

THE
HUMBLE
APPROACH
INITIATIVE

God, Matter, and Information: What is Ultimate?

A symposium sponsored by
the John Templeton Foundation

17, 18, and 19 August 2006

University of Copenhagen

Contact: Mary Ann Meyers, Ph.D., Senior Fellow

Purpose

"Matter, for common sense, is something which persists in time and moves in space. But for modern relativity-physics this view is no longer tenable. A piece of matter has become, not a persistent thing with varying states, but a system of inter-related events. The old solidity is gone, and with it the characteristics that, to the materialist, made matter seem more real than fleeting thoughts."

Bertrand Russell, Introduction to
English translation of 1873
edition of F.A. Lange's *The
History of Materialism* (1925)

The purpose of this symposium is to explore the current understanding of the concept of matter from scientific, philosophical, and theological perspectives. Fourteen scientists and scholars have come together at the University of Copenhagen, under the aegis of the John Templeton Foundation, to consider how the metaphysical philosophy of materialism has been replaced by less reductive forms of naturalism—and assess the implications for religious self-reflection. Since Isaac Newton's description of matter as "solid, massy, hard, impenetrable, moveable particles," the concept has undergone successive transformations. Although challenged by a majority of contemporary philosophers, Newtonian mechanism and materialism was eventually embraced by scientists as the orthodox description of nature. A corollary of this viewpoint was the claim that all physical systems are nothing but collections of inert particles slavishly complying with deterministic laws. Complex systems such as living organisms and societies can, according to this reductionistic picture, ultimately be explained in terms of their material components. Such extreme materialism thus excluded not only God but also the mental world from the inventory of real things. In the twentieth century, however, Newtonian materialism began to crumble. Quantum mechanics revealed a more subtle picture of the nature of matter, and indeed, of the nature of the vacuum. The general theory of relativity and the quantum theory of fields predicted objects such as black holes and cosmic strings that defy description as aggregates of material particles. Chaos theory and complexity theory demolished the notion of a clockwork universe, replacing it with new metaphors, such as nature as a web of relational entanglements, or as a computational process, or as a self-organizing system. In particular, *information* has supplanted matter as the primary currency of physical reality in many contexts. In biology, the informational basis of life has superseded both vitalism and materialism as the conceptual framework for understanding the remarkable properties of organisms. Here we encounter the vexed issue of contextual or semantic information, given that genes contain coded information that must be "interpreted" by a specific molecular milieu. And thus we are led to the field of biosemiotics and human consciousness, where information acquires meaning and even purpose. Our

intention is to discuss the sweeping implications of these developments for philosophy and theology. For example, some philosophers and theologians prefer to speak of an emergent monism that emphasizes the higher-order complex structures that arise in the process of evolution. They stress that informational structures should be accorded the status of “real” since they appear to be causally efficient in the course of evolution. In the same manner, classic divisions between insensitive nature and sensitive culture seem increasingly elusive. Whilst religion is rooted in a pre-scientific view of matter, moreover, it seems appropriate to ask whether a dynamic theology might be bound to reconsider traditional doctrines, including divine incarnation and the presence of Christ in the Eucharist, in the context of current concepts of mass, energy, and information. It is to address such deep questions that researchers from several disciplines gather in the Danish capital during the still long days of summer.

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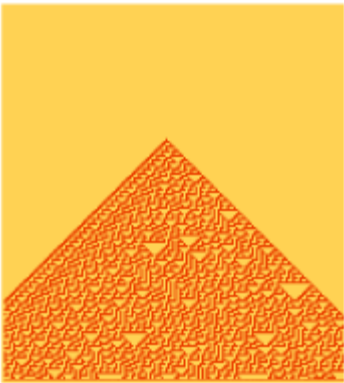
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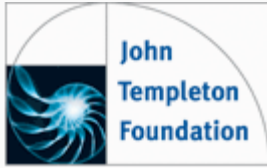
Approach



Cellular automata are collections of "colored" cells computed on grids of specified shapes that evolve through a number of discrete time steps according to a set of rules based on the states of neighboring cells. Stephen Wolfram discovered that certain simple rules can produce patterns and behavior of extraordinary complexity as indicated by the thumbnail image above of rule 30 cellular automation.

© Stephen Wolfram,
A New Kind of Science
Wolfram Media, Inc. 2002

The symposium is part of the Templeton Foundation's *Humble Approach Initiative*. The goal of the initiative is to bring about the discovery of new spiritual information by furthering high-quality scientific research. The "humble approach" is inherently interdisciplinary, sensitive to nuance, and biased in favor of building linkages and connections. It assumes an openness to new ideas and a willingness to experiment. Placing high value upon patience and perseverance, it retains a sense of wondering expectation because it recognizes, in Loren Eisley's haunting phrase, "a constant emergent novelty in nature that does not lie totally behind us, or we would not be where we are." A fundamental principle of the Foundation, in the words of its founder, is that "humility is a gateway to greater understanding and open[s] the doors to progress" in all endeavors. Sir John Templeton believes that in their quest to comprehend foundational realities, scientists, philosophers, and theologians have much to learn about and from one another. The humble approach is intended as a corrective to parochialism. It encourages discovery and seeks to accelerate its pace.



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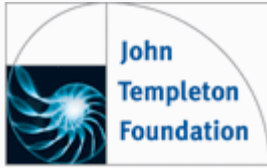
*"Matter has been dematerialized,
not just as a concept of the
philosophically real, but now as
an idea of modern physics. . . .
The things for which Newton
typified matter – e.g.,
an exactly determinable state,
a point shape, absolute
solidity – these are now the
properties electrons do not,
because theoretically
they cannot, have."*

Norwood Russell Hanson,
"The Dematerialization of
Matter," *Philosophy of
Science*, vol. 29 (1962)

Paul Davies, formerly the professor of natural philosophy in the Australian Centre for Astrobiology at Macquarie University in Sydney, has recently accepted a new position as the College Professor and founding director of the Origins Institute at Arizona State University. After earning a Ph.D. in physics at University College, London, in 1970, he held academic appointments in astronomy, physics, and mathematics at the universities of Cambridge, London, Newcastle upon Tyne, and Adelaide before joining the Macquarie faculty five years ago. His research has spanned the fields of cosmology, gravitation, and quantum field theory, with particular emphasis on black holes and the origin of the universe. Dr. Davies is also widely known as an author. He has written more than twenty-five books, both popular and specialist works, including *The Physics of Time Asymmetry* (1974), (with Nicholas Birrell) *Quantum Fields in Curved Space* (1982), *The Mind of God* (1992, 1993), *About Time* (1995), *How to Build a Time Machine* (2001), *The Origin of Life* (2003), and, most recently, *The Goldilocks Enigma: Why the Universe is Just Right for Life*, which will be published by Penguin in the United Kingdom in October—and, as the *Cosmic Jackpot*, by Houghton Mifflin in the United States in April 2007. *The Re-emergence of Emergence*, a collection of essays he edited with Philip Clayton, also will be published next year by Cambridge University Press. Dr. Davies has extensive experience in television and radio, including the presentation of two Australian television series entitled *The Big Questions*. His work in astrobiology was the subject of a BBC television documentary, "The Cradle of Life." He has won numerous awards for his scientific and media work, including the 1995 Templeton Prize, and currently serves as trustee of the John Templeton Foundation. He received the 2001 Kelvin Medal presented by the UK Institute of Physics and the 2002 Michael Faraday Prize of the Royal Society for his contributions to furthering public communication of science. The asteroid 1992 OG was officially named (6870) "Pauldavies" in his honor.

A professor of systematic theology at the University of Copenhagen,
Niels Henrik Gregersen is also an ordained minister of the Evangelical-Lutheran

Church of Denmark. He is widely known for his research and writing on the intersection of science and religion. Dr. Gregersen graduated from the Haderslev Cathedral School and the University of Copenhagen, where he earned his Ph.D. in 1987. He began his academic career as an assistant professor in ethics and philosophy of religion at the University of Aarhus in 1986, became an associate professor of systematic theology in 1989, and was named research professor in science and theology in 2000. He has served as assistant pastor of the university's Church of St. John. President of the Learned Society of Denmark, Dr. Gregersen was formerly vice president of the European Society for the Study of Science and Theology. He is a member of the Theological Commission of the Church of Denmark's Council on Inter-Church Relations, a member of the board of advisors of the John Templeton Foundation, and from 1992 to 2003, he was the leader of the Danish Forum for Science and Theology. Dr. Gregersen is the recipient of a Templeton Foundation Science and Religion Course Program grant and a Templeton Foundation grant for research and writing on the constructive engagement of science and religion. He also has received research support from the Danish Research Foundation for the Humanities, the Felix Foundation, the Niels Møgelvang Foundation, and the Research Foundation of the University of Aarhus. Formerly general editor of *Studies in Science and Theology*, he is systematic theology editor of the *Danish Journal of Theology* and associate editor of the *Encyclopedia of Science and Religion*, as well as a member of the editorial advisory board of *Zygon: Journal of Religion and Science* and a member of the editorial boards of *Dialog: A Journal of Theology* and of *Theology and Science*. A former member of the editorial board of the Danish publisher ANIS and currently co-editor of the Complementa Series published by the University of Aarhus Press, he inaugurated the new Issues in Science and Theology Series, which was published in Scotland by T & T Clark and in the United States by Wm. B. Eerdmans in 2002. Dr. Gregersen has contributed more than 150 major articles in Nordic, German, and English to scholarly journals, a number of which have won prizes, and he has edited or co-edited fourteen volumes of collected works, including *From Complexity to Life: The Emergence of Life and Meaning* (2003) and, most recently, *The Gift of Grace: The Future of Lutheran Theology* (with Bo Holm, Ted Peters, and Peter Wideman), which was published in 2005 by Augsburg Fortress Press. He is the co-author of two books and the author of four others, including *The Presence of God in Evolution* (2006), which has been translated into Romanian. Dr. Gregersen's forthcoming book, *Ind i Gud (Into God)*, will be published in Danish later this year by ANIS, and next year Aros will bring out a new study entitled *The Creator*. A co-authored volume (with Peter Grunderlach, Hans Raun Iversen, and Margit Warburg), *Habits of the Heart in Denmark*, also will be published in 2007 by Reitzel, and another book (with Ted Peters), *Radical Generosity: Contours of Lutheran Theology*, is under contract with Fortress Press.



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Holmes Rolston III

Henry Pierce Stapp

Keith Ward

Michael Welker

Terrence W. Deacon is a professor in the department of anthropology and in the Helen Wills Neuroscience Institute at the University of California, Berkeley. His research combines human evolutionary biology and neuroscience in the investigation of the evolution of human cognition. An ongoing study of the basis of animal and human communication, especially language, has taken him from laboratory-based cellular-molecular neurobiology to the study of semiotic processes. His work has included axon tract tracing studies of language related systems in primates, developmental brain research, fetal neural transplantation, stem cell implantation, and quantitative comparative neuroanatomy. Dr. Deacon began his collegiate studies at the University of Washington, received a baccalaureate degree from Fairhaven College of Western Washington University, and went on to earn a master's degree in education and, in 1984, a Ph.D. in biological anthropology from Harvard University. He joined the Harvard faculty that year as an assistant professor of biological anthropology, was promoted to associate professor, and in 1992 became an associate professor of biological anthropology at Boston University and also a research associate at McLean Hospital and the Harvard Medical School. He accepted his present position in 2002. Dr. Deacon has been a visiting professor at the University of Washington, Tufts University, the University of Massachusetts, Boston, and the University of California, San Diego. The recipient of a Lehman Fellowship from the Harvard Graduate School of Arts and Sciences, a psychiatric neuroscience fellowship from the Harvard Medical School, and a Centenary Alumni Fellowship from Western Washington University, he delivered the 69th James Arthur Lecture at the American Museum of Natural History. He has published some twenty-five chapters in volumes of collected scientific papers and is the author or co-author of more than forty-five articles in scholarly journals. His acclaimed book, *The Symbolic Species: The Co-evolution of Language and the Brain*, in which he argues that language itself was part of the process that was responsible for evolution, was published by W. W. Norton in 1997 and has subsequently been translated into Japanese, Italian, and Greek. Last year it was awarded the Staley Prize by the School of American Research. He is presently completing work on



The mechanical planetarium commissioned from David Rittenhouse in 1771 for the College of Philadelphia stands today in the Van Pelt Library of the University of Pennsylvania.

The Rittenhouse orrery exceeded all existing models in ingenuity. It is called after the title of Charles Boyle, 4th Earl of Orrery, for whom a mechanical model of the solar system had been constructed earlier in the century.

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two additional books, *Homunculus: Evolution, Information, and the Emergence of Consciousness* for W. W. Norton and (with Isaiah Nengo) *Homo Sapiens: Evolutionary Biology and the Human Sciences* for Thompson/Wadsworth.



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MASTHEAD: The collage of images, from upper left, includes 1) quarks and leptons, the two basic constituents of matter; 2) mathematical equations for Newton's universal law of gravity describing one of the four fundamental interactions in nature; Schrodinger's equation, which describes all the wave-like properties of matter and is used to find allowed energy levels in quantum mechanical systems; Einstein's theory of special relativity, which describes the movement of particles in a unified "spacetime"; and an equation for a string unification theory, a recent attempt to answer the question of what the world is made of; and 3) the binary numerical system used internally by virtually all modern computers. The Latin phrase, *fiat lux*, commonly translated in English as *Let there be light*, is adapted from the Greek phrase γεννηθῆτω φῶς, which in turn is taken from the Hebrew רָאָה יְהוָה. It appears in the poetic, starkly simple opening of Genesis (1:3), the biblical narrative of God's creation of the universe.

Credits: © Laguna Design/Photo Researchers, Inc., equations from *The equations: icons of knowledge* by Sander Bais, © Mike Agliolo/Photo Researchers, Inc.



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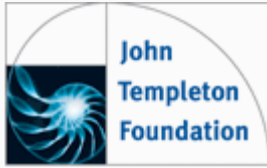
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A theologian widely respected for his teaching and writing in the area of science and religion, **John F. Haught** is the Thomas Healey Distinguished Professor at Georgetown University, where he has taught for the past thirty-seven years. In a 1999 study, *God After Darwin: A Theology of Evolution*, he argued that while a purposeful universe would have to possess at least a loosely directional aim, purpose is “a much wider notion than design.” Dr. Haught claims the debate between evolutionists and creationists is fundamentally misdirected because both these competing ideologies lack an adequate discussion of novelty, which he sees as a necessary component of evolution and a central theme in theological understanding of divine creativity. In his view, Darwin’s vision of life, instead of being hostile to religion—as scientific skeptics and many believers have thought it to be—actually provides a fertile setting for mature reflection on ideas about God and cosmic meaning. Dr. Haught extends his discussion of evolutionary theism in *Deeper Than Darwin: The Prospect for Religion in the Age of Evolution* (2003 and 2005). In the unfinished nature of the universe and its evolution into a “stupendous array of beauty,” he finds support for his belief that the cosmos has some overall point and human beings a basis for hope. A graduate of St. Mary’s University in Baltimore, Dr. Haught earned his Ph.D. in theology at The Catholic University of America in 1970. He formerly served as chair of the Georgetown theology department. A recipient of the Owen Garrigan Award in Science and Religion given by Seton Hall University and of the Sophia Award of the Washington Theological Union, Dr. Haught is a member of the board of advisors of the John Templeton Foundation. He has published more than fifty articles and essays in collected volumes and is the editor of *Science and Religion in Quest of Cosmic Purpose* (2000). He is the author of fourteen books, including *The Promise of Nature: Ecology and Cosmic Purpose* (1993) and *Science and Religion: From Conflict to Conservation* (1995), which has been translated into Romanian, Korean, Persian, and Chinese. The most recent in the scientifically informed alternatives he has offered to Darwinian naturalism, *Is Nature Enough? Meaning and Truth in the Age of Science*, was published earlier this year by Cambridge University Press.



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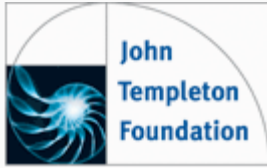
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Jesper Hoffmeyer is an associate professor at the Institute of Molecular Biology and Physiology (IMBP) at the University of Copenhagen who works primarily in the area of theoretical biology. After early research on genetic and biochemical regulation of purine nucleoside biosynthesis, he focused on the history of science and technology, and then, in 1988, established the Biosemiotics Group at the IMBP, which studies living systems from the perspective of sign theory. He is a graduate of the University of Copenhagen, where he earned a master's degree in biochemistry in 1967, before pursuing post-graduate studies at the Collège de France on a science fellowship. Dr. Hoffmeyer began his teaching career in 1968 as an assistant professor at the University of Copenhagen's Institute for Biological Chemistry, which he subsequently headed for two years. He was named to his present position in 1972. The University of Aarhus awarded him a doctorate in philosophy in 2005 in recognition of his pioneering contributions to the field of biosemiotics, and he is also the recipient of the 1985 Poul Henningsen Award, the 1991 Mouton d'Or Award for an article examining the semiotic metaphor in biology, and a Thomas Sebeok Fellowship awarded by the Semiotic Society of America on the occasion of its 25th annual meeting in 2000. The current president of the International Society for Biosemiotic Studies, he serves, in addition, as a member of the governing boards of the Nordic Association for Semiotic Studies, SEE (The Virtual Institute of Semiosis, Evolution, and Energy), and the University of Copenhagen's Centre for Ethics and Law. He is the editor of the *Journal of Biosemiotics* and a member of the editorial boards of *Cosmos and History: The Journal of Natural and Social Philosophy* and of *Cybernetics & Human Knowledge*. Dr. Hoffmeyer is the author of numerous articles published in scientific journals and eight books in Danish, including, *En snegl på vejen: Betydningens naturhistorie* (1993), which was issued in English by Indiana University Press as *Signs of Meaning in the Universe* (1996), and, most recently, *Biosemiotik*, which was published by Ries, Forlag, København in 2005.



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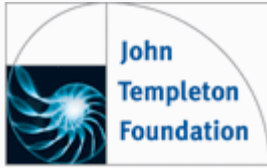
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A professor of mechanical engineering and engineering systems at the Massachusetts Institute of Technology, **Seth Lloyd** is interested in the role information plays in physical systems, particularly systems in the quantum realm. He is a principal investigator at the Research Laboratory of Electronics in Cambridge, Massachusetts, and an adjunct professor at The Santa Fe Institute. He works on problems having to do with how physical systems register information and move it about, how information is transferred and processed, and, most importantly, how the ways in which a system transfers and transforms information determine its behavior. His pioneering research in the fields of quantum computation and quantum communications resulted in the first technologically feasible design for a quantum computer, and he also has demonstrated the viability of quantum analog computation, proven quantum analogs of Claude Shannon's noisy channel theorem, and designed novel methods for quantum error correction and noise reduction. A graduate of Harvard College, Dr. Lloyd studied mathematics and philosophy of science at Cambridge University on a Marshall Scholarship, and then earned a Ph.D. in physics at The Rockefeller University in 1988. He held post-doctoral fellowships at the California Institute of Technology and at the Los Alamos National Laboratory. Joining the MIT faculty as an assistant professor of mechanical engineering in 1984, he was promoted to associate professor in 1988 and named to his present position in 2002. He has delivered numerous invited lectures throughout the United States, Europe, and Asia. His teaching and research has been recognized by a Lindbergh Fellowship, the 1985 Dirac Prize (Erice) given by the Institute of Physics, a Finmeccanica Career Development Professorship, and, most recently, MIT's 2001 Edgerton Prize. The author or co-author of more than 120 papers published in scientific journals, his first book, *Programming the Universe*, which was published earlier this year by Random House, argues that the universe is a system whose specific details and structures are created when quantum bits de-cohere—choose one path out of multiple possibilities—and that this process is identical to quantum computation.



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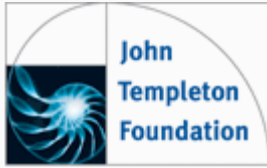
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Bernd-Olaf Küppers, professor of natural philosophy at Friedrich Schiller University in Jena, has long focused his attention on basic questions of natural science and the philosophy of science at the borders of physics, chemistry, and biology. His scientific interests cover a wide range of problems that are centered on the fundamental question of the origin and evolution of life. A graduate of Göttingen University where he studied physics, astrophysics, and mathematics, he went on to study with Nobel laureate Manfred Eigen and received a Ph.D. in biophysics in 1975. After a brief period of research at Columbia University, he worked at the Max Planck Institute for Biophysical Chemistry in Göttingen until 1993. The following year he was a lecturer in philosophy at the University of Heidelberg and held a distinguished visiting professorship awarded by the Japanese government. Named to his present position in 1994, he served as director of the world renowned Institute of Philosophy at the University in Jena. Dr. Küppers is a member of the Deutsche Akademie der Naturforscher Leopoldina and of the Academia Europaea, a corresponding member of the Académie Européenne des Sciences, des Arts et des Lettres, and an honorary member of the Center of Philosophy of the National Academy of Sciences in Buenos Aires. For his contributions to the theoretical foundation of biology, he was awarded the Woitschach Research Prize in 1971 and, in 1999, a honorary doctorate by Nagaoka University of Technology in Japan. Dr. Küppers is co-editor of the international journal *Philosophia Naturalis* and a member of the editorial boards of several other international journals. The author of some one hundred scholarly papers, he has served as editor or co-editor of three books and is the author of four others, including *Molecular Theory of Evolution* (1983 and 1985), a presentation of his physico-chemical theory of the origin of life, *Information and the Origin of Life* (1990), in which he approaches the evolution of living systems from the perspective of modern information theory, and, most recently, *Natur als Organismus*, a re-examination of Friedrich Schelling's philosophy of nature, which was published by Verlag Klostermann in 1992.



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The O'Hara Professor of Philosophy Emeritus at the University of Notre Dame, **Ernan McMullin** is an internationally-respected philosopher of science who has written and lectured extensively on subjects ranging from the relationship between cosmology and theology, to the role of values in understanding science, to the impact of Darwinism on Western religious thought. He is an expert on the life of Galileo. Educated at Maynooth College in Ireland, where he received an undergraduate degree in physics and a bachelor of divinity degree in theology, he was ordained a Roman Catholic priest 1949. He went on to study theoretical physics on a fellowship at the Dublin Institute for Advanced Studies and earned a Ph.D. in philosophy at the University of Louvain in 1954. Joining the Notre Dame faculty as an assistant professor of philosophy that same year, he became a full professor in 1967 and was named to the John Cardinal O'Hara Chair in 1984. Dr. McMullin chaired the Notre Dame department of philosophy from 1965 to 1972. He has been a visiting professor at the University of Minnesota, the University of Cape Town, the University of California at Los Angeles, Princeton, and Yale. A former Phi Beta Kappa National Lecturer, he delivered the Cardinal Mercier Lecturer at the (Flemish) University of Leuven in 1995 and the Reynolds Lecture at Baylor University last year. In addition, he has served as president of the American Catholic Philosophical Association, the Metaphysical Society of America, the Philosophy of Science Association, and the Western Division of the American Philosophical Association, as chair of the History and Philosophy of Science Section of the American Association for the Advancement of Science (AAAS), as a member of the executive committees of the History of Science Society, the Council for Philosophical Studies, and the Society of Christian Philosophers, and as a member of numerous scholarly and scientific committees, congresses, and panels. A fellow of the American Academy of Arts and Sciences, the International Academy of the History of Science, and the AAAS, he is an honorary fellow of St. Edmunds College, Cambridge, and has been awarded honorary degrees by Maynooth, the National University of Ireland, Loyola University (Chicago), Stonehill College, and Notre Dame. Among other honors, he has won the Aquinas Medal of the American Catholic Philosophical Association, the Centennial Medal of

John Carroll University, the Founder's Medal of the Metaphysical Society of America, and two Notre Dame faculty awards. Dr. McMullin has served on the editorial boards of a dozen academic journals and encyclopedia and is currently a member of the editorial boards of *Perspectives on Science*, *International Studies in the Philosophy of Science*, *Studies in the History and Philosophy of Science*, and *International Philosophical Studies*. The author of numerous scholarly articles and the editor of a series of monographs on logic published in the mid-1960s by Prentice Hall, he also has edited ten other books and is the author of *Newton on Matter and Activity* (1978) and *The Inference That Makes Science* (1992). His latest book, *The Church and Galileo*, a collection of essays he edited for the University of Notre Dame Press, was published last year to widespread acclaim. He is currently working on a study on rationality, realism, and the growth of knowledge.

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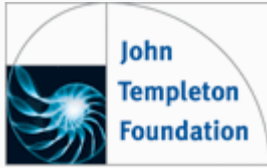
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Arthur Peacocke, the 2001 winner of the Templeton Prize, devoted the first twenty-five years of his career to teaching and research in the field of physical biochemistry, specializing in biological macromolecules and making significant contributions to our understanding of the structure of DNA. His principal interest during the past thirty-three years has been in exploring the relation of science to theology. After going up to Oxford, where he was a scholarship student at Exeter College and took first class honors in chemistry, he worked in the Physical Chemistry Laboratory, with Nobel laureate Sir Cyril Hinshelwood, and earned a D. Phil. in physical biochemistry in 1948. For the next eleven years, he taught at the University of Birmingham and then returned to Oxford as a fellow and tutor at St. Peter's College from 1959 to 1973. In addition to publishing more than 125 papers and three books in his field, he served as editor of *Biopolymers*, the *Biochemical Journal*, and a series of monographs on physical biochemistry published by Oxford University Press. While lecturing at Birmingham, Dr. Peacocke also had studied theology, and he was ordained a priest in the Church of England in 1971. He went on to serve as dean, and as a fellow, of Clare College, Cambridge, for eleven years. In 1985, he became founding director of the Ian Ramsey Centre at St. Cross College, Oxford, a position he held until 1988. To oversee the administration of a grant from the John Templeton Foundation, he resumed the directorship of the Centre, which studies issues in the relation of theology to science, from 1995 to 1999. A founder of the Science and Religion Forum in the United Kingdom, of the corresponding European society (ESSSAT), and of the Society of Ordained Scientists, a new dispersed religious order, he is an honorary chaplain and canon of Christ Church Cathedral, Oxford, and a former member of the board of advisors of the Templeton Foundation. Among the numerous invited lectures that Dr. Peacocke has delivered throughout the world are the 1978 Bampton Lecture at Oxford and the 1992-93 Gifford Lectures at St. Andrews University. He has been awarded the senior degree of D.Sc. as well as a D.D. by Oxford and honorary degrees from Georgetown University and De Pauw University. In 1993, he was made a member of the Order of the British Empire by Queen Elizabeth II. The author of a dozen books exploring the relationship

between science and religion, his studies include *Science and the Christian Experiment* (1971), which won the Lecomte du Neüy Prize, *Theology for a Scientific Age* (1990 and 1993), winner of a Templeton Foundation Outstanding Book Prize, *From DNA to Dean: Reflections and Explorations of a Priest-Scientist* (1996), *God and Science: A Quest for Christian Credibility* (1996), and *Paths From Science Towards God: The End of All Our Exploring* (2001), a volume in which he draws upon decades of creative reflection and writing on science and religion to expound various ways of thinking of God's presence and activity in the world and of re-vitalizing the enterprise of theology. Dr. Peacock's most recent books, in addition to *In Whom We Live and Have Our Being: Panentheistic Reflections on God's Presence in a Scientific World* (2004), a volume edited with Philip Clayton, and *Evolution: The Disguised Friend of Faith? Selected Essays* (2004), a presentation of his theistic view of a purposive evolution, are *The Palace of Glory: God's World and Science* (ATF Press) and, with Ann Pederson, *The Music of Creation* (Fortress Press), both published last year.

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THE
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APPROACH
INITIATIVE

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A symposium sponsored by
the John Templeton Foundation

17, 18, and 19 August 2006

University of Copenhagen

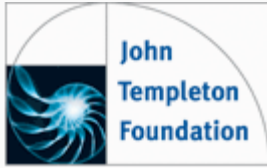
Participants

Terrence W. Deacon
John F. Haught
Jesper Hoffmeyer
Seth Lloyd
Bernd-Olaf Küppers
Ernan McMullin
Arthur Peacocke
Holmes Rolston III
Henry Pierce Stapp
Keith Ward
Michael Welker

One of the world's leading environmental ethicists, **Holmes Rolston III** has devoted his career to interpreting the natural world from a philosophical perspective. His work is unusually accessible to a wide audience, and he has been a pioneer in the application of ethical theory to actual environmental problems through consultancies with conservation and policy groups, including a Presidential commission and the United States Congress. A graduate of Davidson College, where he majored in physics and mathematics and was elected to Phi Beta Kappa, he earned a B.D. from Union Theological Seminary in Richmond, Virginia, and a Ph.D. in theology from the University of Edinburgh in 1958 before spending nearly a decade as a Presbyterian pastor in rural southwest Virginia. He learned the natural history of his surroundings in splendid detail and became an activist on local environmental issues. In his search for a philosophy of nature to complement his love for and curiosity about nature, he entered the philosophy program at the University of Pittsburgh and received a master's degree in the philosophy of science in 1968. He then embarked on a teaching career at Colorado State University where he was named a full professor in 1976 and University Distinguished Professor of Philosophy in 1992. Dr. Rolston delivered the Gifford Lectures at the University of Edinburgh in 1997-98, and in the course of nearly four decades, invitations to lecture or teach have taken him to all seven continents. His work has been recognized by the 2003 Templeton Prize and the Mendel Medal, which he was awarded last year by Villanova University. President of the Rocky Mountains - Great Plains Region of the American Academy of Religion and past president of the International Society for Environmental Ethics, Dr. Rolston is a founder and the associate editor of the influential academic journal *Environmental Ethics* and a member of the editorial boards of *Zygon: Journal of Religion and Science*, *Public Affairs Quarterly*, *Environmental Values*, *Conservation Biology*, the *South African Journal of Philosophy*, and the *International Journal of Wilderness*. He is the author of some seventy articles published in professional journals, fifty chapters in volumes of collected essays, and six books, including the groundbreaking *Environmental Ethics: Values in and Duties to the Natural World* (1988), a systematic presentation of his developed

views that provides a philosophical defense of policies aimed at preserving wild species and wilderness, *Conserving Natural Value* (1994), and *Genes, Genesis and God* (1999). With Andrew Light, he edited *Environmental Ethics: An Anthology*, which was published in 2003 by Blackwell.

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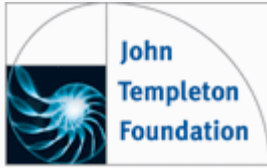
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Henry Pierce Stapp is a senior physicist at the Lawrence Berkeley Laboratory at the University of California, Berkeley, who, in the course of a half-century career in science, has made major contributions to our understanding of quantum theory. A graduate of the University of Michigan, he wrote his doctoral thesis under the direction of the Nobel laureates Emilio Segre and Owen Chamberlain, and earned a Ph.D. in physics from Berkeley in 1955. His dissertation provided a theoretical framework for the analysis of the scattering of polarized protons on polarized targets, which he subsequently used to analyze data, obtained from experiments being conducted at Berkeley's Lawrence Radiation Laboratory, in the first large-scale computer analysis in high energy physics. In 1957, he accepted the invitation of Wolfgang Pauli to work with him at the Eidgenössische Technische Hochschule in Zurich on fundamental problems in quantum theory. An essay he wrote then on "Mind, Matter, and Quantum Mechanics" was developed into a book of the same title, which was published thirty-five years later by Springer-Verlag. Dr. Stapp was named to his present position at Berkeley in 1962, and during the sixties, he was a principal mathematical and philosophical spearhead for the then new approach to quantum theory known as S-matrix theory. He proved, within the S-matrix framework, two basic theorems in elementary particle physics and an array of fundamental discontinuity equations. His thesis work on spin-correlation experiments led to intense involvement with Einstein-Podolsky-Rosen non-locality and to a large set of extensions of Bell's famous non-locality theory. As a visiting scientist, he worked in Munich at the Max-Planck Institute with Werner Heisenberg and at the University of Texas, Austin, with John Wheeler. His 1972 paper "The Copenhagen Interpretation" is widely recognized as a seminal work on the subject. Dr. Stapp's latest research focuses on the possible strong influence of quantum processes on the human brain, specifically on how the quantum Zeno effect can account for the ability of a person's conscious choices to causally influence his or her physical actions. He is the author of more than three hundred scientific papers, and, in recent years, he has written and lectured extensively on the social impact of such a revised understanding of the nature of human agency.



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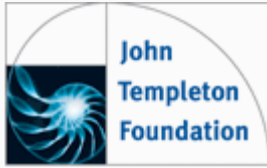
Keith Ward

Michael Welker

Recently retired as Regius Professor of Divinity at Oxford University, **Keith Ward** is one of Britain's foremost writers on Christian belief and doctrine in the light of modern scientific discoveries and in the context of other faith traditions. He has explored the tensions between the classical tradition of natural theology, with its atemporal and self-sufficient God, and the Biblical idea of a creative and responsive God, critically examined recent secular theories of human nature that have led to what he perceives as a subtly misconceived attack on the idea of the soul, compared the place of revelation and concept of creation in the major world religions, and sketched a revised Christian vision that looks to a convergent global spirituality. Dr. Ward is currently serving as Gresham Professor of Divinity at Gresham College, London. A graduate of the University of Wales, where he took a first-class honors degree in 1962, he holds a B. Litt. from Oxford and an M.A. and doctorate in divinity from both Oxford and Cambridge universities. He has been a lecturer at the University of Glasgow, St. Andrews University, and King's College, London. Elected a fellow and named dean and director of studies in philosophy and in theology at Trinity Hall, Cambridge, in 1976, he was appointed F. D. Maurice Professor of Moral and Social Theology at the University of London in 1986 and subsequently professor of the history and philosophy of religion, a position he held for five years before returning to Oxford in 1991. He has been a visiting professor at Drake University and at the Claremont Graduate School and lectured in India and New Zealand, as well as throughout the United Kingdom. Ordained a priest in the Church of England in 1972, he was canon of Christ Church, Oxford, for twelve years and currently serves as a member of the council of the Institute of Philosophy, the board of governors of the Oxford Centre for Vaishnava and Hindu Studies, and the board of advisors of the John Templeton Foundation. Dr. Ward is a fellow of the British Academy. Formerly co-editor of *Religious Studies*, he is the author of numerous articles and twenty-five books on theology and philosophy, including a four-volume comparative theology. The final volume, *Religion and Community*, was published in 2000. Among his most recent books are *God: A Guide for the Perplexed* (2002), a comprehensive account of how human beings have explored and developed their various beliefs

in life's spiritual dimension, *What the Bible Really Teaches: A Challenge for Fundamentalists* (2004), a contribution to the debate on the authority of scripture, and *Pascal's Fire: Scientific Faith and Religious Understanding*, a defense of the compatibility of a theistic view of ultimate reality with science's account of the nature of the universe, which was published by Oneworld earlier this summer.

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Michael Welker is a systematic theologian who works through the biblical traditions and through philosophical and sociological theories to address questions of contemporary culture. Warning against a reductionist systematics that can block, as well as guide, thought, he has focused on the interplay among religious, legal, moral, scientific, and other cultural codes that shape the ethos of the postmodern world. His work is exceptionally wide-ranging, and he has recently considered problems of pluralism in societies, cultures, and canonic traditions, as well as exploring notions of human personhood in pre-modern, modern, and contemporary periods. In *God the Spirit* (1992 and 1994), he articulates a broad spectrum of experiences of the Spirit, searches and quests for the Spirit, and skepticism toward the Spirit informing contemporary theological reflection. His interweaving of diverse testimonies and accounts of God and God's action among human beings illuminates how different people and different groups of people throughout history have served as bearers of God's revelation. Professor and chair of systematic theology in the Theological Faculty of the University of Heidelberg, he was director of the university's *Internationales Wissenschaftsforum* for ten years and is currently the director of its Research Center for International and Interdisciplinary Theology. Dr. Welker is a graduate of the University of Tübingen where he studied with Jürgen Moltmann and earned a doctorate in theology in 1973. Ordained in the *Evangelische Kirche der Pfalz*, he received a Ph.D. from Heidelberg in 1978. He was professor of systematic theology in the Theological Faculty of the University of Tübingen from 1983 to 1987 and, for the next four years, professor and chair of Reformed theology in the Theological Faculty of the University of Münster. He has held an honorary research fellowship at the Institute for the Advanced Study of Religion of the University of Chicago Divinity School and has been a visiting professor at McMaster University in Hamilton, Ontario, Canada, and the Princeton Theological Seminary as well as a guest professor at the Harvard Divinity School. Dr. Welker is a member of the Heidelberg Academy of Sciences and serves on the board of advisors of the John Templeton Foundation. A member of the Consultation on Science and Religion of Princeton's Center for Theological Inquiry since 1993, he

is a member of the editorial boards of *Dialog: A Journal of Theology*, *Evangelische Theologie*, *Jahrbuch für Biblische Theologie*, *Journal of Law and Religion*, *Process Studies*, *Soundings: An Interdisciplinary Journal*, *Verkündigung und Forschung*, and *Word and World*. He has published some 200 articles in scholarly journals and written or edited more than twenty books. In addition to four recent works in German, including *Kirche im Pluralismus* (2000), his latest studies are: *What Happens in Holy Communion* (2000), which has been published in six languages; (edited with John Polkinghorne) *The End of the World and the Ends of God: Science and Theology on Eschatology* (2000), which has been translated into Korean; (with John Polkinghorne) *Faith in the Living God: A Dialogue* (2001), which has been translated into Korean and Chinese; (edited with Ted Peters and Robert John Russell) *Resurrection: Theological and Scientific Assessments* (2002); and (with Wallace M. Alston) *Reformed Theology: Identity and Ecumenicity*, which was published in 2003 by Wm. B. Eerdmans. He has just finished editing a new volume on academic pneumatology and Pentecostalism for Eerdmans, which will be published in November as *The Work of the Spirit*.

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