

MIND & LIFE
INSTITUTE

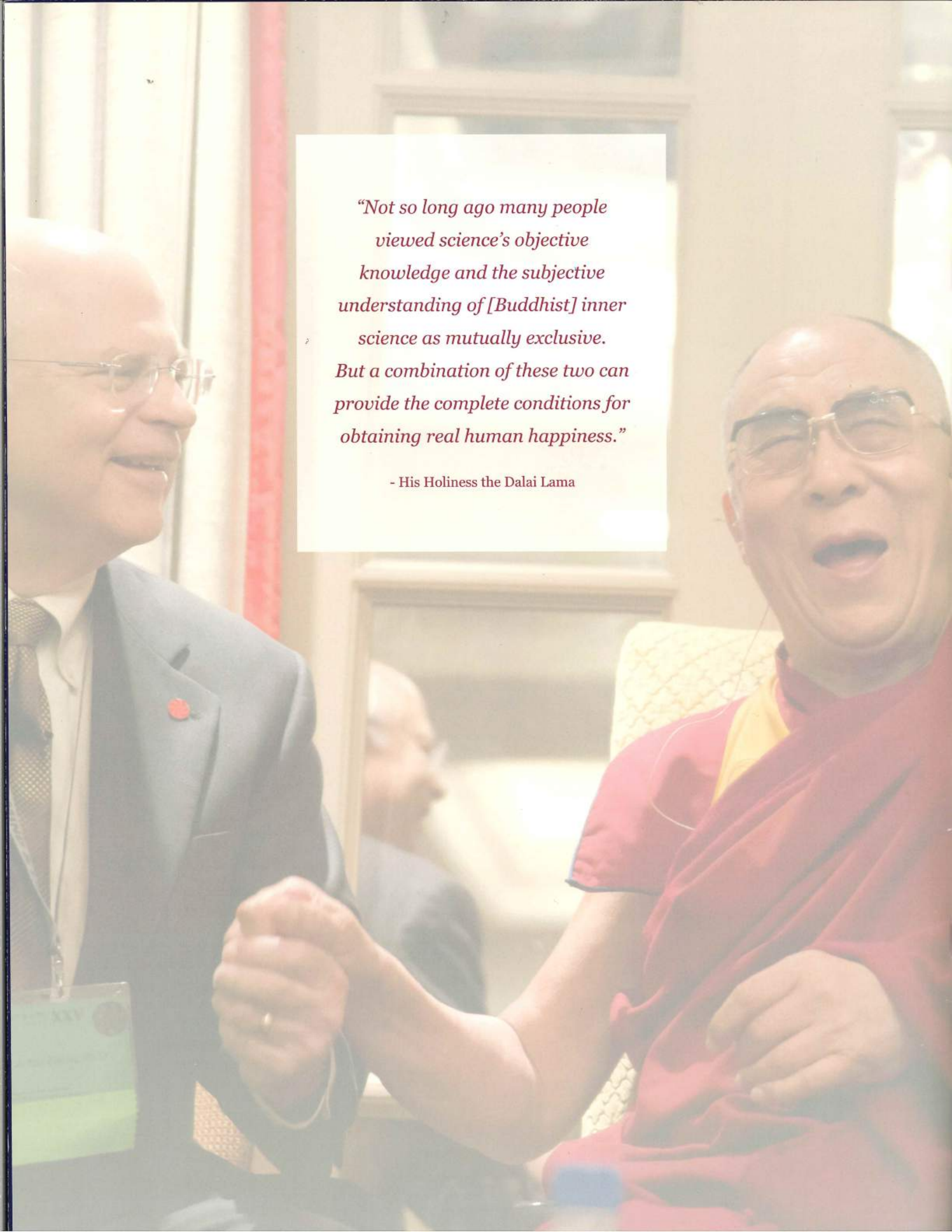
MIND AND LIFE XXVI:
MIND, BRAIN AND MATTER



CRITICAL CONVERSATIONS BETWEEN
BUDDHIST THOUGHT AND SCIENCE

JANUARY 17–22, 2013

DREPUNG MONASTERY
MUNDGOD, KARNATAKA, INDIA



*“Not so long ago many people
viewed science’s objective
knowledge and the subjective
understanding of [Buddhist] inner
science as mutually exclusive.
But a combination of these two can
provide the complete conditions for
obtaining real human happiness.”*

- His Holiness the Dalai Lama

INTRODUCTION

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DREPUNG MONASTERY
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Since 1987 the Mind & Life Institute has organized annual dialogues between His Holiness the Dalai Lama and leading scientists and philosophers. The purpose of these meetings has been to creatively but critically investigate themes of mutual interest concerning the nature of reality, consciousness, the implications of recent developments in neuroscience, as well as to tackle the ethical issues raised by powerful technical innovations made possible by scientific discoveries. In these dialogues, two great investigative traditions - modern science and Buddhist philosophy - come together at the private residence of His Holiness in Dharamsala, India. Leading scientists inquire together with His Holiness and a select group of monastic scholars in the expectation that such cross-cultural dialogue can lead to mutual enrichment, and even to new insights and lines of research. Indeed, several significant research initiatives have originated from these dialogues, including the study of contemplative attention and open awareness, compassion and altruism, neuroplasticity and meditation, cultivating emotional balance, and even new research ideas in the experimental foundations of quantum physics. One can say that from these dialogues the new field of contemplative neuroscience was born.

In 2003 the Mind & Life Institute organized its first public conference entitled "Investigating the Mind: Attention, Emotion and Mental Imagery," which took place at the Massachusetts Institute of Technology in Boston. The impact of that meeting and subsequent large public meetings with His Holiness on the clinical and educational applications of mindfulness has transformed the Mind & Life Institute's mission and scope of work. While continuing our private dialogues, we simultaneously seek to play an increasingly public role in catalyzing contemplative research around the globe through our growing community of scientists, scholars and contemplative practitioners, now approximately 20,000 in number. To this end, Mind and Life holds a Summer Research Institute every year for 150 young scientists and scholars, and has made over 100 Varela research awards in support of research in the

contemplative sciences. These modest grants have resulted in over 200 scholarly and scientific publications and over \$30 million dollars in follow-on funding.

It is against this background that we hold the present meeting. For the first time, the Mind & Life Institute is focused specifically on the task of bringing the Mind and Life dialogue experience to the larger Tibetan Buddhist monastic academic community. Over the last several years, largely through the work of the Emory-Tibet Science Initiative, Science for Monks, and Science Meets Dharma, science instruction has been given to a small group of monastic scholars. Very recently, the decision was made to require science education for Geshe degrees at Tibetan monastic universities, and to facilitate all monastic students being introduced to modern science and the profound philosophical and ethical issues raised by science and technology. In recognition of this fact, this conference is taking place at one of the historically important Tibetan academic institutions, Drepung Monastery in Mundgod, India.

This landmark six-day event, convened at the specific request of His Holiness the Dalai Lama, will bring together 20 of the world's foremost scientists and philosophers with His Holiness and other senior Tibetan scholars. Several thousand monks and nuns from numerous Tibetan monastic centers of learning will be in attendance. In addition to critically engaging in important questions of mutual interest and challenge such as the fundamental nature of our physical world, the problem of consciousness, the nature and workings of our mind, and the interface of contemplative practice and scientific research, this conference also aims to offer an educational forum, whereby the monastic students can learn about the historical development of science, and how science has come to shape the way we understand our world.

We are excited to host this ground-breaking event and are conscious of its significance. It is our highest wish that the discussions and insights that emerge will be of benefit for our world and all beings.

PRESENTERS

Tenzin Gyatso
His Holiness the XIVth Dalai Lama

Michel Bitbol, PhD
Directeur de Recherche
Centre National de la Recherche Scientifique

Khen Rinpoche Jangchup Choeden
Abbott
Gaden Shartse Monastery

Richard Davidson, PhD
Founder and Chair
Center for Investigating Healthy Minds
University of Wisconsin-Madison

Sona Dimidjian, PhD
Associate Professor
Department of Psychology and Neuroscience
University of Colorado at Boulder

James R. Doty, MD
Director
Center for the Study of Compassion and Altruism
Research and Education
Stanford University

John Durant, PhD
Adjunct Professor
Science, Technology & Society Program
Massachusetts Institute of Technology

Anne Harrington, PhD
Professor
Department of the History of Science
Harvard University

Wendy Hasenkamp, PhD
Program and Research Director
Mind & Life Institute

Thupten Jinpa, PhD
Adjunct Professor
McGill University
Chairman
Mind & Life Institute

Bryce Johnson, PhD
Director
Science for Monks
Staff Scientist
Exploratorium

Geshe Lhakdor
Director
Library of Tibetan Works and Archives

Rajesh Kasturirangan, PhD
Associate Professor
National Institute of Advanced Studies, Bangalore

Christof Koch, PhD
Chief Scientific Officer
Allen Institute for Brain Science

Geshe Dadul Namgyal
Member and Translator/Interpreter
Emory-Tibet Science Initiative
Emory University

Lobsang Tenzin Negi, PhD
Senior Lecturer
Emory University

Vijayalakshmi Ravindranath, PhD
Professor and Chair
Centre for Neuroscience
at the Indian Institute of Science

Matthieu Ricard, PhD
Buddhist Monk
Shechen Monastery

Geshe Ngawang Samten
Vice Chancellor
Central University of Tibetan Studies

Tania Singer, PhD
Director
Department of Social Neuroscience
Max Planck Institute for Human Cognitive
and Brain Sciences

Aaron Stern
Founder and President
The Academy for the Love of Learning

Diana Chapman Walsh, PhD
President Emerita
Wellesley College
Governing Board Member
The Broad Institute of MIT & Harvard

Carol Worthman, PhD
Professor
Department of Anthropology
Emory-Tibet Science Initiative
Emory University

Arthur Zajonc, PhD
President
Mind & Life Institute

PROGRAM OVERVIEW

Each day of the meeting will be divided into several parts. The mornings will feature a dialogue between His Holiness and scientists regarding a field of study that has rich intersections with Buddhist thought and practice. The afternoon will be more pedagogical in character, allowing scientists to engage directly with the monastic audience and delve deeper into the methods and findings of Western science and philosophy. Following these presentations, there will be a response from the Buddhist perspective on the theme of the day. The final part of each afternoon will consist of a question and answer session and general discussion between the monastics and the scientists. Evenings will be reserved for special presentations and hands-on scientific demonstrations.

Topics to be addressed over the course of the week include the historical sweep of science and the revolutions in our understanding of our physical universe and the nature of the mind. Scientific and the classical Buddhist philosophical methods of inquiry will be studied, as well as selected topics in quantum physics, neuroscience, and Buddhist and contemporary Western views of consciousness. In addition, the applications of contemplative practices in clinical and educational settings will be explored.



"The great benefit of science is that it can contribute tremendously to the alleviation of suffering at the physical level, but it is only through the cultivation of the qualities of the human heart and the transformation of our attitudes that we can begin to address and overcome our mental suffering... We need both, since the alleviation of suffering must take place at both the physical and the psychological levels."

- His Holiness the Dalai Lama
(*The Universe in a Single Atom: The Convergence of Science and Spirituality*, 2005)

PROGRAM

DAY 1: INTRODUCTION

Thursday, January 17

9:00 – 10:00

WELCOME

*Arthur Zajonc, PhD
Geshe Lhakdor
Anne Harrington, PhD*

OPENING REMARKS

Since he was a youth, His Holiness the 14th Dalai Lama has had a personal interest in modern science and technology. Over many years, this interest has led to the conviction that recent developments in the areas of modern physics, neuroscience and consciousness studies are of genuine importance for Buddhist thought. The Dalai Lama will begin the week-long meeting between the two great traditions of science and Buddhism by describing his perspective on why the dialogue between them is of real significance both for monastic scholars and for scientists.

His Holiness the Dalai Lama

10:00 – 11:30
SESSION 1

WHY DIALOGUE? BUDDHIST AND SCIENTIFIC PERSPECTIVES

For many years, physicist Arthur Zajonc and neuroscientist Richard Davidson have worked with the Dalai Lama at the intersection of contemporary science and Buddhist thought. They will offer their views on the power of this dialogue, and its significance for themselves and their work. This will lead to larger questions of wider importance. Why are Western scientists interested in a dialogue with Buddhism or the contemplative traditions more generally? What are the areas of science where this dialogue has been felt to be most fruitful, and why? What can Buddhist scholars and monastics potentially contribute to the work of Western science, why should they be motivated to do so, and what has been accomplished so far? In addition, Zajonc and Davidson will explore some elementary perceptual puzzles that demonstrate the methods, insights, and also the limits, of physics, neuroscience and consciousness studies. In particular, what can one learn about the significance of context and relationship for observation and cognition generally? Where does physics leave off and the science of the mind begin? What is the difference between them, and how are they related?

*His Holiness the Dalai Lama
Arthur Zajonc, PhD
Richard Davidson, PhD
Moderator: Anne Harrington, PhD
Interpreter: Thupten Jinpa, PhD*

11:30 – 13:00

LUNCH

13:00 – 15:30
SESSION 2

THE SWEEP OF SCIENCE: MIND, BRAIN AND MATTER

Thupten Jinpa will begin the afternoon with a presentation establishing conceptual links between the two investigative traditions of Buddhist thought and contemporary science, drawing especially on key aspects of classical Buddhist epistemology. Questions in the philosophy of science, such as the relationship between scientific claims and truth, scientific method and its legitimate scope, and the central role of observation, hypothesis and experiment verification in science will be addressed and contrasted with relevant notions in classical Buddhist philosophical inquiry. Physicist Arthur Zajonc, neuroscientist Wendy Hasenkamp and historian Anne Harrington will follow up the questions and insights offered by Thupten Jinpa, by providing an orientation to the specific areas of science that will be the focus of the dialogues for the week: physics, neuroscience, and consciousness studies. While each of these fields of science shares methods and epistemological

PROGRAM

DAY I: INTRODUCTION continued

assumptions with the others, each also has its own story, its own preferred methods, and its own animating questions. Together, Zajonc, Hasenkamp and Harrington will aim to tell these background stories. How does physics think about and investigate the nature of material reality? How do neuroscientists study the brain, and why do they think it is the organ of mind? Where does consciousness fit into the world picture of Western science?

Thupten Jinpa, PhD (in Tibetan)

Arthur Zajonc, PhD

Anne Harrington, PhD

Wendy Hasenkamp, PhD

Moderator: Diana Chapman Walsh, PhD

15:30- 16:00

BREAK (TEA)

16:00 – 17:30

SESSION 3

DISCUSSION

This session provides a time for the monastic audience to ask questions of the presenters, fostering an open dialogue about the general principles outlined in the day's presentations.

Moderator: Diana Chapman Walsh, PhD

17:30 – 19:30

DINNER

19:30 – 21:00

EVENING
SESSIONS

MONASTIC SCIENCE EDUCATION PROGRAMS

His Holiness has long cultivated a vision of science education for monastics. The work of several groups over the last decade has aimed to produce a strong substantive foundation for implementing this vision. The Library of Tibetan Works and Archives (LWTA) has played leading roles in developing the resources and conditions that form the basis from which to launch science education in the monastic curriculum in the near future. This session will include presentations from two groups that have collaborated with the LTWA in this effort, Science for Monks and the Emory-Tibet Science Initiative. Working independently, each has brought distinctive and complementary approaches to the monastic science education effort with the aim of building both tailored teaching/study resources and science teaching capacity within the Tibetan Buddhist community. Presentations provide an overview of their progress to date, with Bryce Johnson representing Science for Monks and Carol Worthman representing the Emory-Tibet Science Initiative. Each program will be discussed in turn, by first reviewing its overarching goals, development, and curriculum, then highlighting insights about science and science education for monastics, and finally reviewing key intersections between science and Buddhist thought that have emerged through this work.

Bryce Johnson, PhD

Carol Worthman, PhD

EXHIBITION

(description on page 15)

DEMONSTRATION

(description on page 15)

PROGRAM

DAY 2: PHYSICS

Friday, January 18

9:00 – 11:30
SESSION 1

QUANTUM PHYSICS AND REALITY

The traditional view of reality seeks to identify the intrinsic or “real” properties of things, such as their size, location, velocity, and mass. Physics has increasingly come to appreciate the futility of such an undertaking, and instead realizes that properties only exist relative to measuring instruments. This deprives properties of any absolute status. Modern theories of relativity and quantum mechanics underscore the necessity of replacing all absolute properties with relational “observables.” For example, lengths are shortened in the directions of motion according to Einstein’s relativity theory. The implications of this and similar facts for our notion of reality are profound. For example, objects do not have an intrinsic size, velocity or mass. Even the number of particles in a box can depend on its state of relative motion. In light of these discoveries of physics, we are called upon to set aside realistic, reductive views in favor of those that have a more phenomenological character. Arthur Zajonc will describe particular experiments that contradict the search for intrinsic properties and realistic theories, and Michel Bitbol will speak about the philosophical implications of such experiments and theories. These challenges from the new physics open up important themes for dialogue with Buddhist philosophy concerning the ultimate nature of reality and its relation to human experience.

His Holiness the Dalai Lama

Arthur Zajonc, PhD

Michel Bitbol, PhD

Moderator: Anne Harrington, PhD

Interpreter: Thupten Jinpa, PhD

11:30 – 13:00

LUNCH

13:00 – 15:30
SESSION 2

QUANTUM PHYSICS AND ITS IMPLICATIONS

Quantum physics is grounded on a set of puzzling experiments that resist all efforts to understand them based on normal human experience and classical scientific theory. Arthur Zajonc will describe the key experimental foundations of quantum physics and identify the crucial non-classical aspects of each experiment. These experiments point to a “quantum holism” that demands we reconsider the possibility of a new kind of interconnectedness to reality. The very notion of localized objects with intrinsic properties is challenged by quantum experiments. All attempts at “picturing” the quantum world in terms of conventional concepts based on sense experience are seen to fail. The inherently probabilistic character of quantum physics raises other important questions concerning microscopic causality. Are all events, including the radioactive decay of a single nucleus, caused? Michel Bitbol will describe the philosophical implications of these experiments and the “paradoxes” of quantum physics for our view of reality. One important alternative to “interpretations” of quantum theories is to forego the desire to have a representation of the world at all. “No view” is a well-established tradition within certain schools of Buddhist philosophy. Thupten Jinpa, as the Buddhist respondent, will take up this and related issues in his response to the presentations.

Arthur Zajonc, PhD

Michel Bitbol, PhD

Thupten Jinpa, PhD

Moderator: Anne Harrington, PhD



PROGRAM

DAY 2: PHYSICS continued

15:30 – 16:00 BREAK (TEA)

16:00 – 17:30
SESSION 3

DISCUSSION

This session provides a time for the monastic audience to ask questions of the presenters, fostering an open dialogue about the general principles outlined in the day's presentations.

Moderator: *Anne Harrington, PhD*



17:30 – 19:30 DINNER

19:30 – 21:00
EVENING
SESSIONS

NEUROSCIENCE IN INDIA: A RICH OPPORTUNITY

The human brain is the seat of intelligence, interpreter of senses, controller of movement and is responsible for all we embrace as civilization. Although the brain is one organ among many in the human body, its function has far-reaching impact from education to economic decisions. Brain research poses challenges unheard of in the history of science and hence is aptly referred to as the "last frontier in biology." During the latter part of the 20th century, the study of the brain moved from a peripheral position within both the biological and psychological sciences to become an interdisciplinary field called neuroscience. The study of the biological basis of brain function became incorporated into a common framework with cellular and molecular biology on one side and psychology on the other. In order to make real progress in brain research, and to export laboratory findings to bedside therapies, one has to broaden the traditional scientific approach to accommodate interdisciplinary methods. Neuroscientist Vijayalakshmi Ravindranath shall discuss the recent growth of neuroscience research in India, emphasizing the unique opportunity that exists to make use of traditional knowledge systems in the endeavor to understand brain function in health and disease.

Vijayalakshmi Ravindranath, PhD

EXHIBITION

(description on page 15)

DEMONSTRATION

(description on page 15)

PROGRAM

DAY 3: NEUROSCIENCE

Saturday, January 19

9:00 – 11:30
SESSION 1

CHANGING THE BRAIN

The ability of the brain to change through experience, a capacity known as neuroplasticity, allows for exciting possibilities of human development and transformation. This session will explore the implications of neuroplasticity in the areas of mental training, attention, emotion regulation and compassion. Richard Davidson will provide a broad overview of the impact of mental training in altering brain circuitry and behavior relevant to attention and emotion regulation. The effects of mindfulness and loving-kindness/compassion practices on cortical and limbic functions will be described, as well as new findings on alterations of brain circuitry during sleep and epigenetics. Tania Singer will introduce a model developed for a one-year compassion intervention program that consists of training in attention, interoceptive awareness, perspective taking and meta-cognition, loving-kindness, prosocial motivation and acceptance of difficult emotions. She will then provide empirical evidence for affective brain plasticity after a one-week training of empathy as compared to compassion and loving-kindness. Overall, research in contemplative neuroscience suggests that mental training produces highly specific and enduring effects on brain function and behavior. What are the limits of neuroplasticity, and what does this mean for human potential?

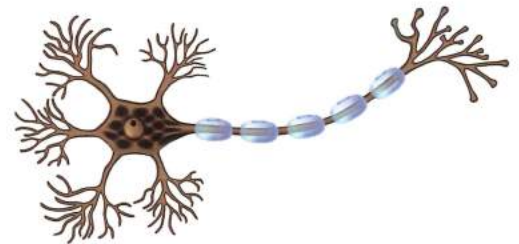
His Holiness the Dalai Lama

Richard Davidson, PhD

Tania Singer, PhD

Moderator: Arthur Zajonc, PhD

Interpreter: Thupten Jinpa, PhD



11:30 – 13:00

LUNCH

13:00 – 15:30
SESSION 2

EXPLORING NEUROPLASTICITY

This session will delve further into the brain circuits underlying emotion and social behavior, exploring how neuroscientists approach these topics. Richard Davidson will first introduce the field of affective neuroscience and focus on brain mechanisms of emotional learning and emotion regulation. He will discuss the involvement of these circuits in producing craving and attachment, and how contemplative training can impact these circuits while cultivating emotional balance. Tania Singer will complement this view by introducing the field of social neuroscience, focusing on the questions of how people relate to and understand each other. She will distinguish cognitive perspective taking from concepts of emotion contagion, empathy and compassion; the former represents a cognitive route to the understanding of others, the latter a motivational and affective one. Compassion is closely linked to a motivational system routed in affiliation and care, which in turn is associated with specific brain systems that help increase trust and reduce fear. Geshe Dadul Namgyal will offer remarks from the Buddhist perspective on issues relating to affective and social neuroscience findings.

Richard Davidson, PhD

Tania Singer, PhD

Geshe Dadul Namgyal

Moderator: Arthur Zajonc, PhD



15:30 – 16:00

BREAK (TEA)

PROGRAM

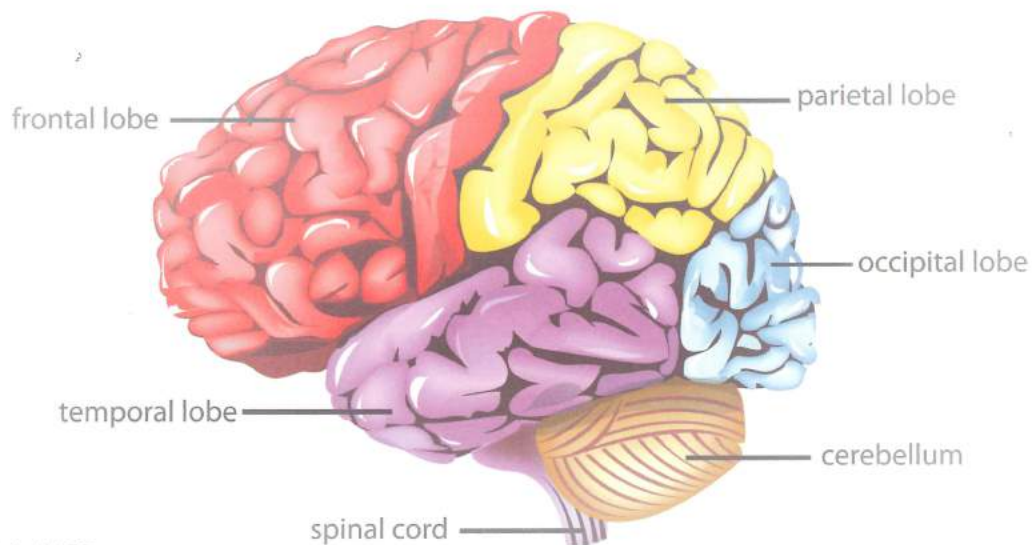
DAY 3: NEUROSCIENCE continued

16:00 – 17:30
SESSION 3

DISCUSSION

This session provides a time for the monastic audience to ask questions of the presenters, fostering an open dialogue about the general principles outlined in the day's presentations.

Moderator: *Arthur Zajonc, PhD*



17:30 – 19:30

DINNER

19:30 – 21:00
EVENING
SESSIONS

HISTORY OF THE EARTH: THE DISCOVERY OF DEEP TIME

More than two hundred years ago scientists in Europe discovered the existence of "deep time". By looking at the stars above their heads and at the rocks beneath their feet, scientists began to piece together an account of the history of the entire universe - galaxies, stars, planets, everything! It turned out that the universe itself was not only unimaginably large but also unimaginably old; and that life on earth had existed for literally millions of years before the first humans ever made their first appearance. We shall reconstruct some of the steps by which European scientists discovered deep time, asking: how did scientists work out what must have happened long before anyone was around to observe it? And what sort of picture of the past did they paint?

John Durant, PhD

EXHIBITION

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DEMONSTRATION

(description on page 15)

PROGRAM

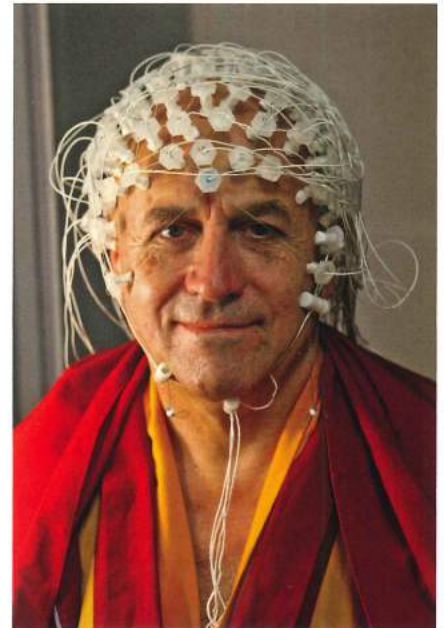
DAY 4: CONSCIOUSNESS

Sunday, January 20

9:00 – 11:30
SESSION 1

CONSCIOUSNESS IN WESTERN SCIENCE AND PHILOSOPHY

The topic of consciousness is one that humans have wrestled with for centuries. How is consciousness related to material substrates, such as the brain and body? Christof Koch will argue that the interactions of neuronal and sub-neuronal processes give rise not only to animal and human behavior but also to conscious experience. He will discuss information theory, which assumes that any physical system that is sufficiently rich in information will have conscious experiences, and the content of those experiences depends on the exact nature of the causal interactions of the underlying components (e.g., neurons). Such theories can be empirically tested in animals, healthy people and brain-injured patients. Matthieu Ricard will offer a Buddhist perspective, exploring consciousness as a primary phenomenon linked to matter, but also examining evidence that consciousness may not be contingent on matter. He will also describe how Buddhism transcends dualist views by suggesting that both material and non-material entities are devoid of intrinsic reality.



His Holiness the Dalai Lama

Christof Koch, PhD

Matthieu Ricard, PhD

Moderator: Arthur Zajonc, PhD

Interpreter: Thupten Jinpa, PhD

11:30 – 13:00

LUNCH

13:00 – 15:30
SESSION 2

APPROACHES TO CONSCIOUSNESS

Consciousness can be studied from many positions within both science and philosophy. This session will explore research on consciousness in the brain, theoretical models of consciousness in cognitive science, as well as neurophenomenological investigations and Buddhist views on consciousness. Christof Koch will introduce a brain-focused approach to consciousness, and will outline the differences between states of consciousness (awake, deep sleep, coma), what we know about the neural basis of consciousness in human and non-human animals, and how these are studied in the laboratory and the clinic. Rajesh Kasturirangan will discuss a theoretical cognitive model of consciousness by introducing the “self as organizer” presupposition as a bridging framework between the various Indian philosophical traditions and the mind-brain sciences. Michel Bitbol will discuss consciousness from a phenomenological standpoint, challenging the view that conscious experience derives from a material basis. Finally, Matthieu Ricard will argue that it is not logically reasonable for consciousness to arise from nothing; rather, causality dictates that consciousness must arise from consciousness itself.

Christof Koch, PhD

Rajesh Kasturirangan, PhD

Michel Bitbol, PhD

Matthieu Ricard, PhD

Moderator: Arthur Zajonc, PhD

PROGRAM

DAY 4: CONSCIOUSNESS continued

15:30 – 16:00 BREAK (TEA)

16:00 – 17:30
SESSION 3

DISCUSSION

This session provides a time for the monastic audience to ask questions of the presenters, fostering an open dialogue about the general principles outlined in the day's presentations.

Moderator: *Arthur Zajonc, PhD*

17:30 – 19:30 DINNER

19:30 – 21:00
EVENING
SESSIONS

THE HISTORY OF LIFE: WHERE DID WE COME FROM?

The discovery of deep time after the year 1800 led to some obvious questions, and none more obvious or more pressing than this: where did we humans come from? Naturalists documenting the variety of life on earth in the first half of the 19th century pieced together the first convincing answer to this question: all of life on earth is a single, gigantic family. Like all other living things on the earth, we humans are a "twig" on an endlessly growing and branching tree of life, related to everything else by perfectly ordinary, but rather slow, processes of descent, with modification, from generation to generation. John Durant will introduce and explore this idea, more commonly known as the theory of evolution, which still lies at the heart of modern scientific understanding of the origins of all living things on earth.

John Durant, PhD

EXHIBITION

(description on page 15)

DEMONSTRATION

(description on page 15)



DAY 5: APPLICATIONS OF CONTEMPLATIVE PRACTICE

Monday, January 21

9:00 – 11:30
SESSION 1

CONTEMPLATIVE PRACTICE IN THE WORLD

As we have seen, scientists are actively studying contemplative practices to understand how they can affect the brain and body. However, these practices are also being used in diverse applied contexts to increase well-being, most commonly in health care and educational settings. Sona Dimidjian has studied both traditional and contemplative based therapies for promoting wellness and alleviating problems such as depression throughout the United States and in India. Her current work focuses on the use of Mindfulness Based Cognitive Therapy to help women prevent depression during the transition to parenthood. Dimidjian will discuss the efficacy of contemplative interventions in clinical contexts, theories and data about how such interventions work, and recent efforts to extend their reach to new settings and populations. Outside the clinic, contemplative exercise as mental training is being increasingly appreciated and applied in classrooms from kindergarten through universities and professional schools. Arthur Zajonc will discuss efforts at developing a “contemplative pedagogy,” as a means of cultivating attention, establishing emotional balance, and supporting deeper learning, creativity, as well as social and emotional learning in students. Zajonc will also describe Mind and Life’s new initiative on education and “secular ethics,” which was initiated in response to His Holiness’s strong desire to ground ethics in our shared humanity and not in religion or ideology. Finally, Geshe Ngawang Samten will reflect on the value of incorporating inner values, ethics of compassion and the understanding of interdependence in educational settings in India.

His Holiness the Dalai Lama

Sona Dimidjian, PhD

Arthur Zajonc, PhD

Geshe Ngawang Samten

Moderator: Diana Chapman Walsh, PhD

Interpreter: Thupten Jinpa, PhD



11:30 – 13:00

LUNCH

13:00 – 15:30
SESSION 2

PROMOTING HUMAN DEVELOPMENT

This session will present a number of training programs that have been developed using contemplative practices in educational and applied settings to encourage human flourishing at its highest level. Geshe Lobsang Negi will discuss his work developing and teaching Cognitively-Based Compassion Training (CBCT), a secular program that seeks to enhance prosocial skills, build character, and enhance basic human capacities for compassion, connection, and forgiveness. Geshe Lobsang will share positive findings from research on the effects of CBCT on biological, psychological and behavioral processes, and will discuss implications for such trainings on individual and social levels. Dr James Doty will speak on CCT (Compassion Cultivation Training), a standardized compassion training program developed at Stanford University, and research findings so far on its effects. Situating this initiative at Stanford University within its larger context, Jim will also speak on the implications of the current scientific research in compassion and

DAY 5: APPLICATIONS OF CONTEMPLATIVE PRACTICE continued

altruism for our understanding of human behavior, education and clinical therapeutic applications. Finally, Aaron Stern will present about his work with The Academy for the Love of Learning, which promotes a model for transformative learning that facilitates the emergence of a natural, shared, secular-based moral and ethical framework for learning and human engagement. Stern will be discussing the Academy's core program, Leading by Being, which is the fullest expression of this model.

Geshe Lobsang Tenzin Negi, PhD

James R. Doty, MD

Aaron Stern

Moderator: *Diana Chapman Walsh, PhD*

15:30 – 16:00

BREAK (TEA)

16:00 – 17:30

SESSION 3

DISCUSSION

This session provides a time for the monastic audience to ask questions of the presenters, fostering an open dialogue about the general principles outlined in the day's presentations.

Moderator: *Diana Chapman Walsh, PhD*

17:30 – 19:30

DINNER

19:30 – 21:00

EVENING
SESSIONS

FEMALE MONASTIC DISCUSSION

This session offers an opportunity for nuns to engage with leading female scientists and scholars and to discuss any questions that have arisen for them over the course of the week. In addition to talking about science and Buddhism, we will also be interested in listening to their experiences, and sharing experiences of our own, as female scientists.

Anne Harrington, PhD

Sona Dimidjian, PhD

Tania Singer, PhD

Wendy Hasenkamp, PhD

Carol Worthman, PhD

Diana Chapman Walsh, PhD

REFLECTIONS ON THE DIALOGUE

Remarks on the ongoing dialogue from the perspective of the abbot of Gaden Monastery, Khen Rinpoche Janchup Choeden. He will also discuss the Science Meets Dharma program, its history in the area of monastic science education, and its recent reformulation to continue promoting this work within Tibetan monasteries.

Khen Rinpoche Janchup Choeden

EXHIBITION

(description on page 15)

DEMONSTRATION

(description on page 15)

PROGRAM

DAY 6: FUTURE DIRECTIONS

Tuesday, January 22

9:00 – 9:45
SPECIAL
SESSION
(IN TIBETAN)

THE FUTURE OF MONASTIC SCIENCE EDUCATION

The Emory-Tibet Science Initiative (ETSI), a collaborative undertaking between Emory University and the Library of Tibetan Works and Archives (LTWA), was established in 2006 in order to fulfill a long-standing vision of His Holiness the Dalai Lama to bring modern science into the core curriculum of Tibetan monastic institutions. The first phase of this program involved the development of a five-year curriculum and supporting scientific textbooks and materials in three scientific disciplines: physics/astronomy, life sciences/biology, and neuroscience. The first cohort of monastics graduated in 2012, and the second cohort will graduate in 2013. The implementation phase of the program, which will begin in the summer of 2014, involves integrating this program into the curriculum of the major Tibetan monastic institutions. In August 2012, the Geluk International Foundation voted unanimously to integrate the ETSI science program into the Geluk University curriculum. Integrating a modern science curriculum into this centuries-old monastic education program is unprecedented and will require significant reorganization of the existing monastic curriculum for participating institutions. Geshe Lhakdor and Geshe Lobsang Negi, director of LTWA and ETSI, respectively, will outline the implementation phase of ETSI and discuss the steps that will be taken to carry out this groundbreaking educational initiative.

Geshe Lhakdor
Geshe Lobsang Tenzin Negi, PhD



9:45 – 10:30
SPECIAL
SESSION
(IN TIBETAN)

BUDDHISM, SCIENCE, AND MODERNITY

A final presentation from His Holiness addressing the monastic community about the future of the dialogue between science and Buddhism.

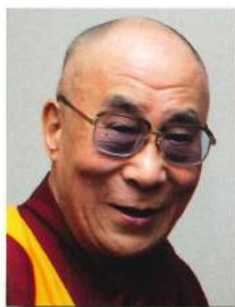
His Holiness the Dalai Lama

10:30

CLOSING REMARKS

Arthur Zajonc, PhD

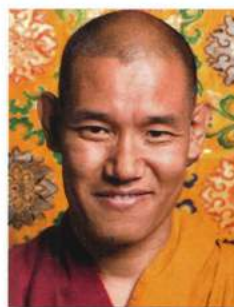
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Tenzin Gyatso

Tenzin Gyatso, the 14th Dalai Lama, is the leader of Tibetan Buddhism and a spiritual leader revered worldwide. He was born on July 6, 1935, in a small village called Taktser in northeastern Tibet. Born to a peasant family, he was recognized at the age of two, in accordance with Tibetan tradition, as the reincarnation of his predecessor, the 13th Dalai Lama. The Dalai Lamas are manifestations of the Buddha of Compassion, who choose to

reincarnate for the purpose of serving human beings. Winner of the Nobel Prize for Peace in 1989, he is universally respected as a spokesman for the compassionate and peaceful resolution of human conflict. He has traveled extensively, speaking on subjects including universal responsibility, love, compassion and kindness. Less well known is his intense personal interest in the sciences; he has said that if he were not a monk, he would have liked to be an engineer. As a youth in Lhasa it was he who was called on to fix broken machinery in the Potala Palace, be it a clock or a car. He has a vigorous interest in learning the newest developments in science, and brings to bear both a voice for the humanistic implications of the findings, and a high degree of intuitive methodological sophistication.



**Khen Rinpoche
Jangchup Choeden**

Khen Rinpoche Jangchup Choeden is the current Abbot of the Gaden Shartse Monastery. He was born in the North Indian State of Himachal Pradesh. In 1979, he joined the prestigious Gaden Shartse Monastery in Mundgod, Karnataka, India and embarked on an extensive course of Buddhist studies. Under the guidance of great masters he studied all five major fields of Buddhist studies. In 1997, he was awarded the prestigious degree of Geshe Lharampa. Subsequently, he

joined the famed Gyuto Tantric University and received intensive training in the field of Buddhist Tantra. He has travelled frequently to the United States, Canada, Singapore, Taiwan, Indonesia, Malaysia, Spain and Portugal to teach Dharma. For years he was chief-interpreter and personal secretary to his mentor, His Eminence Kyabje Lati Rinpoche. While administering the Gaden Shartse Buddhist Institute in Taipei he learned Mandarin at Normal University, in Taiwan. In the year 2009, His Holiness the Dalai Lama appointed him the Abbot of Gaden Shartse Monastery and since then he has been leading the monastery. He is also actively involved in Science meets Dharma projects.



Michel Bitbol

Michel Bitbol, PhD, is Directeur de Recherche at the Centre National de la Recherche Scientifique, in Paris, France. He is presently based at the Archives Husserl, a center of research in Phenomenology. He was educated at several universities in Paris, where he received successively his MD in 1980, his PhD in Physics in 1985, and his "Habilitation" in Philosophy in 1997. Michel worked as a research scientist in biophysics from 1978 to 1990. Thereafter, he

turned to the philosophy of physics. He published a book entitled *Schrödinger's Philosophy of Quantum Mechanics* (1996), and also worked on a neo-Kantian interpretation of quantum mechanics. In 1997 he was the recipient of an award from the Académie des sciences morales et politiques for his work in the philosophy of quantum mechanics. Later on, he focused on the hotly debated connections between the philosophy of quantum mechanics and the philosophy of mind. He published a book on that topic in 2000, and worked in close collaboration with Francisco Varela around this time. He is presently developing a conception of consciousness inspired from neurophenomenology, and an epistemology of first-person knowledge. Michel also learned Sanskrit to better understand basic texts by Nagarjuna and Candrakirti, and recently published a book *De l'intérieur du monde: pour une philosophie et une science des relations*, 2010 in which he draws a parallel between Buddhist interdependence and non-supervenient relations in quantum physics and the theory of knowledge.



Richard Davidson

Richard Davidson, PhD, is the Founder and Chair of the Center for Investigating Healthy Minds at the Waisman Center, and the Director of the Laboratory for Affective Neuroscience and the Waisman Laboratory for Brain Imaging and Behavior, both at the University of Wisconsin - Madison. He was educated at New York University and Harvard University, where he received his BA and PhD, respectively, in psychology. Over the

course of his research career he has focused on the relationship between brain and emotion. He is currently the William James Professor and Vilas Research Professor of Psychology and Psychiatry at the University of Wisconsin. He is co-author or editor of thirteen books, including *Visions of Compassion: Western Scientists and Tibetan Buddhists Examine Human Nature*, *The Handbook of Affective Science*, and *The Emotional Life of Your Brain*. Professor Davidson has published more than 300 chapters and journal articles, and is the recipient of numerous prestigious awards for his work, including the Research Scientist Award from the National Institute of Mental Health, the Distinguished Scientific Contribution Award from the American Psychological Association and election to the American Academy of Arts and Sciences. He has served on the Board of Directors for the Mind & Life Institute since 1992. In 2006, he was named one of the 100 most influential people in the world by Time Magazine and that same year he received the first Mani Bhaumik Award from UCLA for advances in the understanding of the brain and the conscious mind in healing.

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Sona Dimidjian

Sona Dimidjian, PhD, is Associate Professor in the Department of Psychology and Neuroscience at the University of Colorado at Boulder. Her research addresses the treatment and prevention of depression, including a particular focus on the mental health of women during pregnancy and postpartum. She is a leading expert in cognitive and behavioral approaches to treating and preventing depression and has a

longstanding interest in the clinical application of mindfulness and contemplative practices. Currently, she is conducting research on the use of meditative practices, including mindfulness-based cognitive therapy and compassion practice, with pregnant and postpartum women at high risk of depressive relapse and general populations. She also serves on the Mind and Life Research Advisory Council, and the planning committee for the International Symposia for Contemplative Studies.



James R. Doty

James R. Doty, MD, is the Director and Founder of the Center for Compassion and Altruism Research and Education (CCARE), the Founder of Project Respite and a Clinical Professor in the Department of Neurosurgery at Stanford University. He completed his undergraduate training at the University of California, Irvine and medical school at Tulane University School of Medicine in New Orleans, LA. In addition to being a

neurosurgeon, he is also an inventor, entrepreneur and philanthropist, having given support to a number of charitable organizations including Children as the Peacemakers, Global Healing and Family & Children Services. These charities support a variety of programs throughout the world including those for HIV/AIDS support, blood banks, medical care in third world countries and peace initiatives. Additionally, he has endowed chairs at major universities including Stanford University School of Medicine and his alma mater, Tulane University School of Medicine. As founder of Project Compassion, Dr. Doty works with both the Stanford Institute for Neuro-Innovation and Translational Neuroscience and a variety of scientists from a number of disciplines examining the neural bases for compassion and altruism. He is on the Board of Directors of a number of non-profit foundations including the University of Southern California Brain and Creativity Institute, the Dalai Lama Foundation and the Friends of New Orleans (FONO).



John Durant

John Durant, PhD, is Adjunct Professor in the Science, Technology & Society Program at MIT, and the MIT Museum Director. He received his BA in Natural Sciences from Queens' College, Cambridge in 1972 and earned a PhD in History and Philosophy of Science, also at Cambridge, in 1977. After more than a decade in University Continuing Education, in 1989 he was appointed Assistant Director and Head of Science Communication

at the Science Museum, London, and Professor of Public Understanding of Science at Imperial College, London. In 2000, he was appointed Chief Executive of At-Bristol, a new independent science centre in the West of England. He joined MIT in July 2005 as an Adjunct Professor in the STS Program and Director of the MIT Museum. His earlier research was in the history of evolutionary and behavioral biology, with special reference to debates about animal nature and human nature in the late-19th and 20th centuries. More recently, however, he has undertaken sociological research on the public dimensions of science and technology. He is especially interested in public perceptions of the life sciences and biotechnology, in the role of public consultation in science and technology policy-making, and in the role of informal media in facilitating public engagement with science and technology. He is the founder editor of the quarterly peer review journal, Public Understanding of Science, and the author and editor of numerous books, essay collections and scholarly articles in the history and the public understanding of science.

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Anne Harrington

Anne Harrington, PhD, is Professor and Acting Chair of the History of Science at Harvard University, specializing in the history of psychiatry, neuroscience, and the other mind and behavioral sciences. Professor Harrington received her PhD in the History of Science from Oxford University, and has held postdoctoral fellowships at the Wellcome Institute for the History of Medicine in London, and the University of Freiburg in Germany.

For six years, she co-directed Harvard's Mind, Brain, and Behavior Initiative. She also was a consultant for the MacArthur Foundation Research Network on Mind-Body Interactions. Currently she serves on the Board of the Mind and Life Institute. She is also a former founding editor of *Biosocieties*, a journal concerned with social science approaches to the life sciences. Professor Harrington is the author of three books: *Medicine, Mind and the Double Brain* (1987), *Reenchanted Science* (1997) and *The Cure Within: A History of Mind-Body Medicine* (2008). She has also published many articles and produced a range of edited collections including *The Placebo Effect* (1997), *Visions of Compassion* (2000), and *The Dalai Lama at MIT* (2006). She is currently working on a new history of psychiatry, *The Suffering Mind*, and developing a new project concerned with how culture shapes illness experiences. Other research interests include the history of scientific interests in the "inner world" of brain disorder; and the origins and larger significance of current visions of partnership between Buddhism and science.



Wendy Hasenkamp

Wendy Hasenkamp, PhD, is currently the Program and Research Director at the Mind & Life Institute, and chair of the Mind and Life Research Advisory Council. Wendy holds a PhD in Neuroscience from Emory University, where her graduate and early postdoctoral training centered around understanding the pathology of schizophrenia, utilizing techniques ranging from single-cell gene expression to psychophysiology, and from cognitive testing to neuroimaging. More recently,

growing out of her personal interest in contemplative practice, she used brain imaging to investigate the neural correlates of dynamic cognitive states that occur during shamatha-style meditation. In her time at Emory, Wendy was central in the development of the Emory Collaborative for Contemplative Studies, organizing an interdisciplinary seminar focused on exploring the application of contemplative practices in our modern society. She also has been deeply involved in developing neuroscience curriculum and teaching Tibetan monastics in India through the Emory-Tibet Science Initiative since 2009; she has taught summer sessions in Dharamsala for two years and is co-author and editor of several neuroscience textbooks developed through this program.



Thupten Jinpa

Thupten Jinpa, PhD, was educated in the classical Tibetan monastic system and received the highest academic degree of Geshe Lharampa. Jinpa also holds a BA in philosophy and a PhD in religious studies, both from the University of Cambridge, UK, where he also worked as a research fellow in Eastern Religions. Since 1985, he has been the principal translator to His Holiness the Dalai Lama, and has translated and edited many books by the Dalai Lama,

including the New York Times' bestseller *Ethics for the New Millennium*, *Universe in a Single Atom* and *Beyond Religion: Ethics for a Whole World*. Jinpa's own published works include, in addition to scholarly articles on various aspects of Tibetan culture, Buddhism and philosophy, both in English and in Tibetan, *Self, Reality and Reason in Tibetan Philosophy*, *Mind Training: The Great Collection*, *The Book of Kadam: The Core Texts*, as well as *The Essential Mind Training*. Jinpa is an adjunct professor at the Faculty of Religious Studies, McGill University, and a founding member of CCARE (Center for Compassion and Altruism Research and Education) at Stanford University, where he served as the main author of CCARE's Compassion Cultivation Training (CCT). He is the president of the Institute of Tibetan Classics, the General Series Editor of *The Library of Tibetan Classics* series, and currently the Chairman of Mind and Life Institute.



Bryce Johnson

Bryce Johnson, PhD, is the director of the Science for Monks project, and a staff scientist at the Exploratorium, a world-renowned science museum in San Francisco, California. He has been working continuously with the Library of Tibetan Works and Archives for 12 years. From 1999 to 2001 he lived in Dharamsala where he helped launch the Library's science education initiative. His formal education is in engineering, receiving a BS (1997)

and MS (1999) in mechanical engineering from the University of California, Santa Barbara. During this time he began a deep appreciation for philosophy and science. In 2007, he completed a PhD in environmental engineering from the University of California, Berkeley. In 2009 he completed a postdoctoral fellowship at Texas A&M University at the Laboratory for Oceanographic and Environmental Research. His academic research and continued interest focuses on issues related to water quality, emphasizing the connection between humans and their impact on natural and built environments. Since joining the Exploratorium in 2010, he has worked with scientists, artists, and engineers, to develop new exhibits, public programs, and professional development programs for teachers. Through the Science for Monks project, Bryce has led the implementation of over 15 intensive science workshops, providing in total over 70 weeks of hand-on science training. In 2008, he helped establish the Sager Science Leadership Institute

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that trains monks and nuns to be leaders of science education, to grow and sustain the enduring capacity of the monastic community for learning science and dialogue with scientists.



Geshe Lhakdor

Geshe Lhakdor is the Director of the Library of Tibetan Works and Archives in Dharamsala, India. He has served as His Holiness the Dalai Lama's religious assistant and translator for many years and represents His Holiness's vision and work at various national and international conferences and forums. Geshe Lhakdor studied Buddhist philosophy at the Institute of Buddhist Dialectics, where he received his Master of

Prajnaparamita, and in 1989 his Master of Madhyamika with distinction in both. In 1989 he also received his Master of Philosophy (MPhil) from the University of Delhi. From 1986-1989, Geshe Lhakdor served as a translator and research assistant in the Tibet House, Cultural Centre of His Holiness the Dalai Lama in New Delhi. In 1989 he joined the Office of His Holiness the Dalai Lama as his religious assistant and translator, and since then has accompanied him in this capacity to over thirty countries around the world. In 1995, he received his Geshe Degree from the Drepung Loseling Monastic University in South India. He has translated, co-translated and co-produced several books by His Holiness, including *The Way to Freedom*, *The Joy of Living and Dying in Peace*, and *Awakening the Mind and Lightening the Heart*, among others. Geshe Lhakdor is a trustee of the Foundation for Universal Responsibility, Director of the Central Archive of His Holiness, a member of the Advisory Board of the Institute of Tibetan Classics in Montreal, Canada, and Honorary Professor at the University of British Columbia, Canada.



Rajesh Kasturirangan

The Saha Institute of Nuclear Physics in Kolkata, The University of Technology in Compiegne France, IIT in Gandhinagar India, and MIT. He is an editorial columnist for *India Together* magazine and the author of numerous published articles and technical reports. He is particularly interested in understanding how organisms are embedded in the world, i.e., how they grasp regularities, extract energy and information, respond appropriately to environmental stimuli and further their well-being, and he brings a cross-disciplinary approach to these questions that combines Indian and Western philosophy, cognitive science, mathematical modeling and the study of several non-human species.

Rajesh Kasturirangan, PhD, is an Associate Professor at the National Institute of Advanced Studies in Bangalore, as well as the Anchor of the Cognition Programme. Rajesh holds two PhDs, one in Cognitive Science from MIT and another in Mathematics from the University of Wisconsin at Madison. From 2005 to 2006 he was a research scientist for the Department of Brain and Cognitive Science at MIT. He has given invited lectures at JNU in Delhi, The University of Hyderabad,



Christof Koch

became the Chief Scientific Officer at the Allen Institute for Brain Science in Seattle, Washington, where he leads Project MindScope, a ten year, large-scale, high through-put effort to understand the visual system of the mouse. His laboratory studies the biophysics of nerve cells, and the neuronal and computational basis of visual perception, attention, and consciousness and machine vision. He has authored more than three hundred and fifty scientific papers and journal articles, eight patents and five books. Together with his long-time collaborator, Francis Crick, Christof pioneered the scientific study of consciousness. His latest book, *Consciousness – Confessions of a Romantic Reductionist* deals with the philosophical, religious, scientific, technological and personal questions relating to his research into the physical basis of consciousness.

Christof Koch, PhD, was born in the American Midwest, and grew up in Holland, Germany, Canada, and Morocco. He studied physics and philosophy at the University of Tübingen in Germany and was awarded his PhD in Biophysics in 1982. After 4 years at MIT, he joined the California Institute of Technology, in Pasadena, California, where he is the Lois and Victor Troendle Professor of Cognitive and Behavioral Biology. In 2011, he

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**Geshe Dadul
Namgyal**

Geshe Dadul Namgyal began his Buddhist studies in 1977 at the Institute of Buddhist Dialectics, Dharamsala, and completed them at Drepung Loseling Monastic University, South India, earning the Geshe Lharampa Degree in 1992. He also holds a Master's degree in English Literature from Panjab University, Chandigarh, India. He represented his monastery on two year-long tours across the Americas. Later, he was Principal of Drepung Loseling School for five years. He then joined Central University of Tibetan Studies (CUTS), Sarnath, India, as Lecturer in the Department of Indian Buddhism for seven years. He has also served for several years as one of His Holiness the Dalai Lama's religious translators in English. During this period, he traveled extensively with His Holiness as an entourage member on visits both within India and abroad. Since early 2010, he has been serving as Senior Resident Teacher at Drepung Loseling Monastery in Atlanta, USA. He also serves in the team of translators for the Emory-Tibet Science Initiative, engaged in preparing a 6-year science curriculum in Tibetan to be used in Tibetan monasteries and nunneries. He has published a Tibetan translation of His Holiness the Dalai Lama's *Power of Compassion*, a language manual, *Learn English through Tibetan*, and a critical edition of Tsongkhapa's *Speech of Gold*, among others. His translation into Tibetan of Professor Jay Garfield's *Western Idealism and Its Critics* was published by CUTS under the title *nub phyogs pa'i sems gtso'i grub mtha' dang der rgol ba rnam ky'i lugs*, and formally released in December, 2010.



**Geshe Lobsang
Tenzin Negi**

Geshe Lobsang Tenzin Negi, PhD, is the founder and director of Drepung Loseling Monastery, Inc., in Atlanta, GA, and a Senior Lecturer in Emory University's Department of Religion. He also serves as director of the Emory-Tibet Partnership, a multi-dimensional initiative founded in 1998 to bring together the foremost contributions of the Western scholastic tradition and the Tibetan Buddhist sciences of mind and healing. In this capacity, he serves as co-director of both the Emory-Tibet Science Initiative and the Emory Collaborative for Contemplative Studies. He also developed Cognitively-Based Compassion Training, a compassion meditation program that is currently utilized in a number of research studies, including an NIH-funded study examining the efficacy of compassion meditation on the experience of depression. Geshe Lobsang, a former monk, was born in Kinnaur, a small Himalayan kingdom adjoining Tibet. He began his monastic training at The Institute of Buddhist Dialectics and continued his education at Drepung Loseling Monastery in South India, where he received his Geshe Lharampa degree, the highest academic degree granted in the Tibetan Buddhist tradition, in 1994. Geshe Lobsang completed

his PhD at Emory University in 1999; his interdisciplinary dissertation centered on traditional Buddhist and contemporary Western approaches to emotions and their impact on wellness.



**Vijayalakshmi
Ravindranath**

Vijayalakshmi Ravindranath, PhD, is Professor and Chair of the newly created Centre for Neuroscience at IISc, Bangalore. She was the founder Director of the National Brain Research Centre (NBRC) from 2000-2009 an autonomous institution of the Ministry of Science and Technology, Government of India and helped establish NBRC as a centre of excellence and apex coordination centre for brain research that co-ordinates and networks neuroscience research groups in the country. She has actively promoted neuroscience research and training in the country and helped establish several pan-Indian efforts in brain research. The unifying goal of her laboratory is to understand pathogenic mechanisms underlying neurodegenerative disorders, such as Parkinson's and Alzheimer's disease with a goal to discover disease-modifying therapies. She is an elected Fellow of all the three science academies in India, the Indian National Science Academy, Indian Academy of Sciences, and National Academy of Sciences, India. She is also a Fellow of the National Academy of Medical Sciences, India, Indian Academy of Neurosciences and Third World Academy of Sciences. She is a recipient of the prestigious S.S. Bhatnagar award (1996), Omprakash Bhasin Award (2001), the J.C. Bose National Fellowship (2006) and Padma Shri (2010).



Matthieu Ricard

Matthieu Ricard, PhD, is a Buddhist monk at Shechen Monastery in Kathmandu, Nepal. Born in France in 1946, he received a PhD in Cellular Genetics at the Institut Pasteur under Nobel Laureate Francois Jacob. As a hobby, he wrote *Animal Migrations* (Hill and Wang, 1969). He first traveled to the Himalayas in 1967 and has lived there since 1972, studying with Kanguyur Rinpoche and Dilgo Khyentse Rinpoche, two of the most eminent Tibetan teachers of our times. Since 1989, he served as French interpreter for His Holiness the Dalai Lama. He is the author of *The Monk and the Philosopher* (with his father, the French thinker Jean-Francois Revel), *The Quantum and the Lotus* (with the astrophysicist Trinh Xuan Thuan), *Happiness, A Guide to Developing Life's Most Important Skill and Why Meditate?* He has translated several books from Tibetan into English and French, including *The Life of Shabkar* and *The Heart of Compassion*.

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As a photographer, Matthieu has published several albums, including *The Spirit of Tibet*, *Buddhist Himalayas*, *Tibet*, *Motionless Journey* and *Bhutan*. He devotes all the of proceeds from his books and much of his time to one hundred and twenty humanitarian projects (schools, clinics, orphanages, elderly people's home and bridges) in Tibet, Nepal and India, through his charitable association *Karuna-shechen* and to the preservation of the Tibetan cultural heritage. Matthieu has been deeply involved in the work of the *Mind & Life Institute* for many years, and currently serves on the *Mind and Life Research Advisory Council*.



Geshe Ngawang Samten

Geshe Ngawang Samten is presently the Vice Chancellor of Central University of Tibetan Studies, Sarnath, Varanasi, and has been Professor of Indian Buddhist Philosophy at the University before assuming the office. He is educated both in the modern system as well as in the traditional Tibetan monastic system. He has important publications to his credit, as a definitive critical edition of *Ratnavali* with its commentary; Tibetan edition of *Abhidhammathasamgaho*; Sanskrit

and Tibetan versions of the *Pindikrita* and the *Pancakrama* of Nagarjuna; *Manjusri*, an illustrated monograph on Tibetan Buddhist scroll paintings, and co-authored *The Ocean of Reasoning*, (Oxford University Press, New York) an annotated English translation of the commentary on Nagarjuna's *Mulamadhyamaka Karika* by the Tibetan master-philosopher Tson-Kha-Pa. He has scores of papers in various learned anthologies published in India and abroad. He has been Visiting Professor in various Universities and colleges in USA and Australia. He has also been instrumental in promoting Buddhist Studies in India. He strongly advocates to make the education system instrumental in transforming the students through inculcation of value along with development of skills in various fields. He is on numerous bodies of Universities and other academic organizations within and outside India, and expert committees of the Ministries of Government of India. In 2009, he was decorated with *Padma Shri* (one of the country's highest civilian awards) by the President of India in recognition of his distinguished services in the fields of education and literature.



Tania Singer

Tania Singer, PhD, received her PhD in psychology from Freie Universität Berlin in 2000 and was a Postdoctoral Fellow at the Max Planck Institute for Human Development in Berlin until 2002. Afterwards, she conducted research on the neural foundations of empathy and fairness at the Wellcome Department of Imaging Neuroscience in London from 2002–2005 and at the Institute of

Cognitive Neuroscience in London from 2005–2006. In the same year, Tania took up the position of Assistant Professor of Social Neuroscience and Neuroeconomics at the University of Zurich in Switzerland, where she also became Co-Director of the Laboratory for Social and Neural Systems Research in 2007 and Inaugural Chair of Social Neuroscience and Neuroeconomics in 2008. Since 2010, she has been the Director of the Department of Social Neuroscience at the Max Planck Institute for Human Cognitive and Brain Sciences in Leipzig, Germany. Using a multi-method and interdisciplinary approach from areas such as neuroscience, developmental and social psychology, psychobiology, and economics, she investigates the foundations of human social behavior. More specifically, she is interested in the developmental, neural, and hormonal mechanisms underlying social cognition; social and moral emotions such as empathy, compassion, envy, revenge, and fairness; and emotion-regulation capacities and their role in social decision making. She co-organized the *Mind and Life XX Conference "Altruism and Compassion in Economic Systems"* in Zurich in 2010, and was recently elected as a *Mind and Life* board member and member of the *Mind and Life European Committee*.



Aaron Stern

Aaron Stern is a composer, teacher, internationally recognized consultant on learning, and the founder of the innovative educational institution, the Academy for the Love of Learning in Santa Fe, New Mexico. He conceived the Academy with famed musician Leonard Bernstein, and serves as its President. As educational leader of the Academy, Stern designed and directs the Academy's core curriculum and foundational

program, *Leading by Being*. He conducts consultancies and seminars throughout the United States and in Europe. The Academy for the Love of Learning was conceived in the middle 1980s and developed over the next decade. The organization was founded formally in 1998 as a non-profit "think and do tank". The intent of the Academy has been to develop and practice transformative learning methods that reanimate the love of learning in people of all ages while awakening a secular-based moral and ethical framework for human learning and engagement. During the early 1980s Stern served as Dean of the American Conservatory of Music in Chicago. It was there that he began to focus his attention on learning and educational processes, developing creative experiential curricula that won national acclaim. This early work laid the foundation for what is now the Academy for the Love of Learning.

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Diana Chapman Walsh

Diana Chapman Walsh, PhD, was the twelfth president of Wellesley College, from 1993 to 2007. Her tenure was marked by educational innovation, including a revision of the curriculum and expanded programs in global education, internships and service learning, and interdisciplinary teaching and learning. In 1998, Wellesley's Program in Religious and Spiritual Life helped catalyze a national movement by hosting "Education as Transformation," a gathering of more than 800

participants from more than 250 institutions. President Walsh evolved a distinctive style of self-aware leadership rooted in a network of resilient partnerships and anchored in the belief that trustworthy leadership starts from within. Currently, she chairs the inaugural board of the Broad Institute, and serves on the boards of the Kaiser Family Foundation, the Institute for Healthcare Improvement, and the Mind & Life Institute. She was a director of the State Street Corporation (1999-2007) and a trustee of Amherst College (1998-2010). A member of the American Academy of Arts and Sciences, she writes, speaks, and consults on higher education and leadership. Before assuming the Wellesley presidency, Dr. Walsh was professor and chair of Health and Social Behavior at the Harvard School of Public Health.



Carol Worthman

Carol Worthman, PhD, currently holds the Samuel Candler Dobbs Chair in the Department of Anthropology at Emory University, where she also directs the Laboratory for Comparative Human Biology. After taking a dual undergraduate degree in biology and botany at Pomona College, Professor Worthman earned her PhD in biological anthropology at Harvard University, having also studied endocrinology at UCSD and

neuroscience at MIT under Jack Geller and Richard Wurtman, respectively. She joined the nascent anthropology faculty at Emory University in 1986, and has helped to build its biocultural focus and establish its leadership position in the field. Professor Worthman takes a biocultural approach to pursuit of comparative interdisciplinary research on human development, reproductive ecology, and biocultural bases of differential mental and physical health. She has conducted cross-cultural ethnographic and biosocial research in twelve countries, including Kenya, Tibet, Nepal, Egypt, Japan, Papua New Guinea and South Africa, as well as in rural, urban, and semi-urban areas of the United States. For the past 20 years, she has collaborated with Jane Costello and Adrian Angold in the Great Smoky Mountains Study, a large, longitudinal, population-based developmental epidemiological project in western North Carolina. She also heads the Neuroscience

division of the Emory-Tibet Science Initiative, and has been developing and teaching scientific curriculum to monastic students in Dharamsala since 2006.



Arthur Zajonc

Arthur Zajonc, PhD, was professor of physics at Amherst College from 1978 to 2012, when he became President of the Mind & Life Institute. His research has included studies in electron-atom physics, parity violation in atoms, quantum optics, the experimental foundations of quantum physics, and the relationship between science, the humanities and the contemplative traditions. He has also written extensively on Goethe's science

work. He is author of the book: *Catching the Light*, co-author of *The Quantum Challenge*, and co-editor of *Goethe's Way of Science*. In 1997, he served as scientific coordinator for the Mind and Life dialogue published as *The New Physics and Cosmology: Dialogues with the Dalai Lama*. He organized the 2002 dialogue with the Dalai Lama, "The Nature of Matter, the Nature of Life," and acted as moderator at MIT for the "Investigating the Mind" Mind and Life dialogue in 2003, the proceedings of which were published under the title *The Dalai Lama at MIT*. While directing the Center for Contemplative Mind in Society, Arthur fostered the use of contemplative practice in college and university classrooms, and he continues to speak around the world on the importance of contemplative pedagogy. Out of this work and his long-standing meditative practice, Zajonc has most recently authored *Meditation as Contemplative Inquiry: When Knowing Becomes Love*. He has also been General Secretary of the Anthroposophical Society in America, a co-founder of the Kira Institute, president of the Lindisfarne Association, and a senior program director at the Fetzer Institute.

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SCIENCE MEETS DHARMA

In 1998, His Holiness the Dalai Lama asked the Tibet Institute Rikon for help in implementing a new idea: to provide monks and nuns in Tibetan exile monasteries in India with access to scientific education. This led to the foundation of the Tibet Institute Rikon's project Science meets Dharma. During the first project phase (2001-2011), science classes were implemented in eight monasteries in South India, and were well accepted. From 2012 onwards, this education program will be organized by the monasteries themselves. Science meets Dharma will support the monasteries by coaching local teachers, creating new syllabi and preparing of teaching material. In addition, the project is organizing annual study weeks in the two large monastic centers of Bylakuppe and Mundgod. The project management is in now the hands of a Tibetan project manager in India and a Swiss co-manager.

SCIENCE FOR MONKS

In partnership with the Library of Tibetan Works and Archives, the Science for Monks program introduces science into major Buddhist monastic centers of higher learning within the exiled community. Continuing the tradition established in the year 2000, annual 4-week workshops were held between 2001 to 2007 to continue introducing Western science to approximately 50 Tibetan monks from different monastic traditions. These workshops represent a historic pilot program, and mark the first formal teachings of science within the history of Tibetan Buddhism. A major outcome of these workshops has been a significantly increased interest in science education within the monastic institutions. In 2008, a group of 35 scholarly monks were selected from the Science for Monks program, to become both the first cohort of the Emory-Tibet Science Initiative and the first cohort of the Sager Science Leadership Institute. In 2010, the first cohort graduated from the Leadership Institute and in 2011, a second cohort started their training to teach science and start implementing science education programs and dialogue within their local monastic institutions. Through the ongoing support of the Sager Family, the Science for Monks program has brought over 40 Western scientists to India to implement workshops with Tibetan monastics in exile. Over the years, Western scientists have taught more than 250 monks and nuns about physics, quantum mechanics, cosmology, biology, neuroscience, and mathematics, all with a strong emphasis on scientific inquiry.

