

## **REL 866: Religion, Science, and Technology: Issues in Encounter**

YDS Spring 2007

Tuesdays 6.30-8.30pm

### **Instructors**

Primary Instructor:

Willis Jenkins (Ethics, Yale Divinity School)

Co-Instructors:

Nihal de Lanerolle (Neuroscience, Yale School of Medicine)

James van Pelt (Yale Initiative in Religion, Science, and Technology)

Peter Van Ness (Biostatistics, Yale School of Medicine)

Visiting Instructors:

Priya Natarajan (Astronomy & Physics, Yale University)

Denys Turner (Theology, Yale Divinity School)

Oswald Schmitz (Population Ecology, Yale Forestry & Environment School)

John Hare (Philosophy of Religion, Yale Divinity School)

David Smith (Bioethics, Yale Center for Bioethics)

Nancy Kerk (Biology, Yale University)

Charles Townes (Physics, Nobel & Templeton Laureate)

Daniel Munteanu (Theology, University of Bamberg)

### **Summary**

This seminar examines a series of contemporary encounters of religion, science, and technology, asking how to construct responsible and useful interdisciplinary exchanges. It approaches the mutual questioning among science and religion about the interpretation of reality by working from contextual encounters, like the ethics of genetic modification, the morality of human nature, or the neuroscience of health. Over the semester distinguished guest instructors visit from astrophysics, theology, population ecology, philosophy of religion, bioethics, biology, and physics. Open to all graduate students; no background in religion or science required.

### **Method of the Course**

A course on religion and science can be taught many ways. Historical courses often focus on the rise of western science and the resulting development of independent authorities. Methodological courses may begin from the received alienation of religion and science and work out possibilities of collaboration, mutual understanding, and perhaps a new synthesis. Theological courses might revisit doctrines in light of scientific developments, while sciences-for-the-humanities courses provide a supplemental review of the sciences oriented toward religionists. Some recent courses of study focus on the “new atheism” of scientific naturalism in opposition to religious belief.

This course proceeds differently. Each week it focuses on the practical problem of religion-science relationships: how to construct a useful, responsible arena of interdisciplinary exchange? By moving through a series of science-religion issues, participants see how that problem changes as kinds of inquiry change, and learn to work with methodologies of encounter in several different contexts. As they do, participants develop not just a familiarity with religion and science debates, but the capacity to frame intelligible inquiries within it and to identify the fundamental questions which sustain it.

By letting contemporary technologies frame the encounter, this seminar proceeds contextually and pragmatically. In western modernity, religion and science have developed as separate disciplines, often antagonistic, sometimes indifferent, and occasionally collaborative. But contemporary technologies are

forcing new kinds of encounter. Human powers have come near to observing the origins of the universe at the same moment that they have begun to manage planetary ecological systems, to exert control over the genetic codes of life, and to assume responsibility for the human future. As they do, the religions and sciences find themselves addressing unprecedented social questions and placed in fresh arenas of mutual inquiry.

For example, the issue of genetic modification puts the practices in biological perspective and in conversation with theological ideas of nature. That raises the questions about the relation of technology and society and the role of the sciences and religions in that relation, finally pointing toward theological questions about the place of humanity within creation. The course thus introduces the field of religion and science by approaching a few central topics as they arise from contemporary social issues. It then engages the scientific and theological knowledges required to respond to those topics, moving then to consider methodological questions about their mutual relations and limits, and finally to the theological questions raised by those limits and conditions.

In order to work with a consistent religious traditions across weeks this course will primarily focus on Christian encounters with science. But the objective of the course is wider: for participants to make sense of contemporary religion and science debates in context by understanding the comprehensive issues at stake and working with methodologies of encounter.

### **Requirements**

**1. Weekly responses:** Before each class, submit a brief comment or question on the assigned reading of no more than 300 words. Do not try to summarize; instead select a passage that seems significant to you (because it is telling, or striking, or appalling, or importantly inexplicable), and say or ask something about it. You may relate your comment to multiple texts, but do not attempt to cover everything. Go to the Classes v.2 site and click on “Discussion.” Then “Reply” to the topic posted for that week. (Do not post a new topic unless you mean to start a separate discussion thread.) Submit these to the course website by noon the day of class. You may not submit a response or paper for a class you will not attend.

**2.** For one of the weeks during class you will write a longer **discussion paper of no more than 1800 words**, which you will come prepared to discuss in class. These papers are critical engagements with the week’s readings, interpreting one or several of the texts. You do not need to offer a comprehensive assessment, but should try to identify a relevant topic, question, or problem for class discussion. You may write from theological, scientific, philosophical, or social perspectives. Paste the text of your paper onto the website’s discussion board, and also submit as an attachment to the website’s “Drop Box” by 9am the day of class.

**3.** Over the semester you will **work in a small group** focused on a specific issue in the encounter of science, religion, and technology. Groups may select their own issue, with instructor approval. At the end of the course each group presents an analysis and interpretation of the issue, developed as an interdisciplinary brief for a general public audience.

### **Grading**

Participation, weekly responses, attendance	30%
Discussion paper	30%
Group project	40%

### **Texts**

Christopher Southgate, *God, Humanity, and the Cosmos* (2<sup>nd</sup> ed.)

Ian Barbour, *When Science and Religion Meet*

Brian and Deborah Charlesworth, *Evolution: A Very Short Introduction*

Philip Clayton and Jeffrey Schloss, eds., *Evolution and Ethics*  
V. S. Ramachandan, *A Brief Tour of Consciousness*  
[other readings are either available online through the links in this document or on the course website]

## **Course Schedule**

### **Jan 15: Introductions**

#### **Jan 22: Cosmology in Science and Culture** [Natarajan & Jenkins]

*Astrophysicist Priya Natarajan introduces the momentous changes from classical physics to quantum to the most recent in scientific cosmology. The readings for today include recent popular reports from cosmology, inviting questions about how scientific descriptions of the cosmos matter for everyday thoughts about the meaning of life (and other things) in the universe.*

#### Readings

[Cosmology articles](#) from M. Tegmark's site (try read one story from each bullet; start from the bottom)  
Ian Barbour, "Introduction" and "Astronomy and Creation" in *When Science and Religion Meet*, 1-6, 39-64.  
Lawrence Osborn, "Theology and the New Physics," in *God, Humanity, and the Cosmos*, 119-53.

#### **Jan 29: Scientific Ways of Knowing** [De Lanerolle & Van Ness]

*With methodological questions raised by last week's discussion, we examine the epistemological stakes. How do we know reality, and why? This week introduces some major theories of science and discusses how the encounter of religion and science has developed in response to them.*

#### Readings

Ian Barbour, "Four Views of Science and Religion" in *When Science and Religion Meet*, 7-38.  
Karl Popper, "[Science: Conjectures and Refutations](#)," in *Conjectures and Refutations*, 33-9.  
Thomas Kuhn, "[The Nature and Necessity of Scientific Revolutions](#)," in *The Structure of Scientific Revolutions*, 92-110.  
Charles S. Peirce, "[The Fixation of Belief](#)," *Popular Science Monthly* 12 (Nov 1877), 1-15.  
Antony Flew, "[Theology and Falsification](#)," in *Reason and Responsibility*, 48-9.  
Christopher Southgate and Michael Poole, "An Introduction to the Debate between Science and Religion" in *God, Humanity, and the Cosmos*, 3-22, 32-6.  
Paul D. Murray, "Truth and Reason in Science and Theology," in *God, Humanity, and the Cosmos*, 82-112.  
[optional] Stephen Thornton, s.v. "[Karl Popper](#)," *The Stanford Encyclopedia of Philosophy*.  
[optional] Frank Pajares, "[Outline](#) of Thomas Kuhn's *The Structure of Scientific Revolutions*."

#### **Feb 5: Theological Ways of Knowing** [Turner]

*Theologian Denys Turner introduces theological ways of knowing reality. How is faith supposed to matter for ordinary knowing? How does science matter for theology? Can theology matter for science?*

#### Readings

Thomas Aquinas, *Summa Theologiae*, Part One, Questions [1](#), [2](#), [3](#), [4](#), [12](#), and [13](#).  
Jürgen Moltmann, [Science and Wisdom](#), 1-29.  
John Polkinghorne, "[Four Approaches to the Dialogue between Science and Theology](#)," in *Science and the Trinity*, 6-32.

Paul D. Murray and David Wilkinson, "The Significance of the Theology of Creation within Christian Tradition," in *God, Humanity, and the Cosmos*, 39-62.  
[optional] Michael Welker, "[Science and Theology](#)," in *The Oxford Handbook of Religion and Science*, 551-61.

**Feb 19: Ecological Science and Religious Environments** [Schmitz & Jenkins]

*Ecologist Os Schmitz introduces competing models of ecological science. Those various interpretations make a difference for social responses to environmental problems. Meanwhile, religionists appeal to ecology in their own peculiar ways, often to justify theological innovations. Can ecology function as a natural and moral science? Can it teach society right relations with nature?*

Readings

Schmitz *Ecology and Ecosystem Conservation* [class resources]  
Lucbchenko et al. "Sustainable Biosphere Initiative" [class resources]  
Lynn White, "[The Historical Roots of our Ecologic Crisis](#)," *Science* 155, no. 3767 (1967): 1203-7.  
Michael Northcott, "[The Order of Creation](#)," in *The Environment and Christian Ethics* 164-79  
Lisa Sideris, "[Introduction](#)," in *Environmental Ethics, Ecological Theology, and Natural Selection*, 1-9.  
Philip Hefner, "[Nature Good and Evil](#)," in *Is Nature Ever Evil?*, 189-202.  
Langdon Gilkey, "[Nature and the Human Care of Nature](#)," in *Nature, Reality, and the Sacred*, 143-57.  
[optional] Larry Rasmussen, [Earth Community, Earth Ethics](#), 248-69, 282-94, 322-48.

**Feb 26: Evolution** [De Lanerolle & Van Ness]

*De Lanerolle provides an overview of evolutionary science and its religious reception, focusing especially on reasons for its perceived threat (epistemological and theological assumptions). Van Ness reviews how scientific notions of chance, probability, and complexity have changed in the past several centuries and discusses the implication for these changes for the relationships between science and religion. How should we interpret nature?*

Readings

Brian and Deborah Charlesworth, *Evolution: A Very Short Introduction*.  
Ian Hacking, "[The Argument](#)," in *The Taming of Chance*, 1-10.  
Wolfhart Pannenberg, "[Contingency and Natural Law](#)," in *Toward a Theology of Nature*, 72-122.  
[recommended] National Academy of Sciences, "[Science, Evolution, and Creationism](#)."  
[optional] Christopher Southgate et. al, "Theology and Evolutionary Biology," in *God, Humanity, and the Cosmos*, 154-92.  
[optional] Ian Barbour, "Evolution and Continuing Creation," in *When Science and Religion Meet*, 90-118.  
[optional] John Hedley Brooke, "[Darwin and Victorian Christianity](#)," in *The Cambridge Companion to Darwin*, 192-213.

**Mar 4: Morality After the Emergence of Consciousness** [Hare]

*This week considers the evolution debates in another practical frame as it moves into the science of consciousness. If human nature is an evolutionary product, what should we make of morality? And what ethical conclusions should we draw from any answer? John Hare discusses the debates over religious and natural foundations of morality. How to interpret human nature?*

Readings

Philip Clayton, "Conclusion," in *Evolution and Ethics*, 318-36.

John Hare, "Is There an Evolutionary Foundation for Morality?" in *Evolution and Ethics*, 187-203.  
S. Mark Heim, "A Cross-Section of Sin," in *Evolution and Ethics*, 255-72.  
Stephen Pope, "[The Evolutionary Roots of Morality in Theological Perspective](#)," *Zygon* 33, no 4 (Dec 1998): 545-56.  
Michael Ruse, "Evolutionary Ethics Past and Present," in *Evolution and Ethics*, 27-49.  
Jeffrey P. Schloss, "Introduction," in *Evolution and Ethics*, 1-26.  
Christopher Southgate *et. al.*, "Theology and Evolutionary Biology," in *God, Humanity, and the Cosmos*, 154-61, 182-8.

**Mar 25: Human Nature: Neuroscience, Health, and Spirituality** [Van Ness & De Lanerolle]

*What to make of the practices of being human after the knowledge of evolution? De Lanerolle introduces the neuroscience of experience. Van Ness introduces recent research into the associations of religious factors with various health outcomes, and into the roles that religious organizations play in promoting health.*

Readings

Antonio Damasio, "[How the Brain Creates the Mind](#)," *Scientific American* 281, no. 6 (Dec 1999): 112-7.  
T. E. Seeman, L. Fagan, and M. Seeman, "[Religiosity/Spirituality and Health: A Critical Review of the Evidence for Biological Pathways](#)," *American Psychologist* 58, no. 1 (Jan 2003): 53-63.  
P. H. van Ness, "[Theology and Epidemiology as Complementary Perspectives on Aging](#)," *Journal of Religious Gerontology* 15, no. 3 (2003): 25-40.  
Fraser Watts, "Psychology and Theology" in *God, Humanity, and the Cosmos*, 193-212.  
Carl Zimmer, "[The Neurobiology of the Self](#)," *Scientific American* 293, no. 5 (Nov 2005): 93-101.  
[recommended] V. S. Ramachandran, *A Brief Tour of Human Consciousness*.

**Apr 1: Modifying Humans: Technology and Anthropology** [Smith & Van Pelt]

*Now we integrate last week's discussion of human nature with the previous focus on evolutionary dynamism by considering ethical questions around technological modifications of the human. Bioethicist David Smith leads discussion on the promise and perils of medical technologies. What does technology portend for the human? Are there (or should there be) ethical limits to scientific and technological powers?*

Readings

Raymond Kurzweil, [The Singularity is Near](#), 205-325.  
C. Ben Mitchell, et al., [Biotechnology and the Human Good](#), 15-31, 137-58.  
Audrey Chapman, "[Genetic Engineering and Theology](#)," *Theology Today* 59, no. 1 (Apr 2002): 71-89.  
Celia Deane-Drummond, "Biotechnology," in *God, Humanity, and the Cosmos*, 361-92.

**Apr 8: Modifying Nature: Technology and Society** [Kerk & Van Pelt]

*Considering the future of the human last week raised the question of ethical limits to technology; this week we focus on those limits in relation to the natural. Biologist Nancy Kerk introduces the practices of genetic modification, and we discuss the forms of responsible technology and the category of nature as a moral concept.*

Readings

Bill Joy, "[Why the Future Doesn't Need Us](#)," *Wired* 8, no. 4 (Apr 2000): 238-62.  
John Hedley Brooke "[Improvable Nature](#)" in *Is Nature Ever Evil?*, 149-69.

Celia Deane-Drummond, Bronislaw Szerszynski, and Robin Grove-White, "[Genetically Modified Theology](#)," in *The Re-Ordering of Nature*, 17-38.

Philip Hefner, "[Technology and Human Becoming](#)," *Zygon* 37, no. 3 (Sep 2002): 655-66.

**Apr 15: Sustainability: Humanity, Nature, and Technology** [Townes, Van Pelt, & Jenkins]

*Picking up the questions developed from the previous two weeks, we now directly discuss the relation of technology to science, religion, and society. Readings focus on appraisals of those relations from the perspective of sustainability: what does a decent human survival require from religion, science, and technology?*

Readings

Aidan Davison, "[Building a Deformed World](#)," in *Technology and the Contested Meanings of Sustainability*, 93-114.

Jacques Ellul, "[Techniques](#)," in *The Technological Society*, 3-23.

Hans Jonas, "[The Altered Nature of Human Action](#)," in *Imperative of Responsibility*, 1-24.

Albert Borgmann, "[Power and Care](#)," in *Power Failure*, 81-94

Jacqui Stewart, "Technology and Christianity," in *God, Humanity, and the Cosmos*, 340-60.

**Apr 22: Natural Creativity, Divine Agency, and the Human Future** [Munteanu & Jenkins]

*Prepared by many subsidiary debates, including the last three weeks on technology and ethics, we close the course by returning to one of the most basic questions in the religion and science conversation: can we conceive of divine action in the world? How to do so while respecting the integrity of creation and therefore the reliability of science and responsibility of freedom? Theologian Daniel Munteanu introduces a Romanian Orthodox proposal.*

Readings

Ian Barbour, "God and Nature," in *When Science and Religion Meet*, 150-80.

Christopher Southgate, "A Test Case," in *God, Humanity, and the Cosmos*, 260-302.

Dumitru Staniloae, [The Experience of God](#), vol. 2, 1-7 and 21-63.

[optional] Alvin Plantinga, "[Divine Action in the World \(Synopsis\)](#)," *Ratio* 19, no 4 (Dec 2006): 495-504 (available online).

**Exam week meeting for group presentations (tba)**