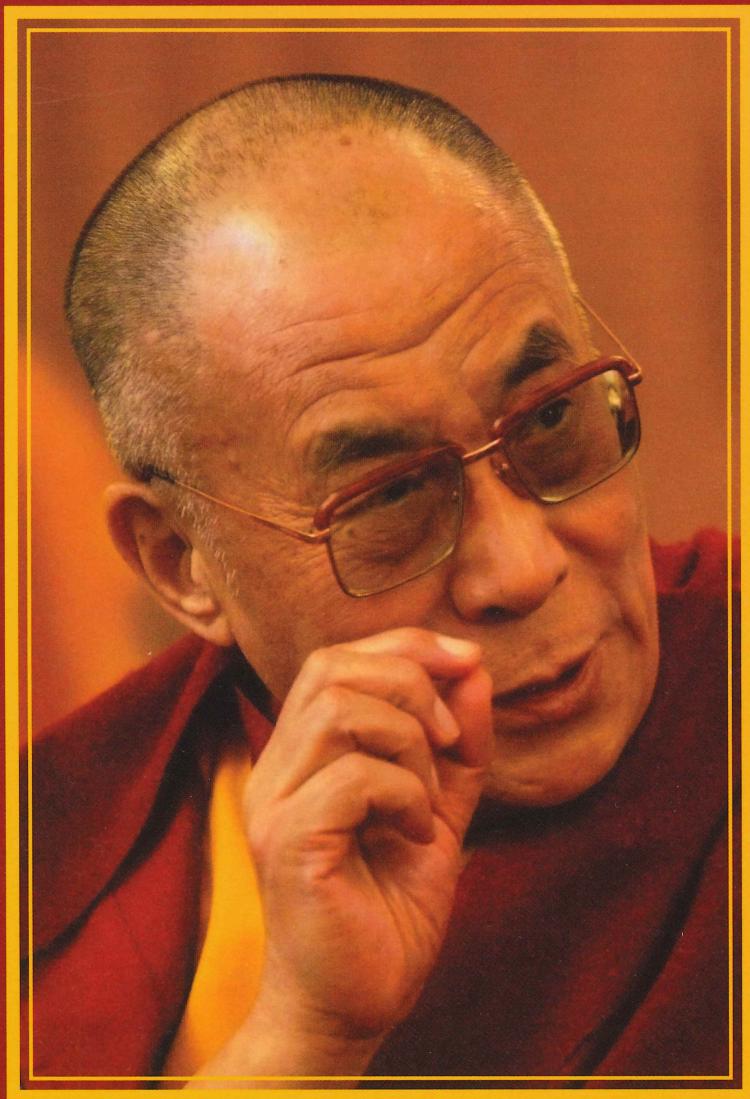


MIND & LIFE XIV



A DIALOGUE ON
THE
UNIVERSE IN A SINGLE
ATOM



APRIL 9-13, 2007
DHARAMSALA, INDIA

INTRODUCTION

The Mind and Life Dialogues and the Mind and Life Institute

The Mind and Life Dialogues were started in 1987 as an experiment to determine whether a rigorous scientific exchange could occur between modern scientists and the Dalai Lama. The experiment was successful and over the ensuing decade, the Mind and Life Institute [MLI] was formed and six additional intimate dialogues were organized among world-renowned scientists, the Dalai Lama and other contemplatives. The proceedings of each dialogue were published in a book to share the extraordinary event with a wider audience.

In 1998, the Dalai Lama and Mind and Life scientists recognized that it was critical to complement the Mind and Life dialogues with a collaborative scientific research program between contemplatives and scientists studying the effects of meditation and mental training on brain and behavior. This research was begun in 2001.

In 2003, MLI held its first public Mind and Life Dialogue entitled *Investigating the Mind: Exchanges between Buddhism and the Bio-Behavioral Sciences on How the Mind Works*. This meeting, co-sponsored by MIT and held on their campus, examined the desirability and efficacy of collaborative scientific research between contemplatives and scientists. The meeting resoundingly endorsed this research effort.

In 2004, recognizing the growing interest in the scientific community in collaborative research on meditation, MLI inaugurated the Mind and Life Summer Research Institute—an annual, week-long residential “science retreat” among basic and clinical scientists, contemplative scholars and practitioners, and philosophers to catalyze the creation of new fields of science: Contemplative Neuroscience and Contemplative Clinical Science.

In 2006, MLI began the Mind and Life Education Research Network, a series of multi-disciplinary research meetings with supporting pilot studies, to investigate how contemplative-based practices can be developed to cultivate mental states of clarity, calmness, kindness and happiness in children.

Today, the Mind and Life Institute is a recognized world leader in the emerging scientific investigation of the effects of contemplative practices on brain, behavior, and the translation of this data into effective tools to benefit people in all walks of life. We do this through a comprehensive strategy that includes the following programs:

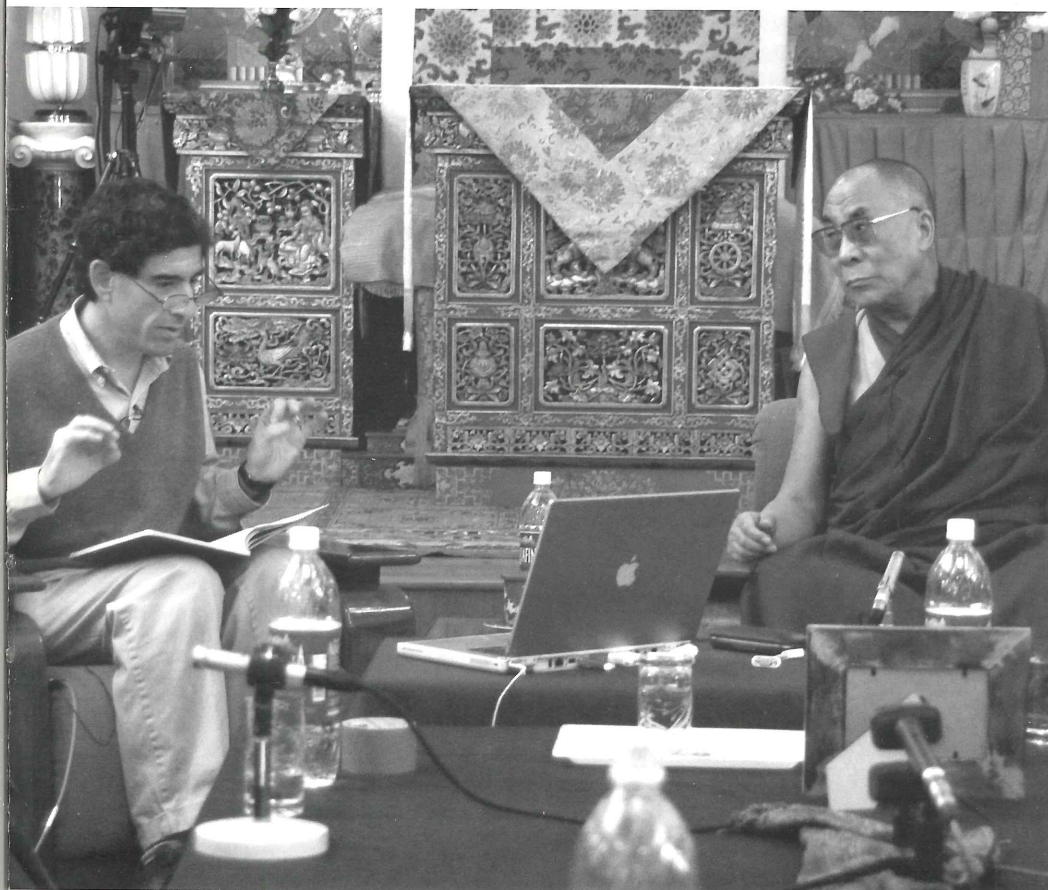
- **Mind and Life Dialogues with the Dalai Lama**
- **Mind and Life Publications that report on the MLI Dialogues**
- **Mind and Life Summer Research Institute**
- **Mind and Life “Francisco J. Varela” Research Awards**
- **Mind and Life Senior Investigator Research Awards**
- **Mind and Life Education Research Network**
- **Mind and Life Electronic Library**
- **Mind and Life International Research Initiative**

OVERVIEW

In addition to being a scientific autobiography, the Dalai Lama's book *The Universe in a Single Atom: the Convergence of Science and Spirituality* highlights those issues he feels are most important in the "convergence of science and spirituality." These issues and questions will form the focus of our Mind and Life XIV meeting, and will become the foundation on which a group of scientists will develop a deep dialogue with the Dalai Lama and other Buddhist scholar-practitioners.

In his book, the Dalai Lama includes ethical, philosophical and even metaphysical reflections prompted by science. These are both specific and general in character. For example, he asks whether science is the sole reliable source of knowledge, which raises the question of the limits of scientific knowledge, reductionism and its ramifications. In addition, each field of science inevitably raises ethical issues that must be addressed. Advances in molecular biology and genetics have spawned a biotech industry which confronts profound ethical dilemmas on a daily basis. Comparable issues also exist for atomic physics and cognitive science. In addition to fundamental scientific questions we will engage and address the larger philosophical, ethical and spiritual issues these provoke.

The Dalai Lama with Richard Davidson at the 2004 meeting in Dharamsala, India



PARTICIPANTS

- **Tenzin Gyatso, His Holiness, the XIV Dalai Lama**
- **Richard J. Davidson, Ph.D.**, Vilas Research Professor and William James Professor of Psychology and Psychiatry, University of Wisconsin-Madison
- **John Dunne, Ph.D.**, Assistant Professor, Department of Religion, Emory University. Co-Director of the Encyclopedia of Contemplative Practices and the Emory Collaborative for Contemplative Studies
- **Paul Ekman, Ph.D.**, Professor of Psychology Emeritus in the Department of Psychiatry at the University of California at San Francisco; Consultant
- **R. Adam Engle, J.D., M.B.A.**, CEO and Chairman of the Mind and Life Institute, and General Coordinator of the Mind and Life conferences
- **Martha Farah, Ph.D.**, Walter H. Annenberg professor in the Natural Sciences, Director of the Center for Cognitive Neuroscience, University of Pennsylvania
- **George Greenstein, Ph.D.**, Sidney Dillon Professor of Astronomy, Amherst College
- **Matthieu Ricard, Ph.D.**, Author and Buddhist monk at Shechen Monastery in Kathmandu and French interpreter since 1989 for His Holiness the Dalai Lama
- **Bennett M. Shapiro, M.D.**, Executive Vice President (ret.) Merck Research Laboratories
- **Wolf Singer, M.D., Ph.D.**, Director at the Max Planck Institute for Brain Research in Frankfurt and Founding Director of the Frankfurt Institute for Advanced Studies (FIAS)
- **Evan Thompson, Ph.D.**, Professor of Philosophy, University of Toronto
- **Anton Zeilinger, Ph.D.**, Professor at the Physics Department of Vienna University and at the Institute of Quantum Optics and Quantum Information of the Austrian Academy of Sciences
- **Arthur Zajonc, Ph.D.**, Andrew Mellon Professor of Physics and Interdisciplinary Studies, Amherst College

INTERPRETERS

- **Geshe Thupten Jinpa, Ph.D.**, President and chief editor for The Classics of Tibet Series produced by the Institute of Tibetan Classics in Montreal; Adjunct Faculty of Religious Studies, McGill University, Montreal
- **Geshe Dorje Damdul**, English interpreter for the Dalai Lama; Dharamsala, India

THE DIALOGUE

DAY ONE

April 9, 2007 – Part I: The Buddhism-Science Collaboration and the Limits of Scientific Knowledge: Exposing the Fracture Points

Dialogue Leader: Evan Thompson

While science has made phenomenal progress in physics, cosmology and neuroscience, the juxtaposition of questions posed by the Buddhist account unmasks many significant gaps in our scientific understanding. Many of these gaps are regarded by some segments of the scientific community not as fundamental limits in our understanding but rather as the current state of progress in particular fields of science, while the Buddhist account highlights some of these gaps as fundamental, such as the conjecture that the brain is necessary and sufficient for the expression of mind. We wish to know where the Dalai Lama is committed to the belief that crucial aspects of human nature cannot be understood, ever, scientifically? Whether there are mysteries that will remain mysteries?

The philosopher Evan Thompson will open the meeting with a consideration of some of the key issues that frame this debate and will expose the significant fracture points that distinguish traditional scientific accounts from the Buddhist view.

Part II: Atomism, Emptiness, Interdependence and the Role of the Observer in Quantum Physics and Buddhism

Dialogue Leaders: Anton Zeilinger and Arthur Zajonc

Quantum physics and Buddhism both raise questions concerning the nature of causality, the constitution of objects, the nature of emptiness and the importance of interconnectedness. As in Buddhism, physics contrasts the common-sense view of the world with a much more subtle and complex ontology and epistemology. In the third chapter of his book the Dalai Lama takes up these themes and relates them to the Middle Way school of Mahayana Buddhism. He writes, for example, of the importance assigned to the observer in both Buddhism (through the idea of dependent origination) and quantum theory, and he explores the crucial role of interconnectedness in ethics and ontology. How far are these two traditions similar and different and what are the larger implications of these ideas for life?

DAY TWO

April 10, 2007 – Cosmology and the Relativity of Space and Time

Dialogue Leaders: George Greenstein and Arthur Zajonc

Two related themes emerge from the Dalai Lama's writings on cosmology:

1) The relativity of time and space as developed within both Einstein's relativity theory and Buddhist philosophy. For example, the Dalai Lama refers to the arguments of the Sautrantika School and Nagarjuna concerning the relative nature of time, and to the Kalchakra system's concept of "space particles" as the source of material existence from out of emptiness or the vacuum. This latter view echoes modern ideas of fluctuations of the quantum vacuum and the inflationary theory and merits further discussion.

2) The Big Bang and the Buddhist idea of a beginningless universe. Like modern cosmology, Buddhism endorses an evolutionary cosmology, but for logical reasons it is held to be one that is without beginning or end. Moreover, there are a "billion-fold" universes in various stages of development. One feature of Buddhist cosmology is the central place of sentient beings whose evolution (karma) is served by the development of a world system. In a sense, their view is "anthropic," that is centered on human development.

THE DIALOGUE

DAY THREE

April 11, 2007— Evolution, Altruism and the Fundamental Nature of Human Emotion

Dialogue Leaders: *Ben Shapiro, Paul Ekman, Richard Davidson and Matthieu Ricard*

Is evolution driven by random mutation and natural selection? How can the adaptations of species best be understood? Can basic evolutionary principles be used to understand the fundamental origins of basic human cognitive and emotional competences? Is the fundamental nature of emotion positive, compassionate and altruistic? How might evolutionary accounts of emotion accommodate these virtuous emotional qualities? To what extent is any particular emotion (e.g., anger) destructive or constructive, or can any emotion be enacted constructively or destructively? What is the role of subjective experience of emotion in the overall function of emotion? Buddhism places great emphasis on the role of experience while modern psychological and neurobiological accounts of emotion place less emphasis on the experiential component. Buddhism underscores the importance of suffering. Is there some teleological significance to suffering? Are there neurobiological parallels? Buddhist accounts emphasize training the mind as a strategy for improving emotional qualities. What are the scientific bases of these practices and what do these practices imply for the stability and plasticity of emotional traits?

DAY FOUR

April 12, 2007— Consciousness

Dialogue Leaders: *Wolf Singer, Richard Davidson and Evan Thompson*

Buddhist psychology and philosophy make strong claims about the primary of subjective experience and from this perspective, Buddhist accounts have argued that there are three fundamentally distinct features of our world: 1. matter comprised of physical objects; 2. mind comprised of subjective experiences; and 3. abstract composites comprised of mental formations. Western science has grounded the study of consciousness and subjective experience in terms of the functions of the brain. The Buddhist account questions the adequacy of this reductionistic proposition and suggests that there remains a large explanatory gap. As His Holiness has asked, how do we explain the emergence of consciousness? What marks the transition from sentient to non-sentient beings?

DAY FIVE

April 13, 2007— Buddhist-Science Collaboration, the Mind-Brain Relationship, and Neuroethics

Dialogue Leader: *Martha Farah*

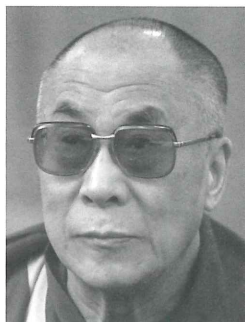
The Buddhist approach with its emphasis on the central role of relieving suffering and promoting compassion has at its root a strong ethical stance toward the acquisition of knowledge. The Buddhists ask what is the purpose of further knowledge acquisition. In the case of neuroscience, how does our growing understanding of brain function illuminate the nature of sentience, suffering, compassion, and moral agency? How might such new knowledge be put to more widespread use in promoting a secular ethics that shares many of the same goals as the Buddhist approach?

Philosophical and Historical Dimensions of the Dialogue

Evan Thompson

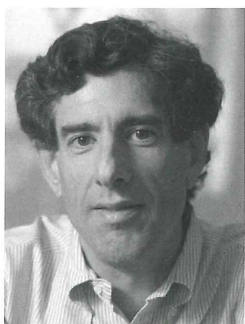
Throughout the meeting we will be aware of the philosophical issues that are implicitly at stake, and also the historical moment the dialogue occupies. The philosophical issues will range from the epistemological and ontological to the ethical and metaphysical.

PARTICIPANT BIOGRAPHIES



Tenzin Gyatso, the XIVth Dalai Lama, is the leader of Tibetan Buddhism, the head of the Tibetan government-in-exile, 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 XIIIth 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 Potola 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.



Richard J. Davidson, Ph.D., is the Director of the Laboratory for Affective Neuroscience and the W.M. Keck Laboratory for Functional Brain Imaging and Behavior at the University of Wisconsin at Madison. He was educated at New York University and Harvard University, where he received his B.A. and Ph.D., 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* and *The Handbook of Affective Science*.

Professor Davidson has also written more than 250 chapters and journal articles. He is the recipient of numerous 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 was a member of the Board of Scientific Counselors of the National Institute of Mental Health. He was named one of the 100 most influential people in the world by Time Magazine in May, 2006 and in November, 2006 he received the first Mani Bhaumik Award from UCLA for advances in the understanding of the brain and the conscious mind in healing. In 1992, as a follow-up from previous Mind and Life meetings, he was a member of a scientific team doing neuroscientific investigations of exceptional mental abilities in advanced Tibetan monks.



John Dunne, Ph.D., is an assistant professor in the Department of Religion at Emory University, where he is Co-Director of the Encyclopedia of Contemplative Practices and the Emory Collaborative for Contemplative Studies. He was educated at the Amherst College and Harvard University, where he received his Ph.D. from the Committee on the Study of Religion in 1999. Before joining Emory's faculty in 2005, he taught at the University of Wisconsin-Madison and held a research position at the University of Lausanne, Switzerland. Support from the American Institute of Indian Studies sustained two years of his doctoral research at the Central Institute for Higher Tibetan Studies in Sarnath, India. His work focuses on various aspects of Buddhist philosophy and contemplative practice.

In *Foundations of Dharmakirti's Philosophy* (2004), he examines the most prominent Buddhist theories of perception, language, inference and justification. His current research includes an inquiry into the notion of "mindfulness" in both classical Buddhist and contemporary contexts, and he is also engaged in a study of Candrakirti's "Prasannapada", a major Buddhist philosophical work on the metaphysics of "Emptiness."

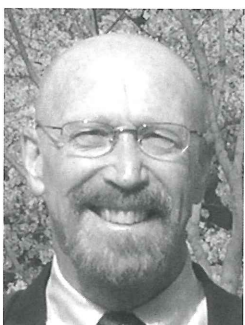
PARTICIPANT BIOGRAPHIES

His recently published work includes an essay on neuroscience and meditation co-authored with Richard J. Davidson and Antoine Lutz. He frequently serves as a translator for Tibetan scholars, and as a consultant, he has assisted Drs. Davidson and Lutz in their neuropsychological studies of Tibetan contemplative practices.



Paul Ekman, Ph.D., was a Professor of Psychology in the Department of Psychiatry at the University of California at San Francisco for 32 years. He received his undergraduate education at the University of Chicago and New York University. He received his Ph.D. from Adelphi University in 1958 after spending a year in clinical internship at the Langley Porter Psychiatric Institute, part of the University of California, San Francisco (UCSF). He served as chief psychologist in the U.S. Army, Fort Dix, New Jersey from 1958-1960. On discharge he returned to UCSF where he held a three-year postdoctoral research fellowship. He then initiated his research program supported by grants from the National Institute of Mental Health and the National Science Foundation, and the Advanced Research Projects Agency of the DOD, loosely affiliated with UCSF. In 1972 he was appointed Professor of Psychology at

UCSF. His interests have focused on two separate but related topics. He originally focused on 'non-verbal' behavior, and by the mid-60's concentrated on the expression and physiology of emotion. His second interest is interpersonal deception. His many honors have included the Distinguished Scientific Contribution Award of the American Psychological Association in 1991, and an honorary doctor of humane letters from the University of Chicago in 1994. Dr. Ekman retired from UCSF in 2004. He currently continues to consult on research and training related to emotion and deception.



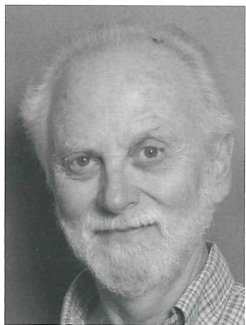
R. Adam Engle, J.D., M.B.A., Mind and Life Institute Chairman and CEO, is a lawyer, businessman, and entrepreneur who has divided his professional life between the for-profit and non-profit sectors. In the for-profit sector, he began his career as a lawyer, practicing for 10 years in Beverly Hills, Albuquerque, Santa Barbara, and Teheran. After leaving the practice of law, he formed an investment management firm, focusing on global portfolio management on behalf of individual clients. He also started several business ventures in the United States and Australia. Mr. Engle co-founded the Mind and Life dialogues in 1983 with Francisco Varela, and formed the Mind and Life Institute in 1990. In 1993, he co-founded the Colorado Friends of Tibet, a statewide Tibetan support group based in Boulder. He also founded a speakers' series at the Stanford Business School entitled

"Integrity and Compassion in Business." He was a founding member of the Social Venture Network, and is a member of the World Business Academy. He received his J.D. degree from the Harvard Law School and his M.B.A. from the Stanford Graduate School of Business.

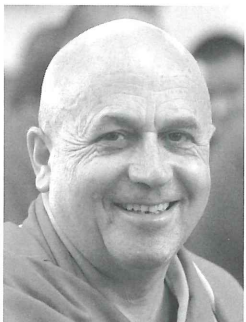


Martha Farah, Ph.D., grew up in New York City and went to college at MIT, where she earned undergraduate degrees in Metallurgy and Philosophy in 1977. She studied Experimental Psychology at Harvard, earning a Ph.D. in 1983 and going on to postdoctoral studies in Neuropsychology at MIT and the Boston VA Hospital. She has taught at Carnegie Mellon University and the University of Pennsylvania, where she is now Walter H. Annenberg Professor in the Natural Sciences and Director of the Center for Cognitive Neuroscience. Her work spans many topics within cognitive neuroscience, including visual perception, attention, mental imagery, semantic memory, reading, prefrontal function, and most recently, neuroethics. Her publications include: *Visual Agnosia*, (MIT Press, 1990; 2nd edition, 2004), *The Cognitive Neuroscience of Vision* (Blackwell, 2000), and the edited volume: *Patient-based Approaches to Cognitive Neuroscience* (MIT Press, 1999;

2nd edition 2006), and she is the Associate Editor for Neuroethics of the *Journal of Cognitive Neuroscience*. She is a recipient of the American Psychological Association's Early Career Contribution Award, the National Academy of Science's Troland Award, and a Guggenheim Fellowship.

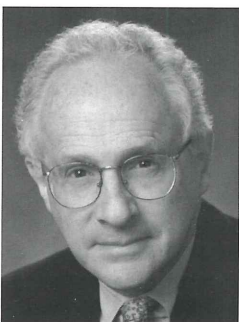


George Greenstein, Ph.D., is the Sidney Dillon Professor of Astronomy at Amherst College. He received his B.S. from Stanford and his Ph. D. from Yale, both in physics. Initially his interests centered on research in theoretical astrophysics, but later they shifted to writing. He is the author of numerous works interpreting science for nonscientists. His first book, *Frozen Star*, was the recipient of two science-writing awards. In conjunction with Arthur Zajonc he is the author of a recent textbook titled *The Quantum Challenge: Modern Research on the Foundations of Quantum Mechanics*, which discusses the problems of interpretation posed by quantum mechanics.



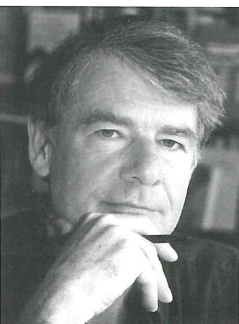
Matthieu Ricard, Ph.D., received a Ph.D. in Cellular Genetics at the Institut Pasteur under Nobel Laureate Francois Jacob. Since 1967 he has lived in the Himalayas and studied Tibetan Buddhism under the most eminent Tibetan teachers, including Dilgo Khyentse Rinpoche. He is the French interpreter of the Dalai Lama. With his father, the late French philosopher Jean-François Revel, he is the co-author of *The Monk and the Philosopher* (Schocken), and *The Quantum and the Lotus* with the astrophysicist Trinh Xuan Thuan (Crown). His latest best-selling book is *Happiness: a Guide to Developing Life's Most Important Skill* (Little Brown). His books have been translated into more than twenty languages. He has also translated numerous books from Tibetan into English and French. As a photographer, he has published several albums, including *Buddhist Himalayas* (Abrams), *Monk Dancers of Tibet* (Shambhala) and most recently, *Tibet: An Inner Journey* (Thames and Hudson). He is a Buddhist monk who lives

in Nepal and devotes much of his time to humanitarian projects in Asia and to the preservation of Tibetan cultural heritage. He is on the board of Mind and Life Institute.



Bennett M. Shapiro, M.D., is a consultant in biotechnology. He was previously Executive Vice President, Worldwide Licensing and External Research, where he directed Merck's research relationships with the academic and industrial biomedical research community. He joined Merck Research Laboratories in September of 1990 as Executive Vice President, Basic Research, Merck Research Laboratories. In this position he was responsible for all the basic and preclinical research activities at Merck worldwide. Earlier, he was Professor and Chairman of the Department of Biochemistry at the University of Washington. He is the author of over 120 papers on the molecular regulation of cellular behavior and the biochemical events that integrate the cascade of cellular activations at fertilization. Shapiro received his bachelor's degree in chemistry from Dickinson College and his doctor's degree in medicine from Jefferson Medical College.

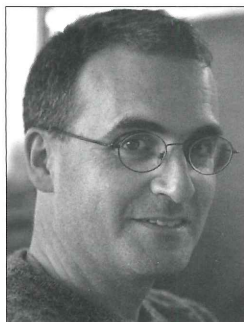
Following an Internship in Medicine at the University of Pennsylvania Hospital, he was a Research Associate at the NIH, then a Visiting Scientist at the Institut Pasteur in Paris and returned to the NIH as Chief - Section on Cellular Differentiation in the Laboratory of Biochemistry, prior to joining the University of Washington. Dr. Shapiro has been a Guggenheim Fellow, a Fellow of the Japan Society for the Promotion of Science and a Visiting Professor at the University of Nice.



Wolf Singer, M.D., Ph.D., is Director at the Max Planck Institute for Brain Research in Frankfurt and Founding Director of the Frankfurt Institute for Advanced Studies (FIAS). He studied medicine at the Universities of Munich and Paris, received his M.D. from the Ludwig-Maximilians-University and his Ph.D. from the Technical University in Munich. Until the mid-eighties his research interests were focused on the experience-dependent development of the cerebral cortex and on mechanisms of use-dependent synaptic plasticity. Subsequently, his research concentrated on the binding problem that arises from the distributed organization of the cerebral cortex. The hypothesis forwarded by Professor Singer is that the numerous and widely distributed subprocesses which constitute the basis of cognitive and executive functions are coordinated and bound together by the precise temporal synchronization of oscillatory neuronal activity. Professor Singer has

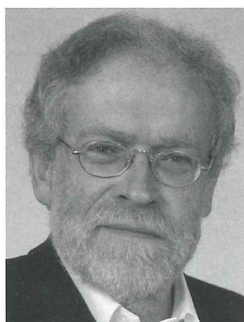
signed more than 254 articles in peer-reviewed journals, contributed more than 191 chapters to books, written numerous essays on the ethical and philosophical implications of neuroscientific discoveries, and published 2 books. He is the recipient of numerous awards including the IPSEN Prize for Neuronal Plasticity, the Ernst Jung Prize for Medicine, the Zülch Prize for Brain Research, and the Communicator Prize of the German Research Foundation. He is member of numerous national and international academies, including the Pontifical Academy of Sciences. He served as President of the European Neuroscience Association, as Chairman of the Board of Directors of the Max Planck Society, and as member of numerous Advisory Boards of scientific organizations and editorial boards of journals.

PARTICIPANT BIOGRAPHIES



Evan Thompson, Ph.D., is Professor of Philosophy at the University of Toronto. He received his B.A. from Amherst College in Asian Studies, and his Ph.D. in Philosophy from the University of Toronto. He is the author of *Mind in Life: Biology, Phenomenology, and the Sciences of Mind* (Harvard University Press, 2007), and the co-editor (with P. Zelazo and M. Moscovitch) of *The Cambridge Handbook of Consciousness* (Cambridge University Press, 2007). He is also the co-author with F.J. Varela and E. Rosch of *The Embodied Mind: Cognitive Science and Human Experience* (MIT Press, 1991) and the author of *Color Vision: A Study in Cognitive Science and the Philosophy of Perception* (Routledge Press, 1995). He is currently working on a new book, titled *Buddha and the Brain: Contemplative Insight and the Neuroscience of Consciousness*. Thompson held a Canada Research

Chair at York University (2002-2005), and has also taught at Boston University. He has held visiting positions at the Centre de Recherche en Epistémologie Appliquée (CREA) at the Ecole Polytechnique in Paris and at the University of Colorado at Boulder. He is a member of the Mind and Life Institute's Scientific Advisory Board.



Prof. Dr. Anton Zeilinger's work on the foundations of quantum physics has led both to concepts for a novel quantum information technology and to a new understanding of fundamental issues in the interpretation of quantum mechanics. His group's achievements include quantum teleportation, entangled-state quantum cryptography, the first experimental realization of a one-way quantum computer and the world record for the largest molecules for which quantum interference has been shown. Among his distinctions are the German Order Pour le Mérite, the King Faisal International Prize in Science, the Sartorius Prize by the Academy of Sciences in Göttingen and honorary doctorates of the Humboldt University Berlin and Gdansk University in Poland. He is a member of the Austrian, the Berlin-Brandenburg, the Polish and the Slovak Academies of Science and of the German Leopoldina.

Zeilinger is currently Professor at the Physics Department of Vienna University and at the Institute of Quantum Optics and Quantum Information of the Austrian Academy of Sciences.



Arthur Zajonc, Ph.D., is Andrew Mellon professor of physics and interdisciplinary studies at Amherst College, where he has taught since 1978. He received his B.S. and Ph.D. in physics from the University of Michigan. He has been visiting professor and research scientist at the Ecole Normale Supérieure in Paris, the Max Planck Institute for Quantum Optics, and the universities of Rochester, and Hannover. He has been Fulbright professor at the University of Innsbruck in Austria. 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 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 again 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 the Mind and Life-MIT meeting were published under the title *The Dalai Lama at MIT*. He currently directs the Academic Program of the Center for Contemplative Mind which supports appropriate inclusion of contemplative practice in higher education. 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.

He has 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 again 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 the Mind and Life-MIT meeting were published under the title *The Dalai Lama at MIT*. He currently directs the Academic Program of the Center for Contemplative Mind which supports appropriate inclusion of contemplative practice in higher education. 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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Zara Houshmand
Sandra Berman

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www.investigatingthemind.org**

A TWENTY YEAR HISTORY OF ACCOMPLISHMENT

Mind & Life Dialogues

The titles of these dialogues between the Dalai Lama and leading scientists show the range of topics that the Mind and Life Institute has explored. For more details on these conferences, please go to www.mindandlife.org.

- 2007: Compassion and Mental Training for the Treatment of Depression, co-sponsored by Emory University
- 2007: The Universe in a Single Atom
- 2005: Investigating the Mind: The Science and Clinical Applications of Meditation, co-sponsored by Johns-Hopkins and Georgetown Universities
- 2004: Neuroplasticity: The Neuronal Substrates of Learning and Transformation
- 2003: Investigating the Mind: Exchanges between Buddhism and the Biobehavioral Science on How the Mind Works, co-sponsored by Massachusetts Institute of Technology
- 2002: The Nature of Matter, The Nature of Life
- 2001: Transformations of Mind, Brain and Emotion at the University of Wisconsin
- 2000: Destructive Emotions
- 1998: Epistemological Questions in Quantum Physics and Eastern Contemplative Sciences at Innsbruck University
- 1997: The New Physics and Cosmology
- 1995: Altruism, Ethics, and Compassion
- 1992: Sleeping, Dreaming, and Dying
- 1990: Emotions & Health
- 1989: Dialogues between Buddhism and the Neurosciences
- 1987: Dialogues between Buddhism and the Cognitive Sciences

Mind and Life Books and DVD Sets

The following books and DVD sets describe discussions between the Dalai Lama and Western scientists. Books in print can be obtained from major booksellers; DVD sets are available directly from the Mind and Life Institute. For more information about each title, please go to www.mindandlife.org.

- *Creating and Maintaining a Healthy Mind*, DVD from Mind and Life Dialogue in 2006
- *The Science of a Compassionate Life*, DVD from the Dalai Lama's Denver Public Talk in 2006
- *The Science & Clinical Applications of Meditation*, DVD from Mind and Life XIII in 2005
- *Change your Mind; Change your Brain*, from Mind and Life XII in 2004
- *Investigating the Mind*, DVD from Mind and Life XI in 2003
- *The Dalai Lama at MIT*, from Mind and Life XI in 2003
- *What is Matter; What is Life?*, from Mind and Life X in 2002 (in preparation)
- *Destructive Emotions: A Scientific Dialogue With the Dalai Lama*, from Mind and Life VIII in 2002
- *The New Physics and Cosmology: Dialogues with the Dalai Lama*, from Mind and Life VI in 1997
- *Visions of Compassion: Western Scientists and Tibetan Buddhists*, from Mind and Life V in 1995
- *Sleeping, Dreaming, and Dying: An Exploration of Consciousness with the Dalai Lama*, from Mind and Life IV in 1992
- *Healing Emotions: Conversations With the Dalai Lama on Mindfulness, Emotions, and Health*, from Mind and Life III in 1990
- *Consciousness at the Crossroads: Conversations with the Dalai Lama on Brain Science and Buddhism*, from Mind and Life II in 1989
- *Gentle Bridges: Conversations with the Dalai Lama on the Sciences of Mind*, from Mind and Life I in 1987

Mind and Life Summer Research Institute

A week-long residential science retreat for 150 scientists, clinicians, contemplative scholar/practitioners and philosophers from around the world, working together to develop a new field of science — Contemplative Neuroscience — how to create and maintain a healthy mind. This is an annual program of the Mind and Life Institute and was begun in June, 2004.

Mind and Life Research Initiatives

- Cultivating Emotional Balance—a research study in collaboration with UCSF Medical Center: a clinical trial testing a 40 hour training for teachers
- Mind and Life Contemplative Neuroscience—basic research at the University of Wisconsin, Princeton, Harvard, UCB, and Reed College.
- Mind and Life Francisco J. Varela Research Awards—providing small research grants to investigate hypotheses developed at the ML Summer Research Institute. 10 to 15 Varela Awards are given yearly.
- Mind and Life Education Research Network—exploring how to bring the benefits of mental training in attention, emotion and awareness to children.



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