SCIENCE AND RELIGION 3:  
COGNITIVE NEUROSCIENCE  
SocSci 130B; Psych 179; RS 100; Logic & Philosophy of Science 140B  
SYLLABUS Summer 2011

Note to students:
I am in the process of converting this class from a 10-week version to a 5-week version, for session 1. The complete syllabus will be available soon, so check back. In the meantime here are a few facts about the course.

You will need to be online Wednesday and Sunday evenings, starting sometime between 7:00 and 7:30 pm, for brief quizzes. You are given only 10 minutes to take the quiz, so it may be possible to arrange to take them even if you are at work or at another class at those times, as long as you have internet access. Make-up quizzes are not allowed, so this scheduling availability is a strict requirement for taking the course.

You will not need to come to campus for the final exam or project. This class can be taken from anywhere in the world, as long as you have reliable broadband internet access.

For answers to other questions, check the FAQ link for this class.

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course website:

Description:

What kind of thing are we humans? Why are we here? In our age, it is science that purports to answer these ancient questions, while technology promises to make us “more than human.” Religions have provided the powerful, history-shaping answers in the past, and it was the Judaeo-Christian-Muslim world-view that gave birth to modern science in Europe. What is the logical/epistemological relationship between these two most powerful engines of change? What will be and what should be their relationship in the future?

The New Atheists (Sam Harris, Richard Dawkins, Christopher Hitchens, Dan Dennett) believe that the epistemology of science and the epistemology of religion are radically different. Is this true? Do the process by which we form religious beliefs and the process by which we form scientific beliefs differ in essential ways? The same people argue that by making irrational “faith” a virtue, religious communities undermine civic practices of public reasoning that are essential to democracies. This is an important criticism. If true it would support their view that tolerance of people’s religious beliefs is not a virtue. Is this correct? Are the religions a public danger?

The development and convergence of genomics, stem-cell research, robotics, nanotechnology, and neuropharmacology hold out the promise of transforming and enhancing human nature, posing difficult religious and philosophical questions in what some refer to as our “posthuman” future. If we are truly to understand ourselves and our place in the cosmos, we must adopt interdisciplinary approaches that cut across fields of knowledge, institutional boundaries, cultural
borders, and religious traditions. We need to explore such questions as these:

Is there a human nature? Is human well-being to be sought in fulfilling essential human capacities, or is the concept of “human nature” a malleable social construct?

Are religious faith and spirituality compatible with contemporary scientific theories of the universe?

Is creation by God compatible with evolution by natural selection? Are human morality and religion biological phenomena determined by our genes? What are the strengths and weaknesses of “evolutionary psychology”?

Does quantum physics point to inadequacies in the mechanistic world-view that accompanied the birth of modern science? What role does consciousness play in quantum measurement?

There is something inescapably private and “first person” about consciousness. What accounts for this? Can third-person, objective science give a complete analysis of first-person, subjective experience?

The human brain manifests a massive complexity, comprising about 100 billion neurons and 100 trillion (10^{14}) synapses. But are we our brains? Or is there something we are that is irreducible to brain states? Is there a soul?

To what degree are we relational beings? Is the notion of the “subject of experience” inescapably relational?

In its early stages, the post-modern discussion of science and religion focused on new developments in 20th c. theoretical physics. Deep shake-ups in the mechanistic, reductionistic world-view that accompanied the rise of early modern science are underway. Now a second frontier is attracting increasing attention. Developments in the sciences point to the possibility that consciousness is fundamental in the universe.

The sciences of the mind -- cognitive science, neurobiology, psychiatry -- are in dialogue with millenia-long traditions of meditation and mental discipline. Neuroscientific evidence that experienced meditators have increased memory for words and images, increased capacity to maintain focused attention, and the ability over time to substitute positive emotions like compassion for negative emotions like fear, anger and anxiety raises questions about the potential (and the limitations) of introspective methodologies in the sciences of the mind. Do the meditative disciplines of the world’s great religions have something to teach us about neuroplasticity and the mind/brain’s capacity for self-transformation? Can introspective and phenomenological methods achieve sufficient objectivity to be incorporated into the neurosciences?

The approx. 1000 million of us who are Hindus believe that the individual human soul is one with an Infinite Consciousness that is the ultimate reality underlying phenomenal experience. The 330 million of us who are Buddhists believe that there are no independently existing entities, that all phenomenal being is inter-relational, but at the same time that each of us has an indestructible Buddha nature. What does contemporary cognitive neuroscience tell us about the nature of personal self-identity? How does the current scientific understanding of personal self-identity
compare with Hindu teaching? with Buddhist teaching? with the Judaeo-Christian-Muslim belief that humans are made in the image of God?

The monotheistic religions have placed a special emphasis on personal freedom and responsibility. What do we mean by “freewill”? Is our belief that we have freewill an illusion? Is freewill incompatible with a physicalist understanding of the world?

**Course objectives:**

This course is part 3 of a three-course series on science & religion. In the first course we discuss the relationship between religion and the physical sciences. In the second course we explore the relationship between religion and evolutionary biology. In this course we discuss religion and cognitive neuroscience, focusing especially on questions about the mind-brain relation, the biological basis for meaning and agency, neural plasticity, self-transformation, the top-down causality of mental states, consciousness, and the nature of self-identity or the “soul”.

By the end of this class the successful student will have a basic understanding of the representational/computational theory of mind, as well as its embodied and “extended” nature. She will be familiar with neuroscientific research that bears on the nature of self-identity, consciousness, self-consciousness, decision-making, and religious experience. She will understand the major philosophical theories of personal self-identity. And she will have sufficient understanding of 3 prevalent philosophic world-views (reductive physicalism, non-reductive physicalism, and “conscious realism”) to make well-reasoned evaluations of religious doctrines about the “soul”.

**Faculty Collaborators & Guest Speakers.** The following collaborators are guest speakers in the 3-course series:

**Francisco Ayala, Ph.D.** is the Donald Bren Professor of Biological Sciences in the Department of Ecology and Evolutionary Biology; Professor of Philosophy in the School of Humanities; and Professor of Logic and the Philosophy of Science in the School of Social Sciences at UCI. Dr. Ayala has published more than 900 articles, authored or edited 30 books, and is a member of the National Academy of Sciences. He chaired the committee that wrote the National Academy of Science booklet, *Science, Evolution, and Creationism*. Prof. Ayala will speak on the implications of Darwinism for both science and religion.

**Jeff Barrett, Ph.D.** is Professor of Logic & Philosophy of Science at UCI. His book *The Quantum Mechanics of Minds and Worlds* (Oxford University Press, 2001) is a major contribution to the philosophy of quantum mechanics. Prof. Barrett will speak on Hume, miracles, and religious knowledge.

**Warren S. Brown, Ph.D.** is Professor of Psychology at Fuller Graduate School of Psychology and Director of the Lee Edward Travis Research Institute. His research includes study of cognitive deficits associated with pathology of the corpus callosum; child development and adult aging; and evoked EEG potentials in mental activity and psychopathology. He is co-author of the book *Did My Neurons Make Me Do It?* (Oxford, 2007) with Nancey Murphy. He will present a neuroscience-based model of downward causation of the mental on the physical.

**Michael Dennin, Ph.D.** is Professor of Physics & Astronomy in the School of Physical Sciences at UCI. He is a nationally known expert on condensed matter and biological physics. Prof.
Dennin will speak on quantum mechanics and on the philosophical issue of reductionism in physics, using examples from his work on foams.

Stephen R. Friberg, Ph.D. is a physicist who has done pioneering experiments in quantum optics, optical telecommunications, and photonics. He is author of 46 technical papers, seven patents, numerous conference presentations, and several articles on the relationship between science and religion. Currently a senior principal scientist at KLA-Tencor (the main provider of diagnostic test equipment to the world’s semiconductor industry), he will give us a primer on quantum mechanics and some of the challenges it poses for common sense.

William Heidbrink, Ph.D. is Professor of Physics & Astronomy in the School of Physical Sciences at UCI. He specializes in experimental plasma physics. Professor Heidbrink's research involves studies of "fast" ions in magnetized plasma. He will speak on the topic of the role of theistic assumptions in science.

Donald Hoffman, Ph.D. is Professor of Cognitive Science, Professor of Philosophy and Professor of Logic & Philosophy of Science at UCI. He is author of more than 70 scientific papers and three books, spanning topics from perception to metaphysics. He will speak on perception as the construction of a virtual reality, the mind/body problem, and his theory that consciousness is ontologically fundamental.

Aaron Kheriaty, M.D. is a resident physician at UCI and the Founder/Director of UCI’s Psychiatry and Spirituality Forum. He graduated from the University of Notre Dame and earned his MD from Georgetown University. He will speak on the history of the relationship between psychiatry and spirituality.

Nancey Murphy, Ph.D. is Professor of Christian Philosophy at Fuller Theological Seminary, Pasadena, CA. She has published many articles on specific topics in the area of science & religion. She is co-author, with Warren Brown, of Did My Neurons Make Me Do It?

Ron Shigeta, Ph.D. is a recent graduate in biochemistry and biophysics from Princeton. He does analysis and genomics for Affymetrix, a leading biotech company. He will speak on genetic engineering and the deep significance of scientific discoveries for the future of religion.

Michael Spezio, Ph.D., Ph.D., M.Div. is Assistant Professor of Psychology at Scripps College and Visiting Scientist, Affective & Social Neuroscience, at Caltech. He has doctorates in biochemistry and cognitive neuroscience and a masters degree in divinity. His recent studies include face-to-face eye-tracking experiments, fMRI studies of affective touch and political judgments, and detailed analyses of how people with autism process faces. He will speak on the early development of self-consciousness and theory-of-mind in humans (as compared with non-human primates).

Kyle Stanford, Ph.D. is Associate Professor of Logic & Philosophy of Science at UC Irvine. His research interests are in philosophy of biology and philosophy of science. His recent book, Exceeding Our Grasp: Science, History, and the Problem of Unconceived Alternatives (Oxford University Press, 2006), is a critique of scientific realism. Dr. Stanford will offer philosophical criteria for evaluating the claims of evolutionary psychology.

Jessica Utts, Ph.D. is Professor of Statistics at UCI. She is interested in statistics education and in statistical studies of the paranormal. She was one of two statisticians chosen to prepare a report for Congress on the formerly classified Stargate Project that sought to determine whether
psychic functioning or “remote viewing” could be used to gather intelligence. She came to UCI from UC Davis in 2008.

**Anshu Vashishtha, M.D., Ph.D.**, did his residency in internal medicine and his Ph.D. in immunology. He has held several positions in the pharmaceutical industry. He is active in the Chinmaya Mission, and in the Swadhyay and Nithyananda Hindu communities. Dr. Vashishtha will speak on the relationship between Hindu metaphysics and western science.

**Roger Walsh, M.D., Ph.D.** is Professor of Psychiatry & Human Behavior in the UCI School of Medicine. His research interests include Asian psychologies, Asian philosophies, Asian religions, Buddhism, ecology, meditation, exceptional psychological wellbeing, postconventional development, and transpersonal psychology. He will be giving the class an introduction to meditation.

**Required texts:**

All the assigned readings are available on the internet or in the Course Reader *(CR)*, which can be purchased at [www.universityreaders.com](http://www.universityreaders.com).

**Evaluation and Grading**

TBA

**Grading scale:**

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<td>93 - 100</td>
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<td>A-</td>
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**Types of Communication**

In an online course, the majority of our communication takes place in the class forums. We will be engaging in lively conversations online. If the need arises, we can also use individual email.

**Netiquette**

In an online classroom our primary means of communication is written. Written communication has many advantages: more opportunity for reasoned thought, more ability to go in-depth, and more time to think through an issue before posting a comment. However, written communication also has certain disadvantages, such as a lack of the face-to-face signaling that occurs through body language, intonation, pausing, facial expressions, and gestures. As a result, please be aware of the possibility of miscommunication and compose your comments in a positive, supportive, and constructive manner.
Disabilities

If you need support or assistance because of a disability, you may be eligible for accommodations or services through the Disability Services Center at UC Irvine. For more information, contact the Disability Services Center at (949) 824-7494 (voice), (949) 824-6272 (TTY), www.disability.uci.edu/incomingstudents, or stop by the center at Building 313 on the UCI map.

Other policies:

Academic honesty is important. Anyone suspected of cheating or plagiarizing will be dealt with according to the directives in the UCI Academic Senate Policy on Academic Honesty. Students are encouraged to read this document, which is available on the web.

Schedule of assignments:

The complete syllabus, with grading information and the schedule of assignments, will be available soon at this location.