

## **Glimpses from TSC 2016 – 12 Abstracts**

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### **1. A Final Destination: The Human Universe**

Deepak Chopra <carolyn@chopra.com> (The Chopra Center, Carlsbad, CA)

This session will discuss the seven universes that human beings have devised to explain existence, leading to the conclusion that the cosmos has evolved to reflect human evolution. This is not a philosophical observation but a "must be so" when it comes to such baffling dilemmas as the origin of life and the appearance of consciousness. The seven universes reflect human perceptions about reality itself. They are 1. The Divine Universe: The first universe was created by God or the gods, who served as the origin of life and mind. 2. The Classical Universe: The second universe was created and ruled by fixed laws of nature knowable through human reason. 3. The Relativistic Universe - The third universe, based on Einstein's General Theory of Relativity, preserved the unity of the classical universe but

showed that a new spacetime geometry was necessary. 4. The Quantum Universe: The fourth universe was still ruled by laws of nature, but in place of constants a large element of randomness and probability was introduced. Einstein's attempt to preserve a unified scheme akin to the classical universe was rejected. Because no one to date has been able to make the relativistic universe mesh with the quantum universe, an enormous mathematical guessing game began and still continues. There are many exotic universes that could be described, according to one's belief in theories such as steady state, eternal inflation, superstring, many worlds, the multiverse, M theory, and so on. All are mathematical in nature. They do not describe how reality actually works, although there's always the optimistic hope that theory and reality may match. Taken as a group, these theories all belong to the present universe, which is: 5. The Uncertain Universe, based on many equations, some critical observations, and huge expenditures of time and money to attempt to extract new data about the fabric of nature. On its own terms this universe has reached a dead end in that exotic phenomena like dark matter and energy, which exist subempirically, may constitute the bulk of creation yet lie beyond any kind of observation and experimentation. Uncertainty isn't a comfortable state to live with, so two other universes have recently cropped up. 6. The Conscious Universe, which is based on the notion that random events may not be enough to explain the exquisite fine tuning of the laws of nature and, more importantly, the rise of life on Earth. 7. The Human Universe, which is based on the undeniable fact that any universe is only knowable through the human mind's ability to think about reality. If all knowledge is rooted in human consciousness, perhaps we are viewing not the real universe but a selective one based on the limitations of the brain. This last proposition leads to the conclusion that the apparent evolution of the cosmos since the Big Bang has been parallel to, and totally dependent upon, human consciousness. We are the conscious agents who create reality in our own image. Although totally contradictory to physicalism, the Human Universe may be completely necessary if we have any hope of solving the remaining Big Questions concerning the inexplicable emergence of life and conscious beings in a cosmos that has no necessity to produce either.

## **2. Emotional Sentience and the Nature of Phenomenal Experience**

Katherine Peil <ktpoil@comcast.net> (EFS International, Kirkland, WA)

When phenomenal experience is examined through the lens of physics, several conundrums come to light including: Specificity of mind-body interactions, feelings of free will in a deterministic universe, and the relativity of subjective perception. The new biology of "emotion" can shed direct light upon these issues, via a broadened categorical definition that includes both affective feelings and their coupled (yet often subconscious) hedonic motivations. In this new view, evaluative (good/bad) feelings that trigger approach/avoid behaviors emerged with life itself, a crude stimulus-response information loop between organism and its environment, a semiotic signaling system embodying the first crude form of "mind". Emotion serves the ancient function of sensory-motor self-regulation and affords organisms - at every level of complexity - an active, adaptive, role in evolution. A careful examination of the biophysics involved in emotional "self-regulatory" signaling, however, acknowledges constituents that are incompatible with classical physics. This requires a further investigation of the fundamental nature of "the self" as the subjective observer central to the measurement process in quantum mechanics, and ultimately as an active, unified, self-awareness with a centrally creative role in "self-organizing" processes and

physical forces of the classical world. In this deeper investigation, a new phenomenological dualism is proposed: The flow of complex human experience is instantiated by both a classically embodied mind and a deeper form of quantum consciousness that is inherent in the universe itself, implying much deeper - more Whiteheadian - interpretations of the “self-regulatory” and “self-relevant” nature of emotional stimulus.

### **3. The Virtual and the Real**

David Chalmers <chalmers@anu.edu.au> (Philosophy, Australian National University; New York University, Canberra, Australia)

I will discuss the relationship between virtual reality, physical reality, and consciousness.

### **4. Can Claimant Evidential Mediums Identify Collaborating Hypothesized Discarnates? A Multi-blinded Experiment Comparing Mediumship Versus Telepathy Control**

Gary Schwartz <gschwartz@spamarrest.com> (Psychology, University of Arizona, Tucson, AZ)

Multi-blinded experiments have reported that skilled claimant evidential mediums (CEMs) (evidence-based persons who purport to communicate with hypothesized discarnates, HDs) can obtain accurate information about HDs. These rigorously designed experiments rule out conventional psychological mechanisms (e.g. fraud, subtle cueing, rater bias, placebo effects, and experimenter bias) as plausible explanations of the findings. A fundamental theoretical question is whether CEMs are obtaining information about the HDs: (1) directly from the HDs (spiritual explanation), or (2) telepathically from the sitters minds (parapsychological explanation)? Three CEMs participated: CEM-1 and CEM-2 served as primary and replicating CEMs. E-CEM served as an experimenter proxy sitter in the HD-present (collaborating) condition, and the imaginer in the HD-absent (telepathy) condition. Four well-known HDs who allegedly worked closely with E-CEM were invited by E-CEM to participate in the HD-present (collaboration) condition. CEM-1 and CEM-2 were kept blind to the identities of the four HDs as well as the order that the individual HDs were silently instructed by E-CEM to step forward and stand in front of two webcams recording the session. CEM-1 indicated that he thought the 4 possible HDs were from a pool of 32 candidates; CEM-2 said 16. The second experimenter, a skilled rater in blinded mediumship experiments, knew the identities of the HDs but was blind to the order that they were invited to step forward to be read by CEM-1 and independently by CEM-2. The design of the HD-present (collaboration) condition was optimized to minimize stress on the CEM's to encourage the successful execution of the protocol. To determine, experimentally, whether the observed accuracy scores were mediated by CEM-1 and CEM-2 reading the mind of E-CEM, plus possible subtle cuing effects, an HD-absent (telepathy) control condition was performed. E-CEM did not invite the HDs to attend the session; instead he consciously imagined each HD standing in front of the two subtracted from the [HD-present (collaboration) + possible telepathy + possible subtle cuing] condition, what remains is the [HD-present (collaboration)] effect. To make the task less taxing for the CEMs, they were given the names of 8 HDs, reducing their possible pools from 32 and 16 to 8. However, they (and the experimenter) remained blind to the order that E-CEM used to imagine the individual HDs allegedly absent from the setting. Striking differences were observed between the two conditions. CEM-1 and CEM-2 were each 100% accurate in the HD-present (collaboration) condition compared to 37.5% (CEM-1) and 12.5%

(CEM-2) in the HD-absent (telepathy) condition (p values for HD-present from 32 pool for CEM-1  $p < .000002$ ; from 16 pool for CEM-2  $p < .00003$ ). A more conservative statistic from the experimenter's perspective (pools of 4 and 8 items respectively), yielded a Yates corrected chi square  $p < .005$ . Careful analysis of the raw telepathy scores revealed no evidence of possible subtle cuing effects. The findings strongly support the collaborating HD interpretation (rather than fraud, sensory cues, or telepathy). Implications for the science of consciousness are considered.

## **5. Experimental Tests of Von Neumann's Psychophysical Interpretation of Quantum Measurement**

Dean Radin <dean@noetic.org> (Research, Ions, Petaluma, CA)

If the path that photons take through a double-slit interferometer is known by any means, then the photons will behave like particles, otherwise they will behave like waves. Numerous interpretations of this observational effect, associated with the "quantum measurement problem," have been proposed. One of the earliest proposals, by John von Neumann, was based on characterization of the measurement process as a chain of interactions between physical entities - e.g., physical system, detector, eye, brain - with the process ending only when knowledge of the measurement is registered by what von Neumann called an "extra-physical" factor, i.e., the observer's mind. In a series of 17 experiments with double-slit optical systems, some using continuous beam lasers and others single photons, we tested von Neumann's extra-physical factor. In these studies participants were asked to focus their attention toward or away from an optical system while the double-slit interference pattern was measured. The hypothesis was that the act of conscious observation would cause a change in interference. Some of the experiments were conducted over the Internet to rigorously isolate the observers from the optical apparatus. Overall the evidence strongly supported the hypothesis, but with a surprise. It was not the case that observation always "collapsed" the wavefunction, as the authors originally expected. But rather that the interference pattern became sharper or more diffuse depending on the observers' intentions, where intention was operationally defined by the nature of the feedback used to link the observers to the optical system. This outcome is consistent with consciousness as an active "steering force" rather than as a passive factor. It is also consistent with a half-century of prior empirical research using other targets of mental intention. These studies therefore suggest, in accordance with interpretations of quantum mechanics discussed by von Neumann along with Bohr, Schrodinger, Eddington, Jordan, Pauli, Planck, Jeans, Godel, London, Bohm, Wheeler, Squires, and more recently Stapp, that the observer is an inextricable part of the measurement process. Discussions about the quantum measurement problem have tended to focus on philosophical and theoretical arguments. This has led to over a dozen different interpretations and strongly held opinions on all sides. Our experiments are important because they offer a means of empirically informing, and possibly resolving, this long-standing debate.

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## **6. EEG Studies on the “Transmission” of Subjective Light/Energy Between a Meditation Teacher and His Pupil**

Peter Fenwick, Luft C; Bhattacharya J <peter\_fenwick@compuserve.com> (Institute of Psychiatry; Kings College; Southampton University, London, United Kingdom)

A 60 year old Teacher, during 3 to 4 minutes of meditation, induced in pupils a strong subjective perception of white (sometimes coloured) light and bodily sensations of energy. Absence of mutual eye contact reduced the intensity and nature of the experience. Hyperscanning EEGs (500 samples/ sec/channel, 64ch, two EEG machines) simultaneously recorded the electrical brain responses of Teacher and pupil under all pairwise combination of instructions to Teacher (transmit/do not transmit) and to pupil (receive/do not receive). A trial of transmitting and receiving was also recorded while both Teacher and pupil wore goggles preventing them from seeing each other’s eyes clearly. Both were blind throughout to the other’s instructions. We estimated the strengths of neural oscillations in standard EEG frequency bands and the effective connectivity (Phase Slope Index) between the two EEGs, as a measure of inter-brain communication. We observed an increase in gamma power (30-70 Hz) in the Teacher’s EEG while transmitting energy compared to when he was not, and an increase in gamma power in the pupil’s EEG when receiving energy compared to when he was not receiving it. There was a similar increase in gamma power for the trial when eye-contact between the pair was restricted by light diffusing goggles. In this trial the subjective effects were significantly reduced, with the visual effects going and the energy feelings remaining at a reduced level. The Teacher’s and pupil’s EEGs synchronized, from the Teacher to the pupil’s EEG, especially in alpha (peak 10 Hz) and gamma frequencies (peak 66 Hz) when both the Teacher was sending and the pupil receiving energy. There was some synchronization of Teacher/pupil interaction in other conditions (e.g. Teacher transmitting, pupil not receiving), but this was less prominent. Synchronization between the brains was blocked once eye contact was prevented by wearing the diffusion goggles. Thus high gamma was found with meditation in Teacher and in the pupil both with and without goggles. Both the visual subjective effects and communication between the brains were blocked by the goggles, suggesting that eye contact between Teacher and pupil is necessary if all the subjective effects of the meditation are to be experienced by the pupil. High gamma has been reported in mindfulness with experienced meditators, but is less prominent in other forms of meditation. The colours seen by the pupil were possibly due to fusiform gyrus stimulation with the spread of posterior gamma activity spreading into this area. fMRI bold activity of the Teacher’s meditation state vs mind-wandering has been recorded but the analysis is not yet complete.

## **7. The ‘Road From Within’ - Orch OR and the Quantum Underground**

Stuart Hameroff <hameroff@u.arizona.edu> (Anesthesiology; Psychology, University of Arizona, Tucson, AZ)

In most theories (e.g. GW, PC, IIT, HOT), consciousness emerges in higher level networks in a spatiotemporal brain hierarchy, with neuronal membrane activities as low level information states. But these approaches fail to address 1) the ‘hard problem’ of subjective experience, 2) memory, 3) agency, 4) binding and 5) how neurons differ from silicon bits, not merely in complexity, but in terms of cognitive capacity of single cells, and what it means to be ‘alive’. The answers may lie within neurons, in deeper-level quantum processes in cytoskeletal

microtubules which regulate axonal firings, synaptic plasticity, and memory. The Penrose-Hameroff theory of 'orchestrated objective reduction' ('Orch OR') suggests consciousness consists of sequential quantum computations in microtubules, e.g. inside dendrites and soma of layer 5 pyramidal neurons. The microtubule quantum bit ('qubit') states are 'orchestrated' by synaptic inputs, memory and vibrational resonances, and self-collapse at specific time intervals and frequencies by Penrose 'objective reduction' ('OR'), selecting particular conscious perceptions and volitional choices. The phenomenal nature of qualia ('hard problem') are attributed to properties in fundamental spacetime geometry which governs OR. Supportive evidence for Orch OR includes the following. Bandyopadhyay's group (NIMS, Tsukuba) showed microtubules have quantum resonances in terahertz, gigahertz, megahertz and kilohertz frequency ranges. (Accordingly, Orch OR proposes EEG rhythms are 'beat frequencies' of faster, e.g. megahertz, microtubule vibrations.) And microtubules are increasingly seen as the site where anesthetic gas molecules act to selectively prevent consciousness. Orch OR is viewed skeptically because the brain appears too 'warm, wet and noisy' for seemingly delicate quantum states, but the anesthetic site of action (and thus consciousness) is defined by the Meyer-Overton correlation pointing to non-polar, pi resonance pathways buried within microtubules and other proteins, regions shielded from polar charges and conducive to quantum states - a 'quantum underground' pervading brain proteins. As deeper, faster, intra-neuronal levels of the brain's cognitive hierarchy, Orch OR and microtubule quantum vibrations may underlie membrane-based theories (GW, PC, IIT, HOT), with consciousness ranging across spatiotemporal scales like music across octaves. Based on microtubule quantum resonances and anesthetic action, Orch OR is experimentally better supported than other theories.

## **8. Mind-Body, Quantum Mechanics, Possibles and a Possible Panpsychism**

Stuart Kauffman <stukauffman@gmail.com> (The Institute for Systems Biology, Seattle, WA)

With Newton we lost our minds and became disenchanted. Newton, in classical physics, gives us a view of the world as an entirely entailed unfolding. Nothing not entailed can happen. Due to this causal closure of classical physics, a classical brain can at most witness the world, not alter it, so be at most epiphenomenal. Then why have we evolved such complex brains? The best hope for a more-than-epiphenomenal mind requires quantum mechanics, QM. "Choice" implies that we could, counterfactually, have chosen otherwise. This is ontologically possible in QM if measurement is real and ontologically indeterminate. The electron could have been measured to be spin up or to be spin down, so the present could have been counterfactually different. An emerging interpretation of QM involves the ontological reality of "possibles", going back to Aristotle and Heisenberg, which I call "Res potentia and Res extensa linked, hence united, by measurement." Real possibles may explain mysteries of QM such as non-locality as well as the counterfactual outcomes of measurement. If QM concerns possibles and actuals as a new non-substance dualism, what mediates measurement? One testable hypothesis is that human conscious mind acausally mediates measurement. Tentative evidence by Radin supports this. If confirmed, how else is measurement mediated? A panpsychism arises if we try the currently untestable idea that quantum variables can measure one another, and do so consciously. This resolves the Quantum Enigma, and the location of von Neumann's epistemic cut from mind to apparatus. Then consciousness and aspects of free will are parts of a panpsychist universe and life evolved with it.

## **9. Origin of Unique Pattern We Observe in the Resonance Frequency Distribution of Proteins**

Anirban Bandyopadhyay <anirban.bandyo@gmail.com> (Advanced Scanning Probe Micros, National Institute for Materials Science, Tsukuba, Ibaraki Japan)

We have investigated the structural symmetry of proteins and determined why peculiar grouping of resonance frequency occurs in the proteins and their complexes. We have investigated more than 20000 proteins theoretically and around 10 proteins and their complexes experimentally. Using cavity resonator model we have identified accurately how distribution of primes in the number system plays a vital role in determining the grouping of resonance frequencies. So far we have published only the experimental data, as is, now, that we have determined the mathematical origin of distribution of resonance frequencies, it appears that nature relies on the number system to create materials and composition of frequencies is an example of a beautiful mathematics.

## **10. The Quantization Paradigm in Physics and Biology**

Jack A. Tuszynski, M. Kafatos <jackt@ualberta.ca> (Physics, University of Alberta, Edmonton AB, Edmonton Canada)

A fundamental tenet in the study of organization in inanimate and living matter is the quantization of energy. In inanimate systems where temperature is a critical organizing parameter, the quantum of action is an atomic-level phenomenon described in terms of Planck's constant, which relates the photon's energy to the frequency of its electromagnetic wave. In living systems, where the cycle time of metabolic processes is the organizing variable, the quantum of action is a cell-level phenomenon described in terms of an analogue of Planck's constant which relates the metabolic energy to the frequency of the enzymatic or mitochondrial oscillators. This article elucidates the relation between these two measures of quantum action. We will review the role of Planck's constant in physics, first, as a fundamental parameter for explaining the empirical laws of black body radiation, to its more modern developments. We will also describe the theoretical and empirical rationale for the cellular level quanta. We exploit this analysis to elucidate how energy transformation in physical processes, where temperature is the organizing parameter, relate to energy transduction in biological processes which are essentially isothermal. Quantum effects in biology are also briefly discussed and these include biophotons, centriole functions, Frohlich's coherence, visual perception, olfactory sensing, bird navigation, light harvesting and photosynthesis as well as quantum evolution, bioenergetics, brain dynamics and most importantly quantum metabolism. It is concluded that the ten orders of magnitude (from  $10^{-34}$  to  $10^{-24}$ ) between the atomic-level physical and the cell-level biological Planck constant correspond to the scale gap between physical building blocks of matter: elementary particles and biological functional units: living cells. We then link the cell level to the organismal level of metabolism and obtain a scaling relationship for the biological Planck quantum of action as a function of size of the biological system studied.

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## **11. The Metaphysics of Substance and Selfhood/Personhood: A Non-Theory Laden Approach**

Mihretu Guta <mihretup@aol.com> (Arts, Sciences and Philosophy, Biola University; Azusa Pacific University, Hacienda Heights, CA)

In this paper, I will attempt to show the advantage of substance ontology in providing us the most preferable framework, both on methodological as well as philosophical grounds, to have a better grip on the diachronic problem of personal identity. In this case, substance ontology plays multi-faceted roles in terms of allowing us for example, to make sense of the persistence of persons over time, intrinsic changes persons undergo while maintaining their identity over time, etc. (see e.g., Loux 2003; Lowe 1996; 1998; Wiggins 2001). However, substance ontology has not been taken seriously by the majority of philosophers. This is because there is a deep-seated but mistaken assumption among contemporary analytic philosophers that given the advances in modern science (e.g., quantum physics), the traditional substance ontology is irrelevant or at the least, it cannot enjoy primary ontological status over other entities, say tropes (see Hoffman and Rosenkrantz 1997; Simons in Oderberg, ed., 1999). It is also not uncommon to see philosophers questionably appealing to Locke's extremely controversial theory of substratum (i.e., "something we know not what") to justify their rejection of any notion that goes by the name substance. Of course, Hume's criticisms of substance ontology adds even more impetus for those who reject substance ontology to try to undermine its centrality for our conception of selfhood/personhood (cf. Dennett 1991). However, with close examination, at the heart of such a rejection of substance ontology lies the naturalistic ontology, according to which everything in the universe has to be explained in purely physical terms as dictated by the physical sciences (see e.g. Jackson 1998; cf. Papineau 1993; 2002). But as I will argue in this paper, when it comes to the metaphysics of the self and its identity over time, the naturalistic ontology suffers from a serious lack of explanatory adequacy. I argue that ultimately, the controversy over the nature of the self is a metaphysical issue, in that it is not for science to adjudicate what the nature of the self has to be. In light of this, the conception of substance ontology I defend in this paper is Aristotelian in spirit as opposed to Lockean or Humean. The category of substance has a fundamental ontological primacy over any other non-substantial entities such as events, places, time, properties (or tropes) and so on. I will argue that substance ontology understood in this way is indeed the most plausible and sustainable conception. Finally, I will point out the relevance of the conception of substance ontology I will defend in this paper to two interrelated issues, namely mental causation and consciousness.

## **12 The Quasicrystalline Nature of Consciousness and the Universe**

Klee Irwin <klee@quantumgravityresearch.org> (Quantum Gravity Research, Los Angeles, CA)

Spiritual and some scientific approaches attempt to connect consciousness to the structure of the universe. For example, Deepak Chopra posits the Vedic view - that consciousness is the ground of physical reality. However, this spiritual model leaves the inquiring scientist asking the same question a child might ask a priest, "How did this God-like universal consciousness come to be?" The Penrose-Hameroff Orch OR theory attempts to answer by saying consciousness resulting from a Fibonacci-string based quantum code in microtubules is



connected with non-local consciousness corresponding to an unknown quantum gravity theory at the Planck scale 23 orders of magnitude smaller, i.e., a theory of everything that would reconcile the outstanding disagreements between general relativity and quantum mechanics. Quantum Gravity Research (QGR) deduced a Fibonacci-string based spacetime substrate of quasicrystal geometry and spin-network operations. The model holds promise of becoming the words only “geometric first principles theory of everything”. Such a theory, for example, would provide an analytical expression for the fine structure constant - leaving no value in nature, such as the speed of light, unexplained by simple first principles. Coincidentally, Roger Penrose invented spin networks. He has also done more than anyone to popularize quasicrystals, such as Penrose tilings. Could such geometric vibrations intrinsic to the universe reverberate upward to reach biology? Perhaps if the substructure of spacetime were endowed with a fractal size scaling quality. This would provide an energetic pathway for cascades of vibrational information to freely move up and down a vast ladder of size scales from the unfathomably small Planck length on up through atomic scales and beyond. Like DNA, the Fibonacci-sequence based geometry of Microtubule ‘A-lattices’ provides a rigorous mathematical framework for such a conjecture - but only if spacetime itself were based on such a Fibonacci-chain fractal structure. Is there any evidence for energy expressions in microtubules flowing up and down such a fractal scale? Anirban Bandyopadhyay et al recently detected resonances in microtubules with quasicrystalline-like patterns. The vibrations are musical in some sense, with a rhythmic progression of frequencies moving up and down a fractal size scale - going from terahertz to gigahertz to megahertz and so on. Musical composer and scientist, Timber Wolf, converted Anirban’s microtubule music to a frequency scale we can hear. He couldn’t resist jamming with the rhythms using his keyboard. Let’s have a listen.