

## ORIGIN AND EVOLUTION OF THE UNIVERSE: AN EXPLORATION OF THE WORLDVIEWS OF SCIENCE AND RELIGION Institution: LOS MEDANOS COLLEGE

Instructor: KATE GRAYSON BOISVERT

### Brief Description

This course examines the origin and evolution of the universe and life from the perspective of both science and religion. It first traces the historical relation of science and religion, analyzes ways they have related to each other in the past and then presents the current scientific theories of origin and evolution from cosmology, astrophysics, and biology. It then studies religious explanations from major world religions (Christianity, Judaism, Islam, Hinduism, and Buddhism), creation mythologies from indigenous peoples, and modern religious explanations which bring together the teachings of several world religions and also integrate religion with science.

By a method of inquiry central to all Los Medanos' interdisciplinary core courses, students analyze the differences and similarities of each approach with respect to content, method, and underlying value systems. They then analyze a range of viewpoints, within both scientific and theological communities, as to how science and religion relate to each other on these topics. They further clarify their own values and beliefs with respect to these issues and assess whether the scientific and/or spiritual worldviews of the present time can offer solutions to the world's global problems of values and potential ecological breakdown.

### Content

Historical Background. Following an introductory definition of terms the course examines first how cosmological worldviews of science and religion have related to each other historically in Western civilization. It uses key episodes in that history to illustrate a spectrum of ways in which science and religion can and have related to each other, from outright conflict to dialogue and integration (Barbour's typology). It follows this model in further analysis.

The course then examines the vast sweep of cosmic evolution, as understood in current scientific theories. It imbues this science-based, chronological flow with religious overtones by organizing the material into three natural phases, Creation, Evolution and Transformation (loosely correlated with the Hindu concept of the Trinity: God the Creator, God the Sustainer or Preserver, and God the Destroyer or Transformer). Following this idea, the major sections of the course are:

I. Origin of the Universe, the Solar System and Earth. Science. The first section examines theories in cosmology (the origin, structure and evolution of non-living matter), astrophysics (the evolution of matter through stars and the birth of the solar system), and geophysics (the evolution of the Earth), whose integration yields the scientific scenario of grand cosmic evolution. Pervasive throughout this section is the study of the scientific method, the power and limitations of science, cutting-edge dilemmas, theoretical challenges to standard models, and theological implications of various theories.

Religion. The course next studies accounts of creation from major world religions and mythological accounts from a number of ancient and/or indigenous peoples. A noteworthy feature of this course is the inclusion of work from modern Eastern philosophy which compares the concepts and terminology of several religions, blending them, where possible, with each other and showing their compatibility with modern science. Many religious and mythical accounts move very quickly into explaining the origin of living beings. In these cases, the religious accounts are studied as a whole, and simply revisited in the next section dealing with biological evolution.

Intercomparison. Initially the religious and mythological accounts are studied simply as straight narratives, and different typologies for categorizing them are applied. A deeper examination follows which seeks to understand the differences and similarities between myth, religious account, and scientific theory at many levels, including content, method, underlying values and purpose. We examine a range of theological interpretations of the same religious accounts, as well as a range of viewpoints about how they relate to scientific and other religious accounts.

II. The Origin and Evolution of Life. In the second section, in an exactly similar pattern, students analyze scientific and religious perspectives on the origin and development of living beings and the relation of these two perspectives to each other. We begin to examine what is happening at the present time in life's evolutionary history. What is the role of humankind with respect to the process? We also begin to examine how these issues affect our everyday life in society and what ethical questions naturally arise. What should be taught in public schools on the subject of our origins? How does and should genetic engineering fit into the scheme of evolution?

III. Future Evolution of the Universe, Earth and Life. Ideas from Science and Theology. In the final section the course continues to ponder questions about possible transformations affecting life and humanity at the present time and theories about the future of the Earth, humankind and the universe. We review findings in science regarding processes of change and transformation, future evolution of life, global ecology, the future of the sun, solar system and the large-scale universe and the theological implications of all these findings. We also study ideas from theologians, Eastern and Western, regarding future developments of Earth and humankind.

Questions to Ponder. A wide range of viewpoints from within science and theology are brought to bear on questions about possible global ecological breakdown, possibilities of genetic engineering, the search for extraterrestrial intelligence, and the terraforming of other planets. We consider more distant futures: What will happen to the Earth and humanity if and when the sun becomes a much larger, more luminous red giant star? Will the entire universe expand forever or close back upon itself, and what are the theological implications of either answer? How do these scientific questions relate to the eschatology of world religions and mythology?

The Place of Man in the Cosmos. Throughout our considerations of these issues runs an important question which has been a theme throughout the course: what is the true place and role of the Earth and the human being in the cosmos? Added to responses from Western theologians and scientists are some new voices from Eastern philosophy which reaffirm older Western ideas of the special spiritual place of the Earth and the human being in the cosmos, while at the same time acknowledging findings of modern science.

The Future of Science and Religion. At the end of the course, we reexamine how the relation between science and religion is developing at the present time and how scientists and theologians envision its future evolution. Is there a deep split between the two, at least in the public at large, if not among scholars? Is there a resultant worldwide crisis in values, preventing the resolution of global problems? Is a re-energizing of religious commitment the only solution, or might new worldviews emerging from science foster deeper understanding of our unity and the need for cooperative action in the world? In particular, could theories which suggest the unity of particles and forces at the moment of creation, the interconnectedness of consciousness and matter, or the influence of miniscule events upon distant large-scale systems (chaos theory) have a profound enough impact on an individual's thinking to influence moral and social action? Might the only solution be to bring together science and religion? Students make a final assessment as to whether or not, as they see it, science and religion can provide a unified, or at least cooperative, vision of reality as a basis for both understanding ourselves and improving the world.

#### Reading List

##### Required Texts.

Barbour, Ian. Religion and Science: Historical and Contemporary Issues (1997).

Duce, Ivy O. What Am I Doing Here? (1966).

Hawking, Stephen. A Brief History of Time (1990).

Peters, Ted. Cosmos and Creation (1989).

##### Optional Text

Jastrow, Robert. Red Giants and White Dwarfs 3rd ed. (1990).

Supplemental Reading (Supplemental readings will be used in a variety of ways. Lecture material will be drawn from many of these sources, and most will be on reserve for students to read or use in their research, as they wish. Small group work in class will focus on some of the readings; different groups may analyze and report back on different material. In some cases, I will hand out my own summary

notes of readings. Unfortunately, at our college, budgetary limitations and copyright laws prevent the ideal — printing a reader for students.)

Baba, Meher. *God Speaks: The Theme of Creation and Its Purpose* (1973), *Discourses* (1987).

Bibles. Hebrew and Christian.

Boisvert, Kate. "Interview with Stephen Hawking," (unpublished, 1988).

Boisvert, Kate. "A New View of Creation" (unpublished, 1981).

Brooke, John Hedley. *Science and Religion: Some Historical Perspectives* (1991).

Chatterji, J.C. *The Wisdom of the Vedas* (1973).

Colum, Padraic. *Myths of the World*.

Davies, Paul. *God and the New Physics* (1983); *The Mind of God* (1992);

*The Last Three Minutes* (1994).

Drees, Willem. *Beyond the Big Bang* (1990).

Edgerton, Franklin. *The Beginnings of Indian Philosophy* (1965).

Eliade, Mircea. "Myths and Mythical Thought," in Alexander Eliot, *Universal Myths* (1976);

*The Two and the One* (1965).

Eliot, Alexander. *Universal Myths* (1976).

Ferris, Timothy. *The Whole She-Bang* (1997).

Freidel, David, Linda Schele, and Joy Parker, *Maya Cosmos* (1993).

Freund, Philip. *Myths of Creation* (1965).

Ghose, Aurobindo. *The Future Evolution of Man* (1974).

Gish, Duane. *Evolution: The Challenge of the Fossil Record* (1986).

Gosling, David. *Science and Religion in India* (1976).

Haught, John. *Science and Religion: From Conflict to Conversation* (1995).

Heller, Michael. "The Abuse of Cosmology," *Mercury*, Nov/Dec 1997.

Jastrow, Robert. *God and the Astronomers* (1978).

Jayatilleke, K. N. *The Message of the Buddha* (1974), *Facets of Buddhist Thought* (1971).

Kalchuri, Bhau. *The Nothing and the Everything* (1981).

Laszlo, Ervin. *Evolution: The Grand Synthesis* (1987).

Lerner, Eric. *The Big Bang Never Happened* (1991).

Lovelock, James. *Ages of Gaia* (1988).

Mader, Sylvia. *Inquiry into Life* (1997).

Matt, Daniel. *God and the Big Bang* (1996).

Montagu, Ashley, ed. *Science and Creationism* (1984).

Mooney, Christopher, S. J. *Theology and Scientific Knowledge* (1996).

Morris, Henry. *What Is Creation Science?* (1987).

Nasr, Seyyed Hossein. *Introduction to Islamic Cosmological Doctrines* (1978),  
*Islamic Science* (1976), *The Need for a Sacred Science* (1993).

O'Flaherty, Wendy (intro). *Hindu Myths* (1975).

*Opposing Viewpoints Pamphlets* (1988)

“Great Historical Debates on Science and Religion”

“How Did the Universe Originate?”

“How Did Life Originate?”

“Are Science and Religion Compatible?”

Pandit, M. P., compiled by. *Guide to the Upanishads* (1967).

Peacocke, Arthur. *God and the New Biology* (1986).

Ranasinghe, C. P. *The Buddha's Explanation of the Universe* (1957).

Rees, Martin. *Before the Beginning* (1997).

Richardson, W. Mark and Wildman, Wesley, eds. *Religion and Science: History, Method, Dialogue* (1997).

Ruether, Rosemary. *Gaia and God* (1992).

Sadakata, Akira. *Buddhist Cosmology* (1997).

Samuelson, Norbert. *Judaism and the Doctrine of Creation* (1994).

Sheldrake, Rupert. *A New Science of Life* (1981).

Silk, Joseph. *A Short History of the Universe* (1997).

Smart, Ninian & Richard Hecht, eds. *Sacred Texts of the World: A Universal Anthology* (1982).

Smolin, Lee. *The Life of the Cosmos* (1997).

Stanley, Steven. *The New Evolutionary Timetable* (1981).

Starr, Cecie and Ralph Taggart. *Biology: The Unity and Diversity of Life* (1997).  
Swimme, Brian. *The Hidden Heart of the Cosmos* (1996), *The Universe Story* (1992).  
Templeton, John, ed. *How Large Is God?* (1997), *Evidence of Purpose* (1994).  
Templeton, John and Robert Herrmann. *The God Who Would Be Known* (1989),  
*Is God the Only Reality?* (1994).  
Thuan, Trinh Xuan. *The Secret Melody* (1995).  
Teilhard de Chardin, Pierre. *The Phenomenon of Man* (1959).  
Weinberg, Steven. *Dreams of a Final Theory* (1993).  
Worthing, Mark William. *God, Creation and Contemporary Physics* (1996).  
Weber, Renee. *Dialogues with Scientists and Sages* (1986).

## Evaluation Methods

Student learning will be evaluated as follows:

34% for research paper

33% for two unit exams and a final exam involving integrative essays

33% for homework assignments, in-class work, two shorter tests, and participation

(+5%) for extra-credit work

## COURSE SCHEDULE

### WEEK 1: INTRODUCTION AND OVERVIEW; HISTORICAL BACKGROUND — I

Overview of course content. Overview of questions course addresses and brief history of scientific and religious cosmological worldviews.

Course Logistics. Assessments. Course goals, topics, teaching/learning activities, expectations of students, methods of evaluation, grading and policies. Requirements for research paper.

Assessment of background, preparation in science and theology, academic and life goals, learning styles, and religious affiliation (optional). Paired sharing and introductions.

Definitions of Terms. Establish basic understanding of terminology: science and its different fields, religion, theology, spirituality, mysticism, branches of philosophy, etc. Group exercise to practice using and applying terms. Discussion of misuses and misunderstandings of terms.

Historical Background. Overview of science and religion in the ancient world. Roots of major world religions, religion and science in ancient Egypt, Greece, and Central America (Mayans). Religious homogeneity and science/religion unity in many ancient cultures.

Reading: Barbour, Introduction, Ch. 1.I, Glossary of Terms, pp.357-360 (select terms); Hawking, Ch. 1.

Supplementary Reading: Brooke, Science and Religion, Introduction; Davies, The Mind of God, Ch. 1;

Haught, Science and Religion, pp. 4-7; Templeton/Herrmann, The God Who Would Be Known, pp. 1-7;

Smart and Hecht, eds. Sacred Texts of the World (introductory pages before each chapter);

Drees, Beyond the Big Bang, Intro, pp. 1-9; Jones, Science and Mysticism, Part I.

## WEEK 2: HISTORICAL BACKGROUND — II

Medieval Period to the Present (Western culture). Medieval worldview (Aquinas, Dante, art and architecture of Gothic cathedrals). The Renaissance and the Copernican Revolution.

Galileo's conflict with the Church. The scientific method (importance of observation).

Galileo. Illustration of Galileo's astronomical discoveries, arguments with the Church, interrogation dialogue and recanting speech at Inquisition. Theories about why Galileo was brought to trial.

Newton and the grand synthesis. 18th to 20th century science. (Darwin covered more fully in Week 11)

Brief comparison of content and ways of knowing in past scientific and religious worldviews.

Themes in History of Western Science:

- 1) Increasing displacement of the Earth and humanity from a central place in the cosmos.
- 2) "Things aren't what they seem" (Theories increasingly contradict apparent reality.)
- 3) Continuing unification of diverse phenomena. Search for ultimate unified theory.

Reading: Barbour, Ch. 1, 2; Hawking, Ch. 2, pp. 177-182.

Supplementary Reading: Ferris, The Whole She-Bang, Ch. 1; Brooke, Ch. 2, Postscript;

Worthing, God, Creation, and Contemporary Physics, Ch. 1; Davies, God and the New Physics, Ch. 1;



Templeton & Herrmann, *The God Who Would Be Known*, Ch. 1, pp.7-13.

### WEEK 3: WAYS OF RELATING SCIENCE AND RELIGION

**Historical Analysis.** Examination of historical case studies and current examples illustrating a variety of ways science and religion relate. Student group work to devise spectrum of ways the two relate.

**Present Typologies.** Barbour's and Haught's typologies. Student group work to apply and expand on these typologies and identify and create illustrative dialogues. Self-assessment and discussion.

**Comparison of Ways of Knowing.** Emphasis on examining how science and religion relate with respect to ways of knowing and basic assumptions (methodology, models and paradigms).

**Assignment:** Submit choice for research paper topic

**Quiz:** Definitions, history, and ways of relating science and religion.

**Reading:** Barbour, Ch. 4; Peters, Preface; Peacocke, "Theology and Science Today" in Peters.

**Supplementary Reading:** Haught, *Science and Religion*, Ch. 1; Davies, *The Mind of God*, Ch. 1, 9;

Mooney, *Theology and Scientific Knowledge*, Ch. 1; Drees, *Beyond the Big Bang*, Ch. 5;

Templeton & Herrmann, *The God Who Would Be Known*, Ch. 1, pp. 13-end, 2; Brooke, Ch. 1;

Templeton & Herrmann, *Is God the Only Reality?*, Ch. 1; Templeton, ed., *How Large Is God?*, Part 1;

Richardson & Wildman, *Religion and Science*, Wildman chapter.

### WEEK 4: SCIENTIFIC THEORIES OF COSMOLOGY — I

**Small-Scale Structure in the Universe.** Description of basic particles and forces. Development of theories of fundamental physics in 20th century — quantum theories of light and particles, atomic and nuclear physics, elementary particles, grand unified theories, superstrings, search for the theory of everything. Theological implications of scientific knowledge about small-scale structure introduced. Video: "Creation of the Universe – Part I"

Assignments: Submit 5 bibliographical references for research paper; submit video response paper.

Reading: Hawking, Ch. 4,5; Jastrow, Ch. 1-3.

Supplementary Reading: Templeton & Herrmann, *Is God the Only Reality?*, Ch. 2; Ferris, Ch. 8, 11;

Silk, *A Short History of the Universe*, Ch. 4, 5.

## WEEK 5: SCIENTIFIC THEORIES OF COSMOLOGY — II

Large-Scale Structure. Description and organization of major astronomical objects—planets, stars, nebulae, galaxies, galaxy clusters and superclusters. Our location in the Milky Way Galaxy. Development of scientific theories of cosmology in the 20th century: observed expansion, general theory of relativity, Lemaitre's "Big Bang" theory, the Steady State theory, microwave background radiation, Big Bang models, deuterium abundance, age problem. Galaxy formation. Cosmic evolution through nucleosynthesis in stars and the birth of the solar system and Earth. Student group work to identify and discuss theological implications. Portions of videos: "Edge of Forever" and "The Lives of the Stars."

Assignments: Video responses due; progress report on research paper.

Reading: Barbour, Ch. 8 (I.1); Hawking, Ch. 3, 8; Jastrow, Ch. 1, 4-6, 9.

Supplementary Reading: Jastrow, *God and the Astronomers*; Ferris, Ch. 2, 6, 7; Swimme, *The Hidden Heart of the Cosmos*, Ch. 8-11; Silk, *A Short History of the Universe*, Ch. 1-3, 6-12; numerous articles from *Astronomy*, *Mercury*, *Astronomy* (98/99) and *Scientific American*.

## WEEK 6: SCIENTIFIC THEORIES OF COSMOLOGY — III

Current Developments, Theoretical Frontiers, Challenges to Standard Models. Trans-creation states (vacuum genesis), multiple universes, cosmological natural selection (Darwinism), boundary problem ( $T=0$ ), first millisecond, unification of all forces and particles in earliest universe, supersymmetry, superstrings, quantum cosmology, inflation, galaxy formation, dark matter, non-homogeneity in large-scale (foamy) structure. Alternative cosmological theories. Anthropic Principle. Limitations of science. Reflection on Significance. Theological Implications. Video: "Creation of the Universe — Part 2"

Assignment: Outline for Paper I due; Written review of one article

Quiz: Scientific Theories of Cosmology

Reading: Hawking, Ch. 9, 10

Supplementary Reading: Ferris, Ch. 9,10; Templeton & Herrmann, *Is God the Only Reality?*, Ch. 3, 4;

Barrow essay in Templeton & Herrmann, *How Large Is God?*; Thuan, *The Secret Melody*, Ch. 7;

Swimme, *The Hidden Heart of the Cosmos*, Ch. 12; Lerner, *The Big Bang Never Happened*;

Rees, *Before the Big Bang*, Ch. 10, 11, 13-15.

Articles: Kanipe, "Beyond the Big Bang", *Astronomy (Reader)*; Jayawardhana, "The Age Paradox", *Astronomy (Reader)*; Trefil, "What is Dark Matter?" and "Was the Universe Designed for Life?" in *Astronomy*, June 1997; Hogan, "Primordial Deuterium and the Big Bang", *Scientific American*, Dec. 1996; Davies, "The First One Second of the Universe", *Mercury*, May/June 1992; Ferris, "Inflating the Cosmos," *Astronomy*, July 1997; Goldsmith, "The Fingerprint of Creation" and Bartusiak, "Loops of Space," in *Discover*, *Astron. Issue No. 1*, 1993; Cowen, "The Debut of Galaxies," *Astronomy*, Dec. 1994; Linde, "The Self-Reproducing Inflationary Universe", *Scientific American*, Nov 1994.

Supplementary videos: "Cosmos," "The Astronomers", "Stephen Hawking's Universe" series.

## WEEK 7: JUDEO-CHRISTIAN VIEWS OF CREATION: SCRIPTURAL ACCOUNTS AND THEOLOGICAL INTERPRETATIONS; RELATION OF RELIGIOUS BELIEFS TO SCIENCE

Planetarium Presentation: Reading of Genesis I with planetarium effects, slides of Michelangelo's Sistine Ceiling and Haydn's "Creation" music.

Interpretations of Genesis I. A wide range from within Judaism and Christianity.

Begin Examining Ways of Relating Judeo-Christian Beliefs to Science. Examples of each of Barbour's 4 categories. Comparison of content, methodology, ways of knowing, models and paradigms. Emphasis on views of theologians. Student discussion in groups.

Concepts for comparison: Existence of God, Creation from Nothing, Need for Creator, Contingency,

Chance and Necessity, Continuing Creation, Design, Purpose, Ordering Principle, Nature of Time, God's Relation to Creation. Student group work to define and evaluate arguments and identify own position.

Assignment: Paper I due, Select culture for creation myth presentation.

Reading: Barbour, Ch. 8 (I, II); in Peters, ed.: Peacocke "Theology and Science Today"; Peters, "Cosmos as Creation"; Barbour "Creation and Cosmology"; Russell, "Cosmology, Creation and Contingency"; Pannenberg, "The Doctrine of Creation and Modern Science".

Supplementary Reading: "How Did the Universe Originate?" Opposing Viewpoints Pamphlet;

Ward, Religion and Creation, I.1, I.2; Morris & Parker, What Is Creation Science? Ch. 5-7;

Matt, God and the Big Bang, Part 2; Templeton & Herrmann, The God Who Would Be Known, Ch. 3,4,6;  
Haught, Ch. 2,5-8. Russell, essay in Templeton, ed. Evidence of Purpose; Mooney, Theology and  
Scientific Knowledge, Ch. 2; Heller, "The Abuse of Cosmology," Mercury, Nov/Dec 1997;

Stoeger, in Richardson & Wildman, eds. Religion and Science; Augustine, Confessions, XI-XII.

## WEEK 8: COMPARISON OF SCIENTIFIC COSMOLOGY TO JUDEO/CHRISTIAN BELIEFS ABOUT CREATION — CONTINUED

Continue Examining Ways of Relating Scientific Cosmology to Judeo/Christian Beliefs.

Comparison of beliefs/findings and ways of knowing: content, methodology, models, paradigms.

Emphasis on views of scientists. Comparison of scientists with theologians.

Concepts for Comparison (continued): Existence of God, Creation from Nothing, Need for Creator,  
Contingency, Chance and Necessity, Continuing Creation, Design, Purpose, Ordering Principle.

Student work in groups to divide up the reading, summarize and compare arguments of scientists and  
theologians, identify ways science and religion relate on these topics, and share their findings. Student  
group work to prepare creation myth presentation.

Assignment: Prepare creation myth presentation

Reading: Barbour, Ch. 8 (III-IV.3); Hawking, Ch. 11.

Supplementary Reading: Ferris, Ch. 12, 13, & "Contrarian Theological Afterthought";

Thuan, The Secret Melody, Ch. 8; Weinberg, Dreams of a Final Theory, Ch. XI;

Stannard, van Till, and Herrmann essays in Templeton, ed. How Large Is God?;

Drees, Beyond the Big Bang, Ch. 3; Swimme, The Hidden Heart of the Cosmos, Ch. 4, 13;

Davies, The Mind of God, Ch. 2, 3, 9; Gingerich and Davies essays in Templeton, ed.,

Evidence of Purpose.

## WEEK 9: MYTHOLOGICAL AND EASTERN RELIGIOUS ACCOUNTS OF CREATION

Creation Myths. Cosmologies of Islam, Hinduism and Buddhism.

Student creative presentations of world-wide creation myths. Analysis and discussion of types.

Scriptural accounts of creation from Islam and Hinduism. Buddhist views on the nature of the cosmos. Consciousness as primary reality in Eastern thought. Interpretation of Eastern accounts and their relation to science. Students select readings in mythology according to interest in culture.

Assignment: Prepare and present creative narrative of a creation myth from chosen culture. Submit written paper analyzing the myth the following class.

Reading and Supplementary Reading: Myths: Eliade, "Myths and Mythical Thought" and pp. 33-36 in Eliot, *Universal Myths*; Eliade, *Myth of the Eternal Return*, pp. 17-21, 49-92; Colum, *Myths of the World* (selected myths); Freund, *Myths of Creation*, Ch. 3-8; Khalchuri, *The Nothing and the Everything* (selected passages); Leeming & Leeming, *Dictionary of Creation Myths* (selected myths); Freidel, et al., *Maya Cosmos*, Ch. 2.

Islam: Koran (Arberry trans.); Nasr, *Islamic Science*, Ch. III, *The Need for a Sacred Science*, Ch. 1,2; *Islamic Cosmological Doctrines*, Prologue, Ch. I.2, II.6, III.12,14; Ward, *Religion and Creation*, I.3. Hinduism: *Hindu Myths* (O'Flaherty, intro), Part V Ward *Religion Creation* I.4; I Aurobindo Ashram, *Guide to the Upanishads* (selected entries).

Buddhism: Ranasinghe, *The Buddha's Explanation of the Universe*, Ch. 1-4; Sadakata, *Buddhist Cosmology*, Ch. 9; Jayatilleke, *Facets of Buddhist Thought*, 1-32, 62-91 and *The Message of the Buddha*, Ch. 5-8.

#### WEEK 10: INTER-RELIGIOUS EXPLANATIONS FROM MODERN INDIAN PHILOSOPHERS AND THEIR COMPARISON WITH SCIENCE

Creation and Purpose in Modern Indian Explanations. Meher Baba's explanation of how and why creation came to be. Concept of the evolution of consciousness and the journey of the soul through multifarious forms to achieve Self-Realization. Levels and planes of consciousness. Aurobindo Ghose's views on the relation of scientific and spiritual knowledge. Ways of knowing through direct experience. Mysticism.

Planetarium Presentation "In the Beginning". Music, slides and planetarium effects accompany narrations of world-wide creation myths, the Big Bang (retold as myth), and Eastern religious accounts.

Final review on Cosmology. Intercomparison of Eastern and mythological accounts with science and Western religion with respect to beliefs and ways of knowing about cosmology. Concepts for comparison: role and place of human consciousness in the universe, eternity and cyclicity of the

universe, immanence vs. transcendence of God, concept of God, theism, purpose of the universe and life, strings and threads as an essential unit of being.

Reading: Duce, *What Am I Doing Here?*; Barbour, Ch. 5 (III-IV).

Supplemental Reading: Baba, *God Speaks and The Silent Teachings of Meher Baba*; Khalchuri, *The Nothing and the Everything* (selected passages); Gosling, *Science and Religion in India, Part II*; Aurobindo Ghose, *The Future Evolution of Man*, Ch. II; Jones, *Science and Mysticism, Part II*, Ch. 9; Ward, *Religion and Creation, Part IV*; Eliade, *The Two and the One, Part I, IV*; Nasr, *A New Science of the Sacred*, Ch. 6-8; Weber, *Dialogues with Scientists and Sages*, Dalai Lama interview;

Drees, *Beyond the Big Bang*, Ch. 6; Ruether, *Gaia and God*, Ch. 1,2; Swimme, *The Hidden Heart of the Cosmos*, Ch. 13,14; Templeton & Herrmann, *The God Who Would Be Known*, Ch. 4.

Supplemental Videos: "Soul of the Universe", "A Still Small Voice".

## WEEK 11: SCIENTIFIC THEORIES OF THE ORIGIN AND EVOLUTION OF LIFE

History and current status of evolution theory. Darwin as case study in the science/religion conflict. Mutation and survival of the fittest as mechanisms of evolution. Basic biochemistry. Synthesis of amino acids and nucleotides from primordial chemicals. DNA and self-replication. Neo-Darwinian theory.

Scientific scenario for the origin and evolution of life and evidence supporting the theory. A wide range of views among scientists. Gradualism, punctualism, catastrophism. Holism vs. reductionism. Current developments, cutting-edge dilemmas, challenges, theological implications, implications for the place and role of the human being in the cosmos. Video: "One Voice in the Cosmic Fugue" (COSMOS)

Assignment: Unit I Take-Home Test (integrative essays) due, Video response due.

Reading: Barbour, Ch. 3 (I), Ch. 9 (I, II); Jastrow, Ch. 10, 11, 13-15;

Supplementary Reading: Starr & Taggart, *Biology: The Unity and Diversity of Life*, Ch. 17, 10, 21; Mader, *Inquiry into Life*, Ch. 23, 24; Templeton & Herrmann, *Is God the Only Reality?*, Ch. 5-7 &

*The God Who Would Be Known*, Ch. 5-8; Peacocke, *God and the New Biology*, Ch. 1-5;

Templeton, *Evidence of Purpose*, Intro pp. 10-20; Davies, *God and the New Physics*, Ch. 5;

Laszlo, *Evolution: The Grand Synthesis*, Ch. 4, 5; Sheldrake, *The New Science of Life*, or Peat and Briggs, "Rupert Sheldrake Seeks Hidden Forms" in *The Looking-Glass Universe*; Swimme, *The Universe Story*, Ch. 5-8; Cartmill, "Oppressed by Evolution," *Discover*, March 1998.

Supplementary Videos: Sheldrake, "Seven Experiments that Could Change the World"

## WEEK 12: JUDEO-CHRISTIAN BELIEFS ABOUT THE ORIGIN OF LIVING BEINGS AND COMPARISON TO SCIENTIFIC THEORIES

Genesis 1 and 2. A wide range of theological interpretations. Students identify and discuss ways of relating beliefs to science —from Biblical literalism to scientific materialism. History of creationism.

Diverging currents in theology. Ways of relating: conflict to integration.

Concepts for Comparison. Chance and design, status and role of the human being, forms of reductionism and levels of holism, sentience and purposiveness.

Societal issues and ethical questions relating to the topic. What should be taught in schools on the subject of the origin of living beings? What ethical constraints should society place on genetic engineering? Video: "God, Darwin, and the Dinosaurs"

Assignment: Paper II due

Reading: Barbour, Ch. 3 (II, III), Ch. 9 (III), 10 (I, II) ; Hefner, "The Evolution of the Created Co-Creator," and Timm, "Scientific Creationism and Biblical Theology," in Peters.

Supplementary Reading: Mooney, *Theology and Scientific Knowledge*, Ch. 4;

Brooke, *Science and Religion*, Ch. 8; *Opposing Viewpoints Pamphlets*, "Great Historical Debates," No. 3 and 4, "How Did Life Originate?," No. 1-6; Peacocke, *God and the New Biology*, Ch. 6-7; Morris, *What is Creation Science?*, Ch. 2-4; Gish, *Evolution*, Ch. 7; Montagu, *Science and Creationism* (selected essays); Wills, "A Sheep in Sheep's Clothing," in *Discover*, January 1998.

## WEEK 13: THE ORIGIN OF LIVING BEINGS IN EASTERN RELIGIONS AND MYTHOLOGY; SUMMARY OF HOW SCIENCE AND RELIGION RELATE ON THE ORIGIN OF LIVING BEINGS

Physical Evolution vs. Evolution of Consciousness. Eastern views of the role of the evolution of physical forms as vehicles for the evolution of consciousness; evolution, reincarnation, and involution; the winding and unwinding of sanskaric threads; special spiritual role of the human being and Earth in the universe. Interpretations of early mythologies.

Ways of relating Eastern religion to science. Implications of evolutionary theory in Hinduism, compatibility of evolutionary theory with explanations from Meher Baba and Aurobindo. Justification, limitations of ways of relating. Barbour's spectrum. Comparison on methods, models and paradigms.

Concepts for Comparison: Ways of knowing (revelation, faith, intellectual conviction, rational proof, direct experience, enlightenment, stages of knowing, God-Realization), purpose and goal of creation, concept of God, God's relation to nature and humanity, immanence vs. transcendence, concept of the Christ or Avatar, reincarnation, involution (spiritual advancement through higher planes of consciousness), strings and threads as an essential coded unit of being at many levels (superstrings, DNA, cords and ropes in mythology [tie to higher realms, fabric of universe], sanskaric threads in Eastern explanations). Societal issues: role and responsibility of the human being in the evolutionary process, genetic engineering, species extinction, public education about evolution in a secular society.

Assignment: Create visual arrangement (can be 3-D) illustrating how many scientific and religious viewpoints relate. Present to class. Unit II Take-Home Essays due (includes justification of visual).

Reading: Barbour, Ch. 10 (II), 11, 12; Duce, What Am I Doing Here?.

Supplementary Reading: Baba, God Speaks; Baba, Discourses, pp. 23-61; Baba, The Silent Teachings of Meher Baba; Khalchuri, The Nothing and the Everything (selected passages); Templeton & Herrmann, Is God the Only Reality?, Ch. 5-7; Davies, The Mind of God, Ch. 7, 8; Ranasinghe, The Buddha's Explanation of the Universe, pp. 243-254; many of the same readings as for Weeks 9 and 10.

#### WEEK 14: FUTURE OF THE EARTH, HUMANKIND AND THE UNIVERSE.

Scientific scenarios for the future of the Earth and universe. Processes of change and transformation (continuing evolution, chaos theory). Problems of predictability and extrapolation. Threat of global ecological breakdown (global warming, ozone depletion, rain forest destruction, species extinction), possibilities of genetic engineering and the future evolution of life, possible location of life beyond Earth and communication with extra-terrestrial intelligence, terraforming other planets for our habitation, death of our planet when the sun becomes a red giant, final collapse or eternal expansion of the universe.

Students who have chosen to examine any of these topics will make oral presentations to the class, giving background facts, a range of viewpoints and their own recommendation as to societal action on the issue.

Reading: Barbour, Ch. 10 (III.1); Jastrow, Ch. 12.

Supplementary Reading: Davies, The Last Three Minutes, Ch. 1, 9-11; Dyson, Imagined Worlds; Thuan, The Secret Melody, Ch. 6, 8; Gould, Questioning the Millennium; Ferris, Ch. 12; Rees, Before the Big Bang, Ch. 12, 14; Goldsmith and Owen, The Search for Life in the Universe, Ch. 17, 19, 21; Pendleton & Farmer, "Life: A Cosmic Imperative?" Sky and Telescope, July 1997; Barlow, "The Prodigal Sister" (about Venus), Mercury, Sept/Oct 1995.



## WEEK 15: VIEWPOINTS OF SCIENTISTS AND THEOLOGIANS ON THE FUTURE OF THE EARTH AND HUMANKIND

Religious Views of the Future. Science and Religion Compared. Eschatology in world religions and mythology. Theological implications of and challenges to scientific scenarios. Ways of relating scientific and religious views. Ethical questions and implications for social action arising from possible future scenarios. Reprise on the place of the human being in the cosmos and the relation of God and the human being to the natural world — comparison of science with Eastern and Western religion.

Assignment: Paper III due, Student Oral Presentations of papers

Reading: Barbour, Ch. 8 (IV, 3-4), 10 (III.2); Santmire essay in Peters.

Supplementary Reading: Templeton & Herrmann, *The God Who Would Be Known*, ch. 9, 10;

Ruether, *Gaia and God*, Ch. 3, 4; Eliade, *The Two and the One*, Ch. III; Matt, *God and the Big Bang*, Ch. 11; Nasr, *A New Science of the Sacred*, Ch. 4, 9, 10; Lovelock, *Ages of Gaia*, Ch 7; Laszlo, *Evolution: The Grand Synthesis*, Ch. 7, 8; Worthing, *God, Creation, and Contemporary Physics*, Ch. 5, 6; Haught, *Science and Religion*, Ch. 9; Drees, *Beyond the Big Bang*, Ch. 4; Ferris, Ch. 12; Ranasinghe, *The Buddha's Explanation of the Universe*, pp. 254-259.

## WEEK 16: FUTURE OF SCIENCE AND RELIGION

A Range of Viewpoints on the Future. Current spiritual crisis in values. Role of split between science and religion in contributing to the crisis. Ways to bring science and religion together. Could unified theories in science contribute to a more enlightened moral worldview? Scientists, theologians, and religious leaders on the future of the relation of science and religion. Discussion and student views.

Assignment: Take-home Final Exam questions (integrative essays) due; Extra-credit reports due.

Supplemental Reading: Baba, *Discourses*, v. 1, "The New Humanity"; Aurobindo, *The Future Evolution of Man*; Weber, *Discourses with Scientists and Sages*, Ch. 1; Chardin, *Phenomenon of Man*;

"Are Science and Religion Compatible?" *Opposing Viewpoints Pamphlets*; Rolston, in Richardson & Wildman, *Religion and Science*; Templeton & Herrmann, *Is God the Only Reality?*, Ch. 8, 9.