

Frontiers of Consciousness Workshop

March 4-5, 2014

National Academy of Sciences
Beckman Center, University of California, Irvine

Meeting Purpose

Reports of experiences suggesting that the mind reaches beyond the ordinary senses, extending through both space and time, present significant challenges to scientific assumptions and to experimental methodologies. Despite such challenges, “extended mind” (EM) experiences have been reported across all cultures and all educational levels, stimulating the imagination and hinting at the existence of uncharted territories.

The purpose of the *Frontiers of Consciousness Workshop*, held in March 2014 at the Beckman Center, University of California, Irvine (the West Coast Headquarters of the US National Academy of Sciences), was to review the latest empirical and theoretical research on EM phenomena. The assembled experts explored best methods for advancing knowledge in this field as well as how to improve both the science and the context in which EM research takes place.

Participants held critical discussions, surveyed the scientific and sociopolitical challenges presented by this line of research, and investigated its implications. At the end, a list of next steps and activities to promote EM research was generated.

Henry Samueli, PhD (Co-founder, Chairman of the Board, and Chief Technology Officer of Broadcom Corporation) welcomed the participants and emphasized that the world is still full of mystery and magic, which unless dispassionately investigated by science will never be understood or harnessed. He illustrated his point by noting that if a person even 50 years ago was shown today’s smartphone, they could only understand it as magic or as a trick. Likewise, for many today EM phenomena are also viewed as magic or tricks, and that opinion will not change without rigorous, systematic scientific investigation.

Federico Faggin, PhD (co-inventor of the microprocessor, co-founder and CEO of several Silicon Valley companies, and head of the Federico and Elvia Faggin Foundation) welcomed the participants and presented an overview of EM and how it could be important for infusing meaning, purpose and beauty into science. He defined different components of consciousness and how, without serious research on EM, the full panoply of conscious and unconscious experiences and phenomena could not be fully appreciated. He challenged the group to look deeply into the nature of EM as a way to enrich our understanding of life.

Wayne Jonas, MD (President & CEO of Samueli Institute) welcomed the participants and provided background on the origin of the meeting. The meeting was first proposed by Samueli Institute to Henry Samueli and Federico Faggin at the Marconi Awards Symposium in 2013. Samueli and Faggin (both Marconi Award winners) proposed that the study of consciousness is a fruitful area which will further our understanding of the nature of inner connectivity among people.

Cassandra Vieten, PhD (President and CEO of the Institute of Noetic Sciences) welcomed the participants and emphasized the value and the necessity of unconstrained scientific inquiry into all aspects of consciousness.

Dr. Jonas charged the group with four tasks. These were to:

1. Assess if the existing empirical data are sufficient to support the existence of EM,
2. Discuss if further research of EM warrants investment,
3. Describe challenges to further research, and
4. Make recommendations on how to advance our understanding of EM.

Sponsors

Federico and Elvia Faggin Foundation, Henry Samueli, Laurance S. Rockefeller Fund, Institute of Noetic Sciences, Samueli Institute

Background

Innumerable anecdotal reports found in all cultures since the dawn of history suggest that the mind occasionally has access to information that transcends the ordinary senses. Examples include perceiving future events or spontaneously knowing a distant person's emotions or intentions. Investigations of such experiences began with the very origins of scientific inquiry, and the experiences themselves continue to be reported today by individuals at all levels of educational achievement. Notable scientific pioneers including Francis Bacon, Isaac Newton, and William James, to contemporary Nobel Laureates and prominent scientists across a variety of disciplines, have openly expressed interest in EM phenomena. Government programs have periodically supported applied research programs in EM. In the United States, programs were sponsored by the Department of Defense (DoD), Central Intelligence Agency (CIA), Defense Intelligence Agency (DIA), and the National Institutes of Health (NIH). Government programs in Russia, Japan, India and China have also funded research into EM-related phenomena.

Despite persistent reports of such experiences, as well as a growing body of experimental evidence, the notion that the mind might have extended properties is considered by some to be scientifically implausible. EM seems to violate core assumptions of the neurosciences as well as physical laws about the structure of space and time. The apparent violation of existing theories has led many to assume that EM experiences are best explained as coincidence, illusion or delusion.

However, as previous concepts about the nature of space, time and causality shifted with the development of general relativity and quantum mechanics, ideas about the properties and capacities of consciousness have also begun to shift. These shifts are now accelerating because of rising evidence that basic characteristics of living systems (e.g., magnetoreception and photosynthesis) are mediated by quantum effects. This radically challenges previous assumptions about the plausibility of EM.

While theoretical models remain at earliest stages of development, systematic empirical study of EM phenomena has been underway for over 130 years. Given the largely pre-theoretical nature of this work and the challenges they pose, the rate of progress has been slow. Nevertheless, a steady stream of research supporting the reality of various EM effects continues to accumulate, and research methods today have advanced far beyond the techniques commonly employed a few decades ago. Experiments now use contemporary neuroimaging and psychophysiological protocols, optical physics, automated blinding and randomization of controls, and quantitative methods for assessing effect sizes and

replication rates. Experimental results using the latest tools and techniques continue to show intriguing effects.

Meeting Summary and Highlights

History and Current Research

Dean Radin, PhD (Chief Scientist, Institute of Noetic Sciences) summarized the extensive interest of prominent scientists over the last four centuries and their exploration and research into EM. He showed that as technologies and methods improved the evidence for EM continued to be observed, and in some cases the evidence has become more robust. He explained that advances in scientific methodology frequently arose out of the study of EM phenomena, and that those methods have become gold-standards in mainstream research, but the origins of the methods are forgotten. Data from the last 130 years of research on telepathy was summarized, concluding that evidence from more than 200 independently replicated experiments unambiguously demonstrate the existence of telepathy.

Jessica Utts, PhD (Chair of the Department of Statistics, University of California, Irvine; President-Elect, American Statistical Association) summarized the statistical status of EM research. She concluded that various lines of research demonstrate highly significant effects based on currently accepted statistical criteria. Additionally, she compared the state of the evidence for EM to other accepted facts, such as the use of aspirin for prevention of heart attacks and the existence of the Higg's Boson.

Julia Mossbridge, PhD (Neuroscientist, Northwestern University) summarized a series of studies on physiological detection of unpredictable future events. The results of the meta-analysis that she co-authored showed that an individual's physiological response to a meaningful future event can be detected before that event unfolds, and that this effect is highly statistically significant. Her own data from ongoing experiments demonstrate that individuals can reliably detect unpredictable future events up to 10 seconds before they occur. She highlighted the potential practical utility of this process.

Daryl Bem, PhD (Emeritus Professor of Psychology, Cornell University) summarized a similar line of research that explores the ability of individuals to detect meaningful future events through behavioral measures. In his studies of unselected individuals, the data revealed a statistically significant, repeatable ability to detect future events involving images with high emotional affect. He then discussed the reaction to these data among his colleagues, showing that even rigorously conducted EM research fails to persuade those who believe (on theoretical grounds) that EM phenomena must be impossible. Scientists, like all of us, are strongly influenced by their prior beliefs.

Marilyn Schlitz, PhD (Medical Anthropologist, Founder & President, Worldview Enterprises) summarized the current research on distant mental interactions with living systems by presenting the results of remote staring and intentional healing studies. These results suggest that the influence of biological and possibly health outcomes is possible through the application of distant intention alone.

Peter Bancel, PhD (Physicist, Institute Métapsychique International) surveyed the extensive research conducted over the last five decades to eliminate systematic error and experimenter bias in EM research on the role of intentional influences of distant physical systems. Application of increasingly rigorous designs, automated technologies, accumulation of large databases, and objective outcome measures have continued to refine and support research on EM interactions with physical and biological systems.

Theoretical and Conceptual Models

Don Hoffman, PhD (Professor of Cognitive Sciences, University of California, Irvine) presented a computational model of EM resulting in descriptive state equations that parallel those in quantum mechanics. His model makes a number of testable predictions for how EM operates and how these theoretical mechanisms might provide a tool for further investigation of the topic.

Menas C. Kafatos, PhD (Professor of Computational Physics, Chapman University) explored the relationship between physics and consciousness. He summarized the ongoing dialogue between physicists and consciousness researchers over the last hundred years, illustrating the parallels, possibilities and problems that have arisen in this dialogue. He made the case that quantum mechanical models provide one fruitful basis for understanding the research on EM. Results of experiments such as the double-slit experiment and weak measurement experiments in quantum entanglement support the need to examine direct relationships between these two fields.

James Carpenter, PhD (Professor of Psychiatry, University of North Carolina) presented his model of EM (called “First Sight”) as a normal cognitive process that underlies all information processing and perceptual filtering. He described and compared EM to subliminal and peripheral perceptual priming, and presented a unified model of information and signal management by the mind, which he called anticipatory unconscious intention. He also discussed research on the use of EM to produce small but robust influences on spontaneous group behavior. This effect is of similar magnitude to that produced by more conventional subliminal perceptual priming paradigms.

Challenges to Research in Extended Consciousness

Cassandra Vieten, PhD provided an overview of the challenges and opportunities currently facing EM research. In addition to conceptual and belief challenges she described a need to embed the study of EM into mainstream scientific dialogues, publication and meetings. Such efforts would provide a wider variety of methods to be applied to the topic, it would increase the critical mass and number of disciplines involved, and it would provide a space for younger investigators to enter the field and build the theories and tools needed to probe deeper into the many questions that existing data on EM has produced.

David Hufford, PhD (Emeritus Professor of Humanities and Psychiatry, Pennsylvania State University, and Fellow, Samuelli Institute) summarized common and ubiquitous types of EM experiences in various cultures around the world. Except for modern Western cultures, these experiences have been routinely accepted as normal parts of human existence. The psychological effects of these experiences depend on how they are framed and contextualized. They can be extremely beneficial when positively framed but damaging when they are suppressed or negatively framed by a culture.

Jessica Utts, PhD discussed the conflicting priorities of scientific researchers, government agencies, private foundations and the media involved with generating and disseminating information about EM. She outlined the barriers to academics who might want to get involved in EM research, including the interdisciplinary nature of the research, the compartmentalized structure of universities, and the stigma attached to the research by vocal skeptics. She concluded by introducing strategies that would help overcome some of these barriers, including open discussions in invitational settings, such as the one taking place at this meeting.

Peter Sturrock, PhD (Emeritus Professor of Applied Physics, Stanford University) described the recommendation he brought to the National Science Foundation (NSF) to establish an Office for Science in the Public Interest. This office would solicit ideas directly from the public on areas they would like to see investigated by science. These ideas would be sorted and prioritized by a panel of scientists and citizens and requests for proposals would be issued to the scientific community for research addressing those questions. The proposals would be managed using the normal review, selection and oversight processes of all science at the NSF. He proposed that one percent of the NSF budget be dedicated to such questions. This process would allow for taxpayer money to be used in a way that more directly addressed areas of interest to those who pay the public bills for scientific research.

Jonah Wittkamper (Director, NEXUS Global Youth Summit) proposed that young and emerging philanthropists and entrepreneurs be brought into the discussion on EM. He believes that these young people would be more open to exploration of this area and could bring fresh ideas, energy and funding to the next phase of its development. By linking up with more experienced scientists and experts the combination could move the field forward more quickly and build on the long history of knowledge and research in this area.

Wayne Jonas, MD built on these ideas with a summary list of possible ways to further the research and utility of the science on EM that emerged during the meeting. As an example, he described the impact of his work in establishing the Office of Alternative Medicine (OAM) at the US government's National Institutes of Health (NIH) more than 20 years before. Research both supported and stimulated by that office and the subsequent creation of the NIH's National Center for Complementary and Alternative Medicine (NCCAM) has taken a field that was ignored or dismissed by mainstream medicine and has begun to sort out what works and does not work in complementary and alternative medicine (CAM). CAM, like EM, is an area with widespread public interest but little investment by scientists or attention by the government or the "serious" media. Thus, the establishment of OAM played an important role in bringing a frontier area out of the shadows and furthering our understanding and utility of CAM. Today, many CAM therapies are being adopted by large organizations in health care, the military and the Veterans Health Administration.

Dr. Jonas proposed that \$3 million be initially appropriated to create an "Office for Mind-Oriented Research and Experience (MORE)" at the National Science Foundation. This office would become part of the currently proposed \$200 million BRAIN Initiative established by the Bush administration and further supported by the Obama administration. The BRAIN Initiative is coordinating research between NSF, Defense Advanced Research Projects Agency (DARPA) and NIH, and it could be the ideal location for MORE. Inserting a small effort on EM research into this effort would help ground and reframe this topic from the fringe into a legitimate area of scientific investigation.

Jonathan Peck moderated the meeting by coordinating small group discussions to address the most compelling challenges and opportunities in the area of EM research. These small groups then integrated their recommendations back into the larger group and engaged in dialogue with the panel members and each other.

Discussion: Next Steps

Key strategies recommended for future steps included the following:

1. Re-examination of the language used in the field of EM research. Examples of language proposed included: human potential research; scientific exploration of spiritual experience; the

neurobiology of mind-brain interactions; post-materialist science; quantum cognition; and implicit perception.

2. Discussion on the value of private versus public investment in these areas as well as linking with interests and activities in Asia, where concepts about EM are more readily accepted, even among scientists. Possible strategies included:
 - a. **Private:** Beginning a private effort by those in the information technology fields, inclusion of young entrepreneurs, and an outreach to Asia for an East-West dialogue on collaboration in EM research.
 - b. **Public:** Establishment of a small office within the National Science Foundation to explore EM research and its relationship to the brain, as described above. An office for Science in the Public Interest was also proposed similar to an effort on “patient-centered medicine” in health care.

A variety of strategies were discussed, including:

1. Establishing a government office program within NSF (as described above).
2. Development of defense applications, such as an alert system for explosive devices.
3. Issuing an EM “X-prize,” conducted with credible support, prestige, and qualified, fair judges.
4. Collecting EM Big Data via a public web or smart phone experiments.
5. Creating an interfaith network focusing on science, religion, and technology related to EM phenomena.
6. Supporting development of tools and techniques for stimulating novel technologies.

Regardless of the strategies that are pursued, the group was clear that a concerted effort is justified into initiating a serious exploration of the role of mind in the physical world.

John Ives (Director of Brain, Mind and Healing Research at Samuelli Institute) and his team organized and executed the logistics of the conference and introduced the process and team members. The working group included John Ives, Wayne Jonas, Julia Mossbridge, Jessica Utts, Dean Radin, Jonathan Peck, Meredith Sprengel and Rachel Draper. Because of a large snowstorm in the Eastern U.S., a number of people who were originally scheduled to attend the workshop could not. A few were able to attend remotely over the Internet. The meeting was moderated by **Jonathan Peck** from the Institute for Alternative Futures.

Partial Attendee List

Attendee	Affiliation
Nick Alexopoulos	Broadcom
Peter Bancel	Institute Métapsychique International
Tiffany Barsotti	HEAL and THRIVE
Daryl Bem	Cornell University
Jeffrey Bland	Personalized Lifestyle Medicine Institute
Jim Carpenter	University of North Carolina School of Medicine
Malcolm Dean	Fetzer Institute
Scott Demary	Alliant International University
Larry Dossey	Larry Dossey, MD, Reinventing Medicine
Rachel Draper	Samueli Institute
Elvia Faggin	Federico and Elvia Faggin Foundation
Federico Faggin	Federico and Elvia Faggin Foundation
James Fallon	University of California, Irvine
Michael Franklin	University of California, Santa Barbara
Donald Hoffman	University of California, Irvine
David Hufford	Samueli Institute & Pennsylvania State University
John Ives	Samueli Institute
Shamini Jain	Samueli Institute
Wayne Jonas	Samueli Institute
Menas Kafatos	Chapman University
Subhash Kak	Oklahoma State University
Jitendra Kavathekar	Institute of Noetic Sciences
Paul Mills	University of California, San Diego
Julia Mossbridge	Northwestern University
Jonathan Peck	Institute for Alternative Futures
Dean Radin	Institute of Noetic Sciences
Henry Samueli	Broadcom & Samueli Foundation
Richard Satava	University of Washington Medical Center
Marilyn Schlitz	Worldview Enterprises
Meredith Sprengel	Samueli Institute
Theodore St. John	Naval Medical Center, San Diego
Peter Sturrock	Stanford University
Lisa Anne Thompson Taylor	Taylor Strategic Partnerships
Neil Theise	Beth Israel Medical Center
Jessica Utts	University of California, Irvine
Cassandra Vieten	Institute of Noetic Sciences
Paul Werbos	National Science Foundation
Jonah Wittkamper	Nexus Network
Susan Yang	Chapman University