

## Science and Theology: In Search of Origins

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### Course Syllabus

#### Course Description

This course introduces students to the dialogue between the natural sciences and Christian religion. It explores the creative tension and dynamic relation between the two, how developments in science challenge Christian understanding and how theology can respond intelligibly to these challenges. In particular, the course focuses on the natural sciences' quests for origins: the quest for the beginning of the universe in cosmology, the quest for the beginning of the human species in evolution, and the quest for the beginning of an individual in genetic engineering. The theological implications of these quests are examined. Diverse and sometimes conflicting theological responses are considered. The quests for the beginning (in the past) are brought into proper perspective with a study on the concept of eschatology, the unique Christian promise of the end (in the future). The course concludes with a comparison of the epistemological principles in science and in theology and an exploration of the nature of theological science.

#### Course Goals

- 1) To introduce students to ways of relating science and religion.
- 2) To help students understand the concepts of the scientific quests for the origins of the universe, homo sapiens and the individual selfhood.
- 3) To explore the relevant concepts and doctrines in Christian theology that have a direct bearing on the scientific quests for origins.
- 4) To help students see how developments in natural sciences have implications on Christian theology and become aware of the dynamic relation between science and theology.
- 5) To help students arrive at theological responses to the challenges of natural science.
- 6) To help students understand the epistemological principles in science and in theology.
- 7) To help students gain a better understanding of God's interaction with the world and ultimately a deeper understanding of God himself. Course Calendar

#### **Week 1: Introduction**

Overview of the course.

A survey of students' view on science-religion relationship.

Brief historical background of the rise and development of modern science since the 17th century.

Increasingly active dialogue between science and religion in the second half of the 20th century. One of the fastest and most fruitful interdisciplinary dialogues in the last three decades.

Readings:

Heron 1980, 1-21 "The challenge of the Enlightenment," 196-214 "Theology and science"

Kang 1997 "Science and religion - challenge and response" & "Science and religion - a continuing dialogue"

McGrath 1999, 1-27 "Historical landmarks"

Polkinghorne 1995 "Contemporary interactions between science and religion"

Southgate 1999, 3-39 "Introduction to the debate between science and religion"

Tutorial assignment for Week 2:

1. How do you see the relationship between science and religion? Illustrate your view with some examples.
2. Do you think the idea that "science has disproved religion" is widespread among the young people? Ask five of your friends who are agnostics or atheists whether they agree that "science has disproved religion," and if so, whether it is one of the main reasons why they do not accept any religious faith.
3. Search the internet for useful web-sites on Science and Religion/Theology. Prepare an annotated list to share with the class.

**Week 2: Typologies of Science-Religion Relationship**

Various typologies to relate science and religion.

Typologies applied to the Chinese context - survey of science-religion relationship in Chinese history - applicability of typology

Readings:

Barbour 1997 chapter 4 "Ways of relating science and religion"

Drees 1996, 39-53 "Classification of areas of discussion in science-and-religion"

Haught 1995 chapter 1 "Is religion opposed to science?"

Kang 2000a "Christian theology and modern science - a re-examination of the three models"

Kwan 1998 chapter 15 "Dialogue between science and religion - four models," chapter 19 "Conflicts between science and religion"

Kwok 1989 chapter 6 "'Science' versus 'metaphysics' in the debate of 1923"

Li et al. 2000, 1-33 "Introduction"

Peacocke 1981, xiii-xv (on typology)

Peters 1998 "Science and theology: toward consonance"

Polkinghorne 1996b chapter 2

Russell 1989 "The conflict metaphor and its social origins"

Zhang et al. 1997 *Science and Philosophy of Life*

Tutorial for Week 3:

Video viewing: "A brief history of time" (Anglia Television/Gordon Freeman Production, 1993)

### **Week 3: Cosmology and the Quest for the Origin of the Universe**

From a static universe to modern cosmology in the twentieth century: a static universe, an expanding universe, steady state theory, the big bang theory, Hawking's cosmological model.

Some important concepts in modern cosmology: such as, black holes, singularities, the anthropic principle, etc.

Readings:

Barbour 1997 chapter 8 "Astronomy and creation"

Fang 1989 1-15 (on cosmology and philosophy), 171-90 (on the implications of *tao* for physics)

Haught 1995, 100-09 "Was the universe created? [First half]"

Hawking 1988, 115-41 "The origin and fate of the universe"

Southgate 1999, 119-30 (on modern cosmology, universal history, and the rediscovery of purpose)

White and Gribbin 1992 chapter 5 "From black holes to the big bang," chapter 11 "Back to the beginning"

Tutorial assignment for Week 4:

1. Read Polkinghorne 1988 chapter 4 "Creation and creator".
2. What are the important theological themes in the Christian doctrine of creation
3. "[The scientist] has scaled the mountains of ignorance; he is about to conquer the highest peak; as he pulls himself over the final rock, he is greeted by a band of theologians who have been sitting there for centuries." [Robert Jastrow, *God and the Astronomers* (New York: W. W. Norton, 1978), p.116.]" Do you agree with Jastrow's interpretation of the theological implications of the big bang cosmology? Discuss.

**Week 4: Creation and the Contingency of the Universe**

Creative tensions between science and theology from Copernicus to Hawking:

- Does theology have any stake in cosmological theories?
- Does cosmology always pose threats to theology?
- Is big bang the moment of creation?
- Is the biblical creation story compatible with the steady state theory or Hawking's cosmological model?

The Christian doctrine of creation:

- *creatio ex nihilo* (creation out of nothing)
- *creatio continua* (continuing creation)
- God the Creator vs the god of deism and the god-of-the-gaps
- contingency, intelligibility and created order
- creation and time

Design, chance and necessity: Does the universe have a purpose?

- design vs chance
- purpose vs meaninglessness

Readings:

Barbour 1997, 199-216 (on astronomy and creation)

The Bible: Genesis 1-2; Job 38-42 (on creation)

Haught 1995, 100-09 "Was the universe created? [Second half]"

Kang 2000d "The origin of the universe and the Christian doctrine of creation"

Kwan 1998 chapter 22 "Religion and modern physics," chapter 23 "Hawking and

scientific determinism"

McGrath 1998 chapter 2 "The quest for order"

Peters 1996, 276-79 "Stephen Hawking and the edge of time"

Polkinghorne 1988 chapter 4 "Creation and creator"

Southgate 1999, 267-73 (on history of the universe)

Welker 1991 "What is Creation?"

Wilkinson 1993, 103-21 "A designer way to God?"

Tutorial for Week 5:

No tutorial this week.

**Week 5: Dialogue between Cosmology and Theology Special Focus  
- Is the origin of the universe theologically significant?**

Is  $T=0$  theologically significant? Has theology any stake in the debates about the big bang?

Is big bang theory more biblical than other cosmological theory and thus more Christian?

Readings:

Craig 1993a, 63-76 "The Universe has a cause of its existence"

---- 1993b "The Caused Beginning of the Universe"

Hawking 1988, 171-75 "Conclusion"

Isham 1988, 397-405 "Quantum creation of the universe" & "Implications for theology"

Kang 2002 "Epistemology, Hawking and science-religion dialogue"

Peacocke 1979, 78-79 (on  $T=0$ ).

Polkinghorne 1994 chapter 4 "Creation"

Russell 1996 " $T=0$ : is it theologically significant?"

Stoeger 1992 "The origin of the universe in science and religion"

---- 1996 "Key developments in physics challenging philosophy and theology"

von Weizsacker 1992 "The origin of time is not in time"

Tutorial for Week 6:

Video viewing: A part of "Origins" (PBS video)

**Week 6: Evolution and the Quest for the Origin of Homo Sapiens**

Introduction to evolution theory.

Evolutionary debate in the mid-19th century.

Challenge and success of Darwinism.

Some recent debates about evolution.

Development of sociobiology.

Readings:

Barbour 1997, 221-30 "Evolution theory," 255-58 "Sociobiology and cultural evolution"

Brooke 1991, 275-91 (on Darwinism)

Jeeves and Berry 1998 chapter 5 "Evolution"

Olding 1991, 71-74 "Reductionism or Darwinism?"

Southgate 1999, 137-71 "Theology and evolutionary biology"

Tutorial assignment for Week 7:

1. Read Barbour 1997, 237-49 "Theological implications".
2. Identify the key ideas in the evolution theory that have implications for theology.
3. Be prepared to discuss one area of conflict in the theology-evolution encounter.

**Week 7: Imago Dei and the Uniqueness of Humanity**

Key ideas in evolution that have implications for theology:

- Challenge to the argument from design: chance (and randomness) vs purpose (and design); blind natural selection (blind watchmaker) vs a Creator God
- Challenge to human dignity: Is humanity different from animals or superior to them? Does evolution theory provide the ultimate victory of reducing life to material processes?
- Challenge to the authority of scripture: How do we understand the biblical account of the creation and fall of humanity in the light of evolution theory? Can the doctrine of the

original sin still stand?

- Challenge to the divine providence: struggle of survival of fittest vs a loving God

The Christian view of human nature:

*imago dei*, uniqueness, personhood and relationship with others, psychosomatic unity, fallen nature in need of redemption

Readings:

Barbour 1997, 253-63 "Biology and human nature," 267-72 "Biblical view of human nature"

Hefner 2000, 83-87 (on personhood and relationality)

Jeeves and Berry 1998 chapter 8 "Biblical portraits of human nature"

Kass 1988 "Evolution and the Bible: Genesis revisited"

Kwan 1998 chapter 21 "Conflicts between evolution and creation"

Murphy 1998 "Human nature: historical, scientific, and religious issues"

Tutorial for Week 8:

No tutorial this week.

**Week 8: Dialogue between Evolution and Theology Special Focus**

**- How should we interpret the origin?**

Either-Or or Both-And?

- Must theology choose between either evolution or creation?

- How can theology maintain a critical yet creative approach to evolution theory?

Should both evolution and creation be taught in biology class in school?

Readings:

Barbour 1998, 430-42 "Models of God's action in nature"

Haught 2000 chapter 4 "Darwin's gift to theology"

----- 1995 chapter 3 "Does evolution rule out God's existence?"

Murphy "Are evolution and Christian theology in conflict?" and "How might God relate to evolution?" (audio)

### Tutorial for Week 9:

Video viewing: - "Genetic engineering" (Hawkill Video produced in consultation with University of Wisconsin, 1998)

### **Week 9: Genetic Engineering and the Quest for the Origin of Self**

Biotechnology and advances in genetic research.

Benefits and dangers of genetic engineering.

The Human Genome Project.

Human cloning and asexual reproduction.

Nature or nurture debate.

### Readings:

Kang 1998 "To clone or not to clone?"

Liu and Duan 1999 chapter 13 "human genome project," chapter 14 "cloning"

Nelson 1994, 2-12 "The frontier of genetics," chapter 2 "Genetic advances in medicine," 65-72 "Is the Human Genome Project beyond criticism"

Shannon 2000, 27-32 "Humans and the new genetics"

Southgate 1999 chapter 11 "Biotechnology - a new challenge to theology and ethics"

### Tutorial assignment for Week 10:

1. Read Peters 1997 chapter 2 "Puppet determinism and Promethean determinism".
2. What do you understand by Peter's "reductionism in the gene myth"?
3. Does the charge of "playing God with DNA" presuppose a reductionist understanding of "gene myth"?

### **Week 10: Personhood and Freedom**

Genetic reductionism.

- Puppet determinism and Promethean determinism
- Do genes alone control the destiny of life?

Uniqueness of personhood.

Freedom and Responsibility.

- Does genetic engineering involve the sin of pride?



- Is nature sacred?
- Are we playing God or are we co-creators?

Readings:

Hefner 2000, 77-83 (on freedom)

Kang 2001a "Cloning human? - some moral considerations"

----- 2001d "Genetic engineering and reformed faith"

----- 2000c "Genetic revolution and the future of humanity"

Murphy "Reductionism and Non-Reductionism" (video)

Peters 1997 chapter 2 "Puppet determinism and Promethean determinism"

Pun 1995 chapter 9 "Moral issues arising from genetic engineering"

Rose 1998 chapter 1 "Biology, freedom, determinism," chapter 10 "The poverty of reductionism"

Welker 2000 "Is the autonomous person of European modernity a sustainable model of human personhood?"

Tutorial for Week 11: No tutorial this week.

**Week 11: Dialogue between Genetic Engineering and Theology Special Focus  
- Am "I" completely determined by my genetic origin?**

Am 'I' completely determined by my genetic origin?

Is original sin inheritable from crime gene?

Am I responsible for what my gene does?

Do genes deny or limit human freedom?

Readings:

Charles 1998 "Blame it on the beta-boosters: genetics, self-determination, and moral accountability"

Haught 1995 chapter 4 "Is life reducible to chemistry?"

Peacocke 1986 chapter 8 "God and the selfish genes"

Peters 1997 chapter 3 "The crime gene, stigma and original sin," chapter 7 "A theology of freedom"

Southgate 1999, 153-63 "Can reductionist programmes rule out the truth of religion?"

Tutorial for Week 12:

Video viewing: "Faith and reason" (PBS Video)

## **Week 12: Creation and Eschaton: The Beginning and the End**

The quest of the origin and the journey towards a promised future:

- Can the meaning of the universe, humanity and the self be fully determined by the past (the origin)?
- Can the past (the origin) be fully understood without a vision of the future?

The end of all things and the ends of God.

- eschatology as scientists see it
- eschatology with insights from science
- eschatology in the light of creation
- eschatology : divine purpose with an open future

Readings:

Barbour 1997, 8-9, 216-220 "Eschatology and the future"; 277-80 "The human future"

Peters 2000, chapter 4 "God and the continuing creation"

Polkinghorne 1996a chapter 7 "Ultimate questions"

---- 2000 "Eschatology: Some questions and some insights from science"

Welker and Polkinghorne 2000 "Science and Theology on the End of the World and the Ends of God"

Tutorial assignment for Week 13:

1. Read Polkinghorne 1998 chapter 1 "Belief in God in an age of science" and 1988 chapter 6 "Theological science".
2. What is a scientific fact? Is science completely objective? Is belief in God reasonable?
3. What would be a scientist's approach to theology?

## **Week 13: Theological Science**

Scientific epistemology and theological epistemology

- rationality and objectivity
- absoluteness and relativity

- personal character of knowledge
- autonomy in scientific and theological inquiries

#### Dialogical theology

- dialogical nature of theology: theology is dialogue
- genuine and fruitful dialogue in a pluralistic culture: multi-disciplines, different approaches, one world
- benefits of interdisciplinary dialogue for theology (and science)

#### Theology of humility

- faith seeks understanding
- awe and wonder

#### Readings:

Cole-Turner 1995 "Theology's future with science"

Kang 2000e "Theology is dialogue"

Kang 2001b "Epistemological relevance of dialogue between natural science and Christian theology"

Peacocke 1995 "The challenge of science to the thinking church"

Polkinghorne 1998 "Belief in God in an age of science"

---- 1988 chapter 6 "Theological science"

Torrance 1969, 131-40 "Scientific requirements of theology," 337-52 "Theology as dogmatic science"

Wolterstorff 1996 "Theology and science: listening to each other"

#### **Week 14: Review and Evaluation**

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## **Lectures**

The main course content is delivered in lectures. The lectures aim to guide students into thinking about the issues rather than to merely provide the answers. Diverse points of view are presented wherever possible. For each quest of origin, the lectures provide an overview as well as focus on a particular issue for more in-depth treatment and discussion. Questions during class are always welcome. Students will be asked to participate in brief small-group discussions during some lectures and to present their group's views. Short essays and tutorial assignments are designed to get students to reflect upon some issues throughout the course.

Given the nature of the course and the dearth of resources in Chinese, the course is essentially based on materials in English. However, a conscious effort will be made to include examples and materials from the Chinese context as far as possible to help students relate to the issues involved.

## **Tutorials**

Students are divided into small groups for weekly/biweekly tutorials. They are assigned readings as well as discussion questions in preparation for tutorials and for them to think about the issues involved in preparation for the following week's lecture. A tutorial session is the main arena for student-led learning. Small teams of students take turns to lead the tutorials. Students are expected to participate actively in discussion and debate.

The instructor's role is to ensure that the discussion stays focused rather than to control the result of the discussion. In some weeks, tutorials are used for video viewing.

## **Student Feedback**

A student evaluation will be conducted at the end of the course to find out students' response to various aspects of the course including the course outline, lectures, readings, assignments, essays, tutorials, assessments. This will help assess the effectiveness of course content and delivery and allow for syllabus amendment and other changes in future.

## **Course Requirements**

### Assessment

Class attendance and participation: 20%

Two short quizzes on assigned readings and lectures: 10%

3 short essays or 1 major paper: 30%

Final examination: 40%

### Tutorials

Students are expected to attend all classes. Absences are permitted only for legitimate reasons. Tutorial assignments are given in the course outline and students are expected to come prepared. Students are divided into small teams to take turns in leading the tutorials. They are encouraged to be creative in their approaches to the tutorials.

### Term Paper

Students are to submit three short essays that address the following questions:

1. Is the origin of the universe theologically significant? (due Week 5)
2. Must theology choose between evolution and creation? (due Week 8)
3. Is "self" completely determined by its genetic origin? (due Week 11)

Each essay should be 3-4 pages long, Times font 12, double-spaced.

A student may choose to write a major paper in place of the three essays, on a topic of interest to him/her that is related to the course content. The topic with an initial bibliography is subject to approval by the course director and is to be submitted by Week 5. Prior consultation with the course director is welcome. The final paper is due in Week 11. The length of the paper should be 9-12 pages long, Times font 12, double-spaced.

### Readings

Students are assigned a variety of readings to guide them into the topics concerned. They are not expected to cover the entire reading list for each week. However, they are

expected to complete at least some readings (approx. 50 pages) before class as they will be called upon to share their understanding of the readings.

Science and religion is a fast growing field. Students are encouraged to take advantage of internet resources and explore the databases of some important websites, such as counterbalance (<http://www.counterbalance.org/>), meta-list (<http://www.meta-list.org/>) etc. Students should also make use of specialised journals in the field such as *Zygon: Journal of Religion and Science*, *Science & Christian Belief*, and *Perspectives on Science and Christian Faith*.