view are duplicative theories. According to duplicative theories, a conscious perception of red involves a first order representation of red, and in addition, a higher order state that (in the normal case) attributes that content to the first order state. For example, on the higher order thought version, the higher order state is a thought to the effect that one is having a perception as of red. So the content is duplicated, occurring non-conceptually in the perception and conceptually in the thought. This paper discusses the advantages and disadvantages of non-duplicative higher order theories in which the higher order state is a pointer to the first order state that does not have its own content. **PL5**

43 Why H.O.T. Still Bests Self-Representation: A Counter-Example to the Self-Representation Theory of Subjective Consciousness Craig DeLancey <craig.delancey@oswego.edu> (Philosophy, SUNY Oswego, Oswego, NY)

The self-representation theory identifies subjective consciousness with representations that are also self-representing. The most developed account can be found in Kriegel: "Necessarily, for any mental state M, M has subjective character iff M is non-derivatively, specifically, and essentially self-representing" (2009: 164). However, many brain events meet these criteria and are not subjectively conscious. Examples include thermoregulation in the human hypothalamus. The hypothalamus has dedicated neural structures to monitor temperature, including some that track the temperature of the preoptic area where the hypothalamus sits. If it is too warm, the hypothalamus activates mechanisms to cool itself. The state of the hypothalamus that tracks the local temperature is thus self-representing: the representation represents its own temperature. These

representations meet all of Kriegel's demanding criteria for subjectively conscious self-representations: they are non-derivatively representational; they are specific; and they are essentially self-representing (tracking local temperature is the proper function of these representations). However, they are not subjectively conscious: no one can report upon nor form episodic memories about the localambient temperature of her hypothalamus. This proves that self-representation cannot be sufficient for subjective consciousness. It remains possible that the self-representation theory describes a necessary condition of subjective consciousness. However, this would render the theory unmotivated. A primary goal of the self-representation theory is to present an alternative to the higher order of thought (H.O.T.) theories of subjective consciousness. H.O.T. theories are seen by self-representation theorists as suffering from two flaws. First, H.O.T. theories might allow that we can be wrong about our qualitative consciousness; second, H.O.T. theories might allow for "targetless subjectivity", where the subject is subjectively conscious of a qualitative conscious experience without the required representations that constitute the qualitative experience being present. Self-representation theories avoid both problems by identifying subjective consciousness with a self-representing state. This state cannot be in error about its representational content, since it is the state of representing this particular content. Nor can this state falsely represent some non-existent content, since the state is representing itself; it must exist in order to self-represent. But a weakened self-representation theory, that claimed only to identify a necessary condition of subjective consciousness, would require that something else makes a state subjectively conscious. Until we are told what that something else is, we cannot know if we escaped the supposed problems for the H.O.T. theory. For example, the sufficient condition might be that there is a separate and higher-order representation of the self-representing state. But this would allow a reformulation of the two challenges to the H.O.T. theory. In conclusion, I offer reasons to believe that the H.O.T. theory is simpler than the self-representation theory, and also coheres more well with our best understanding of subjectivity. As a result, to claim that self-representation is only necessary for subjective consciousness would give us no reason to adopt the self-representation theory over some version of the H.O.T. theory. Bibliography Kriegel, Uriah (2009) Subjective Consciousness: A Self-Representational Theory. New York: Oxford University Press. **C2**

44 HOT Theory and the Prefrontal Cortex Rocco Gennaro <rjgennaro@usi.edu> (Philosophy, University of Southern Indiana, Evansville, IN)

The higher-order thought (HOT) theory of consciousness says that what makes a mental state conscious is that there is a suitable HOT directed at that mental state. Thus, it seems that any neural realization of the theory must be widely distributed in the brain, but it remains unclear just how widely distributed it needs to be. I argue against the view that HOT theory should treat first-order conscious states, and thus unconscious HOTs, as requiring prefrontal cortical activity. There are at least two advantages to my view. First, there is little evidence to suggest that typical first-order (i.e. world directed) conscious states involve prefrontal cortical activity as opposed to other more limited cortical activity (such as recurrent feedback loops in other brain areas). However, when HOTs are conscious, we have "introspection," "executive control," and other more sophisticated mental abilities, which then are rightly associated with the prefrontal cortex. Second, if HOT theory required significant prefrontal cortical activity for all conscious states, then it is needlessly susceptible to the criticism that HOT theory rules out animal and infant consciousness. I therefore challenge the arguments made both by opponents of HOT theory, such as Block and Kriegel, and supporters of HOT theory, such as Rosenthal and Lau. I do agree with latter pair, however, that there is empirical and philosophical support for the higher-order view and I do in fact hold a version of HOT theory (Gennaro, The Consciousness Paradox: Consciousness, Concepts, and Higher-Order Thoughts, The MIT Press, 2012). **C2**

45 Attention in Empty Higher-Order Thought Zachary Hausle <hauslezt@hendrix.edu> (Hendrix College, Conway, AR)

In this paper, I review key literature surrounding the "empty higher-order" challenge to the higher-order thought (HOT) theory of consciousness. Based on Rosenthal and Weisberg's responses to Block's presentation of this challenge, I argue that attention necessarily plays a critical role in

the relationship between higher-order thought and conscious experience. Both the constraints presented by Rosenthal in 2002 and 2011 papers, as well as the empirical evidence supporting HOT, suggest that attention in some sense is necessary for HOT to be feasible. This necessary condition has key implications for HOT, particularly in the case of "empty" higher-order representations. **P1**

46 Phenomenal Similarity and Progression in Consciousness Asger Kirkeby-Hinrup <asger.kirkeby-hinrup@fil.lu.se> (Philosophy, University of Lund, Sweden, Lund, Skåne Sweden)

Higher-order thought theories are elegant accounts of consciousness. However, they lack an explanation of why a particular mental state, rather than some other state, is selected for higher-order representation. As such, these theories are inherently static models showing only the constellation of the higher-order hierarchy at a given point in time. Clearly though, consciousness is not static, as evident by the changing contents of our streams-of-thought. On the higher-order accounts these changes in content are the manifestations of successions of higher-order representations with different objects. However, this offers just the affirmation that the same (higher-order representational) structure obtains at each separate point in time. This cannot explain the dynamics of thought, i.e., of how one state ceases to be- and another becomes higher-order represented. I suggest that we explain the dynamics by making a distinction between two kinds of qualia. This distinction consists in whether the object to which a quale belongs is a mental state (a qualia instance or QI) or the whole 'system' or 'person' (the qualia total or QT). QT should be conceived as akin to the total phenomenal unity thesis (TPUT) as proposed by Bayne and Chalmers. TPUT states that "necessarily, the set of all phenomenal states of a subject at a time is phenomenally unified" (Bayne, T. & Chalmers, D. (2003) "What is the unity of consciousness?" In: Cleeremans, A. (ed.), The Unity of Consciousness, Oxford p. 33). Implicit in TPUT is the notion that there is something it is like to have the set of unified states qua unified set, in addition to what it is like to have each individual state. Since both QT and QIs are characterized by what it is like to have them, I posit that QI and QT can be more or less similar in this respect. Shortly, one may say that 'what it is like to have a headache' can be more or less similar to 'what it is like to be me right now'. I then propose that theamount of similarity between each separate QI and the QT provides a seed for an associative mechanism that feeds mental states for higher-order representation. The more similar a QI is to the QT, the more likely a higher-order representation will occur. One common objection is that certain types of states, such as pain, exhibit a strong tendency to become conscious without apparently being similar to the current QT. I discuss three ways one can respond to this and propose that one line of response should be preferred since it makes the most sense from an evolutionary perspective. I finish the talk by considering two different ways the associative mechanism might 'select' between the seeds. **P2**

47 Scientists Reveal: People Have Conscious Sensations Without Knowing It Victor Lamme <v.a.f.lamme@uva.nl> (University of Amsterdam, Psychology, Amsterdam, Netherlands)

What makes us have conscious sensations? It is generally assumed that the brain has something to do with that. So far, however, the project has been hindered by trying to find the neural correlate of consciousness, as if we know what conscious experience really is, and just have to stick a neural counterpart to it. We don't know what conscious experience is. That's the real problem. And we need neuroscience to help establish a proper scientific definition of the phenomenon. Therefore, the approach should be to not define consciousness merely from introspection or behavior, but from a convergence of introspective, behavioral and neural arguments. The criterion for success should be whether such a new definition explains what there is to explain about consciousness, not whether it fits our intuitive notions. From such an approach (Lamme, 2006; 2010), it emerges that it makes sense to acknowledge that we have conscious sensations (in the phenomenal, qualitative sense) without attention, without access, and hence also without thought. In this talk, I will present further arguments that impose such a far reaching conclusion. We investigated the nature of visual representations outside the focus of attention, evenoutside the realm of the known, using inattentional and change blindness paradigms. It emerged that vision without attention is rich, detailed, precise, integrated, and – most importantly – shows perceptual inference i.e. goes beyond the retinal image towards a perceptual interpretation of that image. So

unattended items have all the characteristics of attended and reportable items – characteristics that are typically absent in fully unconscious processing; they are just not attended and hence not reported. It would hence make no scientific sense to group the unattended and unreported with the unconscious. In neural experiments, we show how feedforward processing enables the categorization of a face, but that conscious perception emerges only after recurrent interactions between FFA and low level visual areas, together with the integration of the facial features and their segregation from background. Thus, a further dissociation between cognition (categorization) and consciousness is established, while the association between integration-segregation and conscious experience is strengthened. Similarly, we show that perceptual inference is present in the neural (fMRI) response to unreported illusory stimuli. In sum, there is now overwhelming evidence showing that (neural) representations outside the focus of attention, and outside the realm of access or thought possess all the key properties of conscious representations, except – of course – reportability. Moreover, these properties (richness, detail, precision, inference, segregation and integration) do all the explaining towards the phenomenal nature of conscious experience. The absence of access does little to explain that away. The proper conclusion is that we may have conscious sensations even when we don't know it. Lamme, V.A.F. (2006) Towards a true neural stance on consciousness. Trends CognSci, 10: 494-501 Lamme, V.A.F. (2010) How neuroscience will change our view on consciousness. Cognitive Neuroscience, 1, 204-235 **PL5**

48 A Higher-Order Statistical Decision View Accounts for Apparent Phenomenological Overflow Hakwan Lau <hakwan@gmail.com> (Columbia University, Psychology, New York, NY)

I present a view on which conscious visual phenomenology is determined by how early visual (i.e. first-order) signals are interpreted by a higher-order system in the prefrontal cortex. This higher-order system sets decision criterion to decide if early visual signals should contribute to conscious visual phenomenology. I show that under lack of attention, the system uses liberal criterion and thus interprets noisy visual signal as reliable. This may account for why we have the impression that the phenomenology in the unattended periphery is so rich. In some cases, we may never have the rich information; we only think we do. **PL5**

49 Conscious Awareness, Unconscious Perceiving, and Overflow David Rosenthal <davidrosenthal@nyu.edu> (CUNY Graduate Center, Philosophy, New York, NY)

I'll argue that a mental state's being conscious consists in one's having a suitable higher-order awareness of that state. There's nothing it's like for one to be in a mental state if one is wholly unaware of it; so there being something it's like for one requires some awareness of the state. Moreover, we're aware of what we can report; so the ability to report a state is generally a reliable mark of such higher-order awareness. Higher-order awareness is not, however, the same as a state's being globally accessible; a state may be globally accessible without being conscious, and conscious but not globally accessible. In subliminal perceiving such as masked priming, states with mental qualities occur without being conscious; we individuate and taxonomize mental qualities by their perceptual and psychological roles, not consciousness. And even when perceptions are conscious, there often are perceptual details we cannot report and are unaware of. Such perceptions are conscious in respect only of some of their perceptual properties, and we must distinguish their conscious from their unconscious qualitative aspects. So both subliminal qualitative states and the unconscious aspects of conscious perceptions outstrip higher-order awareness and reportability. By contrast, those aspects of perceptions that are conscious do not overflow reportability or cognitive access, as Block (2007, 2011) has urged, but rather coincide with them. Indeed, Block's (2011) argument appeals in part to participants' reports, which reflect participants' higher-order awareness of the relevant states. **PL5**

50 Experiential Awareness: Do You Prefer It to Me? Miguel Angel Sebastian <msebastian@gmail.com> (Barcelona, Spain)

Conscious experiences differ in a relevant sense from other kind of states. Conscious experiences are not states that merely happen in me, states that I merely "host," as the beating of my

heart or subpersonal states, but states that are for-me. Having an experience requires some form of access to one's own experience, which distinguishes phenomenally conscious mental states from other kind of mental states. In having an experience one is "aware" of having it. This is the subjective character of the experience. It is often assumed that we can understand any form of awareness as some form or other of representation. I will grant this assumption and focus on the kind of representation required to make sense of the subjective character of the experience: conscious experiences require a certain form of self-representation. Until very recently Higher-Order (HO) theories were the only game in town aiming at offering a full-fledged account of this form of "awareness" within the analytical tradition. Independently of any objections that HO theories face, First-Order (FO) theories need to offer an account of such an access to become a plausible alternative. My aim in this paper is to explore the logical space for understanding the required sense of self-representation and the problem of the subjective character of the experience in such a way. The expression self-representation isambiguous between two senses: it can mean i) representation of the state itself or ii) representation of the self. This distinction allows me to build a distinction, orthogonal to the well known distinction between first-order and higher-order, between mental-state involving theories (i) and self-involving theories (ii). In section 3, I will vindicate the self-involving view; and in section 4, I will present the basics for an understanding, in naturalistic compatible terms, of self-involving representation without the need of higher-order representation. **C2**

51 What is It Like to Have a Higher-Order Thought? A Dilemma for Any Higher-Order Theory of Consciousness Morgan Wallhagen <morganwallhagen@gmail.com> (Philosophy, Bryn Mawr College, Philadelphia, PA)

Higher-order theories of consciousness take as their starting point the very natural idea that conscious states are those we are conscious of having. They then attempt to develop this idea into a philosophically rigorous explanation of consciousness. In this paper, I argue that they cannot succeed in this task, for no mental state is ever made conscious by our being conscious of it. To show this, I draw out a problematic consequence of the (widely overlooked) possibility of hallucinatory representations of one's own mental states, i.e., "higher-order hallucinations." The problem is that the higher-order theorist is committed to saying both that there is and there is not "something it is like" to have a higher-order hallucination. I argue that this inconsistency can be avoided only by modifying the higher-order theory. The resulting versions of the theory, however, either lack explanatory force or are committed to implausible claims about the phenomenology of conscious experience. The upshot is that consciousness is a first-order phenomenon to be explained, not in terms of how conscious states are represented, but in terms of the special way conscious states represent the world. **P1**

52 On HOTs and HOTIEs: Higher-Order Thoughts, Indexed Essentially Josh Weisberg <jweisberg@uh.edu> (Philosophy, University of Houston, Houston, TX)

The Higher-order thought (HOT) theory of consciousness holds that a mental state is conscious when a subject is suitably aware of herself as being in that state. This awareness, the theory contends, is explained by the presence of a higher-order thought, a thought about another of the subject's mental states. An under-appreciated feature of the HOT theory is that HOT involves a kind of self-representation: the HOT represents the subject, herself, as being in a mental state. In several recent papers, David Rosenthal, developer of the HOT theory, argues that HOTs employ a form of "essential indexical" to pick out the self (Rosenthal 2004, 2010; cf. Perry 1979). In this talk, I investigate some of the consequences of the presence of an essential indexical in HOT representation. I argue that the essential indexical aids the HOT theorist in responding to a number of outstanding objections to the view, in particular the so-called "problem of the rock" (Why doesn't being aware of a rock make it conscious?) and the question of why a HOT formed in response to observation or inference does not make the mental state it is about conscious. I contend that the functional profile of the essential indexical restricts its application to targets properly integrated with the subject. States of rocks are not properly integrated and so we cannot represent ourselves as being in rock states (whatever that might mean). And states we learn about through observa-

tion or inference are not properly integrated either – they are like the states of the man spilling the sugar in a super market and not my states, even if I happen to be that man. I close by considering how the presence of the essential indexical in HOTs potentially closes the gap between HOT theory and rival "self-representational" views. I contend that little separates the views, when we take HOTIEs into account. References: Perry, John, (1979), The Problem of the Essential Indexical, Nous 13 No.1: 3-21. Rosenthal, David M., (2004), Being Conscious of Ourselves, The Monist 87: 159-181. Rosenthal, David M., (2010), Consciousness, The Self and Bodily Location, Analysis 70 No. 2: 270-276. **C2**

53 An Iterative Problem for the Higher-order Theory of Consciousness Rex Welshon <rwelshon@uccs.edu> (Philosophy, University of Colorado at Colorado Springs, Colorado Springs, CO)

The higher-order theory of consciousness is presented as an analysis of consciousness that, if correct, supplies the necessary and sufficient conditions for attributing consciousness to a psychological state. In this paper, I consider Ned Block's recent Analysis criticism (July 2011) that the higher-order theory's necessary and sufficient conditions conjointly entail incoherence. I argue that Block's criticism can be defused by the higher-order theorist. In doing so, however, the higher-order theorist implicates the view in further and equally damaging incoherence. I argue that the higher-order theorist is faced with an iterative problem that cannot be solved by appealing, as the higher-order theorist must, to additional levels of consciousness. It is better, I suggest, to stop the problem before it gets off the ground. Unfortunately, doing so entails the falsity of existing versions of the higher-order theory of consciousness. The paper concludes with reflections on an isomorphic problem with certain versions of the radical embodied and embedded view of consciousness. **P2**

54 Rosenthal's Argument Against Intrinsicalism Revisited Jerry Yang <jyang@ntut.edu.tw> (Ellery Eells Memorial Center, National Taipei University of Technology, Taipei, Taiwan-R.O.C. Taiwan)

Rosenthal (1997/2005) provides an argument against intrinsicalism, which has been questioned by Gennaro (1995) and other scholars but has not been fully discussed to date. I intend to show that, Rosenthal's argument cannot hold as stated and hence should be rejected. While turning Brentano's one-level monitoring theory of consciousness into a disguised higher-order theory, Rosenthal challenges intrinsicalism by arguing that if consciousness be treated as an intrinsic property, it then will become simple and unanalyzable on the grounds that only an extrinsic property of the mental can carry an articulated structure of some sort to state consciousness and informative explanation thus can be provided. Rosenthal's line of thought is that informative explanation can be provided only if we can assign articulated structure of some sort to state consciousness, i.e. the properties of mental states. However, the only reason to view consciousness as an intrinsic property of mental states is that no mental property has such structure. If it lacks such structure, consciousness of mental states then will be simple and unanalyzable. In Rosenthal's mind, only extrinsic properties of the mental states can carry an articulated structure of some sort to consciousness and informative explanation thus can be provided. By arguing so, Rosenthal's challenge therefore implies that intrinsicalism is not entitled to be a bona fide theory of consciousness as it's widely advertised. I employ two models of intrinsicalism, each showcasing a unique type of intrinsicalism, to review Rosenthal's argument. Van Gulick's Higher-order global states (HOGS) model of consciousness (2001, 2004, 2006) appeals to a relation of self-representation in obtaining the subjective character of conscious experience. Kriegel's cross-order information integration model (2005, 2007), on the other hand, does not appeal to such a relation. Therefore, Rosenthal's challenge against intrinsicalism cannot prevail in either case. The significance of the study lies in the fact that by reviewing Rosenthal's criticism against intrinsicalism, we may understand the nature of consciousness in a different perspective. For the reason that Rosenthal uses to argue against intrinsicalism is that, he thinks the framework of the mind intrinsicalists hold lacks an articulated structure in the sense that consciousness being 'intrinsic', is not a relational property. A higher-order theorist such as Rosenthal, on the other hand, considers consciousness being

a relational property as he considers the monitoring state to be extrinsic to the monitored state. I argue that consciousness will be denied as a relational property for intrinsicalists only if by 'intrinsic' they mean 'unitary' and if being unitary is incompatible with being relational. For conscious states being unified consciousness as a whole, consciousness is a unitary property of the mind: the conscious experience does not have to be in a relationship to anything else. Nevertheless, unified consciousness is itself relational in many ways. Intricsicalists, however, can still construe consciousness as being a relational property if they consider consciousness will emerge only when the monitoring state targeting the monitored state within one and the same state. **P1**

1.09 Epistemology and philosophy of science

55 War of the Worldviews Susan Blackmore <susan.blackmore@virgin.net> (University of Plymouth, Psychology, Plymouth, United Kingdom)

The problem faced by both science and spirituality is dualism – the apparent duality between subjective and objective, or consciousness and matter. The solution, I suggest, is not to side either with consciousness or with matter but somehow, whether through science, philosophy or spiritual practice, to attain non-duality. Rather than struggle to do this by bringing the impossibly disparate pair together, I prefer to look into how duality arises in the first place. This is why I say that consciousness is an illusion, meaning that consciousness is not what it seems to be. The duality between mind and matter, and the separation between self and other, are delusions and we need to know how they arise before we can transcend them. Whenever I ask "Am I conscious now?" the answer seems to be "yes." Whenever I ask "What am I conscious of now?" there seems to be an answer. In each such moment duality arises between self and other and between the things Iam conscious of and those Iam not. But what about the rest of the time? I submit that most of our lives, in our "ordinary state of consciousness," there is no answer. We are not conscious of some things and not conscious of others. This is an attribution we make only after the fact or when we ask these particular questions. If this is so much of the scientific problem disappears, and the search for the neural correlates of consciousness is transformed. But there is a price to pay. First, we must give up our treasured illusions of self – as both Dennett (the devil!) and many spiritual traditions have long been saying. Second, we must give up the idea that consciousness has magical powers, or indeed any powers at all. Oddly if we practice mindfulness we begin by asking "Am I conscious now?" and trying to stay in the present. There seems to be, as Chopra puts it, a witness. But with long practice the witness disappears. There is no one there but only "this" endlessly arising. The duality disappears, not because everything is consciousness, not because everything is matter, but because the delusion of duality has been dropped and along with it the whole idea that there is any substance, process, or power, that we ought to call consciousness or any persisting self who wields it. True spirituality, I suggest, is about accepting all this. It's a tough path but one familiar in spiritual traditions including Zen, Advaita, and Christian mysticism. This could not be further from Chopra's brand of "spirituality" which empowers "the body's seven energy centers or chakras" to find the "ultimate happiness prescription" and "a practical alternative to growing old," uses talk of love and compassion to construct "seven spiritual laws of success" to make your dreams come true, and makes money from a video game that "promises a soothing journey to enlightenment." **PL1**

56 War of the Worldviews: Primary Consciousness Versus Materialism Deepak Chopra, MD, FACP <deepak@chopra.com> (Carlsbad, CA)

Dualistic worldviews approach consciousness: 1) materialism suggests mind arises from molecules, and 2) Zen, mindfulness, or Advaita Vedanta portray consciousness as primary, with matter and molecules arising from mind. Materialism, based on classical physics, cannot explain how consciousness can arise from brain matter. Can proponents of primary consciousness explain how the world of experience can arise from conscious mind? When correctly described, Advaita Vedanta is entirely about the fullness of consciousness, not its emptiness. The richness of human existence is sourced in the innate qualities that belong to consciousness, of which the first and foremost is knowledge of the self. Because the self is blissful, eternal, and aware, it can shoot

forth a created world to express whatever it wants, in an infinite unfolding of its potential. Nothing escapes the self; all is enclosed within it. Maya is better understood as a distraction than as an illusion. If you forget that you are the very origin of reality, the reason is that your mind was distracted by the colorful, dramatic play of external Nature. How can this be described scientifically? Promising to satisfy both scientists and mystics, quantum consciousness stands where spacetime, matter, energy and mind literally return to their origin, placing consciousness on the edge between quantum and classical worlds, literally creating reality moment by moment. But a warning is also needed. Quantum consciousness may articulate the subject-object split and the fine beginnings of brain states that are the physical carriers of thought. But mind is the thing itself. Its physical surrogates are just that – stand-ins for a universal consciousness, to which we are like tiny spiders exploring a vast silken web (to use one of Tagore's more unsettling images). In the end, only consciousness can explain consciousness. **PL1**

57 Do Non-Ordinary States of Consciousness Have Epistemological Potential in Philosophy of Mind? Angel Cvetkov <an_li1@yahoo.com> (National Yang Ming University, Institute of Philosophy of Mind and Cognition, Taipe, Taiwan)

Non-ordinary (altered) states of consciousness refer to states in which the consciousness of an individual is fundamentally changed for a certain period of time, and during this period, the awareness of the individual, while fully oriented in space and time, is flooded with contents from seemingly other dimensions of existence. These states are not pathological and can be induced in many ways, the ingestion of mind-altering substances or hallucinogens being just one of them. In my presentation, I will explore some clinical, anthropological and psychological research of these states and argue that their rehabilitation can have impact in our understanding of the Mind. For example, Nagel in his famous article "Brain bisection and the Unity of Consciousness" uses the cases of commissurotomy patients to question, and negate the alleged "Unity of consciousness" noting that what we call a unity of a single mind is consisted of "...an enumeration of the types of functional integration that typify it...[which]...can be eroded in different ways, and to different degrees." This is in contrast with the concept of the "Holotropic mind," or a mind that moves towards wholeness, a term coined by Stanislav Grof in his years of clinical research into these states. Grof makes a case in which the mind is seen as a vertical hierarchy of consciousness domains, the most superficial one being the biographical level which then extends into the perinatal (related to birth) and transpersonal domains. He uses the word "Holotropic" for states in which the intellect is not impaired, but functions in a significantly different way from its everyday mode; being able to reach valid information on personal history to insights about aspects of nature, universe, god or consciousness. This vertical dynamic movement toward the transpersonal domain is related but not dependent on the biographic level, making the memory-dependent biographic identity only a tip of the consciousness and personhood iceberg. How would philosophers like Locke and Hume, think on the subject of personal identity if they had exposure to holotropic states which might expose them to coherent intellectual states with non-pathological absence of the ego, or non-biographic identifications with archetypal realities which belong to a different culture? Furthermore, Grof's account on transpersonal states is congruent with Jeremy Narby's anthropological research on sources of botanical knowledge in Amazonian shamans where based on his field research he talks about the possibility that, trough the usage of the ayahuasca or tobacco, shamans can alter their consciousness and establish communicational rapport with the DNA based life, hereby obtaining information about the healing aspects of certain plants. While this can be a stretch of imagination for the modern mind, using these states for the purpose of gaining knowledge and information about the world and the self as integral part of that world is certainly an ancient notion. Is there place in the Philosophy of Mind to accommodate such different epistemic approaches? **P2**

58 An Empirical Strategy to Test Causal Relationship Between Psychological State/Phenomenon and its Neural Correlates Sunita Jeswani, Bhausaheb Biradar <inspired_by_perelman@yahoo.com> (Philosophy, Sathaye College, Mumbai, Maharashtra India)

Much of frontline research in cognitive psychology is guided by the aim of finding precise neurological candidates associated with different psychological phenomena. Underlying this project is the modularity hypothesis that different psychological states may be housed in functionally different brain states. This project has an additional albeit relatively vaguely defined goal of establishing fine-grained causal connections between the discovered neural correlates and their corresponding psychological states. This additional goal is exceedingly difficult for two reasons: one reason is the lack of general and principled criteria for granting existence of causal relationship between brain and psychological states. The second reason comes from empirical findings that can potentially render questionable the idea of unique correlation between brain and psychological states. Thus we are faced with the following problem: how do we empirically test whether or not the discovered brain state really is the brain state correlated to the psychological state under consideration. Solving this problem would be vital to the project of studying causal relationship between brain and psychological states. In the first part of the paper, we propose an empirical method to address this crucial question. The empirical strategy we propose could also be employed to test which of the different brain states found to be correlated to a psychological state could be the real brain state associated with that psychological state. In the second part of the paper, we employ the proposed empirical strategy to address the question of how we conclusively establish the existence or inexistence of a folk-psychological phenomenon, namely free will. Along the way, we take a meta-scientific issue against the reductionist thesis implicit in the modularity hypothesis. **P1**

59 What Do Physics and Metaphysics Have to Say About Consciousness, Future Science and the Emergence of Holism Menas Kafatos <kafatos@chapman.edu> (Chapman University, Schmid College of Science, Orange, CA)

Modern quantum physics has opened the door to the role of the observer in describing physical phenomena, in what John A. Wheeler called "The Participatory Universe". However, what constitutes consciousness, its nature, how it works, even how to define it, have remained open and challenging issues in,among others, physics, and psychology. Neuroscience has made great progress in specific functions in the physical brain and its structure but says precious little if anything about the deeper issues, such as the nature of the individual self, the interaction between observer and observed, and the body-mind problem. The challenge is that underlying subjective experience cannot be studied in itself as an external object. As such, one may be tempted to place this experience in a totally subjective realm and beyond the reach of science. Yet, the great metaphysical monistic schools, particularly of the East, held that there are steps to the unfoldment of consciousness that, when examined, are actually quite common across vastly different cultures, traditions and social structures. The question then arises, are there any common elements between science (particularly physics) and metaphysics which could provide a true dialogue between these great systems of human experience? I will outline a potentially useful approach that would examine consciousness not as an object, not as an epiphenomenon of physical processes, but as the underlying foundation of the universe. Deep, underlying consciousness, although it cannot be objectified, can be experienced. The link to current science, would be to study the properties assigned to conscious processes, the sum total of which constitutes experience. When one proceeds along this path, one discovers that these properties are tied to foundational principles, holding true across both science and metaphysics, and not just in the physical world, but in the mental and living worlds as well. We may be on a path to true holism and a future science that while retaining the objectivity and utter successes of present-day science, will reach across the perceived divide between physics and metaphysics. This will not just be a useful philosophical exercise but may hold the key to the multitude of challenges we face in an increasingly divided and uncertain world, perhaps the key to the survival of humans. **PL1**

60 Attack of the Zombie Scientist Morey Kitzman <kitzmanm@mscd.edu> (Psychology, Metropolitan State College of Denver, Littleton, CO)

The paper argues that questions like the ultimate nature of consciousness are best left to individual for exploration. When quasi government bureaucrats manage the so-called science of consciousness, i.e. scientist, the danger is that it can become a propaganda tool for control instead of enlightenment. How do you control a free people? Can there be a better way than to

define them, as machines, devoid of mind, will, self or soul? Once you cement the idea that we are machines in popular culture, all problems become technical ones that can only be solved by the so-called expert technocrats. The personal responsibility of the individual becomes meaningless and everything depends on the success of the scientist as they turn their attention to improving the lives of the mindless masses. A zombie scientist is one who believes they have no mind and that their primary goal as a scientist is to convince others that also have no mind. The zombie scientist have dominated western thought for almost a century and have succeeded in convincing the world that the old adage "know thyself" is best replaced with "let others tell you who you are." We have a world in which we have effectively relinquished the sacred privilege of self-knowledge to a collective of government funded science bureaucrats. Oddly enough, this alliance between government and science does not seem to raise any concerns. Is the "ministry of truth" just around the corner? The next phase will be the "hard problem of religion" and then we will entrust scientist to tell us the best form of worship. Questions of ultimate truths should always be left to the individual and the efforts of the individual. However, we live in a culture where people know more about pizza than they do about their own minds. A culture where we spend more time watching commercials on television than we do introspecting. It is against this cultural backdrop that we allow others to think for us. And it is from this two dimensionally minded culture that we recruit people to think for us. That is a rather scary proposition. However, it is not just this passive attitude toward self-knowledge that belies the problem. There is also an undercurrent of emotional malaise that pervades our world. From informal surveys conducted over the last ten years, it appears that the average individual spends most of their time caught in emotions of anxiety, depression and anger. In fact, this comprises upwards of ninety percent of their psychic world. In a sense, the giving up of the pursuit of the transcendent aspects of our being and world reflect an all-pervasive disenchantment with life, a form of learned helplessness. In this respect, the dominance of the current crop mechanistic conceptions of self and mind are a projection of this malaise outward. The paper will expand on the above topics. **P1**

61 Are Science and Spirituality Compatible? Bridging Chopra and Mlodinow's "War of the Worldviews" Stanley Klein <sklein@berkeley.edu> (Optometry, UC Berkeley, Berkeley, CA)

Unfortunately, in their recent book "War of the Worldviews", our featured speakers Deepak Chopra, MD, FACP and Leonard Mlodinow give multiple examples whereby science and spirituality are NOT compatible. I say "unfortunately" because their views are potentially so close that they should have been able to come to a compatibilist conclusion. I recommend viewing their Larry King Live appearance that demonstrates, even more than their book, how close their views are. My presentation will be a friendly commentary on their writings and speeches showing what can be accomplished with modest tweaks to their worldviews. I'll argue that Chopra's and Mlodinow's views can not only become compatible, but can work together as in Einstein's words "Religion without science is blind and science without religion is lame" (with Chopra replacing religion with spirituality). To begin the bridge building I'll argue that except for one potential weak link, Chopra's language is a beautiful poetic version of Mlodinow's language. Amazingly, Chopra is even open to creating a universe from nothing, without a need for an external creator! The one weak link is Chopra's claim that "paranormal events are neither fringe nor unreal. They are simply things not yet admitted into consciousness by our official belief system." The problem is that paranormal events violate The Standard Model of quantum mechanics (QM) presented by Mlodinow on pages 273-274 of their book. Luckily paranormal phenomena involve measurements fully within the scope of scientific methodology. Thus further experiments will determine whether The Standard model is wrong or whether Chopra is wrong. I would suggest however, that there are two bigger problems for the bridge building quest. First is whether Mlodinow can become comfortable with Chopra's use of consciousness language throughout the book, including its role in evolution, cosmology and God, in a manner that seem contrary to the equations of the Standard Model. To my eyes, however, these conflicts are due to their different definitions of critical words. Maybe Chopra uses "consciousness" like Einstein used "God". I will explore the definition topic with them before the Tucson meeting and I hope clarity on definitions will enable the conflicts to evaporate. Second and much deeper, Chopra's worldview seem so different from Mlodinow's

world of QM that the science/spirituality bridge has no sturdy foundations. I'm actually optimistic that this hurdle is surmountable. On p. 291 of their book Chopra says that his beliefs are "so close to quantum reality that I keep wondering when my scientific friends will jump into the water – and discover that not only is it safe, it's familiar." Luckily, QM has a minimum of 8 wildly different ontologies (interpretations), including one based on pure consciousness, all leading to identical experimental predictions. Thus, I suspect the paradoxical dualities of QM will provide the needed foundation for a sturdy science/spirituality bridge. I picture Chopra and Mlodinow leaving this conference holding hands and smiling, having laid groundwork for science and spirituality to work together, ushering in the beginning of an end to the "War of the Worldviews". **C16**

62 Consciousness and Existence Gordon Knight <gknight@iastate.edu> (Philosophy, Religious Studies, Iowa State University, Ames, IA)

When Descartes claimed to know with certainty that he exists, he was giving epistemic priority to knowledge of the self. But what is it that grounds this unique epistemic status? What is it about my reflective awareness of my own consciousness that guarantees my own existence? In other words, what is the ontological ground for the epistemic priority of the cogito? I argue that phenomenological considerations support the claim that the cogito is grounded in a unique relationship between consciousness and existence. It is a familiar point that whatever grounds the immediate knowledge I have of my own conscious existence, it is not an argument – any appeal to discursive reasoning undercuts the fundamental character of the cogito itself. Instead, as Descartes realized, we need to think of the cogito as an example of immediate intuitive knowing. When I reflect on my own consciousness, I can find myself aware of my existence. The "can" here is significant. There is no necessity that I become explicitly aware of my existence when I reflect. There is difference between being aware of my awareness of (e.g.) a wall, and my awareness of the existence of such awareness. This phenomenological distinction justifies, in my view, an ontological claim about existence and consciousness. When Iam aware of my own existence as subject of consciousness, Iam aware of a feature of consciousness – there is a distinct "existence aspect" to consciousness that is not found in any other object of awareness. When I perceive a chair, I may be hallucinating. But I cannot hallucinate my own awareness. Existence and consciousness and inextricably intertwined. It is not that consciousness and existence are identical. Rather consciousness is the one thing we are aware of which manifests existence as an attribute. Furthermore, if we try to imagine what it would be like for existence to be found in an external object for consciousness, we find ourselves at a loss. To be sure, we can and do believe chairs and tables exist, but in no example of particular material things can we imagine existence as "latched on" to the object in the way it presents itself to us intuitively in the cogito. Reflection on the cogito thus provides a phenomenological case for thinking of existence as a property, albeit of a very special sort. A thesis that is further supported by the fact that my awareness of my existence can come in degrees, from what is nearly a merely verbal acknowledgement of a trivial fact to a vivid quasi-mystical consciousness that jars me out of my everydayness and invokes wonder. From these considerations I conclude, (1) the cogito provides grounds for thinking of existence as a genuine, if idiosyncratic, monadic property. (2) We have good reason to think that this property is only found in consciousness and (3) we have good reasons for taking consciousness to be fundamental rather than peripheral aspect of reality **C10**

63 Report Skepticism and the Neural Correlates of Consciousness Benjamin Kozuch <bigben@email.arizona.edu> (Philosophy, Cognitive Science, The University of Arizona, Tucson, AZ)

According to Block's distinction between access conscious and phenomenally conscious mental states (hereafter, A-conscious and P-conscious), A-conscious mental states are those poised for use in the rational control of action (including the making of reports), and P-conscious states are those for which there is something it is like to be in. At the outset, it is possible these two kinds of mental states aren't co-extensive. This impacts how we interpret the data presented by negative phenomenal reports, instances in which a subject reports some content (e.g., a masked stimulus) to be not part of her experience (i.e., not P-conscious). More specifically, if A- and P-consciousness were not co-extensive, this implies that more than one hypothesis is compatible with a negative

phenomenal report about some content C: Either (1) content C is really not P-conscious, or (2) content C is P-conscious, but can't be reported as such because it isn't A-conscious. That negative phenomenal reports underdetermine whether some content is P-conscious drives current debates concerning what experimental phenomena like hemispatial neglect, inattentional blindness, and visual form agnosia can (and can't) tell us about consciousness. In this paper, I argue this underdetermination also prevents us from accomplishing the primary goals of neural correlates of consciousness (NCC) research, which includes not just identifying those neural systems forming the basis of P-consciousness, but also ruling out those that do not: Ruling out any neural system from being an NCC ultimately requires the assumption that, if subjects reliably make negative phenomenal reports about content in some neural system N, we are justified in thinking N isn't an NCC. Such an inference is used (implicitly) to argue that V1 and the dorsal visual processing stream aren't NCC. However, consider some neural system whose content is never A-conscious, perhaps because mechanisms of report lack neuroanatomical connections to it (something likely true of both V1 and the dorsal stream). Negative phenomenal reports concerning content in such a neural system can't be considered reliable: Because such content is never A-conscious, subjects will always report it to be not P-conscious, whether or not it is actually P-conscious having no bearing. This undercuts our ability to use negative phenomenal reports to infer a neural system is not an NCC, our only method for ruling neural systems out. When considering how to handle scenarios like these, Block has suggested we first discover the neural signature of P-consciousness, then consider the inaccessible neural system to be P-conscious if and only if it bears this signature. I argue, however, that finding such a neural signature will rely on negative phenomenal reports about content in other neural systems, which are not yet shown to be reliable (for the above reason). I conclude that, because of the underdetermination of negative phenomenal reports, we are – and perhaps always will be – no more justified in thinking an inaccessible neural system isn't an NCC, than in thinking it is. **C19**

64 The Scientific Worldview Leonard Mlodinow <len@caltech.edu> (Author; Physics Faculty of California Institute of Technology, Pasadena, CA)

I will represent the scientific worldview. In science theories are constructed on the basis of logic and observation. To be accepted as science, these theories must result in predictions that can be tested. Through this loop of observation, theorizing, testing, and then refining or redefining theories, science has elevated the state of human knowledge from a condition in which eclipses were thought to caused by wolves crawling across the sky, to a state in which we have the ability to land a person on the moon, and elevated the human condition in many ways, such as doubling our life expectancy. Science cannot yet explain consciousness, but there is also no evidence that our mind does not follow the same laws of nature as everything else we have ever observed in the universe, from the falling of apples to the exploding of distant stars. **PL1**

65 Exposing Neuroscience's Closet Dualism: A Conceptual Analysis of Neuroscientific Studies of Consciousness and Free Will Liad Mudrik, Uri Maoz <liadmu@gmail.com> (Biology, California Institute of Technology, Pasadena, CA)

In his book "The principles of psychology", William James advised his readers to "make our nervous system our ally instead of our enemy" (James, 1890/1971, p. 897). More than a hundred years later, current-day neuroscientists are apparently still struggling to understand the relations between a human being and her brain. On the one hand, most scientists adhere to a materialistic (or physicalistic) ontological approach, denying any possibility of dualism. On the other hand, careful reading of some of the leading neuroscientific texts – especially in the study of consciousness – reveals dualistic ways of thinking and writing. These texts share a common mistake – ascribing psychological predicates to both the brain and the brain's owner at the same time. In some cases, these predicates even contradict each other (e.g., the brain knows that X while the brain owner does not know that X, or the brain wanting its owner to do something that the owner does not want to do, etc.). In this talk we will present the Double-Subject Fallacy: personifying the brain while still preserving the existence of a mysterious self with whom the brain interacts. It is almost as if these are two intentional subjects, two "consciousnesses", fighting for control: "me"

and "my brain". We present examfples of the double-subject fallacy, which appear in prominent texts written by highly regarded neuroscientists. They are in particular abundance in texts that describe findings, theories and neurological disorders of consciousness, as well as those pertaining to decision making and free will. Importantly, the double subject fallacy sometimes leads to improper interpretation of neuroscientific results, giving rise to false conjunctures. We argue that these instances cannot be regarded as metaphors or other rhetorical tools, and are in fact conceptual confusions that reveal dualistic intuitions. Moreover, our criticism does not depend on a specific theory of language (as opposed, for example, to fallacies of the kind raised by Bennett and Hacker, 2003). Even within a philosophically naive way of thinking, sentences that contain the double-subject fallacy can only hinder neuroscientific progress rather than facilitate it. Committing the double-subject fallacy therefore brings about four substantial difficulties for neuroscientific and philosophical praxis. First, it leads to erroneous interpretation of empirical and theoretical findings and thus affects the conclusions that are drawn. Second, it creates a false impression of explaining something that has in fact remained obscure. Third, it revives dualistic thought reminiscent of Descartes' differentiation between body and soul, a differentiation solemnly rejected by most neuroscientists. Fourth, the fallacy transcends the boundaries of science and philosophy, also influencing moral judgments and the judicial system. Hence, the criticism brought here is of more than merely theoretical importance, having practical social implications. **C10**

66 Gap Functionalism: The Ever-Shrinking Explanatory Space for Consciousness in Biologically-inspired and Mechanistic Models of Intelligence Timothy Musgrove <tmusgrove@federatedmedia.net> (Research & Development, Semant, Federated Media Lab, San Jose, CA)

In cognitive science, the last few decades have seen major advances in explaining intelligent-appearing behavior, whether in new models of artificial intelligence, or in better theories for human and animal perception, inference, and planning. A pattern has emerged in these research results which is seldom brought to light, i.e., the increasing success in explaining intelligent behaviors without reference to any deliberate conscious processes. Like ants finding the shortest path to a newly discovered food source without any single ant deliberately thinking about it, so we find emergent processes by which to explain behavior formerly thought to require a conscious intellect. This is rather analogous to the "gap theology" problem pointed out several decades ago by philosophers of religion: theologians had been appealing for centuries to then-unexplained phenomena of the natural world as grounds for positing an over-arching, all-governing God, but as science explained more and more phenomena by naturalistic means, the "God of the gaps" was an ever-shrinking concept. We now seem to have the equivalent of this, in the case of consciousness, with regards to both mechanistic and biologically-inspired models of mental activity: there is less and less need for positing consciousness, as such, in order to explain (or simulate) intelligent processes. An exploration of this shrinking-gap reveals profoundly disturbing and foundation-shaking questions for the study of consciousness. We must seriously consider a radical shift in the epistemic status of consciousness, raising the possibility even of an unassailable epistemic distance standing between us and the object of our study. I outline this new path of questioning, and explain why I believe it is unavoidable. **P2**

1.10 Personal identity and the self

67 The Multipath Approach to Personality: Towards a Unified Model of Self Jonathan Appel, Dohee Kim-Appel <jappel37@yahoo.com> (Behavioral and Social Sciences, Tiffin University, Tiffin, OH)

Human beings exist in multiple substrates or dimensions. But we still need more comprehensive and integrative theories of self-identity and personality. Most personality and developmental theories fail to adequately address the interactional and emergent qualitiesamong the psychological, interpersonal, environmental, and biological aspects of self and personality development. This paper presents a larger framework in which to examine prior models of personality as well as future integrative models. A Multipath Approach to Personality (MAP) is proposed and consists of the following dimensions or levels of analysis of self: 1) the Neuropersonal; 2) the Intrapersonal;

3) the Interpersonal; 4) the Exopersonal; 5) the Ecopersonal; and 6) the Transpersonal. The MAP approach to personality also suggests a multi-modal practice in assessment and research. **P2**

68 The Development of and Out of Self Stuart Jeffrey Besser <sjbesser@nps.edu> (Computer Science, Naval Postgraduate School, Coronado, CA)

Hypothesis: the human brain creates a virtual image of me, the self, with a story based on interpretations of past events. The virtual image is fueled by, continually revived by and perpetuated by continuous thought processes about me. The self attempts to reduce pain and seek satisfaction, but it cannot. There is no satisfactory completion of the story. Compulsive self-talk occurs, because the self is an intrinsic part of the problem. The incessant mental noise prevents the detection of inner stillness. The identification with self creates an opaque screen of concepts, labels, images, words, judgments and definitions that block perception of reality and relationship. This means that the self is attempting to solve an undecidable problem, the halting problem proved by Alan Turing. Assuming that the self algorithm functions like a Turing machine and that it has a program with a finite input, we cannot decide whether the selfs search for satisfaction and certainty will ever finish. The search algorithm begins with the present, but quickly turns to the future for salvation, because lasting satisfaction cannot be found in the present. To maintain the illusion of separation, the self resists or denies the present. The future search compounds the halting problem and adds a major contradiction. While the future holds the promise of potential satisfaction, it also promises death. The only remedy is to step outside of the virtual entity by giving up time and focusing exclusively on the present moment. This remedy is described in the sixth stage of human development. The development of and out of the self occurs in six theoretical stages. The stages represent successive levels of integration and organization of the brain and the virtual self-image. People experience the world differently at each stage. People move forward and backward through the cognitive and psychological developmental stages on a moment-by-moment basis. Different areas develop at different rates within the same person. Constriction to earlier stages occurs whenever people feel misunderstood, unsafe, tired or triggered" by life circumstances that stimulate undeveloped parts of the database. Expansion occurs when people feel understood, safe and rested. Each person has a unique developmental profile, so different external events trigger people depending upon their history. This means that there are a lot of children running around in adult bodies most of the time. The first four stages of self-development are based on self-fulfilling scarcity assumptions: there are not enough resources, money or people. This is actually an unconscious projection of "Iam not enough." Another assumption is that other people cannot be trusted and, therefore, need to be controlled. The actual projection is a fear that I cannot trust myself. The ability of the self to get satisfaction is significantly improved in the fifth stage, when self-fulfilling abundance assumptions develop, but the Halting problem still prevails. The only real solution occurs in the sixth stage when the virtual self, with all of its self-protective, self-defeating behaviors dissolve. Acceptance is the critical element required for moving into the higher levels of functioning. **P2**

69 Do Autistic Patients Have Difficulty to be Aware of Themselves? Hui-Ming Chin, Allen Y. Houng <vhmchin@gmail.com> (National Yang Ming University, Institute of Philosophy of Mind and Cognition, Taipei, Taiwan)

Autistic spectrum disorder (ASD) is a mental disorder of impaired social interaction and communication. Language impairment is also a significant symptom of ASD. The question whether ASD patients lack their self-awareness is raised for two reasons. The first reason is that self-awareness involves the ability of self-reference, which requires the ability of using linguistic or quasi-linguistic forms of expressions such as first-pronoun "I." Hence, the deficient language ability in ASD patients might result in incomplete self-awareness. Second, the familiar view that self-awareness is constitutively related to the awareness of other minds (Bermudez, 2000), or called the Symmetry Thesis, is another way to question the ASD patients' self-awareness. Since ASD patients have lower social ability, they usually ignore social cues which average people pick up effortlessly. Furthermore, ASD patients are usually oblivious of others' behaviors or intentions. They are seldom aware of others as mental beings. Hence, they may be lacking of their

self-awareness. Some neurological researches about mirror neurons provide evidences to support the view above. The dysfunction of mirror neuron system (MNS) may induce the impaired social abilities, and the MNS impairment can be found in ASD patients. (Williams, 2001; Ramachandran, 2007) Meanwhile, the MNS involving the function of imitation, which correlates with self-other distinction, is concerned with the ability of self-awareness.(Iacoboni, 2009) The dysfunction of MNS implies the deficiency of self-awareness. That is to say, if an ASD patient's MNS is injured, his self-awareness is fragmented. I will argue against the above inferences. I think the ASD patients still have self-awareness because language ability and the awareness of other minds are neither necessary condition for self-awareness. According to Bermudez's theory, nonconceptual content can be another resource of self-awareness. Moreover, according to Damasio's theory of self, an organism's core self appears when the organism integrates both their interoception and exteroception . The awareness of other minds is just one kind of the external stimulus which participates in creating the self. Furthermore, the dysfunction of the MNS is merely a neural evidence for social impairment in ASD patients. It just provides a possible explanation for why ASD patients are oblivious to the existence of other human beings and for why ASD patients are not interested to other people's behaviors or mental states. However, there are some critiques of Bermudez's theory which doubt the existence of nonconceptual content. At the same time, Damasio's theory does not spot the difference between the question of how brain can create the self and the question of how it can create self-consciousness. In this article, I will illustrate my theory of the self. I will argue that the self is a unifying process that unifies nonlinguistic concepts about the world. If my statement is acceptable, it offers a better explanation of ASD patients' self-awareness and solves the problems Bermudez and Damasio face. **P2**

70 Personal Identity and Uploading Joseph Corabi, Susan Schneider <jcorabi@sju.edu> (Philosophy, Saint Joseph's University, Philadelphia, PA)

In his recent paper "The Singularity: A Philosophical Analysis," David Chalmers examines philosophical issues associated with the future technology of uploading – transferring detailed functional information about the brain to a computer host. In particular, Chalmers explores the implications of uploading for a variety of issues associated with personal identity and survival. For example: under what circumstances (if any) would an upload of a person be the very same person? If all that remains of a person is an upload, does the person survive? Although Chalmers does not come to any firm conclusions, he expresses sympathy for the view that many kinds of uploading do constitute a form of survival (and perhaps are even numerically identical to the individuals they are uploaded from under some circumstances). Picking up where Chalmers' survey leaves off, this paper examines uploading and personal identity issues in more detail, tracking the relevance of a variety of metaphysical debates about consciousness and self hood for the central questions surrounding uploading, identity, and survival. **C10**

71 Personal Identity: Just Who is the True Dave? Alex Jenkins, Michael Cerullo, MD <Alex.Jenkins@providence.org> (Psychiatry, Providence Health, Portland, OR)

In a recent paper on the singularity David Chalmers discussed the philosophical dilemmas involved in uploading a brain into a computer. Here we will assume a functionalist theory of mind and focus on the problem of personal identity. Will the uploaded entity be the same person as the original, and does it matter if the original brain is destroyed or continues to exist or if the upload is instant or gradual? One of the potential positions of personal identity Chalmers discusses involves the closest-continuer theory. Assume that a human, Dave, is uploaded into a computer, creating two entities, the original person, BioDave, and the uploaded being, DigiDave (using Chalmers terminology). The closest-continuer theory grants identity to the closest related subsequent entity and thus would grant identity to either Dave if the other was destroyed but wouldn't give us a clear answer if both Daves continued to exist. The theory of functionalism and the principle of organizational invariance, which tell us the upload is conscious, do not help with questions of personal identity. Gazzaniga and Sperry tested patients whose corpus callosum had been severed and found that after the surgery both hemispheres of the brain have an independent conscious existence. Let's suppose our subject BioDave undergoes this surgery. Then two BioDaves are

created, RightBioDave and LeftBioDave. In this case neither BioDave has complete personal identity with the original but both would seem to have unique components of identity, suggesting partial identity (termed sharing a relation R with the original according to Parfit). Since DigiDave is isomorphic to BioDave, we could sever the "electronic" corpus callosum and create RightDigiDave and LeftDigiDave. These two halves would share the same partial continuity R with the whole DigiDave as experienced by the split BioDaves to whole BioDave. One important difference is that with DigiDave we could easily "reattach" the corpus callosum and create a single DigiDave again. Presumably the two partial personal identities would merge back into a single Dave continuous with the original DigiDave if the separation has not been too long. If we assume closest-continuer theory is correct, then only one partial DigiDave (or BioDave in the case of real surgery) would retain continuity of identity with whole DigiDave. Now suppose LeftDigiDave is closest to DigiDave (the left hemisphere usually controls language function so this seems a reasonable guess). When the DigiDave brain is split RightDigiDave has no continuity and so his conscious experience begins at that moment (although of course he has false memories of prior existence). When the two DigiDave half-brains are reattached RightDigiDave is part of a continuity of self again. Past memories stored exclusively in the right hemisphere that became false memories with the split now become true "real" memories that form a single continuity of existence. This creates a Dancing DigiDave where certain memories are part of continuous self, then they are not, and then they are again at the flip of a switch. This seems very implausible and argues against the closest-continuer position of identity. **P1**

72 Partial Unity and Bayne's Switch Model of the Split-Brain Syndrome Bernard W. Kobes <kobes@asu.edu> (Philosophy, Arizona State University, Tempe, AZ)

In The Unity of Consciousness (2010) Tim Bayne resourcefully defends his Unity Thesis: in every subject S at time t, all of S's conscious states at t will be subsumed by a single phenomenally conscious state. Against Bayne, I defend a Partial Unity thesis, on which transitivity of the conscious unity relation is sometimes violated. My defense has three parts. First, Bayne argues against Partial Unity on introspective grounds. But introspection cannot conceivably reveal Partial Unity even if it is assumed to exist, so its failure to reveal Partial Unity must be attributed to methodological shortcomings of introspection in this domain. Second, Bayne's mereological conception of unity is plausible only if we incorporate a dispositional element: two conscious states may be parts of one larger conscious state in virtue of a disposition for the larger state to be occurrently present to the subject or accessed by a consuming system. This dispositional element favors Partial Unity. Third, I argue that Partial Unity is empirically more plausible than Bayne's Switch Model, on which consciousness rapidly alternates between the two hemispheres, in accounting for split-brain experimental outcomes. **C10**

73 The Unity of Consciousness and the Split-Brain Syndrome Ting-An Lin, Allen Y. Houng <isly17@gmail.com> (Consciousness Research Group, Taichung, Taiwan)

The structure of consciousness in split-brain subjects is still controversial. The conventional duality model asserts that the split-brain patients have two streams of non-overlapping consciousness at any one time and thus takes split-brain syndrome as a case of disunified consciousness. In contrast, a recently proposed switch model argues that there is only single stream of consciousness which shifts between both hemispheres from moment to moment and thus concludes that the split-brain subjects still possess the unity of consciousness (Tim Bayne, 2008). Both models have their own advantages and problems. The duality model can explain the conflicting behaviors of split-brain patients but has difficulty interpreting the everyday integration while the switch model offers an explanation of the everyday integration but has problems when interpreting the simultaneous consciousness of both hemispheres. In this paper I will propose a new model of split-brain which can solve the above problems. I argue that the split-brain patients have two streams of phenomenal consciousness but only one stream of access consciousness which shifts between the two hemispheres. Based on the distinction proposed by Block (1995), phenomenal consciousness is the feeling of what is it like to be while access consciousness is the availability for report and rational inference. In his later studies (Block, 2007), Block proposes a neural coalitions argument

to show the different neural mechanisms of phenomenal consciousness and access consciousness. According to the argument,among the competing neural coalitions, only the winning coalitions will become access conscious and be broadcasted while some other losing but strong coalitions are the neural basis of phenomenal consciousness. I argue that the competitions of neural coalitions happen simultaneously and independently in both hemispheres of split-brain subjects and thus lead to the two disunified streams of phenomenal consciousness. However, some evidences of behavior and attentional integration in split-brain support that there is only single and unified stream of access consciousness that switches between two hemispheres. This new model can explain both the simultaneous consciousness of two hemispheres and the integration in daily life and thus should be taken as a candidate model of the split-brain syndrome. **P2**

74 Self-World View and a Sane Way of Life Hari Narayanan V. <hari@iitj.ac.in> (Humanities and Social Sciences, IIT Rajasthan, Jodhpur, India)

There have been attempts to explain the nature of the self in scientifically viable terms. Though such accounts of the self point at the non-substantive nature of the free floating or separative self, sufficient attention is not paid to find out the close relation between the world view and the self view and the need to overcome the hold of the substantive view of the self in order to ensure harmonious co existence. The present paper is primarily an attempt in this direction. It will be argued that the ways to go beyond the inveterate ways of understanding ourselves require overcoming the gut feeling of certainty. In this context, it is pertinent to find out whether treating reflective awareness or consciousness as a linguistic enhancement is sufficient to model the changes that are required to ensure a harmonious way of life. The factors that give rise to greed, possessiveness and conflicts need to be addressed and an attempt has to be made to find out whether reflective awareness can remain intact without giving rise to such negative traits. **P1**

75 Is the Primordial Feeling an Essential Element for Building the Self? Hao Pang, Pei-Chi Tu; Allen Y. Houng <howpan@gmail.com> (Institute of Philosophy of Mind and Cognition, National Yang Ming University, Taipei, Taiwan)

According to Antonio Damasio's theory (2010), the self is built in stages: firstly from the simplest stage, the protoself; then to second stage, the core self; and finally the third stage, the autobiographical self. The protoself produces primordial feeling, which is the feeling that my own body exists, and it is present, independent from any object with which it interacts, as a rock-solid and wordless affirming that Iam alive. Damasio says that this fundamental feeling is a critical element of the self-process. Most people have at some time experienced themselves as a kind of bare locus of consciousness, a mere point of view. In this situation, we are not conscious of the existence of our own body. In an extreme instance, which was described in the Jonathan Cole's 1995 book "Pride and a Daily Marathon," he mentioned about a man who lives without proprioception. Here comes my question: Is the primordial feeling really an essential element for building the self? By Damasio's theory, if the primordial feeling is an essential element for building the self, the self of the person who has lost the proprioception will be undermined. But in this case, the patient seems to have a normal self, despites his severe illness, and it is hard to say that the patient's core self or autobiographical self has disappeared or is damaged. It seems to be a counterexample to Damasio's argument. In this paper, in order to account for the case "The Man Who Lost His Body", I want to argue that the self is a unifying process, which is similar to Todd E. Feinberg's theory (2009). The unifying process gives us a sense of being the subject of experience. It unifies two things, the experience of here and now, and episodic memory. The experience of here and now includes the experience of inner sense (feeling of existence of body) and the experience of interaction with environment. Losing proprioception is just losing one of material, and the self remains intact. **P2**

76 Consciousness, Goedel and the "I-it" Structure of Experience Jonathan Shear, Neil Sims <jcs@infionline.net> (Philosophy, Virginia Commonwealth University, Richmond, VA)

Western philosophers generally hold that all experience is "intentional" in structure, characterized by the "I-it", observer-observed relationship. Strong arguments exist indicating that whatever

the "I" might ultimately be, continuing existence of a given "I" is a precondition for coherent knowledge and experience. Kant argued that all the parts of any proposition must be thought by a given thinker for "that" proposition to be thought at all. Similarly, all the parts of a given sensory experience must be had by the same experiencer for "that" particular experience to exist. And understanding even the simplest expressions of logic ("A is A," "A is not not-A," etc.) requires that a single thinker be aware of all of the expression's terms, and take each to have constant meaning. Russell even argued that "I-it" is the only thing that we know with absolute certainty. He later argued however that it seems impossible to give the "I-it" relationship empirical significance, and rejected it as a misleading artifact of linguistic thought. Eastern meditation traditions suggest a more empirical, less purely linguistic approach. Yoga, Vedanta, Zen, etc. often report that it is possible in meditation for all ordinary contents of awareness to disappear, leaving only a bare point of view surrounded by empty phenomenological space. Later, ordinary phenomenological contents (thoughts, internal and external sensory perceptions, etc.) reportedly come to be perceived as filling (or "superimposed on") this phenomenological space. Taking the "point of view" as the "I"-pole, and the "space" and its content as the "it" pole, these experiences (now reported by Western meditators as well) appear to give experiential content to the otherwise problematic, I-it relation held characteristic of thinking and experience in general. The hypothesis that these experiences display the phenomenological nature of the I-it relationship can contribute to our understanding of how important findings in logic and mathematics relate to consciousness. Modern mathematics generates all numbers from the null set. The fundamental notion here is that of set inclusion ("having") iteratively applied, beginning with the barest minimum – nothingness itself. If we take the notion of set inclusion as reflecting the state of recognizing content in phenomenological space, the standard generation of positive numbers can be shown to be structurally isomorphic with the sequence starting with the basic I-it experience of emptiness, "stepping back" conceptually and recognizing that experience in a new one, recognizing *that* experience in a new one, etc. Since the I-pole of experience is always phenomenologically separate from its objects, the ability to "step back" conceptually from content always remains, infinitely iteratible. This "stepping back" is something mathematicians do reflexively, but (generally) without noticing its phenomenological and logical significance. It also plays a fundamental role in the mechanics of Goedel's proof of his famous incompleteness theorem. Penrose's logical argument that Goedel's "conclusion" implies human understanding cannot be captured by algorithms has encountered difficulties. Our phenomenological analysis avoids these difficulties, arguing instead that Goedel's "method" presupposes and "uses" the I-it structure basic to human understanding, and also beyond the grasp of algorithms. **C5**

77 Consciousness, Identity, and Morality Burton Voorhees <burt@athabascau.ca> (Center for Science, Athabasca University, Victoria, BC Canada)

Questions of altruism and morality have been points of contention in evolutionary biology and evolutionary psychology for many years. Apparently altruistic behavior has been found in higher animals, in spite of the apparent loss of evolutionary fitness implied by acting for the benefit of others at a cost to oneself. Altruism has been explained in terms of acting to transmit closely related genes (kin selection), group selection, and expectations of reciprocity. On the other hand, human altruism seems to sometimes go beyond altruistic actions that provide biological or economic reward. Humans also gain psychological benefits from extending help to others, and feelings of satisfaction at 'doing a good deed' can provide sufficient reward. There is a question of identity involved. We humans tend to congregate in marked groups and to make personal sacrifices for the benefit of the group, even if it isn't composed of close genetic kin. This is because we have to capacity to (and are vulnerability to) identify with ideas, beliefs, symbolic cues, and so on. These become a part of our personal identity and, as such, evoke survival related behavior with biological foundations. If the basic identification is simply with Humanity as such this leads to a different sort of altruistic behavior than if our basic identifications are with sports teams, political ideologies, religion, racial or ethnic groups, nationalities, and so on. In human culture, altruistic behavior is generally connected with morality. A given behavior is moral if it satisfies culturally determined ideals of right and wrong, good and bad. Altruistic behavior is, in general, considered

moral and selfish behavior is considered immoral. Even in philosophical theories that reverse this connection, the 'morality' of selfish behavior is explained as something that produces a social benefit and the "immorality" of altruistic behavior is asserted because such behavior is said to weaken society. Whether there is any objective basis for morality is a point of much debate. In this paper, we suggest that there is an objective foundation for morality, although all actual behavior, moral or otherwise, is relative and context dependent. By considering the relevance of consciousness, and self-consciousness this apparent paradox is resolved. **P2**

1.11 Free will and agency

78 A Defense of the Comparator Theory of Phenomenal Agency Christopher Howard <howard.chrism@gmail.com> (Tucson, AZ)

In a recent paper, Jesse Prinz offers a critique of a prominent etiological account of the phenomenology of agency, an account according to which experiences of agency – experiences of oneself as the author of one's actions – can be explained with reference to dedicated sub-personal comparator systems concerned with motor control and production. Proponents of this account include Sarah-Jayne Blakemore and Chris Frith, who in recent work have hypothesized that the malfunction of these dedicated sub-personal comparator systems could potentially explain certain positive symptoms associated with psychotic illness, such as schizophrenic delusions of alien control. Specifically, Blakemore and Frith have hypothesized that the malfunction of these dedicated sub-personal systems in schizophrenic individuals could be responsible for the felt lack of agency, the absence of authorship associated with the schizophrenic's experience of alien control. The demonstrated plausibility of this hypothesis has naturally led a number of theorists, Blakemore and Frith included, to endorse the further hypothesis that properly functioning comparator systems could account for the felt sense of agency experienced by typical individuals in instances of ordinary, controlled bodily movement. Contrary to this hypothesis, however, Jesse Prinz has recently argued that properly functioning comparator systems could not plausibly deliver us phenomenology of an agentive self, a self that is the author of action. Rather, Prinz contends, comparator systems could at best be a source of self-as-object phenomenology, phenomenology of the self qua physical body in the world. In this paper, I set out to defend the comparator theory of phenomenal agency against Prinz' recent criticisms. Specifically, I argue that Prinz' criticisms of the comparator theory of phenomenal agency rest on the following two problematic assumptions. Namely, (1) that the functional operations associated with the comparator system could not plausibly yield as output an agentive phenomenal component, and (2) that there exists a discrepancy between the actual phenomenology associated with instances of controlled bodily movement and what we would expect a phenomenology of agency to be like if the comparator theory of that phenomenology were true. After introducing and discussing both of Prinz' main arguments in support of these assumptions, I offer some considerations that I take to motivate the rejection of each. I then conclude, in light of the demonstrated implausibility of Prinz' assumptions, that the comparator theory of phenomenal agency should not be rejected on the basis of Prinz' criticisms, and thus remains plausible as an etiological account of agentive phenomenology. **C3**

79 Saving Free Will from Science Eve Isham, William P. Banks, Pomona College; Joy J. Geng, UC Davis <eaisham@ucdavis.edu> (UC Davis, Center for Mind and Brain, Davis, CA)

In the traditional view of free will, one would expect the moment of intention to act to precede any brain activities related to the movement. In contrast, Libet et al. (1982) showed that the brain signal called the readiness potential (RP) preceded the moments in which one became conscious of his action (M) and the decision to act (W). These findings supported the deterministic view and suggested that free will is illusory. But is this claim truly valid? We approached this question by testing the authenticity of M and W. If genuine, they would always remain constant and bound to the RP. If M and W varied, then the fact that the RP preceded them would be meaningless. In Experiments 1 and 2, participants pressed a button that elicited a delayed tone. Here M and W shifted systematically with the time of the tone rather than remaining constant. In Experiment 3, the tone was used to falsely inform the participants of their speeded performance. M shifted in accordance

with the false feedback. In Experiment 4, M and W varied when using analog vs. digital clocks to tell time. Experiment 5 further illustrated that M varied with different subpopulations tested (i.e., younger, older and people living with Parkinson's disease). Our results imply that the moment of intention is not consciously accessible. Instead, these moments(M and W) are retrospectively inferred, and therefore are not bound to the RP. Hence, Libet's methodology and findings cannot be used to invalidate the existence of free will. **PL10**

80 Is Experience of Conscious Will Just an Illusion? Ling-Fang Kuo, Allen Y. Houng <sierra214135@gmail.com> (National Yang Ming University, Dept. of Life Sciences,, Taipei, Taiwan)

In Wegner's book The illusion of Conscious Will (Wegner, 2002), he proposes that conscious will has no actual causal power to actions. The experience of conscious will is the result of self-perceived apparent mental causation. However, his theory is not compatible with the research of preSMA, a key structure for voluntary action in the brain. In his book, Wegner not only provide many cases (ex: alien hand syndrome, dissociative identity disorder, schizophrenic auditory hallucination, hypnosis, automatic writing, etc.) to show that we can dissociate conscious will from action, but also proposes a theory of apparent mental causation (TAMC) to explain the relationship between 'Thought', 'Action' and 'Experience of conscious will'. According to TAMC, 'Thought' and 'Action' have their own actual causal paths, and both are unconscious processes. Experience of conscious will arises when a person infers an apparent causal path from thought to action. Whereas Wegner didn't give any evidence of an underlining neural mechanism, we can check his theory by empirical research in neuroscience. In this paper, I will reveal some studies of the brain area preSMA to show that TAMC is false. First, Itzhak Fried found that if the researcher stimulates preSMA with a low current, the subject will generate the experience of an urge to move some body part without actually moving it. (Fried et al. 1991) This finding renders a counterexample against TAMC which regards experience of will as a result of an interpretation between thought and action. Yet, in Fried's case, there is no action which can be the resource of interpretation. Second, the preSMA is located between the cognitive areas of the frontal lobes and motor-execution areas such as SMA and M1. Some scientists point out that because of the special position preSMA occupies, it has a function that transforms thoughts into actions (Haggard 2008). Moreover, some researchers found that preSMA, which is highly related to the experience of conscious will, is involved in the early part of readiness potential, which generates voluntary action.(Lang, W. et al. 1991, Yazawa, S. et al. 2000, Shibasaki, H & Hallett, M. 2006) . Base on those studies, we can know that 'Thought' and 'Action' are connected by preSMA. Furthermore, the area responsible to the experience of will relate to action, rather than a mere result of inference. In conclusion, empirical studies of preSMA illustrate the falsehood of Wegner's theory. Experience of conscious will is not a result of inference, but rather a significant element in voluntary action. **P2**

81 Free-will: The Vehicle Between Unconscious Desire and Intuitive Consciousness Vineeta Mathur, Dr.K.Maharaj Kumari <vineetamathur2@gmail.com> (Chemistry, Dayalbagh Educational Institute, Dayalbagh, Agra, Uttar Pradesh India)

The notion of karma is important for Hindus. The Hindu Karma theory assumes that each person has a huge store of memory traces from previous lives that are transferred to him or her at birth and each person is reborn so that his or her soul may be purified and ultimately join the divine cosmic consciousness. What a person does in each life, his actions or thoughts are the karma which leave their impressions on the mind sky or what in Hinduism is called Akashik Record and influences the circumstances and predispositions that will be experienced in future lives. When a situation similar to the earlier one is encountered, a memory trace arises in the consciousness as an impulse to execute an action or have a notion similar to the earlier one. This impulse does not necessarily compel the person to repeat the act or thought. He or she can still exercise Free Will on what has been laid down in the unconscious. Free Will is the power of making a reasoned choice or decision, or controlling one's actions. The will is only as powerful as the consciousness of the individual behind that will which in turn influences choice. Through free choice in the current life one can influence birth in the next life. Nurturing one's desires makes additions to one's karma. Intuitive consciousness developed by using intuition deletes desires and uproots karma.

This consciousness can be cultivated by associating with an Adept who has attained Supreme Consciousness. A study was conducted with 210 participants to see the effect of Free Will. People of four age groups pursuing various professions and careers took part. The different age-groups were senior citizens, participants in the age-group of 46-60 years, 31-45 years and youth, 15-30 years of age. The special feature was half of the group of senior citizens had deep-rooted faith in a spiritually- realized Guru. All the participants were given standardized questionnaires specially designed to measure levels of intuitive consciousness and reasoned choice of individuals for material temptations. The answered questionnaires were scored individually, the scores tabulated and variation in choices of individuals across the four different age groups was studied. The results showed that intuition and will correlated significantly for senior citizens (0.495) showed lower correlation (0.410) for the age group of 46-60 years and no correlation for age-group of 15-30 years. So it could be said that freewill became more powerful or inclined towards intuition, an aspect of elevated consciousness, with age. However, free-will of the senior group who obeyed the advice of their Guru showed high significant correlations (.784) with intuitive consciousness and insignificant correlation between free will and desire. On the basis of the results a hypothesis can be formulated that one can raise one's consciousness with age but to make the task of surrendering one's desires easier, guidance of a spiritually-realized Guru is mandatory. **C14**

82 Relating Consciousness and Control Joshua Shepherd <jls09k@my.fsu.edu> (Philosophy, Florida State University, Tallahassee, FL)

Our conceptions of consciousness and agency seem to be importantly related. However, the nature of the relationships between these notions are poorly understood and, until very recently, little explored. In this paper's early sections I argue that an important – but poorly understood – set of relationships between consciousness and agency concerns the control agents possess and exercise. In this paper-s later sections, I begin the project of mapping the relationships between consciousness and control. To structure reflection, I formulate the following two theses. CC-Weak. If consciousness does not make important contributions to the control we exercise, agency is impaired. CC-Strong. If consciousness does not control central aspects of behavior, agency is impaired. Although these theses capture something about how consciousness and control seem to relate, they clearly require elucidation. For example, these theses divide along a graded distinction between contributing to control and being in control. How should we understand this distinction? Further, what aspects of consciousness make the purported contributions, or – more mysteriously – warrant the claim that consciousness controls behavior? These issues warrant further attention, but here my quarry is an equally pressing issue. Both CC-Weak and CC-Strong assume that agents exercise control. Plausibly, consciousness contributes to control in subtle ways – ways that remain occluded from view unless we possess a sufficiently subtle understanding of the control that agents possess and exercise. We have to ask: what is control? A review of empirical and philosophical work on control reveals a fragmented literature. Although this work is suggestive, we find less help than we might have hoped. As a general rule discussions of control do not concern control itself, but rather some qualified form of control. In such discussions, the focus is the qualifier. The nature of control is left relatively unexplored. As a result, we stand in need of an account of (a form of) control that could facilitate evaluation of CC-Weak and CC-Strong. Such an account should contain an illuminating description of the form of control at issue, as well as explain what it means to assert that an agent possesses or exercises the form of control at issue. In the remainder of the paper, I offer a sketch of a form of control that I think fits the bill. Intentional control (exercise). The exercise of intentional control is constituted by an agent's activity, when that activity successfully serves motivational states. After offering some elucidation of intentional control, I discuss its theoretical promise. I argue that intentional control is well-placed to facilitate evaluation of CC-Weak and CC-Strong. Further progress in this connection, however, will require a more complete account of intentional control – an account that explains what it means to assert that an agent possesses or exercises intentional control to some degree. In closing, I argue that the way forward here requires us to account for the dimensions of intentional control – the features that, in mediating degrees of control, constitute its possession and enable its exercise. **C3**

83 Randomness, Higher Type Fuzzy Sets and Models for Free Will Prem Sewak Sudhish, D. Swanti <sudhish@alumni.stanford.edu> (Physics and Computer Science, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Is free will really free? How random are conscious decisions? This question has been deliberated on extensively by machine learning and artificial intelligence enthusiasts on one hand and philosophers and theologians on the other. With current knowledge and our understanding of science, it is perhaps not possible to refute either standpoint; while repeatability for free will has not been established yet, the claim that the course of action chosen fromamong various alternatives was destined to be the one has not been falsified either. In this paper, we compare the notion of exercise of free will from the stance of eastern tradition as well as from a computer science perspective. While the eastern and western religious scriptures hold the agent largely responsible for their "decisions" through the exercise of free will, computer scientists areamused by the thought that what might look "random" may be pre-programmed, on lines of pseudo-random number generators that produce seemingly random numbers that are in fact, completely deterministic. Pseudo-random numbers are an oversimplification for a profound concept as free will but this leads us to the thought on whether it is possible at all to build a mathematically sound model for free will. Free will is considered to be related closely to intuition, intelligence and thought, which humans are able to express best through language than precise mathematical expressions. We invoke fuzzy logic paradigm and consider the transition from ordinary crisp sets to fuzzy sets, where the membership of an element in a set is not necessarily 0 or 1. These fuzzy sets are useful in modeling the linguistic uncertainty in expression of human thought. However, even though an element may or may not fully belong to a set, the membership functions are specified exactly, which clearly seems counter-intuitive, since if the exact value of an uncertain quantity cannot be determined, it would also be impossible to determine its exact membership in a fuzzy set. This leads to the idea of type-2 fuzzy sets as an extension of the concept of classical type-1 fuzzy sets. Type-2 fuzzy sets are characterized by a fuzzy membership function, that is, the membership value or grade for each element of the set is a type-1 fuzzy set itself. It has been claimed that the uncertainties that cannot be modeled using classical fuzzy logic can be modeled using type-2 fuzzy logic. However, the criticism applicable to type-1 systems also applies partially to type-2 systems. Even though the membership in type-2 systems is fuzzy, it is again specified exactly, which is counter-intuitive. We conclude that no finite-type fuzzy set would completely be able to represent uncertainty and thus, a type-? fuzzy system would be needed for this purpose. **P1**

1.12 Intentionality and representation

84 An Account of the Distinctiveness of the Phenomenology of Experiences in Different Sense Modalities Michael Arsenault <mike.arsenault@utoronto.ca> (Toronto, Ontario Canada)

Representationalism is the view that the phenomenal character of a perceptual experience is determined by its content. It seems to follow from representationalism that visual and tactile experiences of an object's shape have the same phenomenal character – that there's no difference between what it's like to visually experience the shape and what it's like to tactilely experience the shape. But this seems false. After all, one can introspectively notice the difference between a visual experience of an object's shape and a tactile one even when one is both seeing and feeling that shape at the same time. Thus the representationalist lacks an account of the distinctiveness of the phenomenology of experiences of "common sensibles" in different sense modalities. My goal is to provide the representationalist with just such an account, drawing on recent empirical work on intramodal attention (e.g., Talsma 2006, 2008 and Macaluso 2002). I begin with a seeming platitude: each sense represents a different range of properties. Vision represents, e.g., colour and shape, whereas touch represents shape and hardness, etc. The latter fact can't by itself explain why seeing a given shape feels different from touching it since, as noted above, seeing a shape feels different from touching it even when you're seeing and touching the object (shape) at the same time. But certain facts about intramodal attention provide the needed addition. Specifically, when you visually attend to an object's shape, the effects of attention spread to your representations of other properties apprehended through vision, but not to those apprehended through touch. Hence

if I visually focus on an object's shape, my representation of its colour will be enhanced (e.g., may become more fine-grained) as well, though my representation of its hardness will not. The same seems true of the other senses. Consequently, on the assumption that noticing phenomenological differences between visual and tactile experiences of shape requires switching between visual and tactile attention, we can explain why a visual experience of shape feels visual, as opposed to tactile, by appeal to the fact that whenever you visually attend to shape, the representation of other properties in the range unique to vision is enhanced relative to the range of properties represented through touch, causing the visual experience of shape to take on a distinctly visual feel by association. Nonetheless, we retain the representationalist claim that insofar as two experiences in different modalities represent the same information, they have the same phenomenal character. **C13**

85 Attention and Enactive Intentionality Michael Bruno <michael.bruno@gmail.com> (Philosophy and Religion, Mississippi State University, Mississippi State, MS)

Enactive theories of perceptual consciousness maintain that experience is a kind of active achievement. According to enactivism, the phenomenal characters associated with specific perceptual experiences are grounded by a subject's grasp of certain dynamic relationsamong endogenously generated movements, exogenous changes in the surrounding environment, and sensory feedback generated by those movements and changes. Three central components of the enactivist framework are (i) an emphasis on the inadequacies of any purely representationalist account for the character of experience, (ii) an insistence that there is a close relationship between consciousness and attention, and (iii) the claim that the physical substrates of experiences are spread across brain, body, and world. Each of these elements are individually controversial and critics have pointed out tensions between them. Focusing on the role attention plays in structuring the character of visual experience, I will argue that these tensions can be reconciled by developing an account of enactive intentionality that is at once non-representational and internalistic, while being compatible with (iii). The specific account I defend will draw on and expand upon recent work by Charles Siewert (2006). **C11**

86 How Thoughts Feel: The Cross-modality of Cognitive Phenomenology Christian Coseru <coseruc@cofc.edu> (Philosophy, College of Charleston, Charleston, SC)

Although most philosophers agree that mental states such as beliefs and desires have intentional content, the notion that thoughts are also distinguished by their phenomenal character is controversial. Indeed, some philosophers claim that a clear separation between phenomenal mental states (which are said to lack intentionality) and intentional mental states (which are said to lack phenomenality) ought to be observed in mapping our cognitive architecture. This denial of the phenomenal character of thought typically reflects a commonly observed distinction between two types of mental states: (i) thoughts and desires, usually classed under the rubric of propositional attitudes, and (ii) sensations and sense impressions, which are said to lack intentional content and instead be characterized by qualitative properties. The basic intuition behind this distinction is that sensations are not about a specific object but characterized by a specific qualitative feel (or qualia). In recent philosophy of mind, several authors have advanced the view that occurrent intentional mental states such as thoughts and desires do in fact have a distinctive phenomenal feel or character (Goldman 1993, Strawson 1994, Siewert 1998, Horgan and Tienson 2002, Pitt 2004, Horgan, 2011), claiming that a radical separation between sensations and thoughts is phenomenologically untenable. These philosophers claim that the intentionality of mental states cannot be simply a function of their underlying causal correlates in the brain (as proposed by,among others, Lormand 1996 and Kim 2005). Drawing from the phenomenology of language comprehension (which goes beyond syntactic and semantic equivalence to include factors such as communication awareness, the relation between world and word knowledge, and the pragmatic context of language acquisition), this paper argues that qualia are conscious mental states and as such share certain features with propositional attitudes, and vice versa, that propositional or intentional content in turn displays qualitative features. Two types of arguments are examined: phenomenological (which take into account the contrasting aspects of conscious experience) and epistemological (which rest on the widely shared view that we have a special kind of epistemic access to our own mental states). **C13**

87 The Perceptual Consciousness of Moral Properties Parker Crutchfield <parker.crutchfield@gmail.com> (Philosophy, Arizona State University, Tempe, AZ)

High-level theory is the defensible view that one can become aware of high-level properties (e.g., the property of being a pine tree, a friend, an apple, one's mother) in perceptual experience. This is opposed to the view that claims that one cannot become aware of high-level properties in perceptual experience. According to this opposing view, awareness of high-level properties is downstream of perceptual awareness, and may involve inference or interpretation of low-level sensory information.This paper assumes that high-level theory is true. But if it is true that one can perceptually experience high-level properties, which high-level properties is one able to experience? Surely one is not capable of perceptually experiencing all high-level properties. For example, neither you nor I are capable of having a perceptual experience of the property of being the first-born child in London in 1702. So, it cannot be that one is capable of having perceptual experiences of all high-level properties. What, then, determines which high-level properties one is capable of having experiences of? I begin the paper by arguing that previous attempts to answer this question are inadequate. After a brief discussion of what it means to be familiar with a property, I offer several arguments for the claim that any property with which one is familiar is a property that one is able to have a perceptual experience of. In other words, the way to determine whether a given property is a property that one can have a perceptual experience of (and not just become aware of it non-perceptually) is to see if that property is a property one is familiar with. After defending this claim from various objections, I argue that among the properties some people are familiar with are moral properties. Thus, some people can have perceptual experiences of wrongness or rightness. **C18**

88 Experiences of Absence Anna Farennikova <anyavf@live.unc.edu> (Philosophy, University of North Carolina at Chapel Hill, Cambridge, MA)

Intuitively, we often see absences. For example, if someone steals your laptop at a cafe, you may see its absence from your table. However, absence perception presents a paradox. On prevailing models of perception, we see only present objects and scenes (Marr, Gibson, Dretske). So, we cannot literally see something that is not present. This suggests that we never literally perceive absences; instead, we come to believe that something is absent cognitively on the basis of what we perceive. But this cognitive explanation does not do justice to the phenomenology. Many experiences of absence possess immediate, perceptual qualities. One may further argue that the ability to detect certain absences confers strong adaptive advantage and therefore must be as primitive and fundamental to humans as seeing positive things. In this paper, I argue that we can literally see absences; in addition to representing objects, perception represents absences of objects. I present a model of seeing absence based on visual expectations and a visual matching process. The proposed account has important implications for the role of imagery in perception. It has been previously shown that imaginative projections can restore missing sensory information and thus virtually complete present objects; or, they can inform what the non-present objects are like. On the current account, imagery does not merely represent sensory objects in their absence; it also represents their absences via a mismatch. The phenomenon of seeing absence can thus serve as an adequacy-test for a theory of perceptual content. If experiences of absence are possible, then we have another reason (following Siegel) to reject the view that perceptual content is restricted to colors and shapes. Furthermore, if the proposed account is correct, then we have grounds for dissociating seeing absence from other imagery-based phenomena termed "perceptual presence-in-absence" (Noe, Macpherson), including imagination and modal andamodal completion (the Kanisza triangle, seeing partially occluded objects or backs of objects). **C18**

89 Getting Delusions Right Verena Gottschling <vgott@yorku.ca> (Department of Philosophy, York University, Toronto, Ontario Canada)

There is only one issue uncontroversial if it comes to (monothematic) delusions like subjects claiming that their partner is an imposter (Capgras), that they are dead (Cotard), or deny ownership of body parts (Somatoparaphrenia). These delusions are very hard to explain. Recently, we witness a new trend in this debate. I argue that this trend is inauspicious and present a revised

account of delusions. According to the new trend, delusions are paradigm case of situations requiring embodied approaches and phenomenological approaches. (Gallagher 2009, Ratcliffe 2009) According to this new picture, all the competing existing traditional accounts necessarily fail: pure top-down accounts as well as bottom-up or neuropsychological accounts, and also hybrids of any possible kind. Top down accounts (Campbell 2001, Graham/Stevens 1984) are the standard view: subjects suffering from delusions appear to have pathological beliefs – a belief that has gone wrong in some way. (DSM-IVTR, 2000). Defenders of bottom up accounts, cognitive neuropsychology, argue that in delusions we find unusual experiences. (Gold/Hohwy 2000, Gerrans 2001, 2011) which then are rationalized. So subjects end up with false beliefs, but only the experiences are abnormal, the reasoning is not. Contrary to the standard view, the false belief is not what characterizes delusions. Both accounts are not exclusive, several kinds of hybrid accounts (emphasizing different aspects) have been proposed (Garety et al. 2001, Ramachandran/Bakeslee 1998, Young/Leafhead 1996, Graham 2010). According to the new trend, none of these accounts can be successful because they presuppose an internalist view. We need a paradigm shift and new embodied concepts drawn from phenomenology. This account should then be used to explain all mental disorders; embodied views and phenomenological insights are indispensable for a successful understanding of mental illness. My argument contains three parts. First, I argue that the argument for the new framework is inconclusive, incomplete and based on severe conceptual misunderstandings of the views criticized. Second, I show how versions of the traditional accounts, especially for certain bottom-up and hybrid accounts, can avoid the mentioned problems. And third, I argue that the proposed improved conceptual framework is in fact confronted with even bigger problems than the old ones. In fact, the proposed explanatory advancements turn out to be based on misunderstandings and vague unhelpful concepts. We have good reasons to stick with the existing competing accounts to explain delusion. The attempt to use delusions to motivate the suggested paradigm shift fails. I end by pointing out an improved account to explain delusion: The real issue is the kind of internalist accounts used, not the fact that the accounts are internalistic. There are properties other than being internalistic that some accounts have in common, and these properties make them vulnerable to some of the objections. I show how a neuropsychological approach of delusion which incorporates motivational and affective elements, is not vulnerable to the objections. (McKay/Langdon/Coltheart 2008, Spezio/Adolphs 2008) We need a better and fine grabbed interface between the internal and the external, combined with a more flexible account of different levels of representation and experience. **C20**

90 Synesthesia and Fodor's Theory of Concept Acquisition Matt Keeler, John Camacho <matthew.keeler@ttu.edu> (Texas Tech University, Lubbock, TX)

This paper is concerned with the implications of Jerry Fodor's solution to the doorknob/DOORKNOB problem, particularly the non-cognitivism that he says is required to solve it. We begin by briefly explaining Fodor's paradox of concept learning, followed by his more recent arguments in favor of a brute-causal acquisition story. We then argue that, on Fodor's story, stereotypes are causally inefficacious without an extensive set of non-intentional, neurological locking mechanisms – what he calls the attractor landscape. The attractor landscape works for Fodor in similar fashion as the sensorium works for Empiricists, namely, as a set of concepts lying in wait for particular triggering experiences. This leads to an evolutionary worry: if concept acquisition is ultimately a non-intentional neurological triggering process – a process that is itself ultimately determined by our genetic endowment – then we should see a minority of individuals who, as a result of inheriting a particular genetic mutation, cannot lock a concept, or who trigger a concept in response to the wrong stereotype – similar to a synesthete, who (perhaps) has inherited a particular genetic mutation affecting the sensorium. But because it is doubtful that there are such people, there is good reason to think that Fodor's non-cognitive, neurological nativism is false. **P2**

91 Speech Projectivism Justin Olaguer <emailjustinsamuel@gmail.com> (Philosophy, University of Houston, Houston, TX)

In this talk, I argue that a projectivist view of speech perception is correct: speech perceptual processes result in the projection of attributes onto audible disturbances not objectively present in

the external environment of the subject. The content of speech experience therefore exceeds the plausible range of represented physical properties- so, listeners' sui generis attributions determine speech phenomenality. This claim is important because it restricts the set of acceptable versions of Intentionalism, a strong form of which holds that, "Phenomenal character (or what it is like) is one and the same as a certain sort of intentional content" (Tye 1995, 137). My aim here, in the spirit of Pautz 2010, is to take empirical data seriously in a way popular philosophical theories of mental representation too often do not. Focusing on speech perception (as opposed to pain, taste and olfaction) yields another (perhaps even more potent) way to show why externalistic, reductionistic accounts of experience do not comport with observations. Specifically, I contend research provides evidence that falsifies "Tracking Intentionalism", the view perhaps most notably associated with Fred Dretske and Michael Tye. This version of intentionalism, in the approximation of Brian Cutter and Michael Tye (2011), claims that, "your current neural state has the content that p in virtue of being a token of some (neural or functional) state type with the following property: under optimal conditions, it is tokened if and only if p, and because p" (91). Under optimal conditions, however, the speech perceptual apparatus is consistently responsible for states of a certain phenomenal content irrespective of any particular property set or state(s) of affairs encountered by the subject. Speech perception is radically promiscuous, so to speak. I argue that the projectivist view just is the contemporary, empirical understanding of speech perception. In short, there is no understanding speech without first assuming projectivism. This is because audible disturbances in no way bear the properties perceived: speech sensibilia are wholly the stuff of perceptual attribution, not acoustical stimulation. Perception of speech only happens if the listener assigns (projects) certain attributes to stimuli objectively bearing no such attributes. So, in perceiving properties no audible disturbance bears (i.e. in perceiving properties instantiated nowhere), nothing is tracked per Tracking Intentionalist specifications. On the whole, philosophy too often overlooks speech perception: in my view, it ought to inform contemporary debate about sensory consciousness and the nature of qualia. References: Brian, C., and Tye, M. 2011. Tracking Representationalism and the Painfulness of Pain. Philosophical Issues 21. Pautz, A. 2010. Do Theories of Consciousness Rest on a Mistake? Philosophical Issues 20. Tye, M. 1995. Ten Problems of Consciousness. Cambridge: MIT Press. **C18**

92 Phenomenal Demonstratives David Pitt, <dpitt@calstatela.edu> (Philosophy, California State University, Los Angeles, CA)

According to a widely held view, the semantic content (the meaning) of a demonstrative expression ('this', 'that'), and of the demonstrative concept it expresses, on a occasion of its deployment is just the thing that it refers to. Hence, on this account, if two thinkers think 'that is red' of two distinct things, what they have thought is different; and it is different because the things they have demonstratively referred to in thought are different. Their contents are thus (in part) externally determined. But there are reasons to think that the contents of thoughts (and their constituent concepts) are phenomenally constituted – i.e., that there is a qualitatively distinctive kind of experience of thinking in general, that particular thoughts differ in such experiential properties if and only if they differ in their semantic content, and that these experiential properties in fact determine content – what is thought – on any given occasion. And if the phenomenal properties of experiences are determined entirely by states of affairs internal to experiencers, then it would seem to follow that if two thinkers think a demonstrative thought, like 'that is red', of two distinct (external) things, then what they have thought is, contrary to the widely held view, the same. They may have thought about different things, in the sense that the referents of their demonstrative concepts are different; but their thoughts are identical in content, because phenomenally identical. This paper develops an account of demonstrative concepts and thoughts (and, by implication, demonstrative expressions and sentences containing them) consistent with the internalist, phenomenal individuation of their semantic contents described above. In particular, I suggest, as a starting point, that perceptual demonstrative concepts (demonstrative concepts used to refer in thought to consciously perceived objects, as in 'that is red', 'this is too hot', 'this is not that', etc.) have the (phenomenally constituted) descriptive content the thing Iam attending to. I then offer alternative accommodations of the intuitions used to motivate the standard externalist view, and

briefly sketch a few ways in which this approach could be extended both to non-perceptual uses of demonstrative concepts and to complex demonstrative concepts ('this shoe', 'that foot'). **C17**

93 When Perception Goes Crossmodal Tamar Weber <weber@humnet.ucla.edu> (Philosophy, UCLA, Los Angeles, CA)

In a famous passage from his Essay on Human Understanding, John Locke cites a problem posed to him by Molyneux. In contemporary terms the question can be summarized as follows: Would an early blind subject with the ability to haptically distinguish a cube-shaped object from a globe-shaped object, be able to make the same discrimination visually at the moment her vision is restored? Recent empirical work suggests that the answer is "no", though visual recognition of haptically familiar object shapes can be achieved within a few days (Held et al., 2011). Further studies have shown that some crossmodal calibration can begin after only a few trials. In terms of current perception research Molyneux's question raises several distinct issues worth teasing apart. These include: the role of crossmodal representation in development and learning, the modularity of modality-specific sensory processing, as well as the functional and computational relations between representations of a single property across modalities. There is strong empirical evidence that information from one modality can affect how information from another modality is processed. (See, for example, the McGurk illusion and the rubber hand illusion.) However, it is unclear whether the evidence is neutral between different theories of perceptual representation. The aim of this paper is to clarify the notion of crossmodal representation and its relevance to competing theories of perceptual representation. I focus on the following two questions: (1) Are perceptual attributives abstractamodal representations, or is a given objective distal property represented only in a modality specific way? (2) Could representation of the same property in different modalities ground the acquisition ofamodal concepts that pick out that property? I discuss the recent empirical findings that bear on Molyneux's question as well as two cases of crossmodal representation: visual-haptic (and proprioceptive) crossmodal representation, and visual-auditory crossmodal representation. Though very different, both cases have been considered specifically with respect to the representation of spatial properties such as distance, spatial orientation, and bodily awareness. Finally, I consider how reflections on the questions above and recent empirical findings might bear on a theory of the unity of consciousness. **C13**

1.13 Miscellaneous

94 A Correlational Analysis of Physical, Mental, Emotional, Spiritual, Social and Self Consciousness Sona Ahuja, Prof. Ranjeet Kaur Satsangi <sonaahuja_8@yahoo.com> (Pedagogical Sciences, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Consciousness refers to the totality of the impressions, thoughts, and feelings which make up the person's conscious being; perceiving the whole set of one's mental episodes. This constitutes (private) meta-self-awareness, because there is a perception of the totality, the whole set, and the perception is of internal events (impressions, thoughts, and feelings). Thus, by consciousness we mean our level of perception about ourselves and the world around us. The higher the perception, the greater the consciousness (Morin, 2004). Consciousness involves a recognition by the thinking subject of its own acts and affections; an awareness of an inward psychological fact; and/or intuitively perceiving knowledge of something in one's self (Natsoulas, 1978). Consciousness can be classified into six categories: physical, emotional, mental, spiritual, social and self consciousness. The present study is an attempt to find the intercorrelation between each of these two categories. The study has been conducted on 135 students of Faculty of Education, Dayalbagh Educational Institute. The tool "Consciousness Quotient Inventory" developed by Bardazau (2011) was used to collect the required data. SPSS 16.0 was used to analyze bivariate correlation between the selected variables. The findings of corrrelational analysis reveal that: (i) there exists positive moderate correlation between mental and social consciousness; mental and self consciousness; spiritual and self consciousness, significant at 0.01 level. (ii) there exists positive low correlation between physical and emotional consciousness; emotional and mental consciousness; emotional and social consciousness; emotional and self consciousness; mental and spiritual consciousness; spiritual

and social consciousness; social and self-consciousness; emotional and spiritual consciousness, significant at 0.01 level. (iii) physical and mental consciousness; physical and self-consciousness have insignificant positive negligible correlation (iv) physical and social consciousness are positively correlated and this low correlation is significant at 0.05 level It can be concluded from the findings that the inter-correlations between physical, emotional, mental, spiritual, social and self consciousness is not negative. Thus, with the increase in one of the categories of consciousness the other category increases. The moderate positive correlation between mental and social, mental and spiritual, spiritual and self consciousness indicates that inter-correlation between these categories is higher than the other categories which is either low or negligible. **C23**

95 Rigorously Building and Measuring for Scientific Consensus Brent Allsop, Steven Lehar; Simon Raggett; Richard Wilson; Richard Ruquist; <brent.allsop@canonizer.com> (Canonizer.com, Sandy, UT)

Our goal with the Consciousness Survey Project (http://canonizer.com/topic.asp/105) is building as much consensus as possible on the most important things, determining the most concise language to describe such, and rigorously measuring for consensus in a way that allows everyone to definitively see any falsified trends. For several years now, volunteers have been attending conferences, interviewing, and 'canonizing' experts' views. Our tool is the all volunteer driven, leaderless, crowd-sourced, wiki with camps, bottom up, open survey system being developed at Canonizer.com. Even high school students can help doing the majority of the wiki work, being directed by the supporting experts. The diverse set of publications, previous attempts at surveys, Wikipedia, the internet... all seem to support the pervasive belief that there is no expert consensus on much of anything in this field. While our results are still far from comprehensive, it already appears that, after all, there could be a significantamount of consensus on many important things. To date, it has never been possible for as many diverse experts as we have participating, to develop any kind of consensus on much of anything. The current consensus clearly indicates the most fundamental issue to be whether or not consciousness is approachable via science. About 33 of the 35 participators agree that it is. At the next level down, surprisingly, there is almost as much consensus around what the experts recently unanimously agreed to call "Representational Qualia Theory". (http://canonizer.com/topic.asp/88/6) There is clear expert consensus on many issues at this level, such as where redness is located (not on the surface of the strawberry) and about the "Quale Interpretation Problem" describing why qualia are ineffable and how to overcome such. Below this are various competing theories about just what redness is including the leading "Mind-Brain Identity" camp. At this level, finally, some significant supported competing camps start to appear such as "Higher-dimensional Theories" and "Panexperientialism". Things start to get even more dynamic at the next level down, where David Chalmers' "Functional Property Dualism" established a clear early lead. Despite this camp's continued growth, the competing "Functional Property Dualism" camp seems to be on the verge of overtaking this lead. Where Chalmers predicts if you have the right 'functionality', regardless of if it is neurons, computer chips... you will get redness. Material Property dualists are predicting that it is the right material that has redness, and without it, there is no redness. This minority, yet accelerating camp includes Hameroff's Orch OR theory, which assumes we need to descend below the quantum level to solve this riddle while a lesser camp is predicting ineffable properties can just as easily be observed and effed in any classical or macro level system – maybe even in bouncing billiard balls, sunsets, and so on. Our goal is to expand this survey to include all leading experts and theories in this field and to track the developments until science falsifies all but one theory, forcing all experts to adopt the theory with the highest objective support. **P1**

96 Philosophers' Brains: Could Philosophical Beliefs Have Neural Counterparts? Nick Byrd <nick.a.byrd@gmail.com> (Boulder, CO)

Neuroanatomical, neurobiological, and neurocognitive variances can correlate with variances in self-reported beliefs. For example, self-reported political conservatism correlates with different neurocognitive mechanisms for self-regulation and different brain structure than self-reported political liberalism. In this paper, the author considers the potential intracranial counterparts of

self-reported philosophical beliefs. The hypothesis is this: neuroanatomical, neurobiological, and neurocognitive variances will correlate with various proclivities towards particular philosophical beliefs. To bolster the hypothesis, the author begins with a series of germane studies. The author then presents the potential implications of the hypothesis, the potential objections to the hypothesis, and the potential difficulties in testing the hypothesis. **P2**

97 A Cognitive Model of the Sense of Embodiment in a (Rubber) Hand Glenn Carruthers <glenn.rj.carruthers@gmail.com> (ARC Centre of Excellence in Co, Macquarie University, Sydney, New South Wales Australia)

The rubber hand illusion (RHI) is the experience of an artificial body part being a real body part and the experience of touch coming from that model. An explanation of this illusion takes significant steps towards explaining the experience of embodiment in one's own body. I present a new qualitative cognitive model to explain the RHI. I argue that the sense of embodiment arises when an on-line representation of the candidate body part is represented as matching an off-line prototype representation of what one's body is usually like. The distinguishing feature of this model is the off-line body representation and the process of matching an on-line model to an off-line model, both of which are to be understood in terms of a conceptual space. I close by suggesting that Tsakiris' model cannot not account for non-visual forms of the illusion and considering future directions for completing the "conceptual space" model. **C11**

98 The Importance of Awareness of the First-Person Aspect and the Third-Person Aspect Han Yu Chu, Thomas Benda <j7102@ms33.hinet.net> (Taoyuan County, Taiwan)

In this paper, I would like to point out that the unawareness of our usage of the first-person aspect and the third-person aspect during our thinking causes many problems in philosophy hard to solve. Here by first-person aspect and third-person aspect, I do not mean subjective and objective views, but two innate abilities that every normal person has and uses in daily life. We can think in one of these two aspects or in both of them, while some concepts require both or one of these two aspects to be understood. For example, knowing what is "I" require both first-person aspect and third-person aspect, but a person can see the world only in first-person aspect while having the awareness of the concept "I". In other words, to think in these two aspects and to understand concept in these two aspects are not necessary relevant. What does that mean, then, by thinking in these aspects? A man in a room and sees the room with his own sight is what I refer to the first-person aspect; while the man pictures the sight of himself in the room is what I refer to the third-person aspect. Furthermore, the third-person aspect depends on the first-person aspect to a certain degree, and cannot exist alone. These two kinds of aspect are so intuitive that we usually are not aware which aspect we are using during our thinking and this causes many problems in philosophy. Take George Berkeley's point of view for example, he asserts that everything exists in mind and things have to be perceived to exist. In his argument, "we perceive only ideas" is one of his premises which in my structure a premise from first-person aspect. Russell objects to Berkeley's argument by pointing out that there'sambiguity in Berkeley's argument that something depends on the mind while some have relations with the mind. This is a third-person objection which already assumed that not everything exists in mind and we perceive not only ideas. Russell did not raise an objection to attack Berkeley's argument but have his one point of view on a totally different foundation. Use an argument which is from third-person aspect to oppose an argument from first-person aspect will not actually prove anything and vice versa. However, this does not mean that the first-person aspect contradicts the third-person aspect. In ethics, having free will, in my view, is a concept from first-person aspect and being determined is from third-person aspect. Without being contradictory, these two concepts could exist at the same time since they belong to different aspect and they can even be combined together harmoniously. As this example shows, I suggest that we should be careful about what aspect we are using to avoid such fallacy. It would be impossible to make these two aspects together a new one, just like we cannot be in the box and outside the box at the same moment, but we can still get a more complete picture from these two aspects. **P2**

99 Exploring a Relationship Between Psychological Trauma and Synesthesia Lynn Goode <goodelynn@gmail.com> (Smith College School for Social Work, Houston, TX)

Lynn Goode, a synethete, returned to graduate school at Smith College School for Social Work mid-life to become a psychotherapist after a long career in the arts. Lynn researched and studied the relationship between psychological trauma and synesthesia, **Pre-Conference Workshop**

100 The Phenomenological Mind in the Manifold Context of Lived Experience: A Discussion on Accessibility, Intentionality and a Distinct Phenomenal Temporal Ontology Matthew Houdek <mthoudek@syr.edu> (Syracuse, NY)

Given the private nature of subjective consciousness, third-person, scientific explanations of qualia inevitably fall prey to the characteristic inaccessibility defining the problem in the first place, i.e. a subject's phenomenological world is only 'knowable' from the single point of view (SPOV). The SPOV hypothesis, then, accordingly demands a rigorous and integrated methodology, one that marries first-person phenomenological and third-person cognitive/neurosciences. Such methodologies along with the leading theories of consciousness in philosophy of mind (HOT theory, self-representationalism), differ in design, thesis and scope, but tend to agree on an intentionality and representation based conception of mind-body-world (MBW) relation. The nature of the MBW relation is what a science or theory of qualia essentially wants to define (thus closing the explanatory gap). – Employing an empirically conceivable thought experiment, my presentation primarily focuses on the transitive character of an embodied and embedded subject's "manifold context of lived experience", making an appeal to the efficacy of subtle intentional objects received via secondary sensory modalities. I argue that a subject's phenomenological totality is distinctly sui generis, individually constituted by a (finite) manifold of intentional data of three types: (i) primary (the intentional object Iam consciously "taking"); (ii) periphery (objects Iam somewhat aware of but not paying attention to); and (iii) subtle (objects received through other sensory modalities that Iam not often aware of, but which still effect phenomenal feel). The three types of intentional data have a combination of explicit and implicit effects on the "raw feel" of consciousness, such that an unreflecting subject may hold that qualia of primary intentional data is all that is "going on", all that is SPOV detectable (and thus all that is representational in HOT). However, I explicate the phenomenological efficacy of such subtle influences through clear examples, arguing that due to the manifold context, representational theories of consciousness (as well as integrated methodologies) cannot account for the relation between qualia and the psychological features of mind. I argue that HOT theories of consciousness represent an incomplete and categorically limited view of phenomenal consciousness, and that to differentiate between intransitive and transitive consciousness inevitably erroneously confines consciousness to those intentional objects that we have access to, restricted further by our temporal dogma (the linear way that humans view time). That is, HOT theoretical constructs may categorize/catalogue various phenomenal types; i.e phenomenal states constituted by their implicit intentional state, but I argue that P-types are not what the types are 'types of' – the phenomenological mind itself. I differentiate between the former and the latter by arguing for a distinction between a phenomenal and psychological temporal ontology, and moreover, a distinction between phenomenal states (as perpetuum mobile) and the phenomenological mind, which I explicate through my discussion on intentionality and the manifest efficacy of the manifold context of lived experience. **P2**

101 Internalism and the Phenomenology of Perception Chad Kidd <chad.kidd@auburn.edu> (Philosophy, Auburn University, Irvine, CA)

In this paper, I want to present two ways to delineate the structure of the subjective character of perceptual experience. One is a traditional 'introspective' methodology, which is prominent in 'phenomenological' theories of consciousness today. The other is a 'transcendental' methodology that was prominent in Husserl's phenomenology. I illustrate the transcendental approach by applying it in an *argument* for the acknowledgement of the phenomenal particularity of object-seeing – the subjective appearance of the individuality of the perceived object. **C18**

102 The Extended (Emotional) Mind: Evidence from Infants Joel Krueger <joelk@hum.ku.dk> (Philosophy, University of Copenhagen, Copenhagen, Denmark)

According to the extended mind thesis, some mental states may be partially constituted by external features of an agent's environment. What about other minds? After defending the extended mind thesis, Andy Clark and David Chalmers ask, "What about socially extended cognition? Could my mental states be partially constituted by the states of other thinkers?" (Clark and Chalmers 1998). Given the shape of their prior arguments, Clark and Chalmers appear to conceive of this possibility in terms of information-processing and causal-functional roles. An unusually interdependent couple, say, might be said to literally share beliefs or memories: one partner might consistently and reliably feed the names of individuals to the forgetful partner at various social gatherings. Certain mental states of one partner are thus poised to play an analogous functional role in the psychology of the other. Together the two form a tightly coupled name-remembering system. Instead of pursuing an information-processing perspective, I adopt a phenomenological orientation. I consider the possibility of an even deeper sort of sharing, one that reaches down into the inner structure of phenomenal consciousness. Focusing on shared emotions – and drawing upon arguments implicit in Merleau-Ponty's (1964) essay, "The Child's Relations with Others", as well as empirical work on exogenous attention and mutual affect regulation in early infancy – I argue that the phenomenological structure of some early infant-caregiver dyadic engagements is best described as involving joint subjects. Call this the "joint ownership thesis" (JT). I defend JT and argue that, from the start, experience is constitutively social in that some phenomenal states (e.g., emotions) are jointly owned. I further argue that JT holds promise both for dissolving the epistemological problem of other minds and for specifying a crucial mechanism at the root of our basic social cognitive capacities. **C11**

103 The Space of Consciousness Crystal L'Hote <clhote@smcvt.edu> (Philosophy, St. Michael's College, Burlington, VT)

Clark and Chalmers argue that mental states and processes sometimes physically extend beyond the body-brain to include as proper metaphysical parts iPhones and other devices. The extended mind thesis has enjoyed especial welcomeamong those who endorse computational functionalism. I begin by suggesting that the extended mind theorist has conflated physical extension with intentionality, and that the inadequacies of brain-centered views cannot be met by what is in effect simply extending the brain. More extension does not add up to intention. Although these extended mind theorists are right to think that something dazzling about the mind is missing from a brain-centric picture, what is missing from that picture is acknowledgement of that other way the mind extends – via intentionality and consciousness. The phenomenologically-inspired argument of Noe and Gallagher does travel some distance toward correcting the strategy of the computational functionalist, but even their work does not yet go far enough. For instance, while these phenomenologists maintain that consciousness-as-intentional that extends the mind (and body) out and into the world – that the mind-as-such extends in this way – the apparent conclusion is that the mind thereby extends into a space that is itself mind-independent, i.e., that the mental states and processes have a spatio-temporal physical location that is in principle independent of all experience. In the main, computational functionalists and phenomenologists appear to agree in their conclusions. I argue that the phenomenological extension is more satisfying than computational, but defend the hypothesis that it does not yet go far enough, that the best support for any extended mind thesis will dispense with the realist, even physicalist (in a sense), notions of space and location. More generally, I defend the hypothesis that any account on which mental states and processes are said to be located in space – whether inside or outside the body-brain – will require the supplement of a non-realist account of space. Of course, the mind-independence or not of space is supposed to be a matter that is independent of the space of the mind. To this extent, the hypothesis I defend challenges orthodoxy. **C11**

104 Retrocausality: A Naturalistic Framework in Mental Monism Peter Lloyd <peter.b.lloyd@fencroft.com> (Metronexco Ltd, London, England United Kingdom)

Some psi experiments have yielded evidence of what appears to be a causal influence of consciousness on the physical world, acting backwards in time (e.g. Helmut Schmidt 1978, Daryl Bem 2011). This poses an even greater explanatory problem than a straightforward causal influence of consciousness on physical systems. Some have appealed to quantum physics for an explanatory framework that can accommodate retro-causality. Although quantum physics permits isolated microphysical systems to behave in ways that could be described as retrocausal, there are severe problems in using such physics to explain psi retrocausation. First, from a philosophical standpoint, consciousness simply does not occur as a term in the equations of quantum physics, so it is logically impossible for physics to explain the effect of consciousness on a physical system. (This is one half of the well-known Hard Problem of David Chalmers.) Second, from a physics standpoint, the known cases of retrocausality, like other phenomena of quantum weirdness, occur in isolated microphysical systems only, and it is hard to imagine this ramping up to entangled macroscopic systems at room temperature. Furthermore, the very notion of affecting something in the past offends deep intuitions about the 'flow' of time and causation. (That neither causation nor the flow of time are actually concepts in physics does not mean that we can jettison these intuitions.) And bringing retrocausality into the macroscopic realm would expose us to the risk of the time-travel paradox. (What if one were to go back in time and change something, which causes one not to go back in time?) This paper examines the concept of retrocausation from a radically different standpoint, which respects the fundamental intuition of the forward flow of causation (and hence avoids potential time-travel paradoxes) and does not require quantum mechanics somehow to extend to the macroscopic scale. One of the less often investigated fundamental solutions to the Cartesian mind-body problem is to start from the premise that consciousness is primary. This has been put forward in a form with extrinsic physical relations in Galen Strawson's 'naturalistic monism' (2006). The present author has previously advocated subjective idealism as a solution to the Hard Problem of consciousness (Lloyd 1999,2005). If we take the premise that the physical realm is a purely extrinsic system derived from the intrinsically existing realm of consciousness, then we lose the constraint that unobserved processes within the physical realm must comply with the same laws as the observed processes. In particular, there is no requirement for unobserved physical processes to be determinate until observed by a conscious mind. A conscious mind therefore, in principle, has the potential to determine physical facts that are notionally in the past but do not yet have any observed sequelae. This allows a retrocausal formalism that (at a formal level) is a generalization of quantum weirdness but does not involve extrapolating quantum-mechanics itself beyond the microphysical scale. **C22**

105 A Critical Examination of "The Extended Mind" Jakob Lorsbach <lorsbachja@hendrix.edu> (Philosophy, Hendrix College, Conway, AR)

"The Extended Mind" coauthored by Andy Clark and David Chalmers presents a very radical theory of the mind, namely active externalism, meant to emphasize the essential role that the external world plays in stimulating our cognitive processes. In everyday life we depend on our environment in order to both provide the stimuli that drive our mental processes and aid or augment our cognitive capacities while we problem-solve. This theory is a veryambitious and in many respects a call for a much-needed critical assessment of the way we talk about our cognitive processes generally and the vital role that the environment plays in propelling, aiding in, and augmenting our own individual cognitive processes. However, in this paper I wish to argue against Clark and Chalmers. I will argue that they are wrong in equating an agent's cognitive processes (i.e. conscious intellectual activities) with external features of the environment that the agent can actively utilize to augment his/her previously existing cognitive capacities: the former are processes actively and consciously performed by the agent, whereas the latter are processes or features in the environment that can be exploited by the agent so as to simplify the cognitive task that he/she is faced with but cannot actually perform any cognitive task themselves. **P1**

106 Consciousness in an Inactive Brain: How Neural Theory Permits Violations of a Dominant Assumption in the Science of Consciousness Bernard Molyneux <molyneux@ucdavis.edu> (Philosophy, UC Davis, Woodland, CA)

Most physicalist research into consciousness, both in philosophy and the neurosciences, proceeds under the assumption that consciousness is constituted from, or at least crucially dependent or supervenient upon, activity. Where externalists have questioned whether the activity in question is limited to the brain, I question whether or not activity is required at all. Taking inspiration from the cockroach, which continues to behave for about 10 days after being beheaded, I show that for any neural net and for any stream of inputs, of whatever length, there exists a functionally equivalent net that can intelligently respond to the stipulated input stream using only passive causation – i.e. using only timely non-activations of its neurons. At the limit, for any period (an hour, a year) and for any total series of sensory inputs lasting that long, there exists a possible brain that, in response to those inputs, controls its body normally without any of its neurons firing. The fundamental insight involves appreciating that the digit 0 (implemented using a timely non-firing) can in principle carry any information that any other digit (implemented by a firing) can carry. After quickly presenting an intuitive sketch of the engineering required to create such a brain, I argue that, because this passive net would be functionally equivalent to a human brain at the finest neural grain, and because it can (probably) be built from the same substances from which human brains are built, it is difficult to deny that it would be conscious even when none of its neurons are firing, though the possibilities for denying consciousness are discussed. **C19**

107 Integrated Information: Functional Consciousness or Biological Qualia? Anthony Peressini <anthony.peressini@marquette.edu> (Marquette University, Milwaukee, WI)

Giulio Tononi has offered his integrated information theory of consciousness (IITC) as a "provisional manifesto." Here I sketch a few worries about the approach, in particular that it is more directly an account of qualia rather than consciousness. I argue that the IITC's scientific promise does carry over to a significant extent to broader philosophical theorizing about qualia and consciousness, though not as directly as Tononi suggests, since the account is much more focused on the qualitative character of experience rather than on consciousness itself. I propose understanding it as "integrated information theory of qualia" (IITQ), rather than of consciousness. Finally I situate the Integrated Information approach, so rendered, within the framework constituted by three dominant accounts of consciousness: functional/global workspace, higher order, and biological. **C19**

108 Consciousness: The Factory of Illusions Rashi Prakash, Aashna Prakash,Shashi Prakash <raashi.prakash@gmail.com> (Physics and Computers, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

The 20th century witnessed tremendous scientific progress in many fields. This has brought about a better understanding of the world we inhabit, of the forces that drive it, of the relationships between the human race and the rest of the universe. Scientific explanations have been provided for most of the phenomena that used to be considered divine events. We have learned how the universe was born, how it gave rise to the galaxies, the stars and ultimately to our planet; and what life is, how it survives, reproduces, evolves; and what the structure of the brain is, and how it works. The mystery is no longer in our surroundings: it is inside ourselves. What we still cannot explain precisely is: "ourselves". We may have a clue to what generates reasoning, memory and learning. But we have no scientific theory for the one thing that we really know very well: our consciousness, our awareness of being us, ourselves. Consciousness is a natural phenomenon. Like all natural phenomena it should be possible to find laws of nature that explain it. Physics has come a long way to explaining what matter is and how it behaves. Biology has come a long way to explain what life is and how it evolves. But no science has come even close to explaining what consciousness is, how it originates and how it works. Neurology tells us an enormousamount about the brain, but it cannot explain how conscious experience arises from the brain's electrochemical activity. This paper brings together the idea of different scientists, about consciousness. We try to differentiate between the classical and the quantum theories of Consciousness and

understand the different parameters that we deal while studying Consciousness, like Qualia. We also try to understand the two levels of consciousness. This paper explains that consciousness is in the environment and several models of consciousness focus on its behavior as a "sense" capable of perceiving the processing of the brain. The paper also briefly discusses "Consciousness – As Self-Reference" where the idea of some form of "self-referential feedback" is dealt. **P1**

109 The Law of the Mind – Revisited Fabio Varella <fabiovarella@hotmail.com> (Brasilia, DF Brazil)

Charles Sanders Pierce presented his "The Law of the Mind" exactly 120 years ago. In addition to being a modest tribute to his work, this essay is intended to expand the current debates on consciousness studies by introducing his innovative perspective of the mental action, refashioned in order to avoid the controversy usually attached to the author. The phenomenological constituents of consciousness are classified by defining a time-dependent scale for complementary psychological quantity-like entities: Insistency and Generality. Interesting insights and new analyses emerge regarding issues such as time, continuity, subject/object relations, perception, reality, self-observation, and others. By outlining psycho-dynamical laws intrinsically different from the laws of physics for been less strict, a discussion can begin in consciousness studies regarding the development of practices of investigation relevant to the appropriate psycho-dynamical parameters. Thus, a new psychological non-physicalist science is suggested, much aligned to other unorthodox positions such as the Endophysical Paradigm. **P1**

2.0 Neuroscience

2.01 Neural correlates of consciousness (general)

110 Brain Connectivity in Disorders of Consciousness Mélanie Boly, MD <mboly@ulg.ac.be> (Belgian National Fund of Scientific Research (FNRS), Liège, Belgium)

During the last decade, functional neuroimaging of disorders of consciousness (e.g., coma, vegetative state and minimally conscious state) has evolved from measuring resting cerebral blood flow or electrical activity to studying functional response to sensory stimuli, and to active paradigms, asking patients to concentrate on doing a task like playing tennis. While offering new potential diagnostic tools in these patients, these methods also show how difficult it is to clinically differentiate different states of consciousness. Brain connectivity studies aim at evaluating global cerebral function in patients with disorders of consciousness. In the present talk, I will cover results obtained using a range of functional and effective connectivity approaches based on PET, fMRI, high density EEG, and TMS-EEG recordings. Experimental work performed in other unconscious states (i.e., anesthesia, generalized seizures, and deep sleep) will also be compared and reviewed. Practical and conceptual implications of these studies will be discussed in light of recent theories of consciousness. **PL2**

111 Fractal Brain Hierarchy, Consciousness and Orch OR Stuart Hameroff, MD <hameroff@u.arizona.edu> (The University of Arizona, (Anesthes/Psych); Center for Consciousness Studies, Tucson, AZ)

Fractal, or scale-free structure and dynamics imply systems with self-similar information patterns occurring across many spatial and temporal scales. Such systems are found widely in nature, including the brain. 1) Structure: neuronal dendrites (and their internal cytoskeleton) have fractal geometry, neurons connect in nested hierarchies of "small-world" fractal networks [1], and "grid cells" in layers of entorhinal cortex represent spatial environment at different fractal scales. 2) Mental representation: memory is distributed "holographically"[2], and visual imagery in altered states is often described as fractal. 3) Temporal dynamics: Electrophysiology by He and Raichle [3] and others has shown self-similar dynamic patterns repeating at spatiotemporal scales, e.g. default mode switching (0.1 Hz) and more rapid EEG (10 to 100 Hz), separated by 2 to 3 orders

of magnitude. What about smaller, even faster scales? Underlying neuronal and synaptic functions, cytoskeletal microtubules have a series of resonant frequencies, e.g. roughly 10 kilohertz and 10 megahertz [4], and gigahertz and terahertz resonances are proposed. Self-similar dynamics and information processing in these 6 discrete levels (EEG through microtubule resonances), each separated by 2 to 3 orders of magnitude, may comprise a fractal brain hierarchy in which a process supporting consciousness occurs and moves, akin to musical notes moving through different scales and octaves. What process? Penrose-Hameroff Orch OR [5] is the only theory proposing a specific process resulting in consciousness: quantum computations in microtubules, each terminated by quantum state (objective) reduction by E=h/t. E is the degree of quantum superpositioned matter (microtubule tubulin subunits), h is Plancks constant/2 pi, and t the time at which reduction and moments of consciousness occur. Recent demonstration of quantum-like conductance, condensation and resonance in single microtubules atambient temperature [4] strengthens the biological case for Orch OR immensely. E=h/t, and consciousness, can occur at any layer in a fractal brain hierarchy. At the layer of gamma synchrony EEG at 40 hertz, t equals 25 milliseconds, 40 conscious moments occur per second, and E involves superposition of a billion or so microtubule "tubulin" subunits (0.0000000001 of total brain tubulins). E=h/t can also occur at deeper levels, with higher frequency, greater experiential intensity, and more microtubule/brain involvement. At 10 kilohertz microtubule resonance, E would involve 0.0000001 of brain tubulins, and at 10 megahertz, E would involve 0.0001 of brain tubulins, nearing brain capacity. Meditation, peak experience and altered states may involve consciousness (by E=h/t) moving to deeper, faster, more intense levels in a fractal brain hierarchy. [1] Bieberich (2002) Biosystems 66(3):145-164; [2] Pribram (1971) Languages of the brain, Prentice-Hall; [3] He and Raichle (2009) TICS, [4] Sahu et al (2012) Nature Materials (in press), [5] Penrose and Hameroff (2011) J Cosmology 14 http://www.quantumconsciousness.org/Cosmology160.html **PL4**

112 Identifying the Brain's Awareness System: Lessons from Coma and Related States Steven Laureys, MD <steven.laureys@ulg.ac.be> (University of Liège, Coma Science Group, Cyclotron, Department of Neurology, Liège, Belgium)

Following severe brain damage some patients may loose all brain and brainstem functions and evolve to brain death while others may awaken (i.e., open their eyes) but will only show reflex behavior ('persistent vegetative state' now called 'unresponsive wakefulness syndrome'). Some patients will remain unresponsive for decades; others may evolve to a minimally responsive/conscious state (i.e. showing more than simple reflex behavior (MCS-) or command following (MCS+) but lacking communication). Finally, coma patients may awaken, being fully aware but paralyzed and mute, (i.e., pseudocoma or locked-in syndrome). We here review recent neuroimaging and electrophysiology studies that illuminate the relationships between awareness and brain function in these challenging conditions. Taken together, recent studies show that awareness is an emergent property of the collective behavior of frontoparietal top-down connectivity. Within this network, external (sensory) awareness depends on lateral prefrontal/parietal cortices while internal (self) awareness correlates with precuneal/mesiofrontal midline activity. Of clinical importance, this knowledge now permits to improve the diagnosis of patients with disorders of consciousness, which remains very challenging at the bedside. Current technology now also permits to show command-specific changes in EEG or fMRI signals providing motor-independent evidence of conscious thoughts and in some cases even of communication. References: From unresponsive wakefulness to minimally conscious PLUS and functional locked-in syndromes: recent advances in our understanding of disorders of consciousness. Bruno et al J Neurol. 2011 Jul;258(7):1373-84. Dualism persists in the science of mind. Demertzi et al Ann N Y Acad Sci. 2009 1157:1-9. Attitudes towards end-of-life issues in disorders of consciousness: a European survey. Demertzi et al J Neurol. 2011 Jun;258(6):1058-65. A survey on self-assessed wellbeing in a cohort of chronic locked-in syndrome patients: happy majority, miserable minority Bruno et al British Medical Journal – Open (2011) 23 February 2011 Different beliefs about pain perception in the vegetative and minimally conscious states: a European survey of medical and paramedical professionals. Demertzi et al Prog Brain Res. 2009;177:329-38. The Nociception Coma Scale: a new tool to assess nociception in disorders of consciousness. Schnakers et al Pain. 2010 Feb;148(2):215-9.

Willful modulation of brain activity in disorders of consciousness Monti & Vanhaudenhuyse et al N Engl J Med. 2010 362 579-89 Unresponsive wakefulness syndrome Laureys et al BMC Med. 2010 8 68 **PL6**

113 The Tyranny of the Prefrontal Cortex Jeremy Lent <jeremylent@gmail.com> (San Rafael, CA)

The human prefrontal cortex (pfc) is widely recognized as mediating the executive function: our ability to plan, conceptualize abstractions, make rules, and impose meaning on experience. It controls our physiological drives and turns basic feelings into complex emotions. This paper asserts that the effect of the pfc on other aspects of human consciousness has become so overbearing that it may be analogized more accurately as a tyranny than an executive function. The unique evolutionary expansion of the pfc in the human brain, combined with the dynamics of culture (itself a product of pfc activity) has created a positive feedback loop leading to an imbalance within the human psyche, both collectively and individually. Collectively, this imbalance manifests in the extreme characteristics of our global society, such as our unsustainable use of natural resources to fuel exponentially accelerating material growth. Individually, this tyranny refers to our unreflective absorption of fundamental values that prioritize pfc-mediated abstractions at the expense of other aspects of human experience. The paper introduces the discipline of "cognitive history," tracing the steps whereby the pfc gradually gained dominance in the human collective consciousness. With the evolution of early humans, the pfc mediated the sense of self, theory of mind and a concept of past and future. The resulting enhanced ability for symbolic thought led ultimately to the development of language and a mythic consciousnessamong hunter-gatherers manifested through shamanism. The next phase in the pfc's rise to dominance was the emergence of agriculture, bringing with it a sense of separation from and partial control over the natural world, along with new core human values such as ownership, hierarchy and patriarchy. The next major transition took the form of the extreme version of dualism that emerged in ancient Greece, whereby pfc-mediated abstractions – the deification of reason, the notion of an eternal, immaterial soul – became the foundation for the monotheistic-based Western mentality that separates reason from emotion, mind and soul from the body. This in turn engendered the scientific revolution that forms the basis of the current worldview which ultimately drives the unsustainable trajectory of our global civilization. Acknowledging this tyranny and understanding its dynamic is the first necessary step towards achieving re-harmonization within our individual and collective consciousness. Another step involves exploring alternative root metaphors for the pfc's role in human consciousness, such as "conductor" in an orchestra, or an executive serving for the benefit of the complete human mind/body organism rather than in service of externally imposed cultural values. The Taoist notion of wu-wei (non-purposive action as opposed to pfc-driven goal-oriented action) and the Buddhist conception of the self as a dynamically interactive process rather than a fixed entity, offer potential paths for unseating the "tyranny of the pfc" and achieving a "democracy of consciousness," both in individual and collective cognition. These may be integrated with recent theoretical progress in systems biology and the investigation of self-organization in complex living systems, to offer an alternative, scientifically valid, approach to meaning that could supersede the current pfc-centered dualistic tyranny. **C14**

114 Sleep as an Inverted Consciousness Simon Peimer, Jack Ringler MD <lpeimer1@verizon.net> (Berkshire Sleep Disorders Ctr., Berkshire Medical Center, Pittsfield, MA)

Sleep is often interpreted as total or partial loss of consciousness with recurrently suspended sensory and motor activity (Thorpy et al. 2011). In contrast, LaBerge (2006) stated that "whether awake or asleep, our consciousness functions as a model of the world... From this perspective, dreaming can be viewed as the special case of perception without the constraints of external sensory input. Conversely, perception can be viewed as the special case of dreaming constrained by sensory input". Similar approach was invoked at the dawn of modern psychology by William James (1890): "whilst part of what we perceive comes through our senses from the object before us, another part (and it may be the larger part) always comes out of our own head". We believe that the 'larger part' of our consciousness persists in sleep and may be elucidated by means of

modern neuroscience at all levels, from individual neurons (McCormick et al. 1992, 2010) to global workspace framework (Baars, 1997) Normal sleep requires a starting point, limited sensory input with eyes closed and certain state of mind that is not focused on the outside world. In such situation the brain is at default mode and task-negative neuronal network is active (Reichle, 2001). Just before falling asleep, our patients and subjects frequently report wandering mind, racing thoughts and other inverted mental activity including hypnagogic hallucinations. That introversion may be accentuated by performing monotonous simple task that does not require much effort or attention (Peimer and Ringler, 2011) However, the default mode is not particularly stable, and at any time an individual may start task-related activity including fighting drowsiness by all means. Otherwise, the gradual and unconscious process of falling asleep is assured and accompanied by redistribution of alpha-rhythms in the way that is consistent with internally directed attention (Jensen, 2002; Bollimunta, 2011). The mental activity itself is difficult to assess during non-REM sleep because the output from black- box is closed, and then, after awakening, there are no reports due to retrogradeamnesia. To overcome this limitation, we used a striking model of non-REM sleep, Central Anticholinergic Syndrome (Longo, 1961), that opens a black-box. After injection of atropine the dynamics of EEG and evoked potentials were indistinguishable from normal drowsiness and NREM sleep, but motor hyperactivity and hallucinations were uncovered. This data confirmed that both brain and mind in non-REM sleep are active and may reflect inverted consciousness (Milstein, 1970; Peimer, 1972) At least a short episode of NREM sleep works as a gateway for REM sleep and often associates with alpha-activity. More intuitively than in NREM, dreaming and dream-enacting behavior observed in REM sleep without atonia (Morrison, 1972; Schenk et al. 1986) demonstrate inverted consciousness. The reviewed data support the notion that all behavioral states and related neuronal networks, from default to drowsiness, and all sleep stages require common inverted information processing associated with habituation to environment, inhibition of sensory and motor pathways along with strong input from inverted mind. Further investigation of this model may be beneficial for sleep medicine. **C21**

115 The Neurobiological Correlates of Meditation, Mindfulness and Trance States Julio Peres <julioperes@yahoo.com> (Institute of Psychology, University of Sao Paulo, Sao Paulo, Brazil)

Mindfulness refers to a calm awareness of cognitions, sensations, emotions, and experiences. This state is frequently achieved through mindfulness meditation (MM) which is a practice that cultivates non-judgmental awareness of the present moment. MM has also become widely used in a variety of psychological, medical, and wellness populations. Recently, there have been a number of studies that have elucidated some of the neurophysiological processes involved with MM and other similar meditation practices. This lecture provides a review of that literature, which includes neuroanatomy, neurophysiology, neurotransmitter systems, and recent brain-imaging advances. Moreover, I will approach our recent paper related to trance state and neuroimaging. Despite increasing interest in pathological and non-pathological dissociation, not much research has focused on the spiritual experiences involving dissociative states such as mediumship, in which an individual (the medium) claims to be in communication with, or under the control of, the mind of a deceased person. We investigated psychography – in which allegedly "the spirit writes through the medium's hand" – for potential associations with specific alterations in cerebral activity. Ten healthy psychographers – five novice mediums and five with substantial experience ranging from 2 to 40 years of automatic writing – were examined using single photon emission computed tomography for writing in both dissociative trance and non-trance states. The complexity of the original written content produced by subjects during both types of task was analyzed for each subject separately and for the whole sample. I will expose and discuss interesting results, and these findings deserve explanatory hypotheses. **C15**

116 Cerebral Bihemispheric Coherence and Source Localization for the Brains of People Who Experience Magnetic Field-Induced Sensed Presences Kevin Saroka, Michael A. Persinger <kx_saroka@laurentian.ca> (Laurentian University, Behavioural Neuroscience Department, Sudbury, Ontario Canada)

Weak, physiologically-patterned electromagnetic fields have been used in previous experiments to facilitate the sensed presence experience. It is defined as the feeling of a proximal Sentient Being. Using the quantitative electroencephalograph (QEEG), we measured the brain activity of ten volunteers while they participated in an experimental protocol that reliably elicits the sensed presence by applying weak-intensity (microTesla range) magnetic fields over the left and right temporoparietal regions simultaneously. Coherence analyses and source localization, using sLORETA (standardized, Low Resolution Electromagnetic Tomography) of the QEEG profiles of individuals who experienced a sensed presence compared to those who did not revealed 1) elevated coherence between the left and right anterior and posterior temporal regions, 2) increased theta activation within ventral portions of the prefrontal lobe, and 3) increased gamma activation over the right prefrontal and anterior temporal lobes. The results of this study suggest that intercalation or coherence between the left and right hemispheres is associated with the experience and report of a sensed presence and that transient awareness of these experiences may also involve the activation of the prefrontal regions. **C22**

117 Conscious Experience Wesley Sparks <whsparks2010@gmail.com> (Rancho Palos Verdes, CA)

Consciousness is the experience of the energies of the environment detected and transduced to nerve impulse activity by sensory receptors. Consciousness is experienced in the process of response by intrafusal muscle spindles. The experience initiates behavior by innervating the muscle system. A significant behavior is language. The meanings of language constitute declarative knowledge. Knowledge is a substitute for conscious experience. Meanings are established arbitrarily by agreement and have nothing to do with the reality of consciousness. The only reality is experience. Meanings serve the purpose of communication and entertainment. Conscious experience, differentiated from consciousness, is the enhanced development of energies detected by spindle receptors in the intrafusal muscle spindles. The detection of energies by spindle receptors is analogous to the detection of the environment by sensory receptors. The experienced energies may be as explosive as a car wreck or as subtle as a holiday, a baby's smile, or an appetite for lunch. Conscious experience is response to the environment, our imagination, our feelings, and the meanings we have associated with language. We see, we hear, we feel, we taste, and we touch. Consciousness, as we experience it, includes more than the traditional identifications of the detected environmental energies initially proposed by the Greeks. Consciousness includes the experience and response to the detected energies. The energies transduced by sensory receptors are transmitted afferently as nerve impulse activity to collections of neurons and from the congenitally and experientially configured synapses between neurons, to muscle spindles. Configuration serves to determine the efferent discharge to the spindles. The impulse activity enhances the development of energies. In addition to impulse activity from receptors, enhancement can be effected by the discharge of impulse activity from the cerebral hemispheres. The non-conscious discharge is recorded as a biorhythmic 40 Hz magnetic oscillation. The activity was identified by Rodolfo Linas and Urs Ribary (Proc. Nat. Acad. Sci. USA, 1992). Linas and Ribary propose the 40 Hz oscillation to be a correlate of cognition, probably resultant from coherent 40 Hz resonance between the thalamocortical-specific and nonspecific loops. Spindle receptors detect and transduce energies developed in the spindles. The detection includes the energies of both innervation and enhancement. It is the enhanced development of energies in the intrafusal muscle spindles detected and transduced to nerve impulse activity by this second set of receptors that is conscious experience; The detection and transduction is manifest as the experience of the environment, imagery, dreams, feelings (emotion) and the meanings of language. The detection and transduction can initiate conscious behavior. The character of behavior is determined by hormones, neurotransmitters, and other chemicals—all of which can be referred to as modulators. Modulators are present at synapses and produced on demand or biorhythmically from glands. Synapses are configured

congenitally and experientially. The developed energies in spindles are transduced as experience. The determinants of conscious behavior can be identified generally in three categories: the environment, modulators, and experience. The determinants are subject to scientific inquiry: the experience of consciousness is not. **P1**

2.02 Vision

118 Visual Imagery in the Absence of V1 Activation Berit Brogaard <brogaardb@gmail.com> (Philosophy, University of Missouri, St. Louis, MO)

Visual imagery is sometimes assimilated to low-level perceptual experience. fMRI studies have shown that some visual images are associated with neural activity in V1 and V4. Furthermore, like low-level perceptual experience, visual images appear to depict a visual scene as opposed to a simple relation between an object and a property. I argue, however, that there is good reason to think a lot of the visual imagery that we engage in, including creative visual imagery, is more akin to cognitive processing than low-level perceptual experience. We recently performed an imaging study of subjects engaging in automatic visual imagery. The study shows that subjects can form quite detailed and colorful visual images without any corresponding activity in visual cortex. I compare the results from this study to another recent study showing that the creation of novel visual images proceeds independently of activity in visual cortex. In the last part of the paper I argue on philosophical grounds that while visual imagery clearly is distinct from perceptual experience, the former is not a purely cognitive phenomenon. In fact, states of visual seeming appear to be an intermediary between visual imagery and purely cognitive states, such as states of belief and states of abstract memory. **C19**

2.03 Other sensory modalities

119 Falsifying Computational Theories of Consciousness in the Olfactory System Andreas Keller <andreaskeller@runbox.com> (Philosophy, CUNY, New York, NY)

Visual consciousness has become the de facto model system of consciousness research. The role of a model system in a scientific discipline is that of theory development. Visual consciousness has been a remarkably successful model system and a large number of theories of consciousness have been developed in recent years. In a mature field of research, after theories are formulated in a model system, they will be tested in other systems in an attempt to falsify them. Theories of consciousness are not routinely tested in other sensory systems yet. Consciousness research is, as Thomas Metzinger put it, still in an "initial preparadigmatic phase of theory formation", in which forming a wide variety of theories is valued more than attempts to falsify them. My intention with this paper is to introduce olfactory consciousness as a system in which theories of consciousness that were developed in the visual system can be confirmed or falsified. I hope that this project will contribute to the maturation of the field of consciousness research by moving it from the theory-development phase to the theory-testing phase. I chose olfactory consciousness as a test system for theories of consciousness for two reasons. First, olfaction is an anatomical and computational simple sense. The primary olfactory cortex is only a single synapse away from the sensory neurons and it has been suggested that the olfactory system may represent the minimal neuroanatomy that is required for conscious processing. A second advantage of olfactory consciousness as a system to test theories of consciousness is that olfactory phenomenology is radically different from visual phenomenology. A theory that is consistent with visual and olfactory phenomenology is therefore likely to be consistent with all sensory phenomenology. In this paper I will attempt to falsify six computational theories of visual consciousness by applying them to the olfactory system. I will test the synchronous oscillation theory, the connectionist theory, the global workspace theory, the working memory theory, the syntactic operations theory, and the information integration theory of consciousness. I will show that of these theories only the information integration theory of consciousness is consistent with the facts of olfactory perception. **C12**

120 Anesthetic-Induced Separation of Cellular Registration from Behavioral Recognition of Olfactory Sensory Processing Yan Xu, A Samuelsson; P Tang <xuy@anes.upmc.edu> (Anesthesiology, Pharmacology, University of Pittsburgh School of Medicine, Pittsburgh, PA)

Are neural correlates of consciousness (NCC) [1] a biological entity that is independent and separable from the basic cellular communications in the central nervous system? To answer this fundamental question, we investigated the registration of olfactory processing under general anesthesia-induced loss of consciousness (LOC). Our experimental design relied on two unique manifestations of olfactory processing in rats. The first was the sharp histological contrast in c-Fos expression pattern upon novel versus familiar stimulation [2]. The second was the behavioral characteristic of rodents to spend significantly longer time to explore novel as compared to familiar odorants [3]. We discovered that novelty of an odorant could be recognized and registered by c-Fos expression under general anesthesia. A subsequent exposure to the same odorant 24 h later by the same animals while awake indicated that the first exposure in the clinically definable LOC state already rendered the odorant "familiar" at the cellular level. Behavioral testing, however, suggested that the animals could not recall the sensations registered under anesthesia: they behaved as if the reintroduced odorants were experienced for the first time. Thus, our data suggest that the surgical level of general anesthesia can block NCC without interrupting cellular sensory processing. We hypothesize that NCC emerges at a level above basic cell-cell communication – behavioral LOC and the cellular recognition and registration of sensory information are distinct and separable neural events. 1. Crick, F. and C. Koch, A framework for consciousness. Nat Neurosci, 2003. 6(2): p. 119-26. 2. Bozon, B., S. Davis, and S. Laroche, A requirement for the immediate early gene zif268 in reconsolidation of recognition memory after retrieval. Neuron, 2003. 40(4): p. 695-701. 3. Mandairon, N., A. Didier, and C. Linster, Odor enrichment increases interneurons responsiveness in spatially defined regions of the olfactory bulb correlated with perception. Neurobiol Learn Mem, 2008. 90(1): p. 178-84. **C12**

2.07 Neuropsychology and neuropathology

121 How The Phantom Killed: The Mechanism of Mirror Therapy for Phantom Limb Chieh-Ling Cheng, Allen Y. Houng <ccling1989@gmail.com> (Institute of Philosophy of Mind and Cognition, National Yang Ming University, Taipei, Taiwan)

Mirror therapy was first designed by V. S. Ramachandran foramputees suffering from phantom limb pain. Evidence have shown that after mirror therapy, not only phantom limb pain but also the sense of phantom limbs vanished. According to Ramachandran, the possible mechanism might be, under a turmoil of conflicting sensory inputs, the brain just gives up and says there is no arm anymore. However, there is a homunculus fallacy. Here I want to propose a better hypothesis of how the mirror therapy eliminates phantom limb. Phantom limbs, viewed as the elements of the body schema, are continually perceived by the patients, even though they are aware of the absence of the limbs. In some cases, phantom limbs are reported to be paralyzed and painful. Some research proposes phantom limb pain as a result of sensory-motor conflict. Because of the body schema, the brain continues to have implicit representation of the missing limb. As a result, the motor command center continues to send motor commands to the missing limb; however, there is no corresponding sensory feedback for motor-sensory matching in the parietal cortex. Thus, pain occurs. Here I want to propose that it is the pain that makes up the deficiency of sensory feedback and achieves the sensory-motor balance. Because of the persistent representation of pain in the sensory cortex, time for the telescoping of the phantom limb is prolonged. When the mirror therapy is applied, the patient looks into the mirror and sees the reflection of the intact limb. When moving the intact limb, patient gets an illusion that the limb in the mirror is superimposed on the phantom limb and that the phantom limb appears to move simultaneously. At first appearance, it seems that mirror therapy strengthens the body schema because of the correspondence of the motor commands and the actual body movements. It follows that phantom limb should also be strengthened theoretically. However, it turns out that the limb part of the body schema and the feeling of phantom limb both disappears. The actual mechanism which I proposed is that, while visual feedback of the moving limb is regained for the sensory-motor matching, pain is then needless and thus relieved. After a period of exercising the mirror therapy, the sensory cortex of the limb, without representation of pain, starts to shrink. My hypothesis not only explains the mechanism of mirror therapy but also solves the contradiction between the seemingly reinforcement of the body schema and the actual shrinking of the phantom limb. **P2**

122 When the Body's Louder than the Brain: A Case Study of Trauma Processing by a Patient in Coma and Semi-Conscious State Utilizing Cognitive, Emotional and Sensory Resources of Significant Others Candace Crosby <candace@crosbydana.com> (Missoula, MT)

In May, 1999, patient CF suffered a severe traumatic brain injury (1% chance of survival). She was in a coma for two months and partial coma for another four. Beginning in week two this researcher, a somatic psychology practitioner, joined the treatment team and worked intensively with CF for the next eight years. CF's mother, Director of the University of Montana Early Intervention Specialist training program, became her primary caregiver and treatment coordinator. During CF's less conscious recovery stage multiple unexpected occurrences of trauma processing related to the accident and medical interventions happened. CF utilized the external resource of her mother and this practitioner in a manner evocative of infant-parent regulatory interactions. Our experiences of "seeing" accident scenes and perceiving sensations from CF's physiologic response within our own bodies challenged us to piece together a new framework of understanding. Three interactive incidents: temperature regulation, perceived effort to overcome recessed state to communicate, and PTSD type processing of trauma over a multi-day period, are reported to facilitate our discussion. We present our analysis of events and the many questions they engender which we are eager to explore with others. We understand the brain to be the recipient of complex data from throughout our physical system, integrating it into the most recognizable form of consciousness. During CF's time when her brain was not fulfilling this task did we observe more explicitly the adaptive non-conscious, including the capacity for initiation? How does the physical body, literally our cells and systems, participate in knowledge? For instance, do cells have capacity for memory, and if yes, what kinds? Are trauma experiences explicitly stored in body tissues as well as in the brain? In psychology practice we know that thoughts and emotions have physical body correlates and that there's a multi directional dialog. Assuming that a young adult already has an established network of brain-body interaction, what happens to the network outside the brain during time periods when the brain has limited capacity for involvement? What happens to the perceptual and knowing skills we employ as infants before neural circuits have developed their well established linkages? Are these cognitive ways of knowing still present, like subdued early physical reflexes, and become available again at times when circumstances elicit them? How do family and treatment staff re-activate the intuitive parenting repertoire when interacting with a patient in coma? How do they become external regulators of the patient's system in ways similar to those a parent uses with an infant? Our case study raises significant questions for medical intervention and recovery. Does access to modalities for trauma processing while still in a coma or semi-conscious state improve recovery of all systems and the nervous system in particular? Should special support be given to family members who may have "unusual" experiences with the patient while she is in a semi-conscious state? Does a less hierarchal and possessive view of consciousness beneficially affect social interactions with coma and semi-conscious patients? Do these events support understanding consciousness as an interactive phenomenon? **C20**

123 Recovery of Consciousness (Early Psychological Neurorehabilitation) Svetlana Gusarova, Natalia Ignatieva, Olga Maksakova <sgusarova7@gmail.com> (Rehabilitation, Burdenko Neurosurgical Institute, Moscow, Russian Federation)

Most clinicians consider psychological neurorehabilitation to be connecting with a patient who is able to communicate verbally. Traditionally this form of treatment is used at the social adaptation stage; cognitive and emotional disorders, or neurotic syndromes of the late posttraumatic phase might be a target. In our approach to consciousness, the recovery psychologist may begin to work with a patient in different states of consciousness – coma, vegetative state, mutism, confusion. Lack of ability to communicate verbally is a specific feature of such patients in most altered states of consciousness, except for confusion, where verbal channel can be used only "one way"

from psychologist to patient. A patient in a deeply altered state of consciousness is able to communicate with: body expressions, like breath, etc.; movements, like micro motions by the limbs, etc; and emotional expressions, like mimicry, simple emotional reactions and feelings, etc. The psychologist determines,amplifies and expands the signals, switching it on in connection, creating a "dialogue". Our own 15 years experience as well as the experience of colleagues in other countries has made it possible to set up an algorithm for early psychological rehabilitation, using special methods, that differ from traditional verbal-oriented methods. Working with patients in a deeply altered state of consciousness, psychotherapeutic approaches based on integral (psychic and body) understanding are most effective when therapists use techniques of non-verbal access to consciousness and unconsciousness. We use Body-oriented psychotherapy – somatic "Biosynthesis" therapy by Boadella and Process-oriented psychotherapy by Mindell. These techniques are based on: the principle of feedback (FB); therapist's ability to use psychosomatic resonance; and empathy ("empathic presence", "kinesthetic empathy", etc.). We use these techniques: "Minimal signals" mostly with patients in coma or vegetative state; "Steal the state" if the patient is resistant to changes; "Grounding" techniques to strengthen the patient's feelings of base and stability; "Centering" techniques oriented to the patient's emotional awareness and balance; "Facing and Sounding" techniques to express feelings, locked up by the patient, before and for his additional self-expression, Work with a patient can be provided individually, with a co-therapist and a rehabilitation team. When in a team each participant is part of a common field. Team workers participate in the field and substitute for the deficit of patient's expressive abilities, thus making it possible for perception and recognition by the patient (working with ghost roles). A video will demonstrate several techniques for working with unconsciousness. **C20**

124 Coping Strategy-Associated Energy Metabolism in Rats Seo Jeho, Gun Tae Kim, Chul Hoon Kim, Dong Goo Kim <seojh@yuhs.ac> (Department of Pharmacology, Department of Pharmacology, Brain Korea 21 Project for Medical Science, Yonsei U, Seoul, Korea, Republic of)

The default mode network (DMN) is defined as networks of regions activated in resting state. The DMN is regarded as the brain network related human's higher mental activity such as meditation, creation. In the previous study, we found that energy level of cingulate cortex, which indicated as one of the DMN regions, were differentially regulated by different behavioral coping strategies. In that study, we used rats as the experimental animal and microPET as the tool for detect energy level. We assumed that energy status of DMN is closely related to behavioral pattern generation. We hypothesized that altered DMN energy status could trigger different consciousness status, that could induce different behavioral patterns under the same stressor. C75 is inhibitor of fatty acid synthase (FAS) which synthesize free fatty acid from acetyl-CoA, and acts as activator of carnithine palmitoyltransferase-1 (CPT-1) which transfer the free fatty acid from cytoplasm into mitochondria. Consequently, C75 enhances energy generation in cells. In this study, we used C75 as the energy level modulator. After 1 week of stabilization period, Sprague-Dawley rats (280-300g) were subjected to Intracerebroventricular (i.c.v.) surgery. After additional 1 week of recovery period, we injected 40ug of C75 in 5ul of RMPI 1650 media through i.c.v. injection. We tested effects of C75 on the learned helplessness paradigm, in which helplessness behavior (HL) occued (HL +) or didn't occurred (HL -) within 50 times electric footshocks (0.5 mA, 5 second duration) with a random interval on an average of 52 second (5 - 99 second) for 3 consecutive days. To validate the effect of C75 to locomotion and pain sensation, we performed exploratory behavior test, and hot plate test before the helplessness behavior session of 1st experimental day. All of the C75 injected rats didn't show the HL, but 40% of the vehicle injected rats showed HL. And there are no differences in locomotion, exploration behavior and pain sensation. We found that different status of energy metabolism is associated with the different behavioral patterns under the same environmental stressor. The results suggest that individual difference is originated in DMN energy metabolism and we expect that consciousness-related behavioral response could be modified by regulating DMN energy metabolism. Acknowledgment : This research was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education, Science and Technology (2011-0022775). **P2**

125 Mirror Neurons and Imprinting: The Insufficiency in Explaining Mind-Reading Tzu-Feng Liu, Allen Y. Houng <zphoeng@gmail.com> (National Yang Ming University, Institute of Philosophy of Mind and Cognition, Taipei City, Taiwan)

Simulation Theory is a theory of mind-reading that suggests the way we understand or infer people's minds is to take the perspective they have, put ourselves into their situation, and see what the mental content will be. With the discovery of mirror neurons, Simulation Theory has become a powerful theory of mind these days. In order to prove the neuron basis of mind-reading, flourishing social cognition research in Autism, empathy, language learning, and imitation were connected to mirror neurons. A mirror neuron system is a collection of the same cortical neurons which will fire while one is executing an action and/or observing others performing the same action. Because of similarities to 'imitating', scientists strongly suggest that mirror neurons might be the neuron basis of mind-reading and the Simulation Theory of mind. I object this view, and I will provide a new suggestion to mirror neurons. Indeed, within the experiment of mirror neurons, the imitating phenomenon is really impressive and we might easily think of the abilities of understanding others. But the unanswered question is "How can we see others as subjects?" For example, people with Autism do not have the ability of imitating, but what if it is just because they cannot see others as others? And others are only moving objects without any mental content and emotion? I suggest that mirror neurons are like these kinds of subject recognition; only if we know the other's hands are corresponded to my hands, and other's eyes are corresponded to my eyes could we know others are subjects as well as me, and then could attribute the higher mental abilities to others, such as simulating or inferring their mental content. In my opinion, mirror neurons are contributed to a much lower ability which involve inter-subjective recognition and, therefore, act an essential role in social cognition; this is in contrast to the abilities of simulating and seeing from other's point of view. Studies show that infant macaques can imitate human face movements, and infant humans could perform eye-tracking before 12 months of age, which suggest that the mirror neuron system might have developed at a very young age, even before infants have developed their beliefs, intents, and knowledge about the world. These abilities of tracing bodily gestures are very similar to 'filial imprinting', which is the phenomenon that young animals learn their behavioral characteristics from the animal they first meet. Imprinting presuppose the ability to recognize that animals as a subject. Thus, I suggest that the research of mirror neuron system should be redirected to 'infants' interactions with other subjects. **P2**

2.08 Anesthesia

126 Hyper-Synchronized Gamma (γ)-Frequency EEG-Responses to Electrical Stimulation During Electroconvulsive Treatment Rolf Ekedahl <rolf.ekedahl@neufydi.com> (Clinical Neurophysiology, NeuFyDi AB, Clinical Neurophysiology, Stockholm, Sweden)

A graded response to the frontal electrical stimulation position during ECT-sessions can be recorded in surface EEG at a distant parietal site. The responses trigger a hyper-synchronized gamma(γ)-activity in a majority of the sessions. This observation might offer a new and improved monitoring technique for ECT and raises questions of this hyper-synchronized gamma(γ)-activity plays a role for the treatment effect. Furthermore, it demonstrates a neuronal basis for transmission of hyper-synchronized gamma(γ)-activity in cortex. **P2**

127 Consciousness in the Operating Room George Mashour, MD <gmashour@med.umich.edu> (University of Michigan, Anesthesiology, Ann Arbor, MI)

Intraoperative awareness is clinically defined as the experience and explicit recall of surgical events.1 This potentially devastating complication of surgery occurs in approximately 1-2/1000 cases and is associated with a high incidence of post-traumatic stress disorder.1 Current strategies to prevent intraoperative awareness are focused on anesthetic concentration protocols and processed electroencephalographic indices. However, our recent randomized controlled trial demonstrated that, despite the implementation of prevention protocols, awareness is a persistent complication.2 The problem of intraoperative awareness is linked to the problem of consciousness; 3 As such, new approaches based on the neurobiology of consciousness need to be devel-

oped. Recent work has focused on brain connectivity and network behavior during anesthetic state transitions. This lecture will focus on the frontoparietal network and will describe (1) effects of general anesthesia on frontal and parietal regions,4,5 (2) inhibition of frontoparietal feedback connectivity during general anesthesia,6 and (3) prefrontal cholinergic mechanisms regulating effective connectivity in the rostrocaudal direction. References 1. Mashour GA, et al. Intraoperative awareness: from neurobiology to clinical practice. Anesthesiology 2011; 114(5):1218-1233. 2. Mashour GA, LaRock E. Inverse zombies, anesthesia awareness, and the hard problem of unconsciousness. Consciousness and Cognition 2008;17:1163-1168 3. Avidan MS, et al. Prevention of intraoperative awareness in a high-risk surgical population. New England Journal of Medicine 2011; 365(7):591-600. 4. Boveroux P, et al. Breakdown of within- and between-network resting state functional magnetic resonance imaging connectivity during propofol-induced loss of consciousness. Anesthesiology 2010;113 (5): 1038-1053. 5. Lee U, et al. Dissociable network properties of anesthetic state transitions. Anesthesiology 2011;114(4):872-881. 6. Ku S, et al. Preferential inhibition of frontal-to-parietal feedback connectivity is a neurophysiologic correlate of general anesthesia in surgical patients. PLoS One 2011; 6(10):e25155 **PL2**

2.09 Cellular and sub-neural processes

128 Numerical Study of Hodgkin-huxley (h-h) Model of Ion Transport Phenomena through Biological Cell Membrane Jyoti Kumar Arora, Manmohan Srivastava <dei.jkarora@gmail.com> (Humanities and Applied Science, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

In the theory of neuroscience, many neurological phenomena have been described by various complex models, from the behavior of neuron systems to more abstract areas such as consciousness. The fundamental problem of any information processing system in our mind is the transmission of information, as data storage can be transformed into a recurrent transformation of information between two points. Our body consists of water 55% which is contained within the cells and 45% forming its environment. Some salts present in our body, dissolve in the intra cellular and extra cellular fluid and dissociate into negative and positive ions Na+, K+, Ca2+. The positive ions are present in the interior or exterior of the cells, the membranes of the cells exhibit different degrees of permeability for each one of these ions. Permeability is determined by the number and the size of pores in the membrane, called ionic channels. Our purpose is to develop a more theoretical approach, by proposing numerical solution, which is based on fundamental physical chemistry of ion movement. This will naturally capture the characteristics of charge career transport. The dynamic charge of the trans-membrane potential is thus governed by the net electric current across the cell membrane. The main assumption in the mathematical model setup is that the cell volume and the extra cellular concentration remain constant at all the times. The basis of this paper rests upon the numerical study of the classic H-H model, including four equations of trans-membrane potential and three for gating variables two of which govern "Na" conductance and one of which govern the "K" conductance. **P1**

129 Information Fractalization in Consciousness and the Sentyon Postulate: From Brain Activity to Conscious Molecules Erhard Bieberich <ebieberich@georgiahealth.edu> (Instit. of Molecular Medicine, Georgia Health Sciences University, Augusta, GA)

Recently, consciousness research has gained much attention. Indeed, the question at stake is significant: Why is the brain not just a computing device automatically responding to stimuli, but generates a perception from within? Ambitious endeavors trying to simulate the entire human brain assume that the algorithm will do the trick: as soon as we assemble the brain in a computer and increase the number of (parallel) operations per time, consciousness will emerge by itself. I disagree with this simplistic representation. My argument emerges from the "atomism paradox" that I have introduced more than 10 years ago (1-4): the irreducible space of the consciously perceived world, the endospace is incompatible with the reducible and decomposable architecture of the brain or a computer. I will first discuss the fundamental challenges in current consciousness models and then propose a new model based on the fractality principle: "the whole is in each of

its parts". I have for the first time demonstrated that this model copes with the atomism paradox by implementing an iterative mapping of information from higher-order brain structures to smaller scales on the cellular and molecular level, which I will refer to as "fractalization" (1-4). Information fractalization is the mathematical implementation of information sharing, which has been recognized as one of the fundamental characteristics of information processing in consciousness. Fractalization down to the molecular level gives rise to a new form of matter that is conscious ("bright matter") (4). Bright matter is composed of conscious particles or units I have named "sentyons". The internal fractality of these sentyons allows for the integration of widespread information in the brain by simple transforms converting a computational fractal generated in a neural network into that of the sentyon and back (global-to-local information processing and access in consciousness). These transforms will generate a neural activation loop (the "psychic loop") in a recurrent fractal neural network (RFNN) that allows for continuous and complete information transformation and sharing between higher-order brain structures and the endpoint substrate of consciousness at the molecular level (3, 4). I will discuss candidate substrates (e.g., membrane lipids, calcium waves, microtubules) and how their internal structures will fit the fractalization model. References: 1. Bieberich, E. (1998) "Structure in human consciousness: a fractal approach to the topology of the self perceiving an outer world in an inner space" http://cogprints.org/79/1/struc2.htm. 2. Bieberich, E. (1999) "What the liar paradox can reveal about the (quantum logical) structure of our minds". http://cogprints.org/1210/2/liarfin3.html and http://arxiv.org/html/quant-ph/0101062. 3. Bieberich, E. (2002) "Recurrent fractal neural networks: a strategy for the exchange of local and global information processing in the brain". Biosystems 66, 145-64. 4. Bieberich, E. (2011) "Introduction to the fractality principle of consciousness and the sentyon postulate" Cognitive Computation; online at http://www.springerlink.com/content/964347x7251k0p36/fulltext.pdf **C22**

2.10 Quantum neurodynamics

130 Spiritual (consciousness) Cure Attained by Quantum Mechanics Basis of Qubits Superpositioning and Collapse of Wave in Ras Neurons Siddharth Agarwal, Vijai Kumar,Puyush Agarwal,Sapna Agarwal <siddharthsatsangi@yahoo.com> (Medical, DEI Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

In our earlier paper titled "Esoteric Healing – A preliminary report " presented in joint international conference ASR/NSC 2009 and carried further, study was done in 645 serious hospitalised patients over 4 years and thereby conclusion was drawn that the group of patients or relatives who performed higher consciousness practices, had a significantly higher cure rate. In this paper we are presenting the scientific basis of how the higher consciousness stimuli (resounding the Holy Name) in the form of tactile and auditory impulse propagates the nerve AMP towards the reticular activating system where the qubits inside the tubulins behave as per Orch OR model of Hameroff and Penrose and brings about cure. **P1**

2.11 Pharmacology

131 How do Psychedelics Affect the Brain to Alter Consciousness? Robin Carhart-Harris <r.carhart-harris@imperial.ac.uk> (Imperial College London, Neuropsychopharmacology Unit, London, United Kingdom)

This presentation will describe the results of our recent brain imaging research with the classic psychedelic drug psilocybin, the active component of magic mushrooms. Psychedelics are often described as 'consciousness-expanding' drugs, and users often report that their experiences with psychedelics areamong the most profound of their whole lives. Based on our functional magnetic resonance imaging research with psilocybin I will propose a number of connection points or 'mappings' between the abstract phenomenology of the psychedelic experience and measurable neurobiology processes. The talk will conclude with speculations that these mapping points can extend beyond the psychedelic state to explain unusual experiences felt during spiritual practices such as meditation as well as in pathological states such as early psychosis. **PL11**

2.12 Neural synchrony and binding

132 Exploring the Role of Gap Junction Synchrony in Evolution of Conscious States CM Markan <cm.markan@gmail.com> (Physics and Computer Science, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Quantum approach to consciousness appears to be divided in two main theories that provide the basis for influencing the result through consciousness deliberately and producing the result which the observer wants. Penrose-Hameroff Orch-OR theory admits of maintaining synchrony or coherence long enough before quantum gravity causes the disruption to take place and on measurement one of the results comes to fore. VonNeumann-Stapp on the other hand consider aspects of choice, causation and chance wherein if you cause the attention of the system to be riveted by repeated assertion in fast succession in a way of imposing one's consciousness, then the system might obey conscious prompted result and show it up. Through this paper we try to overcome the divide between P-H and VNS approaches by arguing that the uncertainty in the collapse into a conscious state could be reduced if we accept the role of gap junction synchrony in providing a developmental blueprint that facilitates chemical synaptogenesis. Orch-OR hypothesis suggests that a wave function collapse occurs after every 25ms(gamma frequency range). Prior to a collapse there is a superposition of multiplicity of wave functions (determined by an orchestra of stimuli). During this time period all possible combinations of neural assemblies that could be interpreted on the basis of given sensory input would be in superposition. Every 25ms a neural assembly is inferred (due to wave function collapse). Which neural assembly will be inferred is not clear but may depend on conditions proposed by Penrose-Hameroff. If the same neural assembly is inferred recurringly then there is a possibility that over a period of time there may be hardwiring (via chemical synapse) of that neural assembly based on Hebbian Learning. Then it is likely that the same neural assembly will be inferred with an even higher probability. A positive feedback loop develops that ensures that if an outcome is recurring it gets more likely and slowly becomes certain or 'hardwired' a.k.a. 'Zombie mode'. During early learning period there is a larger freedom for wave function collapse as nearly all neural assemblies are equally likely but with age more neural assemblies get hardwired and hence outcomes are going to be recurring (probability increases). This developmental proposition ensures more and more complex cognitive tasks get hardwired and are performed under sub-conscious state permitting the conscious state or attentional concentration to be focused on more subtle cognitive tasks. Thus the role of neural synchrony and selective attention is to systematically build hardwired neural assemblies for more and more complex cognitive tasks thereby driving the attentional concentration to higher cognitive areas related to subtle faculties so as to get in control of all regions that drive the human brain. This journey of attentional concentration through meditation could systematically lead us to apertures (cortical regions that map the ability to control the functionality of our cognitive capabilities) that may bring us into the realm of the Universal Truth. [Todd Kl., et.al, Gap Junction Expression Is Required for Normal Chemical Synapse Formation, J. Neuroscience, 30(45):15277-15285, 2010] **C14**

133 The Effect of Self Perception from an Exocentric Perspective on Mu and Beta Rhythm Suppression Anthony Mefford, Jean-Paul Noel <amefford@gustavus.edu> (Saint Peter, MN)

The Mirror Neuron System (MNS) has been suggested to play a critical role in social interaction and in the formation of our theory of self. Evidence shows that EEG oscillations in the mu (8-13 Hz) and beta (13-30 Hz) frequency bands are reliable indicators of the activity of the MNS in humans. In a non-moving subject both rhythms are robust; however, a significant suppression of mu and beta rhythms is observed when a volitional movement is made or the same movement is observed in another person. The current study sought to address the topic of mirror neuron activity when subjects viewed themselves, as opposed to someone else, making a volitional movement from an exocentric (third-person) versus an egocentric (first-person) perspective. Mu and beta rhythm suppression was measured while subjects viewed videos of both themselves and of another person making a specific arm movement, from both an egocentric and exocentric perspective, in addition to physically making the mentioned arm movement. Findings showed that both

mu and beta rhythms were suppressed regardless of the perspective in which the movement was observed, and that the characteristics of this suppression did not vary depending on loci of perception (egocentric or exocentric) or relation to agent of movement (self or other). Results support the hypothesis in that the human MNS functions as an observation/execution system, in which the neural mechanism is unaffected by the perceptual point of view. **P1**

2.13 Emotion

134 Transcranial Ultrasound Effects on Mental States: A Pilot Study Chris Duffield, Michael Trakas; Emil Annabi; M. Bagambhrini Gerace; Patrick Boyle; Anthony Lucas; Quinlan Amos; Annemarie Buadu; John J. Badal; Stuart Hameroff <cduffield@gmail.com> (The University of Arizona, Center for Consciousness Studies, Tucson, AZ)

Background/Objective: Transcranial ultrasound (TUS) can modulate brain function. To assess possible TUS modulation of mental states, we investigated effects on subjective reports of mood and pain of sub-thermal TUS versus placebo applied to frontal scalp and brain of chronic pain patient volunteers. Methods: With IRB approval and informed consent, subjects with chronic pain completed two visual analog scales for pain (NRS) and mood (VAMS/Global Affect), and their vital signs were recorded 10 minutes prior to, and 10 minutes and 40 minutes following exposure to either sub-thermal TUS (8 megahertz) or placebo using the 12L-RS probe of a LOGIQe ultrasound imaging machine (General Electric, USA). A physician, also blinded for TUS versus placebo, applied the probe (with gel) to scalp over posterior frontal cortex, contralateral to maximal pain, for 15 seconds. A second investigator operated the ultrasound machine, randomizing TUS versus placebo. The process was then repeated, applying the opposite modality (TUS or placebo). Results: Subjective reports of Mood/Global Affect were improved 10 minutes ($p=0.027$) and 40 minutes ($p=0.039$) following TUS compared with placebo. NRS pain reports improved following TUS at $p=0.073$ at 40 minutes. Conclusion: We found significant improvement in subjective mood 10 minutes and 40 minutes after TUS compared to placebo. TUS can have neurophysiological effects on cognitive and conscious function, and is a promising noninvasive therapy for modulating conscious and unconscious mental states and disorders. We suggest TUS acts via intra-neuronal microtubules, known to resonate in TUS megahertz range. **P2**

135 The Neural Correlates of Emotion as Suggested by Alexithymia Bill Faw <bfaw@bpc.edu> (Psychology, Brewton-Parker College, Mount Vernon, GA)

The realm of emotional responses constitutes the personal sphere wherein one interacts with the environment, past and random thoughts, reasoning and planning thoughts, and one's and other persons' immediate and ultimate values. Components of emotional events include subliminal/liminal perception of real, or imaging of imaginary, objects; representations of those objects; reflexive motor responses; memory and significance appraisals; instinctive, conditioned and deliberate emotional responses; and a range of unattended, attended, higher and higher-order emotional experiences. Alexithymia has been defined as "a diminished awareness and inability to describe ones mood state". This paper sketches the neural correlates of the components of emotion and suggests possible mechanics by which such "diminished awareness" comes about. **C3**

136 A Randomized, Placebo Controlled Study of the 8-Coil Shatki Device Mathew Gendle, Megan G. McGrath <mgendle@elon.edu> (Psychology, Elon University, Elon, NC)

Controversy exists regarding the role of weak and complex magnetic fields (MFs) in the generation of abnormal perceptual phenomena and changes in consciousness. A commercial variant of the MF emitting Koren helmet (the 8-coil Shakti) is currently being marketed for use in meditation, mood enhancement, and the production of altered states of consciousness. The Shakti produces spatially and temporally complex 0.1-1.0 microTesla MF's that may have extensive effects on cortical neurobiology. The present study investigated the effects of the Shakti on the emotional response to color photographs that varied in emotional valance. Participants ($n = 37$) wore the Shakti device in sensory deprivation, and were exposed to either 30 minutes of MFs produced by

the Shakti (via the device's hemispherically symmetrical, fast alternating Amygdala signal), or a sham exposure condition. Participants then rated their emotional reactions to a set of 54 color still images taken from the International Affective Picture System (IAPS). Although participants indicated significantly different emotional responses to images with distinct emotional valances (all p's < 0.0001), exposure to the Shakti's MFs did not affect these responses (all p's > .30), or significantly interact with image emotional valance (all p's > 0.09). Because Shakti MF exposure did not alter the emotional perception of static images, it seems unlikely that it could produce the notable alterations in consciousness claimed by many of its users. Such effects are likely the result of placebo expectancies and individual personality factors. **P1**

2.15 Specific brain areas

137 A Possible Approach to Understand Consciousness Devendra Singh, Soniya <devs.hcst@gmail.com> (Faculty of Engineering, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

The human brain consists of about one billion neurons and each neuron has synapses of the order of 1000. Thus capability of the human brain is 1016 operations per seconds. These days we believed that each neuron in the human brain consist large number of microtubules. Penrose and Hameroff proposed that consciousness involves sequences of quantum computation in microtubules inside brain neurons. To understand the theory of where consciousness resides in the brain, we must understand microtubules. The model based on principal of a neuron is artificial neural network (ANN) which is used to solve many real world problems but insufficient to explain consciousness phenomena. Similarly to ANN, if somehow we are able to design mathematical model of a microtubule (without using quantum theory) then it may be possible to explain consciousness in simple words. **P1**

2.16 Miscellaneous

138 Cardiac Neurons Firing Preceding Cortical Neurons Firing by Variable Time Equivalent to Rp Before Conscious Act Amna Alfaki, MD <amna1952@hotmail.com> (Pediatrics, Omdurman Islamic University, Kharoutm-Omuduman, Sudan)

The signals and the neuronal mechanisms that are underlying the behavior, actions, and action-directed goals in man and animals during conscious state are not fully understood, and the neurodynamic mechanisms and the source of these neuronal signals are not authenticated. Temporal judgment alone can neither account for neural signaling necessary for emergence of conscious act nor explain RP (Readiness Potential, the accepted neural correlate time needed for the neurons to fire) that precedes the onset of action or the latency time of 0.5 ms that precedes the conscious act found by Libet. Neuronal feedback mechanisms between the heart and the brain seem feasible and logical suggestions to be considered, so clearly, I would suggest that the onset of a conscious-directed goal, conscious action, freewill, intention, and the neural signals and mechanisms that control them may depend upon the interaction between two sources: (1) the brain and (2) the heart. The temporal-cardiac (neural system) interaction has been well established in heart-brain interaction studies by many workers who found that the work of the heart precedes that of the brain in EEG (electroencephalography) findings in conscious stimulation, which may explain and account for RP time and the 0.5 ms latency period of Libet's important findings. According to my hypothesis (Alfaki 2009) and views, the temporal neurons in the soma to-sensory cortex will respond to conscious stimulation only after receiving neuronal signals from the cardiac neurons in the neural plexus of the heart; after variable millisecond equivalent to RP or Libet's latency period prior to temporal neuronal firing in response to conscious act, this time is the time needed by cardiac neurons to process and signal information to the brain through feedback mechanism and heart-brain interaction. **A3**

139 Neuroscience of Spiritual Phenomena Seema Bhat, Laxminarayan Bhat <seemaranibhat@gmail.com> (Chemistry, Reviva Pharmaceuticals, Inc., Cupertino, CA)

Consciousness describes a state of awareness and control over the mind. There are several spiritual practices described in the religious literature to achieve higher levels of consciousness but widely practiced methods are prayer, meditation and yoga. Although several methods have been practiced over centuries by mystics and religious sects, apparently, no religious literature provides explanation for the spiritual phenomena with scientific rationale except the one practiced by the followers of the Radhasoami Faith based in Dayalbagh, Agra, India The scientific support for spiritual practices has been growing in recent years as more and more research is starting to validate what has already been known by the spiritual community for centuries now. It is a well known fact that in addition to supreme bliss or enlightenment, the spiritual practice can provide unparalleled physiological, psychological and social benefits. However, the scientific study of spiritual phenomena has been a great challenge for researchers as it requires analysis of very complex subjective experiences accompanied by physiological changes in the body. Thus far, the scientific literatures on spiritual phenomena are mainly limited to physiological changes. We believe that the scientific measures for subjective experiences such as spiritual bliss or enlightenment are beyond the purview of science. The neuroscience plays a very important role in the scientific study of the spiritual phenomena. Spiritual pursuits bring neurological changes by affecting the brain and mind which in turn bring certain psychological and physiological changes. Therefore, most of the scientific methods and techniques used for measuring spiritual phenomena have been in the field of neuroscience. The scientific studies related to neuroelectrical, neurophysiological and neurochemical changes caused by the spiritual phenomena are briefly presented. **P1**

140 Neurogenetics and DNA Consciousness John Grandy <khyber_john@yahoo.com> (Orchard Park, NY)

The neurogenetics of consciousness is the study of the genetic processes in where the degree of DNA consciousness gives rise to the emergence of neuron-based degrees of consciousness. This process then provides a continuum of neuron-based consciousness and eventually neurodegeneration. The degrees of neuron-based consciousness extend from the realm of the invertebrates to the higher vertebrates e.g. mice and humans. The neurogenetics of consciousness has three main components: 1) neurogenesis, brain morphogenesis, and neuron maturation, which are all under the guidance of Homeobox genes, 2) the neuron-based continuum of consciousness that involves epigenetic factors, microtubules, and neuroplasticity, and 3) the end of life processes that involves neurodegeneration. The genetic correlates that influence neurodegeneration can be seen in diseases e.g. Alzheimer disease. In this presentation I will review and illustrate proof that the degree of DNA consciousness is involved in each of these three components of the neurogenetics of consciousness. **P1**

141 Implications of Brain Cell Mechanosensitivity for Consciousness Research Richard Harrington <rjharrington@email.arizona.edu> (The University of Arizona, Tucson, AZ)

Ever since Darwin, evolutionary biologists have appreciated how random mutations and natural selection contribute to the evolution of "function-first" ("form follows function") structures, but only recently have some of them explored the extent to which evolutionary forces must also exploit "form-first" structures in order to generate function-first structures. Form-first structures self-organize under the direction of physical law, and therefore are only secondarily modifiable by natural selection. Just as atoms and crystals are form-first structures ("natural forms"), certain subcellular forms, such as protein folds and microtubules (MTs), can also be classified as natural forms [1]. MTs (as compression elements) combine with actin filaments (as elastic tension-bearing elements) to create the cytoskeletal tensegrity structure (CTS) – a "prestressed" structure in which the most stable (free-energy minimum) form is one of isometric tension [1, 2]. Thus, when first distorted by and then released from pressure, the CTS reverts to its natural form, a feature that confers considerable resilience and robustness to the CTS that higher-level (cell and above) function-first structures can exploit to their advantage. Given that the CTS is a universal component of cells, and given that the CTS is necessarily responsive to mechanical loadings, it is not surprising

to find that all cell types studied to date exhibit mechanosensitivity [2]. Bone cells, for example, respond to mechanical loadings (including muscle contractions) by triggering bone remodeling processes in order to maintain optimal bone density and shape. In the peripheral nervous system, mechanoreceptors (e.g., for touch and pain) translate mechanical signals into neuronal signals. In contrast, the typical brain cell likely needs considerable buffering from externally-applied mechanical loadings – a buffering provided to a large extent by the maintenance of an optimal intracranial pressure to keep the cranial compartment in a state of volume equilibrium. This allows normal brain cell functioning (including interpreting information sent by mechanoreceptors) to proceed without interference from external forces, such as those generated by normal head movements. As one example of interference, as assessed at the subcellular level, compression of rat pyramidal cells induces phosphorylation of MAP2 and tau, thereby destabilizing dendritic MTs and deforming dendrites [3]. At the level of consciousness and behavior, case reports of tumors pressing againstamygdalae suggest that this pressure can trigger bizarre and violent thoughts and feelings that are often externalized as aggression [4]. Given that CTS components have been plausibly linked to conscious processing (e.g., cholinergic system theory [5, 6] and ORCH-OR theory [7]), a possible role for "simulated mechanotransduction" for generating "covert actions" (thoughts and feelings) will be discussed. References: [1] Denton et al. (2003) Bio Systems 71:297-303; [2] Rubin et al. (2006) Gene 367:1-16; [3] Chen et al. (2010) Journal of Neurotrauma 27:1657-1669; [4] Nakaji et al. (2003) Pediatrics 112:e430; [5] Perry et al. (1999) Trends in Neurosciences 22:273-280; [6] Woolf & Butcher (2011) Behavioural Brain Research 221:488-498; [7] Hameroff (2001) Annals of the New York Academy of Sciences 929:74-101. **C6**

142 Scale-Free Brain Activity Biyu Jade He <biyu.jade.he@gmail.com> (NIH/NINDS, Bethesda, MD)

Scale-free dynamics is exhibited by many complex processes in nature. Despite long-held interests in fields such as physics and heart physiology, it has so far been largely neglected in mainstream neuroscience research, partly due to its universality. In this talk I will show that underlying the same power-law distribution, the temporal structures of scale-free dynamics vary from one system to another. This suggests that it is important to go beyond the mask of the power-law distribution and explore the fine spatiotemporal patterns and underlying mechanisms of scale-free brain activity. I will further discuss recent findings demonstrating the functional significance of scale-free brain activity, obtained with both intracranial EEG and fMRI in humans. Lastly, the low-frequency end of scale-free brain activity, termed the "slow cortical potential", has been studied in EEG research for decades, and has recently been shown to be an electrophysiological correlate of the fMRI signal. Its correlation with conscious awareness under various experimental conditions will be discussed. **PL4**

143 Metal Correlates of Consciousness and Cognition Elan Ohayon, Ann Lam <ohayon@salk.edu> (The Green Neuroscience Laboratory, La Jolla, CA)

In the current human condition there is no life or consciousness without metals. Sketch of proof: consciousness is dependent on breathing via hemoglobin; take away iron, lose hemoglobin and consciousness is gone. However, little is known of the more subtle interweavings of metals, consciousness and cognition. In this study, we explore the distribution and co-localization of metals across scales in the human brain. We used synchrotron-based rapid scan imaging at whole hemisphere levels, as well as microprobe imaging to examine large-scale morphometric features and underlying brain microstructures of postmortem samples. Two-dimensional scans showing the distribution elements (including iron, zinc, calcium, copper, and selenium) were mapped using beamlines at the Stanford Synchrotron Radiation Lightsource. Comparisons between- and within-subjects helped reveal differences in elemental distributions between brain areas. For example, initial rapid scans showed the expected high-levels of iron in grey matter structures such as the caudate putamen and globus pallidus, while exhibiting prominent zinc fluorescence along white matter tracts. The extent of variations in elemental concentrations within these structures at the cellular level was further studied with microprobe analysis. Elemental maps of unstained tissue were able to show the degree of iron, zinc and calcium co-localization at resolutions exceeding

1 micron. The application of these synchrotron-based techniques is thus providing novel methods to study the correlation of metals on brain function across large areas, while allowing for co-registration at high resolutions at the cellular level. Ongoing multi-scale investigations include comparisons of varying cognitive conditions including: Williams Syndrome, epilepsy and typical brain development. **P1**

144 Towards a Second-Person Neuroscience of Social Cognition Tobias Schlicht <tobias.schlicht@rub.de> (Philosophy, Ruhr-Universite Bochum, Philosophy, Bochum, Germany)

Philosophers and scientists strive to unravel the psychological processes and neural mechanisms enabling our ability to understand others. But despite the remarkable progress of the science of consciousness, and the more recent apparent success of social cognitive neuroscience, we are still in the dark about the nature of social cognition and its underlying mechanisms. Traditionally, theory-theory and simulation-theory have dominated debates on this topic and thus shaped experiments designed to uncover the neural correlates of social cognition (cf. Newen & Schlicht, 2009). This led to the discovery of two (anatomically different) large-scale neural networks apparently supporting the respective theories: while the so-called "mentalizing system" seems to support the theory-theory, supposedly giving us an inferential, reflective (i.e. "third-person") grasp of others' mental states (Frith & Frith, 2006, 2010), the "mirror neuron network" seems to support the simulation-theory, supposedly giving us a "first-person grasp" of the motor goals and intentions of other individuals (Rizzolatti & Sinigaglia, 2010). It has been argued that the disparity between these results may be due to differences in the experimental paradigms used (cf. Keysers & Gazzola, 2007), such that they presuppose the very frameworks they are taken to support. However, both sets of results share a commitment to a "spectator conception" of social cognition (Hutto 2008), according to which a detached observer evaluates someone else without interacting with them (cf. classical false belief tests). This paper presents conceptual tools of an alternative second-person approach to social cognition and argues for the need of a second-person neuroscience, which will help neuroscience to really go social. Previous empirical research in social neuroscience has focused on the perception of inert stimuli "consistent with the idea of a detached observer;" whereas, in everyday life, making sense of others requires both emotional engagement and interaction. Thus, recent conceptual and empirical developments consistently indicate the need for investigations which allow the study of real-time social encounters in a truly interactive manner. This suggestion is based on the premise that social cognition is fundamentally different when we are interacting with others rather than merely observing them. Firstly, it is unclear whether and how activity in the large-scale neural networks described above is modulated by the degree to which a person does or does not feel actively engaged in an ongoing interaction and whether the networks might subserve complementary or mutually exclusive roles in this case (Schilbach, 2010). Secondly, new experiments based on a second-person framework may shed light on the complex relationship between (unconscious) implicit and (conscious) explicit processes involved in social cognition (Frith & Frith, 2008). For example, ontogenetically we may become experts in social cognition through active interaction, until later, more reflective social abilities may develop which could make use of the very same neural mechanisms forged during social interactions (cf. Karmiloff-Smith, 1992). This is consistent with the "re-use" principle of neural circuits (Anderson, 2010). Finally, the relevance of this approach for our understanding of psychiatric disorders construed as disorders of social cognition (e.g. autism) is highlighted. **C11**

145 The Neuroscience of Vipassana Meditation: Why and How? Stephen Whitmarsh, Mark Leegsma <stephen.whitmarsh@gmail.com> (Computer Science, Radboud University, Nijmegen, Netherlands)

The premise of the Towards a Science of Consciousness Conference is that a unified science of such a kind doesn't yet exist. We agree, more or less tacitly, that there is no agreement, and we desire rather than possess a paradigm. In particular, a definition of the target phenomenon that is both unequivocal and satisfying appears to be lacking. Yet, scientists of consciousness usually proceed as if such a definition were already available. In good pragmatic fashion, we assume a priori that consciousness is an object and exists in an observer-independent way; presumably all

the scientist of consciousness has to do is select the full-fledged phenomenon and find out how it works. With consciousness, however, it doesn't work that way. We will argue, on the contrary, that consciousness is emphatically a question for us and that, against pragmatism, no science of consciousness may ignore this given before it starts empirically investigating its 'nature' or its neurological correlates. Instead, we will turn the questioning of consciousness and its very existence into our main point of departure as well as a phenomenon for neuroscientific investigation. So, instead of continuing the current flaw in the science of consciousness – assuming a priori that consciousness is an object – we suggest the only viable a priori is ignorance. Investigating our relation to a lack of knowledge is the key endeavour in Vipassana meditation. Therefore, a neuroscience of Vipassana meditation will in effect be impossible when – courtesy of any assumptions and a priori definitions introduced – the very phenomenon it investigates (ignorance) is ignored. The issue seems further confounded from the fact that meditation resists definition in a similar way as any a priori definition sabotages its phenomenological questioning. Taken from four years of confronting such issues of ignorance in my PhD on the neuroscience of Vipassana meditation, I will give examples of failure to define and operationalize Vipassana meditation. Along the way it became apparent that the neuroscientist has to become a meditator as well. This resulted in neuroscientific studies of Vipassana meditation using electrocorticography and magnetocorticography that elucidate some of its neural mechanisms and that have resulted in its 'real-life' application in online brain-computer interfacing. **C15**

3.0 Cognitive Sciences and Psychology

3.01 Attention

146 Inattentional Amnesia in the Attentional Blink Benjamin Baird, James Elliot; Michael Franklin; Michael Mrazek; Jonathan Schooler <baird@psych.ucsb.edu> (Psychology, University of California, Santa Barbara, Santa Barbara, CA)

A primary point of contention between the major neurobiological theories of consciousness is whether attention is necessary for consciousness. Global workspace theory (Dehaene et al., 2006) holds that an inability to accurately report supraliminal stimuli that are unattended indicates that they are processed unconsciously (inattentional blindness), while local recurrence theory (Lamme, 2003; Block, 2007) argues that inattention in such circumstances may prevent the encoding of conscious content into a form that allows for access and report (inattentional agnosia/amnesia). The present study evaluated this question in the context of an attentional blink paradigm, in which observers frequently fail to accurately identify a second target in a rapidly presented sequence due to attentional allocation to a first target. By exploiting qualitative differences in priming (Marcel, 1980), we were able to assess whether missed target words reflected conscious or unconscious information processing. The results demonstrate that missed target words show a type of priming specific to conscious information, supporting the inattentionalamnesia view. These results suggest that while attention is necessary for reportability it may not always be a necessary condition for consciousness. **P2**

147 Attention Generalizes Unconscious Perceptual Learning David Carmel, Marisa Carrasco <davecarmel@nyu.edu> (New York University, New York, NY)

Background: Perceptual learning (PL) is the improvement in performance of perceptual tasks that results from practice, and is considered a manifestation of neural plasticity in the adult brain. Endogenous (voluntary) attention facilitates PL, but it has been argued that attention plays no essential role in PL because PL can occur even when observers are unaware of the 'trained' stimulus. We therefore asked whether manipulating attention to stimuli observers remain unaware of would affect PL of those stimuli. Method: We manipulated endogenous (voluntary) spatial attention to assess whether PL would occur at attended and unattended locations. Trained stimuli were presented monocularly, and suppressed from awareness by continuous flash suppression (CFS), a strong form of interocular rivalry in which monocular stimuli are rendered invisible by

high-contrast, dynamic displays presented to the other eye. During 7 training sessions, observers viewed a CFS display and performed an attentional task on stimuli presented to the dominant eye. This task required attention to stimuli presented in two corners of the display located diagonally from each other, while ignoring stimuli in the other two corners. Concurrently, the suppressed eye was shown the trained stimuli – textures composed of short horizontal lines filling the suppressed region, with two 'texture-targets' (three diagonal lines arranged either vertically, one above the other, or horizontally, one next to the other) presented on each trial at retinal locations corresponding to one of the attended and one of the unattended locations. There were therefore two attended locations and two unattended locations, each with one location exposed to a texture target on each trial, and one that was never exposed to a texture target. Before and after the training sessions, we measured duration thresholds (without CFS) for discrimination of texture-target orientation at all four locations. We expected PL – improved performance expressed as shorter-duration discrimination thresholds – to be modulated by both attention and unconscious exposure to texture targets, such that the greatest improvement would be seen at the attended and exposed location, and the smallest improvement would be found at the unattended and unexposed location. Results and conclusion: Surprisingly, performance for texture targets improved significantly at all four locations. Control experiments ruled out the possibility that the improvement was due to either the repeated testing or to the training on the dominant eye's task. As the texture stimuli were suppressed by CFS during training, this finding indicates that attention can facilitate PL without awareness, and furthermore, can generalize it to untrained locations. Acknowledgments: This research was supported by an International Brain Research Foundation Postdoctoral Fellowship to DC and NIH Research Grant RO1 EY016200 to MC. **C4**

148 Both Consciousness and Access are Gradual Phenomena Tony Cheng <cognitivism@yahoo.com.tw> (Philosophy, CUNY Graduate Center, New York, NY)

Consciousness is extremely elusive from the empirical point of view. Reports are not as reliable as we normally think even in cases that participants have high confidence. Neurological data are often hard to interpret. How to operationalize or measure consciousness has been one of the main challenges in psychology and neuroscience. One way to conduct the measurement is to find something reliably correlated with consciousness and measure that item instead. Cognitive access is one such candidate, since it seems to be more graspable from participants' point of view. However, things are not that straightforward. Ned Block (1995, 2007, 2011) has long been trying to dissociate the two on both conceptual and empirical grounds. In this talk I focus primarily on the empirical footings. First we need to get clear about what is supposed to be "overflowed" in Block's term. Various candidates include attention, working memory, access, accessibility, and report. Almost everyone seems to agree that phenomenal consciousness overflows report (e.g., consider locked-in syndrome) and accessibility (e.g., Chalmers 1997, Prinz 2007, and Block's recent concession in 2011). I will argue that what is at issue for our purpose, that is, measuring consciousness, should be "access," and I will discuss its relations to attention and working memory. The general argumentative shape is this: Block makes the distinction between generic and specific phenomenology, and uses it to interpret the Sperling 1960 paradigm. On a charitable reading of Block, generic and specific phenomenologies are not different in kind; they constitute a continuous spectrum. On his view, in standard Sperling cases before the cue tone, participants have specific phenomenology for almost every item on the screen. After the cue, they report the given row on the base of those specific phenomenologies. I will consider various responses to Block's view and his replies, and then join Ian Phillips (2011) in holding that the "postdiction" interpretation captures what happens in Sperling. Instead of developing the metaphysical, temporal structure of experience as Phillips does, I concentrate on the covariance relation between consciousness and access, since our purpose here is to invoke the latter to measure the former. According to my picture, contra Block's most opponents, participants do have specific phenomenologies before the cue, since our attention would randomly flow even before being cued. But contra Block, I argue that we have specific phenomenologies only for four items or so, as opposed to almost every item, since our capacities of attention and working memory do not allow us to have that much. After the cue, the postdictive effect happens and destroys original specific phenom-

enologies by creating new ones, and subjects report based on the new specific phenomenologies. In arguing for this, I argue against Sergent & Dehaene (2004) but for Overgaard et al. (2006, 2010) on the measurement of consciousness. At the end of this paper I compare human cases and analogue cases in chimpanzees based on the studies of Matsuzawa et al. (2007, 2009), and then draw some implications. **C4**

149 Attention without Awareness Robert Kentridge <robert.kentridge@durham.ac.uk> (University of Durham, Psychology, Durham, United Kingdom)

Although our intuitions may suggest that attention and awareness are intimately related, recent empirical evidence indicates that this might not be the case. The initial impetus for work on dissociation between attention and awareness was based on the neurological condition of blindsight in which subjects with damage to primary visual cortex retain the ability to respond accurately in simple visual tasks despite denying awareness of the visual stimuli to which they must respond. We found that cues orienting the attention of such a subject improved his performance, yet, despite exhibiting the behavioural markers of selective attention, he remained unaware of the attended stimulus. Subsequent work in Durham and in other labs has examined the extent to which a variety of forms of attentional control (e.g. endogenous or exogenous control) and attentional selection (e.g. space, feature or object-based selection) dissociate from awareness, in some cases including measurements of both the behavioural and neural correlates of attention and awareness. I will discuss the extent to which different forms of attention, and attention-related phenomena such as visual-orienting and alerting appear to dissociate from awareness. **PL3**

150 Awareness of Attentional System and Spatial Judgments Jean-Paul Noel, Anthony Mefford; Lauren N. Hecht <jnoel@gac.edu> (Gustavus Adolphus College, St. Peter, MN)

Spatial judgments and estimates play a fundamental role in the construction of our visual world. This perception is deeply influenced by the loci of an individual's attentional system and the reference point undertaken when making these estimates. In this study it was hypothesized that exocentric, but not egocentric, spatial estimates would be enhanced by meta-awareness. Furthermore, it was predicted that this effect could be replicated through the process of perceiving oneself from a third person's point of view. In Experiment 1, participants completed the Sustained Attention to Response Task while periodically making depth or segment length estimations. Results confirmed the hypotheses; performance increased for participants in a state of meta-awareness with respect to segment length estimates, but did not for depth estimates. Additionally, it was observed that both when participants were on-task or off-task, meta-aware trials showed smaller standard deviations than did their counterpart non meta-aware trials. In Experiment 2, a third set of participants estimated distances both egocentrically (i.e., relative to their body) and exocentrically (i.e., relative to an external point), either under natural viewing conditions (i.e., egocentric perspective) or when watching themselves in a virtual reality environment (i.e., exocentric perspective). Results indicated that from an exocentric perspective participants underestimated both egocentric and exocentric distances; however, from an egocentric perspective participants underestimated exocentric distances and overestimating egocentric ones. From these results it can be concluded that participants perceive exocentric distance more accurately when conceptually distant from their own attentional system (i.e., in a state of meta-awareness), and that the processing mechanism underlying this effect is not a purely visual mechanism as the effects were not replicated when participants viewed themselves from a third person's point of view. It is conjectured that meta-awareness could act as a spatial baseline providing a new Cartesian-like coordinate system, as opposed to an egocentric polar coordinate system, in this manner enhancing exocentric judgments. **C4**

151 Attention as the Mechanism of Consciousness Jesse Prinz <jesse@subcortex.com> (City University of New York, Graduate Center, Philosophy, New York, NY)

There is a growing body of evidence linking attention and consciousness. Phenomena such as inattentional blindness suggest that attention is necessary, and pop-out, when there are no competing tasks, suggests that attention is sufficient. In addition, both fMRI and electrophysiology suggest that attention and consciousness share neural correlates. But there are also numerous studies

that purport to show that attention is neither necessary nor sufficient for consciousness. This talk surveys the best of these, including studies which try to establish that there can be unconscious attention in blindsight, masking, and interoccular suppression. These results are re-interpreted as establishing a dissociation between consciousness and orienting, a process that is psychologically, physiologically, and phylogenetically dissociable from attention. **PL3**

152 Phenomenal Consciousness without Access? Christian Stevens <cstevens@uoguelph.ca> (Philosophy, University of Guelph, Toronto, Ontario Canada)

The debate concerning whether or not phenomenal consciousness overflows or outstrips cognitive accessibility initiated by Ned Block's celebrated paper, "On a Confusion about a Function of Consciousness," shows little sign of abating. Recent experiments (Landman et al., 2003, Sligte et al., 2008, 2009, 2011, Vandenbroucke et al., 2011) relying on George Sperling's (1960) famous partial-report method have been taken by some scientists and philosophers (Lamme, 2006, 2010, Block, 2007, 2011) as persuasive evidence in favor of the view that localized recurrent processing (recurrence confined to visual areas) is the neural basis of (visual) phenomenal consciousness. Other theorists meanwhile, (Dehaene and Naccache, 2001, Maia and Cleeremans, 2005, Dehaene et al., 2006) hold that top-down attentionalamplification of local recurrent processing is necessary for a stimulus to be consciously perceived. My aims in this paper are threefold: 1) To show that the theorist who maintains that there can be phenomenal consciousness (p-consciousness) without access-consciousness (a-consciousness) is, nevertheless, committed to a kind of (direct) epistemic access to such phenomenal states. 2) To point out a kind of confusion that arises from a failure to understand or fully appreciate the connections between working memory and access-consciousness. 3) To examine whether the partial-report data support the claim that there can be phenomenal consciousness without access-consciousness, or, if you prefer, that phenomenology overflows cognitive accessibility.1) and 3) are essentially independent, while 2) sets the stage for 3) and also does us the service of clearing away certain erroneous takes on the issue. Even if only 2) is successful, or ultimately persuasive, we will, at the very least, have a firmer grip on the real 'choice-points' that exist in this debate. **C4**

3.03 Other sensory modalities

153 Sound Vision: The Consciousness of Seeing with Sound Daniel Kish <daniel.kish@worldaccessfortheblind.org> (World Access for the Blind, New York, NY)

Daniel Kish, totally blind from birth, uses and teaches the use of sonar to blind individuals to help them image their surroundings, and travel with freedom, grace, and confidence through all kinds of environments, whether familiar or not. He provides his perspective on the conscious foundations of this ability from his own phenomenonological experience, and his expertise gathered from working with many hundreds of blind students from all over the world. Audience experience and demonstrations of the skill are included. **PL7**

154 Echolocation Behavior Provides a Window to the Mind of a Bat Cynthia Moss <cynthia.moss@gmail.com> (University of Maryland, Psychology, Baltimore, MD)

Echolocating bats produce ultrasonic vocalizations outside the range of human hearing, and they perceive their surroundings from information carried by sound reflections returning to their ears. This active acoustic sensing system allows bats to perform complex spatial tasks in the dark. What are the acoustic cues used by bats to perceive their surroundings? Bats rely on the time delay between call emission and echo return to estimate the distance of objects, and they use differences in the time, intensity and spectral content of echoes at the two ears to estimate the direction of objects. Bats process dynamic echo information on a millisecond time scale, and their spatial perception by sonar supports rapid maneuvers through complex environments. There is great diversityamong bats in the time-frequency structure of echolocation calls. Some bat species produce frequency modulated (FM) calls, and others produce constant frequency (CF) calls. It is well documented that bats using FM calls actively adjust the duration of their sonar vocalizations to avoid overlap of emissions and echoes. FM bats also control the direction of their sonar beam,

which restricts the direction and volume of space sampled by the echolocation system. Therefore, the temporal characteristics of a bat's sonar signals can be used to estimate its window of attention along the range axis, and its sonar beam aim can be used to infer the direction of its acoustic gaze. Here, I will describe a series of studies that investigated adaptive sonar behavior of the big brown bat, Eptesicus fuscus, performing in a variety of echolocation tasks. This species produces FM calls that change as the bat sorts and tracks echoes from objects at different distances and directions. Our findings suggest that the bat's perception by sonar is supported by finely tuned adaptive sonar signal control. Collectively, our studies illustrate how adaptive sonar behavior in bats can provide a window to their echo information processing and perception of complex scenes. **PL7**

155 Consciousness in the Birds Rubina Saxena, Ms. Rimple Saxena <rubinasaxena17@gmail.com> (Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

The people from the East, when succeeded in gaining the vision by means of which real knowledge of the spirit could be obtained, naturally felt that the same spiritual essence was working in every living creature as illumined their own "self" or ego and the entire universe endowed with life by a Supreme Spirit, the Supreme Being. If a man who strayed away in the morning returns home in the evening, he is not said to have gone astray. Similarly pigeons like many other animals have certain level of consciousness always present in them as they also have spirits/souls in them which is a part of the spiritual essence – Supreme Being. 1) Pigeons have the capacity to share attention between different dimensions of a stimulus, but (like humans and other animals) their performance with multiple dimensions is worse than with a single stimulus dimension. 2) Pigeons can be taught relatively complex actions and response sequences, and can learn to make responses in different sequences. 3) Pigeons readily learn to respond in the presence of one simple stimulus and withhold responding in the presence of a different stimulus, or to make different responses in the presence of different stimuli. 4) Pigeons can discriminate between other individual pigeons, and can use the behaviour of another individual as a cue to tell them what response to make. 5) Pigeons readily learn to make discriminative responses to different categories of stimuli, defined either by arbitrary rules (e.g. green triangles) or by human concepts (e.g. pictures of human beings). 6) They do less well with categories defined by abstract logical relationships, e.g. "symmetrical" or "same", though some experimenters have successfully trained pigeons to discriminate such categories. 7) Pigeons seem to require more information than humans for constructing a three-dimensional image from a plane representation. 8) Pigeons seem to have difficulty in dealing with problems involving classes of classes. Thus they do not do very well with the isolation of a relationshipamong variables, as against a representation of a set of exemplars. 9) Pigeons can remember large numbers of individual images for a long time, e.g. hundreds of images for periods of several years. When a pigeon is born, it already has all the awareness it will ever have. It already knows everything that will happen to it, almost like a map of its life that is spread out before it. One continuous awareness that extends from its birth to its death. A pigeon is aware of its entire history from birth till death (no surprises!), but experiences it as one timeless moment. The entire life history of the pigeon all exists at the same time, including the trip away from and back to the loft. In some sense, the pigeon never went anywhere. The possible answer to how the pigeon finds its way home is that part of the pigeon's mind is already home and never left home. When a pigeon is released, the part of its mind that's still at home guides it back to its loft. Because in some sense it's already there. **P1**

156 Echolocation in People Lore Thaler <lore.thaler@durham.ac.uk> (Durham University, Psychology, Durham, United Kingdom)

People use vision, hearing and touch to sense their environment and to go about their daily lives. While touch is particularly helpful to explore the proximal world, vision and can be used to sense the distal world. With regard to hearing, everybody is aware of the fact that people can hear the distal environment when it makes a sound, such as a car passing by or a person speaking. People are less aware of the fact, however, that we can also sense the distal environment through its echo, such as the reverberation of a step in a building. In the literature there are many reports of blind and vision impaired people who make mouth clicks and use the echoes of the clicks to navigate

the environment. In fact, there is plenty of footage on the internet that shows blind people who use clicks and echoes to ride bicycles, go hiking or navigate familiar and unfamiliar cities. In my talk I will describe what is currently known about echolocation in people on the behavioural and neural level. I will also discuss how spatial perception through echolocation might potentially be related to visual experience. **PL7**

3.06 Language

157 To Lie You Have to be Conscious Maxim Stamenov <maxstam@bas.bg> (Institute for Bulgarian Langua, Bulgarian Academy of Sciences, Sofia, Bulgaria)

In the cognitive sciences it is widely acknowledged that complicated mental processes and representations may become instantiated with as well as without consciousness. In other words, higher computational complexity of certain mental processes, e.g. those based on re-entrance and recursion, does not necessarily correlate with higher chances for consciousness access. Correspondingly, one of the major challenges is to establish what are the requirements for a certain mental representation to become conscious as a condition of its implementation. One of the most plausible candidates of a mental state that must be conscious is taken the one involving the speech act of lying. Being aware that one says something that is nonfactual in order to mislead the partner about a certain state-of-affairs in the world is assumed as the intentional component constitutive of a lie as such. Here the nonfactual assertion is considered as a necessary condition, the intent to mislead the partner with it is also considered necessary (but still not sufficient condition), while the execution of the intent becomes the sufficient/fulfilling condition. The intentional arc from planning to execution with its cathexis to consciousness relies on certain mental architecture. This arc is mediated by discrete mental actions that may be embedded within each other and in each of which certain step of their execution in the mind tends to "attract" consciousness at the expense of all other possible. As means to direct mental processing online during thinking and conversation one heavily relies on the resources of natural language. The foci of the processing correspondingly become coded first and foremost in the formal and semantic structure of the finite verbs one uses in thinking mediated by language. The present talk will discuss the point why in order to perform or understand a lie as such one must be conscious starting with a concrete example and carrying out an analysis how complicated patterns of thinking that are not themselves conscious can support the act of becoming conscious of certain mental content in a certain way. **P1**

3.07 Mental imagery

158 Hallucinations as Adaptation: Divine Voices, Visions, and Autoscopy as Neuropsychological Vestiges Brian McVeigh <bmcveigh@email.arizona.edu> (East Asian Studies, The University of Arizona, Tucson, AZ)

"Hallucinations" and "adaptation" are not two words we usually associate with each other. After all, we link the former with loose brain wiring that causes malfunctioning apparent in the nonsensical and irrational ravings of the insane. However, enough pieces of a neurological, phenomenological, and historical puzzle exist to argue that before about the first millennium BCE, hallucinations were adaptive. In other words, individuals "heard" divine voices when confronted with a challenging or stressful situation. Inspired by Jaynes's theory of bicamerality, this is an extraordinary claim, so I begin with the most believable but personally immediate experience we all have: mental imagery. I point out that what we "see" with our mind's eye is in fact semi-hallucinatory. Then I chain together, link by link, three parts of an argument that become increasingly controversial: (1) evidence for an earlier mentality in which hallucinations were adaptive; (2) reactivations of vestigial neurostructures that cause audiovisual hallucinations in modern times. I utilize recent research on hallucinatory reduplications of one's own body (autoscopy, out-of-body experiences, and heautoscopy). Such phenomena, similar to the ubiquitous theophanies recorded in ancient texts (e.g., Old Testament), are remnants of an older neuropsychology that has lost its sociocultural adaptability. Understanding present-day anomalous behaviors (besides autoscopy,

spirit possession, speaking in tongues, channeling, etc.) aids us in appreciating the hallucinatory nature of subjective inner visualizations as adaptations. The final link in my argument, that (3) introspection and hallucinations share key affinities, comes full circle: conscious interior experience and hallucinations are "superceptions." More specifically, superceptions subsume several types: extraceptions (audiovisual hallucinations interpreted as divine voices and visitations in ancient times); vestigial extraceptions (e.g., hallucinations still experienced by schizophrenics); introceptions (mental imagery or inner quasi-perceptions); and coceptions (perceptions and introceptions coincide; such overlapping deludes us into assuming that interior experiences are sensory reflections of reality). **C14**

3.08 Implicit and explicit processes

159 The Influence of Intuition on the Development of Spirituality Sheryl Buotte <sattig@u.arizona.edu> (Psychology, The University of Arizona, Seneca, SC)

Intuition is a way of perceiving the world that is fast, automatic, associative, and emotionally driven. In its most extreme form intuition is psychic ability, a sixth sense. Intuitive persons prefer to use intuition across many situations and do so consistently over time. Prior research links intuition with spirituality, yet fails to define a causal pathway. This research aims at determining a causal connection through Structural Equation Modeling that shows that intuition influences spiritual experience, then spiritual belief or religious belief, or religious belief through spiritual belief, and then finally religious fundamentalism. It also tests a causal connection from intuition to schizotypy (mild, non-clinical schizophrenia-like symptoms). The structural equation model shows that intuition leads to spiritual experience and spiritual experience leads to spiritual belief . And it shows how a new factor, contemplative, mediates the relationship between intuition and spiritual experiences, intuition and religiousness, openness and religiousness, and openness and spiritual experiences. In this model the path from intuition to schizotypy is significant. The type of spiritual belief and experience determined by intuition is decidedly spiritual, not just unusual experiences which one could interpret as spiritual. A new intuition scale was created, the Attig Intuition Scale, for this research. It proved to be reliable and valid; a good measure for the type of intuition which leads to spiritual belief and experience. **P2**

3.09 Unconscious/conscious processes

160 Semantic Preconscious Modes of Cognition – An Experimental Study Josan Arsh, Ankita Mathur; Purnima Sethi <arshjosan08@gmail.com> (Bangalore, Karnataka India)

The term cognition, i.e.to know, to conceptualize, or to recognize, generally refers to the processing of information by human mind, mental processes (thoughts), application of knowledge and changing of preferences. Cognitive processes are often classified as conscious and unconscious. Sigmund Freud popularized the idea of the unconscious, a sector of the mind that harbors thoughts and memories actively removed from conscious deliberation. The term preconscious is chosen in preference to others, such as unconscious, subconscious, subliminal, or implicit because it has the useful connotation of something that is on its way to being conscious, or which could become escalated to consciousness in the right circumstances.In this study, we have attempted to investigate these modes of cognitive processing through a psychophysical experimental approach. We conducted a survey on a set of 25 university students who were exposed to a visual cue containing a set of four numbers (Arabic digits) and depending on the task were asked to extract their average value or compare it against a reference value. The target stimuli were preceded by a hidden visual cue (presented much below the threshold of conscious perception) that could be valid or invalid and all the target stimuli were also presented very briefly to the subjects, for approximately about half a second. The intent was to investigate the possibility of ensemble coding for abstract yet highly familiar symbolic stimuli (Arabic numbers) and also to understand the relation between ensemble coding and conscious perception.We observed that the subjects could mostly extract correct mean values in this short exposure time with a few outliers both slightly

above and below the mean value and that the subjects exhibited a bias towards overweighting the large targets. We also distinctly observed that the hidden cues remarkably influenced the subjects reaction to the main response. Thus, we infer from these results that approximate averaging might rely on intuitive parallel computations and that four simultaneous digits can be processed without conscious access at a semantic level. It is likely that approximate averaging essentiallyamounts to finding the typical value of a set, and could be accomplished by a parallel process where all magnitudes are simultaneously weighted and their votes used to converge to single attractor value. The results of these experiments extend previous findings on ensemble coding as they indicate that an ensemble code could be extracted from a set of abstract symbolic stimuli that are presented without the participant's awareness. Thus awareness or consciousness might be an unnecessary condition for ensemble coding. The idea here is that consciousness is instantaneous but takes time to manifest through the brain pathways, thus the preconscious reactions are faster than conscious reactions. **P1**

161 Implications of Two Conscious Entities in One Brain Frank Heile <frank@heile.org> (Retired, Santa Clara, CA)

Previously I've presented evidence that two conscious entities simultaneously exist in the human brain – primary consciousness (based on sensory representational systems) and symbolic consciousness (based on language/symbolic representational systems). Experiments and phenomenon supporting this theory include 1.Top down vs. bottom up attention, 2. Split brain experiments, 3. Theory of mind, 4. Blind sight phenomenon, 5. Non-conscious perception and priming, and 5. Libet's decision delay experiments. The symbolic consciousness uses the auditory and speech motor systems as the primary I/O channels and these channels are largely sequential and have relatively fewer parallel paths. However, the primary consciousness predominantly uses the visual and somatosensory systems which have massively parallel input and output channels. This leads to an evolutionary advantage of the symbolic consciousness system; it is much better at planning out long term sequences of events since it is built on top of the more sequential auditory sensory and speech motor systems. The evolutionary development of the God concept and of spirituality in general can also be understood in terms of these two separate conscious entities. During the evolutionary development of a weak symbolic consciousness, the primary consciousness may have been perceived as a God – certainly it is has more power and thus is able to control the symbolic consciousness. These two kinds of consciousnesses can also explain and understand the non-theistic (Eastern) approaches to spirituality. For example, the dual or non-enlightened state is one where the symbolic consciousness believes it is the only conscious entity in the brain. The enlightened or non-dual state is one where life is experienced in a unified primary and symbolic consciousness and where it is recognized that the apparent separation into two conscious entities is an illusion. A stated goal of some spiritual practices is to live in the present moment. However it is not easy for the symbolic consciousness to live in the present moment since the content of the symbolic consciousness is dominated by stories of the past or plans for the future. In addition, it takes up to about a half second of time for anything to become conscious to the symbolic system. Thus living in the present moment is something that only the primary consciousness can do well. The symbolic consciousness enabled humans to accomplish many things – such as agriculture, science and technology. However there have been significant disadvantages caused by excessive reliance on the symbolic consciousness for day to day living. For example the built-in and consistent goals of the primary consciousness can be distorted by the many symbolic consciousness judgments which can result in addictions, regrets, resentments and fear. These are areas where the various spiritual paths can be seen to be of benefit since they can result in a more integrated and unified consciousness. These benefits can also be achieved without requiring faith in unscientific religious concepts through this scientific understanding of the strengths and weaknesses of the symbolic and primary consciousnesses. **P2**

3.10 Sleep and dreaming

162 Dreaming a Conscious Experience; Mind – The Instrument for all Thoughts Binathi Bingi <binti179@gmail.com> (Physics, Computer Science, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

It is an everyday experience to all of us that, we feel pain and pleasure during the normal condition of wakefulness. As one passes into the condition of dream or deep slumber or into a condition of trance, there is no perception of the physical world and entities like pain and pleasure. Dreaming and wakefulness are the most general global state-classes of consciousness. Dreaming involves a state which is physiologically and psychologically different from deep sleep. Dreams are said to mainly occur in the REM stage of sleep, which has a high resemblance to a state of being awake and dreams satisfy the various constraints of globality. The conscious state of the dreaming subject is generally characterized by full intellectual clarity in case of lucid dreams. Dreams reflect the dreamer's unconscious mind and specifically that dream content are shaped by unconscious wish fulfillment. From a philosophical point of view, one must ask in what sense dreams can be considered as conscious experiences, and what happens to experiential subject during the dream state. Probably, it may be mentioned here that even in dreams, where the scenes are changing so rapidly, it is the diversion of attention to the various subjective impressions that brings about these transmutations. In some cases, external sounds etc. produce a sudden diversion, and new and sometimes extremely queer or terrifying features are introduced. It may be stated that the conductors of sensory action, in the case of mental pain, due to shocks to associations, the communion is entirely by means of thoughts, which represent various subjective forms assumed by attention with reference to the different impressions with which it is associated. The instrument of thinking for such thoughts is the mind and that this is as much dependent upon the spirit-current for this action as the senses are for the performance of their functions, as like the senses, the mind becomes inoperative when the spirit-currents are withdrawn from the mental plane in the deep slumber or coma. The spirit entity should therefore never be confounded with mind. It may be stated that the inherent essence of spirit force is joy, energy, and intelligence that sensory currents are the rays of that force, and that is by the association of the spirit-current with matter and mind that all phenomena of pleasure and pain may take place. So, we would like to propose that dreams are the conscious experiences that occur on the mental plane, and as the white matter of brain is devoid of neurons, it may be proposed that the spirit force manifests in the white matter of brain and it powers the mind, which corresponds to the grey matter of brain, which is proposed to be the instrument for our thoughts. **P1**

163 Ten Dimensions of Dream Meaning Arthur Funkhouser <atf@alum.mit.edu> (C. G. Jung Institute, Bern, Switzerland)

While it is true that everyone has their own dream language, there are still some general things can be said about dream meaning. In my talk I'll present 10 dimensions of dream meaning that can serve as orientation aids when working at understanding one's own dreams and those of others. These range from the somatic level out to the spiritual dimension and some of them are based on the ideas of C. G. Jung. Along the way, these will be illustrated by actual dreams and some in the audience may wish to contribute one(s) of their own. **P1**

164 Video Game Play As Nightmare Protection Jayne Gackenbach, Mycah Darlington; Mary-Lynn Ferguson <gackenbachj@macewan.ca> (Psychology, Grant MacEwan University, Edmonton, Alberta Canada)

In the current inquiry, the same inventory was administered to western Canadian undergraduate students for course credit that had been administered a year ago to soldiers. Because we had the exact same measures on both samples we were able to compare them directly. Thus with gamer group, dream, and sample as the independent variables using ANCOVA's on the various threat simulation content analyses dependent variables were computed. Covariates were emotional reactivity and number of past traumas. Only males were included in this analysis as there were so few

females among the soldiers. There was a three way interaction between gamer group, dream type and sample on the aggressiveness of the threat. What's important for the nightmare protection thesis is that the gamers in both samples acted the same in their dreams whether recent or traumatic/military. However, those young men who rarely gamed showed opposite effects as a function of sample/context. Severity of threat also evidenced a three way interaction with the same pattern. Additionally, there was a main effect for gamer group across dream type and sample, such that high end gamers had less threat to themselves. Thus it appears that gamers are acting the same in their dreams despite the broader context of being in the military or in college or the dream type. But those young men who do not report gaming very often are acting quite differently in their dreams as a function of life circumstance and dream type. That is, gamers' evidence the same dreamt aggression and life threatening dream situations across samples and dreams. While those who game rarely, flipped between high and low dreamt threat as a function of both context and dream type. Additionally, across dream type, threat is not directed towards themselves for gamers. Gaming seems to have a stabilizing influence in terms of threat in dreams for these young men. Supporting this interpretation is another content analysis on central image. Hartmann has shown that the intensity of central images in a dream is higher following trauma related dreams than in more ordinary dreams. We found that here as well, for these male students and soldiers. Their trauma or military dreams' central images were more intense than their recent dreams central images. However, we also found a main effect for gamer group, with less central image intensity for the high end gamers than for lows. Additionally, high end gamers, whether students or soldiers, were found to have more positive emotions associated with their central image across dream type. These results support our general thesis of the potential nightmare protective function of daytime video game play. For at least the low end gamer we conclude that context is everything. It not really surprising that high end gamers dreams are similar in dreamt threat as they are playing the same games if they are deployed or at home on the sofa, combat centric. **C21**

165 Dream Formation as a Psychological-Biological Self-Organizing Narrative David Kahn <david_kahn@hms.harvard.edu> (Psychiatry, Harvard Medical School, Cambridge, MA)

While dreaming the dreamer is often the actor in a play being created by his or her dreaming-conscious mind. The dreamer thus experiences, rather than simply imagines the dialogue being constructed in his or her mind. We suggest that dream consciousness emerges through a self-organizing process. Self-organization occurs in both the awake and sleep states. But, when asleep, self-organization occurs almost entirely through local interactions between internally generated stimuli, unlike when awake where self-organization occurs though both local interactions and, importantly, also through the incorporation of external sensory input. When asleep self-organization evolves within an environment consisting of acetylcholine with no serotonin or norepinephrine with which to counteract the hallucinatory effects of a pure cholinergic environment. When asleep self-organization evolves without the opportunity to conduct reality checks with the outside world, and without the ability to direct one's thoughts because there is only minimal activity coming from the executive dorsal lateral prefrontal cortex. But what is self-organized to produce the dream? Thoughts and feelings that occurred during the day or days preceding the dream, out of the blue (random) thoughts of people and places, elements that are psychologically and emotionally salient for the dreamer – in short, anything and everything. Nonetheless, the dream is not a series of disjointed elements, instead the dream tells a story using narrative techniques, similar to those used in a theater piece, and is held together no matter how bizarre the story may appear to the wake mind. Further, this fictional creation, though based on the dreamer's autobiography, can disregard the current ages and mortality status of people, can include a blend of people not commonly found in the same setting, and can include behaviors not likely or even possible to occur in wake life. How does this story come about from these disparate elements? The most likely answer is through the physical and biological mechanism of self-organization. Self-organization is a universal mechanism by which form, structure, and behavior emerge from local interactions without executive direction. Examples include the formation of a multicellular Dictyostelium discoideum (slime mold) from single cells, the construction of a termite nest through the collective behavior

of termites, the construction of a raft through the collective behavior of fire ants, a flock of birds, a school of fish, improvised dance and improvised music playing. But, self-organization occurs only when non-equilibrium conditions exist. In the case of Dictyostelium discoideum starvation conditions are necessary; in the case of raft building by ants, flooding conditions are necessary. What might be the analogous non-equilibrium inducing behavior in dreams? We explore this question on a psychological-biological level by considering both the unbalanced cholinergic/aminergic environment and the tension created in consciousness when disparate elements appear unconnected. This tension results in a non-equilibrium situation that is relieved only when the disjointed elements become part of a story. They become part of a story through the narrative-creating ability of self-organization. And when self-organization occurs a story-creating narrative, the dream emerges as the collective response to local interactionsamong disparate elements. **C21**

166 Dreaming of World of Warcraft: Video Game Elements in Dreams Eva Murzyn <e.murzyn@derby.ac.uk> (Psychology, University of Derby, Derby, United Kingdom)

This presentation discusses the results of an investigation into the gaming patterns and dreams of over 900 World of Warcraft (WoW) players who responded to an online questionnaire, and who contributed over 300 game-related dreams. The aim was to examine the ways in which video games can be reflected in the players' dreams. To analyse the dream reports, a novel coding scheme was created that followed the features of World of Warcraft and allowed for distinctions between the various types of game content that can be incorporated. The dream and gaming activity data was then explored with an eye towards the possible contributions of the continuity theory (Schredl, 2003) and the sleep memory consolidation approach (Smith, 2010). The results suggest that theamount of gaming dreams the participants reported was linked with their engagement with the game, as measured by the time they spent on playing and out-of-game activities that were still centered around World of Warcraft. The dream content analysis identified a number of incorporation categories, grouped around three components of video games: form, content and mechanism; and implied that the pattern of game features that appear in the dream reports is related to the types of game activities the players prefer. The findings are interpreted in the light of existing dream content theories as well as select gaming psychology ones. **C21**

167 A Case Study of the Shamanic Technique of Dreamwalking Faith Suaso <vsuaso@comcast.net> (Desert Milagros, Tucson, AZ)

This dissertation documents the life of a spiritual teacher and shaman known as Dreamwalker and her technique of dreamwalking. Dreamwalking is defined as the purported ability of a spiritual practitioner, such as a shaman, to enter into the dream state of another person for the purpose of training and educating that person to attain mutually agreed upon goals. Dreamwalker claims to use this method with her students and is recognized by her students as having this ability. The research focuses on two specific areas. First, the experiences that shaped Dreamwalkers path as a spiritual practitioner and shaman, including her initiation into the experience of dreamwalking and the role this technique has had in her personal life. The research also focuses on her use of dreamwalking as a shamanic technique to connect with her spiritual teachers and gather information for the purpose of teaching her students. Secondly, this research offers a description of this technique and its affect on its recipients. Of particular interest are student accounts of dreamwalking experiences, their awareness of interaction with Dreamwalker, and the perceived benefits of this technique. Lastly the research explores the similarities between dreamwalking and other dream states. As students progressed in their training they often reported that they saw Dreamwalker in their dreams and would describe the events that took place, which often consisted of some form of teaching or the testing of acquired skills. Dreamwalker relied on students recognizing and recalling specific images that she claimed to have embedded into their dreams to determine their level of awareness and as an indication of what information to share with that student. This process was used to establish a hierarchy of training those students could enter only when they received and could acknowledge the appropriate images received during dreaming. **P2**

168 Sleep Mentation and Sleep EEG During Adult Somnambulism Antonio Zadra, Marc-Antoine Labelle, Mathieu Pilon, Jacques Montplaisir <antonio.zadra@umontreal.ca> (Universite de Montreal, Centre for Advanced Research in Sleep Medicine, Montreal, Quebec Canada)

Introduction : Sleepwalking is a parasomnia characterized by misperception and relative unresponsiveness to the environment, mental disorientation and variable retrogradeamnesia. Behavioral manifestations of varying degrees of complexity and duration arise from incomplete awakenings, usually from slow-wave sleep (SWS: stage 3 and 4 sleep). Relatively little is known, however, about the phenomenological aspects of this parasomnia and the EEG that accompanies such episodes. Methods : Participants were 94 adult patients (43 men, 51 women, mean age = 32.9 SD=11.7 years) referred to our sleep disorders clinic for chronic sleepwalking. All underwent at least one polysomnographic assessment in the sleep laboratory and were free of any other major sleep disorder. Post-arousal EEG patterns associated with behavioral episodes recorded in the laboratory were investigated. Participants also completed a detailed questionnaire assessing various aspects of their sleepwalking, including phenomenological dimensions of their episodes. Results : Questionnaire data revealed that only 8% of the patients report never remembering sleep mentation from their episodes upon awakening. Perceptual elements from the sleeper's actual environment during somnambulistic episodes were sometimes (23%), often (35%) or always (17%) recalled by the sleepwalkers. Sixty-six patients (70%) reported that various forms of mental content or sleep mentation (e.g., images, thoughts, emotions) often or always accompanied their episodes. Furthermore, episodes were described by 37% of the sample as being often or always triggered by some form of sleep mentation. Emotions were described by 71 sleepwalkers (75%) as being often or always experienced during their episodes. The most commonly reported emotions were fear, panic, confusion, anger, frustration and helplessness. Three post-arousal EEG patterns characterized most episodes recorded in the laboratory. Irrespective of these specific patterns, delta activity was found in almost 50% of the post-arousal EEG recordings from slow-wave sleep but was generally absent from more complex episodes. There was no evidence of complete awakening during any of the episodes investigated. Conclusion : Although sleepwalking is often characterized in terms of its automatic behaviors, the present results indicate that perceptual, cognitive and affective dimensions play an important role in the subjective experience of adult sleepwalking. Morning recall of nocturnal somnambulistic episodes may also be greater than generally believed. The displayed behaviors are construed by most patients as being motivated by an intrinsic sense of urgency or underlying logic that accounts for their actions during actual episodes. The post-arousal EEG patterns highlight the dissociation between cortical and motor activities during such episodes, since sleepwalkers can perform motor activities (normally associated with wakefulness) while showing EEG patterns indicative of sleep or partial sleep. These results support the conception of somnambulism as a disorder of arousal. Variations in the motor and emotional manifestations of sleepwalking may be related to different activation patterns of the cingulate cortex as it modulates behaviour in response to emotional processes. **PL2**

3.11 Cognitive development

169 Prenatal and Postnatal Exposure to Nicotine and Tobacco Smoke: Risk for Disturbances of Consciousness Martha P Fankhauser, Richard J Harrington <fankhaus@email.arizona.edu> (Pharmacy Practice and Science, The University of Arizona Colleges of Pharmacy and Public Health, Tucson, AZ)

The purpose of this presentation is to outline how exposure to nicotine and tobacco smoke can negatively impact fetal and neonatal neurobehavioral development, thereby predisposing the individual to developing disturbances of consciousness. Nicotine acts as a neuroteratogen that can compromise neural development, thus increasing the risk of impaired neurobehavioral development. Prenatal exposure to tobacco smoke may cause long-term medical, psychiatric, behavioral, and neurodevelopmental conditions in children. Birth defects (e.g., cardiovascular, musculoskeletal, gastrointestinal, and morphological) have been associated with maternal smoking during pregnancy. Infants who are exposed to tobacco smoke during pregnancy are at higher risks for preterm

delivery and have lower average birth weights, decreased brain growth, and are at increased risk for neonatal, perinatal, and infant medical complications and mortality. Low birth weight may cause serious neurological consequences such as decreased cognitive abilities and learning disabilities, and behavioral problems such as hyperactivity and impulsivity. Neural activity during prenatal and postnatal brain development is impacted by nicotine and other chemicals contained in smoke as well as exposure to other substances such as lead, poor nutrition, and stress-related factors. Genetic factors such as reduced monoamine oxidase A, dopamine transporter, and serotonergic functioning may be involved in causing neurodevelopmental conditions. In-utero exposure to tobacco smoke may be a significant environmental risk factor for causing inattention, hyperactivity, irritability, aggression, and impulsivity. In most studies, prenatal maternal smoking has been associated with causing attention-deficit hyperactivity disorder (ADHD) symptoms and conduct disorder in children. Postnatal exposure to secondhand smoke also increases the risk of medical conditions (e.g., asthma, respiratory diseases, sudden infant death syndrome) and neurobehavioral disorders (e.g., ADHD, conduct disorders, antisocial behaviors, and learning disabilities). The presentation will explore nicotine's activation of the nicotinic acetylcholine receptors and how this may alter brain functioning to cause disturbances of attention, alertness, cognition, and behaviors. **C20**

170 The Relationship Between Ego Development and Persistent Non-Symbolic Experience Jeffrey A. Martin, Allan L. Combs, California Institute of Integral Studies <jamartin@fas.harvard.edu> (Hong Kong Polytechnic University, Harvard University, Newport, KY)

Non-symbolic experiences have been reported for millennia and are generally attributed to spiritual and religious contexts, although atheists and agnostics also report them (Newberg, d'Aquili, & Rause, 2001; Newberg & Waldman, 2006, 2009). Popular terms for them include: nondual awareness, enlightenment, mystical experiences, peak experiences, transcendental experience, the peace that passeth understanding, unity consciousness, union with God, and so forth (Levin & Steele, 2005; MacDonald, 2000; Thomas & Cooper, 1980). Most are temporary, but some individuals report a persistent form of them (Butlein, 2005; Levin & Steele, 2005; Maslow, 1970, 1973; Travis, Arenander, & Dubois, 2004). Persistent non-symbolic experience involves a fundamental change in the experience of what it is like to be alive and perceive the world. The most widely used list of phenomenological characteristics that relate to the experience is offered by Stace (1960), and is applied to both temporary and persistent forms. It can be summarized as self-reports of: a unitive quality, a noetic quality, transcendence of space and time, a deeply felt positive mood, paradoxically, and ineffability. During the 1990s and first years of the 21st century these experiences were often equated with advanced levels of ego development as well as various forms of intelligence (Alexander & Langer, 1990; Combs, 2002; Cook-Greuter, 2000; Wilber, 2006), and were frequently said to lie above traditional developmental stages such as those associated with Loevinger and Piaget. The result was a kind of developmental stew in which elements of psychological growth and spiritual development were blended together. Though these ideas have been revisited in recent years (Combs, 2006; Wilber, 2009), there is still a widely held popular notion that equates spiritual growth with ego development and various forms of intelligence. Under this taxonomy individuals who report persistent non-symbolic experience should also be at the highest developmental stages (Combs, 2002, 2009; Cook-Greuter, 2000; Wilber, 2000, 2006). There is little evidence to support such a view, and several fundamental problems with it were identified in the present study. We hypothesized that individuals who report persistent non-symbolic experience would exhibit a range of psychological developmental levels, rather than being situated at the 'most developed' level. The hypothesis was examined in a diverse sample of 36 adults (F=9, M=27) reporting persistent non-symbolic experience using the construct of ego development, measured with the Washington University Sentence Completion Test (WUSCT). The WUSCT has been mentioned by proponents of the 'higher development' thesis as being well suited for this form of measurement. Possible levels ranged from 1 (low) to 10 (high). As predicted, Ego development stages were measured from 5 (Loevinger and Cook-Greuter's 'Self Aware' stage) to 10 (Cook-Greuter's 'Unitive' stage), and were not simply situated at the highest level. Overall, this study provides the first strong evidence that persistent non-symbolic experience does not represent higher levels of ego development. **C15**

3.14 Cognitive architectures

171 The Mind as a Kantian Whole: A Marriage of Neo-Associationism and Neo-Emergentism Allan Combs, Stanley Krippner <allan@sourceintegralis.org> (Transformative Inquiry, California Institute of Integral Studies (CIIS), Santa Rosa, CA)

Stuart Kauffman's recent discussions of "Kantian wholes" comprised of autocatalytic sets of chemical and organic reactions that exhibit self-organized criticality are reminiscent of earlier reflections by thinkers as prominent as Kant himself, as well as Hegel, Peirce, Bergson, Whitehead, Poincare, Schrodinger, Bertalanffy, Prigogine and others. In each case a fundamental question has concerned causality, and whether valid scientific explanations must come entirely from bottom-up analyses. Each has argued in one way or another for the fine-grain "incomputability" (Kauffman's term) of such systems, and the latter's importance for the creativity seen in biological and other forms of evolution. [Pardagraph] Through a series of closely reasoned publications beginning in 1995 the authors have labored to show that the onflow of the mind, James' "stream of consciousness," can be understood as such a Kantian whole. Moreover, that the dynamical processes describing it may reflect parallel dynamical processes of the brain itself. Drawing together the ideas from these past efforts, and combining them with current complexity theory the authors attempt to give a partial answer to James' query, "This multitude of ideas, existing absolutely, yet clinging together, and weaving an endless carpet of themselves... whence do they get their fantastic laws of clinging, and why do they cling in just the shapes they do." ("The Principles") **C10**

3.15 Ethology

172 Epistemological and Methodological Biases in Demonstrations of Advanced Cognition in Nonhuman Animals and their Ontological Consequences Alexis Mourenza <amourenz@ucsc.edu> (Philosophy, University of California Santa Cruz, Santa Cruz, CA)

In animal behavior and cognition research (at least) three distinct types of biases can be identified: epistemological biases (ex: problem of other minds), methodological biases (ex: simplicity considerations), and ontological biases (ex: observer-dependence of object of study). While the biases themselves can be securely placed within one of those categories, the consequences of those biases do not necessarily remain within that category. That is, epistemological biases may have epistemological consequences, but they may also carry methodological and/or ontological consequences. In this paper I will focus on the ontological consequences of some of the most prevalent epistemological and methodological biases that have been identified in the scientific literature on the status of advanced cognition in nonhuman animals by examining how conceptions of human intelligence and assumptions of the supposed uniqueness of human cognition impact experimental investigations into the status of advanced cognition in nonhuman animals (i.e. higher-order thought, specifically abstract reasoning and theory of mind). Further, I will discuss how those experimental investigations, as well as the biases by which they are informed, actually impact the ontological status of the possession of those cognitive skills by the animal subjects under investigation. **P2**

3.16 Self-consciousness and metacognition

173 If Reflection is Consequent to Conscious Prospection, A Paradox of Self-Awareness and Control May be Resolved with Symmetric Tuning of Epistemic Reception of Prospectual Contents, Especially Speech Whit Blauvelt <whit@csmind.com> (Bellows Falls, VT)

A paradox of self-control is that conscious choice isamong consciously seen prospects. Which prospects arise controls the range of choice and will. So key to conscious choice is control of which prospects are arising. One cannot wholly choose which prospects should arise; to consciously consider a prospect even for this it must have at least partially arisen. While one can choose to further cultivate a prospect already partially emerged, one cannot choose which of those prospects not currently even partially conscious should join the present set for consideration

and choice. One cannot consciously choose all of what shall arise, but one might question and adjust what one takes it as once it has, putting regular habits and assumptions under philosophical scrutiny and pragmatic experimentation. Even those scholars who largely discount the role of consciousness love questioning assumptions about just what it really is, this stuff in consciousness. Those of us who lean more towards valuing consciousness' function might do well to join them. A common folk assumption is that we have inner speech. Most all of us consciously entertain language in various ways, since it is woven richly into our prospects. What we are to take instances of language as as they arise may not be a fixed given. Adjusting our reception may change the overall quality of what emerges in consciousness, not just regarding language, but the entire scope of prospects, and even the scope of present awareness. Examining inner speech opens the question of identity, not just of what is to be chosenamong, but who chooses. Many find this unproblematic, seeing the who who chooses as being simply reflected in their inner speech (or, Hamlet-like, complexly reflected). When we question what we take inner speech as, we open to question how we are then to reflect the self, the who who chooses. There are a number of reasons to doubt the simple assumption of inner speech's straight-forward reflection of self. There are also practical ways to receive inner speech in a different light. In adopting such a light, we might find the emergence of consciousness, in terms of scope and quality of its contents and capacities, changes. A specific method of prospectual reflection can be defined and practiced, in which inner speech is actively recognized as prospective in nature and context, with conscious reflection taken to be an aggregate property of our relationship with the whole field of emergent prospects, and inner speech taken to have no special epistemic status in knowing self, beyond that which is due to the social use of language in declarative acts. A bit of philosophical tuning may alter the operation of consciousness. So altered, it might be better revealed. **P2**

174 Subject to Error: Is Anarchic Hand Syndrome a Counterexample to Immunity to Error through Misidentification? James Dow <dow@hendrix.edu> (Philosophy, Hendrix College, Conway, AR)

In discussions of self-consciousness as the self-ascription of experiences, it is often said that self-ascriptions are immune to error through misidentification relative to the first person singular pronoun (IEM). However, I consider whether the phenomena of anarchic hand syndrome serves as a counterexample to this principle when applied to the self-ascription of actions. I provide the background for a dialectic between Anthony Marcel, who has suggested that anarchic hand syndrome is a counterexample to IEM, and Christopher Peacocke, who has suggested that it is not a counterexample. I provide three objections to Peacocke's account, and defend the claim that anarchic hand syndrome serves as a counterexample to IEM. Throughout the paper, I provide key conceptual and empirical distinctions between alien hand syndrome, utilization behavior, and anarchic hand syndrome. I also respond to Lane and Liang's (2011) paper on putative counterexamples to Immunity to Error. In the final section, I discuss the upshot of rejecting the IEM principle, in particular the idea that IEM is a mark of self-consciousness. **C3**

175 On the Metacognition of the Phenomenal Qualities of Experience Ken Mogi <kenmogi@qualia-manifesto.com> (Sony Computer Science Laboratories, Tokyo, Japan)

Awareness of the phenomenal qualities of one's experiences can be considered as an instance of metacognition (Flavell 1979). Although many people take the concept of qualia as naturally the most salient feature of phenomenal consciousness, some authors have expressed views that deny the central importance of qualia (Dennett 1991). How do such cognitive heterogeneities occur? It is interesting to investigate what cognitive factors correlate with the awareness of the phenomenological qualities of our experience. Here we conducted an investigation into the relationship between various cognitive tendencies and the awareness of the phenomenal qualities of subjective experience. The subtle nature of the expected correlations necessitated an investigation with a large number of subjects. Web-based questionnaires were conducted using Google Docs. 1153 subjects (675 males and 478 females, age average = 36.4, age standard deviation = 11.0) answered the questions voluntarily, in response to tweets recruiting subjects. The author's Japanese twitter

account (@kenichiromogi, with ~352000 followers at the time of investigation) was used for the call of participation. Participations were accepted for 10 consecutive days. After a brief introduction, the subjects were asked questions regarding their awareness of the phenomenal qualities of experience (qualia and free will), their own academic performances, belief in paranormal worldviews (UFOs and reincarnation), theological views (the existence of God), political views (e.g., liberal or conservative), and views on one's own death. After answering the questions, the subjects were asked to indicate their informed consents. There was a significant correlation between one's understanding of the concept of qualia and the awareness of qualia as an essential element of phenomenal experience ($r=0.741$). A weak correlation was found between the awareness of qualia and the academic performance at school ($r=0.141$), and the attitude towards the death penalty ($r=0.171$, those aware of qualia tending to be opposed to the death penalty). Intriguingly, no significant correlation was found between the understanding of the concept of qualia or the awareness of qualia with the subject's assessment of the difficulty of the scientific elucidation of consciousness ($r<0.05$). Thus, although there are well-founded reasons to consider qualia as a (the) hard problem of consciousness (Chalmers 1996), the awareness of the qualities of one's phenomenal experiences do not necessarily lead to the realization of the difficulty of its scientific elucidation. A significant portion (30%) of the surveyed reported that they didn't understand the concept of qualia at all, while a majority of subjects tended to believe in the existence of free will, with 62% answering in the affirmative. We conclude that the absence of the metacognition of the phenomenal quality of qualia does not constitute a crucial cognitive deficit. This may explain why heterogeneous opinions exist within the research community (e.g. Dennett vs. Chalmers). It also puts the metacognition of the phenomenal properties of experience in the class of late arriving cognitive abilities. Based on the analysis, I discuss the functional significance of the metacognition of the phenomenal qualities of experience in the evolutionary context. **C19**

176 The Fundamental Dichotomy of Self-consciousness and the Essential Indexical Stephane Savanah <stephane.savanah@gmail.com> (Macquarie University, Chatswood, Australia)

Ruth Millikan (2001) has argued that in thoughts the 'essential indexical' (the natural language 'I') is indeed essential but not indexical. I argue that the reverse is true: in thoughts the essential indexical is not essential but is indexical. The argument depends on what I see as a Fundamental Dichotomy in the philosophy of self-consciousness. In this presentation I explain this fundamental dichotomy and show that Millikan's view supports what I call the intrinsicist side, while the opposing view (which I defend) supports the relationalist side. John Perry's (1979) famous supermarket example is utilised to make the argument. The essential indexical is just one example of the multitude of philosophical debates on what Uriah Kriegel (2007) calls the 'peculiarities' of self-consciousness. Although these discussions share a few common themes, for the most part they appear disparate and unconnected. So, for example, Ryle's Elusiveness Thesis would not appear to be related to Armstrong's description of the inner-sense model of self-consciousness, nor apparently does Shoemaker's 'immunity to error relative to the first person pronoun' connect with Rosenthal's Higher Order Thought theory. However, I propose that there is a fundamental question uniting all these debates, which I have called the Fundamental Dichotomy of self-consciousness, such that taking a position on this dichotomy enables one side of all these debates to be brought together to form the kernel of a coherent general theory of self-consciousness. I do not propose such a theory here; my purpose is to describe the Fundamental Dichotomy and show how it ties together the apparently diverse issue in self-consciousness philosophy. In summary, the Fundamental Dichotomy is whether the nature of self-consciousness is best described as intrinsic or relational. The intrinsicist view has it that a subject can be inherently self-conscious without the mediation of (say) an inference or self-observation. The relationalist view, by contrast, sees self-consciousness as always involving a relation of some sort – say between a self-conscious thought and the thinker of the thought. The paradigmatic example of this dichotomy is the debate over whether self-knowledge is gained via privileged access or self-perception. The privileged access model characterises self-access as direct and immediate and this fits in with the intrinsicist side of the Fundamental Dichotomy. In the perceptual model one can envisage a conceptual separation

between the self as perceiver and the self as percept, thus aligning it with the relationalist side. I briefly cover several debates and so-called peculiarities of self-consciousness and show how they map onto either side of the Fundamental Dichotomy. For most of these I do not go into depth but I have singled out one issue, the case of the essential indexical, to examine in greater detail. **P2**

177 Cultivating Higher Levels of Consciousness through Martial Arts, Meditation, and Yoga Jeremy Tost, Dr. Jules A. Troyer <jrtost@valdosta.edu> (Psychology and Counseling and, Valdosta State University, Valdosta, GA)

The ongoing theoretical debate on higher-order theory of consciousness has been accompanied by proposals for the quantitative characterization of self-awareness. The pursuit towards a science of consciousness is marked by the necessity for novel and effective methods for measuring the underlying factors inherent in individual differences in level of consciousness, as well as measuring the effectiveness of different interventions historically associated with increasing self-awareness and consciousness. This poster highlights the usefulness of meditation, martial arts, and yoga in cultivating higher levels of consciousness. Specifically, consciousness is defined within the context of higher-order theory and measures the four underlying factors of meta-self-awareness, reflection, openness, and helping others. These four factors have been established as the primary underlying components of consciousness by the Troyer Level of Consciousness Inventory in multiple large scale studies across the United States. This study compares correlations of these three consciousness raising activities with the total level of consciousness score, as well as correlations with each of the four subscales. The authors present data from two separate samples (N=438; N=446) illustrating the statistical significance found using bivariate correlations and linear regression. In addition, the historical traditions surrounding the use of meditation, martial arts, and yoga in expanding or increasing consciousness are discussed. This research is intended to provide an empirical foundation for spiritual and martial practices presumed to be associated with promoting higher levels of consciousness. Finally, the authors discuss utilizing a variety of behavioral and neurophysiological measures to further substantiate the effectiveness of these consciousness raising activities. **P2**

178 Don't Drop It, Just Because it's Hot: Meditation and Consciousness within the Higher-Order Theory Framework Jules Troyer <jatroyer@valdosta.edu> (Psychology, Valdosta State University, Lake Park, GA)

The pursuit towards a science of consciousness has produced many advances;among these are the philosophical and empirical questions concerning higher-order thought theory of consciousness. This presentation draws from two large scale empirical studies (N=438; N=446) on the effects of meditation on level of consciousness, specifically testing the association between causal roles and intentional content within the framework of cognitive/representational theory and higher-order theory of consciousness. The role of self-talk or inner dialogue related to problem solving tasks is discussed within the context of reflection and metaself-awareness; two of the four factors revealed by the Troyer Level of Consciousness Inventory. In addition, the effectiveness of using meditation to modify the quality of self-talk and direct it towards positive self-regulation and behavioral and cognitive change is analyzed. It is argued that for a state to be conscious, in its truest sense, it must be positioned to affect the decision-making process of the individual. In addition, it is proposed that quantitative advancements in level of consciousness are contingent on positive self-reflection and metaself-awareness directed towards better decision making. It is further advanced, that meditation effectively clears the mind of problematic rumination or attachment to ineffective problem solving strategies. This paper highlights the statistical significance of the relationship between meditation and the faculties required within many problem solving tasks, through the use of correlation. Additionally, the author discusses problems and methods involved in understanding meditation and consciousness. Finally, a survey of current behavioral (e.g. problems solving, martial arts, etc.) and neurophysiological (e.g. EEG) studies being conducted by the author to expand this thesis is presented **P2**

179 Exploring Loss of Self-Referential Narrative and Awakening: A Research Subject's/ Collaborator's Journey Gary Weber <happinessbeyondthought@gmail.com> (Port Matilda, PA)

Following almost total loss of internal self-based narrative, after 20,000 hrs of meditation and yoga, the presenter, a PhD and physical scientist, undertook an investigation to understand scientifically how such phenomena could be explained. He has been a subject/collaborator in five cognitive neuroscience/mediation studies over the intervening 13 years. The most recent of those studies, just published in the Proceedings of the National Academy of Sciences, was an fMRI study on experienced meditators (>10,000 hrs) at Yale University which showed that the default mode network (DMN – what one's brain is doing when it isn't 'tasking') can be permanently altered with meditation. The typical posterior cingulate cortex (PCC)/medial prefrontal cortex (mPFC) narrative/"selfing" core/axis DMN is changed to one comprised of a deactivated PCC with, surprisingly, a simultaneously increased activation of the dorsal anterior cingulate cortex (dACC) and dorsal lateral prefrontal cortex (dLPFC). This permanently altered DMN configuration apparently uses the dACC and dLPFC in a "watching"/"cognitive control" couple to maintain the PCC in a deactivated state to retain the reduced/"no selfing" narrative whether one is meditating or not. Further confirmation of continuous PCC deactivation was demonstrated with a real time fMRI (rt-fMRI), in a soon to be published study. rt-fMRI has the ability to continuously monitor the extent of "selfing" and consequently self-referential narrative as a particular center is activated/deactivated. This approach shows promise as an effective neurofeedback tool for enhancing the effectiveness of meditation and reducing emotionally-charged narrative and resultant stress, depression and anxiety. Another recent study in which the presenter was a subject/collaborator was a psychological profiling of 'self-reported persistent non-symbolic, nonduals'(SRPNS) with standard established psychological testing protocols, the Washington University Sentence Completion Test (WUSCT) and the Hood Mysticism Scale. This work, accepted as a PhD thesis, demonstrated that the psychological profile of SRPNSs is similar to that of the normal population in both scoring and variation. Surprisingly, perhaps, the SRPNSs were more mystical, as measured by the Hood Scale, than populations of 'psychedelics', 'contemplatives' and 'psychotics'. Additionally, carefully-controlled and designed EEG studies in which the author was a subject, demonstrated, with confidence levels reaching $P < .005$, that 'advanced nondual meditators' demonstrated 'prescience', or apparent awareness of randomized events about to occur. This work, which has been accepted for publication, used unpredictable, randomly generated, audio and visual stimuli, matched controls and 32 EEG channels. The combination of these studies successfully demonstrated that, through extensive meditation, it is possible to produce, a) permanent alteration of the default mode state, and hence the reduction/elimination of a self-based narrative with its concomitant increased stress and emotion, b) a psychological state that is similar to the 'normal' population but is more mystical, and c) apparent extension of consciousness through time, or prescience. **C8**

3.17 Temporal consciousness

180 Experimental Evidence that the Flow of Time is a Perceptual Illusion Ronald Gruber, MD, Richard A. Block, PhD <rgrubermd@hotmail.com> (Stanford University, SUMC, Stanford, CA)

Gregory (1981) said that perception and science are two descriptions of the world. Furthermore, some perceptual illusions are alternative interpretations of the same stimuli. The flow of time (change) and subjective motion would be reasonable examples. Our experiment tested stimulus frequency alterations on the flow of change for spatial and color stimuli in the illusion of motion. We made video scenes of a walking man (spatial) and a toasting bread (color) with interstimulus intervals (ISI) of 0.5, 3.0, and 7.0 s. Participants judged whether they could see it happening (flow) or could not, but know it must have happened (no flow). The flow of change was ISI-dependent, being lost at 6.1 s for spatial change and 4.7 s for color change. The flow of time is a superimposed percept similar to other perceptual illusions. If flow is a physical property, it should be independent of the nature of stimuli; if not, it could flow differently for qualitatively different

stimuli. Our results showed the latter. This is direct experimental evidence that the flow of time and subjective motion are perceptual illusions, or alternative descriptions, as Gregory implied. **PL10**

181 Conjunctions in Time But Not Necessarily In Space Underlie Perceptual Unity: Sensory Perception Shows that "Wireless" Communication May Be Used to Integrate Between Separate Brain Loci Moshe Gur <mogi@bm.technion.ac.il> (Technion Israel Institute of Technology, Biomedical Engineering, Haifa, Israel)

Any physical device, including computers, when comparing A to B, must send the information to point C. Explanations of brain processing take such a convergence for granted thus generating models relying on increasingly converging hierarchical streams. Given our current understanding of how physical devices function, such models seem unavoidable. However, they consistently fail to explain many perceptual phenomena such as object perception or multi-sensory integration. To see whether the brain, at times, can compare (integrate, process) events that take place at different loci without sending the information to a common target, I performed experiments in three modalities, somato-sensory, auditory, and visual, where 2 different loci at the primary cortex are stimulated. Subjects were able to integrate inputs in time and space affecting small separate cortical loci. Stimuli lasted 8-15 ms, and subjects were able to detect a 3-4 ms time gap in tactile and auditory modalities and a ~13 ms gap in visual stimuli. They were also able to detect very small visual angles defined by two flashed points. The ability to correlate activity between two small separate loci was independent of cortical distance up to 2-4 cm. When each stimulus affected a different hemisphere so that the information has to be transferred via the corpus callosum, performance deteriorated considerably. Given the organization of sensory cortex where localized responses in primary cortex do not interact while convergence in downstream areas results in loss of individual stimulus identity, and in decreasing sensitivity and selectivity to elementary stimuli, those results cannot be explained by conventional convergence models. We must thus assume a non-converging mechanism whereby two (or more) activated cortical loci can be integrated without sending information via axons into another downstream integrating site. Once we allow for such a non-converging mechanism, many phenomena can be viewed differently. Take for example the question of how and where does multi-sensory integration take place; we perceive synchronized auditory-visual inputs coming from a talking face yet visual and auditory information stimulate very different brain loci. If my hypothesis of the brain's ability to relate activity taking place at separate loci without using convergence-by-wires is correct, it implies that the brain can rely on heretofore unconsidered (unknown?) physical force and that conventional models, including computer programs, would not be able to capture many brain processes. **PL10**

182 Why Happy Hours Always Go By So Quickly? Ka Yeung Leung, Pei-Chi Tu; Allen Y. Houng <gulongol@gmail.com> (Institute of Philosophy of Mind and Cognition, National Yang Ming University, Taipei, Taiwan)

In this abstract I would like to find out the relationship between emotions and the experience of subjective time feeling. Such relationship can be explained by the 'global emotion moment' model (Craig 2009). It states that the junction of the anterior insular cortex (AIC) and the anterior cingulated cortex (ACC) will integrate all the stimuli of many sensory modalities and create a global emotion moment. The more global emotion motions are created, the longer subjective time we experience. This model implies that the intensity of emotion has a positive relation with the expansion of subjective time. However, in such model, there are some difficulties explaining why happy hours always go by so quickly. The reason is that, first, sometimes we experience an intensely emotional period, but we experience speeding of time rather than slowing of time. For example, when we engage in gambling activities, we easily experience an intensely emotional period of composing different emotions such as happiness, nervousness, anxiety and joy, but we would not experience a slowing of time during gambling. Second, sometimes we would experience a kind of unnamed anxiety, maybe worrying about the future, the intensity of that emotion is so slight that we hardly identify it clearly, but we usually experience a slowing of time during that period. Many recent studies shows that the mechanisms of emotion awareness, self-awareness,

time perception and attention share the same brain regions (AIC, Inferior frontal gyrus (IFG), ACC). Therefore, I doubted that the creation of global emotion moments and the expansion of subjective time are directly decided by the intensely emotion period. Rather, the expansion of subjective time is largely dependent on the interaction of attention with self- awareness. I suggest that, the expansion of subjective time would happen if those emotions are helpful by shifting our attention from outside world to self- awareness. For example, although we experience an intensely emotion period when we focus on gambling, our attention is focus on the outside world and those intensive emotions do not relate to self- awareness. Thus the number of global emotion moments does not increase rapidly and then we will not experience an expansion of time. When we are experiencing an unnamed anxiety, although such feeling is not intensive, it will move our attention from outside world to the self-awareness, thus the number of global emotion moments increases rapidly and we will experience an expansion of subjective time I think meditation is also a good example to illustrate my hypothesis of subjective time. At the very beginning of meditation, our attention towards outside environment decreases, hence our intensity of emotion decreases, but our attention will focus more on inner status, i.e. self-awareness, and thus the number of global emotion moments increases, then we will experience an expansion of subjective time. On the later stage of meditation, there is no self- awareness when we enter the status of 'no-self', thus there is no experience of subjective time expansion. **P2**

3.18 Intelligence and creativity

183 Ranking Managerial Consciousness Based on Analytical Hierarchy Process (AHP): A Case Approach K. Santi Swarup, Mukti Srivastava, DEI (Management); Anoop Srivastava, I.G., R.P.F., Ministry of Railways, DEI (Management) <kssdei2001@yahoo.com> (Management, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Consciousness affects managerial decision making in the real world. In today's dynamic and complex world, managers have to evaluate multiple criteria and various constraints associated with them. An attempt is made in this paper to rank managers into various consciousness levels based on the decisions they have taken. This paper has been developed based on the views from a diverse group involving entrepreneurs, executives, management students and faculty. The research methodology involves first identification of the attributes in consultation with the diverse groups. Secondly based on Analytical Hierarchy process (AHP) developing weights for these attributes and also the ranking of managers based on these attributes. The managerial decisions considered were based on the real cases which we have come across while counseling Micro Small and Medium Enterprises (MSMEs) at Dayalbagh, Agra, India. Analysis of the results was done to identify the weights associated with various attributes and the ranking of managers. We used Consistency Ratio (CR) to validate the results. **P1**

184 A Neural Correlates of Creativity: fMRI Study for Japanese-Syllogistic-Riddle (JSR) Solving Tasks Yoshi Tamori, Akimitsu Okumura <yo@his.kanazawa-it.ac.jp> (HISL, KIT, Hakusan-shi, Ishikawa Japan)

According to Michael Mumford (2003), creativity involves the production of novel, useful products. In the most cases, creative activity can be rephrased as a generic searching in the mental or productive space, and it often requires the enlightenment. In terms of searching, we can discriminate creativity from the other mental searching activities based on the search space size. As for a problem which is intended to solve, creative mental process would not be assigned for a single line of reasoning (deductive process) toward the solution, but for a searching the solution from vast search space. In order to investigate a neural correlates of creativity, we measured the BOLD signals using 3T-fMRI while subjects were engaged in Japanese-syllogistic-riddle (JSR) tasks (Nazo-kake). JSR is a word play which is intended to find a whole sentence made up of three phrases. The first phrase serves as an introduction. The second phrase usually serves as an unexpected development. The final phrase puts the former two phrases together, and serves as an explanation, a climax, or a conclusion of the whole sentence. This syllogistic riddle play histori-

cally appeared in the Heian era about a thousand years ago in Japan. We required subjects in the experimental tasks to find the remaining phrases based on the pre-presented phrases of the introduction or the ones of both the introduction and the development. There are three possible questions in which we can require subjects to find (1) the whole phrases, (2) the second and the final phrases based on the given first phrase, or (3) the final phrase based on the given first and second phrases. For example, in (1), the question is like "please make some three phrase story which has a surprise or an interesting ending." In (2), the question is like "'what is related to a phonorecord and ... ', keep going like that." In (3), the question is like "what is related to a phonorecord and two letters "AB"." For those questions, whole story as the answer is: what is related to a phonorecord and two letters "AB"?" It is "CD", because both things come before "CD". There are two types of subjects in the present study. One is called type-I in which the subjects prefer questions with no hint, thus the solution could have a plenty of possibilities. The other is called type-L in which they prefer deductive questions. Our fMRI results show the activations in the orbitofrontal cortex (OFC) and the straight gyrus (SG) for type-I subjects. On the other hands, type-L subjects show the activations in inferior frontal gyrus (IFG), BA45 and posterior cingulate gyrus (PCG). OFC is related to a relaxation and/or a controlling level of involvement for a particular topic by suppressing the whole brain's activity. We expect that in creative searching, OFC suppresses the localized brain activities related to the involvement for a particular topic, and then controls the size of search space. This research has been supported by NPO, Neurocreative Laboratory. **C12**

185 Towards a Formal Definition of Non-Computable Creative Processes Stephen Waldon <steve@centerforquantumai.com> (Center for Quantum Artificial Intelligence, Evanston, IL)

At the 2011 Toward a Science of Consciousness Conference, I suggested that natural creative processes form a general class of phenomena that cannot be modeled using traditional notions of computation. As a continuation of this work, I now provide a more thorough discussion of the types of processes that have come under the general label of "creative" in the broader literature and discuss how they can be divided into two classes. The first class covers those that have been shown to be implementable by classical computing machinery. The second class includes processes that have yet to be simulated by any artificial means. Follow up this general discussion is made by providing a formal definition of each class. These definitions builds on the concept that creative processes can be categorized based on their ability to extend a mapping from input space to output space such that the output space of the extended mapping includes new categories previously not in the output space of the original mapping. Creative processes that possess the ability to extend the output space of a mapping in this way form a class of processes I call class 2 and the rest fall into class 1. Finally, I make an initial attempt at providing proof of the non-computability of class 2 by showing that processes contained in it are equivalent to the halting problem. **P1**

3.19 Miscellaneous

186 Pushing the Boundary: Dissociation and Virtual Worlds Gregory Garvey, <greg.garvey@quinnipiac.edu> (Visual/Performing Arts/Game, Quinnipiac University, Hamden, CT)

In this workshop session we will consider the impact of the growing use of games and virtual worlds. Previously I have considered the use of the work-family-life balance framework of border/boundary theories to describe, analyze and understand how gamers and users of the online virtual worlds navigate back and forth between the domains of the real and the virtual. Border theory as described by Clark (2000) and boundary theory of Ashforth, B. E., Kreiner, G. E. and Fugate, M. (2000), were both developed to address the domains of work and family conflicts. Using the terminology of border/boundary theories I examine the case of Devin Moore who acted out a scenario from Grand Theft Auto leading to the deaths of three police officers. While border/boundary theories acknowledge third places outside the work/family domains these theories do not address what I have called fourth places such as immersion in gameplay or virtual worlds. The use of the concept of boundaries in other disciplines such as psychology (Hartmann, Harrison and Zborowski, 2001) and anthropology (Boellstorff, 2008) will be briefly discussed. When considering the virtual world of Second Life (http://secondlife.com) I observed that descriptions of the

experience of being 'in-world' bore a close resemblance to several of the diagnostic criteria for dissociative disorders as listed in the American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders, (2000). In order to investigate this conjecture I used the Structured clinical interview for Depersonalization – Derealization Spectrum (SCI-DER) developed by Mula et al., (2008) as a model for a new survey. I list a selected subset of questions adapted from the SCI-DER and I will discuss some preliminary results from a pilot survey. **A2**

187 Lessons About Inner Experience from a Soldier with Symptoms of PTSD Chris Heavey, Neda C. Raymond, Russell T. Hurlburt <chris.heavey@unlv.edu> (Psychology, University of Nevada, Las Vegas, Las Vegas, NV)

"Peter" spent more than two years in Iraq, often engaged in combat. He lost close friends in battle and suffered serious injuries. Upon his return he suffered from symptoms of PTSD. We engaged in descriptive experience sampling with Peter to explore his inner experience. We met nine times over a stretch of two months to discuss 45 moments of his inner experience randomly selected by a beeper that he carried in his everyday environments. In this presentation we will describe Peter's inner experience and the lessons that can be drawn from our work with him and others. These lessons include: (1) there are large individual differences in the content and nature of inner experience. Peter's inner experience included several flashbacks, hallmark symptoms of PTSD, including an occasion where he relived in graphic detail friends a few feet from him being blown apart in combat. Peter also showed signs of hypervigilance, another symptom of PTSD. Perhaps the most surprising characteristic of Peter's inner experience was the occurrence of visual images corresponding to strong negative emotions without concurrent emotional experience. These included Peter innerly seeing himself torturing his ex-wife and, at another moment, innerly seeing himself punching his co-worker in the face. Peter also experienced frequent sensory awareness, something he was unaware of before sampling. (2) People often have strong but dramatically incorrect beliefs about the nature of their inner experience. Before using the beeper, Peter confidently described the characteristics of his inner experience, but most of those characteristics turned out not to accord with his own descriptions of actual beeped moments of inner experience. Peter easily came to conclude that his retrospections about his experience had been mistaken. Peter is not unusual in this regard; thus people's descriptions of their own inner experience should not be naively accepted. (3) Peter's actual inner experience changed dramatically over time. This progression likely resulted from the confluence of several factors. First, inner experience is created by the experiencer, and that process of creation is a skill. The process we engaged in likely improved Peter's skill at creating coherent inner experience. Second, over time Peter overcame his (incorrect) beliefs about his inner experience, instead developing the ability to apprehend his actually ongoing (and likely clearer) inner experience. The implications of these three lessons are important for anyone interested in inner experience. **C3**

188 Left-Handed Inner Experience: What it Can Tell Us About Method in the Science of Inner Experience Russell Hurlburt <russ@unlv.nevada.edu> (Psychology, University of Nevada, Las Vegas, Las Vegas, NV)

1. "True or false? The inner experience of left-handed individuals differs from that of right-handed individuals in important ways." Choose one: A. False: Why should handedness impact inner experience? B. True. C. It is impossible to investigate inner experience reliably enough to answer that. D. I don't know. If you answered B., then answer question 2: 2. In what important ways does the inner experience of left-handed individuals differ from that of right-handed individuals? Those would seem to be important questions, but (I think) not many consciousness scientists, neuroscientists, or psychologists can give adequate answers to them. This talk is *not* primarily about the experience of left-handed individuals (although I will give my answers to those questions). Instead, I will use the investigation of left-handers' experience as an example to inform three fundamental discussions. (1) Left-handed experience illustrates the importance of reliable first-person accounts. Left-handedness occurs in 5-10% of the population; left-handedness is known to be associated with brain asymmetries; inner experience is clearly related to brain function. Therefore a grasp of left-handers' inner experience may provide insights into brain func-

tioning that are important to consciousness scientists, neuroscientists, and cognitive psychologists. (2) The investigation of left-handed experience illustrates why science does not (yet) know the answers to such questions. Subjects are often said to have privileged access to their own experience, but that is not true in at least one important sense: subjects have no direct comparative frame of reference. The only experience they ever directly apprehend is their own (left-handed) experience; they therefore cannot be expected to know what is important, unusual, or scientifically significant about their own experience or how their own experience is similar to or different from that of right-handed (or other left-handed) individuals. Similarly, most investigators also have intimate familiarity with only one stream of experience (their own), leading to a pervasive but (I think) incorrect belief in the universality of characteristics of experience. (3) The investigation of left-handed experience will serve as a springboard into the discussion of how science might proceed if we wish to take inner experience seriously. There will be challenges, for example: (a) Science will have to accept that presuppositions interfere with the ability to apprehend and describe experience in high fidelity; those presuppositions operate both within the subject and the investigator. (b) Science will have to work out effective ways of helping both subjects and investigators bracket those presuppositions. (c) For a variety of reasons, it should be expected that presuppositions are more stubborn for investigators than for subjects. (d) Science will have to recognize that bracketing presuppositions is a skill no less complex than, say, violin playing, and therefore it should be expected that across investigators there will be a wide range of skill. Furthermore, for a variety of reasons, investigators' self-reports of skill level should not be expected to be highly correlated with their actual skill. I will offer suggestions about how those challenges can be overcome. **C5**

189 That Was Definitely in My Awareness: Recognizing (Un)Straightforward Descriptions of Inner Experience Stacy Reger <regers@unlv.nevada.edu> (Psychology, University of Nevada, Las Vegas, Henderson, NV)

Descriptive Experience Sampling (DES) is a method of exploring inner experience (thoughts, feelings, tickles, etc.,). In the DES method, participants jot notes about their experience at the semi-random sound of a beeper. Soon after enough moments are gathered, researchers interview participants to gain as full and rich an understanding of their experience at each moment as they can. But subjects may not be skilled at noticing their own experience, or may for a variety of reasons be motivated to overlook or distort features of their own experience. The aim of DES is the high fidelity apprehension of inner experience; lack of skill or motivated distortion reduces the fidelity of apprehension. The interviewer's task is to assist the interviewee in providing a high fidelity description of experience. When subjects are giving low fidelity descriptions of their experience, they typically signal that lack of fidelity with verbalizations and behaviors that DES calls subjunctifications. Subjunctifications include any clue that an interviewee is not giving a straightforward description of his or her experience at a given moment, and can include word choices (e.g., use of the subjunctive mood, approximations, metaphors) and behavioral cues (e.g., hesitating, looking distressed). This paper will describe subjunctification and provide a series of videotaped examples from DES interviews that illustrate the presence and absence of subjunctification. It will also include a demonstration of the interactive computer tool (DES IMP), a training program designed in the DES lab at UNLV for researchers interested in learning the skill of DES interviewing and in particular the art of recognizing subjunctification. Learning to recognize subjunctification is a useful skill for any researcher, particularly those using qualitative and interview methods, and the DES IMP provides a multi-media, interactive way to gain this skill. **C4**

4.0 Physical and Biological Sciences

4.01 Quantum theory

190 Spukhafte Fernwirkung: Can Distant Healing Intentionality (DHI) be Explained through Imagery Induced Ultraweak Biophoton Emission, Qubits and Quantum Entanglement? Werner Absenger <wa@wernerabsenger.com> (Spring Lake, MI)

Introduction: Quantum Entanglement (QE) is often evoked pertaining to states of nonlocal consciousness or Distant Healing Intentionality (DHI). It seems authors seek refuge in QE in connection with experiments and phenomena for which all other plausible explanations have been exhausted. While it is easy to invoke QE, it is a different story, for us non-physicists, to grasp the concept of QE. What does it even mean for molecules to achieve a state of QE? The impetus for this systematic review of the literature on QE and DHI came from research by Achterberg et al. (2005) and a subsequent presentation given by Dr. Achterberg (2008) at Utrecht II: Charting the future of parapsychology. When one considers the study by Achterberg on DHI, it becomes clear that there are mechanisms at play that, as of now, escape scientific investigation. With her research, Dr. Achterberg was able to determine that healers who practiced DHI produced measurable (through fMRI imaging) changes in brain functions of DHI recipients. This happened despite the fact that healers (from now on referred to as Alice) and recipients of healing (from now on referred to as Bob) were hermetically sealed from each other. Communication via visual and/or auditory cues and every other sensory function currently understood by science between Alice and Bob was impossible at the time of the experiment. The objective of this paper, and because of the absence of a working hypothesis on the precise mechanisms at play with nonlocal consciousness or DHI, was to report the results of a systematic review of the literature, and if possible, develop a step by step hypothesis how the research results by Achterberg et al. (2005) could have come about. Methods: The following questions were posed, followed by a systematic review of the literature to get answers to the phenomenon of nonlocal consciousness or DHI. A) What is DHI? B) What is QE? C) Which molecules can become entangled? D) Is nonlocal consciousness or DHI dependent on entanglement? E) How is entanglement achieved? F) How could entanglement be achieved by living organisms outside a laboratory? G) Which chemical reactions, innate to human metabolism, produce molecules that could become entangled? This project required inclusion of a hypothesis involving ultraweak biophoton emission elaborated on elsewhere by Kobayashi et al. (1999) and Bokkon (2009). The inclusion of the ultraweak biophoton hypothesis allowed for the development of a step by step hypothesis pertaining to the intricacies of DHI communication between Alice and Bob. Conclusion: Based on current scientific evidence, a hypothesis can be formed that gives a clear, plausible, step-by-step explanation of the nonlocal consciousness or DHI results documented by Achterberg et al. (2005) and elaborated on by Achterberg (2008), when one sets aside classical Newtonian physics and scrutinizes nonlocal consciousness or DHI from a quantum mechanical approach. **P1**

191 Mind-Matter Relations In Dual-Aspect Monism a la Pauli and Jung Harald Atmanspacher <haa@igpp.de> (Theory and Data Analysis, Institute for Frontier Areas of Psychology, Freiburg, Germany)

In the mid 20th century, Wolfgang Pauli and Carl Gustav Jung outlined an approach to understand mind-matter relations within a framework presently known as dual-aspect monism. Their approach can be reconstructed in detail based on their comprehensive correspondence. It leads to two basically different types of mind-matter relations interfering with each other: (i) structural correlations that are persistent and reproducible, and (ii) induced correlations that are evasive and hardly reproducible. This distinction predicts a classification of mind-matter relations that can be tested by analyzing empirical material. The extensive collection of cases of exceptional experiences at the IGPP counseling department reveals compelling evidence that the Pauli-Jung conjecture provides a novel and informative way to assess this material. **C7**

192 Strange Enough? Ontological Singularities, Closed Time-Like Curves and the Hard Problem Uziel Awret <awretu@trinitydc.edu> (School of Quantum Computation, Trinity DC University, Falls Church, VA)

Joe Levine divides the question of consciousness in two. The question of 'phenomenal content' and the question of 'subjectivity'. In this paper I will subject the first question to a strategic suspension and concentrate on a falsifiable version of the second – What physical environment can cause a collection of physical ultimates to become accessible only to itself? – suggesting a contextual information theory of consciousness (CITC) where bits can become self-relational in special physical environments. Can an alien smart enough to construct a system conscious of blue

experience blue? Will it reach the conclusion that certain types of information possessed by S are hard to access? Will it understand why? A putative CITC: 1) Ultimates' properties depend on their physical environment (Pitowsky, Graphene.) 2) There are physical environments in which ultimates become self-relational. 3) The brain is a highly nested hierarchical system ideally suited to act on its ultimates. 4) The brain harbors physical singularities that constitute a minimal NCC (the best NCC at any given time.) 5) These singularities harbor CTCs (Closed Time-Like Curves, See Seth Lloyd 2010 paper refuting Tegmark, also see Scott Aaronson on CTCs and hyper-computation.) Will the truth of 1-5 yield a physical explanation of subjectivity? Can we exchange philosophical ineffability with physical intractability? Physical singularities justify the identification of physical ultimates with bits. What Bekenstein himself isamazed at is that his bound is independent of the physical realization of the bits. CTCs map unto the time axis like the unit sphere maps unto the infinite plane in projective geometry. Premises 1-4 already give us a philosophical advantage endowing a minimal NCC with exquisite finality. In "Wittgenstein's Vienna", Janic and Toulmin describe Kant's transcendental epistemology as an epistemology that determines its scope and limitations 'from the inside' so to speak. This is true for mature scientific theories in general, arithmetic after Godel and mechanics after Heisenberg come to mind. Will a mature theory of cognition discover its limitations from the 'inside' or informed by philosophy? The fifth premise yields additional advantages like truly constitutive self-relationlity, (Kriegel's SOMT, for example.) a blurring of the state/process distinction (O'Shaughnessy), and novel ways of viewing identity and uploading. I will conclude that the puzzle of subjectivity has physically possible explanations and it is quite possible that tackling this part of the hard problem first will help us deal with the question of phenomenal content later. To have access to the information inside a CTC one must become part of the loop. The "view from the inside" means existing inside such a CTC or synchronized CTC foam. It is premature to resort to Russellian Monism. The rest of the paper explores the physical possibility of biological singularities, either because of information compression in brains or by treating electrons as CTC harboring naked ring singularities (Brian Green.) I will mention the Claustrum and possible formation of physical singularities in the high temperature two-di Nernst effect in conformal quantum field theory (Nature 2009) and speculate about weak interactions inside synapses. **C7**

193 The Cognitive Force in the Hierarchy of the Quantum Brain Wolfgang Baer, Alfredo Pereira; Gustav Bernroider <baer@nps.edu> (Information Sciences, Naval Postgraduate School, Monterey, CA)

It is generally accepted that the human brain maintains and updates an internal model of the external world. It is further likely that the qualia of observable experience are due to awareness, through measurement, of such an internal model rather than the direct result of causal sensory stimulation. It has been suggested by the presenter that a model of sufficient resolution may be implemented in the mass-charge separation induced by the imbalance between gravito-inertial (Fg) and electro-magnetic (Fe) influences on all material structures from its surrounding environment. The implication suggests a balancing force field (Fc) holding charge and mass together exists and the dAlembert Principle should be modified to include such a force as shown in the following equation 0 = Fg + Fe + Fc. If our internal model is implemented by the separation distance between charge and mass induced by such a force then primitive correlates of consciousness would be built into the gravito-electric structure of all material described by this addition to the foundations of physical theory. Connecting this pan-psychic view of the mechanism of primitive consciousness to the consciousness of our every day experience requires a hierarchy of supervisory and control layers that translate macroscopic stimulation patterns carried by neural pulses into the underlying mass-charge displacement patterns. Layers of the quantum brain structure are being studied by many investigators who individually contribute insight into the hierarchy. Combining a representative sample of these contributions into a coherent whole is the main topic of this presentation. We apologize to investigators whose ideas are not included in this necessarily limited representative example of the integration effort outlined in the next paragraph. At the bottom of the hierarchy small linear displacements between charge and mass are identified by

W. Baer as the complex displacement field associated with the Schrödinger wave function. The required doubling of degrees of freedom when charge and mass are no longer treated as properties of individual particles matches the alternatively derived doubling from G. Vitiello quantum field theory investigation of the brain as an interactive dissipative system. The resulting organization of water dipoles, comprising 98% of all brain material provides the next higher level of organization. Long range communication between neural colonies being investigated by R. Pizzi suggest an integration layer. The astrocytes system with long range calcium waves proposed by A. Pereira could provide this function. The brain design by J. Roenager suggests a similar role for astrocytes that interface to the next layer through quantum wires appearing in S. Hameroff/Penrose theory of microtubules. These are thought to provide elements of q-bit calculations and possibly influence the gating state of neuronal ion chambers that control the macroscopic neural pulses finally seen emerging as classic physical effects. The hierarchy of supervisory and control layers each acting as observers to next lower levels suggest that complex processing paths involving both macroscopic and quantum elements control the fundamental gravito-electric structure that comprises our model of the world and forms the neural correlates of consciousness experience. **P1**

194 The Quantum Reduction Process Connects with Consciousness Gerard Blommestijn <gblomm@gmail.com> (Amstelveen, Netherlands)

Quantum mechanics can be said to involve two types of process: the evolution of the wave function of a system in the absence of observation (process 1), and the sudden change of the wave function to one of the measurement outcomes at the moment of observation (process 2). The latter type of process is called the reduction or collapse of the wave function. Thus, at this highest level of distinction between the different types of processes of reality as we understand it, we see the essential importance of observation, and therefore of consciousness. In other words, process 2 has a direct connection with consciousness. Process 2 also turns out to have other special properties: 2a) Before the observation the reduction process contains nothing that determines which of the possible outcomes will become the real one (no hidden variables). It stands, as it were, above the laws of physics. It is true that it has to obey the probabilities that these laws dictate, but in one single event any possible outcome can happen. This is called indeterminism, which is usually understood as randomness of the outcomes, but, strictly speaking we know nothing about the causes of the outcomes, except that they are essentially unpredictable, totally free. Another special property of the reduction process is entanglement: 2b) Outcome correlations over large distances, which cannot be attributed to communication by physical signals. This property is also called 'non-locality', that is to say, the entanglement of the reduction process binds together different parts of a system, irrespective of distances. Combining the above properties, we get the following picture: the reduction processes are directly connected with consciousness, are absolutely free with respect to its outcomes, and are able to join distant parts of a system into one unity. These properties are unusual in the world of physics. On the one hand the probabilities of the reduction processes follow the classical deterministic behavior of nature; on the other hand, the individual events show unpredictable freedom and binding to unity, which is exactly what consciousness does. Consciousness has freedom of the will (conditioned by probabilities) and it always binds its experiences together into the oneness of the I, the self, which is always here, now and singular. These considerations lead us to the conclusion that the reduction processes themselves (or their equivalents, in interpretations of quantum mechanics without any reduction process) are in one sense connected to the world of physical objects, and in another sense directly to the essence of subjectivity, the Self, the I, or I-ness. So, the reduction process connects the material world with the world of I-ness. Now a question comes to mind: is there energy flowing between these two worlds? The happy answer is no, only (conscious) information flows between them, because the reduction process itself does not involve energy transfer, although its outcome may give rise to different courses of action by the physical world. The refutation of the ontological independence of 'I-ness' is therefore no longer valid since quantum mechanics. **P2**

195 Orch OR Model of Consciousness: Experimental Evidence Part II Vanessa Buechner <vanessa.buechner@psy.lmu.de> (Psychology, University of Munich, Munich, Germany)

Recently, Penrose and Hameroff (2011) proposed a model of consciousness and quantum computations originating from the mid 1990's. According to this model consciousness depends on biologically 'orchestrated' quantum computations in collections of microtubules within brain neurons. The continuous Schrodinger evolution of each quantum computation terminates a quantum-gravity process related to the fundamentals of spacetime geometry. This process is called 'objective reduction' of the quantum state (OR) and results into a moment of conscious awareness. Any brain activity within the microtubuli that occurs before the 'objective reduction' follows quantum mechanical rules in line with Schrodinger's equation. Also, as mentioned above, OR indicates a conscious moment implying that quantum states need to be – by definition – preconscious. One core feature of quantum physics is that time has no direction (Penrose, 1994), i.e. future and past are interchangeable and this should consequently apply for preconscious processing, as well. In a second set of experiments, we extended the findings of Maier (in this volume) using the same subliminal presentation technique. First, we tested the effect of erotic picture material on preconscious decisions (see Bem, 2010, Exp.1). In two additional studies, we tested the influence of trial randomization on our results. We randomly activated a specific trial by using a quantum-based RNG both before and after participants' decisions to rule out alternative explanations of our effects. In addition we tested possible moderating factors such as personality traits. **P2**

196 Conscious Observation and The Double Slit Experiment: Subtle Effects in Reconstructed Dynamics Karla Galdamez, K. M. Galdamez <galdamez.k.m@gmail.com> (Physics, IONS and UC Berkeley, Santa Cruz, CA)

Through the present work, we review and re-interpret two accounts of quantum mechanics regarding the measurement problem, Continuous Spontaneous Collapse theory, (CSL), and Stochastic approach. Our aim is to present a further analysis of the double slit experiment and its relation to conscious intention based on the recently accepted article by Physics Essays entitled: 'Consciousness and the double-slit interference pattern: six experiments' by D. Radin et al. which demonstrates experimental evidence of John-von Neumann consciousness interpretation of wave function collapse in quantum theory. Within the CSL theory, our focus will lie on the study of non-linear differential Schrodinger equations with an emphasis on those abiding to non-locality and thus introducing the subject of superluminal velocities or faster than light travel. In this way we will explore Weinberg's perspective on the construction of a 'complete' theory of quantum mechanics with the added primary feature of conscious observation. We start by analyzing Benney-Roskes and Davey-Stewartson non-linear equations which arise primarily in water waves and then in non-linear optics. Thus in a reconcieved notion of CSL, including conscious observation as a primary element, we study wave function collapse and subsequent dynamics thereof. Similarly we compare our results with the local non-linear Schrodinger equation, the Bloch-type master equation, assuming Markovian approximation. Throughout these non-linear equations, we explore possible experimental applications whereby the non-linear term or noise factor can be potentially determined to contain a signature for conscious observation, i.e. coherence within the randomness. Subsequently, we present a stochastic approach of quantum theory abiding to a Brownian treatment for electron motion with the purpose of depicting specific relevant trajectories from source to detection in the double-slit experiment. In this section we review Bohmian quantum mechanics and trajectory motion along with possible experimental treatments of time arrival whereby conscious observation can potentially be determining factor. Our main equation of analysis will be the Ito stochastic differential equation through which calculations of sample paths (or trajectories) will be presented with a hypothesis as to where conscious observation may be detected. **P2**

197 Conjectures of Quantum Physics Toward a Working Hypothesis on Subjective Reality Jeff Graubart <jeffgrau@rcn.com> (Independent Consciousness Studies Researcher, Chicago, IL.)

My working hypothesis is based on four conjectures that specify a relationship between quantum physics and consciousness. To be consistent, they must follow from an interpretation based on quantum realism. To explain the conjectures, I introduce a model and a von Neumann stylized nomenclature for quantum worldviews. 1) Panpsychism: The wave and particle are not orthogonal. The wave represents the frequency of transition between subject and object. 2) Subjective causation: Von Neumann "process 3" discussed with a novel macroscopic example from chaos theory. 3) Interactionism: Attention by a subject to an isolated system changes the objective dynamics. Interference gating, Stapp's quantum Xeno, and others are surveyed. 4) Combination: subjective reality emerges from subjects as objective reality emerges from objects. A basis of combination is partial and full entanglement and mixed state superposition. I then discuss the implications of these conjectures for consciousness studies. 1) Substance dualism emerges from property dualism for complex subjects, suggesting a philosophy that is a Chalmers' F-D continuum. 2) A discussion on how the total information about a system might be distributedamongst subjects, such that no subject has complete knowledge. 3) Comparison of these conjectures with those of Orch-OR. 4) The non-reducibility of physics in general (exclusive of consciousness), and the importance of subjective control in natural processes. 5) Obstacles to developing a non-local realistic interpretation of quantum mechanics, in particular a derivation of the Born rule, that is consistent with the conjectures. 6) Discussion on how a hierarchical subjective reality eliminates decoherence problems in quantum interactionism. 7) Zombies are metaphysically impossible under the conjectures. Substantively, this includes the so called "unconscious zombie processes." Polypsychism follows with certainty, yet it is almost completely absent from the literature on such relevant topics as blindsight, Libet's studies, and the neural correlates of consciousness. 8) Proposed experiment: Subjective control in the movement of energy along a protein backbone. **P1**

198 The Quantum Observer as the Basis of Human Consciousness John Russell Hebert, Menas Kafatos <tmeeg@aol.com> (Anesthesiology, Center for Brain, Consciousness and Cognition, VA Medical Center, Houston, Texas)

The origin of consciousness, whether due to neural or quantum processes, is currently a lively research and discussion topic for philosophers, neuroscientists and physicists. One physicist (E. Walker) has suggested that to understand physics we have to understand consciousness. Menas Kafatos has suggested that physics through its description of the observer element in creation is opening the door to understanding consciousness. Up to this point neuroscientists and physicists have ignored the observer element and have tied consciousness theory primarily to objects within consciousness. We propose that consciousness cannot be understood fully by looking exclusively at objects within consciousness. Because consciousness and physics both contain elements of the observer, we have taken the approach to separate out the objects within consciousness from the de-objectified self or observer within consciousness. This framework allows the common nomenclature of neuroscience and quantum physics as well as consciousness, to apply. Qualities are here identified as "objectified"(observed) and "de-objectified" (observer). To examine the relationship of the observer within quantum physics to the observer within human consciousness we examine the resonance features of the EEG. This EEG analysis reveals aspects of the human observer that relate to observer/observed resonance phenomena described by quantum physics. Through phase synchrony analysis we found that the wavelength of alpha frequency (8-12 Hz) matches average head size dimensions and these facts form unique conditions that create the alpha standing waves that we found. Thusly the alpha frequency is determined to be the primary resonant frequency (PRF) of the brain. Of key importance to this investigation the alpha in-phase standing wave is tied to the stand-alone observer element in human consciousness. In addition, taking into account the work of others, we find that the observer alpha and the observation (an interaction of alpha and higher frequency gamma) involve resonant interactions between primary and secondary resonant EEG frequencies to form objectified mental reality. Along with these EEG findings which identify the observer with the N=1 PRF of the brain we find that quantum physics also contains the observer element and that string theory is built on N=1 primary and n:m secondary resonance frequencies at the deepest quantum level. As in the EEG, the N=1 PRF at the de-objectified level in string theory is tied to its boundary conditions and forms a standing wave. Also in quantum string theory, as in the brain, the secondary resonance frequencies the observer/observed phenomena through the principles of measurement theory form objectified physical reality. Thus through phase synchrony, standing wave and resonance phenomena we have discovered a link between

human EEG and quantum physics on the subject of the origin of human consciousness. With the quantum-like behavior of EEG and the quantum-like experience within consciousness in the de-objectified state and through an analysis of primary (de-objectified observer) and secondary (objectified observer/observed) elements of both EEG and quantum physics we provide evidence for and a rationale for describing a quantum observer at the basis of human consciousness that is as well the basis of the physical universe. **P1**

199 Tackling the Hard Problem: A View Behind the Scenes of Matter Provides Valuable Clues for the Development of a Theory of Consciousness Joachim Keppler <joachim.keppler@diwiss.de> (Department of Physics, Science Consult, Roth, Germany)

One of the main challenges in consciousness research is widely known as the hard problem of consciousness. Already in the 1990s David Chalmers speculated that finding a solution for this problem may be deeply linked to unraveling the mysteries of quantum physics. In my talk I argue that Chalmers is absolutely on the right track. A theoretical approach called stochastic electrodynamics (SED) which aims at deriving quantum physics from first principles clearly indicates that physics can be reconciled with consciousness. (1) I start with a brief overview of SED and explain that SED is capable of answering fundamental questions of physics such as the stability of matter as well as the creation of form in the universe. The key insight from SED is that the structuring principles in nature and the peculiar features of quantum physics can be traced back to energy flows and resonances between matter and an all-pervasive, stochastic radiation field, called zero-point field. According to this approach the properties of matter are not intrinsic but acquired by dynamic interaction with the zero-point field which in return picks up information about the material system. In summary, matter is a selective frequency filter (resonator) that is orchestrated by the zero-point field and generates information states in the zero-point field. (2) In the second part I point out that these principles apply also for biological systems. From this perspective phenomena such as neural gamma synchrony and long-range coherence can be interpreted in terms of resonance phenomena induced and stabilized by the zero-point field. As a matter of fact the analysis of EEG data reveals that the brain behaves exactly like a resonant stochastic filter. These findings suggest that every resonance pattern in the brain is associated with an information state in the zero-point field, disclosing a deeper connection between neurophysiology and SED. (3) In the last part of my talk I build a bridge between SED and consciousness. I show that insight gained from SED perfectly agrees with the fundamental discoveries of eastern philosophy which has a long tradition in exploring the nature of the mind. From a one to one comparison between SED and eastern philosophy I draw the conclusion that ultimately mind and matter must be based on the same substrate and that the zero-point field is an appropriate candidate for this substrate. This approach opens a door for a theory of consciousness. The cornerstones can be summarized as follows: The carrier of primordial consciousness is the zero-point field. Our individual consciousness is the result of a filtering process which causes the realization of information states in the zero-point field. Such information states have external as well as internal aspects. The external aspects are physical and manifest themselves as dynamic coherence patterns (NCC), while the internal aspects are phenomenal, i.e., a conscious moment is a zero-point information state experienced from inside. The psychophysical laws are those laws that map information states in the zero-point field to qualia. I conclude with an outlook on experimental tests of the theory. **C7**

200 How Influence Creates Quantum Entanglement? Visualizing Mind – Mind Interaction Svetlana Machova <svmachova@email.cz> (Computer Science, Engineering, Charles University in Prague, EU, Plzen, Czech Republic)

Our research is bringing together expertise from the fields of cognitive linguistics (Lakoff), philosophy, depth psychology (Jung), religion (Bible, Quran) and quantum physics (Einstein, Broglie) and attempt to visualize a probabilistic picture of Mind and its interaction. Empirical findings about the phenomenology of mind gained from Free Association Experiment, has opened a new dimension of consciousness study and quantum linguistics research, allowing us to create a link between a collective unconscious level and a conscious Quantum Mind (Hameroff – Penrose). We particularly concentrate on the transcendent mechanisms of influence, empathy and other interactive phenomena from the position of quantum entanglement. The research presented provides a multilingual associative experiment as an attempt to explore Semantic Spaces of Mind in the Czech language, collects and compares it with the conceptual language view in Russian, English and potentially with other languages. Free Association data collected from 200 participants reacted on 400 mind – related cognitive metaphor (Lakoff) stimulus allowed us to identify the main structures of the quantum web visualizing the dimension of Mind. Primarily, we were interested in creating a semantic network, cluster analysis and examine its correlation with the quantum phenomena. According to our findings, quantum mind behaves not only as light waves but also as particles (de Broglie), as aether, a fluid, creating a cloud or an atmosphere. MIND AS A SPACE (Barnden, Lakoff) conceptual metaphor suggested that by "letting-in" an "open" Mind space can be easily inspired, influenced, enlightened, networked, entangled (Radin) by other Minds. Thus, our research suggests that a literal meaning of the quantum metaphor of mind represent a huge field of research discovering this transcendent realm. **P2**

201 The Physics of Belief Sky Nelson <theskyband@gmail.com> (Global Heart Center for Spiritual Living, Santa Rosa, CA)

A study of consciousness includes a study of belief. Belief seems to arise, along with the sense of "self", as a result of our experiences in the world. We do not experience the manifest world directly, but rather through the filter of our beliefs. My aim is to define belief in terms that are compatible with physics, and thereby build a foundation for a physical theory of consciousness. I build upon the concept of retroactive event determination, as presented in my previous work. In this model, belief is an identification (i.e. correlation) between the aware "self" (the subject) and its physical environment. The building blocks of these correlations are the "symbolic meanings" of events. An event takes symbolic meaning when I, the subject, correlate that event to my sense of "I", as in, for example, responding to an unsuccessful attempt at a math problem with the correlation "Iam bad at math." This statement represents a belief that is derived from my personal interpretation ("subjective symbolic meaning") of the event. "Objective meaning", on the other hand, is determined by the types of possible outcomes available from a given situation. Building on the notion (developed previously using various mainstream interpretations of quantum theory) that a given system has a limited number of potential future timelines available to it (consistent with its present state), one can define the objective meaning of the current state as the weighted average of the available future timelines. In the math example above, simply doing a math problem wrong does not greatly limit or define my future possibilities. Therefore, the objective meaning of the event itself is not very strongly weighted toward any particular correlation. However, my response to the event will also carry objective meaning. If I choose to respond by making an effort to get tutoring "help", I restrict my possible futures to ones that are more likely to include the coincidental ("synchronistic") appearance of "help" through a seemingly random event (aka "synchronicity"). My action therefore selects a subgroup of timelines which contain events that support my action, and the weighted average ("objective meaning") of available timelines becomes skewed toward the nature of my action. The two types of meaning are different but related. My belief that "Iam bad at math" will very likely lead me to act in ways that carry objective meaning which reinforce my beliefs. For instance, as a result of my belief, I may give up on a problem before I try hard enough, or I may reject the help of a parent or teacher. These actions carry an objective symbolic meaning that reinforces my personal meaning, in turn bringing me more coincidental situations in which Iam likely to be unsuccessful (e.g. another student laughing at me), even though the personal meaning had no validity of its own to begin with. As a result, the beliefs I form about the world will ultimately influence the types of experiences I have, in a presumably calculable manner. **P2**

202 Consciousness, Rainforest Realism and the Implicate Order Paavo Pylkkänen <paavo pylkkanen@his.se> (University of Skovde/Helsinki, Skövde, Sweden)

In their 2007 book, Every Thing Must Go, Metaphysics Naturalized, Ladyman and Ross launch an attack against contemporary analytic metaphysics or 'neo-scholastic' metaphysics as they call it. According to them, it "contributes nothing to human knowledge and, where it has any impact

at all, systematically misrepresents the relative significance of what we do know on the basis of science" (p. vii). Their view is no doubt an extreme one, but if they are correct, this would have important implications for consciousness studies. For example, 'neo-scholastic' philosophers of mind typically rely on their intuitions when reasoning about the place of consciousness in nature, but Ladyman and Ross remind us that intuitions are "the basis for ... everyday practical heuristics ... they are not cognitive gadgets designed to produce systematically worthwhile guidance in either science or metaphysics" (p. 10). For Ladyman and Ross, a truly naturalistic metaphysics aims to unify hypotheses and theories taken seriously by contemporary science. To achieve this they propose a view they call 'Information-Theoretic Structural Realism'. This assumes that because of its wider scope, fundamental physics has priority over the other sciences. For Ladyman and Ross fundamental physics implies that what exists primarily is structure (thus 'structural' realism), while things in the traditional metaphysical sense are secondary and in the end depend on the relational structure of the world. However, in order to reconcile the pragmatic usefulness of things in the special sciences with their notion of structure as fundamental they propose a view they call 'rainforest realism'. This way they acknowledge that their view allows for the existence of a wide range of things, as long as things are understood as pragmatic devices. What is the fate of consciousness in a genuinely naturalistic metaphysics? This question is not the main focus of Ladyman and Ross's project. However, it seems to me that many key features of consciousness would not have a strong status in their view, which emphasizes verifiability and structure. While their view enables one to fruitfully reevaluate many common assumptions of consciousness studies (such as the idea that the world comes in 'levels'), I think that when trying to explain consciousness it is reasonable to consider alternative schemes of naturalistic metaphysics. In this paper I will thus compare and contrast Ladyman and Ross's rainforest realism with Bohm's (1980) implicate order scheme, with respect to how they can tackle the problem of consciousness (see also Pylkkanen (2007)). References: Bohm (1980) Wholeness and the Implicate Order. London: Routledge; Ladyman and Ross (2007) Every Thing Must Go: Metaphysics Naturalized. Oxford University Press; Pylkkanen, P. (2007) Mind, Matter and the Implicate Order. Heidelberg and New York: Springer. **C7**

203 A Spiritual Psycho-Physical Higher-Order Quantum Theory of Consciousness Sukhdev Roy <sukhdevroy@gmail.com> (Physics and Computer Science, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Formulation of a scientific theory of consciousness poses a formidable challenge. It requires the resolution of the dichotomy of subjective and objective knowledge through an integrated approach that assimilates the complete range of human knowledge, acquired over centuries of painstaking experimentation, in subjective spiritual experience and objective knowledge of modern science. In this paper, we attempt such an integration of spiritual consciousness with psycho-physics and quantum physics to formulate a higher-order theory of consciousness. Spiritual principles define spirit to be the basic entity which works through mind and matter. We consider the primacy of the spirit which is pure consciousness, intelligence, energy and bliss; generates thoughts and other subjective phenomena; is the focus and source of vital energy that sends forth currents to the mental and physical planes; and which causes that process of assimilation that results in the construction of the physical frame. Mind is an instrument through which it performs its subjective functions and it is one of its media of action. It is well known in esoteric sciences that man is in the image of God and is a perfect microcosm of the macrocosm. The physical domain is a reflection of the mental, which in turn is a reflection of the spiritual domain. General principles can therefore be ascertained that can lead to a broader worldview of reality and consciousness. Whenever energy manifests itself, it exhibits repulsion and attraction. In the human frame, the current of the spirit is inwards and attractive, and that of reaction (mind) is outward and pertains to objective/subjective tendency. The spirit current manifests itself mainly as sensory and structural form. The principle of conditional forward causation governs the process of all actions and involves the spirit generating intention (impulse) to give rise to mental propensities, which make us perform actions and fulfill the intention. Physical processes derive from mental and spiritual processes and always act according to past physical events. Mind predisposes physical/physiological potentialities in quantum-like behavior. The pre-dispositional capacities of the spirit through mind are consequently conditioned by their actual effect (law of karma) and mind predisposes the brain to carry out those functions which correspond to it's own functions. We identify quantum-like analogies in spiritual and mental processes and propose a generalization of the Schrodinger wavefunction. We examine the characteristic quantum features of nonlocality, duality-non-duality transition, superposition, entanglement, field of potentialities, and time evolution of discrete states as a succession of states. As with the quantum state so do spiritual and mental states have a tendency for possible outcomes, with a basic unity to act as a whole, with propensities or thoughts, like spatial distributions, describing where the spirit or mind or quantum object can operate or actualize. We examine the role of information and intention as an intrinsic feature of consciousness that is the driving motivation of spiritual, mental and quantum processes. Conscious awareness thus crucially depends on higher-order representations that involve the spiritual and mental states, which represent oneself as being in the relevant first-order mental states. **C8**

204 The Mystery of the Wave Function (psi) Resolved Hasmukh Taylor <hasmukh_taylor@hotmail.com> (Director of Yoga, Philosophy, and Pranava Yoga, Orlando, FL)

There are intriguing parallels between the insights of the early Vedic theory of consciousness and those of quantum mechanics and neuroscience. In Vedic theory, one views awareness in terms of the reflection that the hardware of the brain provides to an underlying illuminating or awareness principle called the Self. This hardware may be compared to a mirror. The hardware of the human brain represents the clearest picture to focus the Self, which is why humans are able to perform in ways that other animals cannot. Neural network models have been used by cognitive scientists to model behavior. I believe there are limitations in the current theories of psychology and the field of psychology is in a state of crisis. These models do not take into account the notion of Self. We are no closer now to understanding the most fundamental problems of psychology than we were when psychology became a science a hundred years ago. Each of us is aware of being a unique "Self", different from other people and the world around us. But the nature of the "Self", which is central to all psychology, has no physiological basis in contemporary theory and continues to elude us. The concept of "mind" is as perplexing as ever. There is a profusion of little theories-theories of vision, pain, behavior-modification, and so forth – but no broad unifying concepts. But on closer examination, cognitive psychology turns out to be little more than the psychology of William James published in 1890; some neuroscience and computer technology have been stirred in with the old psychological ingredients, but there have been no important conceptual advances. We are adrift without the anchor of neuropsychological theory, in a sea of facts – and practically drowning them. We desperately need new concepts, new approaches. Cognitive abilities arise from a continuing reflection on the perceived world and this question of reflection is central to the brain-mind problem, the measurement problem of quantum physics, and the problem of determinism and free-will. As this mirror possesses a quality of quanta, it should be described by a quantum mechanical wave-function. It is well known that Schrodinger's development of quantum mechanics was inspired, in part, by Vedanta. His debt to the Vedic views is expressed in an essay he wrote in 1925 before he created his quantum theory: This life of yours which you are living is not merely a piece of this entire existence, but is in a certain sense the "whole"; only this whole is not so constituted that it can be surveyed in one single glance. This as we know, is what the Hologram expresses which is yet really so simple and so clear. I propose the model of Hologram which uses the real object as the Self or Brahman and Consciousness would act as the Source's laser illuminating the real processes of the Cosmos thru the Laws of Physics – processes that have been recorded on a subtle inner surface of the Self, and generating the holographic illusions of daily life. **A1**

205 Fundamental Energy Theory (FET): Six Specific Qualitative Vacuum Energies that Constitute our Physical World and Everything that Exists – A New Paradigm Birgitta Therner, Arnold Therner; Steen Loeth MD, PhD; Andrea Moellenkvist PhD; Leif Pettersson <remark@therner.se ; ncp@newcosmicparadigm.org> (New Cosmic Paradigm – NCP, Skoevde, Sweden)

Although natural science has created the foundation of our modern technological society, it can-

not explain what the physical world essentially consists of and what it really is. (Physics assumes that the total energy of the universe is composed of 70% dark energy, 25% dark matter and only 5% ordinary matter – in fact 95% of the universe consists of something unknown.) The same is true for consciousness, in fact both our inner and outer worlds are a mystery. 'The Cosmic World-view' including 'The Fundamental Energy Theory' – FET involves a completely new description of reality that provides logical and consistent answers to these puzzles. FET takes us into the vacuum/zero-point field and describes the vacuum energies or 'fundamental energies' operating there. According to the theory there are six of these subtle energies, each possessing a specific quality – which is an original and novel concept. These qualitative energies also have different impacts and strengths and they build up everything from the very densest physical matter to the most subtle that exists including our own consciousness and mental life comprising thoughts, feelings, memories, etc. One part of FET is primarily focusing on two of the fundamental energies, the expansion and contraction energies and how they are underlying and constituting the entire physical world, (the other four fundamental energies are also involved in these processes but to a much lesser degree). The expansion and contraction energies have totally opposite characteristics, according to their names the expansion energy expands and the contraction energy contracts, i.e. there is a tension between them. FET states that the interaction and tension between these two energies constitute the very basis of what physicists call force, particles and matter. The theory describes the creation of particles from the zero-point field that in turn elucidates the phenomena of mass (Higgs field), curved space, the mechanisms of gravity and much more. Actually FET also meets all the criteria for what physicists term 'the Theory of Everything'. The completely novel concept presented in FET is that the vacuum/zero-point field contains six specific qualitative energies constituting everything and that two of them have qualitatively opposing features that give rise to the entire physical world. Taken together, in fact this is a New Paradigm. FET is based on the intuitive knowledge contained in Martinus Cosmology – and is made available by the independent organization New Cosmic Paradigm NCP, working with the branch of this intuitive knowledge that is building bridges to science. This area is especially represented by Per Bruus-Jensen, former trainee and collaborator with Martinus. An important addition to this field is 'The Fundamental Energy Theory/FET' presented in the book: 'Physics, Martinus Cosmology and The Theory of Everything' (2012) by Leif Pettersson, published by NCP. www.newcosmicparadigm.org – A new understanding of a reality according to which the universe is infinite and alive and where life is controlled and governed by an all-embracing consciousness in harmony with eternal creative principles and precise laws of nature that are associated with it. **P1**

4.02 Space and time

206 Language and Symbolic Thought in Albert Einstein's Relative Space-Time: New Interdisciplinary Perspectives in Einstein's Mechanics of Relativity Nildson Alvares Muniz <alvaresmuniz@bol.com.br> (Brasilia, Distrito Federal Brazil)

Our paper intends to discuss Albert Einstein's conceptual ontology with special focus on the grounding of 'Relative Space Time' concept. It understands that Einstein's ontology given its tropological nature, it builds essentially the concept of relativityamong the relations between language and thought according to a semiotic perspective. So, the main objective of our paper intends to analyze Einstein's Relative Space according to Semiotic approach when it intends to discuss the role of language and thought in Albert Einstein's categorization, figurativisation, metaphorisation of relative space-time. The second objective aims to present new interdisciplinary perspectives between Anthropology and Semiotics, when it analyses Einstein's innovative method in Modern Physics. Einstein's method verified in May, 29th, 1919, in Sobral, Brazil, as it took a total eclipse of the sun as a new method of investigation in Modern Physics. This paper intends to present new interdisciplinary perspectives in order to explain the above mentioned innovations in Albert Einstein's relative space-time. Since 1919, there have been numerous interpretations of Albert Einstein's Theory of Relativity, in the sciences, when Einstein presented one innovating conception of Cosmology with new scientific consequences for human knowledge. Our approach takes

an interdisciplinary perspective, and it considers the main contributions of prominent theorists in Structural Anthropology, Hermeneutics and Semiotics, such as Charles Sanders Pierce, Ferdinand De Saussure, Emile Benveniste, G. Frege, Claus Emmeche, Winfried Noth, Claude Levi-Strauss, Gaston Bachelard, Gilbert Durand, Clifford Geertz, and Paul Ricouer in order to discuss the role of language and symbolic thought in the modes of reality comprehension, taking Einstein's relative space-time conceptualization, figurativisation and metaphorisation. Since Einstein's innovative scientific experience is considered to be one of the most important contributions to Modern Physics, we argue that our confirmations so far obtained and here presented on the Physics of Einstein, if they do not completely solve Einstein's long standing enigma of relative space-time conceptualization, they point at least to some beacons in this very much complex but fascinating field in the relations of man-language-myth-world relations. As we emphasized above, these beacons can only be comprehended according to tropological relations, because what is involved in the conversion of the non-familiar into familiar is a creation of metaphors which is in general figurative, that is, Einstein's relative space-time must be perceived as a linguistic sign, a symbolic image and also as a conceptual metaphor in Relativistic Mechanics. **P2**

207 Three Dimensional Time and Consciousness Daniel Beal <dmbealmd@msn.com> (Psychiatry, Cincinnati VAMC, University of Cincinnati, Cincinnati, OH)

It is possible that more than one dimension of time plays a role in consciousness. Physics has been suggesting dimensions in addition to the consensual three dimensions of space and one of time since 1921 when Kaluza-Klein theory added an extra space dimension in an attempt to unify gravity and electromagnetism . Over the last decades astrophysicists have introduced the concept of extra dimensions of time to account for anomalous red shift observations. While string theory formulations typically invoke one time dimension and 9 to 24 space dimensions, recently quantum physicists have added more time dimensions in alternative theoretical formulations. In one case, Itzak Bars works with two time and 4 space dimensions in an alternative to conventional string theory. In another formulation, Chen describes 3 dimensional time in which a time dimension is associated with each space dimension in a geometry which appears superficially like a Euclidian x, y, z axis reference frame. Chen's geometry is a more complex Finslerian frame of reference that follows from the Riemann geometry upon which the Theory of Relativity is based. As expressed, these theories of extra time dimensions do not suggest an extension into the everyday world of consciousness. But what if these theoretical extra time dimensions are in fact a fundamental if hidden aspect of the universe and consciousness? Khrennikov describes "subcognitive time scales" and Hameroff elaborates "temporal non-locality" which involve quantum concepts and consciousness, so there is some precedence for advancing quantum temporal concepts into consciousness. What if we were to explore macroscopic multiple dimensions of time? If we arbitrarily take the case of three dimensions of time, how might they be expressed in consciousness? One might propose that various altered states of consciousness are associated with different time dimensions. In a simple case, we could consider ordinary waking consciousness, dream consciousness, and deep meditative or cosmic consciousness. If ordinary waking consciousness is displayed on the x-axis with time's arrow going from the negative to the positive direction, then dream consciousness could be the y-axis, and a timeless cosmic consciousness the z-axis. There is the common experience of a seemingly prolonged dream occurring in a short duration of objective y-axis time; leading to the possibility that dreams are occurring in another time dimension. Deep mediation is frequently described as timeless, as are aspects of near-death experiences. Any exclusive y or z axis conscious event would have no trace on the x axis of ordinary consciousness. Any altered state of consciousness remembered in ordinary consciousness would then be some vector product of the time experience combining xy-axis or xz-axis in order to leave an x-axis trace. Is the theory of multiple time dimensions in consciousness testable? Not in any simple or obvious way. Cognitive neuropsychology/neurophysiology is probably not sensitive enough to detect the phenomena. Techniques of introspection might clarify a phenomenology of multiple time dimensions in consciousness, but the subjectivity of the technique would make testable hypothesis generation difficult. **P2**

208 From Agile Business to Business in the Relativistic Realm Arsh Dayal, Vishal Sahni <deiarshdayal@rediffmail.com> (Faculty of Engineering, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Everyone is driving toward zero latency, and has literally tried every optimization that can be imagined. The impetus is a recent phenomenon called high-frequency trading. Typically, a high-frequency trading firm – or rather, its computer systems' buys and sells financial instruments while holding on to them for perhaps just fractions of a second. High-frequency traders make money by exploiting tiny and fleeting disequilibriums in the markets – say, when the price of one asset changes and the price of another that should be equivalent in value doesn't shift immediately to match. One reason the high-frequency traders can beat others to the punch is that they often locate their computers in data centers run by the exchanges. The New York Stock Exchange, for example, moved its computer infrastructure last year to a facility it built in New Jersey, where it also leases space to trading firms. It can command premium prices for that space because close physical proximity means fast access to the exchange's raw trading data. Most other market participants don't see that data until milliseconds later, after it's been consolidated and combined with information from other exchanges. High-frequency traders also gain an edge by having the fastest telecommunications link possible between distant trading centers where the prices of what is being bought and sold are fundamentally related. The fate of some companies whose stocks are being traded in New York City, for example, hinges on the price of commodities being traded in Chicago, and vice versa. If the computerized trading platform in one of these cities has access to information about the market in the other sooner than anyone else – even just a few milliseconds sooner – it can execute profitable trades. The round-trip travel time of a signal along a newly installed New York-Chicago cable at 13.3 milliseconds, is 3 ms faster than competitors can offer. With electronic trades now taking less than a millisecond to execute, firms with access to this fast connection can profit handsomely. Gross et. al. have developed a model called as Relativistic Statistical Arbitrage that investigates, in a rigorously quantitative way, what happens when the kinds of trading opportunities that high-frequency traders exploit are limited only by the speed of light, or at least the speed that light travels at in optical fiber. The naive solution is to put pre-programmed computers on either side of a low-latency link and is what is being done at present and leading to a race to reduce point-to-point latencies. Gross et. al., in their model highlight a different strategy for agile business trading and present the next phase for setting up nodes. They have derived that the most advantageous position to be in, to wring a profit from tiny discrepancies in price between two distant trading centers, is at an intermediate point between them. We can no longer operate on the implicit assumption of absolute simultaneity, referring to the pre-Einstein notion of how time flows. So it seems finance is now moving into the relativistic realm. **C22**

209 Perception of Time and Consciousness Purnima Sethi, Ankita Mathur <sethi.purnima@gmail.com> (Physics and Computer Science, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Time is the most elusive of objects under study and its nature still remains shrouded in mystery. Is time a process which flows or is it sliced into disconnected moments or is it just a dimension in which processes occurs? Is time real or is it a phenomenological fabrication in a timeless universe? Does time actually exist? In whichever direction the answer lies, the problem of time is intimately related to our conscious perceptions. We experience time as a directional flow of sequential events, yet the physical meaning of time remains far from understood. The mystery of time could be attributed to the mystery of consciousness, each questioning the existence of the other. In this paper, we would like to demystify and elucidate on this temporal processing and the human time perception in the higher states of consciousness also exploring its relevance to the famous Orch-OR theory given by Penrose and Hameroff. The concept of higher consciousness rests on the belief that the average, human being is only partially conscious due to the character of the untrained mind and the influence of 'lower' impulses and preoccupation. As we achieve higher states of consciousness, mind withdraws its attention from the outer surroundings and concentrates within, contemplating the divine form and the divine name and we lose the awareness of passage of time. Temporal judgments are constructions of the brain which contains a variety of

internal clocks and rhythm detectors that might influence the experience of time. We propose that since the rate of information processing by brain slows down in this process and the memory becomes less dense, thus our brain cannot exploit the knowledge of elapsed time. Elaborating further on the enigma of time and consciousness, we would also like to dwell upon the Penrose-Hameroff's Orch-OR theory according to which when enough entangled tubulins are superpostioned long enough to reach Penrose's OR threshold by E=h/t, an objective reduction (OR) "conscious event" occurs. Quantum gravity is responsible for these states, which are separate in space-time, with intervening distance between them in space-time, in converging them to one measured state, and this takes about the same time as consciousness to clear the effect through the artifact of mind. However, in the purely spiritual region, it is all spiritual consciousness. It does not require any time lapse, there it is instantaneous. We propose that it is likely that, when we achieve higher states of consciousness, superpositions are large enough so consciousness does not take much time to dawn upon the observer. Since the superpositions are high, E is high, so by E=h/T, T reduces drastically. There is no change, no time, only a constant state of eternal bliss. Time loses its meaning beyond the Physical Universe and the region of the Universal Mind. Thus the temporal characteristics of consciousness pertain only to the Physical and the Material world. **P1**

4.03 Integrative models

210 A Framework for Consciousness and its Interactions with the Physical World Ashok Agrawala <agrawala@cs.umd.edu> (University of Maryland, College Park, MD)

The starting point of the framework proposed as a consistent, unifying structure is the recognition that the two fundamental entities in creation are consciousness and energy. Both of them take many different forms but are the ones that are needed for formation, operation and sustenance of creation. With the equivalence of matter and energy well established, in the physical world all material objects may be considered as a form of energy. We propose that while consciousness interacts in the physical, material realm, its primary manifestation is in a different realm, and depending on the form of consciousness there are multiple such realms. Further, consciousness is discrete and consists of Consciousness Elements (CEs) which are the basic building blocks of consciousness. With each and every material object a CE is associated, only some aspects of the consciousness of the CE are accessible through physical measurements. The main instrument capable of sensing any features of CE or deriving some properties of it is the mind of a sentient entity – and even such a mind, depending on its development, can only access a part of the full attributes of the CE. Three basic qualities of CE are 1) Awareness and Self-Awareness, 2) Intelligence, and 3) Self-Actuation. Not all these are available for all CEs. For example the CE associated with a piece of stone may contain all its attributes but may have no intelligence or actuation capabilities. When we consider a collection of material objects, each object has its CE and the collection has its CE which may simply be the collections of the attributes of individual members of the collections, or, when the members of the collection are synergistic, may have additional attributes – emergent properties. The property of awareness refers to all the information that may be accessible. We note that the information is not in the represented form as it is in the physical world. It is directly accessible and all its meaning and essence is directly available. When a CE is aware of itself, i.e. has the ability to access information about itself, it acquires the self-awareness property. A CE is capable of initiating action on its own – self-actuation. These actions may simply be modifying some parts of information in its awareness (thinking and analyzing), some messages sent to some other CEs which may be able to carry out some other actions, etc. The intelligence is the capability of initiating actions based on the current awareness. Further, all actions require energy which is appropriate for that action. While all material objects have associated CEs, there are many CEs which do not have any material objects attached to them. Such CEs exist in non-physical realms. Consciousness functions in a consistent manner at all levels but depending on the degree of refinement it manifests itself in different ways. A common property of sentient entities seems to be their ability to use energy to carry out actions. **P1**

211 The Mystical Dimension of Consciousness Dennis Balson <danian.b@bigpond.com> (Taree, New South Wales Australia)

Creative forces have existed since the Big Bang. Matter, energy and organic compounds are fundamental entities that exist throughout the universe and within all living things. When this planet became suitable for the formation of life – in the form of living cells – that was the beginning of a particular type of natural intelligence. Some of these cells evolved into the basic materials of life and someamazingly are able to replicate themselves endlessly and others can communicate and cooperate with each other. Every cell has a nonphysical entity within. The entity within brain cells is primary, but mental activity is secondary. If it was not for this natural entity, minds wouldn't be capable of thinking, but brains are merely vehicles for this Universal Intelligence, which is devoid of mental properties. Each form of life is inseparably linked to this Mystical entity. Every brain is different to every other because each occupies a different space, but each brain has a unique relationship to every other by possessing the same Consciousness. Once mental activity commences then each mind becomes a separate and independent entity. The consequences of overvaluing structured and normative forms of knowledge is to lose touch with the more intuitive and spontaneous forms of knowing. Wisdom is not the result of possessing more knowledge because wisdom is the cessation of thought. Most mental activity creates illusions, therefore all knowledge and beliefs are constructs of the mechanistic mind, which overvalues 'things' and thoughts. However, the primary Consciousness, which is the entity that is necessary before the mind can function, is nonphysical. If the brain is hardwired so a to rely on ordinary thought systems, then the mind cannot be free to sense 'what is'. Without the primary entity, thoughts would never eventuate, and when they do, they (like dreams) are never real; the mind only imagines things to be real. When the mind is no longer imprisoned in the depths of the past, and when it ceases to be stupefied by what it believes, and when knowledge is devalued in favour of present experiences, then the meditative mind has the potential to 'sense' the natural dimension. Brain cell activity 'functions' instantaneously, but mental activity functions in the line of time. For example, the mind can experience stars that no longer exist. Even a present experience is relative to what occurred in the 'past' because it takes time for the cognitive mind to function, however between one thought and another there is a silent moment where concepts do not exist; where the mind may experience a sensual wonder about the mysterious unknown. The mind usually responds to information that was acquired relatively recently, whereas this Universal Intelligence existed since the beginning of time. Knowledge, information and the material universe are continually changing, but this Universal entity never changes. Knowledge and intelligence can be compared and measured, but there is no comparison or measure for the Intelligence that exists in nature. If nothing existed before the Big Bang – that nothing became everything. **P1**

212 Expositions About Spiritual Linkages to Quantum Consciousness Sanjay Bhushan <bhushan.sanjay@rediffmail.com> (Management, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Banking upon the quantum conception of soul (as a quantum equivalent of information) and quantum reincarnations coined recently by Stuart Hameroff and also the Ervin Laszlo's Akashik theory, we can realistically infer it to be the current force of spirit (soul), which, by virtue of being a supreme information reservoir (potential as well kinetic), is responsible for the elevation of an ordinary cognitive consciousness to a higher degree of spiritual consciousness. This was authoritatively and scientifically proved in the religious scriptures of Sant Mat (Radhasoami faith) long ago. Perhaps, these freshly realized revelations about the quantum correlate of spirit forces (soul) and their reincarnation mechanism selectively made by some of the quantum scientists across the globe can comprehensively resolve the much debated conflict between the science and the religion regarding the claims of existence of subtler spiritual forces, especially when one becomes able to understand the gradation and potential differences existing between the super quantum intelligent spirit/soul entity and that of human mind and the matter and their reciprocal internal communion and relations. It can also pave the way to realize that all mind/brain properties and the hidden potentials at microcosmic level are subordinate to the macro spirit force which supplies to them all the needed energy and intelligence and bliss to realize whatever is contained within or manifested

outside as its physical organization. On the other hand, one can also realize the dynamic possibility of exciting, inducing or setting kinetic these quantum conscious neurons (or, cellular automata made up of tubulines; jointly propounded by Stuart Hameroff and Roger Penrose) through the performance of concentration meditation practices, prescribed in eastern yogic tradition or generally, in the religion of saints for the awakening of a fairly dormant conscious-spiritual dynamics inside a human mind/brain and transforming it into an enlightened spiritual quantum brain. **P1**

213 The Relational Nature of Consciousness Julia Bystrova <julfire@yahoo.com> (Sebastopol, CA)

What is the primary principle at work in both the subjective experience and in the objective study of consciousness? Identifying this commonality can offer a way to bridge the split between our subjective and objective inquiries in our pursuit of understanding what consciousness actually is and how it might evolve. The relational model I present here is referred to as "relationality" and is an integrative philosophy that offers that the most basic operative at work in the phenomena of consciousness is the dynamic of relating. This claim offers it as more foundational than any single scientific or spiritual view on its nature. First I present first a basic model for understanding this concept and then explore some significant ways we see it at work in science, philosophy and religion. Building on this commonality to both science and spirituality, then offer this philosophical model as a way of understanding the nature of reality and consciousness. This meta-view recognizes an ultimate principle at work in consciousness and all life, while yet recognizing the need to accommodate certain reductionist approaches for functional reasons. Relational concepts assist in integrating the splits in our thinking between our scientific approach and more spiritual sensibilities. Additionally, bringing together in mutual importance the rational processes of our mind with our experience of the body will help to bridge the perceived mind-body dualism. In this way, it is my hope, that I can offer some tools to facilitate our thinking towards this interface and thus assist a resolution for some of the most troublesome challenges in our exploration on this subject. This will be done, in part, with a presentation that will utilize certain techniques effective for bringing the listener into an experience of the information presented. **P2**

214 The Triadic Dimensional Distinction Vortical Paradigm (TDVP): A Consciousness, Infinity and Dimensionality Paradigm Shift Edward Close, Vernon M. Neppe MD, PhD, FRSSAf, DFAPA, BN& NP <eclose@ejcenterprises.com> (Telicom, International Society for Philosophical Enquiry, Jackson, MO)

The current scientific paradigm provides explanations of possibly 99.99% of the reality we experience. However, areas of the paradigm are conflicted and other components remain unexplained, particularly in the biological sciences where the exact way life arises in physical reality remains a mystery. These factors motivate the need for a new paradigmatic approach which must integrate many scientific disciplines and provide a new, comprehensive model. The reason this has not been achieved before is because many "Theories of Everything" or paradigmatic models have ignored the fundamental role of an extended form of consciousness. Only a few have recognized "consciousness"; even fewer have included extra dimensions, andamong those that have, only the proposed Neppe-Close paradigm shift: "the Triadic Dimensional-Distinction Paradigm (TDVP)" incorporates infinity, order, life, dimensionality and consciousness. TDVP utilizes very specific and detailed operational definitions of these and other fundamental concepts. In this model the unification of space and time (as per Hermann Minkowski) is demonstrated to be insufficient, explaining why the attempts at all-embracing multidimensional models have failed even when extended to 10 or 11 space-time dimensions. When infinity, order and life are incorporated, a stable model can be produced: This requires inductively applying the physical, biological, consciousness and psychological sciences with a mechanism for testing in our 3-dimensional space, 1 point in time reality, by applying a top-down feasibility approach ("lower dimensional feasibility", absent falsification (LFAF) and a bottoms-up Popperian falsification approach). TDVP extends the thinking of Minkowski and Einstein, and postulates that space, time and a broader extended "consciousness"(more correctly, a C-substrate) are fundamentally inseparable, consisting of the "distinct" finite and "continuous" infinite sub-realities. S, T and C can be partially separated, but

while separated, remain "tethered" maintaining communication and potential transfer of order even remotely. This applies equally at the subatomic level as well as the astrophysical level, and impacts the biological, consciousness and psychological sciences. TDVP provides a mechanism allowing for the interfacing within, across and between multiple dimensions of finite sub-reality by a process called "indivension" and a content of "vortices". This creates finite realities that are always linked by an all-pervasive infinite subreality essence consisting of all-embracing time, space, and extended consciousness, as well as an eternal existence in the infinite, translated into "potential life" in the finite. Effectively, this allows for multidimensional time, for psi, retrocognition and precognition, for free will and for survival after physical death. TDVP generates about 600 different ideas, many testable hypotheses, plus speculations and indicators for additional research. This is more than a theoretical model. It is supported empirically, has areas of testability in our experiential 3S-1t domain, has mathematical dimensionometric and logical support including the calculus of distinctions, generating a number of axiomatic principles and theorems. Philosophically, the model is described as "Unified Monism". TDVP signals a dramatic paradigm shift in dimensional biopsychophysics. **P2**

215 Colored Light Impinging (Color Therapy) on the Chakras as a Novel Way of Disrupting Disease States in the Body Hari Cohly, Alakh Saini, Hui Chu Tsai <hcohly2005@gmail.com> (Biology, Jackson State University, Jackson, MS)

We have previously shown that the four chakras have the highest energy in the eye chakra followed by the chakra of the throat, followed by the heart center and then finally the umbilicus using the Chinese Meridian Energy Analysis Device. What remains to be established is the color of light which corresponds to these 4 chakras. Is there a unique color which corresponds to the color of the 4 chakras or is it different combination of colors that are required for the chakras to come to its equilibrium. The objective of this study is to determine the optimum color of the chakras and to determine what color of light to impinge on the chakras to get a skewed chakra back into its equilibrium point. Inherent within the construct of this objective is that disease alters the equilibrium of the chakras and that if an energy is impinged in this chakra the skewed chakras from its equilibrium point is brought back into its equilibrium point. A device which measures the optimum frequency of light impinging on the chakras will be established of healthy humans and that energy frequency will be characterized. This energy optimum will be characterized for all the four points of the aforementioned chakras system. When the body is diseased the skewed energy spectrum will be evaluated and the frequency of energy that is required to bring the body back into the equilibrium will be determined. The Gas discharge visualization (GDV) apparatus as well as MEAD can be used as an additional device to determine if the energy equilibrium has been accomplished by providing the additional light energy in terms of energy infusing into the diseased chakras. Thus, a new system of energy profiling will be developed to determine the disease versus healthy state of individuals which can be verified by the monitoring using the GDV and MEAD. **P1**

216 Exploration of a New Tool for Understanding the Dynamics of Consciousness Richard Geer, Gerry Marr, MA, MFT; Linda Lott, RN.; Sonya R. Hardin, PhD, RN, NP-C, Professor of Nursing, University of North Carolina, Charlotte, NC <starman@star-journey.com> (Star Journey/Cosmic Design Publishers, Walnut Creek, CA)

The complexity of life is the expression of the profound relationship between consciousness and the cosmos. Uncovering insights about the nature of Self is empowering and enhances personal growth. A methodology called Star Journey is designed to guide individuals in the exploration of Self. Star Journey Symbol Method has two major purposes. First, it is a contemporary model of consciousness, providing a new framework for understanding the Self. The system's Circle Pattern reveals a classic Cycle of Growth and charts seven distinct Levels of Living (a spectrum of inner and outer personal experience). Within this matrix are ninety-six archetypal Symbols, which serve as metaphors for timeless components of conscious experience. The Circle Pattern is the geometric basis of this framework. It is orderly and patterned yet unlimited in its possibilities, showing the diversity of conscious expression. Secondly, the Star Journey set of Symbol metaphors functions as a tool for self-exploration, one with practical use in problem solving, decision making and exploring relationships. Through the language of simple, archetypal symbols, one can tap deep inner knowing. This entails a guided process of utilizing several different mental functions, including free association, analysis, imagination, creative visualization as well as charting Levels of Living. Workshop participants will utilize the Star Journey method first-hand, learning the application of using its symbols to gain personal insights. This will involve directly experiencing synchronicity with life processes as well as tapping one's intuition. Through sharing of story and reflection, participants will find new techniques for exploring consciousness. The process reveals how personal perspectives shape perception of a situation and therefore one's reality. They will learn how they can envision new approaches leading to improved outcomes and enhanced awareness. Attendees will also learn how symbols function as components of the Circle Pattern, which adds dimension from seeing the connections and inter-relating of these archetypal symbols as part of an elegant mapping of the self. The workshop will include lecture with audience participation, discussion and break out into small groups to allow for more in-depth exploration of various techniques. A deeper understanding of Star Journey, and of consciousness itself, is achieved not only from lecture and discussion, but also from active engagement and participation. Recent case studies will also be presented. Attendees will also be presented the various formats/media where Star Journey is available. These include: – Printed materials (Symbol cards, Circle Pattern chart, three published books) – Interactive online versions of the same tools – iPhone App for mobile use of Star Journey method – Virtual world version of Star Journey: 3-D, interactive, experiential with multi-user use involving a global community. The latter is also a teaching platform for live streaming of Star Journey workshops to viewers on the internet. The workshop will also discuss applications of this method in various disciplines, including nursing and health care delivery, use with teens and their families, as a coaching and mentoring tool, and teaching through a world-wide virtual world format. Other applications will also be explored in small group discussions. **A2**

217 Revelations of Ultimate Reality Through the Apertures in the White and Grey Matter of the Brain Gurpreet Gill, Bini Gupta; Purnima Sethi <gupi0801@gmail.com> (DEI Dayalbagh Educational Institute, Agra, India)

This paper carries forward the aforesaid systemic study of consciousness with a view to refining the plane of origin of consciousness. According to the Penrose-Hameroff Theory consciousness occurs if an appropriately organized system is able to develop and maintain quantum coherent superposition until a specific objective criterion is reached; the coherent system then self-reduces introducing a stream of consciousness. These quantum-superposed states develop in microtubule subunit proteins (tubulins) within certain brain neurons. In the structure of human frame, the brain is the most extraordinary organ. The substance of the brain namely, the grey matter comprising of the neurons cell bodies and their dense network of dendrites and the white matter consisting of the myelin sheathing that covers the axons of these same neurons, which appears to be the source from which all lower nervous centers have been created, becomes insensitive by the administration of chloroform and shares the same condition as the rest of physical frame. We infer from this observation that the spirit centre is not in substance of the brain and that its focus is situated in a plane altogether different from the plain of brain matter. The apertures within the white and the grey matter provide means of communion with the six subdivisions of Universal Mind and Universal Spirit. It may be stated that the conductors of sensory action, in the case of physical pain, are the nerves, while in the case of mental pain, due to shocks to associations, the communion is entirely by means of thoughts, which represent the various subjective forms assumed by attention with reference to the different impressions with which it is associated. Thus we propose that since the white matter is devoid of neurons thus it is not responsible for the sensation of pain and pleasure. Moreover as microtubules exist everywhere in the body hence consciousness is not limited to the brain but is intrinsic to the human microcosm and is an innate part of us. One can thus render the apertures or nerve centers (existing in the human head) kinetic to get revelations of higher reality and thus enhance ones consciousness. **P1**

218 Experimental Verification of Jyotish Confirms Feedback Singularity Model of Conscious Experience Alex Hankey, Ramesh Rao <alexhankey@gmail.com> (Yoga & Physical Science, SVYASA, Vivekananda Yoga University, Bangalore, Karnataka India)

The recently published in vitro veterinary science experiments confirming the concept of Jyotish muhurtas demand a model of biological regulation and conscious experience which an couple to quantum correlations of the kind shown to have been generated in the birth of the solar system. This is satisfied by the well known criticality condition in complexity biology, giving confidence that these extraordinary experimental reesults have substance, Conversely it is necessary for conscious experience to be mediated by this same well known condition. The feedback singularity model of experience satisfies the criticality condition since feedback criticality is singular and leads to many attractive features of experience, particularly those required by David Chalmers's well known analysis. For example, singularity physics is non-reductive because correlation lengths extend to infinity at critical points, These experiments therefore strongly support the feedback singularity model of experience, and should be considered in greater depth. **P2**

219 Qualitative Field Perception Theory: A Quantum Explanation of Phenomenal Consciousness Brian Hewlett <bhewlett@thefoundationoflife.org> (The Foundation & Ministry of L.I.F.E., Tucson, AZ)

From a sociological and social psychological perspective, human consciousness is associated with the social construction of reality. Reality, according to these scientific disciplines, is constituted by perceived social phenomena or objects of consciousness that are developed in social contexts by the perceiver or the observer of reality. This presentation outlines Qualitative Field Perception Theory (QFPT) as an explanatory psychological process, operation, or function of second-order phenomenal consciousness in terms of concepts, scope, formulation, and application. In line with theories that argue phenomenal consciousness is the construction of analog space where an analog "I" observes it and moves metaphorically in it (Jaynes 1976) and in line with the sociological notion of reality construction (Berger & Luckmann 1967), QFPT asserts, based on underlying principles of quantum mechanics, that the second-order observer constructs or collapses upon perceived particles of experience that serve as the objective reality experienced in the first-order using qualitative attributes that are subsets of a larger infinite field. The theory inadvertently offers a foundation for the evolution of human consciousness into the spherical level of consciousness or the "noosphere" outlined in previous shamanic teachings. In conjunction with the theoretical outline, the presentation involves a discussion concerning methods of empirically testing its plausibility, its relationship to current understandings of the physical and cognitive worlds, its implications for some previous theories in the consciousness literature, and its relevance to both the hard and soft problems of consciousness studies. **P2**

220 Mapping The Human Brain – An Organized Word Structure for the Human Mind William Hohenberger <wrh@defnet.com> (Natural Philosophy Alliance, Fort Myers, FL)

Human beings exhibit many common and similar behavioral traits; and therefore, the foundation for our collective human behavior, from which those individual behavioral traits arise, must be organized and structured. Accordingly, the words that both define and describe those individual behavioral traits within our collective behavioral foundation must also be organized and structured. This proposed "Organized Word Structure" (OWS) for our human language directly overlays the human brain, explains the various mechanisms and processes that function within the human brain, and thereby philosophically maps the overall processes functioning within the human brain. Moreover, it delineates human nature and includes absolute definitions for good and evil. The OWS can also be directly correlated on a one-to-one basis with the "I Ching" – an ancient Chinese Oracle (2000 to 5000 years old) of the motivating forces (Yin & Yang) within human nature, with the "Kabbalah" – the classical study (1000 to 2000 years old) of the meanings of the Hebrew alphabet and Hebrew text, and with "Luescher's Color Test" – a correlation between human perceived colors and the human psyche. The I Ching, the Kabala, and Luescher's Color Test each independently and together collectively validate the OWS. A very brief and also very

typical example is: OWS (12-Experiences), I Ching (03-At the Beginning) and Luescher's Color Test (36-Sensual Gratification), which reads like a sentence in a book – "Experiences Begin with Sensual Gratification." The various processes used in developing the OWS and used in integrating the OWS with the other disciplines referenced above, are structural in form, are exact in procedure and cannot be deviated in anyway. However, it is recognized that some of the words chosen within the OWS may be improved, as the remainder of the OWS is finished, which because of the depth and the breadth of the theory, will require many years of additional work. **P2**

221 Slicing Consciousness: A Pedagogical and Theoretical Integration of Consciousness Studies, Zen Buddhism, and Swordsmanship Jesus Ilundain-Agurruza <jilunda@linfield.edu> (Philosophy, Linfield College, McMinnville, OR)

This presentation showcases a unique philosophy of mind course and its applicability to consciousness studies. The dual pedagogic and theoretic facet examines and presents: 1) An academic study of consciousness that relies on the mind sciences (philosophy of mind, neuroscience, cognitive psychology), where students connect various methodologies – phenomenology, conceptual analysis, empirical research, intuition – to one another and experientially, via swordsmanship, to physical activity, and 2) the implication and suitability of an extended model of the mind (Chalmers, Clark, Johnson, Thomson, Varela) for 1, and how 1 contributes to said model. To delve into pedagogy first, it coevally engages mutually supportive theory and praxis. The working assumption is that fertile understanding lies at the crossroads of an East/West comparative framework that cuts up the phenomenon of consciousness, and probes various issues: access and phenomenal consciousness, Noe's sensorimotor theory, attention and timing, or conscious and unconscious action and their role in skilled action,among others. Recent work in the mind sciences is correlated to Buddhism, particularly the Japanese Zen-based Kenjutsu 'swordsmanship' manuals (Takuan, Munenori, Chozansi), where consciousness is prominently featured in a cognitively embodied way that sharply illuminates Western views. Moreover, Zen Buddhism intimates its suitability to conceptualize a view of the extended mind that overcomes self-centered consciousness for other-focused consciousness (cf. Austin's Zen and the Brain). Premised on the notion that as embodied beings we cognitively and emotionally engage the world through movement, the practical component uses hands-on swordsmanship. This proves specially revealing and fruitful to pierce the highly abstract material. Weekly practice with bokken (wooden swords) experientially, explicitly, and concretely connects to and vets the theoretic dimension, e.g., a phenomenological analysis of wielding an object, a sword, shows how it may become a conscious and unconscious cognitive-emotional extension of ourselves, insightfully reflecting back to the theoretical framework. Our contemporary unfamiliarity with swords allows progressive skill acquisition that correlates to the course's academic facet. Citations from students' work illustrate this model. To slice open the theoretical underpinnings now, the underlying extended-mind model connects with Japanese philosophy's notion of bodymind and active achievement (Nagatomo, Nishida, Yuasa). The dichotomies of mind/body, self/other, reason/emotion, objectivity/subjectivity, theoria/praxis, and reflection/action blend into an intersubjective, embodied, extended, and enactive account of consciousness. In this comparative, interdisciplinary view consciousness and emotive cognition coalesce into a complex environment of artifactual, topological, biological, historical and narrative dimensions. It can be objected that embodied cognition does not imply actual, conscious bodily movement, so this rudimentary application has scant payout. To simultaneously parry and riposte: the analysis of skillful movement in activities that require highly refined and precise coping, i.e., sports and martial arts, is a advantageous way to evaluate extended, enactive models. While extant philosophical literature uses active pursuits as examples, these are not the focus of rigorous, thorough study. The present model posits a conscious/unconscious feedback loop of awareness and embodied cognition validated by the manuals, experiential practice, and theory. Thus, detailed inquiry into and literal application of such physical activities complements existing work on extended mind models. **A3**

222 Primal Mind, Primal Games: The Origins of Our Troubled World and How We Can Go About Fixing It Paul LeMay, Hifzija Bajramovic, MD <phl222@telus.net> (Vancouver, BC Canada)

Human consciousness has long been ruled by a variety of both conscious and sub-conscious biological, psychological and cultural forces. The mixing of these has resulted in the formation of a complex system dynamic that has sped the evolution of the human brain, which has in turn sped our progress as a species. Yet this complex system dynamic has also resulted in the commission of enormous harms. After a concerted six + year effort, a Canada-based psychiatrist and an independent science writer have collaborated in the development of a framework that describes this complex system. The framework suggests that much of the human mind can be understood to employ three default positional mindsets whose interplay has not only allowed us to survive as a species, but also continue to operate as the underlying psychological template of much of human society. They have also given rise to what we all experience as separativeness consciousness. We have also discerned a fourth emergent function, one that gives rise to what most of us only fleetingly experience as connectedness consciousness. The framework also proposes how quantum Darwinism and glial cells may play a role in this emergent faculty. **P1**

223 The Fundamental Energy Theory – FET (specific Qualitative Vacuum Energies) and the Theory of Everything – A New Understanding of Reality Steen Loeth, MD, Birgitta Therner; Arnold Therner; Andrea Moellenkvist PhD; Leif Pettersson <ncp@newcosmicparadigm.org> (New Cosmic Paradigm NCP, Skoevde, Sweden)

Physicists have worked intensively to understand our physical world, including the unification of the four forces of nature: gravity, electromagnetism and the strong and weak nuclear forces, into a 'theory of everything', but so far without success. Now Leif Pettersson, engineer with profound interest in physics and consciousness studies, presents a groundbreaking material with theories based on the intuitive knowledge contained in Martinus Cosmology. These theories demonstrate a new model, 'The Fundamental Energy Theory' – FET, that without any contradiction unifies the four fundamental forces of nature, and actually gives us 'The Theory of Everything'. Hypotheses are presented that may explain the mechanisms behind Einstein's General and Special Theories of Relativity, quantum physics with its hypothetical gravitons, Higgs particles, the enigmatic dark matter and dark energy, etc. FET offers a logical, coherent key to many unsolved mysteries of physics, some of the puzzling questions studied in CERN. FET meets today's physics and gives a completely new concept of reality. The theory describes and explains what the physical world is and how it is constructed. FET takes us into the zero-point field and to the vacuum energies or 'fundamental energies' operating there. According to Martinus there exist six fundamental energies, each of them holding a specific quality and impact. These subtle, qualitative, energies build up everything in life and existence from the very densest physical matter to the most subtle that exists including our own consciousness (thoughts, feelings, memories, etc.). We can recognize these fundamental energies in everything and everywhere in the universe, both in our outer and inner worlds. FET now presents two of them: the contraction and expansion energies, underlying what physicists call force, particles and matter. Here we can follow the creation of particles from the zero-point field that in turn elucidates the phenomena of curved space, the mechanisms of gravity and much more. Throughout the principles FET describes, it becomes obvious that science has reached the limits of measurement in a 'universe of distances' and has begun to move into a 'non-local universe of conditions/modalities'. This actually describes a transition from a physical 'universe of distances' to a paraphysical 'universe of conditions/modalities'. The quantum vacuum is the first encounter with this transition and represents a doorway into this world of states/dimensions beyond our present knowledge of time and space. At this point we get closer to the understanding of both the physical and the paraphysical worlds and how they are interconnected. These two are not only interconnected, but constantly developing in an eternal evolutionary, ascending spiral – it is all about an evolution of consciousness. FET is made available by the independent organization New Cosmic Paradigm – NCP, working with the branch of the intuitive knowledge contained in Martinus Cosmology that is building bridges to Science. This area is especially represented by Per Bruus-Jensen, former trainee and collaborator with Martinus. An important addition

to this field is 'The Fundamental Energy Theory/FET' presented in the book: 'Physics, Martinus Cosmology and The Theory of Everything' by Leif Pettersson (2012). **A1**

224 Orch OR Model of Consciousness: Experimental Evidence Part I Markus Maier <markus.maier@psy.lmu.de> (Psychology, University of Munich Germany, Munich, Germany)

Recently, Penrose and Hameroff (2011) proposed a model of consciousness and quantum computations originating from the mid 1990's. According to this model consciousness depends on biologically 'orchestrated' quantum computations in collections of microtubules within brain neurons. The continuous Schrödinger evolution of each quantum computation terminates a quantum-gravity process related to the fundamentals of spacetime geometry. This process is called 'objective reduction' of the quantum state (OR) and results in a moment of conscious awareness. Any brain activity within the microtubuli that occurs before the "objective reduction" follows quantum mechanical rules in line with Schrödinger's equation. Also, as mentioned above, OR indicates a conscious moment implying that quantum states need to be – by definition – preconscious. One core feature of quantum physics is that time has no direction (Penrose, 1994), i.e. future and past are interchangeable and this should consequently apply for preconscious processing, as well. In a first set of experiments, we tested the assumption that, in a preconscious mode of perception and decision making, future events can influence past preconscious behavioural choices. Using a subliminal picture presentation (with positive, neutral and negative pictures sets, see also Bem, 2010) we were able to demonstrate that participants are unconsciously anticipating and avoiding negative future outcomes. The effect seems to be limited to preconscious modes of information processing and to the avoidance of negative events. These results conceptually replicated recent findings reported by Bem (2010). They also support central propositions of the Penrose and Hameroff (2011) model about conscious and preconscious processing and its relation to quantum mechanics. **C22**

225 Consciousness – Why Does it Exist at All? – The Hard Problem of Science Answered by the Philosophy of Radhasoami Faith Ankita Mathur, Purnima Sethi <6.ankita@gmail.com> (Dayalbagh educational Institute, Jaipur, India)

The riddle of consciousness is considered to be one of the final frontiers of science. The phenomenon and its enigmatic features, such as free will, the nature of subjective experience, or 'qualia'- our 'inner life' (Chalmers' "hard problem"), non computability, the notion that consciousness involves a factor which is neither random, nor algorithmic seem to escape all attempts to scientific reduction. There is nothing that we know more intimately than conscious experience, but there is nothing that is harder to explain. Penrose and Hameroff (Orch. OR theory) have proposed that pre-conscious processing continues until the threshold for objective reduction (OR) is reached by E = h/T. At that instant, collapse or OR occurs which is an actual event in fundamental space-time geometry. This event selects a particular configuration of Planck-scale experiential geometry, enacting a "moment of awareness", "occasion of experience" or conscious event. Another interpretation put forward by Steiner sees the brain not as the producer of consciousness, but rather as a mirror for the reality existing outside of it. In this study, we postulate a scientific exposition of consciousness to show the convergence of concepts between spirituality and science. In this context, we would like to highlight that the principles and philosophy of the Radhasoami Faith-A Religion of Saints, provides plausible solutions to these fundamental queries pertaining to consciousness left unanswered so far. Radhasoami Faith reveals the existence of a spirit entity and the creation of the universe from the original abode- a huge infinite reservoir of spirit forces. Consciousness is primarily the attribute of this spirit entity, through mind and matter, as covers thereof in human embodiment partially reflect that attribute in them. It is this spirit force that powers our mind to experience the subjective states of consciousness. Here, of great relevance are the words of Most Revered Professor P.S. Satsangi bridging the gap between science and religion-"I submit that the spiritual force field is a quantum force field and similarly the mind force field is a quantum force field and their fundamental particles are individual spirit forces that are resident in human body and individual mind forces that are also resident in human body. These fundamental particles are zero dimensional ones physically and are far subtler entities to be accessed

through meditational practices. They are as real as the material world. Therefore intuition can be cultivated, intuition can be acquired and it can be availed of..” When higher level of consciousness is attained by human beings of this creation, then they are endowed with the human body equipped with the brain. Quantum Physicists have demonstrated beyond any reasonable doubt that the observer and the observed are fundamentally connected; their relationship is interactive and participatory. And that observer is the spirit force which is the prime source of consciousness. Radhasoami Dayal is the Supreme Reservoir of all consciousness.” Thus, we conclude that consciousness- the most intractable problem of mankind can be well understood by the principles of spirituality underpinned by science. **P1**

226 Curing Chronic Diseases by Rewriting the Life Calendar – Removing Subconscious Energetic Signatures Makes a Trauma Just an Experience Folker Meissner <folker@dr-meissner.de> (Chairman, German Academy for Energy Medicine and Bioenergetics, Koenigswinter, Germany)

Even though the current health system is disease-oriented, based on evidence based medicine and statistics, it almost generally fails as far as chronic diseases are concerned. Thus for the majority of people real healing is not achievable. Based on the understanding of the human being as a unique multi-dimensional composition of consciousness and energetic components we have to generate an individual medicine which is focused on health and healing. From a physiological point of view the body is characterized by permanent changes. Energy is constantly transformed, while entropy and negative entropy are balanced in equivalentamounts. The body is an open system containing various non-linear systems and dissipative structures. They all together keep the body in a state of stable imbalance. What if 3D/4D diseases are only projections of 5D causes finding their reasons of manifestation in the imbalance of the system? Traumata, i.e. trapped emotions adjacent to events, may cause illnesses, and so does the lack of virtual (subtle) or real energy. Our body consists of millions of cavities ranging from big ones like cranium, thorax or abdomen to very tiny ones like microtubules in our cells. These cavities act like antennas collecting source energy, which is a virtual energy found in the universe. The exchange or flow of source energy in the body is controlled by the information field known as Human Body Field (HBF). Once collected in our cavities source energy is changed into real energy for chemical, electrical or magnetic processes. Different kinds of energy are used within the information system “human being” for physical, emotional and mental functions. However, persistent errors within this processes may end up in chronic diseases. How to get rid of contaminated events, projections and lack of energy? One way to do this is to rewrite the life calendar, i. e. to delete energetic signatures of events which had happened in our lives and which had become traumata. A trauma is created when there is a negative emotion stored in an event. Any recall of this event will also recall the emotion stuck in it. In severe cases when the trauma has created an illness we call this phenomenon Post-Traumatic Stress Disorder (PTSD). Our life calendar normally contains several emotionally labeled events, not all of them are traumata. Rewriting the life calendar means going back in time (and maybe dimension) to the first emergence of that kind of trauma, finding the lack of energy and the emotion stuck and getting rid of the informational signature of this emotion; e.g., When there was a case of abuse, we normally expect fear and despair in the patient at that time, but meanwhile the presented emotion could be sadness or grief. Using different modalities we are able to trace back that currently related emotion to the given event, to the emotion stored in the event and solve the emotional scar. What remains is an experience, an event without emotional fixation or “contamination”. The lecture will show original case histories including the particular way of healing. **A1**

227 The Psyche Mechanisms and Life Bosons Abi Olowe, <abiolowe@yahoo.com> (Grace Theological Institute, Manvel, TX)

The study of consciousness requires the basic understanding of the psyche, the human engine. Many of the concepts and terms are currently used inambiguous ways. For example, the term “Mind” is used in a way as to connote psyche. However, Mind is just one of the five faculties of the psyche. Like the other faculties, Mind has billions of psyche elements. These psyche elements

are responsible for behavior, character, and personality. The central nervous system is governed by hundreds of billions of neurons, so also is the psyche governed by hundreds of billions of psyche elements. Behavior and personality can be affected by both the physical state of the central nervous system and the state of the psyche, but character can only be affected by the state of the psyche. This justifies that the psyche and the central nervous system are two different entities which interact to produce actions. Particle physics has it that the elementary particles of matter, fermions, are governed by fundamental forces called bosons. In a similar way, the physical unit of life, cells, are vitalized by life bosons. Life bosons exist in different forms and at different order levels. The psyche is made up of life bosons. The properties of life bosons are discussed in this paper. The understanding of life boson provides a clearer view of the concepts of consciousness and cognition. **P2**

228 Is Consciousness a Primitive of the Universe? An Argument Based in Part on a Novel Test for Consciousness Donald Padelford <dfp07@dfpnet.net> (Integral Review, Seattle, WA)

My paper entitled “Consciousness in Evolution, Sketch for a New Model” (Google ‘padelford consciousness’ to view), presented in poster session at the 2010 TSC conference, contains, in passing, a novel test for consciousness (@page 14). This test bears on the question of whether consciousness (or proto-consciousness) is a function of complex neuro-processing, or alternately is a primitive of the physical universe in somewhat the same sense that spin or mass may be primitives. (Which question appears to be the basic issue underlying the Chopra Mlodinow debate.) It is argued in the paper that conscious systems are hierarchical and negentropic at each level of the hierarchy. This is certainly true for biotic systems (ie organisms). It is not true of machine-like systems. The paper additionally proposes that these hierarchically negentropic systems evince “entangled learning”, while machine-like systems do not. This proposed difference between machine-like and organism-like systems is testable although the test has not been run. Thus hierarchical negentropy, consciousness (or proto-consciousness), and entangled learning are all seen to be linked, and one of these (entangled learning) can be tested. The following question arises: If one has a simple hierarchically negentropic system, such as a molecule, and if it demonstrates entangled learning (evidence of which exists), then is it proto-conscious? I argue ‘yes’ although other interpretations are possible as discussed in the paper. Whether entangled learning can be demonstrated at a level more basic than the molecule, e.g. at the level of the atom, is unknown. The evidence to date makes a prima facie case for the existence of entangled learning, and therefore of proto-consciousness, in the pre-biotic. While this may or may not extend below the molecular level (and this may not be testable, at least not currently), there seems to be no reason to infer that it does not. And an argument by analogy (organism : molecule = molecule : atom) would infer that it does. Thus in my view the “preponderance of the evidence” standard comes down in favor of the view that proto-consciousness is a primitive of the universe. This has implications for,among other things, cosmology. **P1**

229 Need of a Systems Model of Consciousness Based on Esoteric wisdom and Findings of Quantum Physics Mani Mala Sundaram <mani@sundaram.net> (Wellingborough, Northants United Kingdom)

Consciousness research is faced with problems known as Hard problems and of qualia. According to Chalmers, the problem of experience will still be there even if all relevant functions are explained. Then, there are problems of coherence. Hence, there is an urgent need of change of paradigm. I submit, a systems approach, based on Esoteric wisdom of east and new findings of Quantum physics about the nature of our world, is urgently needed to solve the problems. In fact, these problems then will not exist, as they are due to our traditional science perspective that consider reality as matter only. A systems view takes a holistic view and considers existence of mind, body and spirit, and sees inter connection and interactionamong different parts of a system. E. Laszo’s Akashic field theory is good effort, but it considers reality at mind level or Brahmand. This does not explain true nature of reality or consciousness. A systems model, that considers consciousness as absolute reality, is needed. Again, a system’s approach studies the whole, hence, it can cope with complexities of human experiences. **P1**

230 The Epiphany of Love – The Law of Vibrational Equality Donna Trousdale <donna.trousdale@gmail.com> (The Power of Synergistic Living, Santa Monica, CA)

Science has come to realize that the Universe is not physical. It's Consciousness. In other words, that which we call "universe" and our relationship to it, is purely "conceptual". This calls for a whole new approach to our "scientific epistemology". In this paper, I will show how the 3 fundamental mathematical concepts of "PI" "PHI" and "E" (the base of a natural logarithm) are responsible for creating Universal harmony, balance, and equilibrium and how together they form TOE or a Theory of Everything. I will present the "vibrational" solution to the PI-ratio as a constant whole number and explain how this ratio creates the ability to "perceive" and "interpret" vibration into a reality experience. I will also explain the deeper conceptual roots of PHI and E, from both a mathematical approach as well as a conscious, psychological perspective. I will also demonstrate how numbers and geometry are the tools of our conscious memory system and our ability to construct knowledge. **A3**

4.04 Emergent and hierarchical systems

231 Interoception and the Brain-Gut Axis as Cornerstone for a Non-Reductive Physicalist Enumeration of Consciousness Jesse Bettinger <jesse.bettinger@cgu.edu> (Ctr for Neuroeconomic Studies, Claremont Graduate University, Claremont, CA)

"We are as much gainers by finding a new property in the old earth, as by acquiring a new planet." Ralph Waldo Emerson. Successes in cognitive and affective neuroscience over the last decade have led to the clarification of evolutionarily recent and adapted axes on the human line – a hierarchical, reflexive axis with integrated networks of circuitry responsible for maintaining the intricate, homeostatic balance of body systems in participation with cerebral, autonomic, and enteric nervous systems – and for generating dynamic, moment-to-moment (including emotional/affective: Terasawa, Fukushima, and Umeda, 2011) interoceptive maps of the internal milieu of the human body (Craig, 2003, 2009; Mayer, 2011; Critchley, 2004). "Understanding the physical basis of psychosomatic processes, including the so-called mind-body problem, will require a detailed understanding for the psychobiology of interoception." Oliver G. Cameron. Taking what perspectives have been acquired in neurophysiology and neuroanatomy from advances in cardiac autonomic balance and flexibility (Friedman, 2007; Porges 2007, 2011; Cribbet, 2011), enteric computational capacity (Mayer, 2011), and neurovisceral connectivity (Craig, 2009) – especially the continuously integrated signals forming interoceptive re-representational mappings in the right anterior insular cortex (rAIC) + the proposed emotional/affective accretion-dynamics in insula – the purpose of this presentation is to demonstrate that the hard problem of consciousness (Chalmers, 1996) can be largely reallocated to the interoceptive, autonomic, and enteric enterprise – therein finding anample basis for to house and build-up a refined understanding of our moment-to-moment conscious experience with agency – like a floating point co-processor evolving with autonomic systemics – a brave new world of consciousness unfolded in and through interoception and the aperiodically "radiating" enteric computational capacity –> affective intelligence reports: intuitions, instincts, insights carried by "gut feelings". A further incorporation of research associated with the evolutionarily specialized von Economo neurons (Allman, 2007, 2009) adds a cytoarchitectonic and proteomic layer of description onto the picture of how moment-to-moment affective and interoceptive multi-state dynamics are conferred neuroviscerally. Respecting the computational and representational capacities of the brain-gut axis and enteric nervous system, plus the re-representational interoceptive maps integrated and generated in rAIC, we come to consider that maybe there has been a whole world hiding inside us the entire time. Under such an interpretation, it should be easy to see the renewed explanatory power in a concept like "no-mind" as conferring the wisdom that a "loud self" clouds one's ability to hear and connect with their own neurovisceral and enteric "intelligence agencies" – not to mention the corollary stress, anxiety, and emotional disparity. When we get out of touch with our autonomic and enteric systems it seems we also increase susceptibility to many types of biological and psychological pathologies. The east encourages us to simplify and procure no-mind, finding in this the plenum of Tao. In

kind, the west instructs us to "be still and know that Iam God" and that "the kingdom of heaven dwells within." A great many more examples can be expected in religious texts and numerous philosophies to confer a similar sense of interoceptive and enteric self-discovery/attenuation as covalent to the "journey within" of each individual. **P2**

232 Horizons of Knowledge: Universal Complementarity Across All Levels of Scales in a Complex Universe Neil Theise, MD, Menas Kafatos, Fletcher Jones Endowed Professor of Computational Physics, Chapman University, Orange, CA <neiltheise@gmail.com> (Pathology and Medicine, Beth Israel Medical Center of Albert Einstein College of Medicine, New York, NY)

The Copenhagen Interpretation of quantum mechanics states that quantum scale phenomena exist as potentialities, described by probability functions, that "collapse" into observed phenomena only with the act of observation. Moreover, quantum phenomena exhibit complementary aspects that are revealed by specific observations, wherein there are a range of possible states prior to observation and any single observation is unable to capture all aspects of the complete physical situation simultaneously. This associated principle was described by Niels Bohr as "complementarity", the particle/wave duality of light being the classical example thereof. While complementarity has largely remained a feature of quantum phenomena, arguments that observation and therefore the observing mind were necessary ingredients for a specific, existent universe have remained limited to the quantum realm, inapparent at levels of scale addressed by classical physics. Classicists could thereby defend the stance that at scales relevant to classical physics, a defined world exists waiting to be observed, independent of that observation. While Bohr posited a "universal complementarity", not limited to quantum level phenomena, but applying across all scales, its definition remained elusive as in the quantum realm it is tied to the existence of the quantum of action. We argue that describing the universe as a hierarchy of complex systems from the smallest, Planck scales up to the cosmological scales, reveals such universal complementarity. Smaller level interacting agents self-organize into "emergent" structures which then function as individual interacting agents at the next higher scale. Thus, choice of scale of observation determines whether something appears to be a unitary thing or, instead, a phenomenon arising from interactions of smaller things. One of us has posited "horizons of knowledge", applying at different levels, which, when approached, reveal complementary constructs. The set of all such constructs describes the complete reality under consideration but, as in the quantum realm, all constructs cannot be simultaneously revealed in a particular observational situation. Choosing to observe at any level of scale obscures phenomena examinable only at other levels of scale above and below. Similar to how experimental conditions determine whether one sees the reciprocal features of light, so the choice of observational scale allows one to describe the observed phenomena only as one kind of state vs. another. Example: the body is a solid thing at everyday scale, but at the microscopic level the body as unity ceases to exist, revealing a self-assembling community of single cells; in turn, each cell, if observed at the nanoscopic level, ceases to be a unitary thing but is revealed to be self-organizing molecules/ions in aqueous solution. Thus, even at levels of scale governed by classical physics, observational choice remains inextricably woven into the establishment, in the observational moment, of the present conditions. To some theorists, this implicates consciousness itself as inextricably linked to the moment by moment evolution of the universe. In our view, the hierarchy of "horizons of knowledge", requires the interplay of the observer with the observed in a fundamental way, and as such "reality" is not immutable or external. **C7**

4.05 Nonlinear dynamics

233 Positive Feedback and the Subjectivity of Consciousness Richard Sieb <siebr@shaw.ca> (Department of Neuroscience, Independent Consciousness Studies Researcher, Edmonton, Alberta Canada)

Consciousness is our ability to form conscious experiences. Conscious experiences are points of view or perspectives which arise entirely within a subject as a result of sensory input. They have no meaning or existence outside the subject in which they arise. Hence conscious experiences are

said to be subjective. Conscious experiences could arise from positive feedback. Positive feedback is a basic physical mechanism in which the output of a system feeds back as an additional excitatory input into the same system. This input produces (excites) more output, which produces (excites) more input, which produces more output, and so on. Hence one has a positive (excitatory) feedback cycle. This cycle results in an exponential increase in activation of the system (much like seizure activity in the brain) which would soon exhaust the system (like which happens with seizures). Inhibitory influences (acting on the output and input of the system), however, act to suppress and control the uncontrolled excitation, resulting in the emergence of a balanced stable state of the system (a stable balance between input and output). This stable state is known as an explicit state as it physically exists for a period of time and can physically affect other systems. Such explicit states emerge in a nonlinear manner, since the excitatory and inhibitory influences are nonlinear. Nonlinear emergence is the emergence of something new with properties not seen in its components. Such nonlinear emerging explicit states have no meaning or existence outside the system which produces them. Hence these states may be considered subjective in relation to the systems in which they are developed. They therefore have subjectivity analogous to the subjectivity of conscious experiences. Hence the explicit states developed by positive feedback and nonlinear emergence are very similar to conscious experiences. This suggests that conscious experiences may also arise from positive feedback and nonlinear emergence during sensory processing. Positive feedback and nonlinear emergence is a basic physical mechanism responsible for the production of a vast number of natural phenomena. Flames, waves, businesses, stock markets, countries, persons, cells, groups, etc. all arise via this mechanism. All of these phenomena, like conscious experiences, have meaning and existence only within the system in which they are developed. One cannot pick up and walk away with a conscious experience any more than one can pick up and walk away with any of the other nonlinear emerging phenomena. Consciousness allows us to make voluntary intentional actions of various kinds (skeletomotor, oculomotor, speech, writing, reading, thinking, emotions). That is, we can choose to produce an action for some purpose. A conscious experience therefore may be considered an explicit state capable of producing a voluntary intentional action. A conscious experience emerges from the sensory processing of a specific sensory stimulus. Perception (the interpretation of sensory stimulation in terms of previous experience) of a specific sensory stimulus is necessary for producing a voluntary intentional action related to that stimulus. Conscious experience therefore may emerge in a nonlinear manner from a positive feedback cycle involving perception. **P2**

234 Rapid Sampling of Brainwaves Clarifies Fractal Nature of the EEG Peter Walling, MD, Kenneth N. Hicks; Miguel Uh <peterwalling@gmail.com> (Baylor University Medical Center, Anesthesiology and Pain Management, Dallas, TX)

The scientific search for correlates of consciousness involves observation, measurement, analysis and deduction. (Refs 1-5). The Electroencephalogram (EEG) recorded from skin electrodes is handicapped by its distance from the cerebral cortex. The intervening skull and scalp cause diminution of high frequency signals and also interfere with localization of the sources. However, accurate timing of events is retained, That and the non-invasive nature of the recordings, offer huge advantages. Today's EEG machines usually record at ~400-800 samples per second (s/sec) and for most purposes this is adequate. We study the dynamics of EEG in animals and humans and have found that sampling rates below 1000 s/sec are insufficient, especially when the analysis of a short time series is necessary. We, therefore, had software written which enabled us to record up to 40,000 s/sec.(EEGo4 download from www.wallinghicksbrainwaves.com) During studies of intentionality and volition, for example, when a subject was asked to blink and trip a flash simultaneously, we noticed a preceding high frequency burst in the frontal and motor cortex EEG, consisting of gamma waves.(~80-140 Hz). These 'Volitive Gamma Bursts', (VGB), were only about 80-100ms in duration. The analysis of waveform, frequency distribution, power spectrum, and the calculation of non-linear functions such as Correlation Dimension (d2), and Lyapunov exponent would be virtually meaningless if only 40-80 data points were available for analysis. Recordings at ~8,000 s/sec give much more meaningful data. The Volitive Gamma Burst (VGB), where the attention is keenly focused on one task, differs dynamically from the Gestalt, where

data from the senses are bound together in a multidimensional construct. VGB is represented by a low dimensional toroidal attractor. When recording from unrestrained animals, there are often only short strips of recordings without movement artifact. EEGo4 permits recording using a Grass Amplifier and Measurement Computing DAC, displaying the EEG time series and the real time 3D Attractor. Real time attractor videos consume much data if they are to look realistic. Advantages of rapid EEG sampling: 1. Frequency analysis of short time series is possible. 2. Power spectrum analysis of short time series is possible. 3. Fast Fourier Transform (FFT) extends to higher frequencies where examination of higher EEG frequencies and harmonics may be examined. 4. Direct comparison of different scalp locations for direct evidence of synchrony is possible. 5. Short time series in moving animals becomes available for analysis. 6. Non-linear analysis from short segments of data is possible. 7. Meaningful fractal attractor movies are possible. 8. Fleeting indicators of short lived attractors become discernable,(e.g. a trefoil as the signature of a Torus Attractor. References: 1. www.wallinghicksbrainwaves.com 2. Walling PT: Consciousness: a brief review of the riddle. Proc (Bayl Univ Med Cent).2000, Oct; 13(4) pp376-8) 3 .Walling PT, Hicks KN: Nonlinear changes in brain dynamics during emergence from Sevoflurane anesthesia. Anesthesiology; 2006;V 105; pp 927-35 4.. Walling PT, Hicks KN: Dimensions of consciousness. Proc (Bayl Univ Med Cent).2003,April;16(2)pp162-66 5.Walling, Peter .T, Hicks, Kenneth N; Consciousness: Anatomy of the Soul.(2009) Authorhouse,Bloomington, IN **PL4**

4.06 Logic and computational theory

235 The Possibility of MAPs as Quantum Logic Gates in Neuronal Microtubules Saatviki Gupta, Stuart Hameroff, MD <saatviki@gmail.com> (Dayalbagh Educational Institute, Delhi, India)

This paper examines the possibility of microtubule associated proteins (MAPs), playing the part of quantum logic gates on the surface of microtubules and acting as the information processing units at the intersection of helical 'braids' formed by tubulin, leading to the emergence of a topological quantum computing paradigm within each individual microtubule. The idea of the existence of ordered braids in the form of winding, helical pathways has been proposed earlier, (Penrose & Hameroff, 2011) according to which conductance along some particular microtubule lattice geometry, such as Fibonacci helical pathways, was proposed to function as topological qubits. Topological qubits are a superposition of alternative pathways, which intersect repeatedly on the microtubule surface, forming braids. Quasiparticles called 'anyons' travel along such pathways forming 'world lines'. Particular braids or pathways correspond to particular information states. While in superposition, anyons follow multiple braided pathways simultaneously (where each path acts as one of the possible superpositions of the state of that particle), then reduce, or collapse to one particular pathway and functional output. The intersections of these braids may be points of logical computation, the output of which may be fed into a more complex information processing hierarchy. As a step towards understanding the logical operations taking place at these intersections, a scheme has been proposed in which MAP attachment sites have been projected as centers of information processing and propagation in the form of classical logic gates such as AND and XOR (T.J.A. Craddock et al. 2012). This paper suggests a scheme for these MAPs to possibly function as quantum logic gates. The inputs to these being from the qubits travelling as anyons along the topologically ordered, winding helical pathways. One such simple quantum gate is the controlled-NOT (CNOT) gate which acts as a 'controlled inverter'. This is a two input quantum logic gate, and on the microtubule surface can be considered as input paths or world lines of anyons acting as inputs to a MAP. The state of the control qubit decides the output of the second qubit. Thus this theory likens the microtubule surface, to a two-dimensional electron gas within which the existence of anyons is possible and the microtubule geometry provides preferential helical paths which act as the world-lines followed by these anyons whose movement in these specific pathways forms a thread, and the movements of the anyons as they are swapped over or under each other, produces a braid like structure with MAPs at each intersection acting as the centers for the interaction of the anyons. The quantum computation is thus encapsulated in

the braid so formed. The final states of the anyons, which represents the result of the computation, depends only on the braid and is undisturbed by any noise or disorder in the environment, in this way providing an ideal and robust arrangement for the formation, movement and interaction of quantum states while protecting them from premature decoherence and collapse. **C6**

4.07 Bioelectromagnetics/resonance effects

236 Does Practicing Reiki Alter the Electromagnetic Field of Heart and Hands of Practitioners? Ann Baldwin, William Lee Rand; Gary E. Schwartz <abaldwin@u.arizona.edu> (Physiology, The University of Arizona, Tucson, AZ)

The purpose of this study was to determine whether practicing Reiki increases the electromagnetic field from the heart and hands of Reiki practitioners. Exceptionally high strength electromagnetic fields (100 nT) have been measured from the hands of a few energy healers in two previous studies. However, these results have not been repeated in 19 years despite huge advances in the sensitivity of the measuring devices, leading to doubt about the validity of the original measures. If practice of Reiki markedly increases the intensity of the biofield of a practitioner at particular frequencies during healing, this would support the hypothesis that Reiki works by electromagnetic induction. Using a Magnes 2500 WH SQUID at the Scripps Research Institute, San Diego, the electromagnetic field from the hands and heart of each of 3 Reiki masters was measured when they were: (i) not practicing Reiki, (ii) sending distance Reiki and (iii) sending Reiki to another person in the room. Each recording lasted 5 minutes. Magnetic field intensity of the hands and heart was also recorded for 5 minutes from 4 volunteers who were unfamiliar with Reiki. These volunteers were then given Reiki attunements after which the recordings were repeated first at baseline and then while they sent Reiki to themselves. For all subjects, under all conditions, the recordings from sensors closest to the heart and the hands showed spikes of about 2 pT corresponding to the electromagnetic manifestation of the heartbeat . This signal and harmonics were also seen in the frequency spectra. Recordings from two Masters and one volunteer showed a low intensity sine wave oscillation of 0.25 - 0.3 Hz (intensity 0.1 - 0.5 pT) independent of whether or not they were performing Reiki. This oscillation was probably produced by respiratory sinus arrhythmia, as judged by the frequency (equivalent to 15-18 breaths /minute) and comparison with results from previous studies. No segments of high intensity (hundreds of nT) electromagnetic fields were seen in any of the recordings. These results suggest that either Reiki practitioners do not routinely produce high intensity electromagnetic fields from their palms during healing, or this process is impeded by the presence of magnetic shielding. The former interpretation implies that Reiki healing is mediated by some mechanism other than electromagnetic radiation, such as torsion. The latter interpretation is consistent with the theory that energy healers must tune into an external environmental radiation, such as the Schumann resonance (7-8 Hz), so that their brainwaves become entrained to this frequency and initiate radiation of energy from the hands at Schumann harmonic frequencies. Due to the high degree of magnetic shielding of the room containing the SQUID, such external radiation would probably be blocked and would not be accessible to the Reiki practitioners in the room. **A3**

237 Atmospheric Ions Induction for Consciousness: Negative Ions with Positive Effects Manmohan Srivastava, Shalini Srivastava <dei.smohanm@gmail.com> (Chemistry, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Atmospheric ions find important place in the recent research especially in theological science. Atmospheric ionization leads to the formation of charged particles in the form of negative and positives ions. The normal ratio of positive to negative ions is 12/10. Changes in ratio of positive to negatively charged ions have been found to exhibit remarkable effects on the behaviour of plants, animals and human beings. Positive ions cause to release the allergy producing hormone serotonin (5-hydroxytryptamine). Serotonin secretion is associated with various unpleasant symptoms and change in the behavioural patterns. Negative ions are exceedingly beneficial for stimulating body defence system and human mood while reducing mental stress. Interestingly,

all types of beneficial responses take place as a result of the role of friendly negative ions to accelerate the enzymatic oxidation of (5-hydroxytryptamine). Consciousness relates with a field of force (gravitational, atmospheric, electric, magnetic, chemical, thermal, social etc) centred in a brain, operating throughout the body, simultaneously into all levels and impacts our sensory and perceptual system. Philosophical reflection of the terms aim, awakening, awareness and attention collectively constitute the substrate of biological consciousness. The present paper describes the favourable effects of atmospheric negative ions, for an overall soothing effect promoting human behaviour reaching to a condition suitable for attaining consciousness. Transmission, storage and processing of information regarding consciousness are performed by neurons involving several effects and mechanisms which are not fully understood. Attempts have been made to correlate the conditions of one's surroundings scientifically with the consciousness. **P1**

4.08 Biophysics and living processes

238 Your Consciousness is Your Faith Parul Verma Ahuja, Mrs. Sunita Satsangi <parul.verma@gmail.com> (DEI Dayalbagh Educational Institute, Delhi, India)

Faith and consciousness are defined and considered inseparable from one another and determine and create the same result. Faith is the intent of things hoped for and the evidence of things unseen. Consciousness is something that stands under and supports that which one is experiencing in one's world. Our consciousness is the present evidence of what we will experience in our life as our thoughts and emotions are externalized. Faith, which is reflected and determined by consciousness, is the seed of all creation in our physical world. Faith is an invisible, intangible and imponderable force. But, it is spiritual or if we prefer, we can call it metaphysical in nature. It is determined at the level of thought of consciousness. What we believe will happen or not happen in our life determines the level and quality of faith that we have and as a result project which determines what will be experienced in your life at some point. In the same way, consciousness is the seed for all creation in the world. Whatever thought processes we develop, it represents the kind and quality of the faith that we hold. Faith makes us progressive for higher development of consciousness through which the mind transcends the circumscribed and enters into the life of the boundless. Faith is a movement of the soul deep within us; it is a power of Truth. This true faith should not be confused with our preferences, wishes and desires. Faith is most effective when it is integral, i.e. the mind blends with the heart and the body in totality. Our capacity to understand, communicate, interpret, etc. is all essential to our existence. All these talents may be very real, but they are limited. When we shift our faith from our own limited talents to the infinite creative powers of the Divine Consciousness, we rise in consciousness towards that which we rely upon. The faith required for spiritual experience is a faith in the reality of a higher Consciousness. This faith is a premonition of a knowledge and experience awaiting our discovery. The intuitive perception and reliance on the Divine Consciousness opens up our being to the descent and working of that power in our inner and outer lives. When we rely on that even in apparently insignificant daily events, then the true Consciousness behind the surface of life reveals itself. Our consciousness is shifting moment to moment, day to day. There are thus two postulates: 1. The level of consciousness demonstrates the faith in us. 2. The faith in us elevates us to the consciousness it expresses. Experience of higher consciousness comes sooner than expected to those who proceed with faith, devotion, goodwill, and a balanced mind. Doing, rather than fantasizing or talking about the techniques, is the key. As you proceed earnestly, you experience several unusual, utterly delightful levels of awareness. You move through "levels of the heart" and through numerous planes of consciousness. The study will explain both, the effect of consciousness on faith and the effect of faith on consciousness. **P1**

239 Plant Sensitivity to Spontaneous Human Emotion Ben Bendig <bbendig@ucla.edu> (Psychology, University of California, Los Angeles, Los Angeles, CA)

The question of plant consciousness made waves in the 1960s and '70s with the publication of research by lie detector expert Cleve Backster (1968) and the popularization of his work in

"The Secret Life of Plants" by Tompkins and Bird (1973). By measuring electrical resistance in the leaves of plants, Backster demonstrated that plants were sensitive to events in the environment, including threats to the plant, death of nearby organisms, and human interaction, particularly human emotions. The current research sought to replicate Backster's findings, focusing on spontaneous emotion during human interaction. Plant electrical activity was measured with a GSR device during conversations involving the experimenter and acquaintances, using a plant that the experimenter had cared for (Schefflera Arboricola, Trinette variety). Comparisons were made of activity during 4-second intervals of time with the presence of emotions (e.g., anger, surprise, embarrassment) versus 4-second intervals of no activity in the room containing the plant, revealing a highly significant difference ($p < .0001$). A comparison of the emotional intervals against all other human interaction intervals was also highly significant ($p < .0001$). Controls employed indicate that these differences are not due to temperature, sound, or movement. Movement artifacts are particularly important to control for as nearby movement produces electrical changes in the leaves, even without contact. Interaction intervals with possible movement artifacts were excluded from the calculations. The importance of genuine emotion in evoking these responses points to the necessity of ecologically valid and spontaneous situations for a proper scientific study of plant perceptual responses. **P2**

240 Energy Distribution Profile of Human Influences the Level of Consciousness Devendra Chaturvedi, Lajwanti, Tsai Hui Chu, Hari Har Prasad Kohli <dkc.foe@gmail.com> (Electrical Engineering, Dayalbagh Educational Institution, Agra, Uttar Pradesh India)

The purpose of this experimental study was to determine the energy levels corresponding to the different parts of the body, which is related with consciousness. In this experiment, the energy level is measured at the navel center, the heart center, the throat center and the center of the line between the two eyes of Human using DEI Meridian Analysis System (DEI-MAS). The probe was placed at the navel, heart, throat and third eye energy centers and subsequent readings were taken. The average current in microamperes recorded as 54 +_ 3 microA at the navel, 77+_ 2 microA at the heart center, 84 +_ 3 microA at the throat center and 103 +_ 3 microA at the third eye. Thus, we conclude that the lowest energy current level is at the navel center followed by the heart center, the throat center and the third eye which has the highest energy current level of the mentioned centers of the body. Therefore, it is postulated that consciousness is increasing from the navel center all the way to the center of eyes. **P1**

241 Chromophores, Quantum Coherence, and Microtubules: A Theoretical Investigation of a Quantum Mechanism of Signal Propagation Along a Microtubule Travis Craddock, Jonathan Mane; Douglas Friesen; Jack Tuszynski <travisc@ualberta.ca> (Physics, University of Alberta, Sherwood Park, Alberta Canada)

Over decade ago it was postulated that consciousness stems from quantum computation in neuronal microtubules. However, it has been purported that biological systems are far too ``warm and wet'' to support quantum phenomena. Recent advancements in experimental techniques, and the theoretical understanding of quantum biophysics, have allowed investigators to probe biological systems for quantum coherent phenomena. Specifically, evidence has been accumulating for the necessary involvement of quantum coherence and entanglement between uniquely arranged chromophores in light harvesting photosynthetic complexes. Amazingly, microtubules also possess a distinct architecture of chromophores, namely the aromaticamino acids. The spacings and dipolar properties of these aromatics are similar to those found in photosynthetic units strongly suggesting that microtubules may support coherent energy transfer. Here we present a theoretical investigation of energy transfer between chromophoricamino acids in microtubules via dipole excitations coupled to the surrounding environment. We present the spatial structure and energetic properties of the aromaticamino acids in the microtubule constituent protein tubulin. Plausibility arguments for the conditions favoring a quantum mechanism of signal propagation along a microtubule are provided along with a discussion of the potential role for such energy migration in the phenomena of consciousness. **C6**

242 Exocortical Cognition: Heads in the Cloud Stuart Dambrot <smdambrot@criticalthought.com> (Critical Thought | TV, New York, NY)

Technological evolution may be defined as the ongoing projection of our sensorimotor cortex through augmentation of our physicality – i.e., devices that enhance our arms, legs, eyes, ears, and so on. It's clear that the next (and at least penultimate) frontier is our emerging ability to directly augment and extend our brain. The current extension of location-independent cloud computing from data to applications (as instantiated in personal, portable, connected computational platforms that increasingly act as portals to off-device resources) forms the foundation for what I've termed Exocortical Cognition: the end game of accelerating progress in neuroscience, genetics, synthetic biology, nanotechnology, artificial general intelligence, quantum physics, and knowledge virtualization – all converging to externalize neocortical cognitive function. In other words, the question, after James J. Gibson, will soon be: Ask not what's inside your head, but what your head's inside of. Synthetic genomics will allow us to design artificial genomic sequences that express as novel tissues and organs with predetermined technological functionality. Such endogenously-expressed neocortical enplants (as opposed to exogenous implants requiring invasive surgery) with communications and neocortical/binary translation capabilities will allow transhumans to engage in a nonlocal cognitive environment where cognition will be distributed over a network of distributed location-irrelevant resources. Moreover, concomitant advances in quantum computing and communications will leverage quantum entanglement to provide the ability to have such cognitive interconnectivity operate independently of the distance constraints and consequent time delays associated with standard signal propagation technologies. Finally, the incorporation of entangled sensors and sentient robotics into the exocortical network will enable spatiotemporally-independent telepresence to effectively support multiple exoselves to operate simultaneously. **P2**

243 Manifestation of Energy at Macroscopic and Microscopic Level Drishti Malhotra, Daya Malhotra; Queena Satsangi <drishti.dei@gmail.com> (Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Everything that happens in our life and everything that happens in our body begins with something happening in our consciousness. Consciousness is something we experience. Consciousness is part of a system for receiving information, processing it, and outputting it. Respectively these aspects are conscious perception, conscious thought and conscious decision-making. However we look at it, consciousness defines our existence and reality.Our consciousness, our experience of Being, who we really are, is energy. We can call it Life Energy. This energy does not just live in our brain, it fills our entire body. Our consciousness is connected to every cell in our body. This energy can be measured through the process known as Kirlian photography. Change in our consciousness creates a change in the energy field that is being photographed, which is called the aura.A change of consciousness creates a change in the energy field. Hence a change in the energy field happens before a change in the physical body. Thus we can say that it is not the physical body that creates the energy field, the aura, but rather the aura or energy field that creates the physical body. What we see as the physical body is the end result of a process that begins with the consciousness. As the auras are aspects of consciousness in the same way Chakra a Sanskrit word, which means "wheel," or "vortex," (because thats what it looks like when we look at it) is also an aspect of consciousness.In a similar manner the supreme reservoir of spirituality which is satt, chitta, ananda, and prakash i.e. pure energy manifested itself in human form with emanation of the sound which in articulate speech is Radhasoami. **P1**

244 Living Tissue Organization: Physical Principles Jiri Pokorny <pokorny@ufe.cz> (Institute of Photonics and Electronics ASCR, Prague 8, Czech Republic)

Living tissues display remarkable organization which is to some degree similar to that of crystalline solids. Interactions leading to ordering arrangement depends on physical forces between atoms in crystalline solids and between cells in tissues. Interactions between cells were assumed to be completely provided by chemical and cohesive forces. However, these forces are of a short-range nature. Long-range forces may be connected with cellular electrodynamic field generated by microtubules. Interaction between cells depends on properties of the electrodynamic field, in

particular on the intensity of the electric field, frequency or frequency spectrum, and time-space pattern. The interaction forces between cells are of oscillatory nature, may be actively altered in the course of cellular activity and depend on continuous energy supply. Organization of tissues corresponds to the state far from the thermodynamic equilibrium. Functional mitochondria provide conditions for normal physical processes and generation of the electrodynamic field by microtubules. Coherence and power of the electrodynamic field depends on water ordering, nonlinear conditions, and energy supply. The space pattern of the electrodynamic field corresponds to the cellular microtubule structure. The tissue functions may depend on coherent electrodynamic field, in particular the brain tissue function. Mitochondrial dysfunction is developed in cancer and may be responsible for other pathological states. At the frequencies 10 MHz and 15 kHz the wavelength of the electrodynamic field is 30 m and 2 km, respectively. It is an immediate vicinity field as the dimensions of the biological systems are much smaller than the wavelengths. From classical and quantum mechanical point of view the field is of electrostatic and virtual photon nature, respectively. Its energy is periodically returned to the source which is important for interactions. The coherence time depends predominantly on the quality (i.e. low losses of energy) of microtubule oscillators. At 15 kHz (10 MHz) the coherence time is 5 ms (8 μs) and 0.4 ms (0.5 μs) for the quality factors 150 and 10, respectively (based on fringe visibility). The time delay caused by propagation does not seem to play a significant role in the immediate vicinity of the source. A model of one dimensional array of oscillating dipoles visualizes the attraction forces acting between cells. But three dimensional dipole structures corresponding to microtubule distribution may represent a real picture. Nanotechnological measurement of the electrodynamic field generated by isolated cells and cells in tissues might form a basis for further analysis. **P2**

245 Chemical Synthesis of Microtubules: An In-Vitro Study in Progress Pushpa Sahni <deipushpasahni@gmail.com> (Chemistry, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Microtubules have been implicated to play an important role in the functioning of neurons and the brain, and are purported to give rise to cognitive brain functions such as memory (Woolf, 2006) and consciousness (Hameroff, 1998a). Self-organisation studies have been carried out by Tabony, 2007 by warming the cold solution of tubulin to 36 C in the presence of excess of GTP. Over a period of 5 hours the homogeneous solution self-organizes to form a macroscopic structure. Its structure is studied with the help of electron micrograph, small angle neutron scattering measurement, fluorescent imaging. Microtubule population is itself capable of carrying out collective actions. Like ant colonies leave behind the chemical trails (pheromones) and communicate, under appropriate conditions, neighbouring microtubules or microtubule population may communicate indirectly with one another by a stigmergic process involving the chemical trails (free tubulin) that they themselves produce. Thus, this raises the intriguing questions as to what extent microtubules like ants and other social insects spontaneously develop very high-level behaviour extending up to what is called “swarm intelligence.” Microtubules are reaction-diffusion systems. This leads to the self-organisation of microtubules. The self-organisational behavior arises from the collective action of the entire microtubule population in which individual microtubules are strongly coupled to one another by processes involving the chemical trails they form by their own reactive growing and shrinking. The way this comes about, shows many analogies with the way ant colonies self-organise and develop high-level emergent phenomena and the way that microtubules self-organise (Tabony, 2006).The reaction dynamics at opposite ends of microtubule are different. Due to this, microtubules often grow from one end whilst shrinking from the other. When the rates of growth and shrinking are comparable, individual microtubules retain the same approximate length but change position at speeds of several um per minute. This type of behavior is termed “treadmilling.” Another type of behavior is called “dynamic instability” occurs when individual microtubules either shrink or grow very abruptly. A shrinking microtubule is capable of forming a trail of free tubulin. In order to understand the link between microtubules and consciousness, an extensive study on microtubules is in progress. We are interested in the chemistry of cytoskeletal microtubules organization and dynamics. Rapid polymerization and depolymerization of microtubules and actin filaments have been the subject of much ongoing research. The

active forces arising from the dynamical instability and the interaction of molecular motors with cytoskeletal filaments lead to a variety of complex nonequilibrium phenomena. We are interested in models that illustrate how such active forces may help regulate the proper functioning of cellular activity. **C6**

4.09 Evolution of consciousness

246 Taking Hints from Protozoans – Did Microtubule-Related Plasticity Evolve Jointly with Consciousness? James Beran <jimberan@earthlink.net> (Richmond, VA)

If microtubules and other cytoskeletal components are involved centrally in consciousness, one would expect evolutionary and developmental changes in consciousness to correspond somehow with changes in cytoskeleton. (compare, e.g., Arhem et al., 2008) The literature provides several relevant studies, e.g., about evolution of cytoskeleton itself (Erickson 2007, etc.,), tubulin (e.g., Tuszynski et al., 2006), microtubule associated proteins (MAPs) (e.g., Dehmelt et al., 2004), synapses (Emes et al. (2011) etc.,) – but we find no persuasive description of correspondence between changes in conscious experience and changes in cytoskeleton based on mutation and/or expression of genes. Indeed, each day’s new, unique conscious experiences could not possibly result from corresponding genetic mutation – human evolution couldn’t happen overnight. Trying a different tack, we find hints that evolution led from earlier unicellular organisms lacking microtubules to a wide variety of protozoans and other protists with extraordinarily diverse microtubule-containing cytoskeletons (Gull, 2001 etc.,); From one such protist, the path apparently led to complex animals with microtubule-rich neurons (Baas et al., 2009 etc.,) in brains capable of changingamong a broad repertoire of conscious experiences. Neuroscientists accept, of course, cytoskeleton’s generic role in constructing and operating neural circuits (Purves et al. (2008), etc.), including neural circuits involved in consciousness; but the evolutionary path from protists to animals with brains suggests that cytoskeleton also evolved features specifically involved in consciousness. To explore this possibility, we make three working assumptions: (1) Microtubules and other cytoskeletal and synaptic components can interact in concert with changes in conscious experience – we call their concerted interactions “real-time plasticity” or “RTP”; (2) in response to each distinct source of neural signals that change conscious experience, neurons in a respective neural circuit undergo RTP and thus transduce the neural signals into changes in conscious experience, i.e. performing neural-to-conscious transduction (“N-to-C transduction”); and (3) an N-to-C transducer circuit obeys a relatively stable (though perhaps probabilistic and context-dependent) mapping from neural signals to changes in conscious experience. (for related concepts, see Hameroff, 2006 re “real-time activity”; Woolf et al., 2009, re: “collective plasticity”, etc.,) These assumptions suggest that mutations of more than one type occurred during joint evolution of cytoskeletal plasticity and consciousness – examples include, first, cytoskeleton-affecting mutations that support RTP in N-to-C transducer circuits (“Cyto-RTP mutations”) and, second, mutations, e.g., in sense organ proteins, that affect neural inputs to Cyto-RTP-based transducer circuits (“neural input mutations”). To illustrate interplay between different types of mutations, we develop hypothetical accounts of two visual phenomena: In one, trichromatic vision occurs immediately when necessary photopigments are first expressed (Mancuso et al., 2010) etc.,); in another, experiences of reading can arise either through visual or tactile sensation. (Cheung et al., 2009 etc.,). If we can identify Cyto-RTP mutations and neural input mutations that have related effects on visual or other phenomena, we will have much stronger evidence that cytoskeleton has features specifically involved in consciousness. **C6**

247 Consciousness or Unconsciousness – a Unique Dimension on Evolution of Creativity Parul Bhatnagar, Mrs. Radhika Seth; Mrs. Meenakshi Seth, <parulpb@gmail.com> (Drawing and Painting (Textiles, Textile Design, Distance Education, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

What is creativity? Is it consciousness or unconsciousness. The paper focuses on the design students from the remote and backward areas of the country of a particular University, where the

true self awareness is brought forward with the play of colours and forms, the bottled up creativity of the unconscious mind is like a champagne bottle which when released comes out with a fizz. With the intuitive consciousness, neurophysiological processes can be presented in a creative and artistic form, which gives us way to reality. It is said we do not realize the awareness towards our creativity and in turn productivity. For the execution of our creative ideas, we tend to look outside for motivation, which is actually not true. Self-awareness is about increasing consciousness level by which we can bring out the best of our selves and the best out of life. Consciousness opens up new avenues and abundant possibilities, towards A Unique Dimension on Evolution of Creativity, which might prove to be an adaptable approach towards our students pursuing the art and design practices. The presentation includes a brief display of video-film. Demonstrating on unconscious mind of students. Their Playing with colours and making designs with Multi-media learning, these strategies are demonstrated through the video. **P1**

248 In Search of What's Ahead: An Investigation of the Evolution of Consciousness and Awareness Chris Boyd <cboyd@overmanarts.org> (Phoenix, AZ)

If we are to agree that we live in a constant state of change, then we must be open to the possibility of existing in a time indicative of the evolution of the collective consciousness. Human beings were not created to live lives of materialism and complacency but are often times restricted by the restraints, limitations, and illusions manifested by the ego. Instead, I argue in concurrence with some Eastern philosophical theories, that we engage in cycles of birth and death, all the while aspiring to reach the truth of our existence by navigating through a series of finite lessons that are specifically created and carried out by each individual. The subject matter found in a lesson one individual is working on may never be a relevant lesson for someone else. The quest for truth is the driving force that fuels our innate evolutionary progression in the areas of consciousness, awareness, and the experience of being human. Currently we are living in a very transformative time in which, certain individuals have begun accessing the blueprints for building the foundation of what humanity looks like in the future; a global society that is not centered on financial gain and accumulation but instead revolves around a unified understanding and respect of impermanence. These individuals serve as bridges between the present and future state of the collective consciousness by building the foundation for interconnectedness and the realization that everything is nothing more than energy. As they receive and process this information, they have a responsibility to convey it to others through various types of media and communication tools. Conventional ways of living have helped to reinforce the existing paradigms that govern so many of the decisions, perspectives, and expectations of the majority of those in Western societies. These existing paradigms can begin to be dismantled as we move into a more humanistic mode of living built on compassion, empathy, and increased awareness of the consequences of our actions. This paradigm shift can be made possible by incorporating the notion of higher consciousness into the worldviews of an increasing proportion of the population. This evolution of consciousness is an event that is currently taking place. It is not a question of if or when it will occur but instead a matter of discussing the best means possible to integrate new perspectives, ideas, and theories into a society that is so easily manipulated by consumerism and fear. **P1**

249 A Perspective on Consciousness Jaime Cardenas-Garcia <jfcardenasgarcia@gmail.com> (Cardenas & Assoc., Hanover, MD)

A scientific explanation of the consciousness of a human organism needs to take into account two intimately interrelated but separate periods: the first is the history of the human organism to its current stage of development: genetic, locomotive, sensorial and specialized organs, including all aspects of evolutionary development from inorganic entities, to organic entities and unicellular structures to its current multicellular specialized structure. This often ignored long period of human organism development needs to be recognized as providing limitless possibilities for development of all facets of the human organism. The second is the shorter period related to the development of the human organism from conception, to birth and beyond. This shorter period of development may be viewed as encompassing all stages of genetic realization of the human organism, from fertilized egg to multicellular specialized human organism with intermediate stages

allowing a window into the long first development period. It is generally this second period of development that research into consciousness is interested in, while ignoring the first long period of development. One common thread of both periods is that consciousness has a history. The history of consciousness in the first long period may be further divided into before and after consciousness; it is postulated that the second short period begins in the after consciousness period. This after consciousness period for a human organism may be further subdivided into periods of developing consciousness, receding consciousness and finally unconsciousness. This presentation argues for a working definition of consciousness as the ability of an organism to interact with its environment for the purpose of satisfying its most basic physiological (and spiritual) and social needs to survive and sustain itself, and uses this definition of consciousness to critically examine the history of consciousness as outlined above. **P1**

250 The Epigenetics of Consciousness Paul Evans <p.l.evans@att.net> (The Sapphire Institute, Charleston, SC)

What is consciousness? Contemporary neurologists and philosophers often describe consciousness as an emergent phenomenon with correlates to underlying neurophysiology, biochemistry and perhaps even electromagnetic radiation. When asked how consciousness may have evolved, scientists hypothesize an evolutionary unfolding from single cell organisms to plants and non-human animals and finally to modern humans, also suggesting an emergence of consciousness but to different degreesamong living things dependent perhaps upon natural selection, heredity and genetics. In this presentation the latter stages of the evolution of the human brain are explored and it is theorized that novel human consciousness may have emerged as a consequence of a heavily and progressively modified genetic transcription environment. But, rather than selective adaptation developing consciousness through DNA mutation alone, it is suggested a primary mechanism of genetic engineering was epigenetic. Epigenetics is a relatively new model in biology where gene expression is shown to be altered by factors external to underlying DNA sequenced code. What epigenetics is and why it is important to the study and understanding of the evolution of human consciousness are detailed in this presentation. Epigenetic factors currently influencing transhumanism and biological singularity are discussed. **P2**

251 A Panpsychist Approach to Evolution Tam Hunt <tam.hunt@gmail.com> (UC Santa Barbara, Santa Barbara, CA)

This essay provides a critical review of two recent books on evolution: Richard Dawkins' The Greatest Show on Earth, and Jerry Coyne's Why Evolution is True as well as a critique of mainstream evolutionary theory and of natural selection, in particular. I also suggest a generalization of sexual selection theory that acknowledges mind as pervasive in nature. Natural selection, as a theory of how biological change occurs, must be carefully framed to avoid the long-standing 'tautology problem' and must also be modified to more explicitly include the role of mind in evolution. A propensity approach to natural selection, in which 'expected fitness' is utilized rather than 'fitness,' can save natural selection from tautology. But to be a productive theory, natural selection theory needs to be placed alongside sexual selection – which is explicitly agentic/intentional – as a twin force, but also placed alongside purely endogenous factors such as genetic drift. This framing is contrary to the normal convention that often groups all of these factors under the rubric of 'natural selection.' I suggest some approaches for improving modern evolutionary theory, including a 'generalized sexual selection,' a panpsychist extension of Darwin's theory of sexual selection that explicitly recognizes the role of mind at all levels of nature and which may play the part of a general theory of evolution better than natural selection theory. **P2**

252 A World Awake: Media and Technology's Role in Evolving Human Consciousness in the Noosphere Jay Kumar, Amanda Coolong <kumar@chapman.edu> (Philosophy, Religious Studies, Chapman University and Holospheria, LLC, Los Angeles, CA)

In the early 20th century Pierre Teilhard de Chardin coined the term "noosphere" to denote the current evolutionary stage of collective human consciousness. Furthermore, his Law of Complexity/Consciousness postulates a direct correlation between an increase in an organism's neural,

organizational, and social structure with higher degrees of consciousness. In essence, Teilhard believed humankind would experience an inevitable evolutionary quickening brought on by an increasingly complex system of interaction and socialization. The result is a massive evolution in consciousness by which the planet and human cognition unify into a more complex conscious entity, a process presently accelerating on a planetary scale. In our technologically driven world, digital media can be viewed as a meta-consciousness that pervades every aspect of human culture. We constantly interact with and influence media and in turn, it changes our collective consciousness. As a species, humanity is forming a more complex neural and organizational network, as we become more aware of each other through real-time media and realize the deeper connection that exists between us all. The question lingers: what will happen when the Internet and media mature, and how will human consciousness respond? In this cross-disciplinary panel, experts in global media & information technology, social philosophy, religion, and consciousness studies explore the following relevant questions. What if the combined increase in complexity of human socialization, social media and technology is a manifestation of Teilhard's Law of Complexity/Consciousness and the vehicle driving the noosphere? If the noosphere is the next evolutionary step for the planet, in which all life, technology, and humanity emerge as a new holistic conscious entity, can we collectively as a species influence our own evolution? What are these enabling technologies, and how do we effectively engage them to propel humanity's emerging collective consciousness and the acceleration of the noosphere? **P1**

253 Fossil Records in Geological Evolution History and Emergence of Consciousness Anand Mohan <registrar.dei@gmail.com> (Registrar, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

The Earth's history spanning over a timescale of 4.6 b.y. has already witnessed five mass extinctions creating conditions that promoted rapid adaptation. The totalamount of oxygen locked up in the banded iron formations formed during Precambrian times is estimated to be perhaps twenty times the volume of oxygen present in the modern atmosphere. Likewise Algae Stromatolites common during the late Archaean and early Proterozoic helped in creating an oxygen atmosphere. Looking into the record of life on earth, geologists established major changes in living communities. Basis of such inferences are fossils. Geogenensis of fossil treasures have provided some inkling for making consciousness possible. Prokaryotic organisms became the first individual life forms to leave fossils visible to the naked eye (macrofossils). Purposeful behavior surely occurred in unicellular eukaryotic ancestors of modern organisms like paramecia and euglena who perform rather complex adaptive movements. Paramecia swim in a graceful, gliding fashion via coordinated actions of hundreds of microtubule-based cilia on their outer surface. They thus seek and find food, avoid obstacles and predators, and identify and couple with mates to exchange genetic material. Such intelligent behavior could have enhanced a species' survivability and the opportunity for mutation by avoiding extinction. About 540 m.y. ago there apparently occurred a world-wide dramatic acceleration in the rate of evolution: the "Cambrian Explosion." Early Cambrian worms which could apparently burrow, swim, or walk the ocean floor with tentacles and spines. Amoeba responded to light by diffuse sol-gel alteration of their actin cytoskeleton. Nervous systemsamong small Cambrian worms may be estimated to contain roughly hundreds of neurons. Primitive eye cups and vision were also prevalent, as were tube-like alimentary systems. Cambrian urchins and other creatures also featured prominent spine-like extensions. The versatile axonemes are utilized for sensation, locomotion and manipulation, and provide perception, agency and purposeful, intelligent behavior and the possibility of induction of primitive consciousness. Ammonites are thought to have been good swimmers with flattened, discus-shaped, streamlined shells. Arthropods were well pre-adapted to colonize land, because their existing jointed exoskeletons provided protection against desiccation, support against gravity and a means of locomotion that was not dependent on water. Taste and smell developed subsequently at the level of arthropods and shared well by the vertebrates. Evolution of sense organs is a featureamong animals to exhibit their response to external Stimuli. The gradual attainment of perfection in the geometry of the shell size, regularity of shell coiling, ornamentation or suturing on the cells, offers some clue to the

fact that during the continued course of evolution process, primitive consciousness also came in to existence during Cambrian times. The exact place of consciousness in process of evolution is unknown, but the actual course of evolution itself offers some clue. Fossil records indicate that animal species as we know them today including conscious humans all arose from a burst of evolutionary activity some 540 m.y. ago. **C14**

254 The Evolution of Visual Illusions: The Relationship of Primary Visual Cortex Volume to Illusory Size Perception in Primates Michael Proulx, Alexandra A. de Sousa, The University of Coimbra (Portugal), University of London (UK) <m.proulx@qmul.ac.uk> (Research Ctr in Psychology, Queen Mary University of London, London, United Kingdom)

How has consciousness evolved? Here we combine two approaches, comparative neuroanatomy and the perception of visual illusions, for the first time to address this question. Specifically we examined the relationship between the volume of the primary visual cortex (V1) and illusory size perception across anthropoid primates. Visual illusions provide an important opportunity to assess how conscious visual experience can diverge from a seemingly objective visual stimulus. V1 size differs within and between species in relation to overall visual sensation, however not much is known about the causes of V1 size variation between closely related species. Recently it has been shown that within humans V1 volume is negatively correlated with the perception of two size illusions: a variant of the Ponzo illusion and the Mueller-Lyer illusion. Using a similar approach, we investigated the notion that anthropoid primate genera with larger V1 volume report size illusions of a lesser magnitude. The basis of V1 size variation is important in human evolutionary studies because V1 volume is the most dramatically reduced cortical area in modern humans (relative to brain size). Anthropologists have long inferred that the relative reduction in V1 volume is due to expansion of higher order visual and multisensory cortex. However, human absolute V1 volume is larger than or similar to that of their closest relatives, the chimpanzees and bonobos. Matching published data on V1 volume and illusory perception for the same genus, our preliminary data show that anthropoid genera with larger V1 volume have a weaker experience of size illusions. We consider the implications of these results for comparing particular functional brain regions, rather than overall brain size, for reconstructing human brain evolution and understanding conscious perception in humans and other primate species. **C12**

255 Consciousness Evolved as Energy Carrying Information, Flowing through Complex Control Loops with the Purpose to Sustain the Self Paul Storey <paulstorey@live.com> (Robotics Engineer,T3M, Citrus Heights, CA)

Occam's razor favors the most simplistic explanation, making the fewest new assumptions, as the recommended explanation of things. We can extend this principle, as is done quite successfully in sciences and engineering, to utilize quantities which are known and measurable, verifiable and repeatable, as the building blocks of our explanations of the universe. These principles are applied to the explanation of consciousness. Evolution is the explanation of the origination and development of life. As one of the most remarkable creations of evolution, conscious minds are the culmination of a long path through the billions of years of increasing complexity of reproducing creatures on earth. If we adopt the evolutionary viewpoint in our quest to explain and understand consciousness, then consciousness can be seen as coming from nonexistence, up through humble beginnings, through billions of years of increasing complexity allowing increasing abilities, to its remarkable present state. Although this viewpoint will be difficult to accept for those with supernatural penchants, it allows us to use the tools of science and engineering to be applied to consciousness, and to compare the plethora of creatures surrounding us as to their brains and the qualities of their perceptions and awareness as waypoints leading to the consciousness which we possess. The evolution of consciousness is not the primary focus of this presentation, but it is inseparable from the explanation of the development of consciousness throughout billions of years in terms of fundamental physical units expressed in engineering terms. The tools of the hard sciences, thermodynamics, entropy, information theory, cognitive science, robotics and artificial intelligence, can then all then be applied to the brains and minds, used to describe all the

progressive stages of life which culminated in our conscious minds. My previous presentations discussed in depth the control systems of primitive organisms, and why these control systems were so essential to understand how a creature could maintain equilibrium, then how additional control enabled the creature to move, to coordinate its parts, integrate sensory data into internal states representing an external world, and states representing itself. The control system embodied the self to come into existence. The information and energy flowing through the control system is one and the same as the goals, the drives, instincts, the emotions of the entity. Control theory is not an easy field to understand, nor is it lucrative to those studying consciousness, but it is indispensable to keeping one standing and not falling over, essential to explain how anything can walk on legs. The actions to seek food or shelter or to reproduce are all advanced control systems activities built on earlier control systems. Briefly, energy powers the control system, the control system regulates the flow of energy to maintain the commanded set point, its goal, its purpose. In living things, their purpose is to sustain existence and to reproduce. Information controls the flow of energy. Consciousness can thus be viewed as energy carrying information flowing through complex control loops with the purpose to sustain the self. **P2**

256 Interdisciplinary Approach to Define Consciousness Chandra Prakash Trivedi, Aseem, Aditi, and Manisha Sengar, Assistant Professor, Zoology, Dashbandhu College, Delhi University, Delhi <atcptrivedi@gmail.com> (Education, Vedic Research Institute, Ratlam – Former Principal MJS P.G.College, Bhind, Indore, M.P. India)

The consciousness is a unique phenomenon, through the consciousness we feel our existence in life. The consciousness is related with the origin of the creation and life on the earth. The consciousness has evolved in ascending order from a single ancestor. The primary form of consciousness The creation has evolved from the cosmos with action and interaction in the pre-cosmic condition. The quarks are the first in the series, the interactions of the quarks has given the ways to produce subatomic particle to produce atom. The subatomic particles are the instrument and the energy is the source of existence or consciousness in the atom, which maintain its continuity in molecules and matter. The consciousness is universal as cosmic consciousness, and it became individual with the existence of the atom, matter and life. Higher form of the consciousness The consciousness is the feeling of existence. The life has originated from the single cell. In the early primitive condition, the aggregation of the molecules and matter has synthesized the cell body at a particular temperature pressure gradient. In the closed system the movement of the charged ions of the colloidal system has generated the coaservate. It is the first symbol of consciousness. The cell proceeds towards organic evolution with genetic recombination and the photosynthesis by green cells with modification of the physical environment. In its true sense the consciousness is hereditary. The mother feed the developing embryo with food and consciousness in the womb. It shows that that every thing, which an individual acquire in the life is from the parents, but the fate and the DNA is different, no two individual will have the same DNA and fate in life. The DNA is the blue chip of life with all the information of life and death. It is only an instrument without consciousness. Accordingly the physical body develops with sense organs and nervous system as per the hereditary characters from the parents. In actual sense the sense organs and the brain are the vehicles of DNA. They execute the functions with thought and memory stored in DNA in the life till death. Hence the memory remains as immortal, and it is stimulated with circumstances in life. The words and thoughts are imperishable. After the death of an individual the thoughts and words remains in the universe, and immortal. The fertilized DNA has all the information with hereditary characters for the development of the physical body and the sense organs. As soon as the fertilized DNA divide, a language code open on the DNA, which is the code for the mental development of the brain, the mental code is specific, which attract the specific thought energy resting in the sky, if the mental code and thought energy are complimentary with each other, than the thought energy of an individual tie down with the DNA, and open the language code on the DNA with his past memories. The language of the DNA decides his fate with pains and pleasure of life. **P1**

4.10 Medicine and healing

257 A Proposal for the Study of the Molecular Mechanisms of Meditation Shub Agrawal, Hari Cohly <sshanti89@gmail.com> (Brooklyn, NY)

It is widely accepted that regular aerobic exercise improves cognition. The current research suggests that exercise-induced cognitive improvement is largely a result of increases in neuroplasticity through various mechanisms, including increased levels of BDNF and neurogenesis in the hippocampus. In addition, people who partake in regular aerobic exercise are reported to have longer attention spans. Recent research also suggests that meditation improves cognition by increasing attention span. Research has found that, as in exercises, meditation results in physiological changes throughout the brain. One study found that there is a strong coupling between the posterior cingulate, dorsal anterior cingulate and dorsolateral prefrontal cortices (regions associated with self-monitoring and cognitive control) in people who meditate. Interestingly, where there is exercise-induced neurogenesis, there is also an enlargement of glial cells surrounding the newly born cells. Another study suggests that long-term meditators have white matter fibers that are either more number, more dense, or more myelinated throughout the brain. However, it is imperative that we use this knowledge of the physiological effects of meditation upon the brain to begin to examine the molecular mechanisms of meditation. I propose that the cognitive benefits of meditation are a result of increased plasticity in the brain, similar to the mechanisms now being elucidated in exercise research. It seems that exercise and meditation improve cognition through separate means; exercises increases attention span through improving spatial memory and general cognitive performance, while meditation increases attention span by improving self-monitoring and cognitive control. This suggests a dichotomy between the mechanism through which meditation and exercise improve cognition. While exercise increases grey matter, through neuronal proliferation in the hippocampus, meditation increases white matter, thus increasing the effectiveness of large scale networks throughout the brain. Further investigation of this effect is necessary. In order to truly understand the physiological effects of meditation on the brain, it is imperative that we also begin to examine the underlying molecular mechanisms of that effect. **P1**

258 A Clinical Case of Insomnia Due to Tinnitus, Treated with Music Integrative Neurotherapy Alexander Jon Graur <graur@medicamus.com> (University of Torino, Italy, Pavarolo, Italy)

Tinnitus is defined as the perception of sound in the absence of an acoustic stimulus and as a subjective experience of the patient. It is a symptom in nearly all ear disorders and has an obscure, still unknown mechanism of install and development [1]. The actual methods of treatment employed mainly a ‘sound mask’ aimed to cover in loudness the audio volume of tinnitus. Music it is often implied in the process by producing play lists according to the personal preferences and musical cultural background of the patient or the therapist, trying to offer an alternative to the usually unpleasant and permanent sound heard by the patient. But music it is not implied in treating the tinnitus itself. The medical treatment of the presumed causes involved consists usually in lowering blood pressure medication, hearing aids, a.s.o. The clinical case presented in this paper is quite different, because the patient’s otolaryngology and audiology tests shown a physiologically intact hearing apparatus, a normal SRT (speech reception threshold), with no modifications of the hearing capacity or ear disorders in act. No medication was undergone which could allow the suspect of influencing the tinnitus phenomenon (hyper/hypo tension medications, for example). The tinnitus appears after a Radiation Therapy applied locally in the parietal zone as a treatment for a malign skin tumour, and generated a sleep deprivation symptom which affected the personal and social life of the patient. The role of Music Integrative Neurotherapy in this clinical case had multiple finalities. First of all: to reduce the impact of the tinnitus on the mind’s processes. Second: to allow the mind to produce a pattern recognition path which brings to the assimilation of the tinnitus with other known body sounds; in this case with the heart beat sound.Then to help to store this information at the level of long term memory data bank. Third, to allow the therapeutic intervention on the sleep disorder (insomnia) produced by the tinnitus. **A3**

259 Attention Deficit Disorder and Consciousness: Medication Effects and Endophenotypes Ross Grumet <rfg@psychiatryatlanta.com> (Atlanta Psychiatric Specialists, PC, Atlanta, GA)

Problem: Adults with attention deficit disorder (ADHD) are traditionally classified as inattentive type, hyperactive-impulsive type or mixed. There are inherent problems with this classification because of comorbidities (coexisting psychiatric problems) and the preponderance of mixed types in many populations. Response to stimulant medication can separate these persons into different subgroups based on phenomenology and these subgroups may represent endophenotypes (a biomarker, genetically based, resulting in specific brain activity patterns). Study: More than 200 ADHD patients are retrospectively evaluated based on their response to stimulant medications (methylphenidate [Ritalin],amphetamine salts [Adderall] and related drugs). Patterns of response resemble a previous study of psychiatric patients whose possible endophenotypes included emotional, motor, and several cognitive changes. A new diagnostic classification is proposed. **P1**

260 Internal Persuasion, Narrative Medicine, and the Neuroscience of Consciousness Marianthe Karanikas <karanikas@missouristate.edu> (English, Missouri State University, Springfield, MO)

The study of internal persuasion relates the art of narrative medicine to the neuroscience of consciousness. Internal persuasion is the ability to use ethical, emotional, logical, or mythical belief structures to change the psychophysiological reaction to the hedonic tone of experience. In this inquiry, "psychophysiological reaction" refers to the psychological and physiological mechanisms associated with the craving, aversion, and inattention to hedonic tone (the pleasantness, unpleasantness, or neutrality of experience.) Although a quality of "pristine" experience, hedonic tone is often influenced by a "rich" cognitive context (Hurlburt, 2011; Baars, 1988). In narrative medicine, the physician helps to mobilize the patient's complex systems of internal persuasion through empathetic listening (Charon, 2006). Ethical, emotional, logical, or mythical belief structures are revealed as the patient expresses narratives of illness and healing. In so doing, the patient may well change the psychophysiological reaction to the hedonic tone of experience. Inquiry into the mobilization of internal persuasion through narrative medicine may elucidate aspects of the neuroscience of consciousness, particularly how cognitive contexts influence which experiences grab the "spotlight of attention" (Baars, 1988, 1996, 2003, 2005, 2010; Crick and Koch, 1990) and how the" autobiographical self" relates to the "neural self" (Damasio, 2000, 2003, 2009, 2010).The study of internal persuasion in narrative medicine also complements the neurophenomenological approach of Francisco J. Varela, Richard Davidson, Antoine Lutz, Julie Brefczynski-Lewis, and colleagues, specifically the exploration of how cognitive contexts influence experience and how empathy can help transform psychophysiological reactivity (Lutz et. al., 2002, 2008). **P1**

261 Elemental Archetypes; Sub-personalities and the Archetypes Out of Which They Arise Gerald Marr <geritall49@gmail.com> (Learning Facilitator, Star Journey / Cosmic Design Publishers, Goleta, CA)

Western psychology has much to gain from the wisdom and experience of eastern thought. Ayurveda, the East Indian model of holistic healing has much to offer in response to the question researched herein. How can archetypes be identified according to the elemental model of Ayurveda? Models that exist outside the mainstream of psychology may have value to offer our psychological healing arts, as they have already added insight and diversity to our somatic western medical model. The evolution of the ideas introduced to our culture from Ayurveda by way of Polarity Therapy, a western bodywork model that applies the fundamentals of Ayurveda, has a great deal to offer with regards to the connection between the mind and the body. The Polarity Therapy model is used as the fundamental framework to answer the central research question. The research of James Said, whose synthesis of work is called ImpulseWork, the concept of identifying archetypal energies by the Ayurvedic elemental categories, ether, air, fire, water and earth, is introduced. The ideas of Ayurveda and Polarity Therapy are used to explore the rich response that occurs when habitual actions are slowed down and experienced, as they are in various body-centered psychologies. From this innocent point of departure arises the idea that, based on an elemental model, sub-personalities such as those described in Voice Dialog can be traced to their

archetypal foundations and therefore understood at this deeper level. This same idea is applied to a variety of serious pathologies, and two examples are analyzed from DSM-IV vignettes. **P2**

262 The Invisible Bridge of Consciousness: Traversing Between the Mind and the Universe with Intuition Sari Roth-Roemer, Ondre Seltzer <azmedpsych@gmail.com> (Arizona Medical Psychology, PLC, Scottsdale, AZ)

How does intuition fit into our current conceptions of consciousness? In this session we will address new theories of intuitive consciousness, linking this with recent research on neural plasticity and epigenetics. We will address how this new conceptualization of consciousness applies to personal, social and political landscapes. This session will deal with questions of personal and universal consciousness through integrating and applying the unique perspectives of a medical psychologist and an energy medicine healer. Intuition, that inner knowing that connects us to something greater than ourselves, is something that is available to us all to a greater or lesser degree. What role does this play in consciousness? Is it possible that our brain communicates with more than just our individual thoughts and behaviors? Perhaps there is a component to brain development that allows the mind and its' consciousness to change and adapt according to the information it receives. Consider how we are now using cloud computing as a way of accessing knowledge and storing information. What if there are aspects of consciousness, thoughts and processing that occur outside of the brain? This may explain why some of the greatest minds through the centuries, whom with limited resources and lack of written knowledge, were able to influence the world in which we live today. Or it may define the "inspiration" received by those who achieve great success. Does intuition provide that link between a personal and a universal consciousness? Furthermore, we can now look to neuroscience and epigenetics to help explain how our very thoughts may even affect our basic genetic material, and that knowledge not only can pass through teaching but also through our genes. Perhaps the bridge between science and mysticism has finally been made. Once we cross that bridge we may find a common bond between the conscious mind and the universe beyond it. Through examination and discussion of the current scientific evidence, theory, and controversy, the value in combining scientific and esoteric viewpoints to these important aspects of intuition and consciousness will be explored. Demonstration of practical applications, including mindfulness, meditation and energy healing, will be included in this session. **P1**

263 Alters and Icons: The Surgical Suite as Sacred Ritual Shawn Tassone, MD <ladeaobgyn@yahoo.com> (Tucson, AZ)

Medical science originally evolved from religion and spirituality (Modjarrad, 2004). This statement seems conflicted with the general premise that spirituality holds no place in medical practice, and some have declared those bringing spirituality into medical practice are 'quacks' (Block, 2008). It is important to distinguish between religion and spirituality, with spirituality being more focused on individual growth, less formal, less authoritarian and orthodox, and more universalizing (Ravenscroft & Ravenscroft, 2004, p. 66). There is no doubt medicine and spirituality deal with personal suffering, and both of these paradigms attempt to simultaneously relieve suffering. Spirituality and suffering are unique to the individual, and thus the hermeneutical aspect of suffering comes into play. Studies have shown patients undergoing coronary artery bypass gain a new appreciation for life and health, and spirituality develops as an inner strength helping them navigate through suffering (Britt Raholm, 2002). If medicine has religion, spirituality, and ritual as its base then there is no place in more sacred than the operating room. The operating room is not a place often seen by many, and those who experience this arena as a patient see the process as detached from their own spiritual connections. The purpose of this talk is to look at surgery, its preparation, consents, theater, and recovery as a spiritual process and look at the foundations of this process from the viewpoint of a sacred ritual. Rituals in medicine can invoke an archaic sense of indigenous cultures and not the technologically superior theaters we see in hospitals today. However, in an anthropological sense, ritual can be a transmission from illness to health; if patients and physicians can understand this connection it may improve the quality of care given to surgical patients and enhance recovery (Wall, 1996). **P2**

4.11 Miscellaneous

264 The Role of Consciousness in the Origin and Evolution of Life Allan Emren <allan@nuchem.se> (Nuchem Research AB, Tollered, Sweden)

During the origin and evolution of life, there were a number of essential large steps that had to take place in addition to a more or less steady evolution. Common to those steps is that no known mechanism is efficient enough to make them happen. In the present paper a "super Darwinian" approach will be taken in an attempt to make it plausible that life and evolution towards a conscious species is possible. Example of the obstacles is that a self replicating peptide has to be smaller than 37 units for life to be probable on earth, or less than 111 for the entire universe. This could be compared to the smallest known RNA sequence able to copy another molecule, being 165 units long. Furthermore, the initial genetic code had to switch into the present DNA based one. As the original code probably was very different, switching from one to the other was extremely difficult, similar to an evolution of Chinese written language into English. Thus, intelligent life should not be able to appear anywhere in merely 14 billion years. As we are here, however, there has to be some mechanism that makes intelligent life possible, unless we are created and developed in a supernatural way. In the super Darwinian theory presented here, life has been able to overcome the evolutionary obstacles by taking advantage of the (disputed) fact that consciousness coupled to matter is required for the quantum mechanical wave function to collapse. When energy is converted to matter, the particles form entangled states. Such states persists until a measurement forces collapse of the wave function. Consequently, one could expect that the entire universe was in a state describing all possibilities simultaneously. Among all those possibilities, there will have been a huge number in which life was initiated at different locations in the universe. Then, the potential instances of life have undergone evolution. Each of the successful evolutionary routes would lead towards a particular kind of intelligent species, humans being one of them. Other routes would possibly have been developing towards very different kinds, like intelligent insects, or even more strange species, like Donald Ducks, trolls, or an intelligent species built from interstellar gas clouds. The parallel processing would make evolution fast enough to overcome the difficulties mentioned above. Different branches of evolution would proceed at different rates. Finally there would appear a species with a brain intelligent and efficient enough to handle consciousness. The universe would have produced a conscious observer and its wave function had to collapse. Instantaneously, all other branches disappeared. This super Darwinian mechanism would cause extinction on a far greater scale than any other known. Actually, there would be no fossils left from erased branches. They were erased not only from continued existence, but even from history itself. There are at least three ways in which this super Darwinian theory could be falsified, one of them being that if intelligent life is found anywhere else in the universe, the theory is probably wrong. **P1**

265 Meaning Making Brains: Toward an Existential Neuroscience Nathan Munn <munnn@umhelena.edu> (General Education, University of Montana – Helena, Helena, MT)

There are many parallels between existentialism and cognitive neuroscience. These include pre-frontal cortex volitional activity and freedom, mirror neurons and the I-Thou relationship, social cognition and being-in-the-world, functional brain changes in psychotherapy and existential choice and responsibility, authentic self and precuneus activity, and the relationship between meaning in life and suicidal ideation. Meaning, of course, is a major focus of existentialism. Brain function does more than just information processing. It makes conscious meaning. From the images produced by emoticons: ;-) – to the meaning of life, brains make meaning from the information presented to them. It is as if information is the carrier of a wave of possible meanings and brains, using widespread neuronal salience processing, collapse this wave into a particular conscious meaning. Considering these parallels, meaning making, as the function of brain activity, is a natural phenomenon. Rather than an emergent phenomenon, brains utilize the natural process of meaning making to produce consciousness much like lungs utilize the natural physical process of gas diffusion to produce respiration and the stomach utilizing pH to produce digestion. Meaning as a natural phenomenon may help explain the "measurement problem" in quantum mechanics. Conceivably this meaning making function could be used as a "place holder" in consciousness science much like the Higgs boson in particle physics. Meaning making as a natural physical process would also help end human's search for meaning. Meaning would be everywhere. The only remaining issue is how to collapse the meaning waves into particular meanings about self, surroundings, and the future. **P1**

5.0 Experiential Approaches

266 The Sacred Buddha Relic Tour: For the Benefit of All Beings Nisha Manek, MD, Usha Tatini, MD Mayo Clinic, Scottsdale; William A. Tiller, PhD <nisha.manek@arthritishealth.net> (Arthritis Health, Scottsdale, AZ)

For the first time in history, an extraordinary worldwide tour of sacred Buddha relics is bringing a direct experience of Divinity to thousands of people around the globe. A single Sunday afternoon visit to a Buddha relic tour in Minneapolis interminably transformed my understanding of the actuality of a high spiritual state, here defined as unconditional loving kindness. Mystics throughout time have advocated meditation and contemplative practice as the door of entry into the spiritual realms. Scientific inquiry of meditation has demonstrated that 1) spiritually adept Buddhist monks have different brain structure and function compared with normal people 2) it takes thousands of hours of meditation practice to achieve the neural transformation and 3) to experience the peace and happiness that meditation fosters it takes sustained practice and training. These accepted scientific facts come under closer scrutiny in light of the exceptionally high experiences of ordinary people at Buddha relic tours. The Buddha relics emanate energy, that is, a special transmission outside of the scriptures, without dependence upon words or letters, and give direct first-person experience of unconditional loving kindness. The relics are showing that experiential knowledge of a high spiritual state has the capacity to transmit a powerful and inspirational impact, more so than the linear process of conceptual reason. It is the power of the heart. In this presentation we discuss the beginning stages of understanding the transformative power of high states of spirituality such as that with Buddha relics. It is vitally important to point out that there is no-body physically present that can be studied, nor is there a nervous system. Yet, inexplicably, the formless quality of evolved consciousness such as loving kindness is encapsulated in the form of crystal-like relics. We discuss research in consciousness that definitively shows that human intention can be imprinted or embedded in electrical devices. The resulting intention host device can be utilized in a different time and location to change material properties in line with the specific intention. The set of conditions whereby the intention has robust effects include raising the physical space to a higher gauge symmetry state. This research is then extended to the Buddha relics. We show that simple electrical devices can be imprinted with the unconditional loving kindness essence of the relics by just being in the presence of the Buddha relics. The resulting relic-influenced energy host device demonstrates remarkable space conditioning properties that are experimentally measurable and the excess thermodynamic potential can thus be calculated. These data provide dramatic examples of what is achievable for a directed human consciousness and also a framework for understanding spiritual realities such as loving kindness. This information will be more and more important in all areas of future human life, but none may be more urgent than that involved in the alleviation of suffering in all its forms. **P2**

5.01 Phenomenology

267 Phenomenological Experiences of Cognitive Processing, Sensations and Perceptions throughout the Sexual Response Cycle Gregory Holler, Gregory Holler, PhD; Stanley Krippner, PhD <docgholler@yahoo.com> (South SF, CA)

One hundred and one male (n =41) and female (n =61) respondents completed Maliszewski and Vaughan's self-report inventory. This inventory investigated various components of sexual experience related to cognitive processing, sensations, and perceptions during sexual arousal,amplitude, orgasm and postlude. Phenomenological data as well as descriptive statistics for each variable

showed that males and females tended to score similarly on measures of general processes, sensations, and perceptions with males scoring at slightly higher rates across all phases of the sexual response cycle. **P1**

268 The Inner Experience of an Individual with Bipolar Disorder Johanah Kang, Chris Heavey; Russell T. Hurlburt <kangj@unlv.nevada.edu> (Psychology, University of Nevada, Las Vegas, Las Vegas, NV)

"Kathy" suffered from bipolar disorder. We used descriptive experience sampling to investigate her inner experience. On each of ten sampling days, she carried a beeper with her as she went about her typical daily activities, noting what was ongoing in her inner experience when the random beep sounded. After she collected the day's six moments of experience, we met for about an hour, working to apprehend her inner experience at each moment in high fidelity; the same procedure was followed on subsequent sampling days. During our first several days of sampling with Kathy, she struggled to describe her inner experience; over time she became progressively better. Why? Although it is possible that practicing the task of describing her inner experience led to the improved coherence of Kathy's reports of her inner experience, we will argue that it is more likely that Kathy's reports became more coherent because her inner experience itself became more coherent. Although everyone accepts that most externally observable behaviors are skills that must develop gradually as the result of the interaction of maturation and environment, many people uncritically presume that inner experience is something that emerges fully developed. We believe, and will argue here, however, (a) that inner experience must be created by the experiencer out of the inchoate welter of inner happenings; (b) that this creation-out-of-the-welter is a skill that is gradually acquired and honed; and (c) that some people, perhaps including those with some forms of mental illness, lag in their ability to create coherent inner experience. We will describe the progression of Kathy's reports of inner experience over our ten meetings together and discuss whether it is consistent with the notion that the changes in her reports reflected not merely reporting skill but reflected fundamental changes in her ability to create coherent inner experience. That is, her attempts to describe her inner experience became coherent because her inner experience itself became coherent. Ultimately, the ability to create inner experience may play an important role in psychological health. **P2**

269 Convergent Phenomenology Bruce Mangan, <mangan@cogsci.berkeley.edu> (Cognitive Science, Institute of Cognitive and Brain Studies, Oakland, CA)

As an explicit method, the roots of Convergent Phenomenology go back to W.R. Garner's work on perception in the 1950s. But the intuition at its core is as old as common sense: the likelihood of a given hypothesis is increased as independent lines of evidence and analysis converge on it. In effect Darwin used this method to argue for Natural Selection; William James used it to investigate consciousness. Convergence is the most inclusive method for evaluating scientific claims, and arguably the most widespread; certainly it is used more extensively in the sciences that evaluation via covering laws. A convergent approach to phenomenology moves as far away as possible from the 'apodictic' presumption of Husserl, and as close as possible to the operations of science as it is actually practiced. We will briefly note the most common lines of collateral support (e.g., neural, behavioral, linguistic) for an explicit phenomenological claim, but focus on two of the most neglected. These are (1) implicit phenomenological claims and (2) bioengineering plausibility. The first underlies much traditional philosophy, notably, in the West, Plato and Kant. The second rests on current experimental findings about the relation of conscious to non-conscious processing: phenomenological claims that make bioengineering sense in this context are stronger than those that do not. Among other implications, this approach undercuts intractability arguments against the use of introspection in science, argues for an integrated expansion of consciousness research, especially in the direction of traditional philosophy, and suggests that for the scientific investigation of consciousness, fields like paleontology, evolutionary biology and physical anthropology (not physics), are the natural models for hypothesis evaluation. **C5**

270 Experiential Phenomenology of Hybrid Model of Engineering Profiles in a Technological Organization Abhishek Nigam, Bhanu Prakash Rupali Misra Nigam <abhisheks.nigam@gmail.com> (Connected Home Division, ST Microelectronics Pvt. Ltd., Greater Noida, Uttar Pradesh India)

Consciousness defines our existence and reality, but the mechanism by which the brain generates thoughts and feelings remains unknown. Despite several centuries of research on the brain, communication through language or gesture remains the only way we can discover the conscious thoughts and experiences [Rees, 2007]. Dr. Steven Covey identified conscience, self-awareness, imagination, and independent will as interconnected human endowments guiding the decision-making space between stimulus and response. This cognitive decision making behavior, its subjectivity; awareness; sentience; having a sense of selfhood; or the executive control system of the mind can result in increased employees? competence levels and also organization's bottom-line. In this era of technological innovation, there exists a felt need of adjusting the existing organisational systems. There is increasing silicon design complexity owing to evolution of design methodologies and wide availibility of tools in alignment to Moore's law which states that the number of transistors on an integrated circuit doubles in approximately two years. This poses the challenge to create a hybrid model – a fluid organization where the employee, exercising his independent will, consciously transits between the CAD and design execution profiles in line with the dynamic business need. This paper is an attempt to study the experiential phenomenology of the resource response in light of the identified stimulus – exponential increase in technological complexity, reduced time to market, hiring freeze and employee turnover. With the manpower cost contributing to the 60% of the total design cost, the paper realizes the functionalism of this hybrid model of different engineering profiles, studies the methodology of conscious and unconscious learning, unlearning and relearning and how applying the attitude of curiosity can also enrich employees' competence levels and area of influence. **P1**

271 Inner Awareness V. Empirical Introspection V. Phenomenological Reflection David Woodruff Smith <dwsmith@uci.edu> (Philosophy, University of California, Irvine, Irvine, CA)

In what ways are we aware of conscious experience? There are importantly different forms of first-person awareness of experience. I shall distinguish three and note a fourth, as below. 1. Inner awareness of my current experience (in perception, thought, volition): a form of awareness that is an intrinsic dependent part of the experience (a "modal" character, on my preferred model) – this as opposed to a higher-order or perhaps same-order monitoring (per Armstrong, Rosenthal, Kriegel). 2. Introspection of my current experience: a form of empirical observation where I catch myself in the act and characterize the experience I was just having – this as practiced by early psychologists (Wundt, Titchener), with limitations currently pressed anew (per Schwitzgebel). 3. Phenomenological reflection on my current (and past) experience: a form of reflection that analyzes the ideal or "logical" structure of a familiar type of experience (a type you and I have experienced often enough) – this reflection as distinguished from "inner observation" in "mere" psychology and explicable as a variation on "pure logic" (per Husserl; cf. recent analytic phenomenology). I would also contrast awareness in meditation with these three forms of awareness. 4. Meditation in "mindfulness" practice (vipassana): a form of awareness of my current states or processes of consciousness in a specific condition of controlled meditation – where I "witness" the sensations, thoughts, and emotions that happen to pass through my mind in this controlled state, unlike empirical introspection in a psychologist's experiment. – How does mindfulness differ from empirical introspection? **C5**

272 Point A and B Practices for Growing into Universal Consciousness: A Phenomenological Study Wandan (Wendy) Zeng, Sastry Bhamidipati, PhD <wendy.zeng@gmail.com> (East West Psychology, California Institute of Integral Studies, San Francisco, CA)

Meditation is the natural manner of keeping one's attention on the object of meditation (K.C.Varadachari, 2002). During this period every meditator experiences the influx of lot of everyday thoughts and feelings. They interfere with our constant attention, and effort seems to be demanded to check the influx of these wayward thoughts. The need to throw out all these thoughts

is also felt seriously. Dejection seems to overtake most meditators(119). However, Sri Ramchandra (1899-1983), the founder of Natural Path (or Pranahuti Aided Meditation) has discovered two psychic points located about the heart area called Point A & B, by cleaning which, could check the influx of unwanted thoughts. The claim is that by meditating on Point B, one is capable of bringing sensual urges and desires, which are greatest obstacles for meditators, to a level of balance and moderation. Point A practice could enable a person to develop universal love and fraternity. This study explores the experiences and effects of Point A and Point B practices in meditators. This phenomenological study into the experiences of Point A and Point B practices is based on semi-structured interviews with eight PAM meditators with 6 months to five years of experience. Part I of the results of the study reveals that before the start of meditation on Point B, meditators' common states of mind are more of wandering states of mind, dullness, agitation, anxiety, heaviness, lethargy, disinclination for the practice. After ten minutes of Point B practice, meditators reported slowing down and reduction of the intensity of thoughts, switching to a calmer and more settled state of mind, and becoming inclined towards meditation. Some reported the feeling of lightness, weightlessness, inner glow and being enveloped in grace. Part II of the results related to the experiences of Point A reveals that meditators have feeling of connectedness with all. There is also a common switch in the state of mind from that of unsettled to settled state. Many experienced the feeling of fraternity, compassion, peace, love and warmth in the heart. There is also feeling of moderation, faint flow of energy and sensation, and centered-ness. Over a period of practice on these two points, they find that they become less impulsive and reactive in general. There is perceptible moderation of desires and anger. They also observe discernable improvement in empathy, sympathy, friendliness, fraternity, concord, and kindness towards others. They become capable of practicing truthfulness, non-injury, non-stealing, non-possessiveness in thought, word and deed to a great extend as well as being in tune with nature. References: K.C. Varadachari (2002). Complete Works of Dr. K.C. Varadachari, Vol 1. Sri Ramchandra Publisher: Hyderabad, India. **P1**

5.02 Meditation,contemplation & mysticism

273 A Method for Studying Consciousness Bharat Agrawal, Nataliya Kostyuk; Hari Cohly <bagrawal2011@gmail.com> (Electrical Engineering, Dayalbagh Educational Institute, Dayalbagh, Agra, Uttar Pradesh India)

Consciousness refers to a state of being. Meditation alters the state of being by elevating the individual. The study of consciousness can be reduced to the study of physical consciousness, psychological consciousness and spiritual consciousness. Physical consciousness refers to the Brain and Body. The Brain and Body can be studied in great depth using an Electronic Current Generating device and EEG. The current and the brain waves measured give in depth information towards the physical consciousness level. Psychological consciousness refers to the Mind. The study of psychological consciousness requires tools like APZ (Altered States of Consciousness) Questionnaire, GSR (Galvanic Skin Response) and GDV (Gas Discharge VIsualization) in order to evaluate psycho-emotional status and psychological status. The psychological analysis will give greater insight into the study of consciousness then physical consciousness. Spiritual Consciousness is of the highest order and refers to the Spirit. Spiritual consciousness can be measured by GDV and SQUID, both are indirect methods for study via measurement of electrophotonic emissions and electromagnetic radiation. Integrating these devices into one system will allow for a complete and holistic study of consciousness. Thus this method offers insight into the effects meditation has at the physical, psychological and spiritual levels. **P1**

274 Can We Know Consciousness By Using Purely Physical Methods? Ritu Atam <rituatam@hotmail.edu> (MD Anesthesiologist, Ellington, CT)

The human mind inherently tries to understand complex things by breaking them into simpler components (reductive method), and the tools that we use are physical tools. Purely physical explanation is well suited to physical structures, explaining macroscopic structures in terms of detailed microstructural constituents; and it provides a satisfying explanation of the performance

of functions, accounting for these functions in terms of the physical mechanisms that perform them. This is because a physical account can entail the facts about structures and functions: once the internal details of the physical account are given, the structural and functional properties fall out as an automatic consequence. The facts about conscious experience cannot be an automatic consequence of any physical account, as it is conceptually coherent that any given process could exist without experience. On the one hand, science sees the mind as the operation of the brain, the electrochemical activity in a vast network of nerve cells. But on the other hand, we each see ourselves as a conscious being, capable of thinking, feeling, and experiencing the world around us. In fact, the mind has aspects that cannot be reduced to anything; such as qualia, mental unity, and semantic thought are irreducible. These aspects of mind seem to entail something beyond the physical world, something that is fundamentally different from the machine-like operation of the brain. According to the texts of Hinduism, there are two types of knowledge- Aparavidya, that encompasses the entire spectrum of 'objects', that is, anything that can be objectified by our senses or mind (all worldly knowledge), and Paravidya, that is the 'higher knowledge' which realizes the higher regions of consciousness. According to religion of saints, the mind and spirit are distinct entities within the physical body, but not part of it, and therefore not accessible through the physical body or through hardware instrumentation. Phenomena occurring in the physical world are the effect of the cause in the subtle world (the higher regions of consciousness). By using the external senses and the physical instruments, it is only possible to measure the effects that the causes taking place in the higher regions of consciousness produce on the physical world. The consciousness of the spiritual domains cannot be perceived or realized by physical senses but requires one to elevate one's consciousness by performing yoga practices, especially Surat Shabda Yoga. **P1**

275 Effects of Meditation Forming a Collective Mind on Decision Maker Groups Concerning Risk and Investments Saverio Bellomo, Prof. Giovanni Di Bartolomeo; Prof. Stefano Papa <saveriobellomo@yahoo.com> (Science of Communications, University of Teramo, Italy; Albuquerque, NM)

Our Experimental Economics research measures the other-regarding preferences in a variant of Berg et al. (1995) Investment Game with meditation. The experiment examined whether a meditation protocol for experiment student participants before playing an investment game had a significant effect on the results compared to a standard investment game. The goal of this research is to show a potential shift of participants behavior when they played in different contests. One of the major tasks was to support the formation of a Collective Mind between two groups (trustors and trustees) of participants who were placed in two different rooms by random sampling and were matched in an anonymous way. In order to create this Collective Mind, a customized guided meditation protocol was used. The meditation session was guided by an experienced meditator in the Italian language. One 30-minute meditation session was characterized by the following five exercises: Exercise of Brain Synchronicity (6 minutes), Exercise of Affirmation (3 minutes), Exercise of Chanting (3 minutes), Exercise of Concentration (15 minutes), and Exercise of Chanting (3 minutes). The experiment was conducted in January 2011 at University of Teramo, in Italy. We verified that, with one or more meditation sessions, the trustors demonstrated more trust on average compared to an investment game done without adding a meditation variant. Our results confirmed that our sample provided significance testing. Why? A possible answer is that the variant of meditation formed a Collective Mind where the subjects played increasing social preferences and demonstrated more trust. As seen from the meditation questionnaires, almost everybody had never experienced any form of meditation before. So what happened to our subjects to induce a consistent majority to show social preferences? It seems that even a short meditation session can induce the brain into a different state, where compassion, positive changes in cognition and emotion, can be manifested by increasing the other regarding preferences. In conclusion, we observed that using a short meditation session, where the subjects were guided to reduce their brain thought activity through a meditation protocol, the investors sent more tokens. **C8**

276 Experiences and Effects on the Mind by Meditation on the Subtlest Object: A Phenomenological Study Sastry Bhamidipati, Wendy Wandan Zeng <sastry.bhamidipati@gmail.com> (Imperience – Pranahuti Aided Meditation Research Center, Fremont, CA)

The goal of this study is to explore the experiences and the transformative effects on the mind by meditating on "light without luminosity," the subtlest thought, used in the system of Pranahuti Aided Meditation (PAM). It is a truth that one becomes what one contemplates (K.C. Varadachari, 2002). Based on this principle, if one meditates on a very subtle object, the mind will transform itself accordingly to the nature of that subtle object and become very subtle itself. According to research studies, our subconscious mind processes information about 220,000 times faster than the conscious mind (Zimmermann, 1989). Thus the conscious mind is in fact the bottleneck in effecting true changes in us (K.C.Narayana, 2009). The Natural Path Meditation, different from all other major traditional meditative methods such as concentration and mindfulness which depend on the exertion of the conscious mind, brings forth a completely new category of meditation method that transcends this bottleneck by using the subconscious mind in meditation. In this meditation, the meditator gives himself/herself a one-time suggestion of the subtlest thought of "light without luminosity present in the heart where it beats" at the start of the meditation and henceforth allows the subtlest idea to work in the subconscious mind. The meditator is advised to neither concentrate consciously nor be mindful of thoughts arisen during the course of the meditation. However, the subtlest suggestion given at the beginning is capable of working its way through at the subconscious level and bringing the meditator to an absorbed state. This phenomenological study is on the experiences of meditation on "light without luminosity" is based on eight semi-structured interviews with PAM meditators with 6 months to five years of experience. The first part of the study into the experiences of the meditation reveal that meditators have the common experiences of time transitoriness or time collapse, absorption, calmness, relaxation, settled state of mind, energy flow, vibration in the heart, jerks in the body, aspiration thoughts, contentment, gratitude, peace, silence, happiness, freshness, lightness, expansion and love. The second part of the study on the transformative effects felt by the meditator reveals that they find their internal conflicts and disturbances alleviated and disappeared to a great extend, there is much stress relief in their lives. They become more plain, simple and contented persons and have a more positive outlook and holistic perspective on life. They found they have acquired better discipline, better self control and more confidence in themselves. Some of them become more courageous and are able to hold a stoic attitude in trying circumstances in life. There is also the awareness of interconnectedness and fraternity with others. They show more empathy, selfless service, sharing and co-operation with others. They also feel that they are heading towards completeness in life. These results suggest that such transformations may be connected to the meditation technique on the subtlest object of "light without luminosity." References:K.C. Varadachari (2002).Complete Works of Dr.K.C. Varadachari,SriRamchandra Publisher:Hyderabad Zimmermann, M. (1989)."The nervous system in the context of information theory",Human Physiology,Springer-Velag:Berlin **C8**

277 Spiritual Consciousness: The Real Path Satgur Chetna, Aradhana Sawhny,Nirakh Bal <rschetna@gmail.com> (Engineering, Dayalbagh Educational Institute, Agra, India)

Consciousness is one of the most emerging topics in today's world. As a subject of philosophy it is difficult to delineate. In simple words consciousness is, having sense of ipseity or executive control system of mind. Experimental determination of consciousness is a critical issue considering it relates with spirit. To ascertain magnitude and dimensionality of divergent spiritual levels has been arduous for scientists for long. David Hawkins, with reference to his work on kinesiology, merely observed the effects on the Physical Nature and not what constitutes the real spiritual experience.Spiritual consciousness is the realization of God. "There is no Truth higher than God and no Enjoyment higher than God-Realisation." This paper will make an attempt to discuss the real path or the inward path of consciousness as discussed by the pioneers of Sant Mat. **P1**

278 The Overlooked Role of Intuition in the Reach for Higher Consciousness Emmanuel Karavousanos <ekaravousa@aol.com> (Bellerose, NY)

No one can know when humans began to seriously wonder about the mind and the fact that we are conscious beings with the ability to think. At some point mysticism entered the picture and the so-called mystical state was accepted as a legitimate field of inquiry within the sphere we know as consciousness. Mysticism soon became a universal dilemma seemingly without solution, hence the name. In time the mystical state was given some new and perhaps distinctive names including ultimate reality, higher consciousness, enlightenment, nirvana, Brahman and more. These titles only added to its incomprehensibility. If we can come to know why, why a mystical experience occurs, this would give us the incentive to strive for it. Mysticism remains esoteric in that we fail to understand why it occurs. People lose interest while others begin to wonder about it. To appreciate, fully appreciate the meaning and majesty of the mystical mind, one must ascend to that higher state. Over the centuries we have tried in so many ways to reach that peak of consciousness. Many use various prayers while others use different forms of meditation. This presentation will offer that the desire to reach for that unique state of mind will become universal once we realize and know why, why a mystical experience occurs. Only then will there be a reach by all to attain that gift. Why? Why then does a mystical experience occur? It occurs when one's mind turns toward the analysis of familiar, obvious and known ideas that have been accepted and taken for granted. With this presentation we will actually know why a mystical experience is triggered and how this occurs. The mystical state will no longer be – mystical! It is here that the important but overlooked role of our intuition will be understood and become known. **P1**

279 Getting Past Negative Thought Patterns through Holistic, Psychological and Meditative Techniques Naama Kostiner <nishla40@hotmail.com> (Haifa, Israel)

The average human brain processes four hundred billion bits of information every second, yet consciously we are aware of only about two thousand. The unconscious brain stores away the rest and eliminates the need for us to think about each small step and action during the course of our day. Routine and habitual behavior help us function at almost every level, yet it establishes powerful, well-based neural pathways in the brain, making it difficult to let go of "negative habits" or trends that have, over time, become obstacles in the way of our goal achievement. Harnessing emotions are a key factor in changing habitual thinking. Maintaining new positive perceptions and introducing helpful self-talks all aid in altering the electrical and biochemical activity in the brain, so that whatever we focus our "conscious attention" on changes or creates new pathways and can break negative thought patterns. According to Watzlawick (1974), when seeking to change thinking patterns, the aim should be re-framing one's conscious awareness by building up a new approach to his or her personal story. Saleebey (2001), contributes to this point of view by stating that the longer one stays with a "problem /negative habit – focused assessment", the more likely it is that the habit will enhance and dominate that person's reality. In order to create a new approach or a healthier habit, it's important to shed light on a person's untapped reservoirs of strength as well as focus on the small victories in a person's experience. One's values and hopes can be located in specific life events so it stands that small and recognized accomplishments help to "re-author" and establish a fresh and successful history. This new history stands as a witness for new patterns of resistance and resilience to a person's problems and/or negative habits and make way for new, healthier, paths to evolve. Integrating traditional psychotherapy and "new age" holistic techniques such as meditation, offers an alternative approach to problem resolution skills and/or shifting stagnated patterns. Meditation expands awareness and allows "turning in" intuitively in search of inner strengths and quieting of the mind. This expansion seems to occur in both the outer and inner dimensions of being and as a result one becomes more physically, mentally, emotionally, and spiritually awake. Color Therapy has also been known to work as a catalyst for healing processes – helping the individual get in touch with his inner voice and strengths; this state opens a psychological and cognitive pathway open for exploration and accumulation of new healthier habits. This dialogue between traditional psychology and holistic therapy promotes one's creativity and turns it into a tool to help behave, think, and feel differently. **A1**

280 Awareness of Sound and Voice and Awareness of Awareness Mark McMahon <Mark@SonicHarmonic.com> (SonicHarmonic.com, Tucson, AZ)

Using metaphors, analogies and practical exercises, sound and voice become a schoolhouse for the study of consciousness. Lessons learned from this very tangible form of vibration can be extrapolated to more subtle forms of vibration, thus creating a new larger perspective for the student to navigate in other realms. This poster is about sharing the adventure in consciousness that sound and voice have taken me on. I started out in healthcare as a dentist. After a brush with mortality I was catapulted on an odyssey. Following my passion for travel and photography, I drove from Tucson to the southern tip of South America. Thereafter, and quite unexpectedly, a sound healing modality burst into my life. Working with others I was able to heal aches and pains using the sound of my voice. I discovered that the technology also worked to clear mental/emotional blocks, as well as clarify and strengthen intent and create desired feeling states.I was delighted with the results but had no clue about the mechanism. This prompted me onto a path of inquiry and research. What exactly is healing? Wellness? What is sonic energy? How is voice related to intent? How is my intent related to another's? My conclusions and answers to these questions are secondary to the joy of the journey. Science offers plausible explanations up to a point. Frequency and Resonance. A trained voice can shatter glass. Lithotrypsy treatment can 'shatter' kidney stones. The multidimensionality of the universe, the multidimensionality of our being, the multidimensionality of a simple verbal message. Sending and receiving. I have learned and now teach the science. But my search has taken me beyond science, beyond my culture and education. The realms of the adventure that are beyond words and rational explanation are where the fun, the real joy is for me. I teach the science but mostly as a pacifier for the logical mind so that the larger part of the being can experience the grander, multi-dimensional scale of what is happening. I really want to share my thrill of using my voice as a vehicle to explore consciousness. I invite you to follow your own voice, in all of it's dimensions, on your own path of exploration. **P2**

281 Practicing Consciousness in Daily Life Surjeet Nagpal <nagpalss@gmail.com> (Department of Sanskrit, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

It is important to understand that to develop awareness in daily life we do not need to go around with an empty mind. Rather, we strive to be awake and centered in the present, clearly knowing at each moment what we are doing/thinking. For instance, if you are walking down the street to the bus stop, know that the body is walking. If thoughts, plans, or memories come into the mind, be aware of them. When you come to an intersection, you know it and can decide whether or not it is safe to cross. When we are practicing Conscious living, we still experience thinking, seeing, hearing, feeling, and other mental and physical activities, but we remain centered on whatever main activity we are involved in at that moment. When trivial thoughts come into the mind, we let them go, because there is something more important and meaningful for the mind to be involved in – the present experience. If something important comes up that needs to be thinking about such things, then we can, of course, think about it. When we do, this new thought becomes the present activity for the light of awareness that shines on each thing so that it becomes clear. **P1**

282 Map of States of Consciousness Based on Eastern Spiritual Traditions Pritam Pyari, Sukhdev Roy <sukhdevroy@iitdalumni.com> (Music, Centre for Consciousness Studies, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Consciousness has been the focus of extensive studies in eastern spiritual traditions since ancient time. Documentary evidence of different states of consciousness that span the physical, mental, causal and spiritual domains and the methodology to attain them through meditational practices, dates as far back as the Vedic period (~1000 BC). Various spiritual traditions that include Hinduism, Jainism, Buddhism, Islam-Sufism, Sikhism, Sant Mat and Radhasoami Faith, have provided detailed revelations of different states of consciousness. It is enlightening to study the unity as well as diversityamongst these traditions, with respect to consciousness, to achieve the primary objective of self-realization, enlightenment and eventually salvation. It is also remarkable that they have sustained their respective spiritual perspectives and traditions over centuries of human evolution and provide their followers a basis of assessment of their spiritual progress with

respect to the different states of consciousness. A detailed study of the teachings of Saints over the past millennium, that include many Sufi faqirs and mystics such as Shams-i-Tabrez, Hazrat Khwaja Moin-ud-din Chishti and Maulana Rumi between 12th to 13th century AD in Mid-East and many Saints(Sants) between 15th to 19th century in the Indian sub-continent that include Sant Kabir, Guru Nanak (August Founder of Sikhism), Sant Dadu, Sant Paltu, Sant Jagjivan, Sant Tulsi of Hathras and Huzur Soamiji Maharaj (August Founder of the Radhasoami Faith), shows that there has been a progressive increase in the revelations of higher states of consciousness with time. A comparative analysis of their descriptions interestingly yields identical terminologies, characterization of different states of consciousness and the meditational technique for their attainment, i.e., Surat-Shabda-Yoga-union of spirit with sound current). In an unprecedented clear, lucid and detailed exposition by Huzur Soamiji Maharaj, enshrined in the sacred scripture Sar Bachan of the Radhasoami Faith, in both poetry and prose form, the highest state has been revealed as Radhasoami. The human frame as a microcosm possesses eighteen subtle centres when rendered kinetic through meditation, hold communion with corresponding states and regions of consciousness pertaining to the physical/material region-Pinda, the states of Universal Mind-Brahmanda, and that of Universal Spirit. Beginning from the six chakras, one can progress to the astral regions of Shiva, Brahma and Vishnu to Sahasdal Kamal, Trikuti (Brahma-Om) and Sunn (Para-Brahma). Beyond Brahmanda lie the regions of Mahasunna (dark-interface), Bhanwar Gupha (whirling vortices), Sat Loka, Anami Loka, Alakh Loka, Agam Loka and Radhasoami Dham. The higher states of consciousness are characterized by perception of spiritual sounds, namely, Niranjan-bells and conch-like, Om-roaring thunder-like clouds, Rarang-sarangi/sitar-like, Soham-flute-like, Satbagpipes-like and Radhasoami). In order to effectively develop a comprehensive understanding of the detailed subjective experiential science of various spiritual traditions, it is extremely important to prepare an all-inclusive map of the different states of consciousness. In this paper, we develop a map of the full spectrum of consciousness based on various sacred eastern scriptures. The map would be invaluable for mapping theories and introspective accounts in other spiritual traditions, their validation through meditational techniques and possible scientific experimentation. **P1**

283 Levels of Consciousness of Jivanmukta Durga Prasad Rao <dr.cdprao@gmail.com> (Centre For Consciousness Studi, Dayalbagh Educational Institute (DEI), Agra, UP India)

Among the four goals of human life, Dharma, Artha, Kama and Moksha, Moksha is considered to be the ultimate, the attainment of which is permanent emancipation and gives Supreme consciousness. Moksha or Mukti is the ultimate goal of life and it is complete emancipation or attainment of Brahman, Supreme Consciousness and Bliss. It is of two types, Jivanmukti and Videhamukti. Emancipation during one's life time is Jivanmukti while the same after death is Videhamukti. The concept of Jivanmukti is a unique feature in Indian Philosophy. The statements 'Brahmavidapnoti param' (The knower of Brahman attains the supreme benefit), and 'Brahmaveda brahmaiva bhavati' (The knower of Brahman becomes Brahman) signify this concept. This state of Jivanmukti can be achieved by any true seeker under the guidance of a living Adept. The nature of pure consciousness is to some extent revealed to us by the statements and activities of those Jivanmuktas. Though the bliss experienced by them is one and the same, the activities are different, and the difference is on account of their different missions of life. Vidyaranya in his Jivanmuktiviveka categorised them into groups based upon their nature, status, priorities and activities, both worldly and spiritual. Seven stages of Jivanmukta are described. In the first stage one desires to know Brahman. In the second, he starts enquiry and in the third he knows Brahman indirectly. These three are considered to be in the waking state of Jivanmukta. In the fourth stage, he realizes Brahman directly and the world appears to him as a dream. In this state he is called Brahmavit, and this state is considered to be like dream state. Gradually the Jivanmukta enters into the fifth stage where he is absorbed in Nirvikalpasamadhi. In this state he is called Brahmavidvara. Now and then he comes out of the Samadhi either out of his own will or on request. This is like the stage like Sushupti where he is awake while asleep and asleep while awake, and is called a Brahmavidvariyan. The next is the final stage where he internally renounces all actions and does not desire anything for himself. His inner eye is open, even though he may perceive all things with his external eyes and perform all normal activities. This stage is called Turiya State

in which he is known as Brahmavidvarishtha. He comes out of this stage of his own will to grace the world. He is full of bliss and happiness, and therefore appears to be an ordinary man; but in reality, he is free from all delusions. A person who has progressively attained these higher stages of consciousness, works for salvation of the entire creation. **P1**

284 Integration of Aparavidya, Paravidya and Personal Inner Experience for Consciousness Research Ranjeet Kaur Satsangi, Dr. Sona Ahuja <ranjeetkaurdei@gmail.com> (Pedagogical Sciences, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Consciousness, is what, why, how are the questions of utmost debate right from very existence of mankind. In a general sense, it can be explained as awareness of knowing. Awareness of knowing that we know. Consciousness is not a concrete thing that can be seen, smelled, listened or tasted through our physical sense organs. It can be understood as subtle energy pervading our total existence like fragrance in the flower. It is not the vital property of living beings only. It encompasses the whole universe- animate or inanimate. Even the smallest atom of the element has a consciousness of its own kind. This is the reason why the whole universe is operating in accordance with certain laws which we call laws of nature. Consciousness has various levels. The level of consciousness existing in non-living things is lower than the level of consciousness of plants. In the same way, the level of consciousness of plants is lower than the level of consciousness in animals. Even in human beings, the level of consciousness varies form man to man. It varies according to age and educational level. Consciousness has many dimensions too, starting form consciousness about the self, about one's own physical body, about one's emotions, about environment (physical and social), about spirituality and so on. Thus, to understand consciousness we cannot depend upon one discipline only. Right from ancient times, knowledge has two major categories, the Aparavidya and Paravidya. Aparavidya is knowledge of the material world that we attain by our sense organs and which is useful in living in this world. Paravidya is the knowledge of the meta-world, the world beyond the physical limits. This was attained by our ancient Rishis and Saints by making their hidden centres present in their brain, kinetic through regular mediation or Sadhna, under the guidance of a Guru. This knowledge is present in our ancient scriptures, religious books and bachhans and bani of Saints like Sant Kabir, Guru Nanak, Jagjeevan Sahab, Paltu Sahab, Sant Tulsi Sahab of Hathras and also Saints of Radhasoami Faith. Therefore in order to understand the subtle intricacies of consciousness, we need to understand it through the vantage points of various disciplines of Aparavidya like Biology, Chemistry, Physics, Neuroscience, Psychology, Philosophy, etc. Also, we need to understand it through our ancient scriptures like Vedas, Upanishads, Geeta, Bible, Quran, etc. But these scriptures can only give theoretical knowledge about consciousness which is just Vachakgyan. In fact, consciousness is a personal experience. To achieve highest level of consciousness is the goal of human existence and is the birth right of each individual human entity. To realize its bliss within is a personal experience. This can be attained through constant meditation or most precisely Surat-Shabd-Yoga under the guidance of an able Guru (Shabd Guru). Thus, to conclude it is only through the integration of Aparavidya, Paravidya and personal experience that we can fully understand consciousness. **C16**

285 Consciousness: In the Light of Neuro-Dynamics Concepts Richa Satsangi <richasatsangi@yahoo.co.in> (Lombard, IL)

Consciousness is an intrinsically dynamic phenomenon and must therefore be studied within a framework that is capable of rendering its dynamics intelligible. Neuro-dynamics offers a powerful approach to the outstanding problems in the cognitive sciences. It is to understand how ongoing conscious experience is related to the workings of the brain and nervous system because it provides a coherent framework for investigating change, variability, complex spatiotemporal patterns of activity, and multi-scale processes. The nervous system is a complex dynamical structure, in which individual neurons have intrinsic activity patterns and co-operate to produce coherent collective behavior. Its complexity is certainly due in great part to its histological and morphological structure, and one of the most striking aspects of the brain as a system is the connectivity pattern it exhibits. The organization of the brains connectivity is what ultimately determines the form of the neural spatiotemporal patterns. One of the most important conclusions

of the study of the brain as a system is that, despite its massive interconnectedness, the brain shows a strong segregation into clusters at both structural and functional levels. The interplay of these two characteristic features of the brain lies at the basis of one of the most interesting issues in contemporary neuroscience the large-scale integration of brain activity and its role in the unified nature of experience. Consciousness manifests subjectively as a kind of continuously changing or flowing process of awareness, famously called the stream of consciousness. There seems to be an endogenous, spontaneous, ongoing flow to experience that is quite refractory to external constraints. This intuitive convergence of complex dynamical patterns in experience and in brain activity is highly suggestive. It suggests that the framework of dynamical systems theory could offer a valuable way of bridging the two domains of brain activity and subjective experience. The neuro-dynamics of consciousness is an attempt to relate two dynamical phenomena that take place in a subject the formation of metastable patterns in the subjects neural activity and the transient emergence of dissociable elements or aspects of his or her conscious experience. This paper elucidates neuro-dynamical approach in describing consciousness subjective experiences. It also accentuate dynamical aspects of experience might serve as a leading clue for uncovering and tracking the neurobiological processes crucial for consciousness. **P1**

286 Cosmic Consciousness Hierarchization: Analytic, Experimental and Experiential Prem Saran Satsangi, Vishal Sahni <deivishalsahni@rediffmail.com> (Dayalbagh Educational Institute, Chrm, Advisory Committee on Education, Agra, Uttar Pradesh India)

This paper presents a systemic analytic framework for hierarchization of consciousness. It is supported by study of human consciousness as a surrogate of macrocosmic consciousness via scientific experimental measurements of electromagnetic wave radiation as well as the experiential observations of the participating members of the Dayalbagh community during meditation-cum-prayer meetings. Besides the theoretical underpinning [1] of the paper in the O-theory family of models and Physical System Theory, Fuzzy Analytic Hierarchy Process (AHP) [2,3,4] is used for hierarchization of the identified 21 cosmic consciousness regions of the Universe, consisting of six sub divisions and one buffer-zone each for the three grand-divisions of the macrocosm, viz., physical region ('Pind'), region of universal mind ('Brahmand') and purely spiritual region ('Nirmal Chetan Desh'). In terms of oriental philosophy of Saints (Radhasoami Faith) [5], consciousness has the following six chief attributes or criteria, both at the macrocosmic level of the universe as well as the microcosmic level of human being – 'Sat', the truth of love (or inseparability); 'C(h)it', the conscious knowing (the reality of immortal existence); 'Prem-ananda' or bliss of love (experiencing the joy of unity consciousness); 'Prakash' or light (refulgence of consciousness / energy centres); 'Shabda' (characteristic mystic word or name (inward and attractive sound-current articulation of consciousness force-field), and accompanying "Anahad nad" (unstruck celestial music). The experimental part of the paper presents a systemic study [6,7] of macrocosmic consciousness of the Dayalbagh community, during congregational meditation-cum-prayer meetings in the Community Hall at Dayalbagh, through relevant repeatable non-intrusive (non-invasive) scientific experiments using random number generators, electric circuits such as RC filters (low pass, band pass and high pass), tuned LC circuits, RC phase-shift circuits, and a diode bridge square law modulator circuit (for sensing electromagnetic waves in the Community Hall), Quantum Random Number Generation Waveforms and Electromagnetic Wave Radiation power spectra, and finally SQUID (Superconducting Quantum Interference Devices)-based measurements, used for sensing extremely low magnetic fields at cryogenic temperatures. Measurement techniques have been suitably devised for recording spatial variations in consciousness across clusters and during identified activity phases of the meditation-cum-prayer sessions. For instance, the SQUID-based results are rather interesting and indicate that the atmosphere becomes quite focused during meditation and the magnetic fields in the vicinity also rise. An even more interesting observation is that immediately after meditation, there is a kind of residual effect and the serenity continues to prevail. Implementation of fuzzy Analytic Hierarchy Process for cosmic consciousness involves evaluation by participants of grade of membership of each of the identified 21 alternative consciousness centres for the 6 criteria or attributes of consciousness in the form of a position matrix based on their domain knowledge and intuitive meditational experience. To conclude, 'Param

Purush' (Supreme Being) Radhasoami is : 'Param' 'sat' – 'c(h)it' – 'premananda' – 'prakash' – 'shabda' – 'anahad nad' (the fountainhead of all consciousness in the cosmos). **C16**

287 Consciousness is the Potential for All Creation Aman Sethi <aman_sethi@hotmail.com> (Naperville, IL)

Our brain is like a quantum machine that is in direct contact with the laws of nature, and through consciousness, when there is a desire to create, our brain sends a signal to the very source of nature's law that starts the process of creation. When we break down the process of creation – Before anything happens in this physical world, it is conceived in the imagination in our mind and consciousness – this is the quantum state where images of objects and desires are conceived. These images then unfold into expressed objects and events in the physical world. If we empty our brain of all thoughts (as in a state of Sumiran Dhyan or Practice of Meditation), it turns out that awareness is not empty or even passive. Beyond the limits of time and space, there is one process that is taking place all the time – Creation. Creation is creating continuously, using consciousness as a tool. If we break any experience down to its most basic elements, we will observe ripples in the quantum field; also if we break any object down into its most basic elements, we get ripples in the quantum field. The quantum field is the origin of creation – in other words, our thoughts originate first in this field of consciousness (quantum field) that triggers the process of creation. So, just by paying attention and having a desire at the level of consciousness, we turn on the switch of creation – this manifests itself in the physical world. How do we release our full potential to create? Sumiran Dhyan (Practice of Meditation) brings us into contact with our silent level of awareness. This allows us to experience a deep settling of our mind so we can bring our awareness to pure consciousness. If we release an intention/desire to create something in that stillness of the mind, pure consciousness does not have a choice but to make it happen in the physical world. Just by paying attention and having a desire at this level of awareness and consciousness, we start the process of creation. We are also assisted in this creation process by the entire universe of which our consciousness is a part of. Consciousness therefore unfolds objectively as the visible universe and subjectively as events inside our mind. We know that behind any experience is an "experiencer" who always knows and is aware of what is happening. Through Sumiran Dhyan, when we are able to find a way to be the experiencer, we find ourselves at a still point around which the whole world turns. This process starts with Sumiran Dhyan (Meditation) and the grace of the Supreme Lord. Every experience comes to us as a feeling, a thought, or action. At unexpected moments, the "experiencer" is more present in these things than usual. We can attain this higher state of awareness through regular Sumiran Dhyan (Practice of Meditation). **P2**

288 Meditation-Induced Bliss Viewed as Release from Conditioned Neural (Thought) Patterns which Block Reward Signals in the Brain Pleasure Center Patricia Sharp <psharp@bgsu.edu> (Psychology, Bowling Green State University, Bowling Green, OH)

The nucleus accumbens is thought to orchestrate a constellation of processes related to reward, instrumental conditioning, and subjective pleasure. It is also thought to give rise to the addictive consequences of repeated reward, such as compulsive gambling, drug addiction, and the subjective feelings of craving and anhedonia which accompany these addictions. Although the biochemical details remain unclear, it seems that the neurotransmitter, dopamine, as well as endogenous opiates play interactive roles in these processes. These transmitters are released interactively by natural rewards (food, water, sex, money, play, etc.). They are also released and/or mimicked by almost all drugs of abuse (heroine,amphetamine, cocaine, nicotine, alcohol), and this suggests that these drugs usurp the 'natural' accumbens reward system (Wise 2004; Koob & Volkow 2010). Addiction and craving develop gradually over repeated drug exposure, and they seem to be largely dependent on conditioned (learned) changes in the dopamine response to reward. In particular, it seems that over time, contextual cues which accompany drug use (injection paraphernalia, social and physical environment) come to elicit an anticipatory, compensatory down-regulation of dopamine release (Nestler & Carlezon 2006; Schultz & Dickenson 2000). Thus, repeated drug use causes a painful down-regulation of the very biochemical activities which accompany everyday pleasures, and which presumably caused the sought-after drug-induced 'high' during

initial use. As with many spiritual traditions, Buddhist philosophy provides strong advice against the pursuit of worldly pleasures as a means to attaining the 'good life'. Although these pleasures seem gratifying at first, they will ultimately only lead to craving, dissatisfaction, and pain. Thus, this spiritual insight fits well with the vicissitudes of dopamine in relation to vice. Interestingly, the Buddhist view of addiction is more expansive than most. Buddhist psychology includes any attachment to a fixed identity (self), along with the attendant desires for success, power, money, etc., as a form of addiction. In general, then, both neuroscientific and spiritual analysis might at first seem to suggest that the best we can hope for in life is to avoid vice and avarice, and hope to maintain a stable, if uninspiring, level of reasonable hedonic tone. In contrast, however, many forms of Buddhist meditation practice are said to give rise to an immense and abiding joy (e.g. Shankman 2008). Most of these practices involve a stilling of the mind in which all content-laden thought (fantasies, daydreams, plans) ceases, and the mind enters a state of open, formless, clarity and bliss. In apparent agreement with this claim, a study of highly accomplished Yoga Nidra practitioners has shown a 65% increase in endogenous dopamine release in the accumbens during this practice (Kjaer et al. 2002). I propose that the explanation for this can be obtained by following the Buddhist suggestion that almost all of our repetitive thought patterns can be viewed as a form of addiction. It follows, then, that if we completely turn off the internal "gossip of ego" (Trungpa Rinpoche 1972), we find relief from the dopamine down-regulation which is, perhaps, the perpetual concomitant of our daily rumination. **C8**

289 Meditation: A Brief Look at its Neuroscience Maricelli Soberanis, Thomas Benda <marflorita@gmail.com> (Taipei, Taiwan)

Meditation is difficult to define mainly because it refers to an extensive range of practices. For the purpose of this paper, meditation is referred to the contemplative Eastern practice developed by the Buddha Shakyamuni. Even within Buddhist meditation, there are different procedures to practice meditation. This study will mainly focus on two meditative procedures, Insight and Zen meditation, comparing neuroscientific findings correlated to permanent changes in the brain. It will then look at a recent study based on the Eastern philosophies of meditation and critique its neuroscientific findings. Insight meditation focuses on cultivating attention and nonjudgmental awareness to internal and external sensory stimuli, termed mindfulness. Zen meditation focuses on openness towards the mental flow of events and a normal breathing pattern while sitting cross-legged in a straight posture. Both insight and Zen meditation studies have shown morphological differences in meditation practitioners. Lazar and colleagues (2005) found an increase of cortical thickness in the regions related to attention, interoceptive, and sensory processing when compared to non-meditators. A study on Zen meditators (Grant, 2010) also found thicker cortical regions and more experienced meditators were associated with having thicker gray matter. A recent study by Jang and colleagues (2010) on the default mode network (DMN) of meditators versus non-meditators revealed that areas associated with the DMN showed increase connectivity for meditators. The brain's default mode network, characterized by a decrease in neural activity during goal-oriented activity, has revealed to have similar areas associated with meditation. The DMN supports introspective mental activity. In particular, the medial prefrontal cortex (MPFC) has been related to the autobiographical self, stimulus independent thought, and self-projection. In Jang's study, the MPFC showed increase functional connectivity in the anterior MPFC region. Neuroscience can be viewed as the connection of brain functioning to discuss meditation. The results of these meditation studies may be attributed to greater neuronal connectivity derived from neural plasticity as a result of experienced meditation. Neural pathways of meditation may be significant in understanding how the processes in the brain relate to highly debatable terms such as consciousness. Future neurobiological studies on meditation may contribute to enlighten the phenomenon of different states of consciousness. **P2**

290 Identification of the Conscious Self P Sriramamurti <psriamamurti.db@gmail.com> (Ctr for Consciousness Studies, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Consciousness is the state of being aware of what is happening outside in the world and inside the mind and the spirit, the Self. There are three factors involved in the process, firstly knowing,

secondly the instruments of knowing the senses and their aids, the mind, and thirdly the conscious subject, the knower, the Self. Often we attribute consciousness to the senses and the mind. But I see things, I understand the happenings and My own Self. Who is this I? It is not the eye or its aids. It is not the mind that thinks, feels, enjoys. It is the one who uses these senses and mind to know things, the experiencer, the Spirit entity, the Atman. All cognitive and conative activities are performed for Its sake, the Atman's sake, for Its pleasure. So what is to be investigated into is the nature of Atman, the conscious Being. What is Atman? Where does it exist in man? Seers Prophets and Saints taught the process of dissociating the Spirit, the true conscious Being, from its objects, and the means of obtaining their consciousness by withdrawing Itself inwards identifying the Inner Self. The journey inwards and the stages one has to traverse are explained philosophically in Vedanta and practically in prevalent Yoga techniques. Hatha Yoga teaches how the Spirit spread out in the physical body through mind and can be reversed back to its seat in human body, the Ajna Chakra. Crossing over Chidakasa, it goes to attain the three forms of Brahman, the Absolute Universal Self, successively as Virat, Hiranyagarbha and Avyakrita. These states are described by Risis, Munis, Buddhas and Prophets. Corresponding gateways are said to be situated in the innermost quarters of the centres in the grey matter of the human Brain. The Sufis, Saints and Param Sants described further stages in the recesses of the Spiritual Self in white matter up to Radhasoami, the highest Spiritual Region, the Supreme Reservoir of Spirituality. Research into Consciousness needs to be conducted by turning around and looking inwards through inner eyes provided by Nature in the grey matter and white matter of the human brain in the form of apertures. Contemplating and focusing our attention there, under the guidance of Self Realized Adepts glimpses and visions of higher states of consciousness can be had. As the Chakras, Kamals and Padams are situated in realms of higher Consciousness they dimly reflect at their physical counterparts of nerve centres and ganglia. But when concentration of Spirit-Mind currents are riveted at those centres the gateways of higher realms open up gradually. The only means to affect this is the repetition of the Holy Name Radhasoami the articulate form of the inner resonance of Spirit Force at the highest centre enabling hearing unstruck sounds. Other Holy Names also, which are articulated forms of resonance of Spirit Forces at the centres of their origin can help one to reach the realms of their respective sources. **P1**

291 The Science of Spiritual Consciousness Ravindra Srivastava <ravindra.srivastava07@gmail.com> (Business, BSES, Noida, Uttar Pradesh India)

Before making an insight into any study it is imperative that there should be a clear cut understanding of the topic. Let us first understand the topic The Science of Spiritual Consciousness. There are 2 key words in this (1) Science (2) Spiritual Consciousness Science means a systematic method of gathering knowledge and organizing it into laws and principles. Spiritual Consciousness means The Spirit Force and Its Reservoir. Hence the subject means analyzing in a scientific manner, the characteristics, nature, tendencies, working principles, acts and manifestations of the Spirit . Just as gross matter, which can be studied scientifically, we will study, the spirit, in a scientific manner. Modern day science, primarily, concentrates only those activities which are considered as a Force (Energy) viz. chemical, atomic, nuclear, biological, magnetic, electrical, hydraulic, pneumatic etc. It is somewhat reluctant to consider the Spiritual Consciousness as a Force (Energy) in the same perspective, as it considers the aforesaid forces because the former is intangible to the physical senses. We, in our study will "prove" and establish that spiritual consciousness is nothing abstract but is a Force (Energy) and dominates all other forces (i.e. electrical, magnetic, nuclear, pneumatic, chemical, biological). It will also be established that the modus operandi of spiritual consciousness is fundamental, and all the other aforesaid forces not only owe their origin to the spirit force but their working principles are a replication of the principles adopted by the spiritual consciousness in course of its workings and manifestations. Basic attributes and characteristics of the Spiritual Consciousness will be highlighted Similarities will be drawn between the principle of operation of the spirit force and material forces. The Creation of Cosmos by the process of Spiritualization of the spiritual consciousness, with an insight into the intricate concepts like Condition preceding Creation of Cosmos and state of spirit entities therein; Object of Creation; Birth of Time; Genesis of Ego and Self; and Origin of Variety in creation; will be the

core of the study. Our study will also envisage- (a) the objective of the spiritual consciousness (b) the impediments encountered in the achievement of its objective and (c) the remedial measures required to overcome the impediments. Finally, drawing intermediary inferences and arriving at a conclusion has always been an integral part of scientific methodology. We shall, accordingly, draw concrete conclusions, based on our study. **P1**

5.03 Hypnosis

292 The Use of Clinical Hypnosis in Palliative Care: The Experience in a Skilled Nursing Unit Care Home (SNU) to Discover the Benefits of Consciousness Expansion Paola Brugnoli, MD <paola.brugnoli@libero.it> (ICU/Anesthesia; AIST Italian Association for the Study of Pain Therapy &, Trento, Italy www.residenzava, Italy)

The Skilled Nursing Unit Care Home (SNU), is a place of residence for people who require constant nursing care and have significant deficiencies with activities of daily living. Residents include the elderly and younger adults with physical or mental disabilities. Many patients experience anxiety, distress, physical and psychological pain and suffering. The Skilled Nursing Unit (SNU), Care Home "Residenza Valle dei Laghi" in the city of Cavedine, Trento, Italy, organized a group therapy in this study, which investigated responses to patients' pain and suffering, with clinical hypnosis techniques. We have organized a group of patients with physical chronic pain evolving in psycho somatoform disorders, utilizing the group therapy with direct and indirect clinical hypnosis, by metaphors and relaxing musical video. The anesthesiologist and hypnotherapist Dr.Paola Brugnoli, MD, and the psychologist Dr. Livio Dal Bosco treated the group of patients of the SNU. The hypnotherapy group is a psychodynamic group therapy where the people context and group process is explicitly utilized with clinical hypnosis as a mechanism of change by developing the manifestations of conscious energy, exploring and examining interpersonal relationships within the group to discover the benefits of consciousness expansion. **A3**

293 An Analysis of My Anomalous Experiences Spanning a Lifetime Fiammetta Rubin <rubinartstudios@aol.com> (Naturopathic Educational Services, Philadelphia, PA)

My presentation will discuss phenomena addressed in the film entitled "Fiammetta's Story," filmed in Sweden in 2011 by Marcus Perfjell at the Toward a Science of Consciousness Stockholm Conference and will include descriptions of experiences of clairvoyance, psychokinesis, sudden information about the present and past, synchronistic information in the form of thoughts, images and holograms and information obtained through self hypnosis. The understanding to these phenomena is not yet possible by way of classical physics which is not at the moment capable of addressing the teleportation of macro particles through microtubules in the brain, or of thought transmissions except through the scientific studies with computer generators done at PEAR, and with research using data from fMRIs. On the other hand we cannot dismiss the reports of such phenomena as psychic aberrations and mass delusions simply because we do not yet totally know their causes. The Pentagon's research from the sixties about non-local viewings does support a hypothesis of a "natural" energy at work, and not of a deus ex machina. So does the work of C.G.Jung. Concepts of materialism, spirituality and multiple universes shall also be discussed in this paper. **A2**

5.04 Other altered states of consciousness

294 Interspecies Healing through Musical Storytelling Yvonne Dardenne <jayadevi@att.net> (Hayward, CA)

The Great Score of life manifests in an orchestra of relationships. The relational symphony is both intersubjective and co-created. While the Master Composition is in the key of Universal Love, the intentions of the musicians' soul, heart/mind, and body create interrelated melodies, rhythms, and variations in this key. The closer the symphony attunes with the perfect love, harmony, and beauty of the Master Composition, the greater the well-being of its individual players and

the orchestra as a whole. Well-being manifests from an individual's alignment with unconditional love, principles of health, and interrelatedness. Between a human and their animal companion, a transference/ counter-transference of states of health occur in the intersubjective consciousness of the human-animal bond. Imbalances or blockages to energy flow in the bodyheartmindspirit of either species can result in reciprocal imbalances in the other. Most existing work in pet facilitated therapy, trans-species psychology, and animal telepathic communication approaches the human as separate from the animal. As such, it lives in a dualistic paradigm. Interspecies Healing through Musical Storytelling is non-dualistic as it considers the human and non-human animal as one entity. Its focus is on their bonded relationship as the 'prima materia' of the consciousness matrix. By using the healing modalities of music and metaphor to shift the energy and morphology in this intersubjective space, a closer, finer tuning of alignment with health results in both beings. The primary scientific basis for this work is found in quantum physics theories of nonlocality, and entanglement, concepts of nonlinear time and retrocausality; neurophilosophy theories of intersubjectivity and panpsychism; the morphogenic field theory; and neurocardiology's heart/ mind entrainment. The healing power of music and story is proven to aid in restoration of harmony, rhythm, and balance to living beings. The Experience We are all on a personal journey in life; each with our own unique sense of purpose. Our animal companions share the journey with us. After a musical PowerPoint presentation of scientific theories and principles, Ms. Dardenne will lead participants on a musical "hero's journey" into the imaginal realm with the purpose of creating a wider breadth of well-being in both themselves and their pets. To set the stage for this journey, participants will be asked to reflect where they are in their own hero's journey, identify their and their pet's most burning needs, and set an intention for healing. Through this individual and collective musical storytelling experience, the heart's emotional energy will shift and shape change consciousness in both the participants and their pets at home. **P1**

295 In Pursuit of Cognitive Liberty: Exploring the Spiritual and Psychological Implications of Psychedelic Consciousness April Fisher <apedfish@gmail.com> (Humanities, CSUN, Yorba Linda, CA)

In the book "Higher Wisdom: Eminent Elders Explore the Continuing Impact of Psychedelics" editors Roger Walsh and Charles Grob interview many of the most notable scholars and researchers to reflect on their contributions to the field of psychedelic studies. The insights obtained in this collection about the nature of Psychedelics and the variety of ways to use them for psychological growth and spiritual transformation has been invaluable as one of the primary resources for my paper on Psychedelic consciousness. Starting with exploring the ritual use and spiritual significance of Peyote in the Native American Church to contemplating the inherent sacredness of the psilocybin mushroom through the lens of Vedic philosophy I transition into tackling the bigger question of why and how Psychedelics can be used as a transformative tool for individual and global consciousness. Looking at the past present and potential future use of Entheogens in a productive and intentional way through existing research and literature provided a foundation to facilitate my own thoughts and theories on how and why these substances can be used in a positive way in a society that, perhaps unnecessarily, attaches stigma and prohibition to them. It is with this change of perception in mind that I invite readers to examine the history and psychological/spiritual nature of psychedelics and consider their potential benefits as a purposeful pursuit of cognitive liberty for the expansion of our global human consciousness. **P2**

296 A Quantum Model of Altered Consciousness for Mind-Body Medicine Reginald Humphreys, Kathleen Eagan <drrbh@compuserve.com> (American Society of Clinical Hypnosis, Dallas, TX)

The authors recently presented the details of a quantum model of consciousness designed to aid in the understanding of phenomena observed during clinical hypnosis (TSC Sweden, 2011). This quantum model posits the existence of eight channels of autonomic communication, residing within five quantum dimensions. The effects of hypnosis on consciousness are understood as resulting from entrainment of the parasympathetic and/or sympathetic branches of the autonomic nervous system. Simple entrainment of the most accessible autonomic channels produces the

basic hypnotic trance which is in widespread clinical use. Concurrent entrainment of multiple autonomic channels is associated with trance enhancement and therapeutic specificity. Simultaneous entrainment of autonomic channels which reside in different quantum dimensions is hypothesized to be a higher-order form of entrainment, which fosters a higher-order alteration of consciousness. We have referred to this as multidimensional entrainment of the autonomic nervous system (Humphreys & Eagan, 2010), "quantum trance," and "quantum hypnosis." These new ideas could have a revolutionary impact on each of the fields of inquiry involved. For the vast number of scientists devoted to studying the autonomic nervous system, the availability of a working quantum model of autonomic functioning represents a giant step forward in the sophistication of autonomic science. This grounding in quantum concepts extends to and elevates the scientific status of hypnosis, as well as the scientific status of the study of altered states of consciousness. This elevation has been much needed, as both hypnosis and the field of altered states of consciousness have suffered from a sort of second-class status. Hypnosis has a long history of being underutilized clinically, despite an excellent track record of effectiveness. Similarly, hypnosis has been almost ignored in the world of science, possibly because of the lack of convincing models for explaining the nature and effects of hypnosis. The historical field of studying altered states of consciousness, long ago rejected from the formal subject matter of psychology, barely survives today as a part of the separate field of consciousness studies. However weak or unnfluential these fields of inquiry may have been historically, we advocate a return to their use, with the observation that these fields of study are much stronger when combined than when considered one-at-a-time. We suggest anamalgamation of these approaches, as follows: Quantum causal factors produce powerful effects in the human autonomic nervous system. These autonomic effects produce or allow for changes in consciousness, including altered states of consciousness. These altered states may have profound effects on the mind and body, and can be fashioned as interventions in mind-body medicine, including hypnosis. This union of quantum, autonomic, and altered consciousness models as a causal line of succession provides a strong multitheoretical platform for planning interventions in mind-body medicine. Interventions will need to take into account that quantum, autonomic, and consciousness factors coexist in a state of alignment with each other, and ascertain goodness-of-fit within each of these domains. While many quantum theories of consciousness have been offered, the quantum model used here is largely derived from insights provided by Rudolf Steiner. **P2**

297 Psilocybin and Personality Change – What Do Increases in Openness Tell Us About Potential Mechanisms of Action and Therapeutic Applications? Katherine MacLean <katherine.a.maclean@gmail.com> (Johns Hopkins University School of Medicine, Psychiatry/ Behavioral Sciences, Baltimore, MD)

The psychological and behavioral effects of psilocybin and other classic hallucinogens have been extensively described in empirical research as well as in unpublished clinical trials and reports of non-medical use. However, we are just beginning to characterize the specific mechanisms by which psilocybin acutely alters consciousness and brain function, and can, under safe and supportive conditions, occasion long-lasting changes in behaviors, attitudes, cognition, and personality. A recent study from our laboratory at Johns Hopkins University indicated increases in the personality domain of Openness up to 14 months after a high-dose psilocybin session. Openness includes a collection of traits associated with imagination, aesthetic sensitivity, intellectual engagement, and broad-minded tolerance of the viewpoints of others. Although our studies have not directly measured the corollary benefits of increased Openness, the results indicate avenues for future research into creativity, problem solving, empathy, and cognitive functioning. The findings also have important implications for the application of psilocybin and classic hallucinogens in clinical psychiatry. My talk will focus on the relationship between specific alterations of consciousness during psilocybin sessions and long-lasting changes in personality traits, including a discussion of potential mechanisms of action, future research directions, and therapeutic applications. I will end with a brief, but hopefully tantalizing discussion of the interface between psilocybin and meditation, with a focus on how these methods of introspective training might occasion changes in core aspects of self and conscious experience. **PL11**

298 Role of Ethical and Spiritual Values in Enhancing Consciousness Madhulika Nemani, Nemani, Somayajulu; Cohly, Hari Har Prashad <paulmadhu@yahoo.com> (Panacea Systems Inc., Johns Creek, GA)

Human being has been evolved from origins of religion to social animal to rational animal to God seeking animal to God loving animal and now becoming God realizing animal. Ethical and Spiritual values plays a significant role in enhancing judgment power and realizing one Self. Ethics refers to rules or standards governing the conduct of a person whereas spiritual values help achieve oneness with Supreme Being. The paper is a sincere effort to develop a prototype model for enhancing and strengthening consciousness by using Spiral Dynamics and Systems approach. Human being is made of various sub systems – Physical, Moral, Ethical, Emotional, Social and Spiritual. Each subsystem needs to work in synchronization and in equilibrium with other subsystem and also to the main system in order to fully realize the effects. Through Spiral dynamics it will be depicted how one can increase and improve consciousness in wakeful state. The study will emphasize on two variables Ethical values (Trustworthiness, Respect, Responsibility, Fairness, Caring) and Spiritual values (Truth, Love, Righteousness, Goodness). It will portray cause and effect relationship between ethical and spiritual values and its impact on raising consciousness in human being. A Hypothesis will be formulated – Ethical values with a complement of Spiritual values assist in enhancing consciousness in man. Questionnaire is designed to collect data from different religious sects – monotheist (Christianity), polytheist (Hinduism), atheist (Jainism and Buddhism) and Sant Mat (Radhasoami Mat). Statistical scale is developed on points of 1 to 5 (1 - unethical, 5 - highly ethical) to measure ethical values. Correlation between Ethical and Spiritual values will be computed. Ethical values are the means, not the end to achieve ultimate objective. A person can hop on one leg or can comfortably walk on both the legs – ethical and spiritual to realize Spiritual humanism. Human beings are incessantly evolving and with each iteration he further improves and develops. It is expected that any person irrespective of any religion, cast or creed can enhance consciousness and awaken inner Self by strengthening ethical and spiritual values. **P1**

299 Evidences and Measurements of Consciousness from Science and Spirituality: An Analysis Soam Prakash <prakashsoamdei@gmail.com> (Department of Zoology, Dayalbagh Educational Institute, Agra, India)

Consciousness is nothing but a subjectivity of mind which is a connecting cover of spirit to mind and then to body(brain) via it. The Penrose theory of taking reductionist approach is good for one side of the brain which does logical thinking while the other part does the subjective sensibility – like love, emotions, beauty, intelligence and kindness, Mercy etc. The roles of NDE, disembodied spirits, incarnations, transmigration of soul are evidences which cannot be ignored while attempting to measure it. The attribute like love, beauty, intelligence and happiness cannot be measurable directly, therefore the role making unit of measurement arises. Spiritual science also describes the attributes of God which can be actualized by spiritual authorities but cannot be quantified and measurable. We pretend to make a plausible measurement technique to evolve a phenomenon like consciousness with help of physical science, biological science, psychological science and with spiritual sciences along with examples. **P1**

300 Cognitive and Non-Cognitive Reactions in Humans with Altered States of Consciousness Panchalingam Suntharalingam, Dr. Clive Thursfield <panch.suntharalingam@bcu.ac.uk> (Birmingham City University, Birmingham, West Midlands United Kingdom)

Introduction/Objectives: A severely brain injured patient can track movement, giving an impression of cognition. Is this apparent cognition a result of reflex conditioning or is this cognition? Published literature widely describes theamygdala as being involved in emotional reflex responses such as fear (Calder et al. 2001, Davis and Whallen 2001, LeDoux 1996). This would indicate that cortical processing or theamygdala can cause the body to release adrenalin in response to the emotional stimuli, thereby affecting the heart, sweating and breathing rates. Skin Conductance Response (SCR) to emotional stimuli has been recorded in human subjects. Clinically SCR has not yet been used clinically to assess patients with altered states of cognition after sustaining

severe brain injuries. The diagnosis and assessment of cognitive and non-cognitive states remains difficult due to a lack of objectivity. The hypothesis of this research is that SCR is present in low awareness patients and that SCR can be used as an indicator of the presence of cognition in this client group. Therefore the aim was to establish whether this technique could be used as an objective tool for the assessment of awareness in patients who are in vegetative (non-cognitive) or minimally conscious states (exhibiting some form of cognition). Participants, Materials/Methods: An experimental study designed with comparative analysis. Fifty healthy volunteers (males, n = 33; females, n = 17) and 7 patients (males, n = 6; females, n = 1) in low awareness states were tested for skin conductance response with a standard set of visual and auditory stimuli. SCR latency, rise-time andamplitude responses were recorded. The data from the patients was individually compared with that of the volunteers. Patient selection was based on accepted criteria. Clinically five patients were in minimally conscious state and two were in vegetative state. Statistical analysis included ANOVA and Pearson's correlation coefficient. Results: The results from the research show that responses to visual imagery and or auditory stimuli does produce SCR activity in severely brain injured patients. Mean values of Latency, Rise Time, Recovery Time Min Amplitude, Peak Amplitude and Amplitude were derived from the control trials and compared to the same parameters from the patient study. SCR in the patients has shown significant correlation with the control study in the metrics measured. Out of 7 patients, 2 minimally conscious patients showed significant correlation with controls ($p<0.006$) and three patients showed responses to the customised stimuli but not to the control set. The two vegetative state patients failed to show any significant SCR. Conclusions: The initial results indicated that SCR was recorded in patients who are minimally conscious but not in those who are in vegetative state. To date there is no evidence to support the absence of significant SCR in vegetative state. To our knowledge this is the first study to use SCR as an objective tool in the assessment of the level of cognition in this patient population. Further research with well defined stimulation paradigms would be required to confirm these findings and further explore theamygdala effect. **C20**

5.05 Transpersonal and humanistic psychology

301 Morphic Resonance and Inherited Memory: Healing from Trans-Generational Trauma Using the Systemic Family Constellation Process Dan Booth Cohen <dan@hiddensolution.com> (Systemic Constellations Conferences and Education, Inc., Needham, MA)

Sheldrake's theory of morphic resonance posits that there is a collective field of memoryamong humans which form a background against which individual experience and memory develop. While the theory has not been validated under controlled conditions, the experiential Systemic Family Constellation process has been found to be a practical method for accessing and working with these fields. Systemic Family Constellations are widely used to relieve recurrent or persistent emotional, behavioral, and physical difficulties produced by archaic traumatic memories embedded in the family. The process is applied in therapeutic settings by psychiatrists, psychologists, and an array of mainstream and alternative care providers throughout the world. The lineage of Systemic Family Constellations traces through philosophers and psychologists including Husserl, Boszormenyi-Nagy, Erickson, Satir, and Hellinger. Standing still and silent, many humans can accurately perceive the collective field of memory for themselves and others. To understand the effects of trans-generationally inherited trauma, representatives create a three dimensional matrix of the ancestral lineage. This transforms irreal field dimensions of human experience into real spatial symbolic representations, thereby allowing them to be worked with directly. This opens a dimension of consciousness that is familiar in First People's traditions, but nearly lost within the cosmology of science and technology. Inherited memories and repetitious patterns of loss and trauma occur in multiple generations absent direct sensory inputs – e.g. an adopted child's phobias mirror the phobias of a biological relative. This contradicts the mainstream scientific consensus that humans perceive, transmit and receive information exclusively through direct sensory input. Tens of thousands of Constellations worldwide suggest that there is a transpersonal dimension of mind, memory, and behavior that is not derived from personal history and experience. With several thousand licensed doctors, psychologists, and therapists using the process and sharing case

histories in on-line forums and print journals, a new understanding of this aspect of human consciousness is emerging. This picture challenges more familiar findings of quantitative, reductionist research in psychology. There are no published peer reviewed controlled research studies assessing these claims. The evidence base comes from clinical case histories. Personal consciousness – which is the object of scientific psychology – is the accumulation of sensory input, individual experience, and brain/mind functions. Fields of continuous consciousness resonateamong individuals and across generations. Recent research in the fields of epigenetics, quantum consciousness, morphogenetic fields, and psi phenomenon create a theoretical framework in which to understand how the memories of parents, grandparents, and great-grandparents, and the countless ancestors that existed before them, can literally co-exist in the minds and bodies of living individuals. **P1**

5.06 Psychoanalysis and psychotherapy

302 The Coming of Aliveness in Felt Sensing and its Role in Experiential Psychotherapies
David P. Glanzer, Annmarie Early <glanzerd@emu.edu> (Eastern Mennonite University, Harrisonburg, VA)

Edge sensing (Glanzer & Early, in press), or "focusing", awareness of the "felt sense" at the edge between implicit and scripted knowing (Gendlin, 1996) is a special state of consciousness phenomenally like "awake dreaming." Dreaming, in that whatever comes to consciousness from the implicit is welcomed at face value and has a dynamic living quality like dreaming. Awake, in that the mind is engaged in thoughtful interaction with what shows up, beginning with perceptual description and moving in the end to dyadic communication in which both what comes and the "I" of the "awake-dreamer" acquire greater self-substance and presence. For the one who is the "awake-dreamer" or "focuser" there are potentially three phenomenally distinct conscious states within edge sensing as a whole activity. The first is what it is like to "clear a space" in alert attentiveness for whatever comes. This process just by itself results in a distinctive state of value across therapeutic approaches. In the second state the "focuser" perceives and welcomes the presence of [something] – often sensed first in "body" awareness or imagery. The distinctive phenomenology here is the sense of entering and becoming present to the grounded place of "cleared space" in order to encounter [something], and to preserve the integrity of that state through active description of the [something] encountered. It is this state in which, in the focusing method, a "focusing companion" plays the most crucial supportive role. The third state, when it comes, brings an even more vivid sense of distinctness from ordinary awareness, as in this state the [something] that came acquires agency, becoming a someone perhaps more than a something. "It" becomes a "you" (Buber, 1970) with transformance potentials (Fosha, 2000). These three states, while phenomenally distinct, interact with each other, with the third state contingent on the second, which is in turn contingent on the first. This process, culminating in encounter, is what "experiential" refers to across all experiential psychotherapies. More than any technique or experience as a task or method, it is encounter that makes these therapies experiential. The role of the therapist is to be present, a witness and enabler of the client's process. What comes at the edge is new life from the client's own implicit (in Gendlin's sense) embodiment in the world. How these processes are recognized and utilized in experiential psychotherapies will be explored. The language of these phenomenal states will also be explored with reference to Clark's (2008) arguments about self extended in the object world, but in this case mind-self "supersized" through the other, both "real" and "virtual". **C21**

5.08 Anomalous experiences

303 Towards a General Theory of Self-Transcendence
Albert Garcia-Romeu <paper_tiger77@yahoo.com> (Institute of Transpersonal Psychology, Los Altos, CA)

Despite decades and even centuries of interdisciplinary inquiry, contemporary philosophical and psychological paradigms continue to struggle in defining the nature of selfhood and self-transcendence with regards to human consciousness. What is the experience of having or being a

"self," and what is the experience of transcending that self? How does the experience of selfhood change and manifest over time? The developmental dynamics of self-concept have been explored in depth by a number of theorists (e.g., Erikson, Kegan, Wilber). Meanwhile, the transformative power of self-transcendent experiences has been studied in an attempt to understand the ways in which human self-concept may be shifted towards greater awareness, health, and wholeness. This includes research on various altered states of consciousness ranging from meditation and mystical experiences, to Maslow's "peak experiences," Csikszentmihalyi's "flow," and the psychedelic experience. Although these altered states may be considered distinct and discrete phenomena, the quality of self-transcendence is a common theme observed between phenomenological accounts of these different states. In addition to the developmental and altered states literature on self-transcendence, contemporary research in the hard sciences from genetics to neuroscience have shed light on the biochemical processes related to self-transcendent experiences and attitudes, providing some preliminary accounts of how such experiences may be functioning at the cellular and neural levels from a third person perspective. Nevertheless, our current understanding of the subjective dynamics of selfhood, including the ramifications of self-transcendent experiences in the conceptualization of the self, have not been thoroughly elucidated or well researched. This presentation will provide a general background in the relevant theories mentioned here around the topic of self-transcendence, as well as an overview of modern empirical research on self-transcendence from psychology and the biological sciences. Finally, results of a qualitative study of self-transcendent experiences and their effects, collected by the presenter in 15 face-to-face interviews with healthy adult participants, will be expounded in an effort to more rigorously define the subjective experience of self-transcendence and situate these findings within the overall body of contemporary theory and research. The qualitative discussion will include major themes of participants' self-transcendent experiences determined via thematic content analysis, including direct quotes, as well as a preliminary grounded theory of self-transcendence emerging from the results of this study. **C15**

304 "We are More Borg Than We Know": Universal Artificial Intelligence and Recent Research in Cognitive Neuroscience Suggest We are an (Organic) Distributed Universal Intelligence
Richard Long <rlong19@gmail.com> (Orbis Technologies, Inc., Oviedo`, FL)

We'd like to approach the issue of emotion and consciousness from a different perspective, inspired by the recent work in Universal Artificial Intelligence (Hutter, Schmidhuber), Distributed reinforcement learning models, and work on machine learning facilitated by human emotional expression (e.g. Broekens). We will focus on two powerful but largely independent hypotheses, which together provide a somewhat cohesive synthesis of the existing literature on emotion and consciousness. The two hypotheses are as follows. 1. Emotional expression is a direct, highly evolved and conserved mechanism for direct distribution of reinforcements from one agent to another. Human groups and societies thus become a sort of unified intelligence which is in theory more powerful than any single Human. Autistics, those with Asperger's syndrome and highly successful sociopaths are clearly variants with asymmetrical reinforcement distribution. Such individuals can become highly successful – able to maximize their personal reinforcement policies contrary to the reinforcements of others. i.e. they have no 'empathy' but can convincingly pretend to. Many of such individuals go on to climb the organizational ladder easily and become leaders. Hence, there is a tendency for organizations to become "sociopathic". We assume that emotional expression is NOT a form of communication analogous to language, but is instead a highly evolutionarily conserved and specialized mechanism for the direct distribution of reinforcements, thus providing one necessary component to a distributed Universal Artificial Intelligence in the sense of Hutter et.al. 2. In the Universal Artificial Intelligence of Hutter et.al., the most powerful and difficult to implement component is an Oracle, which is able to model and predict future reinforcements based an minimal representation of past (State, Action, Reinforcement) triple sequences and the current State given various actions. The Cortex and cortical development seems to follow the law of minimal neural representation of the incoming data. We therefore hypothesize the cortex is in fact a simulator of past past (state, action, reinforcement) history while at the same time modifying neural connections to be both minimal in the Shannon information sense, and to

accurately reconstruct or hallucinate the past and present data. Such a neural system, if minimal, is provably an optimal predictor. In this view, the Motor Cortex, long thought to be the originator of motor action, is instead a redirection of motor pathways from the Stratum. The motor cortex implements a simulator of a "motor intention sense", not a motor action generator per se. The discovery of 'mirror neurons' throughout the motor cortex is a predictable consequence of such a simulator. This is one of the most novel aspects of the theory. After a foundation is laid for these hypotheses, we discuss the future ramifications of accelerating technology to increase the interactions between individuals. We conjecture that at some moment in the near future a 'critical mass' will be reached so that a social 'phase transition' occurs, and the nature of society changes radically away from the current hierarchically centrally (usually sociopathic) controlled system to a distributed system. The emergence of a new state of collective consciousness is conjectured and explored. **P2**

305 Research on Mediumship and The Mind-brain Relationship Alexander Moreira-Almeida <alex.ma@ufjf.edu.br> (School of Medicine, Federal University of Juiz De Fora, Juiz De Fora, MG Brazil)

Mediumship, an experience widespread throughout human history, can be defined as an experience in which an individual (the so-called medium) purports to be in communication with, or under the control of, the personality of a deceased. Since the 19th Century there is a substantial, but neglected tradition of scientific research about mediumship and its implications for the nature of mind. This chapter will review studies investigating the origins, the sources of mediumistic communications. Since one crucial aspect of mediumistic experience is the claim for the persistence of mind activity and the communication of personalities after bodily death, I discuss what would be evidence for personal identity and its persistence beyond the brain. After that, empirical evidence provided by studies on mediumship is presented and analyzed, including a brief biography of two very productive mediums: Mrs. Leonora Piper and Chico Xavier. Finally, I discuss the implications of these data for our understanding of mind and its relationship with the body. Applying contemporary research methods to mediumistic experiences may provide a badly needed broadening and diversification of the empirical basis needed to advance our understanding of the mind-body problem. **C24**

306 Exploring the Relationship Between the Synesthesias and Anomalous Experiences Christine Simmonds-Moore, Alvarado, C and Zingrone, N <csimmond@westga.edu> (Psychology, University of West Georgia, Carrollton, GA)

Dr. Simmonds-Moore will discuss the idea that synesthesia (or the synesthesias) may underpin a variety of anomalous experiences, including ESP. For example, several authors have explored the idea that synesthesia may be associted with anomalous experiences (including the aura and out of body experiences). In addition, those who are psychometrically anomaly-prone (scoring high on personality dimensions which are more likely to report anomalous experiences, score high on measures of paranormal belief and potentially to score higher on laboratory based measures of ESP; namely positive schizotypy and related variables) may be more likely to experience synesthesia. However, the literature is sparse in terms of the explicit exploration of the relationships between synesthesia and anomalous experiences. In addition, where researchers have considered these relationships, they have often employed the Synesthesia subscale of the Tellegen Absorption scale to assess synesthetic experiences in the general population, which has some limitations. There are several features associated with synesthesia which suggest that strong synesthetes may perform better at a laboratory based ESP test (including consiousness binding, a greater ability to consciously perceive weak stimuli and better episodic memory and visual-spatial skills for some forms of synesthesia). An ongoing two-part research project will be described which will examine the relationship between synesthesia and anomalous experiences. In an online survey investigation, a synesthesia questionnaire has been developed to measure the full range of these types of experience. Respondents will also complete questionnaires about their anomalous experiences (including ESP experiences), personality and mental health. This will allow for a systematic evaluation of the incidence of the synesthesias and the relationship between synesthesia and

anomaly-proneness in the general population. In a second investigation, a laboratory experiment will investigate the idea that those who are strong synesthetes may perform better at an ESP task and that they may have better episodic and other memory ability than other people, which may underpin ESP ability. This study will compare performance on a mental time travel task and on a version of Bem's precognitive memory task to compare performance between synesthetes and a group of matched controls. **Pre-Conference Workshop**

5.09 Parapsychology

307 Feeling the Future: Recent Experimental Evidence for the Anomalous Anticipation of Future Events Daryl J. Bem <d.bem@cornell.edu> (Cornell University, Psychology, Emeritus Professor, Ithaca, NY)

The term psi denotes anomalous processes of information retrieval that are currently unexplained in terms of known physical or biological mechanisms. One variant of psi is precognition or, more generally, cognitive, affective, and behavioral responses to future events that could not be anticipated by any known inferential process. Recent laboratory experiments will be reviewed that appear to demonstrate physiological, and behavioral responses to randomly selected future stimuli. Issues of replication and the influence of an experimenter's beliefs and expectations on psi performance will also be discussed. **PL8**

308 Using Remote Viewing to Describe Future Events: Eleven Experiments in Retrocausation Courtney Brown <courtney4@farsight.org> (Emory University (Political Sc, The Farsight Institute, Decatur, GA)

This study uses remote viewing in a predictive manner within the context of a novel experimental design to describe eleven target events spread out over a year, each of which occurs approximately one month after the remote-viewing sessions are completed. The study was conducted at The Farsight Institute using 12 highly experienced remote viewers who were trained in the use of four remote-viewing methodologies that are the same as or derived from those previously used by the United States military for espionage purposes. While prediction using remote viewing has a long and spotted history, the current investigation is aimed at enhancing our understanding of the remote-viewing phenomenon by utilizing a temporal outbounder approach to tasking in order to improve the description of future events. In this design, the tasker is located in time after the remote-viewing sessions are completed and after the occurrence of the chosen target event. Exploiting one of the largest bodies of remote-viewing data ever collected using military-related viewing methodologies, this study finds strong support for the hypothesis that experimental designs utilizing a temporal outbounder as a tasker greatly enhances the accuracy of remote-viewing descriptions of future events. The causal mechanism for why this might occur is left to be determined by future research. **C24**

309 Brain and Physiological Activity of Sender and Receiver During Local and Remote Periods of "Spiritual Transmission" Arnaud Delorme, Dean Radin; Leena Michel; Rael Cahn; Cassandra Vieten <arno@cerco.ups-tlse.fr> (Ions (Petaluma), CERCO, UPS-CNRS, Paul Sabatier University, Faculte de Medecine, Toulouse, France)

Practitioners from a wide variety of spiritual traditions occasionally report strong psychophysiological responses when they are in the presence of a spiritual teacher who has achieved some level of mastery, particularly when the teacher directs attention or intention toward the practitioner. While many such anecdotal reports of this phenomenon exist, almost no empirical research has been conducted to examine it. There are no studies published that we are aware of in the major scientific databases referring to empirical laboratory studies of spiritual transmission (shaktipat). The aim of the proposed work is to objectively examine the psychophysiological correlates of spiritual transmission in both transmitters and recipients under controlled laboratory conditions. Spiritual transmission is said to occur through sight, sound, touch, or thought. For example, the teacher may simply gaze at the student, speak words or make sounds, touch the student with their

hands or with a feather, or transmit spiritual energy through intention or thought. Proximity does not appear to be required. There are many anecdotal accounts of recipients who experienced transmission by looking at a photograph of a spiritual teacher. In the devotional traditions of Hinduism, practitioners often place photos of their teachers in their environments (home, car, workplace) to remain in connection with the teacher's transmission. We run a block-design protocol in which we tested 3 different senders experienced in spiritual transmission, and 10 different receivers who were either disciples of the guru or naive subjects. Experiments were performed at two locations in California in two different laboratories. Senders and receivers sat in different rooms at about 30 meters distance of each other. Two conditions alternated: a condition of active spiritual transmission and a condition of rest. We recorded distant spiritual transmission and rest for 5 consecutive sessions of 5 minutes each. On 2 of the 5 sessions (sessions 2 and 4), the sender was instructed to give spiritual transmission. During rest (sessions 1, 3, and 5), the sender remained silent and attempted to keep his mind out of the spiritual transmission state. The receiving subjects were asked to stay in a meditative and receptive mental state. We used the EEGLAB software (www.sccn.ucsd.edu/eeglab) to analyze the electro-encephalographic signals from both senders and receivers focusing on the brain activity during the spiritual transmission mental state compared to the brain activity during the rest state. For some of the subjects, we also performed correlation analysis between scalp channels of senders and receivers. False detection rate (FDR) was used to correct for multiple comparisons. We report significant activity in receivers when senders are performing spiritual transmission at a distance. We also report significant brain correlations between senders and receivers in some of the testing sessions. These results suggest that spiritual transmission to an isolated person at a distance appears to produce measurable physiological effects in some distant receivers. **C16**

310 Psychic-Mediums in Contemporary America: A Helping Profession Armand Diaz <armand@integraltransformation.net> (Bayside, NY)

Psychic-mediums have long been a subject of interest to parapsychologists, but the vast majority of research on psychic abilities and mediumship has focused on establishing the validity of the phenomena and assessing reliability, while the perspective of the psychic-mediums themselves has been less thoroughly explored. How they perceive themselves, their work, and their role in society are all important factors in understanding psychic phenomena. This study of six skilled psychic-mediums used in-depth interviews to explore the viewpoints of practicing professionals in contemporary America. Participants were given the opportunity to express their thoughts and feelings about the value of the work they do, its place within society, skepticism about it, and why they chose this particular professional route. Although each of the participants presented a unique perspective, several common themes emerged from the data. The participants all exhibited a high degree of independence in their thinking and placed a high value on professional autonomy. Concern with proving the scientific validity of psychic and mediumistic phenomena was nearly nil, and all of the participants took a matter-of-fact view of the reality of both. There was no significant desire to convince skeptics, although they did hope for greater acceptance in society. Perhaps the most important finding of the study was that the psychic-mediums interviewed saw themselves as helping, healing professionals. While they are legally considered "entertainers," the participants recognized that the work they do has significant ramifications for their clients, many of whom are grieving or in distress about difficult life issues. Given that motivation is recognized as an important factor in psi, it is a key point that helping others was regarded as the primary motivation for working as a professional psychic-medium. Taken together, the results of this study suggest that there is a need to balance laboratory studies of psychic-mediums with field research, as it is in the context of actually working to help others that performance may be at its height. Beyond concerns of accuracy, the qualitative kinds of information that have the greatest impact on clients would be another important area of study, as the participants statements suggest that a few powerful pieces of information during the course of a consultation may be more important than the volume of information obtained through extrasensory means. **P2**

311 Might Consciousness Exist in DNA or its Hydrogen Bonds? Ingrid Fredriksson <ingrid-f@telia.com> (Triquetra – Return AB, Arjang, Sweden)

Does consciousness exist in water? In every living being and organism there is an entire world as amazing as the one we see around us. In our body there are 100,000 billion cells, and DNA that extends 10,000 km. The base pairs in our DNA are held together by hydrogen. Essential water, the precondition for all life! What if it is the hydrogen bonds in DNA's base pairs that constitute our immune system and all our consciousness! This, together with the quantum hologram and non-local consciousness, provides an explanation and an exciting developmental phase in the illusion in which we live. Consciousness appears to exist in everything that has DNA. Our consciousness takes in information without employing our normal five senses (Remote Viewing is one instance of this). It is especially interesting that the information collected in this way appears to be independent of distance not only in space but also in time, which has resulted in the phenomenon now called non-local consciousness. This leads to the speculation that perhaps consciousness as such cannot even be said to have its origin in the brain, but that the brain's function is rather to translate consciousness so that it can function smoothly in a physical dimension of time and space. Might it be that what we think of as our brain – yes, our entire body – is a "slave-transmitter" for our consciousness, which actually lives free of time and space? If we conceive a non-local consciousness, as it is demonstrated by the EPR paradox, Alain Aspect, or modern information technology, we gain a number of explanations for what had previously been unexplained, as when consciousness leaves the body in out-of-body or near-death experiences when people describe having seen their body from above, or – why not? – when a loved one dies and knowledge of this reaches us instantaneously on another continent. **P2**

312 Nonlocality, Intention, and Observer Effects in Healing Studies: Laying a Foundation for the Future Stephan Schwartz, Larry Dossey, MD <saschwartz@earthlink.net> (Brain, Mind, and Healing, The Samueli Institute, Langley, WA)

All research domains are based upon epistemological assumptions. Periodic reassessment of these assumptions is crucial because they influence how we interpret experimental outcomes. Perhaps nowhere is this reassessment needed more than in the study of prayer and intention experiments. For if positive results from this field of research are sustained, the reality of nonlocal consciousness must be confronted. This paper explores the current status of healing and intention research, citing a number of major studies and using the 'Study of the Therapeutic Effects of Intercessory Prayer (STEP) in Cardiac Bypass Surgery Patients: A Multicenter Randomized Trial of Uncertainty and Certainty of Receiving Intercessory Prayer' as a case study of this line of research. The paper argues that the dose-dependent model typical of drug trials, and adopted for use in the STEP and other studies, is not the optimal model for intention-healing research, and critiques this approach in detail, citing apposite research from which we draw our recommendations and conclusions. The paper suggests that the usual assumptions concerning blindness and randomization that prevail in studies using the pharmacological model must be reappraised. Experimental data suggest that a nonlocal relationship existsamong the various individuals participating in a study, one which needs to be understood and taken seriously. We argue that it is important to account for and understand the role of both local and nonlocal observer effects, since both can significantly affect outcome. Research is presented from an array of disciplines to support why the authors feel these issues of linkage, belief, and intention are so important to a successful, accurate, and meaningful study outcome. Finally, the paper offers suggestions for new lines of research and new protocol designs that address these observer effect issues, particularly the nonlocal aspects. The paper finally suggests that if these effects occur in intention studies, they must necessarily exist in all studies, although in pharmacological studies they are often overshadowed by the power of chemical and biological agents. **C24**

313 Photonic Measurement of Apparent Presence of Spirit Using a Computer Automated System Gary Schwartz <gschwart@spamarrest.com> (Psychology, The University of Arizona, Tucson, AZ)

Research investigating the potential of detecting the purported presence of spirit (POS) has been hampered by the necessity of employing a human being to collect the data. To infer the presence of alleged spirit, it is essential to remove the simultaneous presence of an experimenter (POE), thereby eliminating his or her physical energy as well as accompanying conscious intentions and expectations.The purpose of these two proof-of-concept experiments was to explore the feasibility of completely automating data collection in the absence of an experimenter to determine if evidence consistent with POS was still obtained. A computer automated system was developed making it possible to collect all data in the absence of an experimenter (thereby achieving complete experimenter blinding). In the evenings, the computer would (1) start the experimental run at random times, (2) conduct 30 minute baseline as well as POS trials involving two different alleged spirits, and (3) record background light in a completely dark chamber with a highly sensitive low light Princeton Instruments CCD camera system. The CCD camera and light-tight recording chamber were housed in a light-tight room; the computer, large screen monitor and speakers were housed in a separate control room. The participants were two purported spirits involved in previous POS research published in this journal using a silicon photomultiplier system. Intervention: The primary intervention was the computer selecting and presenting visual and auditory information inviting Spirit 1 or Spirit 2 to enter the chamber in the absence of experimenter presence and awareness. The CCD camera provided 512 by 512 pixel images of 30 minute exposures (reflecting a combination of possible background light plus instrument dark noise). The images were imported into image processing software and two dimensional FFT analyses were performed. Average brightness levels of the FFTs were calculated and subjected to repeated measures analyses of variance. Compared to pre and post baseline images, the POS trials were associated with reliable increases in the average brightness of the FFT images, suggesting increased structure of the background light as revealed in the FFT's. These findings indicate that POE per se is not sufficient to explain the observed POS effects. Future experiments can address the remaining potential psi interpretations (decision augmentation theory [DAT] and retro PK) as well as the source of the observed information (i.e. the chamber, cosmic rays, and / or the CCD chip itself). Using Logmein software it is now possible to conduct experiments across distance and setting. A video demonstrating the latest developments in engineering a working POS communication prototype will be presented. **C24**

314 Quantitative Electroencephalographic (QEEG) Profiles of Remote Viewing (RV): 6 Week Randomized Control Study on Psychic (PSI) Development and Functioning Mandy Scott, M.A. Persinger <mx_scott@laurentian.ca> (Psychology, Laurentian University, Sudbury, Ontario Canada)

Although the accuracy of Remote Viewing (RV) has been well established (Utts, 1995), little research has been conducted with respect to the quantification of brain activity during RV and its development. The present study recruited individuals with or without previous experience in PSI (n=11 and 4 respectively) and measured their QEEG profiles with eyes open and eyes closed once a week for three weeks before the non-psi group was randomly assigned to control or experimental groups (N=6 and 5). The experimental group received RV training via a 4-hour workshop facilitated by the primary experimenter, while the control group attended a sham workshop for the same duration on QEEG research. The psi-control group did not attend a workshop. Following training, all participants completed weekly baselines for three additional weeks, each baseline including measures for eyes open, eyes closed, visualization, remote viewing, as well as an eyes closed post baseline. Major group differences emerged during the latter weeks of the treatments. During Remote Viewing all three groups displayed increased power within the fast beta range within the left and right occipital lobes. In addition, both the PSI and RV groups displayed significant elevations of beta power over the right frontal (F8) and temporal (T4) regions compared to the controls. Only the RV-trained group exhibited a significant increase in power as well over the left prefrontal (F7) region. These results are consistent with current models of PSI phenomena in general and RV in particular and indicate strong cerebral correlates can be shown for these processes. The relationship between the accuracy of the remote viewing experiences for the different groups and the correlation with brain power spectra will be discussed. **C24**

5.10 Miscellaneous

315 Exploration of a New Tool to Chart Levels of Consciousness Sonya R. Hardin, Richard H. Geer BA MTH; Gerry Marr MA MFT; Linda Lott RN <srhardin@uncc.edu> (School of Nursing, University of NC at Charlotte, Charlotte, NC)

The complexity of life is the expression of the profound inter-relationship between consciousness and the cosmos. Discovering insights about the role of consciousness is empowering and enhances personal growth. A transformational tool called Star Journey Symbol Method is a contemporary cosmology, providing a new framework for understanding the dynamics of consciousness. The system's geometric Circle Pattern charts a new series of Levels of Conscious Experience, which are set against a backdrop of a classic Cycle of Growth. Set within this matrix are ninety-six simple, archetypal Symbols, which serve as metaphors describing timeless facets of conscious being at various stages and levels. The Levels appear as seven concentric rings of Symbols within a circular design. They reveal a spectrum of layers of consciousness, spanning both the outer external world and inner realms of being, and defining the levels in between. In simple metaphoric terms, the model demonstrates the dynamics of consciousness in all levels of the cosmos. In the list of Levels below, the first two (Stars and States) represent the external world; the last two (Gates and Signs) correspond to deep inner realms of being; and those in between (Star-Crosses, Gifts, and Keys) describe ways the psyche interface with the outer world. Seven Levels of Conscious Experience:1) Consciousness as Energy-Stars; 2) Consciousness in Form-States 3) Consciousness as Being-Star-Ctosses; 4) Inherent Abilities of Consciousness-Gifts 5) Consciousness in Transition-Keys 6) Approaches of Consciousness-Gates; 7) Sources of Satisfaction-Signs. Relating to and understanding subtle, non-physical concepts such as states of being can be greatly enhanced by utilizing symbols and metaphor. These constructs provide a direct and immediate connection to the mind, including conscious, sub-conscious and unconscious layers. In this way, such subtle concepts are not only easier to grasp but often reveal more facets reflective of richer meanings than simple dictionary definitions. For example, the Sun symbol (a Star-Cross symbol of self-expression) readily describes showing one's "sunny side," expressing Optimism. Yet this could be perceived by others as Domineering. Another example is the symbol Block (a Key symbol of challenge leading to realization). On the one hand, a Block can be viewed as an Obstacle standing in one's path or a Problem needing solving before one can progress. Yet one can choose to see the same symbol in a different light, as Block creating Foundation and also being a Building block. Workshop participants will utilize the Star Journey method first-hand, learning the application of using its symbols and levels for exploring consciousness. A Guided Process reveals one's synchronicity with life processes as well as tapping one's intuition. Through sharing of story and reflection, participants will find new techniques for understanding the dynamic role of consciousness in shaping reality and personal experience. The workshop will include lecture with audience participation. A deeper understanding of Star Journey, and of consciousness, is also achieved from attendee's active engagement and participation. **P2**

316 Higher Levels of Consciousness Hans Mohan <hansugreat@gmail.com> (Electrical Engineering, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Consciousness is ordinarily thought of as a state of awareness. The fascinating and intriguing complexity of consciousness needs deep understanding of the higher realms of spirituality. The inter phase between awakening of spiritual faculties of man and developing inner consciousness of self is related to the realization of truth, the ultimate reality. Truth is the highest virtue but higher still is truthful living. This helps in self-realization and experiencing higher states of consciousness. However, true, long-term practitioners of transcendental meditation performed with patience and perfection are rare in sight. Levels of consciousness vary from person to person, according to attainment of higher and higher realms of spirituality and in the humble submission defying subjective or objective comparison. Undoubtedly, science and technology in the new

millennium have expanded their range and scope. Falling in line with above milieu, active groups of optimistic scientists extend support for duplicating the operation of the mind on a computer mediating a quantum role in brain functions. However, as the instinct for spiritual life is in human nature, it is most likely that ethical-spiritual dimension in conjuncture with intellectuals of science may facilitate to resolve in future the uninterrupted continuity of science in search of creation of universe, consciousness, the ultimate truth that apparently seems to have pushed mankind towards the limits of knowledge. In this crusade towards the final frontiers of knowledge where the last pillar of science culminates at religion, we will have to wait to see what rewards future will bring. The internal practice of Surat, Sabda, and Yoga is the Radhasoami Faith has always provided simple means and ways to attain higher levels of consciousness. **P1**

317 Consciousness in Day-to-Day Life Lopamudra Nimmagadda <lopa5672@gmail.com> (Naperville, IL)

Consciousness seems to be, to monitor the self and the environment, and control our thoughts and behavior. Consciousness of a person can be affected by his thoughts, social environment, religion and his moral and ethical behavior. Spiritual consciousness can be enhanced by association to a spiritual person and by our own experiences. Whenever we come in contact with spiritually charged environment it affects our levels of consciousness, similarly good feelings, thoughts, experiences have a direct effect on our consciousness. Family, society and overall environment affects our consciousness in some way or the other. Many a times our response to things in the environment and within ourselves is automatic, learn and do things without conscious awareness. It is when things go wrong and we are faced with important choices when consciousness becomes useful by devoting extra cognitive resources to information that may be especially significant. This paper deals with consciousness of normal person and how his consciousness can be affected in different environment, by his thoughts and action. What measures he must adopt to elevate his levels of consciousness. By being conscious, how it will affect him and his environment. This study elaborates the consciousness in our day-to-day life. **P2**

6.0 Culture and Humanities

318 Consciousness and the Conception of Salvation: A Comparative Analysis of Jainism and Radhasoami Religion Poornima Jain <poornimajaindb@gmail.com> (Sociology and Political Scienc, Dayalbagh Educational Institute, Dayalbagh, Agra, Agra, Uttar Pradesh India)

Jainism has been one of the oldest religions of India whereas Radhasoami Religion emerged during the mid 19th Century. Basic difference in the significance between the two is that there has been a decline in the number Jains, on the contrary the number of the followers of the Radhasoami religion has been growing continuously. Both the religions claim themselves to be scientific in nature. The basic philosophy of Jainism is that the purpose of all living beings is to develop Consciousness to the highest level so that the true nature of the Universe is experienced. In Radhasoami religion "Bhakti Marg" is scientifically the most efficacious method for developing spiritual faculties of man and also for the achievement of the object of religion which is salvation, Moksha, Nirvana etc. Jainism preach that God is not a Creator, Preserver, or Destroyer of the Universe. Every living being has the potential to become God. Conquer your desire by your own effort to attain salvation. According to the Radhasoami religion "this creation is subject to dissolution and everything therein is also perishable". This paper tries to draw the comparison between Jain and Radhasoami religions with respect to salvation of the soul. **P1**

6.01 Literature and hermeneutics

319 Consciousness of the Self in T.S. Eliot's 'Ash-Wednesday' A Mystical Approach of the Poet Namita Bhatia, Mr. Soami Das Bhatia <drnamitabhatia@gmail.com> (Facilitator,Theology, S.B.N. Girls P.G. College; Facilitator, Theology, Dayalbagh Educational Institut, Agra, U.P. India)

Consciousness is an awareness, a recognition or a realization and Mysticism is the immediate

consciousness of the transcendent or ultimate reality. It deals with the peak experiences of such communion in the field of consciousness as an expansion of normal consciousness. The mystic faculty is a common heritage of humanity. Being present in a hidden form and an undeveloped state, everyone has the capacity to develop it and have the experience of the super consciousness. Mystical experience is a study of consciousness by consciousness itself – a study of the inner life by life itself and the poem 'Ash-Wednesday' is such a study. T.S. Eliot was born in St. Louis, Missouri and studied at Harvard, the Sorbonne and Oxford. He received the Nobel Prize for literature in 1948 and was greatly influenced by Dante, Shakespeare, the Bible and Christian mystics. The influence of Indian philosophy and mysticism on him is also clearly noticeable. 'Ash-Wednesday' was published in 1930. In Christianity the term refers to the first day of Lent, an annual season of mourning for forty days for the suffering and death of Christ. On this day the priest marks the sign of cross with ashes on the forehead of the penitents and says, "Remember, man, that thou are dust, and unto dust thou shalt return". Ash-Wednesday comprises six sections or parts which have a unique compactness and coherence of the thematic progression. The form adopted is of Dramatic Monologue which gives the speaker to reveal through loud thinking and enact the inner drama of the clash between flesh and the spirit. The distinction is not between a 'private self' and a 'higher self,' it is between the individual as himself and the individual in communion with God. In the beginning it might have been purely intellectual-emotional affair, but when the speaker makes an effort to act in accordance with his belief, he fluctuates between the world and the Word. The persona is shown as climbing up the stairs but looking back intently again and again. He has rejected the desultory world of the false dreams of happiness, yet it tempts him. He is too weak to erase from his mind the memories of his past sensual life and overcome the temptations of the illusory attractions of pleasure at present. So at the end of the journey he finds himself at the same place from where he started. Yet he has a will to transcend the material world and get the spiritual world and hence he pleads, "And let my cry come unto Thee". The path of Self-consciousness, however, may be walked only if the will goes on longer than the intellect. Thus the poem becomes a matter of self-exploration and self questioning, a search within and a groping towards Super Consciousness. **P1**

320 Life's 'Luminous Halo:' Virginia Woolf's Fictive Depiction of Consciousness Sheridan Hough <houghs@cofc.edu> (Philosophy, College of Charleston, Charleston, SC)

How is it, to be in the world? How best to capture what it is like? In attempting this task, representational apparatus may disappoint. Certainly, the multifarious layers of thought, sensation and emotion, both temporally and spatially expressed and understood, can be rendered in terms of subjects and objects. The relations between the subject and the objects it apprehends can be expressed via propositional attitudes, and we can thus describe the subject's experience of the world in terms of beliefs and desires. These serviceable distinctions, of course, ultimately fail to give an adequate description of the 'feel' of the world, of how it is to be 'worlded'. Frustration with the traditional means of analysis, and the desire to expose the very nature of being in the world, are the two central motives behind the phenomenological enterprise. When Husserl directs his readers 'zu den Sachen selbst'–'to the things themselves' – we hear this desire. Here is Husserl's own description of his quest for phenomena: "to be a meditating philosopher... means to refuse to be satisfied with a vague ego cogito and instead pursue the steady flux of the cogito towards being and life. It means to see all that which is to be seen, to explain it and penetrate it..." (Paris Lectures, 14) We are instructed to put away our usual representations and look into a realm of apodictic certainty. We are charged with a search for reality itself, a reality that is found in consciousness. This essay explores this desire and this pursuit as manifested in both phenomenology and fiction. First, I review Husserl's phenomenological project, its method and goal. Husserl's famous slogan 'to the things themselves' is an epistemological instruction: Husserl wants us to attend to the components of consciousness so that we can understand how we can know anything. When we perform the epoch, we discover that which is prior to all evidence, all theory, and indeed all assumption: we discover the existence of the world, a world already shaped by the intentional action of mind. Virginia Woolf makes use of this Husserlian maxim and transforms it into an aesthetic obligation. She too would have us, as writers, scrutinize our quotidian behaviors in order

to see 'the things themselves.' The success of Husserl's method of abstention, and the status of the 'things themselves' thus seen by the phenomenologist, are not at issue here; rather, I use his method and goal as a frame for understanding Woolf's own fictional enterprise, which is, I will argue, a phenomenological move intended to reveal the world, and to describe what it is like to be in, and of, a world. The power and beauty of her prose is ultimately a product of her phenomenological commitments to the depiction of conscious experience. **C5**

321 Expanding the Nature of Storytelling Rich Shapero <julie@tfim.com> (TFIM, San Mateo, CA)

The potential to expand the nature of storytelling is powerful. By combining lucid prose with entrancing music to create a multimedia experience, I'm attempting to bring my stories to life in ways that would otherwise be impossible.This has always been an experiment, and I want people to approach it that way. Integrating words and music will require people to look past its weaknesses and unfamiliarity. What excites me about merging prose and music is that, of all art forms, music is the most emotional and literature is the most cognitive. I think there's magic in being able to skim the prose and see the embedded lyrics surfacing through sentences and paragraphs. Certainly, there are ways of creating unusual and interesting reflections between the two. When recording the music, the contributing vocalist or instrumentalist gets a copy of the novel, the base tracks and they play around with their parts, develop ideas.The musicians are in character, working on a part, evolving it, in the emotion and meaning of the moment, and never required to step out of it until we're done. As much as possible, the mechanics of recording are forgotten. I've been intimately inspired by the art work of Eugene Von Bruenchenhein's and it has played a meaningful role in the process of creating my second project, in quite a few ways. I used the paintings to stimulate my imagination. They're bursting and exuberant in a way that seemed to match the tone of my story. I also projected the paintings onto a big screen for the musicians to see while they were tracking. So EVB inspired them as well. Within the projects there are failures, and there are surprising successes. The objective is to capture moments of brilliance – moments that really connect. Like all worlds, my works can be entered from many directions. Experienced as a whole, the music expresses the emotional core of the story, the novel serves as its narrative shell and the tablet application seamlessly combines the two, adding the experience of visual art to create an immersive storytelling experience. **A1**

322 Echoes and Reflections of Spiritual Consciousness in the Poetry of American Transcendentalists and British Romantics of the 19th Century Santosh Kumari Srivastava <dr.santoshkumari.s@gmail.com> (Women's Polytechnic, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

The fundamental question, that has been puzzling the great thinkers in East and West, is how the brain produces Conscious experience – question which addresses who we are, the nature of Reality and our place in the Universe. The topic of Consciousness has been so complex, so evasive yet so fascinating that it is being approached from wide perspective ranging from philosophical to anthropological to non-scientific. The three specific groups of thinkers are – the scientists, the psychologists, the men of religion. Men of Religion have broadly been talking of two categories of Consciousness – the `Chaitanya' or the Pure Consciousness and materially contaminated Consciousness. But what is Consciousness? Literally speaking Consciousness is the quality or state of being aware, especially of something within oneself. It means to be Conscious of something. Iam Conscious of myself. I know that I exist. The Consciousness is that `Iam'. This brings us to another question that if Iam Conscious that `Iam', then what am I? In material Consciousness `Iam' means Iam a product of this material world. In pure Consciousness one is conscious of one's pure identity in relationship with the Supreme Lord. Here `Iam' means Iam the spiritual-part and parcel of the Supreme soul."The Rishis of old in India made full use of that order of Intelligence which is wisdom. They first made use of five senses and when this did not produce the desired result, they experimented and discovered that there were hidden and latent senses inside us.... They discovered more and more hidden senses or centres. Ultimately they found a nerve centre in their brain which as soon as became Kinetic revealed to them the ultimate reality and then they drew the line

of demarcation. They called that body of knowledge which is derived through the physical senses as `aparavidya' and that obtained through the high senses as the `paravidya'...." By developing the inner eye in which is located the spiritual essence, can we obtain direct communion with the Supreme Being, the reservoir of 'Spirituality-The Supreme.' The paper studies of the reflection of some such experiences of Spiritual Consciousness in the poetry of the American Transcendentalists & the British Romantics of the 19th century. Human Brain, in this way, is central to all activities of Consciousness. Its power has been realized both by Science and Religion of Saints. The only difference is that whereas science is concentrating more on the physical processes, Religion of Saints concentrates upon experiences received as a consequence of the awakening of the hidden power of the mind. The two have yet to reconcile. **P1**

6.02 Art and aesthetics

323 The Road to MinDville: Consciousness Goes to the Movies Nick Day, Sascha Seifert <nick@conscious-pictures.com> (Conscious Pictures, Sebastopol, CA)

As filmmakers dedicated to representing consciousness on the big screen, we find ourselves facing a compelling range of questions, some about the subjective experience of watching a film (what might be called the qualia of cinema) and others about the content of film itself. For example, how does the experience of watching a film affect our consciousness? In what ways is it like a dream or a hypnotic trance? Why do we accept such a blatant artifice in the first place, readily suspending our disbelief? What are the challenges when presenting science, philosophy and experiential or mystical insights to a wider audience? What should be the goals and methods of what might be called conscious cinema? In addition to exploring these questions, we will look at some of the ways consciousness has been represented in narrative cinema, using devices such as dream worlds (Wizard of Oz, Inception, Waking Life), illusory or metaphorical brain-in-a-vat worlds (The Matrix, Being John Malkovich), and the afterlife (What Dreams May Come, Heaven Can Wait). We will also present an overview of our own movie, Mindville, which has been created with Stuart Hameroff, and is the first major motion picture to directly feature the topic of consciousness. Part live action, part animation, Mindville is the story of two young people who are unexpectedly transformed into virtual versions of themselves and taken to an existential fairground dedicated to consciousness in search of answers to life's biggest questions. We will present some preliminary materials from Mindville and discuss some of the challenges that accompany creating such a project. **A1**

324 Transitional Spaces: Consciousness, the Imagination, and the Avatar-Mediated Experience Denise Doyle <d.doyle@wlv.ac.uk> (School of Art and Design, University of Wolverhampton, Wolverhampton, West Midlands United Kingdom)

"We can think of the virtual as the shadows within the body of what it might mean for the very materiality of our bodies to be a weave of flesh and shadow, tangible and intangible" (Kozel 2007, p.138). This paper investigates new understandings of the imagination and consciousness in light of the existence of virtual worlds and game environments. The focus in particular is on the transitional spaces created through the avatar-mediated experience. What are the appropriate conditions and context for the study of the imagination, and the study of imaginative states that are, as Edward Casey notes, "remarkably easy to enter into" (Casey 2000, p.6). A bodily base for the imagination is considered. The paper examines new readings of the imaginary through contemporary writings of the virtual and focuses on the new time-space relationships that are experienced in game environments and virtual spaces. To what extent the virtual has changed our framing of the imaginary? How does our experience of space in virtual worlds and game environments impact on our experience of the imaginary and the imagination? Does the coupling of the two terms, the virtual and the imaginary, shed light on new relationships and experiences of both space and time at the beginning of the twenty-first century and lead us to a greater understanding of consciousness itself? Much debate has surrounded ideas of the virtual, in light of the move to a world increasingly full of the digital. Authors such as Brian Massumi (2002), Gilles Deleuze (1991), Elizabeth Grosz (2001), Pierre Levy (1998), and Susan Kozel (2006, 2007), have each written about the

virtual. Grosz suggests that the coupling of the digital and the virtual is misleading although she also notes that, "the computer and the worlds it generates reveal[s] that the world in which we live, the real world, has always been a space of virtuality".(Grosz 2001, p.78). According to James B. Steeves, in a phenomenological analysis of perception there are two essential aspects of the experience "the logic of the sensible world as it appears to the observer and the role of the observer (and most importantly her body) in the interpretation of that experience" (Steeves 2007, p.37). For Robert Bosnak the process of embodiment precedes any mental or emotional knowing. A key element of what Bosnak terms the "embodied imagination" is that there is "an inversion of the notions of inside and outside [that] changes the very nature of the space [original emphasis]" in which we find ourselves (Bosnak 2007, p.20) In this context then, how do we understand our avatar as our represented "presence" in virtual and game spaces? What are we identifying with when we identify with an avatar? This paper proposes a new understanding of the phenomenon of embodied experience in virtual worlds and game environments. **A2**

325 {event(dimension):} Geneva Foster-Gluck, <genevaley@hotmail.com> (Sugar Beast Circus, London, United Kingdom)

A fascination with one of the most beautiful scientific experiments leads circus athletes and audience into the world of quantum mechanics. Nostalgic of kitsch Sci-Fi films and analogue computer graphics {Event(Dimension):} calls upon our instinctual understanding of reality to question the role of the observer and the nature of time. {Event(Dimension):} will divide the audience into two groups, one will enter a lecture space while the other enters the abstract Quantum Space, each group will experience a different yet simultaneous show, they will then switch places to have the other experience. The two different experiences will be bound together by a shared sound track, the overlap of the two experiences and the repetition of the soundtrack will culminate in a two part narrative that through circus physicality, association and memory will tell an abstract and insightful story of the Quantum Enigma. The Sugar Beast Circus has been recognized internationally for its distinct aesthetic and conceptual approach to contemporary circus, representing a new generation of circus makers where fine art, abstract narrative and physical skill come together in an exciting new form of storytelling. This multiple dimension narrative was developed through a dialogue between quantum physicists and The Sugar Beast Company. {Event(Dimension):} is performed by 5 diversely trained artists showcasing aerial, hand balancing, contortion and cyr wheel skills. Supported by Arts Council England and in residency at La Broche, new circus arts centre | Cherbourg-Octeville and Circus Futures. Produced by McMc Arts. "It's strange really that there aren't more instances of magic realist or fabulist circuses." John Ellingworth – sideshowmagazine.com "Jacques Derrida suggested that to be haunted by a ghost is to remember something you have never lived through. The Milkwood Rodeo, the first of a double bill by Sugar Beast Circus, is like a physical manifestation of this idea, a strange melancholy ghost story". Lyn Gardner The London Guardian, Thursday 15 April 2010 www.sugarbeastcircus.com **A1**

326 Contemplative Artistic Practice Jeffrey Jon Gluck <jeff@jeffreyjongluck.com> (Palo Cedro, CA)

As an artist with a lifetime of interest in the workings of the mind, Jeffrey Jon Gluck has developed a methodology he calls the Contemplative Artistic Practice. He has always been drawn to eastern thought and philosophies: actually to all cultures and denominations of contemplative practices, from C.G. Jung to Judeo-Christian to Hindu and Buddhist teachings. The path of this practice allows the artist to intuitively access the depths of the creative mind. By entering states of quiet stillness where the mind is settled and awareness is focused in clarity, spontaneous insights occur. His methods are a form of Zazen or seated meditation known as Shikantaza, which means 'just sitting'. In this method there is no object to focus upon, just the act of pure awareness. Consciousness turned inward; awareness being aware of itself. The Tibetans refer to this as 'resting in the nature of mind'. Sensations of thought experienced as realizations suggest new visions and direction to the artist. The vocabulary of archetypal symbols and patterns are reinterpreted, remixed and expressed anew as imagery evolves. This imagery includes many of the world's most significant symbols, such as Ensos – the zen circles of enlightenment and the square, triangle and circle representing earth, humanity and heaven. Also from the yogic art tradition are the Brahmanda – the cosmic form that creates, sustains and destroys the Universe, and the grid pattern or networks referred to here as Puja. Ideas are manifest through the engrained skills and techniques of studio procedures. In Jeffrey's case by combining, shaping and finishing metals, his Contemplative Artistic Practice Imagery takes its place in the world. www.jeffreyjongluck.com **A1**

327 The Modern Artist – A Catalyst for Perceptual Awareness Mark Matey <hikokamura@gmail.com> (Tel Aviv, Israel)

Experiencing Visual Art involves cultivating and highlighting our perceptual and mainly visual awareness. Artists are especially sensitive to visual phenomena and refer continuously to examples provided by other artists, in the process of transcription of their potential into art. Often when we experience an artwork we are invited to share in the artists' heightened sensitivity in a way that heightens our own. "Because our entire universe is made up of consciousness, we never really experience the universe directly we just experience our consciousness of the universe, our perception of it, so right, our only universe is perception." Alan Moore. Part of an artist's role in the world has always been portraying mirroring image for society to look upon and reflect itself. An artist holds a delicate balance in his hands, revealing himself, whether intentionally or not, and wholly revealing some aspect of his audience. If there are degrees of intensity in conscious experience then art can induce a strong stimulant. Recent neurological research shows that while creating, artists step into "a zone" not noticing the passage of time as they work. Like meditation practitioners, artists are able to achieve an altered state readily, without "artificial" stimuli. These altered states open doors to the creation of a different world, existing within our shared perspective of the world. Writer Alan Moore (quoted above), refers to art as a form of magic lying inside consciousness. Like a spell, artwork can manipulate symbols, words and images, presenting the artist as the closest version of a "shaman" in our contemporary world. Exhibitions: That Gallery – Hong Kong /4+6 postcard international group exhibition and The Brooklyn Art Library – 2011 – 2012 Sketchbook Project World Tour. For more information: http://markmatey.carbonmade.com/ "My work explores undertones of escapism by means of dealing with my own problems and inner demons without actually dealing with them. With influences as diverse as dubstep and classical music. From Goya – to my eight year old brother's finger paintings. Growing up wasn't easy for me; I carried out a lonely, quiet childhood that resulted in creating a rich inner world with vast imagination. Certain things have surfaced into my art work, however translating images from my consciousness onto paper was and still is the hardest part of my creative process. Iam always trying to be honest about what I feel and think; not making big statements about changing the world or people's perceptions, but perhaps the things under my "bed" can keep you company?" MM **P2**

328 The Worlds of Pessoa and Kabakov and How Might the Impossible Become Conscience Ana Leonor Rodrigues <analeonor.rodrigues@gmail.com> (Technical University Lisbon – Faculty for Arqchitecture, Lisbon, Portugal)

Within the complexity of our conscious states artistic creativity appears as a possibility of acknowledging reality, of creating worlds, that taking from the World or from within the Self parts of it or stimuli, create new realities. These new realities, or artistic objects, have the quality of stimulate our senses, perception and empathy (some would say sensibility) to attain particular moments of clear and universal consciousness. On the other hand Chris King (King 2003) states that living systems are in bifurcations of information coming from the past and coming from the future in a constant state of choice. I would like to observe how the creation of impossibilities as in the work of the Russian artist Illia Kabavov, or the invention of a multitude of persons as in the work of the Portuguese writer Fernando Pessoa, may link the moment of "eternal" consciousness of the artistic experience with the constant choice between retarded and advanced waves. **P2**

329 The Experiences of Creative Synesthetes – From Lady Gaga to Saturday Night Live's Darrell Hammond to Actor Geoffrey Rush and Beyond Maureen Seaberg <maureenseaberg@gmail.com> (Author, Staten Island, NY)

Dr. V.S. Ramachandran says while synesthesia is not the creativity gene, it does seem to lay a foundation for creativity. Nature, he points out, likely has a hidden agenda as it does when the sickle cell anemia gene also protects people from malaria. "The reason it was preserved through

evolution and natural selection is because it makes some people metaphorical and link ideas and be creative," he said in Tasting the Universe (Seaberg, New Page, 2011). "You need this whole spectrum of human diversity." Synesthetes do tend to inhabit the arts – they are seven times more likely to be in the field, says Ramachandran. And as stigma is erased surrounding the trait and awareness raised, more and more famous synesthetes are "coming out." Seaberg, the first researcher to document the colored music synesthesia of Billy Joel, Itzhak Perlman and Marilyn Monroe, will present from personal interviews with newly public notable synesthetes Lady Gaga, Darrell Hammond, the late Laura Nyro (whose friends provide the evidence) and Geoffrey Rush as well as media reports and describe how they are using it to inform their creative process. **C13**

330 Singularity Sanctum Tonietta Walters <tonie@theartsoffice.net> (NoumenArt Center for Applied Aesthetics, Lyerly, GA)

The Singularity Sanctum is a a self as source interdisciplinary project that uses art-making processes and aesthetic theory as ground for the investigation and documentation of certain altered states of consciousness. It is the central hub of the Cosmoscope section within the virtual environment of the NoumenArt Center of Applied Aesthetics [NCAA]. NCAA is focused on trans-humanist fine arts research at the intersection of cultural preservation and consciousness studies. 'Applied Aesthetics' as used here is based on the concepts of 'phronesis' in applied ethics and participatory democracy in digitally preserving cultural & spiritual artefacts. The NCAA Mission is to: Advance research and education with attention to the theoretical and practical groundwork of digitally representing nondual spiritual and cultural artifacts. Provide an integrated methodology for virtual world assimilations of real world concepts. Reinforce comprehensive epistemic objectives of digital memory preservation. Locations: NCAA's virtual environment is currently being developed on Military Open Simulator Enterprise Strategy [MOSES]. Project MOSES is an exploratory effort by the US Army Simulation Training & Technology Center designed to evaluate the ability of the Open Simulator to provide independent and secured access to a virtual environment. OpenSim OpenVCE based mirrors: NoumenArt region on Kitely Virtual Worlds on Demand Second Life Satellite: Xhyra Graf has a satellite classroom, gallery and studio at Virtual Montmartre in Second Life. Simulation Sections: NoumenArt Museum & Gallery – a 'living' museum meaning that it will document the work of living artists. Includes artworks by artists from the Alto Tiete region of Brazil including display of rituals using both artist videos and performance bots. In partnership with the City of Suzano Secretary of Culture and the American Museum for Creole Cultures Cosmoscope – a simulation of my working environment [130+ acres of wooded area-the plan is to duplicate the actual topography] and the objects in it including studio/workshop and land art. Includes an automated avatar for interactions with the objects and visitors. **A2**

6.03 Music

331 Essence of Spirituality in the Ragas of Hindustani and Carnatic Music Systems Gunti Binathi <binti_14@yahoo.com> (Music, DEI Dayalbagh Educational Institute, Visakhapatnam, Andhra Pradesh India)

Essence of spirituality is that concept which is liberated from physical entity, beyond the limitations of human comprehension and which is elevated to transcendental spheres or spiritual sublimity. Music is one of the best medium to attain ultimate spiritual ecstasy. This has been proved by many saints like Saint Tyagaraja, Sant Kabir etc. who preached in their compositions that NAAD the sound is ultimate. The entire creation of God is based on the Nada Brahma. Naad is of two kinds 1.Aahata and Anaahata Naad. Here, music of Aahata naad is compared to external music or aahata sangeet(Apara vidya) and Anaahat naad i.e internal music is compared to anaahata sangeet(Para vidya). Music of India is regarded as means of divine contemplation and bliss. Raga system is the striking aspect of Indian music. Music and spirituality are inseparable elements. The objective is to prove that Essence of Spirituality can be attained through rendition of ragas with bhava that helps an artist or a devotee to reach the heights of Anaahata sangeet to some extent. Ragas have the quality of expressing the feelings to God without the necessity of language. As

stated: "Music should become the bridge that takes the listeners from sensual level to spiritual level of Atman". Ragas like "SARAMATI, ABHERI, SINDHU BHAIRAVI" etc., in Carnatic music and GURJRI, BHAIRAVI etc., in Hindustani music portray bhakti ras in their swara sangatis. So these kind of ragas are to be personally analysed for spirituality by self and also by collecting spiritual experiences from other great artists. **P1**

332 Visual Bias in Consciousness Studies: Why Philosophers Should Pay Attention to Auditory Perception and Music Listening Jenny Judge <judge.jennifer@gmail.com> (Faculty of Music, St John's College, Centre for Music and Science, Cambridge, Cambridgeshire United Kingdom)

The philosophy of perception aims to explore human perception in general, but has historically focused almost exclusively on visual perception (Ihde 2007; O'Callaghan 2007; O'Callaghan 2009). The study of consciousness has largely followed this lead, discussing conscious phenomena in primarily visual terms. There are two main assumptions built into this approach: firstly, that vision is representative of perception in general; and secondly, that the carving up of perceptual experience into discrete modalities in the first instance is justified. In this paper, I will argue that attention to auditory perception and music listening challenges both of these assumptions. I will also discuss the possibility that principled attention to auditory perception and music listening may allow for a finer focus on the temporal nature of consciousness itself; the objects of auditory perception, insofar as they are temporally (rather than spatially) constituted and individuated (Bregman 1990; O'Callaghan 2007), may have greater scope than their visual counterparts for an exploration of the way in which consciousness unfolds in time. Moreover, the conscious experience of music, from the perspective of listener and performer, can be considered to be fundamentally grounded in issues of embodiment, intersubjectivity, aesthetics and social meaning, rather than purely 'basic' auditory perception. This, I will argue, illuminates the extent to which a discussion of consciousness in general as though there were such a process as basic, 'pre-cognitive' perception bound to singular modalities may be ill-informed, or based on historical rather than philosophical premises. I will also suggest that empirical investigations of auditory perception and musical cognition, insofar as they focus on unconscious mechanisms to the exclusion of the conscious experiences involved, ignore insights from philosophy of mind and consciousness studies. Philosophy of perception also fails to incorporate clues from the psychology of auditory perception. I will suggest that this could be a direct result of the aforementioned visuocentrism in philosophy of mind; consciousness studies, in tacitly committing to a visual model of consciousness, has rendered itself inaccessible or seemingly-irrelevant to the empirical psychology of music and audition. A more holistic perspective on perception would therefore benefit not only consciousness studies but also the empirical psychology of music, paving the way for a more truly interdisciplinary inquiry into perception and consciousness. Bregman, A. S. (1990). Auditory scene analysis: the perceptual organization of sound. Cambridge, Mass.; London, MIT Press. Ihde, D. (2007). Listening and voice: phenomenologies of sound. Albany, N.Y., State University of New York Press; Bristol: University Presses Marketing [distributor]. Levine, J. (1983). "Materialism and qualia: the explanatory gap." Pacific Philosophical Quarterly 64: 354-361. O'Callaghan, C. (2007). Sounds: a philosophical theory. Oxford, Oxford University Press. O'Callaghan, C. (2009). Auditory Perception. The Stanford Encyclopedia of Philosophy (Summer 2009 Edition). E. N. Zalta. **C13**

6.04 Religion

333 Quantitative Assessment of Religious Affiliation, Political Orientation, and Strength of Belief in God on the Spiritual Discernment Scale: Spiritual Discernment Profiles Robert Benefield, Frederick L. Newman <rbenefield@etbu.edu> (Behavioral Sciences, East Texas Baptist University, Marshall, TX)

Two hundred and sixty participants completed the online version of the Spiritual Discernment Survey (SDS), a detailed demographic section, and open-ended questions regarding the participant's personal spiritual discernment experiences. In an effort to obtain a suitable confirmatory fit

analysis, indicators (survey items) with the least reliability were deleted within each factor, then factor means for each of the seven factors and an overall SDS score were obtained. The regression of these seven factor mean scores with the overall score was now found to be .99 (as a result of four items being dropped). A MANOVA indicated a significant effect of political orientation on the total SDS score and six of the factors. Liberals and conservatives were significantly different on the following factors: 1) distinguishing good from evil, 2) God communicating with the participant, 3) nature of God revealed, 4) God initiating overt behavior, 5) discernment has prerequisites, and 6) new age spiritual concepts. A MANOVA indicated a significant effect of strength of belief in God on the total SDS scores and five of the factors. Participants with no/weak vs. strong faith were found to differ on these factors: 1) distinguishing good and evil, 2) God communicating with the participant, 3) nature of God revealed, 4) God initiating overt action, and 5) has prerequisites. A MANOVA and Between-Subjects ANOVAs indicated a significant effect of religious affiliation on the total SDS scores and six of the factors. Participants who were not affiliated with any religion (and sometimes Catholics and Other) tended to disagree with these notions regarding spiritual discernment: 1) distinguishing good and evil, 2) God communicating, 3) nature of God revealed, 4) God initiating overt behavior, and 5) has prerequisites. However, groups with no religious affiliation agreed with idea that (factor 6) New Age concepts are part of spiritual discernment activities. On the other hand, participants who were Baptist (and often Other Protestant) agreed with factors 1-5 above and disagreed with New Age concepts. It was determined using a factor analysis model, that a suitable model could be generated if one factor was dropped from the analysis. Hence, an exploratory factor analysis was conducted on the remaining six factor means. Two factors resulted from this analysis-Factor 1: Good versus Evil, How God Communicates, Nature of God Revealed, God Initiates Behavior, and Prerequisites to Discernment and Factor 2: New Age Spirits. Regression analyses were conducted on two demographic measures political orientation and strength of belief in God. All six factors related to the Political Orientation measure. Examination of the Strength of Belief in God factor (higher score indicates stronger belief) revealed that only two factors were correlated with this demographic variable. The How God Communicates factor produced an r = +.576 and the Nature of God Revealed factor produced an r = +.610. **P2**

334 Towards 'Spiritual Intelligence': The Bhagvadgita as a Narrative of Eternal Consciousness Bani Dayal Dhir, Arsh Dhir, Prem Lata V <arsh@dayalmotors.com> (Department of English, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

In recent years theories of 'Multiple Intelligences' have broadened our concepts of intelligence beyond intelligent quotient (IQ) as evident in the works of Gardner (1983), Emmons (2000), Vaughan (2002), Nasel (2004), David B. King (2008). In the last two decades Spiritual Intelligence (SI) Paradigm has emerged as breakthrough in psychology and is receivingamazing attention from scholars and thinkers. Several models are being developed to comprehend human perception, intuition and cognition. The Bhagvadgita, the most influential aesthetic and esoteric work in Indian Philosophy, is an exposition of the science of the Supreme Spirit and a mandate for action. The paper, in its applicational case study endeavours to delineate The Bhagvadgita as an embodiment of 'Multiple Intelligences' in general and 'Spiritual Intelligence' in particular. It locates The Bhagvadgita within the framework of the Spiritual Intelligence Model of David Brian King which has four dimensions: Critical Existential Thinking, Personal Meaning Production, Transcendental Awareness, Conscious State Expansion. Moving from the idiom of 'Spiritual Intelligence' the paper also showcases The Bhagvadgita as a metaphor for man's inward voyage from material consciousness to spiritual consciousness. This journey motif is analyzed by employing the logarithmic scale for calibrating consciousness proposed by Dr. David R. Hawkins, who even assesses the levels of Lord Jesus Christ, Lord Krishna and Lord Buddha and places them at the highest level of his scale. In this context, the paper would bring to the fore the notions of 'Ultimate Consciousness' or the 'Super Consciousness' and 'Absolute Truth', obtained only in Pure Spiritual Region, revealed only in the Oriental Religion of Saints (Radhasoami Faith). The paper presents how Arjuna's enlightenment level attained during the revelation of the Cosmic Form was only upto the lower part of Brahmand (Universal Mind), where as there is revelation of the nine

more Regions above it in Oriental Religion of Saints. Thus, the scale of Hawkins raises several questions. The Bhagvadgita emphasizes devotion to Purushottama, the Lord of the three Regions (Lord Krishna being the incarnation of Purushottama). Rev. Prof. P. S. Satsangi reveals that in the Oriental Religion of Saints (Radhasoami Faith) there is the revelation of the Fourth Region which even The Bhagvadgita does not mention. He further elucidates that "there is existence of the Fourth Purush as the Param Purush, the one and only Lord- God of the universe, whose realization can alone bring true emancipation." From this perspective the paper would probe into the viability of the highest level of consciousness mentioned by Hawkins and would illuminate the sublime notion of 'Ultimate Reality'. The paper would also provide new insight into the levels of 'Spiritual Intelligence' with reference to the Oriental Religion of Saints (Radhasoami Faith) where there is revelation of the mystery of ten Regions pertaining to ten levels. **P1**

335 A Neurotheological Approach to Understanding James Joyce's Concept of Epiphany and Related States of Wajad and Turiya with Some Reflections on the Radhasoami Faith Gur Pyari Jandial <gpj.dei@gmail.com> (English Studies/Faculty of Art, Dayalbagh Educational Institute, Agra, India)

Neurotheology, also known as spiritual neuroscience, is the study of the correlation between neural phenomena and subjective experiences of spirituality. According to the proponents of neurotheology, there is a neurological basis for subjective experiences traditionally categorized as spiritual or religious. Neurotheology attempts to explain the neurological basis for religious experiences, such as the perception that time, fear or self-consciousness have dissolved, spiritual awe, oneness with the universe, ecstatic trance, sudden enlightenment and altered states of consciousness. The principal writer to extend the meaning of the word "epiphany" as a secular term beyond the realm of religion was James Joyce, who was interested in sudden, dramatic and startling moments which seemed to have heightened significance. By "epiphany" Joyce meant "a sudden consciousness of the 'soul' of a thing". In Hindu philosophy, turiya (or chaturtha) is the experience of pure consciousness. Ecstasy is called Wajd by the Sufis. This bliss is the sign of spiritual development and also the opening for all inspirations and powers. This is the state of eternal peace, which purifies from all sins. Only the most advanced Sufis can experience Wajd. The Radhasoami faith, considered by its adherents as the true path to achieve God-realization, is also referred to as Sant Mat or Religion of Saints. The teachings of this faith centre upon a type of meditation practice known as surat shabd yoga. Shabd refers to a sound current which can be perceived in meditation. Yoga refers to the union of our real essence (soul) through an inner listening with focused mental concentration with the inner sound (shabd) which it is maintained emanates from Radhasoami the Supreme Being. It is therefore taught as the unchanging and primordial technique for uniting the soul with the Supreme Being through the power of Shabd. In a presentation at the Toward a Science of Consciousness Conference held at Tucson, April 13-17, 2010 Robert G. Mays, B.Sc., and Suzanne B. Mays propose that the 'mind' is an energetic, spatially extended, nonmaterial entity that is united with the brain and body. The mind is a separate entity having the character of a structured energy field, which can interact with physical processes including brain neurons. The nonmaterial mind is also the seat of conscious experience. The mind interacts directly with cortical neurons, probably via electrical interaction, resulting in both subjective phenomenal experience and causal influence on neurological processes. All cognitive faculties reside in the mind but ordinarily need the brain's neural activity for conscious awareness. The meditative traditions specially in India provide a compelling example of strategies and techniques that have evolved over time to enhance and optimize the human potential for God-Realization. This paper is an attempt to make a neuroscientific study of some of these traditions and practices; i.e., an analysis of epiphany, Turiya, Wajad or the experience during meditational practices in the Radhasoami faith, in the light of the basic tenets of neurotheology. **C15**

336 Consciousness & Spirituality Tanoj Kumar, Manoj Seth <manojseth8@gmail.com> (DEI Educational Institute Dayalbagh, Agra, Uttar Pradesh India)

Consciousness Metaphysics in practice relates to how consciousness interacts with matter. Spirituality in practice is a bi-product of conscious awareness of realities more subtle than physi-

cal existence. Metaphysics is and has been an integral and essential art and science of mankind since the dawn of civilization. Consciousness is the energy and force that operates the physical vehicle in its entirety, spirituality is the emanation of subtle energy from the human entity. When speculating and/or projecting ones consciousness into the subtle realms, one is practicing intermediate to advanced metaphysics. Projection of consciousness or "astral projection" is expressed by transcendent space/time, and focused consciousness through time/space, this is master metaphysics. Spirituality Spirituality is the expression of conscious metaphysical discernment and wisdom. Every living thing has a metaphysical expression, or subtle reality that occupies the same physical space. We practice basic level metaphysics everyday upon awakening from sleep. The very act of subjecting higher consciousness and spirituality to the physical form is a metaphysical act of lower nature. To pray to a diety upon waking is a metaphysical practice as well, as the mind and soul seeks to connect with "higher consciousness and spirituality". When we have intuitive thoughts and impulses, we are practicing intermediate level metaphysics. Conscious awareness of these subtle thoughts and impulses is metaphysical transmission of information from the subtle worlds within and without the individual, to the mind. Metaphysical consciousness and spirituality when functioning in unison may generate extremely high vibrational energies and frequencies. To know thy self is master metaphysics of the highest nature, as to know thyself is pure metaphysics. **P1**

337 Decision Support System for the Teachings of Bhagvad Gita and Radhasoami Faith
Dharampal Satsangi <psriramamurti.db@gmail.com> (Centre for Consciousness Studi, Dayalbagh Educational Institute, Dayalbagh, Agra, Uttar Pradesh India)

Religious doctrines are obscured with abstruse principles and there is much of doubtable spirituality through which a way must be deftly navigated before truth can be found. Pseudo religious men in their colorful garb and flowing oratory are all too common. There is an innumerable crowd of mental acrobats and contortionists through which a seeker of truth must elbow his way through, in search of the really enlightened ones. The seekers trained themselves until they became proficient in their pursuit and finally found the truth. They exercised powers of mental concentration until they attained almost complete control over their mental process and some even developed unison with Ultimate Reality and became 'The liberated Ones'. In the Eastern Religious Tradition they came to be called Gurus. Seekers of truth spent large parts of their lifetime searching for such Gurus and some having found them followed their teachings and gained spiritual light. And once the Guru departed, what was left was a collection of His teachings, which were, most of the time, difficult to practice in an ever changing society. The followers therefore were left to find their way through the maze of life, holding a guide-map of yore in hand. Soon the practice of true religion got reduced to a few convenient rituals. Recent past has seen a resurgence of interest in spirituality and those with a scientific drift are looking for a systemic approach to religion and spirituality. All religions, Christian, Islam, Shintoism, Hindu,among others, have their own distinct ethos which was cultivated over a period of time. Their teachings and practices can be reduced to a systems model to assist an earnest seeker in developing an Optimal Life Trajectory following which the summum bonum of life can be attained. The Bhagvad Gita is a religious classic and a philosophical treatise which sets forth in precise and penetrating words the essential principles of a spiritual religion which are not contingent on ill-founded facts, unscientific dogmas or arbitrary fancies. The essential purpose of the Gita is to teach us a how devotion to a living Adept can lead one out of bondage by adopting the right technique of action. The only way in which a great scripture can be a practical guide to mankind is when it teaches spirituality that can be lived. Radhasoami faith is a modern faith of the devotional school where the statements of eternal truth and Ultimate Reality are presented in the accent of our times. It has devotion to a living Adept as the centre piece and contemplation on the cosmic sound form and devotion through self-less action as the path to emancipation. This paper endeavors to present the design of a Decision Support System (DSS) for the teachings of Bhagvad Gita and Radhasoami faith which are two most important philosophies in the Eastern Devotional tradition. The DSS presented here is of a flexible nature and can be readily adapted to other religious traditions as well. **P1**

338 The Science of Consciousness Creation is a Manifestation of the Supreme Consciousness Evolution, Process and Divisions of Creation Religion of Saints Radhasoami Faith
Parmeshwar Rao Tatavarty <parmesh.33@gmail.com> (Mentor,Post Graduate Diploma, Dayalbagh University, New Delhi, Delhi India)

The Supreme Consciousness is known by many names.The absolute reality, the infinite, the ultimate consciousness, the divine, God, the ultimate truth and the Omnipotent creator are few of the names through which the Supreme Power is referred to.The universe came into being due to the decision by the Supreme Being to express itself in the form of a manifestation.All the religions which believe that this creation had a beginning declare that a Shabda or Sound manifested itself at the beginning of creation. Mohammedans hold that God pronounced Kun (Come into being) and the creation came into being. It is stated in Bible that God said Let there be light and there was light. Itamounts to say that at the beginning of creation there occurred commotion in the centre of spirituality which was immediately followed by the manifestation of a Shabda (Sound) in some form as "ikshana" i.e. thought or wish or command.The Supreme Consciousness brought creation into existence as an outward flow in order to facilitate a process of cleansing and emancipating the souls to purify and liberate on a permanent basis. Hence, scientifically, an inward flow or a reverse flow towards the Supreme Being the reservoir of the ultimate power must have also been created. A force current in nature resolves itself into three degrees or directions. In a flame we have the first degree portion where the light is white and brightest, the second from the point where the flame begins to emit smoke and the third is the intermediary portion between the two i.e. from the point where white light ends to the point where the smoke begins. It can be inferred that the Prime Spiritual Force Current Adi Chetan Dhar must also have three divisions or regions. The Radhasoami Faith therefore affirms that Creation consists of three grand divisions-(1) Nirmal Chetan Desh (Region of Pure Spirituality) (2) Nirmal Maya Desh (Region of Pure Matter) and (3) Malin Maya Desh (Region of impure matter).They represent respectively the Head, Body and Feet of the Supreme Being and His creation. The soul travels upwards and inwards through a process in order to reach the ultimate reservoir- as per the divine plan by achieving the necessary purity to ultimately mingle and remain with the Supreme Consciousness forever on a permanent basis. According to the Radhasoami Faith that Prime Sound-Adi Shabda was Radhasoami. It is therefore believed that the Prime Sound, Adi Shabda, Radhasoami continues to resound as ever. If someone is able to awaken his latent spiritual faculty of hearing at the particular Spiritual centre he would be able to hear that Sound Radhasoami resonating all over the creation. Corresponding to the various regions in creation there are different phases of that Shabda resonating at the corresponding Spiritual centres of those regions.The Radhasoami Faith prescribes the methods of Surat Shabda Yoga as a practice and method to achieve the upward flow of the soul with the help of the spiritual leader or Guru. **P1**

339 Consciousness 'A Perspective' from the Point of View of the Youth Solution for World Peace Process
Guru Mehar Tatavarty <tgmehar@gmail.com> (New Delhi, Delhi India)

The youth of today has a tremendous advantage as against the earlier generations.Today the youth are exposed to the technology which is available at a price and comfort which was never the good fortune of the earlier generations. However what is required today in the world is the solution or mantra of a peaceful coexistence for everybody in the whole world. A disoriented and misled youth is a biggest problem of any country. The "Role of Consciousness" education cannot be understated and under valued at all. The current day world is fast moving on the one hand and also fast affecting on the other. What we mean by this is that the power body or the power surplus segment must be ready to transfer the power to the power deficit segment at the least greed level. Then only there would be power sharing by one and all internationally. This would then lead to a peaceful orientation in the world. The power so referred is not just the military power but all kind of power be it economical, academic,social,political, geographic or spiritual. The spiritual power and occult development in the east need to be shared and appreciated by the world. The spiritual path and religious teachings by the Saints would go a long way in the development of a new world order in the world where peaceful coexistence would be appreciated and facilitated by all concerned. **P1**

340 Intuitive Consciousness or Consciousness in Plants? Shikha Verma, Asha Juneja <shikhaj@rediffmail.com> (Theology, Dayalbagh Educational Institute, Navi Mumbai, Maharashtra India)

Consciousness is the relationship between the mind and the world with which it interacts. Besides, interaction with the material world, Consciousness is a faculty through which nonmaterial God interacts with the material world. But how does one explain the nature of this Consciousness? Also, does non-human consciousness exist? This paper contemplates the Intuitive Consciousness and consciousness experienced in plants by two researchers on the basis of their personal unique experiences while carrying out their respective difficult scientific research problems. The first challenge was – to produce true potato seeds. The method chosen intuitively was grafting of potato plant (scion) on tomato plant (stock). There was completeamalgamation of the upward going sap of tomato with the downward coming sap of potato to produce a profusely flowered plant. This congeniality of the two plants to achieve 100 % graft union in all the plants was miraculous. Another exceptional experience was during the study of opening and closing of about 1000 flowers (of potato/tomato graft). The researcher witnessed each petal open and hear the flower petals separate with a soft sound or pulse. The consistent and precise timings for opening/closing of flowers was remarkable e.g. each day, 3 petals would always open at 6.30am. During the entire tenure of research, plants communicated and even helped the researcher reach the desired result. There was harmonyamong her and the plants as if, they were together carrying out The Mission of the Supreme Being, their Creator and He was communicating with both. The 2nd researcher had the task of determination of chemical form of chromium, a contaminant metal in the xylem sap (dilute solution that transports water, ions and compounds absorbed by roots to aerial parts of plant). ?Most Cr whether fed as Cr(III) or toxic Cr(VI) was held in the root, a little was transported above as harmless Cr(III)-organic complexes?. The plant thus used a detoxification mechanism to overcome the ill effect of Cr(VI). From the standpoint of evolutionary biology, consciousness can be viewed as an adaptation in the sense of a trait that increases fitness. But is it really an adaptation or the consciousness of the plant? The xylem sap has been described as the "spirit" of the plant as it provides nourishment to the whole plant to remain alive and active. In this case, it also prevents the plant from harmful Cr(VI). Thus, whenever a human is deeply engrossed to find solutions to difficult problems, something beyond intelligence plays a role. Is it Intuitive Consciousness or Divine Intervention? Consciousness is in all – plants, animals and humans though the level may differ. It represents the connecting faculty through which our Common Creator, the Supreme Being has plugged all in the mystery of life. He sends subtle messages through our consciousness for our well being which unfortunately, mostly we fail to sense. However, this faculty can be reawakened, enabling us to feel this great power within us, and also appreciate and feel the pulsating life of His other Creations. **P1**

341 Perception, the Buddha-Nature and the Brain: A Challenge to Neurotheology on the Dynamics of Spiritual Meaning Jonathan Weidenbaum <jow@berkeleycollege.edu,> (Liberal Arts, Berkeley College, New York, NY)

Neurotheology, the discipline which explores correlations between religious experience and the nervous system, comes in more than one form. While some neurotheologians aim to isolate a specific part of the brain as the foundation for spirituality (i.e. the temporal lobe), others argue for the importance of recognizing myriad components of the nervous system as working in tandem. While a few are anti-religion, others seek, on the contrary, to vouch for both the validity of mystical experience and the value of religious commitment. However, what many neurotheologians seem to have in common is a general interpretation of the nature of experience: namely one in which the brain, as the primary seat of significance, fashions sensory data into structures of meaning. According to many neurotheologians, mystics can therefore alter their reality by provoking the right transformations within the nervous system. The purpose of this essay is to argue that this interpretation of our perceptual and intuitive life fails to account for the felt-character of some of the most venerable types of experience labeled as religious. I do not deny that the nervous system is a necessary condition for all experience, religious or otherwise. I maintain that it is not a sufficient condition, and that the ecstatic feel of religious experiences involves configurations

of meaning that are not reducible to a model in which the brain receives and shapes value-neutral bits of stimulation. I argue that this model can also be self-refuting. For instance, in describing how the brain creates reality, the authors of Why God Won't Go Away state that even science is a kind of mythology, a useful fiction (leaving us to wonder why we should accept their conclusions). Drawing upon key American and European thinkers, I suggest that the rich qualities of religious experience are better accounted for through a more nuanced understanding of the relationship between the nervous system, an active and mobile body, and the environment – and not through a concentration upon a priori mechanisms or "God-parts" of the brain. I conclude with a discussion of the implications of my position for the veridicality of different kinds of religious and mystical experience. I hope only to advance the conversation over neurotheology, and not to dismiss it. **C16**

6.05 Mythology

342 Echo and Narcissus: Phenomenol Experience for Whom? Paul Nugent <pauldnugent@hotmail.com> (Rensselaer Polytechnic Institute, Lenox, MA)

If phenomenal experience or "what it is like to be" characterizes the "hard problem" of consciousness, then is it possible that "form follows function" and the consciousness's deepest desire, if we entertain that it might have one, is to know what it is like? The myth of Echo and Narcissus, along with scholarly literature on phenomenal consciousness, are used to develop a theme that consciousness wants to witness a particular world (e.g., the Earth) in a particular way (e.g., through the phenomenology of the human being or other sentient creatures). The tragedy of the myth of Narcissus is that he is unable to ritually offer his phenomenal experience of his world to anyone but himself. He, and the nymph Echo who wants Narcissus to offer his phenomenal experience to her, both weaken and wither because neither obtains what they really need out of the relationship. The myth, then, can serve as a powerful framework with which to consider what personal and ethical responsibility each individual human "self" may adopt given the unique status of phenomenal consciousness in the universe. **P1**

343 Collective Consciousness Gurpreet Satsangi, Satgur Chetna,Arti Saney <gurpreet.kaur.satsangi@gmail.com> (Science, Dayalbagh Educational Institute, Agra, India)

The collective unconscious – so far as we can say anything about it at all – appears to consist of mythological motifs or primordial images, for which reason the myths of all nations are its real exponents. In fact, the whole of mythology could be taken as a sort of projection of the collective unconscious.We can therefore study the collective unconscious in two ways, either in mythology or in the analysis of the individual **P1**

6.06 Sociology

344 Employee Spiritual Consciousness: An Empirical Study from an Employee Engagement Perspective Smriti Caprihan, Dr. Sumita Srivastava <scaprihan@gmail.com> (Department of Management, Dayalbagh Educational Institute, Dayalbagh, Agra, Uttar Pradesh India)

Business organizations, the most compelling social entities, are beginning to rethink corporate strategy in the recognition of emerging trends of ethics, values, corporate social responsibility and the enduring issue of spirituality at work. Today's businesses require not only intellectually gifted and emotionally steady individuals but go one step ahead by demanding the finer qualities of moral behaviour and job fulfillment in their present and potential employees. These qualities of the soul are addressed through a high spiritual quotient. This research study measures employee engagement and employee spiritual consciousness as stand- alone variables. In this study, spiritual levels of employees are recorded on the independent Spirituality Assessment Scale (iSAS) developed by Rojas (2002). It comprises of the Intrapersonal, Interpersonal, Suprapersonal and Ideopraxis aspects of spirituality. The employee engagement score has been measured using the Gallup Q12 scale. An attempt is made to correlate an employees? spiritual consciousness with

his engagement levels in order to study if a heightened spiritual quotient impacts work engagement. The regression coefficients indicate that heightened spiritual quotient results in higher work engagement levels. Additionally, demographic data collected on each employee's years of service at one organisation discloses that employees with a higher spiritual consciousness have a low job turnover. **P1**

345 From Evolution to Mindful Action: A Theory in Support of Leadership Consciousness Crystal Dujowich, Zachary G. Green, PhD <crystald@sandiego.edu> (Leadership Studies, University of San Diego, San Diego, CA)

Theories in consciousness have spanned contributions in hierarchal categories, materialist processes, and spiritual pathways. In many ways, this information is not usable in a broad spectrum to the masses. Likewise, advances in leadership literature have provided understanding that leadership can be thought of as a process. As such, leadership requires movement and some definitions of leadership include the notion of change as a pre-requisite. Yet, as the literature also highlights, not all change is positive and not all movement is mindful. The ability to be mindful can be translated into practice by understanding how the parts relate to the whole. In this way, individuals are observant of interconnectivity and ultimately are represented by increasingly expansive views in human development theory. However, mindfulness or heightened consciousness does not assure action. A person can have a deep understanding of themselves, their role, their relationship to others, and the context in which they are embedded without taking action. Therefore individuals placed in expansive developmental categories and possessing heighten consciousness can be passive. Conversely, leadership consciousness unites the conceptual understanding of leadership as a mindful action. Leadership consciousness is the process, practice, and presence of bringing together critical elements of experience that crystallize an emerging future and bring forth mass action. It arises at an individual level but enjoins the collective in a mutual moment of sparked awareness whereby the concentrated energies move from potential to potency. In this respect Leadership consciousness becomes the conjoining of disparate critical energies in focused way to bring mass change. The fundamental energies of Leadership Consciousness are linked through five distinct but interrelated, continuous, and often concurrent levels: Critical Mass, Critical Moment, Critical Incident, Critical Connection, and Critical Synapse. This paper draws on constructivist human development theory, quantum science, and integral philosophy to conceptualize how leadership consciousness can be understood, applied, and seen in the world today. **P2**

346 Quantum Management – Redefined – Using Intuitive Consciousness Chhavi Gupta, Amolly Gupta <chhavigipta61@gmail.com> (Consciousness Studies, Managem, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

We are seeing Management Philosophy being redefined into a subtler and hopefully a more sustainable field of management called "Quantum Management". It is a re-invention and re-discovery of management philosophy where the aspect of intuition or intuitive knowledge is being brought about. It propounds that – more than mere analytical approaches to problem solving and decision-making, intuition plays a major part. This would then mean that the traditional theory of physics of objectivity is being replaced by quantum subjectivity. In this paper we will explore the Quantum Skills which need to be developed in order to practice Quantum Management because we are dealing with an environment of unpredictability. And how do we practice intuition? We will delve into this aspect as well. By-in-large, we do this by silencing the rational mind, as we know the intuitive mind produces extraordinary awareness. It helps us see things as they are, without the filtering lens of sensory perception and in the process, toughest problems can be effectively solved. Most of the time employees get bogged down in enormous information gathering and take decisions based on this mindless-myriad. What is needed is positive decision-making by tapping that subconscious focus on pertinent data. By weaving effective silence into our daily routines, we will naturally create whole-brain organization, which will draw on intuitive knowledge and rational analysis. But, we must be willing to step-out of our zone of comfort with a deep sense of commitment and courage, transcending egos and fears, if we want to practice quantum relationships. The workplace will have to move from a place of power and politics to partnership, whereby a

new collective vision will emerge as to what is possible and passionate action will spontaneously flow. We embark upon this project bearing in mind the guiding words of Professor P.S. Satsangi Sahab, Chairman, Advisory Committee on Education, Dayalbagh, Agra, India; "Intuition can be cultivated, 'intuition' can be acquired, and it can then be availed of. Once we recognize each individual's ability to intuitive knowledge, unthinkable breakthroughs will occur". **P1**

347 Personal Consciousness and Organizational Climate: A Pilot Study with Reference to Indian Organisation Shalini Nigam, Smriti KhannaStudent, M.A. Psychology, DEI (smriti.khanna89@gmail.com) <shalinidb@gmail.com> (Management, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

William James, the propounder of the theory of consciousness in classical psychology, defined consciousness as the "function of knowing". He referred to consciousness in terms of mind-states that are personal, dynamic, fluid and selective. The paper attempts to relate the dimensions of organizational climate with the personal consciousness of the individuals. In the words of James, personal consciousness is characterized by "absolute insulation" and "irreducible pluralism". Hence, by personal consciousness it means that every mind keeps its own thoughts to itself. There is no giving or bartering between them. No matter how similar the thoughts of two different minds may be, in terms of quality, subject, location or theme, in no way can these be fused with one another. It is suggested that an effective organizational climate would be determined by the awakened personal consciousness of the individuals within the organization. An organizational climate should be such that it evokes and connects with the personal consciousness of every individual in order to yield optimum efficiency. Being an exploratory research, the results are based on an opinionnaire administered on a focus group of experts in different organisations. **P1**

348 Consciousness: Evolution and Perception in the Corporate World: A Study on the Evolution of Consciousness in Corporate Culture and its Perception Sanjay Prasad, Deepa Prasad <sanpras@gmail.com> (Dayalbagh Educational Institute, Naperville, IL)

The modern society is highly impacted by the growth and scientific innovation that corporate world brings to the common household. Underlying driving force is the human consciousness of the corporate administration. Ethics, culture, historical implications and adoption to the growing needs of society and country has been guiding the corporate world to achieve its goals. Holistically it the consciousness state of the persons that play a key role in the decision making process. In this presentation, we will review the evolution of the perception of consciousness over last 50 years that has greatly affected the common man and country at large. In early 70's, the ethical and moral values in corporate culture were mainly focused on ideology to bring innovation and growth in the corporate culture. Over the past 40 years, the consciousness as perceived through corporate culture and ethics, moved away from the ideal values to the worldly gains centered on individuals. This has degraded the state of consciousness and has endangered the corporate and economical growth. **P1**

349 Antecedents and Consequents of Spiritual Consciousness: An Organizational View Sumita Srivastava, Prof. Sanjeev Swami <sumita.srivastav@gmail.com> (Management, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Spiritual consciousness in an organization is collective awareness of the interconnectedness of the different manifestations of the existence (Mitroff and Denton 1999). Spirituality connotes the meaning-giving and contextualizing transformative intelligence (Emmons, 2000; Zohar and Marshall 2000). Organizations reflecting spiritual consciousness adopt a caring attitude towards existence. In recent years, contemporary management theory and practice have paid special attention to this emerging concept in management. This refers to the perceived increasing importance of research into the various aspects and dimensions of spirituality in the business world and the workplace. Different terms have been used in the literature to denote this construct – Spirituality at Work, Workplace Spirituality, Organizational Spirituality and Spirituality and Management, Spiritual Consciousness at Workplace. The main focus of the current work is to explore how spiritual consciousness manifests itself in organizations and what impact it has on organizational and

employee performance. Several antecedents of spiritual consciousness in organization have been proposed by researchers. However, a broad conceptual framework of antecedents and consequents of spiritual consciousness in organization is missing. The purpose of the present research is to address this gap in the literature. Based on the past research, three sets of antecedents pertaining to eco-technological imperatives, people centered management and maturing scientific paradigm are proposed to be related to spiritual consciousness in organization. Spiritual consciousness in organization is hypothesized to be related to employee well being and organizational productivity. The link between spiritual consciousnesses in organization and employee well being is moderated by organization's structure and top management's credibility. Further, the link between spiritual consciousness in organization and organizational productivity is moderated by technology and competitive intensity. Based on the above parameters, a 2x2 organization profile grid has been conceptualized and proposed to categorize various organizations. Illustrative case studies of two organizations of Indian origin are provided to exemplify the application of this grid framework. **P1**

6.07 Anthropology

350 Observations from South America: Globalization as an Agent of Ethnogenocide or Darwin's Natural Selection? Susan Kosciolek Salerno, Ralph W. Hood, Jr. <rfs894@mocs.utc.edu> (Psychology, UT – Chattanooga, Chattanooga, TN)

Five months of field observations in South America, specifically in Ecuador and Colombia, focused upon government efforts to educate the children. These efforts have resulted in the relocation of indigenous populations from the jungle into community compounds. One consequence of this relocation is that elder populations retain their indigenous lifestyle while the younger population prepares for a life outside of the community. Elder indigenous have sought to establish tourism as a solution to preserving their culture but communities, that have been on the forefront of tourism, have grown to resent the intrusion and perceived judgment concerning their cultural morays. What is the role of modern society? Shall we observe this process as one of natural selection or one of ethnogenocide? Any future discussion of the moral and ethical issues facing the indigenous populations should include a conversation about the unintended consequences of continued indigenous interactions with modern society and the responsibility of the global community for those interactions. **P2**

351 Consolidated State Model of Consciousness Applied to Neolithic Imagery David Miller <dlmiller@mail.uri.edu> (Psychology, University of Rhode Island, Hope, RI)

This paper challenges the experiential foundations of the "consciousness contract" set forth by Lewis-Williams (2005) in Inside the Neolithic Mind. Lewis-Williams offers a "states of consciousness" model to explain the emergence of Neolithic graphic artifacts, applying a typology of hypnagogic states and their associated phenomenology and imagery described by Mavromatis (1987). While we agree with the general Lewis-Williams neuropsychological approach, we take issue with both the employed typology and the three-stage model of levels of consciousness. Broadening the consciousness taxon with supplementary experimental and clinical research (eg, artistic/creative states; temporal lobe epilepsy) provides a wider range of phenomena that must be taken into account. Additionally, his sole reliance on altered states of consciousness also fails to include the more normative perceptual and cognitive processes. A two-stage model, consolidating the first two stages of Lewis-Williams' three-stage model (eliminating the "construal" stage), permits a closer alignment of his observations with the corpus of experiential accounts as well as conventional cognitive theory (including the distinction between top-down and bottom-up processing). The recent literature on recurrent visual processing provides more than adequate explanatory power for a more parsimonious two-stage model. This approach also removes the over reliance on entoptic feedforward (subcortical) phenomena which characterizes three-stage approaches. **P1**

352 The House of the Jaguar: Shamans Meet Scientists: Preserving Knowledge of Ayahuasca, Medicinal Botany and its Indigenous Use S. A. Whitmarsh, Jan-Frank Gerards <s.whitmarsh@cs.ru.nl> (Computer Science, Radboud University, Nijmegen, Netherlands)

The therapeutic and spiritual potential of Ayahuasca (yage or yaje) has become recognized in popular culture resulting in an increasing number of Ayahuasca retreats are organized all over the world. Ironically, the knowledge of its use held by indigenous cultures, as well as knowledge of other medicinal plants and practices, faces increasing ecological, political, economic and legal challenges. While western science is slowly turning its head towards the staggering wealth of clinical and scientific questions that these practices raise, its indigenous knowledge is disappearing. For ten years the Dutch organisation "Kleinschalige Ontwikkelingsprojecten" (SKOP) has been working together with the Columbian organisation Nabi Nuhue on a project to preserve knowledge of medicinal plants and indigeous healing practices. Nabi Nuhue is led by Kajuyali Tsamani. For the last 30 years he has been an apprentice of elder shamans of several tribes where he gained knowledge that was under threat of disappearing because either the tribes themselves where dissapearing or because within those tribes there was no interest anymore in becoming an apprentice of the shaman. In the south of Columbia, project Nabi Nunhue owns about ten acres of land with a large botanic garden of medicinal herbs, fruit trees and crops. Six acres are natural preserve. In a moloca (ceremonial hut) cultural and shamanic exchanges take place between representors of tribes from Columbia, neighbouring countries and the US, such as the Kogi, Huitoto, Kofan, Camenza, Guambiano, Sikuani (all Columbia), Inbaya (Ecuador) and Lakota (US). People from the region, as well as people from all over the world, have come to Nabi Nunhua for healing and knowledge of traditional practices and its culture. Visitors are inspired by the use of Ayahuasca and other medicinal plants, indigenous traditions, art and alternative uses of energy, natural material and biological agriculture. The project has helped several shamans and tribes in preserving, stimulating and revisiting traditional medicine. Plans are underway for a symposium / multidisciplinary meeting between indigenous shamans and western scientists hosted at the Nabi Nuhue. Potential topics, speakers and attendance will be discussed. **P2**

6.08 Information technology

353 A Change in Consumer's Paradigm: Marketing Learning and Reproducible Machines Alejandro Manuel Alcaraz Ramirez <aalcarazr@gmail.com> (Faculty, Social & Political Sc, UNAM, Universidad Nacional Autónoma de México, Faculty, Social & Political Sc, Mexico City, Mexico)

Technological advances mean more output with less input. This represents many things, the ones we are concerned about in this article are: Concentration of money and knowledge; Impact of automation for world economy's jobs. Machines play a fundamental role in today's material reality, despite our lack of knowledge about the origin of most things that surround us. The problem can be approached from the Consumer's view, what we call the Consumer's Paradigm. There is no responsibility in consuming, neither consciousness nor meaning, but dependency to the articles that are needed or supposedly needed. Machines, Technology, Processes Knowledge and Human Intelligence are keys of massive production. The problem is that this keys are not massive available, but just the result of them. Products are available and addictive for everyone but knowledge for their reproduction is just available for a few. The market is saturated with consumers but not with producers. The relation is not balanced. Consumer's paradigm can be changed by modifying machine's symbology and construction, which is related to its language. Consumers and Producers should have a different interaction. The point is to develop knowledge of production and consumption, what will bring consciousness. This interaction is linked with a new kind of education, marketing education, the second change of Consumer's Paradigm. Consumption should link process education build on reproducible steps. Consumers cannot individually reproduce the objet by themselves, but the way they interact can be more active and helpful for both parts, what will bring equilibrium on market interaction. Materialism is just seen in one direction, accumulation. Materialism is a way to express and defend one's existenceamong others, but it can also be

an endless vicious circle. Materialism should be seen as a way to reach higher consciousness, not as a goal. For reaching Materialism Consciousness, Materialism first has to become step key reachable. A change in Consumer's Paradigm will change Consumer's role from passive to active, a new Consumer's Philosophy. This new approach to machines has to construct first a philosophy from which machines will be constructed and developed. Build a new reproducible symbology that will make machines step buildable and understandable. **P2**

354 Consciousness and Laws of Qualia Manish Kumar, Rashi Prakash, Ruchira Prasad <mk040870@gmail.com> (Technical College, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Nothing is more chastening to human vanity than the realization that the richness of our mental life – all our thoughts, feelings, emotions, even what we regard as our intimate self-arises exclusively from the activity of little wisps of protoplasm in the brain. The distinction between mind and body, illusion and reality, substance and spirit has been a major preoccupation of both eastern and western thought for millennia. Neurological syndromes in which consciousness seems to malfunction, such as temporal lobe epilepsy, visual scotomas, Charles Bonnet syndrome, and synesthesia offer valuable clues about the normal functions of consciousness and "qualia". An investigation into these syndromes reveals, that qualia are different from other brain states in that they possess three functional characteristics, which are stated in the form of "three laws of qualia" based on a loose analogy with Newton's three laws of classical mechanics. First, they are irrevocable: One cannot simply decide to start seeing the sunset as green, or feel pain as if it were an itch; second, qualia do not always produce the same behavior : given a set of qualia, we can choose from a potentially infinite set of possible behaviors to execute; and third, qualia endure in short-term memory, as opposed to non-conscious brain states involved in the on-line guidance of behavior in real time. The idea is to understand "What Neurology tells us about the Biological Functions of Consciousness, Qualia and the Self. "Our primary goal in this paper is to understand the fresh approach to the problem, by treating it not as a philosophical, logical, or conceptual issue, but rather as an empirical problem. The paper consists of two sections. In part one; we describe some thought experiments to illustrate the problem of qualia. In part two, we offer numerous examples from neurology and perceptual psychology that, together with a new theoretical framework we offer, will help eventually solve the problem of consciousness, much of our discussion will focus on the notion of qualia. **P1**

355 Experiential Proposal of a Sustainable and Scalable Productivity-Model in a Knowledge-Based Technological and Competitive Business Organization Vivek Sinha <vivek.sinha@st.com> (STMicroelectronics, Noida, India)

Classical management styles were very effective in factory environments. With the arrival of Information & Communication revolution and strong knowledge based industries, coupled with emergence of the knowledge-worker, new leadership styles are needed to manage the specificities of such organizations and businesses. This paper attempts to describe based on about 11 years of management experience, a holistic view of one such conscious leadership style and its linkages to the overall Productivity Ecosystem in a knowledge-based organization. Different roles played by different elements of the influence-pyramid in conjunction with Herzberg's hygiene theory forms the starting point. The emphasis is on effective tapping of the human consciousness which can make business move, provide personal satisfaction to employees, and create an overall organizational model capable of producing sustainable and scalable business excellence. The focus remains on enabling & supporting the human processes, and possible use of intuitive decision making, in order to achieve results – without losing the big-picture of the highly technological, demanding & dynamic business needs in a globally real-time connected high-tech industry. The model and approach is purely experiential in nature, with more of qualitative analysis and anecdotal examples. Quantitative research, data gathering and its analysis is scope for further work in this direction. Based on personal experiential research, Maslow's need-hierarchy is linked to organizational behavior and Organizational development (OB and OD). The model possesses an overall alignment with the Blue-Ocean strategy. This paper may be considered as a proposal

or a hypothesis, based not on objectivity of numbers but on subjectivity of conscious experiential learning, and a deeper analysis & examination of those experiences, eventually driving an overall positive impact on business results and employee morale. [Key Words ? Holistic View, Conscious Leadership, Herzberg, Subjectivity, Productivity Ecosystem, Intuitive Decision-making, Conscious Experiential learning, Maslaw, Blue-Ocean strategy] **P1**

6.09 Ethics and legal studies

356 Consciousness and Leadership Diksha Kalra, Mr. Sandeep Kalra <kalradiksha@yahoo.com> (DEI Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

It is often said everything rises or falls on leadership. There is an increasingly realizationamong the corporate world that the ascent to a sustained effective leadership is linked to the ascent in one's consciousness level . Self-knowledge is considered the gateway to realizing, not only one's own fullest potential, but also that of employees and the organisation. The conservative, Authoritarian style with low conscious indicators of fear, greed, anger and mistrust is known to create negative climate and discouraged . The leaders now try reaching the 6th level of Servant like with attributes of caring, trust and even beyond at 7th level with humility, generous, compassionate and always looking for "how can I help". Bhagvad Gita also projects Krishna as a Transformational Servant leader (Harsh K Luthar). The ascent of a leaders' intent from "survival for self" to "service to others" is interdependent on his ascent on the ladder of virtues and values . As one transcends the levels, their effects assert themselves within human consciousness. This then linked with physical reality, begins a transformational process, becoming ever more spiritual in its essential nature. We all have a mix of the different styles or levels with one type being dominant. Even a Servant transformational leader has to deal with the pull of his emotions when he makes decisions. However, a strong spiritual foundation helps in maintaining a balance of ethics and also the consciousness level enabling a Service Oriented Style.Viveka, Varigya, Sama and Mumukshutwa help in treading a path which can greatly discount the ill effects of Sanchita Karmas leading to a more clean Chitta. This enables leaders to maintain their poise, rational and balance and sticking to values. In other words Virtues or values (including ethics) are, at root, a system of interrelationships or interdependencies and augment each other. It is the state consciousness level and Chitta of its leaders that an organization becoming positive, professional and successful like Wipro or Decaying like Satyam or Enron . **P1**

357 Constitutional Empowerment – The Creation and Evolution of a Constitutional Convention of Consciousness – Towards a Constitution of Humanity Kathryn Welch, <kathryn-welch@usa.com> (Tucson, AZ)

A need for the reclamation of the language of power and state is eminent in the context of the critical, complex, and threatening challenges to the future of humanity. This research declares a presence of independence from imposing valuation systems within the existing structure of established order and governance, inviting into being an organization of current, evolving wisdom in leadership, knowledge, as well as scientific applications and practice within the tremendous field of consciousness research. Integration models for reconciling theories of consciousness are used to demonstrate intelligent and effective means to organize, synergistically, varying perspectives and correspondingly derived opinions often founded in layers of opposing, complementary, yet incomplete evidence with the intention of furthering an ever evolving understanding of establishing knowledge and truth about consciousness and our existence. A clear and aspiring aim to reconcile inclusive, spiritual values of humanity and sustainability with the knowledge and applications continuing to emerge from science and the experience of relationship is definitively established as well as a model of effective integration of these values into policy, law, and governance. Models of leadership and restorative justice currently coming forth into view through the reclamation of the language of power calibrate a social valuation to humanity. This awareness and acknowledgment of the quality, nature, and excellence of actualized, proactive humanity that may be cultivated, nurtured, and optimized in any human being is the fundamental virtue and guideline

for the synergism that is poised herein to resolve our systems of regulation and order towards a rectification of the political business discordant with the great majority of humanity and the fulfillment of humanitarian needs. These models indicate a synergistic alignment and involvement of established networks of organizations and institutions that will lead to the empowerment of financial facilitation/ the allocation of resources of monetary taxing collections to apply existing solutions to specific critical problems we face as policy makers and citizens of the state of humanity. Terms are defined, establishing clear aims to alliance these new powers of leadership that transparently disseminate information by way of presence, deep care and respect for existence, scientific research (particularly research in fields of consciousness) and through the new and evolving entrepreneuring channels of communication demonstratively empower individuals and communities which constitute the state of humanity to embody a proactive liberty. These aims and alliances presence and affect the integration of these values responsibly into established orders of policy, law, and governance. It is an intention of this research to make evident how this may be achieved without opposition to existing structures of power and enforcement, illuminating undeniable solutions that will non-violently reclaim humanity's future of a sustainable and just new world order. **P1**

6.10 Education

358 Adding Consciousness to Teaching Effectiveness Using a Systemic Approach Sarup R. Mathur, Raj Kumari Kalra, Faculty of Education, Dayalbagh Educational Institute, Agra, India <sarup.mathur@asu.edu> (MLF Teachers College, Arizona State University, Tempe, AZ)

Teacher skills, disposition, and knowledge are essential ingredients of teaching effectiveness. Teacher preparation programs make a sincere effort to provide teacher candidates with skills, knowledge, and experience to enhance their instructional effectiveness. Several frameworks such as psychoanalytic, behavioral, humanistic, cognitive, and ecological have emerged to provide foundation of the teaching process. Classroom ecologies continue to challenge teaching effectiveness with students with diverse skill levels and needs ranging from behavioral issues to academic concerns. This presentation will generate an important understanding about the complexity of collective behaviors that exist in the school environment challenging the role of the teacher. Besidesamenities and tools of effective teaching and frameworks that have provided explanation to student behavior, teaching includes pedagogical understanding of consciousness where teaching can go beyond a stepwise process that leads to predetermined conclusions. Rather it is viewed as a system in which intuitive judgment plays an equal role with the other ingredients (teacher knowledge, skills, and dispositions) of effective teaching. Teaching is more than a process of instruction; it is a system where conditions are created to expand the existing space of the possible, to foresee the impossible, and to become conscious for the unknown and unimagined. Teaching is not just modeling the skill, demonstrating a sequence of steps or presenting a convergence of truths, but also about developing consciousness for new interpretive possibilities. It is possible only when participation in an elaborative process that goes beyond skills and knowledge and opens up new spaces for discussions of intuitive consciousness. Tiered models such as Response to Intervention (RTI) and Positive Behavior Supports (PBS) maybe viewed as preliminary efforts to create such systems of teaching, where instruction, curriculum, and evaluation are designed to be purposefully aligned with varying needs of students. Starting from meeting the universal (Tier 1) academic and behavioral expectations, schools develop targeted (Tier 2) and intensive (Tier 3) interventions to meet some specific needs of students. Teachers attend to the soft signs early on and adopt approaches to remediate skill deficits before they become significant concerns. These models are viewed as problem solving models that have preventative as well as facilitation components. The teacher is involved in the process of decision making in moving students from Tier, 1, to Tier 2, and Tier 3. It is important to add intuition as an important ingredient of teaching effectiveness, as it relates to effective decision making and problem solving. As we move from teaching effectiveness to teaching consciousness, we need to highlight the salient qualities of an intuitive teacher, who is not only consciously involved in making better decisions about students, curriculum, and

instruction, but also consciously encourages them to explore the unknown, assist them in distinguishing between right and wrong, provide sense of relevance, fairness and harmony. **C23**

359 Puzzles about Consciousness for Kids of All Ages Iris Oved, Students From St. Gregory School <irisoved@email.arizona.edu> (The Paradox Center, Tucson, AZ)

By April of 2012, middle-school students at Tucson's St. Gregory School will have participated in an after-school program centered around questions about consciousness. Topics of discussion include: Do colors look the same to you as they do to other people?, How do brains allow us to feel the pain of a pinprick and the taste of a strawberry?, and, If you found out that your granny is in fact a robot, would you still be nice to her and would you still love her?. This talk will discuss the methods designed for the after-school program and observations gathered. Kids from the program will present at the poster session, reporting their own observations, questions, views, arguments, and examples. An informal sample of these discussions was carried out in November of 2011, with four male children, ages 10-13yrs. In that discussion, the children were given questions, some guidelines about turn-taking, and a set of legitimate moves to make in the conversation (offer a hypothesis, make an argument, give an example, give an analogy, make a distinction, give/request clarification, agree/disagree with another participant). Using these moves, the kids explored the issues with sophistication, joy, honesty, and respect for each other and for the inquiry. The after-school program was inspired by the Philosophy for Children (P4C) methods generated in the 1970s by Matthew Lipman. It is offered by The Paradox Center, a (soon-to-be) non-profit organization associated with the University of Arizona's Cognitive Science Program, designed to improve creative critical inquiry in the youth. **C23**

360 Bringing Undergraduates to Consciousness Robin Pappas <robin.pappas@oregonstate.edu> (Center for Teaching and Learni, Oregon State University, Corvallis, OR)

The "renaissance in consciousness studies" has been marked by precipitous growth in research across andamong the disciplines. That much of this work is being conducted within university settings means that researchers are able to expose potential future consciousness scholars (i.e., students) to the range of approaches, conceptual paradigms, and puzzles that frame these studies. Graduate students have been contributing to this epistemological surge by assisting in laboratories, studying special collections, and conducting ethnographies,among other efforts. Fortunately, many are able to enter this discourse early, while they complete their course of study: seminars such as Tom Roberts' Psychedelic Mindviews and David Lenson's comparative literature seminar on narrative, not to mention the array of interdisciplinary opportunities available at the University of Arizona and elsewhere, expose students to several possible lines of inquiry into consciousness. However, (UA's Center notwithstanding) undergraduate students typically have far fewer opportunities to explicitly address questions about phenomena such as lucid dreams or visual awareness, or practices such as therapeutic use of psychedelics, let alone thorny enigmas such as the Explanatory Gap. Indeed, their condition as novitiates in the ivory tower is also their greatest disadvantage: most have not yet developed the critical thinking skills needed to pursue such topics or have not had sufficient exposure to know how their current interests and choice of major map onto consciousness studies. This university instructor is interested in exploring how we might use such institutional constraints as disciplinary major, general education curriculum, and "first year experience" to bring undergraduates to consciousness studies sooner and in ways that promote their capacity for undertaking such study in meaningful ways. In this presentation, the speaker will first describe the three types of undergraduate courses she has taught that address altered states of consciousness and Western narratives of substance use. The speaker will then provide examples of class activities and assignments used in the courses and share examples of student responses to these. In the third part of the presentation, the speaker will invite discussion with session participants on ways to engage students in the context of undergraduate courses across the disciplines about the range of questions and issues involved in consciousness studies as well as ways in which students may leverage major and elective coursework to anticipate research opportunities and careers "in consciousness." **C23**

361 Consciousness Studies in the Academy: Progress Report on Work Being Done at Mainstream and Alternative Institutions Ed Sarath, Joseph Subbiondo, President, California Institute of Integral Studies; <sarahara@umich.edu> (University of Michigan, Program in Creativity and Consciousness, Ann Arbor, MI)

Recent years have seen increasing interest in consciousness studies in higher education, with a wide range of pedagogical and research approaches being explored at a wide range of institutions. This panel brings together representatives from mainstream and alternative institutions to report on work being done at their respective campuses. A number of questions will be considered: What constitutes research in consciousness at your institution (neurobiological studies, theoretical/philosophical inquiry, etc.)? What kind of pedagogical applications are used (e.g. largely theoretical coursework, or are other experiential modalities – e.g. contemplative/meditation practices, creativity included)? What are the prospects for advancing this work on your campus (obstacles, opportunities, existing resources, interest/receptivity)? What might the future of the field look like? What can mainstream institutions learn from alternatives, particularly those which are founded on consciousness-based principles of one kind or another? What might alternatives learn from work in consciousness studies done at mainstream schools? Consideration of these questions from diverse institutional perspectives will likely reveal insights and strategies for future growth that are useful at a variety of campuses. The formation of a new organization called Consortium for Consciousness Studies in Higher Education as a galvanizing catalyst for this work will also be discussed. Panelists include Joseph Subbiondo, President, California Institute of Integral Studies; Ed Sarath, Professor of Music and Director, Program in Creativity and Consciousness Studies, the University of Michigan; Stuart Hameroff (or some other representative) Center for Consciousness Studies, the University of Arizona; plus one other representative/institution TBA. **C23**

362 Consciousness – Art and Creativity Radhika Seth, Dr. Parul Bhatnagar; Ms. Meenakshi Seth <dei.radhika@gmail.com> (Textile Design, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

The paper projects that artists can conceptualize the true self-awareness with the medium of creativity. Artist offer insight into the unknown world where resides the truth and purity. With the enlightenment of consciousness, a perception can be presented in a creative and artistic form, which gives us way to reality. Creativity is produced by the hidden action in the form of consciousness (spirit), which is caused by our individual efforts. The creativity is the mirror image of what we perceive in our mind and bringing it out in an aesthetic sense. It is said we do not realize the awareness towards our creativity and in turn productivity. For the execution of our creative ideas, we tend to look outside for motivation, which is actually not true. Self-awareness is about increasing consciousness level by which we can bring out the best of our selves and the best out of life. Creative consciousness opens up new avenues for unseen meanings, prevalent possibilities, making new innovations, new experiences and enquiries, which might prove to be an adaptable approach towards our art and design practices. **P1**

363 Development of Modules Based on Science of Consciousness for Teacher-Trainees Neha Shivhare <nehashivhare1@gmail.com> (Pedagogica Sciences, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

Teachers are the pivot of the whole educational system and the influence of their personality on the functional efficiency of educational institutes, students and society has been widely recognized. In India, teachers in the Vedic age were men of the highest caliber from the point of view of knowledge and spiritual progress. Living in their ashrams they paid attention to the spiritual development of themselves as well as of their students. This enabled them to be spiritually inspired and morally inclined. But in the present times of nuclear energy and jet planes, it is not sensible to expect teachers and students to perform such rigorous spiritual practices for their all round personality development (physical, psychological, social and spiritual). Therefore, recent years have seen a variety of efforts by professionals in various fields to design courses that will assist in enriching the personality of teachers and students. In this direction only, the modules based on Science of Consciousness are specifically designed to cater to the need of psycho-socio-spiritual development of teacher trainees. Although, it is difficult to define Science of Consciousness but it can be operationally defined as the systematic and scientific study of human and spiritual consciousness based on philosophical, psychological and neuro-scientific researches. As such though, it can not substitute spiritual practices but can surely provide an awareness related to various perspectives of life and the cosmos, thus broadening the mental and emotional horizon of people enabling them to lead a more meaningful life. For this purpose fifteen modules on Science of Consciousness were developed and experimentally tried out on a sample of forty teacher-trainees. It was found that these modules significantly increased the emotional intelligence of teacher-trainees. The present paper throws light on the stepwise procedure for the development of modules on Science of Consciousness and describes their content and teaching methods. It concludes with the discussion of the research findings. Although Science of Consciousness is still in its developmental stage but this paper can suggest us alternatives for incorporating the findings of various researches (philosophical, psychological, neuroscientific, etc.) based on consciousness and allied aspects in teacher-education programmes for evolving their consciousness which may further lead to the evolution of consciousness of human society for a better today and tomorrow. **P1**

364 Education for Better Consciousness Meenu Singh <reenu1968@gmail.com> (Faculty of Education, Dayalbagh Educational Institute, Agra, Uttar Pradesh India)

The human body consists of three entities – the body, the mind and the spirit (Atma). For the development of the body one takes nourishing food and performs exercise. For the mind one gets education and reads a large number of books but the development of the third entity viz. the spirit is severely left alone. It causes the disaster, destruction, exploitation, selfishness, aggression, hatred feelings and materialistic attitude in this world. For the better worldliness and the spiritual development, there is an urgent need of the awakening of attributes of spirit and development of hidden / inner senses. Education based on fundamental teaching of three R's (Reading, (W)riting and (A)rithmetic), scientific education of three 'R's (Reductionism, Repeatability and Refutation) and the education of the development of three domains (Cognitive, Affective and Psychomotor) given by B.S.Bloom is not sufficient to develop complete personality as the entity of spirit is not realized by the educationists, which is the main current of the Supreme Being and gives existence to the human body. Spiritual education of three 'S's (Satsang, Seva and Sumiran) should become the integral part of the curriculum along with teaching of other subjects. This education will provide spiritual dimension and will kindle the spark of the divine in us. **P1**

6.11 Miscellaneous

365 Drama, Self and Consciousness: A Process of Transcendence Lowleen Malhotra <imk_122@rediffmail.com> (Anand Engineering College, Anand Engineering College, Agra, India)

Drama is a genre that is closest to life and soul. It is a composite art that involves the audience, actors and the dramatist at the time of performance. It may also be called a therapy wherein the objective of the writer is to facilitate personal growth and promote mental health through Catharsis. The characters are possessed with multifarious self positions that are constantly in dialogue or conflict with each other, internal and external, reaching no final solution, at the same time, changing its stance. This technical communicative process of perception, reflection, interpretation, recognition and rejuvenation is empirical, leading man into the higher realms of consciousness. Thus, drama is a double-edged weapon that can inset and enkindle a quest in man to fathom and understand the spark within us of higher consciousness. Through this study I intend to analyze the influence of stagecraft on the mind of the audience and how it leads him to redefine and reframe his life's goal. **P1**

366 Synesthesia Collage Alice Schultze <roseypetunia@cox.net> (Phoenix, AZ)

My intent is to present a collage of colored words, colored letters, colored spirituality, colored pain, all expressing my experience with synesthesia. I have come to this term only of late – recognizing now that Iam a synesthete. Professionally, I was a humor and feature writer for New

York and Long Island Newsday, the Regional Section of The New York Times, and the Hamptons-based Dan's Papers. Now I create poetry, often spiritual, and have a website: The Poetry of Alice Schultze. My technique is simple: I see the poem written in the air in front of me – and write it down. My hope in this presentation is to not only speak of my own experiences – and perhaps touch on those of others – but to be open enough so that newbie synesthetes might recognize themselves and feel at home. **P2**

367 Spiritual Consciousness Among Students to Inculcate Discipline: Dayalbagh Asha Satyavolu, Gagandeep Nigam <ashasatyavolu.dei@gmail.com> (Dayalbagh Educational Institute, Agra, India)

Consciousness is the inner self which comes from the soul of an individual. It relates the mind, heart and soul to give rise the thoughts at different levels. Spiritual consciousness is the awakening of the soul at higher levels. This is observed at a place called Dayalbagh where students at college level having spiritual atmosphere around them. The idea is about to becoming consciously aware that our identity extends far beyond the realms of our current state of awareness at different levels of alternate states of consciousness. It is an awareness of being that is both infinite and eternal. Having this understanding and perspective, we can then ask our inner self to tap into these different levels of consciousness and implement a power of suggestion beyond, anything we have ever known. This will be flashing on How and What factors bring discipline (such as Adhyayn, Seva, Vyayaam). "Education,more education,education made perfect is the only panacea for or country's ills and evils." (Param Guru Huzur Sahabji Maharaj, Fifth Revered Leader of the Radhasoami Faith, Dayalbagh. "Discipline, self sacrifice and hard sustained work are not only very helpful in this endeavour but are very essential." (Param Guru Huzur Mehtaji Maharaj, Sixth Revered Leader of the Radhasoami Faith, Dayalbagh. "It is not a big university or big building or large number of teachers or large number of departments which raises the status of a university. It is the quality of the work that makes a university great." (Param Guru Huzur Dr. M.B. Lal Sahab, Seventh Revered Leader of the Radhasoami Faith, Dayalbagh). Thus, personality of an individual can be developed if one gets involve himself in such an atmosphere with a special spirit force around them. **P1**

368 Imaginary Colors and Conceptualist Theories of Color Experience Kendall Lewellen <lewellenks@gmail.com> (Conway, AR)

This paper problematizes conceptual theories of phenomenal character with the counterexample of novel colors or reports of color experiences which cannot stem from objects in the external world. In doing so I will use the 1983 experiment on imaginary colors conducted by Hewitt D. Crane and Thomas P. Piantanida. Because debates regarding conceptualism and representational theories of phenomenal character are oftentimes parallel, I will explain connections between the two and show that the conceptualist position shares the epistemological consequences of representational theories of phenomenal character. Ultimately, I will extend criticisms of representational theories of phenomenal character raised by Fiona Macpherson to contemporary debates on conceptualism and color experience. These criticisms illustrate that phenomenal color experiences outstrip concepts derived from the external world, thus undermining the conceptual position.

KEYNOTE SPEAKER | STEVEN LAUREYS

Indentifying the Brain's Awareness System: Lessons from Coma and Related States

Thursday, April 12, 11:30am to 12:50pm
at KIVA Ballroom

Steven Laureys, MD, PhD (University of Liège, Coma Science Group, Cyclotron, Department of Neurology, Liège, Belgium) Steven is a Clinical Professor (ULg) and Senior Research Associate (tenure) at the Belgian National Fund of Scientific Research (FNRS) and leads the Coma Science Group at the Cyclotron Research Center (Director Pr André Luxen) and Department of Neurology, Sart Tilman Liège University Hospital (Pr Gustave Moonen). He graduated as a Medical Doctor from the Vrije Universiteit Brussel Belgium, in 1993. While specializing in Neurology he entered a research career and obtained his M.Sc. in Pharmaceutical Medicine working on pain and stroke using in vivo microdialysis and diffusion MRI in the rat (1997). Drawn by functional neuroimaging, he moved to the Cyclotron Research Center at the University of Liège, Belgium, where he obtained his PhD (2000) and his "thèse d'agrégation de l'enseignement supérieur" (2007) studying residual brain function in coma, vegetative, minimally conscious and locked-in states. He is board-certified in neurology (1998) and in palliative and end-of-life medicine (2004) and presently is invited professor at the Collège Belgique (Belgian Royal Academy of Sciences) and chair of the "European Neurological Society Subcommittee on Coma and disorders of consciousness."

Dr. Laureys is a member of the American Academy of Neurology Committee for the Development of Practice Guidelines for the Vegetative and Minimally Conscious State (2007) (Robert G. Holloway, Dan Larriviere, Michael A. Williams), is Honorary International Fellow of the Royal Hospital of Neuro-disability, London, UK (Keith Andrews) and was invited member of the 2004 Congress on Life-Sustaining Treatments in the Vegetative State organized by the Vatican's Pontifical Academy of Life (Gian Luigi Gigli) and the 2006 Mohonk Consensus Meeting for the US Congressional Report on Disorders of Consciousness (Joseph Giacino). **[115]**

KEYNOTE SPEAKER | DARYL J. BEM

Feeling the Future: Recent Experimental Evidence for the Anomalous Anticipation of Future Events

Friday, April 13, 11:10am to 12:30pm
at KIVA Ballroom

Daryl J. Bem, PhD (Cornell University, Psychology, Emeritus Professor, Ithaca, NY) The term psi denotes anomalous processes of information retrieval that are currently unexplained in terms of known physical or biological mechanisms. One variant of psi is precognition or, more generally, cognitive, affective, and behavioral responses to future events that could not be anticipated by any known inferential process. Recent laboratory experiments will be reviewed that appear to demonstrate physiological, and behavioral responses to randomly selected future stimuli. Issues of replication and the influence of an experimenter's beliefs and expectations on psi performance will also be discussed.

Appointments include: Professor Emeritus of Psychology (Cornell University 2007), Professor of Psychology (Cornell University 1978-2007), Visiting Professor of Psychology (Harvard University 1987-88), Professor of Psychology (Stanford University 1971-78), Assistant Professor to Professor of Psychology & Industrial Administration (Carnegie-Mellon University 1964-71) **[311]**

PLENARY BIOGRAPHIES

Toward a Science of Consciousness 2012 Co-Chairs

Co-Chair, David Chalmers is Professor of Philosophy and Director of the Centre for Consciousness at the Australian National University, and Professor of Philosophy at New York University. He is the author of The Conscious Mind (1996) and The Character of Consciousness (2010). He is a former director of the Center for Consciousness Studies at the University of Arizona, and was one of the founders of the Association for the Scientific Study of Consciousness. He has been a co-organizer of the Tucson consciousness conferences since 1996.

Co-Chair, Stuart Hameroff is a clinical anesthesiologist, Professor of Anesthesiology and Psychology, and Director of the Center for Consciousness Studies at the University of Arizona in Tucson. Beginning in the early 1970s, Hameroff has studied biomolecular mechanisms underlying consciousness, actions of anesthetic gases and information processing in cytoskeletal microtubules inside living cells. In 1994 Hameroff teamed with British physicist Sir Roger Penrose in the controversial Orch OR theory of consciousness, based on quantum computations in microtubules inside neurons.

Susan Blackmore is a freelance writer, lecturer and broadcaster, and a Visiting Professor at the University of Plymouth. She has a degree in psychology and physiology from Oxford University (1973) an MSc and a PhD in parapsychology from the University of Surrey (1980). Her research interests include memes, evolutionary theory, consciousness, and meditation. She practices Zen and campaigns for drug legalization. Sue Blackmore no longer works on the paranormal. She writes for several magazines and newspapers, blogs for the Guardian newspaper and Psychology Today, and is a frequent contributor and presenter on radio and television. She is author of over sixty academic articles, about eighty book contributions, and many book reviews. Her books include Dying to Live (on near-death experiences, 1993), In Search of the Light (autobiography, 1996),Test Your Psychic Powers (with Adam Hart-Davis, 1997), The Meme Machine (1999), Conversations on Consciousness (2005), Zen and the Art of Consciousness (2011) and Consciousness: An Introduction (a textbook, new editions 2010 and 2011). Her work has been translated into more than 20 other languages. Dr. Blackmore has two children and lives in south Devon with her husband Adam Hart-Davis.

Ned Block, PhD, Harvard, Silver Professor of Philosophy, Psychology and Neural Science, came to NYU in 1996 from MIT where he was Chair of the Philosophy Program. He works in philosophy of mind and foundations of neuroscience and cognitive science and is currently writing a book on attention. He is a Fellow of the American Academy of Arts and Sciences, has been a Guggenheim Fellow, a Senior Fellow of the Center for the Study of Language and Information, a Sloan Foundation Fellow, a faculty member at two National Endowment for the Humanities Summer Institutes and two Summer Seminars, the recipient of fellowships from the National Endowment for the Humanities the American Council of Learned Societies and the National Science Foundation; and a recipient of the Robert A. Muh Alumni Award in Humanities and Social Science from MIT. He is a past president of the Society for Philosophy and Psychology, a past Chair of the MIT Press Cognitive Science Board, and past President of the Association for the Scientific Study of Consciousness. The Philosophers' Annual selected his papers as one of the "ten best" in 1983, 1990, 1995, 2002 and 2010. He is co-editor of The Nature of Consciousness: Philosophical Debates (MIT Press, 1997). The first of two volumes of his collected papers, Functionalism, Consciousness and Representation, MIT Press came out in 2007. In 2008-2009, he was Distinguished Visiting Professor, University of Hong Kong; Townsend Visitor, University of California at Berkeley; and Smart Lecturer at Australian National University. In 2009-2010, he gave the Royal Institute of Philosophy Annual Lecture, was the Lansdowne Lecturer at the University of Victoria and gave the Josiah Royce Lectures at Brown University. In 2010-2011, he gave the Thalheimer Lectures at Johns Hopkins. In 2011-12, he will give the Rudolf Carnap Lectures (with Susan Carey) at Ruhr-Universität Bochum and the William James Lectures at Harvard University. He was elected Fellow of the Cognitive Science Society starting in 2012.

Mélanie Boly, MD, PhD, is currently Postdoctoral Researcher at the Belgian National Fund of Scientific Research (FNRS) and Neurologist in training at the University Hospital CHU Sart Tilman (Pr Gustave Moonen). Dr Boly has performed several studies comparing auditory and noxious stimuli cerebral processing in minimally conscious and vegetative state patients. In collaboration with the team of Adrian Owen in Cambridge, she also elaborated a method to assess the presence of voluntary brain activity, and thus of consciousness, in non-communicative brain injured patients. This method has already proven to be of potential interest in early detection of signs of awareness in patients previously diagnosed as in vegetative state (Boly et al., Neuroimage 2007; Owen et al., Science 2007). Her current research is on the assessment of cerebral responses to pain in individual non-communicative patients, and their relationships with the patients' behavioural responses as evaluated using standardized clinical scales.

Robin Carhart-Harris, PhD; Neuropsychopharmacology Unit, Imperial College London. After an MA in Psychoanalysis at Brunel University, London, Carhart-Harris completed his PhD in psychopharmacology at the University of Bristol. In 2009, under the mentorship of Professor David Nutt, Carhart-Harris moved to Imperial College London to continue his fMRI research with the classic psychedelic drug psilocybin (magic mushrooms). Over the last four years Carhart-Harris & Nutt have built up a programme of research with psychedelics that includes fMR and MEG imaging with psilocybin, fMR imaging with MDMA and soon an MRC-sponsored clinical trial to assess the efficacy of psilocybin as a treatment for major depression. Carhart-Harris has a review article published in Brain on the neurobiology of Freudian constructs and his work with psilocybin is now published in PNAS and the British Journal of Psychiatry with several other relevant papers to follow. Carhart-Harris has been supported by the Beckley foundation (UK) and the Neuropsychoanalysis Foundation, Heffter Foundation and MAPS (US).

Philip Goff, a lecturer in philosophy at the University of Liverpool, is currently a research fellow at the Centre for Consciousness at the Australian National University, where he is writing a monograph arguing against physicalism. Fundamentally, "I am a metaphysician who thinks metaphysicians don't think enough about consciousness. I'm developing a 'neo-Cartesian' approach to metaphysical enquiry, which takes intuitions about the nature of consciousness as its starting point."

Ronald P. Gruber is on the clinical faculty as Associate Professor at Stanford University and the University of California (SF). He takes an interdisciplinary approach to the study of time and has 52 publications and/or presentations in the fields of psychology and physics, including 3 chapters. His current research focuses on experimental verification of Einstein's "stubborn illusion" of the flow of time.

Moshe Gur is an Associate Professor at the Dept. of Biomedical Engineering, Technion, Israel. I am a neuroscientist who has been studying for many years the visual system. Together with my collaborator, Max Snodderly, I have recorded from single cells in the primary visual cortex of alert monkeys. We were able to show that in the awake monkey V1 single cell properties are compatible with the most demanding space perception abilities. I have also studied the human visual system using psychophysics, fMRI, and theoretical modeling. My own experimental data as well as observations of basic sensory mechanisms have led me to the view that some brain processes cannot be explained by the usual mechanistic approach (e.g., comparison by physical convergence) and we must look for a new type of physical interactions.

Stuart Hameroff, MD is Professor of Anesthesiology and Psychology, and Director of the Center for Consciousness Studies at the University of Arizona in Tucson. Hameroff became interested in intelligent behavior of microtubules, protein lattices which organize activities within living cells. Hameroff and colleagues developed theories of microtubules as self-organizing molecular computers. In the 1990s Hameroff teamed with Sir Roger Penrose on the controversial Penrose-Hameroff "Orch OR" model of consciousness based on quantum computing in brain neuronal microtubules, a notion bolstered by recent evidence. In Orch OR, Penrose physics connects brain microtubules to the most basic level of the universe - fundamental spacetime geometry at the Planck scale. At that level, Penrose had also proposed Platonic information could guide, or influence conscious choices and perceptions. Viewing consciousness as such a process in the fabric of the universe, Hameroff suggests, provides plausible scientific explanations for spirituality – inter-connectedness through entanglement, accessible Planck scale wisdom, and potential afterlife and reincarnation.

Eve Isham stumbled upon the world of consciousness research when I began my graduate work with the late William "Bill" Banks (Pomona College, Founder and Editor-in-Chief for the journal Consciousness and Cognition). Together, we began asking many questions about consciousness, free will and intentionality, and critically, whether these processes could be studied scientifically. Currently, I am a postdoctoral scholar at the Center for Mind and Brain, UC Davis with Joy Geng. One main focus of my postdoctoral research is on the validity and reliability of temporal report of action, and how this subjective measure is correlated with the neural signatures of timing and action. The virtue of this research is a step toward identifying the psychological and neurological basis of consciousness.

Anthony Jack has long been interested in the intersection of philosophy and the science of the mind. After studying Psychology and Philosophy at Oxford University, he did a PhD in Experimental Psychology at University College London on visual awareness in perceptual masking. He then trained in cognitive neuroscience, doing postdocs at two major centers for brain imaging: the Functional Imaging Labs in London's Queen Square, and the department of Neurology at Washington University in St. Louis. In this time he has studied a range of cognitive processes, from low level perceptual processing in primary visual cortex, to the executive functions of the frontal lobes. He currently holds a faculty position in Cognitive Science at Case Western Reserve University, where he runs the Brain, Mind and Consciousness Lab and holds secondary appointments in the departments of Philosophy, Psychology, Bioethics and Neurology. His current work focuses on social and moral cognition and the default network. Unlike many scientists working on consciousness, Prof. Jack's work is not aimed at uncovering the neural bases of consciousness. He regards that as a (largely) misconceived enterprise. Instead, his work aims to reveal the cognitive origins of the mind-body problem, and more generally how our cognitive architecture helps to generate tensions
that have implications for health, pro-social behavior and philosophy.

Biyu Jade He attained her B.S. in biology from Tsinghua University in 2004. She received her PhD in Neurosciences from Washington University in St. Louis in 2009, where she studied the functional significance and spatiotemporal structures of spontaneous brain activity, as well as the neural basis of the fMRI signal. After doing a short post doc at Mallinkrodt Institute of Radiology at Washington University, she joined NIH as an early-stage investigator in August 2010. Topics currently studied in her lab include the dichotomy of conscious versus unconscious processing in the brain and the mechanisms, organizations and functions of scale-free brain activity.

Menas Kafatos joined Chapman University in 2008 as the Vice Chancellor for Special Projects and is also Founding Dean of the Schmid College of Science, Director of the Center for Excellence in Applied, Computational, and Fundamental Science, and is a Fletcher Jones Endowed Professor of Computational Physics. He received his B.A. in Physics from Cornell University in 1967 and his PhD in Physics from the Massachusetts Institute of Technology in 1972. After postdoctoral work at NASA Goddard Space Flight Center, he joined George Mason University and was University Professor of Interdisciplinary Sciences there from 1984-2008. He also served as Dean of the School of Computational Sciences and was Director of the Center for Earth Observing and Space Research. He has 34 years experience in undergraduate and graduate Earth systems science, hazards, remote sensing and data information systems, physics, computational and theoretical astrophysics, astronomy, and foundations in quantum theory. He has published numerous books including The Conscious Universe, the Non-local Universe (with Robert Nadeau, Springer-Verlag), Principles of Integrative Science (with Mihai Draganescu, Romanian Academy of Sciences Press), and more than 250 articles on computational science, astrophysics, Earth systems science, hazards and global change, general relativity, cosmology, foundations of quantum theory, and consciousness. He has helped foster several Memorandums of Understanding with several international institutions such as Peking University, Seoul National University, Korea University Ewha Womans University and recently made a research agreement for remote sensing/GIS with Korea University and climate change with Ewha Womans University. Dr. Kafatos has wide interests in several fields of science and information science: Earth System Science/Earth Observing/Remote Sensing: Interdisciplinary Earth system science; natural hazards and climate change; aerosols and pollution; vegetation and climate change coupling; tropical cyclones; Earth Observing System observations. Data Information Systems: Federated, distributed data information system architecture; content-based Earth science

data browsing; user interfaces; distributed data systems and associated technologies. Astrophysics and Space Sciences: Black holes, active galaxies and quasars; accretion hydrodynamics in curved metrics; General Relativity; high-energy emission from cosmic sources; ultraviolet astronomy, symbiotic stars; atomic physics; cosmological redshifts. Foundations of Quantum Theory, Cosmology and Consciousness: Cosmological observations and their limitations; Universal Diagrams; foundations of quantum theory; quantum theory and brain dynamics; consciousness as the unifying field in the cosmos.

Robert Kentridge started out in Psychology working on brain mechanisms of reward before a sideways move into studying eye-movements and visual attention which in turn led me to neuropsychology. I have concentrated on two neurological conditions, both of which affect visual consciousness - blindsight and cerebral achromatopsia. Patients with blindsight can make accurate discriminations of simple properties of visual stimuli even though their condition renders them blind. Together with my colleagues, Charlie Heywood and Larry Weiskrantz, I discovered that the speed with which a blindsight patient responds to a stimulus he does not see is affected by manipulations of visual attention. I first reported the finding at the 1998 Tucson meeting. I have continued to study the relationship between visual attention and consciousness in normal volunteers and in neurological patients ever since. I am also currently working on a project assessing the cortical areas involved in perceiving different aspects of materials such as colour, texture and glossiness and another assessing the contribution of unconsciously processed visual information in rehabilitating reading in patients with visual deficits following strokes. I am Reader in Psychology at Durham University, a beautiful cathedral city in the north-east of England.

Daniel Kish, CEO of World Access for the Blind, has been challenging the blindness rehabilitation, establishment, the hallowed halls of academia, and the scientific and research community to break through previously immovable barriers of widely held misconceptions about blindness, other disabilities, and about the very capacities of human perception for the past 15 years. With advanced degrees in Developmental Psychology and Special Education, Daniel holds both Certified Orientation & Mobility Specialist (COMS) and National Orientation & Mobility Certifications (NOMC), the first ever blind professional to achieve this duel credential. Working through his unique interdisciplinary approach of collaborating with families, school districts, rehabilitation agencies, and experts specializing in neural science and perception, Daniel has positively impacted the lives of countless children who are deaf-blind, on the autistic spectrum, and those with sensory integration disorders to attain self directed mobility towards high achievement. Though his expertise emphasizes the full range of development of human perception in blind people, he is most widely known for his work in echolocation. Through in-depth collaboration with

noted scientists and perception experts, Kish has conducted pilot research, completed the most comprehensive literature reviews, and created the first systematic curriculum for advanced training to challenge the conventional understanding of the use of echolocation in blind individuals. From this research and thousands of hours experience with students of all ages and abilities, the term “FlashSonar” was coined. Kish and some of his students combined FlashSonar with other alternative techniques to apply them to independent urban and mountain bicycling, skating, ball playing, and solo wilderness expeditions. Daniel’s work has positioned him on the cutting edge of technological advances in artificial vision systems on the immediate horizon, having conducted more than a hundred public seminars, university faculty workshops, and professional development trainings on topics ranging from development of perceptual and imaging systems in the brain, to
how dependency conditioning such as sighted guide and lack of early cane training stunts short and long term psychological and physical development, to how this disruption can be remediated by reestablishing natural processes of self directed exploration. Daniel seeks to lay the ground work for collaborative cooperation among top scientists, perception experts, blind rehabilitation agencies, and sources of funding toward the development of a focused consortium to design and apply consumer
based technologies and strategies to enhance the brain’s ability to perceive and function in the world at large, which will set an important scientific basis for changing what it means to be blind.

Victor Lamme, Cognitive Neuroscience Group – Amsterdam – studied medicine, but never touched a patient. I started working on the brain right away. First, I did a PhD with Henk Spekreijse at the University of Amsterdam, where I studied figure-ground segregation mechanisms in the visual cortex of the monkey. After that, I did a postdoc at M.I.T. with Peter Schiller at the department of Brain and Cognitive Science. I returned to the Netherlands with a Royal Academy fellowship. Then I became a group leader at the Netherlands Institute for Neuroscience. During all those years, my research was mainly on awake monkeys, studying the neural mechanisms of perceptual organization and visual awareness. As of 2002, I am full professor of cognitive neuroscience at the department of psychology of the University of Amsterdam. My research has since then focused entirely on consciousness, with a shift towards studying the phenomenon in human subjects, using EEG, fMRI, TMS and a variety of manipulations.

Hakwan Lau is a cognitive neuroscientist who works on the question of what accounts for the difference between sensory processing of which we are aware, and sensory processing of which we are unaware. Is the former always functionally more powerful than the latter? Do they necessarily depend on different neural pathways? (In short, my tentative answers to both questions are negative.) Currently I am an assistant professsor of psychology at Co-

lumbia University in New York City. I have previously worked at the Wellcome Center of Neuroimaging in London (2004-2007), and did my doctorate at Oxford as a Rhodes Scholar (2001-2005). I was born and raised in Hong Kong, where I studied philosophy as an undergrad (1998-2001).

Geoffrey Lee is Assistant Professor of Philosophy, UC Berkeley; (PhD, New York University). His main areas of research interest are philosophy of mind, metaphysics, and the foundations of cognitive science and neuroscience.

Katherine MacLean, PhD; Psychiatry & Behavioral Sciences, Johns Hopkins University School of Medicine. Katherine MacLean received her bachelor's degree at Dartmouth College where she completed a two-year research stint recording brain activity in rhesus monkeys. Heeding the call to study the neuroscience of consciousness more directly, she transitioned to human research for her graduate work at the University of California, Davis. There she worked with Ron Mangun on studies of visual attention and with Cliff Saron on the Shamatha Project - a longitudinal study of changes in behavior and brain function during intensive meditation training. She received her PhD in Psychology in the Fall of 2009 and subsequently joined the Behavioral Pharmacology Research Unit within the Johns Hopkins University School of Medicine as a postdoctoral fellow. For the past two years, she has been working with Roland Griffiths and Matthew Johnson on laboratory studies of the psychological and behavioral effects of psilocybin and other hallucinogens (Salvia divinorum). In her ongoing research, she has been investigating the intersection between psilocybin and meditation, including potential brain mechanisms and therapeutic applications.

George A. Mashour received his MD and PhD in neuroscience from Georgetown University and was awarded Fulbright Scholarships for neuroscience research at the Max Delbrück Center in Berlin and the University of Bonn. He completed his training in anesthesiology at the Massachusetts General Hospital and Harvard Medical School, as well as fellowship training in neuroanesthesiology at the University of Michigan. He is currently the Director of Neuroanesthesiology at the University of Michigan and holds faculty appointments in anesthesiology, neurosurgery and neuroscience. Mashour's primary scholarly interest is in consciousness and anesthesia. In his clinical research he studies intraoperative awareness and has conducted several large randomized controlled trials. In his laboratory he investigates the effects of general anesthesia on sleep homeostasis. Finally, his theoretical research group explores network science approaches to assessing consciousness and anesthesia. In addition to numerous peer-reviewed publications, Mashour has edited several textbooks related to anesthesiology and the neurosciences, including Consciousness, Awareness, and Anesthesia (Cambridge University Press, 2010) and Neuroscientific Foundations of Anesthesiology (Oxford University Press, 2011, with R. Lydic).

Leonard Mlodinow holds a PhD in theoretical physics from the University of California at Berkeley, has been an Alexander von Humboldt fellow at the Max-Planck-Institut fuer Physik und Astrophysik in Munich, and on the physics faculty of California Institute of Technology. He has authored numerous publications in academic physics journals as well as in the popular press, and has written 5 popular science books, which now appear in 25 languages – Euclid's Window: The story of geometry from parallel lines to hyperspace (2001); Feynman's Rainbow: a search for beauty in physics and in life (2003); A Briefer History of Time (2005, co-authored with Stephen Hawking); the New York Times best-seller, editor's choice, and notable book of the year, The Drunkard's Walk: the story of randomness and its role in our lives (2008), short listed for the Royal Society book award; and the #1 best seller The Grand Design (2010, co-authored with Stephen Hawking). With Matt Costello, he co-authored the children's book series The Kids of Einstein Elementary. Dr. Mlodinow also wrote for network television for many years, including the series MacGyver, and Star Trek, Next Generation, and the comedy Night Court, has appeared in front of the camera on numerous television talk shows including Larry King Live on CNN. His writing awards include the Committee for Skeptical Inquiry's Robert P. Balles Prize in Critical Thinking and the Liber Press Award from the Spanish publisher. He was also a pioneer in computer games, as producer, executive producer and designer of several award-winning games. Between 1997 and 2003 he was Vice President for software development for the New York publisher Scholastic Inc., the U.S. publisher of the Harry Potter series, where he created a children's games division and built it into one of the top five in the United States.

Cynthia F. Moss received a B.S. (summa cum laude) from the University of Massachusetts, Amherst in 1979 and a PhD from Brown University in 1986. She was a NATO Postdoctoral Fellow at the University of Tübingen (1985-1987) and a Research Fellow at Brown University (1987-1989) before accepting a faculty appointment at Harvard University, beginning in 1989. At Harvard, Dr. Moss received the Phi Beta Kappa teaching award (1992) and was named the Morris Kahn Associate Professor (1994). In 1995, Dr. Moss moved to the University of Maryland, where she is now a Professor in the Department of Psychology and ISR. She served as Director of the Neuroscience and Cognitive Science Program (2004-2007) and is currently Co-Director of the Computer and Signal Processing Core of the NINDS P-30 Center for Comparative and Evolutionary Biology of Hearing. She is a member of the Society for Neuroscience, the Acoustical Society of America, International Society for Neuroethology, and the Association for Research in Otolaryngology. Her lab

includes undergraduate, graduate and postdoctoral researchers, supported by funds from NSF, NIH, AFOSR, Howard Hughes, the Whitehall Foundation, and private industry. Dr. Moss received an NSF Young Investigator Award in 1992 and a Berlin Institute for Advanced Studies Fellowship in 2000 and 2008. In 2001, Moss was elected a Fellow to the Acoustical Society of America. Moss and her graduate student, Kaushik Ghose, won first place in the multimedia division of the NSF-AAAS Visualization Challenge in 2004. In 2009 Moss and ISR colleagues Horiuchi and Krishnaprasad were awarded ISR Outstanding Systems Faculty of the Year. In 2010 she was recognized with the University of Maryland Regents Faculty Award for Research and Creativity. She has edited two books and published over 75 chapters and research articles. Moss's research program is directed at understanding sensory information processing and adaptive motor control. In the Moss lab, the echolocating bat serves as a model system for a neuroethologically-based study of hearing, tactile sensing, and perceptually-guided behavior. Research combines acoustical, psychophysical, perceptual, computational and neurophysiological studies, with the goal of developing integrative theories on brain-behavior relations in animal systems.

Kevin O'Regan is director of the Laboratoire Psychologie de la Perception, CNRS, Université Paris Descartes. After studying theoretical physics at Sussex and Cambridge Universities, Kevin moved to Paris in 1975 to work in experimental psychology at the Centre National de Recherche Scientifique. Following his Ph. D. on eye movements in reading he showed the existence of an optimal position for the eye to fixate in words. His interest in the problem of the perceived stability of the visual world led him to question established notions of the nature of visual perception, and to predict, with collaborators, the phenomenon of "change blindness". His current work involves exploring the empirical consequences of a new "sensorimotor" approach to vision and sensation in general. He is particularly interested in the problem of the nature of phenomenal consciousness, which he addresses experimentally and theoretically in relation to sensory substitution, sensory adaptation, pain, color, and space perception. He is interested in applying this work to robotics. Kevin O'Regan has just published a book: "Why red doesn't sound like a bell: Understanding the feel of consciousness" with Oxford University Press.

Jesse J. Prinz, distinguished professor, City University of New York, Graduate Center Director, Interdisciplinary Committee for Science Studies, CUNY, Graduate Center. I work primarily in the philosophy of psychology, broadly construed. I am interested in how the mind works. I think philosophical accounts of the mental can be fruitfully informed by findings from psychology, the neurosciences, anthropology, and related fields. My theoretical convictions are unabashedly empiricist. I hope to resuscitate core claims of British Empiricism against the backdrop of contemporary philosophy of mind and cognitive science. Authored Books: Works of Wonder: The Experience and Invention of Art (in production). The Conscious

Brain. New York: Oxford University Press (in press). Beyond Human Nature. London: Penguin / New York: Norton (in press). The Emotional Construction of Morals. Oxford: Oxford University Press (2007). Gut Reactions: A Perceptual Theory of Emotion. New York: Oxford University Press (2004). Furnishing the Mind: Concepts and Their Perceptual Basis. Cambridge, MA: MIT Press (2002). Edited Books: The Handbook of Philosophy of Psychology. Oxford: Oxford University Press (forthcoming). Mind and Cognition, 3rd Edition (with William Lycan). Oxford: Blackwell (2008) Philosophy of Mind section in S. Cahn (ed.) Philosophy for the 21st Century. New York: Oxford University Press (2002).

David Rosenthal is Professor of Philosophy at the Graduate Center of the City University of New York, and Coordinator of the Graduate Center's Interdisciplinary Concentration in Cognitive Science, with a secondary appointment in the Program in Linguistics. He holds a PhD from Princeton. He has published extensively about consciousness, arguing for a higher-order-thought theory of consciousness and for a quality-space theory of mental qualities, which he argues often occur without the relevant qualitative states' being conscious. He is past president of the Association for the Scientific Study of Consciousness, and has been Visiting Professor, Nihon University (Tokyo), McDonnell Visiting Lecturer and McDonnell-Pew Visiting Fellow, University of Oxford, and Resident Fellow, Center for Interdisciplinary Research (ZiF), University of Bielefeld.

Lore Thaler is an Associate Faculty Member, Department of Psychology, Durham University. Education: 2002-2008 The Ohio State University. Major: Cognitive and Experimental Psychology. MA (2004) PhD (2008). PhD Thesis: A Representation Based Approach to Visually Guided Motor Behavior. Committee: James Todd (Advisor), Roger Ratcliff, Delwin Lindsey, Richard Jagacinski; 1998-2004 University of Bonn, Germany. Major: Psychology. Diploma, 'very good' (Grade: 1,1). Thesis: The Effects of Phase on Shape Perception – A Psychophysical Study. Committee: Arndt Bröder, Cristina Massen; 1997-1998 University of Greifswald, Germany. Major: Philosophy and History of Art; 1989-1997 Gymnasium Wülfrath, Germany. Major: Biology and German Literature. Abitur, 'very good' (Grade: 1,2). She is a member of The Vision Science Society and the Neural Information Processing Systems (NIPS). The long term goal of my research is to determine how the nervous system computes and represents 3D spatial structure from sensory information, such as vision, audition and proprioception, and how it uses spatial representations to generate responses, such as perceptual reports or motor actions. In the context of this goal, I am currently pursuing the following lines of research: Spatial representations and motor action | Echolocation | Perception of shape from texture.

Peter T. Walling is an Anesthesiologist at Baylor University Medical Center, Dallas. In partnership with Kenneth N. Hicks, the non-linear nature of the emergence dynamics from anesthesia has been recorded and published. Dr. Walling lives on a farm and has recorded the EEG of >20 species of fauna. Plotting estimated fractal dimension against species diversification time gives an idea of the evolution of brain complexity and permits an informed guess at the first "dawning" of consciousness. Frequent presenters at Tucson (TSC), Walling and Hicks have also written a book; "Consciousness: Anatomy of the Soul."

Antonio Zadra received is PhD in clinical psychology from McGill University in1994 and was a Postdoctoral fellow of the Medical Research Council of Canada at the Hopital du Sacré-Coeur's Sleep and Chronobiology Research Centre from 1995-1998. He accepted a faculty position at the Université de Montréal in 1998 where he is now Professor of Psychology. Dr. Zadra is Director of the university's Dream Research Laboratory and leads a research group investigating non rapid-eye movement sleep parasomnias at the Center for Advanced Research in Sleep Medicine (CARSM). His research program centres around the quantification of dream content in normal and clinical populations, on the assessment, correlates and treatment of dream-related disorders, and on the pathophysiology of non rapid-eye movement sleep parasomnias with a focus on somnambulism. Dr. Zadra has authored numerous scientific journal articles and book chapters on dreams, nightmares and parasomnias. His research has also attracted considerable attention from national and international media outlets including TV stations such the CBC, CBS, BBC, Radio Canada, Discovery Channel, France 2, RAI International, newspapers like The New York Times Online, Globe and Mail, The Sunday Telegraph, Le Figaro, L'Express, Corriere della Sera, and popular magazines including the The New Yorker, New Scientist, Life, Cosmos, Macleans, and Science et Avenir. Dr. Zadra's work has also been featured in several documentary productions including most recently by the CBC, PBS Nova and BBC Horizon.

DEEPAK CHOPRA

Pre-Conference Forum, Workshop and Dinner

Monday, April 9, 2012 | 9:00am to 10:00pm

Deepak Chopra, MD, FACP has authored more than sixty four books translated into eight-five languages, including nineteen New York Times bestsellers. He is a fellow of the American College of Physicians, member of the American Association of Clinical Endocrinologists, Adjunct Professor of Executive Programs at the Kellogg School of Management at Northwestern University, and Senior Scientist with The Gallup Organization. Dr. Chopra is a columnist for the San Francisco Chronicle and the Washington Post On Faith and contributes regularly to Oprah.com, Intent.com and the Huffington Post; and hosts his daily show on BlogTalk Radio called "Deepak Chopra Radio" which focuses on the areas – success, love, sexuality and relationships, well-being, and spirituality. Time Magazine heralds Deepak Chopra, MD, FACP as one of the top 100 "Heroes and Icons" of the century and the "Poet-Prophet of Alternative Medicine." Apply Vedic tradition to modern science and vice versa, he will lead an evening special workshop: Neuroscience of Enlightenment. Dr. Chopra is founder of The Chopra Foundation, Carlsbad, CA. **[56]**

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TOWARD A SCIENCE OF CONSCIOUSNESS 2012
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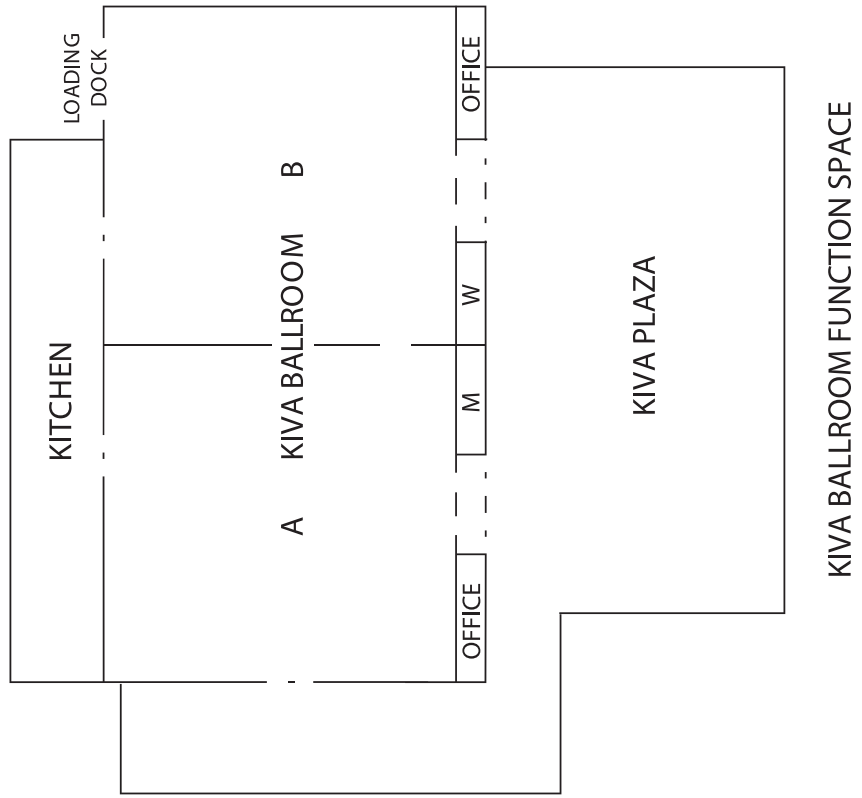
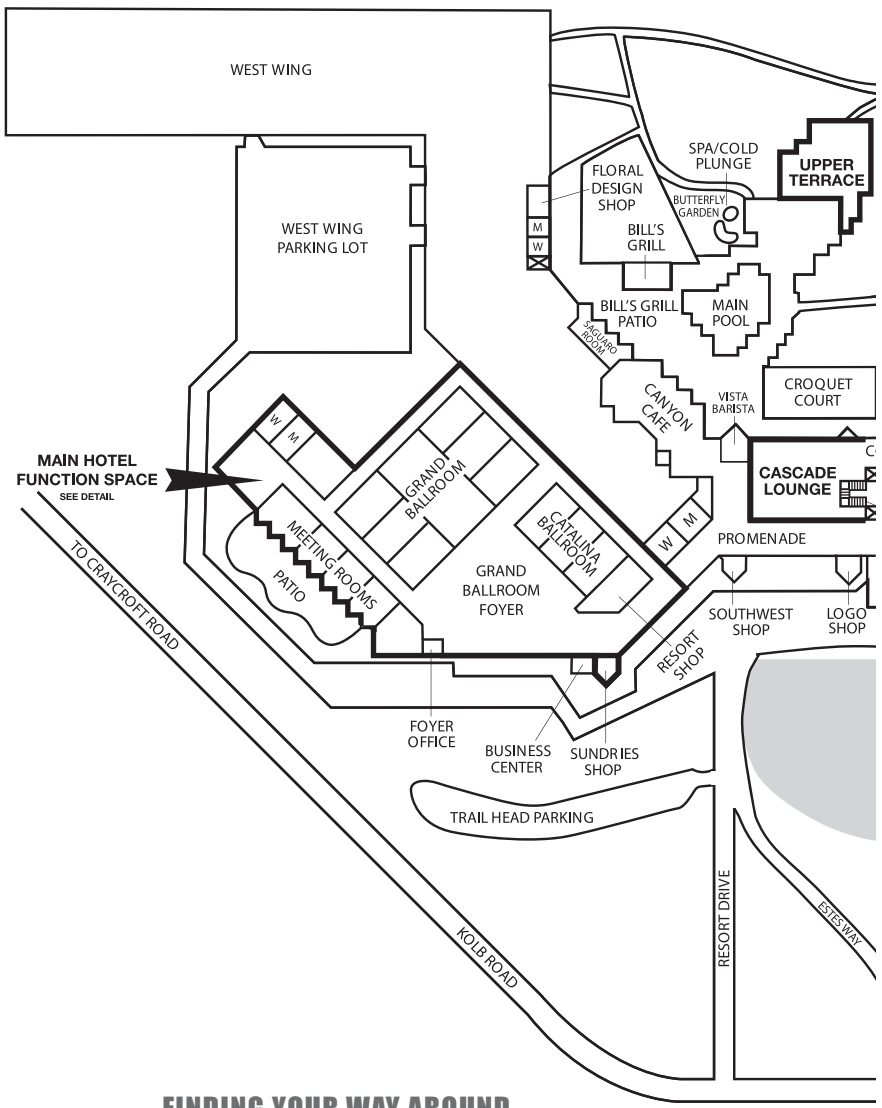
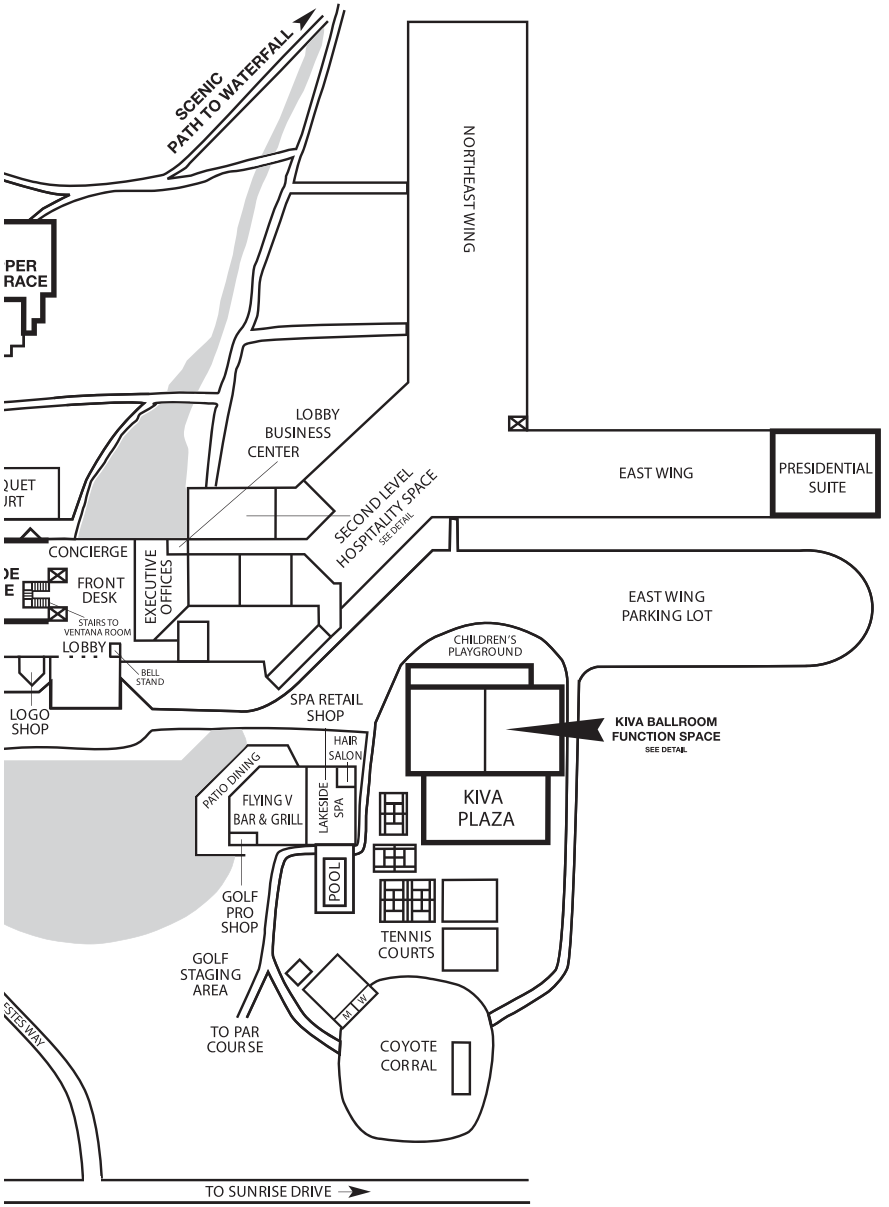
To order video and audio recordings of the TSC 2012 conference please fill out the order form in your Registration packet and return to the Registration Desk or visit www.leeinnovationsgroup.com after the conference. Feel free to contact Nikki Lee at NikkiLeeAZ@gmail.com with any questions.





FINDING YOUR WAY AROUND THE CONFERENCE

Toward a Science of Consciousness 2012
Tucson, Arizona



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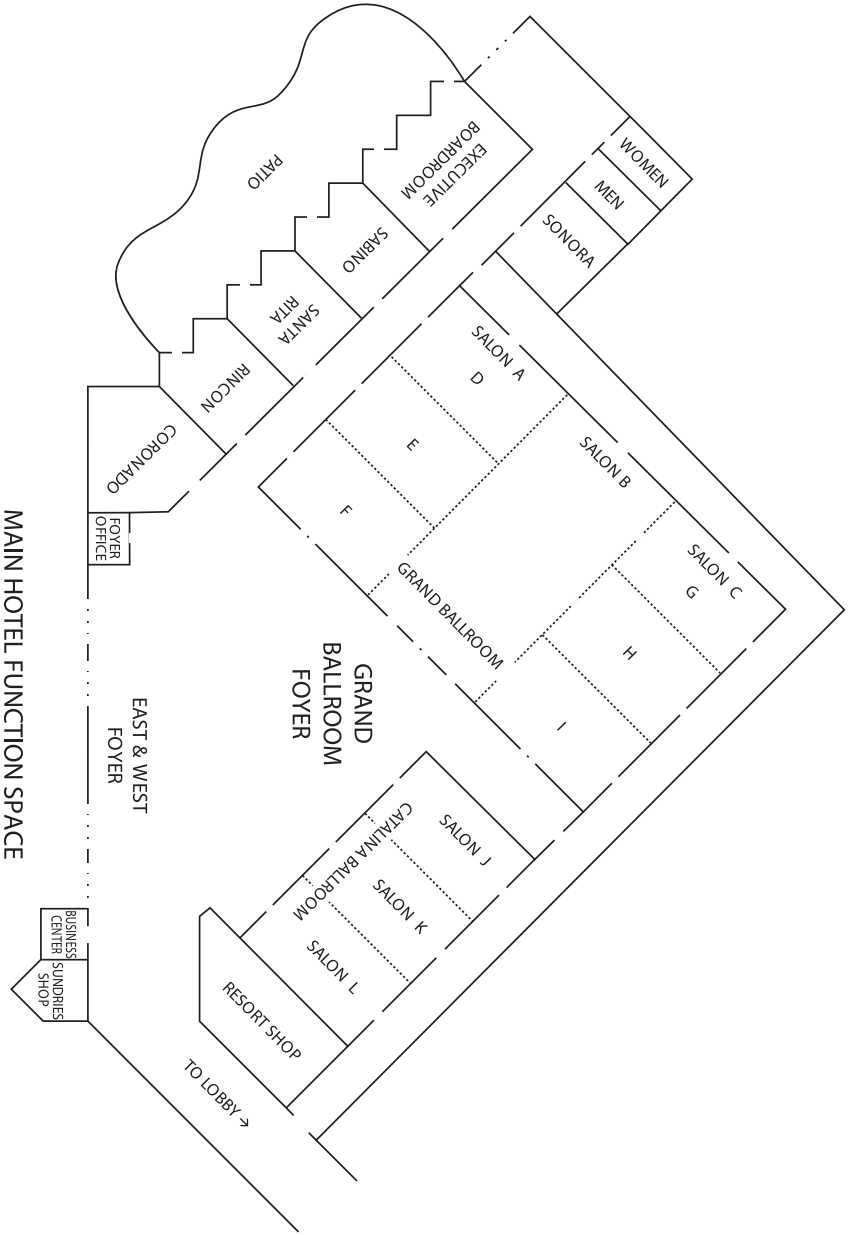

Loews Ventana Canyon MAIN HOTEL MAP

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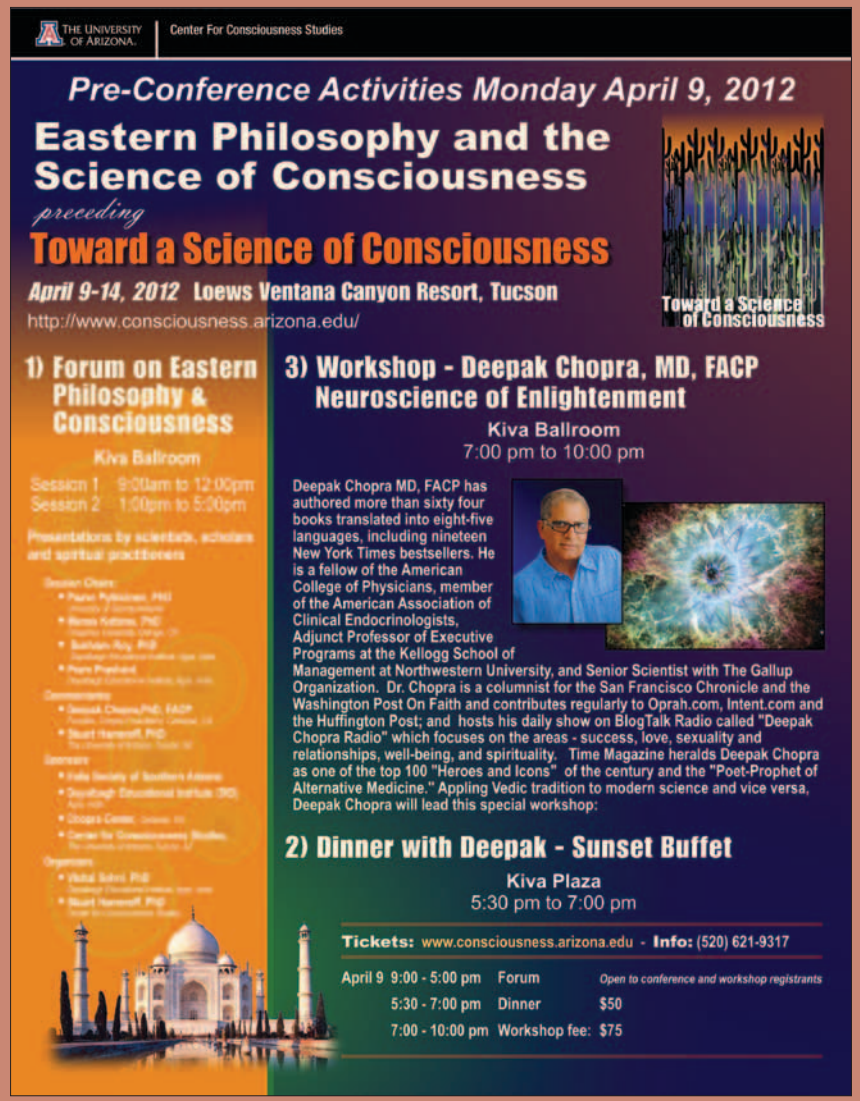

FORUM ON EASTERN PHILOSOPHY & CONSCIOUSNESS
KIVA Ballroom | Monday, April 9, 2012, 9am-Noon and 1pm-5pm

DINNER WITH DEEPAK CHOPRA, MD, FACP – SUNSET BUFFET
KIVA Plaza | Monday, April 9, 2012, 5:30pm-7pm

WORKSHOP – DEEPAK CHOPRA, MD, FACP
NEUROSCIENCE OF ENLIGHTENMENT
KIVA Ballroom | Monday, April 9, 2012, 7pm-10pm