# PUTTING THE BUDDHISM/SCIENCE DIALOGUE ON A NEW FOOTING

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## Physical and Biological Perspectives on Expanded Views of Mind and Consciousness: Relevance to the Contemporary Buddhism-science dialogue, and to Conversation between Scientific and Religious Worldviews More Generally

MANGALAM RESEARCH CENTER FOR BUDDHIST LANGUAGES

This project was made possible through the generous support of a grant from the John Templeton Foundation. The opinions expressed in this video are those of the speaker(s) and do not necessarily reflect the views of the John Templeton Foundation.

***Physical and Biological Perspectives on Expanded Views of Mind and Consciousness***

**David Presti, PhD**

Presti opened his presentation by passing out fine chocolate, which he described as a sacrament, to the group. He asked them to savor it with full attention to the sensory experience while he described the process of its production and the workers involved in great detail, as an example of interconnection.

He described growing up in the mid-west in a scientifically oriented family, and studying sciences, philosophy, and mathematics in college at the same time as he encountered Asian spiritual traditions and found his way to Francisco Varela's early work. He studied theoretical physics as a graduate student at Caltech, where his interest in the philosophy and evolution of mind led him to study biology under Max Delbrück and then to post-doctoral work in neurobiology and a second doctorate in clinical psychology. He worked in addiction and PTSD treatment for a decade before his current faculty position at UC Berkeley.

Presti spoke of his personal experience—represented by an image of colliding galaxies contained within a brain—of deep interconnectivity between fundamental physics, what we know about the furthest reaches of the cosmos, and our own bodies as living systems, and in particular, how our biology is involved in the creation of our experience.

After meeting with the Dalai Lama in 2003, he became involved in experiments on binocular rivalry in experienced Tibetan meditators in India, and in 2004 began teaching neuroscience with "Science for Monks," a program created in 2000 to increase knowledge about physical and biological science among Tibetan monastics. The ongoing project has involved teacher training for senior Tibetan monastics in leadership roles as well as facilitating basic instruction in the monastic communities, science fairs where the monastics prepare their own posters, the involvement of professional thangka painters in preparing graphic materials and murals, and a series of conferences for Tibetan monks and nuns in India bridging Buddhist themes with science.

In his meeting with the Dalai Lama, Presti was encouraged to follow his interest in studying phenomena believed to be true by Tibetan Buddhists, but which are outside the present explanatory paradigms of Western science. He affirmed his strong belief that the metaphysical aspects of both Buddhism and science should not be bracketed but rather confronted directly in the dialogue. Referring to the discomfort that many scientists feel when faced with discussion of reincarnation, telepathy, and other seemingly supernatural phenomena, he observed that the possibility of such phenomena proving to be real is no threat to science but only an expansion, in the same way that quantum mechanics expands the realm of physics without undermining the reality of classical physics.

Presti described his meeting with Khenpo Tsultrim Lodro, a very prominent teacher in eastern Tibet who has an interest in science. Lodro has written an ethnography of reincarnation, interviewing children who remembered their past lives, which was inspired by Ian Stevenson's work at the University of Virginia. Francisca Cho asked whether Lodro saw reincarnation as an objectively real continuation of consciousness across lives, or in a psychological or metaphorical sense that would sit more easily with

Western culture. Presti affirmed that it was assumed to be objectively real but also pointed to the need for a richer cross-cultural perspective that encompassed the "inextricable enfolding of mind and world, or psychology and physical reality." He insisted that any effective scientific investigation of mind and consciousness had to give priority to this paradoxical interface in a way that contemporary science is not designed to do.

He bowed to William James, whose *Principles of Psychology* in 1890 outlined a framework for a science of mind as consisting of the study of observable behavior, the biological underpinnings of behavior, and also of mental experience directly. James had a particular interest in experience, including spiritual and mystical experience, altered states of consciousness, and paranormal experience, which he approached with a radical empiricism, putting no boundaries on what aspects of experience were valid to study. Presti identified with James' empirical approach, seeing himself grounded in the data of experience, but also anticipating a major paradigm shift on the scale of those associated with Copernicus, Darwin, Einstein, and quantum physics. He predicted it would be a cognitive revolution involving recognition of the deep interconnectivity of mind and world. Because mind has been excluded from consideration in the physical sciences, this paradigm shift will bring about very different approaches than we use now. The forward trajectories of current work in neuroscience, cellular and molecular biology, genetics, behavioral science, and neuromorphic engineering will continue to produce interesting and—if the past is a predictor—unexpected material from which new physical principles might emerge. The unfathomable complexity of life, together with the inextricable enfolding of mind and world, may eventually set a limit on understanding, but in the meantime we move forward step by step.

Presti showed a series of images of increasing complexity: a cartoon visualization of a neuron; Golgi-stained neurons; an electron microscope view of a tightly packed, thin slice of cortex (neuropil); the complex oscillatory EEG signal generated by the collective action of billions of neurons—and at each step he described how the image was a gross simplification limited by the method of representation. At another level of complexity, he guessed that subcellular structure would be important in understanding the function of neurons, which likely involves quantum coherence. He gave an example of how, in photosynthetic reactions in plants, algae, and bacteria, light moves through an array of light-capturing proteins in a way that maximizes efficiency using non-local diffusion of energy described by quantum mechanics. As the technology for measuring at the subcellular level becomes more sophisticated, we will likely find similar effects in other sensory systems.

He described the work of his late colleague and mentor Walter Freeman III, who invented the field of neurodynamics, using mathematical models to understand the collective behavior of large numbers of neurons. Freeman came to develop a hypothesis that the cortical neuropil behaves like a superfluid undergoing a phase transition during moments of perception.

In further demonstration of the brain's complexity and plasticity, Presti gave a rundown of the many mechanisms of dynamic change at the 100 trillion or more chemical synapses, in addition to the 100 trillion direct electrical connections between cells in the brain. He followed with a detailed description of the actions of G-protein coupled receptors that occur at chemical synapses. The complexity he described operates

at a much subtler and more nuanced level than efforts to map the brain's physical connections or functional regions can address.

Clifford Saron observed that brain mapping has had enormous social impact, such that people assume it offers useful explanations, whereas neuroscientists were responding to the existence of shared methodology and the possibility of clarifying distributions of function that had been haphazardly gathered from brain injuries, but they never saw it as the answer to how the brain works.

Presti foresaw increasing reasons for neuroscience to interface with fundamental physics as the scaffolding on which biology is built. In particular, he saw quantum mechanics as a potentially relevant direction that may lead to new insights concerning consciousness through confrontation between the effects of observation on the physical reality we observe, or possibly through the actions of entanglement, which recent experiments have shown to work across time as well as space.

He suggested that a refined analysis of mental experience could be another way forward, and he returned to William James on the potential value of studying altered states of consciousness as well as anomalous mental phenomena. James also recognized the value of empirical study of religious experience, in a way that remains relevant to the science/Buddhism dialogue. He wrote in 1909, in *A Pluralistic Universe:* "Let empiricism once become associated with religion, as hitherto, through some strange misunderstanding, it has been associated with irreligion (which Presti indicated included contemporary science as generally practiced) and I believe that a new era of religion as well as philosophy will be ready to begin… I fully believe that such an empiricism is a more natural ally than dialectics ever were, or can be, to the religious life."

Presti touched on the history of scientific research into anomalous phenomena, beginning with the founding of the Society for Psychical Research in 1882, and their ethnography of hundreds of cases of telepathy, clairvoyance, precognition, and crisis apparitions. He then turned to Ian Stevenson's work at the University of Virginia on recording and verifying what appear to be children's memories of previous lives. He found the accounts compelling, and noted several consistent patterns. The children's memories begin around age three and they stop talking about them at age six or seven. They remember previous lives as ordinary—not famous—people, usually of the same sex, having died an unnatural death or at a very young age, and they often have phobias associated with the cause of death. Another study at the University of Virginia has gathered a large body of empirical data tracking more than a thousand people who have had near-death experiences. Presti saw these efforts as beginnings that open new territory through approaching these phenomena empirically, perhaps contributing to expanding the framework of what is considered acceptable science.

In the discussion that followed, David McMahan expressed appreciation for Presti's expanding scientific discourse to include other types of narratives. Saron took a more critical stance: though he wasn't feeling the heebie-jeebies that such topics would normally induce, he argued that extraordinary claims require extraordinary evidence and not just converging correlations. Presti noted the prevalence of damaging misrepresentations of anomalous phenomena in popular literature and claimed that he was arguing not for any particular interpretation or agenda, but merely that there was enough evidence in the reports to warrant attention from mainstream science. Francisca Cho articulated the resistance to paying attention—the accounts trigger an immediate

epistemic judgment of fraud, hallucination, or similar—but she also recognized that what Presti was advocating was "just along the lines of William James: let's do empirical investigation, bracketing any sort of conclusion metaphysically." Presti confirmed the need to be agnostic about the limits of one's metaphysical framework, and thus willing to go beyond those constraints to investigate phenomena empirically, but the bias against such research in the scientific community blocks progress. As Buddhism takes seriously the centrality of mind in nature, the ongoing and evolving conversation between science and Buddhism may be a powerful catalyst for expanding the investigation of mind within science.