

## Science and Religion: Historical and Contemporary Perspectives

Course: History of Science and Technology 3030

Institution: University of King's College, Halifax

Instructor: Professor Stephen D. Snobelen

“Religion and science are opposed . . . but only in the same sense as that in which my thumb and forefinger are opposed — and between the two, one can grasp everything.”

---Sir William Bragg (1862-1942), Pioneer in X-Ray crystallography

### Summary of course aims:

-- to trace and examine the relationships between religion and science through history as religion and science have themselves developed over the millennia

-- to determine and examine the relationships between religion and science in the postmodern world today

-- to identify and examine converges between religion and science in the past and today

-- to stimulate the development of a sophisticated and nuanced understanding of Science-Religion issues on the part of Arts, Journalism and Science undergraduates

-- to help promote dialogue between the sciences and humanities at King's and Dalhousie

-- to provide a flagship course for the King's History of Science and Technology programme, founded in 2000

### Course legacies:

-- this course will be offered yearly and will become a permanent and prominent part of the King's HOST and Dalhousie Science curricula

-- a course website will be created that will continue to grow in as the course continues to develop

-- the course is also intended to serve as the springboard for the creation of an interdisciplinary Society for Science-Religion Dialogue at King's and Dalhousie

### Summary of special features:

-- the combination of survey style of presentation (1 hour per week), which will introduce students to a wide range of themes in Science-Religion studies, with more in-depth treatments of special (but representative) topics in seminars (1 hour per week) and focussed-theme lectures (1 hour per week)

-- the use of an array of media, ranging from printed text, to demonstrations, images, film and the Internet

-- an inter-disciplinary focus, utilizing and synthesizing insights from history, philosophy, theology, literature and the social and natural sciences

-- this course had been constructed in consultation with faculty members in the humanities and sciences at King's and Dalhousie, along with students who will be taking the course in 2002-2003

-- guest lectures by scientists on specialist themes

-- two public dialogues will provide a forum for the wider academic community and the public to discuss select topics emanating from this course

-- in keeping with the King's College emphasis on primary source reading, the seminars will focus on historical and contemporary texts written by theologians and scientists; primary text sources will also underpin the general and specialist lectures

-- students will be asked to write research essays focussing on primary, rather than secondary, sources; the intent is to encourage students to graduate beyond interpretations of others to engage directly with the work of scientists and theologians

Core texts:

Mariano Artigas, *The mind of the universe: understanding science and religion* (2000).

Ian Barbour, *Religion and science: historical and contemporary issues* (1997).

John Brooke, *Science and religion: some historical perspectives* (1991).

W. Mark Richardson, et al, eds., *Faith in science: scientists search for truth* (2001).

Christopher Southgate, et al, *God, humanity and the cosmos: a textbook in science and religion* (1999).

Wentzel Van Huyssteen, *Duet or Duel? Theology and science in a postmodern world* (1998).

Course reader:

Science and religion: primary source selections, course reader prepared for HOST 3030 (2002).

Supplementary texts available at King's Library (reserve and reference):

John Brooke and Geoffrey Cantor, *Reconstructing nature: the engagement of science and*

religion (1998).

Gary B. Ferngren, ed., *The history of science and religion in the western tradition: an encyclopedia* (2000).

Alister E. McGrath, *Science and religion: an introduction* (1999).

Arthur Peacocke, *Paths from science towards God* (2001).

John C. Polkinghorne, *Science & theology: an introduction* (1999).

Wentzel Van Huyssteen, *The shaping of rationality: toward interdisciplinarity in theology and science* (1999).

Fraser Watts., ed., *Science meets faith: theology & science in conversation* (1998).

Select secondary readings: King's Library (reserve)

Schedule: Tuesday 2:30-4:30 (lecture/seminar/discussion); Thursday 2:30-3:30 (lecture/discussion)

Evaluation:

- Participation and attendance: 5% / 10%
- Primary source in-class presentation (one each term): 5% / 10%
- Primary source research essays (one each term): 15% / 30%
- Take-home assignments (two each term): 10% / 20%
- Examinations (one each term): 15% / 30%

Note: although students are encouraged to take both parts of the course for full benefit, the historical (Fall) and contemporary (Winter) parts of this course may be taken separately or out of order and are designed to stand alone

Historical Perspectives (Fall 2002)

1A. Introduction to the study of science and religion (10 September)

- overview of the course, its aims and its range
- review of core secondary texts
- discussion of primary texts and their centrality to the course
- explanation of course format and evaluation
- sampling of course content from ancient to modern examples

1B. Seminar: myths, models and metaphors

- the conflict thesis (warfare)
- complementarity (separation)
- integration (harmony)

- Stephen Jay Gould's "non-overlapping magisteria" (NOMA) model
- Margaret Osler's "appropriation-and-translation" model
- Wentzel van Huyssteen's "transversality" model
- texts: secondary readings on method and historiography (Barbour, Brooke, Osler, Van Huyssteen)

1C. Special topic: the history of the study of science and religion (12 September)

- an analytical history of the scholarly study of the engagement of science and religion
- current trends and new areas of research interest

Goals for week 1:

-- to introduce the field of science-religion studies, including the study of historical themes

-- to provide the requisite methodological and tools for this study

2A. The ancient roots of science and religion (17 September)

- Babylon: omens, portents and astrology
- Israel: order out of chaos
- Greece: a rational world
- ancient cosmogonies and accounts of origin: east and west

2B. Seminar: the ancient world

-- texts: Babylonian omenological documents, Plato's Timaeus and Aristotle

2C. Special topic: entrail divination (19 September)

- guest lecturer: Professor Daryn Lehoux, King's History of Science and Technology programme
- background to entrail divination with hands-on demonstration of ritual sheep liver dissection

Goals for week 2:

-- to reveal the ancient roots of the Science-Religion relationship

-- to encourage students to begin to engage with counter-intuitive and historically-remote modes of thought

3A. The study of Nature in Judaism (24 September)

- the Hebrew Scriptures
- Rabbinic Judaism
- the Kabbalah and mystical Judaism

3B. Seminar: ancient and Medieval Judaism

-- texts: the Hebrew Bible, Talmud, Maimonides and Kabbalistic texts

3C. Special topic: monotheism and the understanding of Nature (26 September)  
-- how monotheism in Judaism, Christianity and Islam has contributed to the shaping of western philosophy and science

Goals for week 3:

-- to emphasize the diversity of ancient and Medieval Jewish approaches to Nature  
  
-- to highlight the role Jewish and monotheistic thought played in the foundation of western science

4A. The study of Nature in Christianity (1 October)

-- the New Testament  
-- Patristic writings  
-- Augustine of Hippo  
-- biblical hermeneutics (the quadriga)  
-- (Greek) Orthodoxy

4B. Seminar: ancient Christianity

-- texts: New Testament, early church Fathers, Augustine

4C. Special topic: Augustine and scriptural exegesis (3 October)

-- Augustine on literal and allegorical interpretations of the Genesis account of Creation

Goals for week 4:

-- to establish the link between the interpretation of scriptural revelation and the reading of Nature

-- to establish the roots of contemporary Christian perspectives on science and religion

5A. The study of Nature in Islam (8 October)

-- astronomy  
-- qibla and the religious motivations of science  
-- biology and medicine  
-- alchemy  
-- Abu Hamid al-Ghazali  
-- Avicenna (Abu 'Ali Ibn Sina)  
-- Averroës (Ibn Rushd)

5B. Seminar: Islamic harmonizations of religion and science

-- text: Averroës, On the harmony of religion and philosophy

5C. Special topic: Islam and Islamic cosmology (10 October)

Goals for week 5:

- to recover the high religious and scientific culture of pre-modern Islam
- to highlight the important influence Islamic science had on the rise of western science

6A. Scholastic Christian theology and the sciences (15 October)

- Medieval Scholastic thought
- Aristotelianism
- science and religion in the universities
- the world view of Dante Alighieri's *Inferno*
- voluntarism and theories of divine action
- Ockham

6B. Seminar: voluntarism and the rise of modern science

- texts: primary and second texts on Medieval voluntarism

6C. Special topic: Aquinas, Aristotle and the Church (17 October)

- the Thomist synthesis of Aristotelianism and Catholicity

Goals for week 6:

- to identify and examine the conscious Medieval Christian engagement with Science-Religion issues and the centrality of theology to the study of natural philosophy
- to set up the Thomist backdrop to the Galileo affair

7A. New heavens, new earth: the Copernican Revolution and its religious impact (22 October)

- intuition, counter-intuition and religious tradition
- the unsettling of the Aristotelian world view
- the role of Platonism and mathematical realism
- the "dethronement" of humanity
- Biblical literalism and the hermeneutics of accommodation

7B. Seminar: heliocentrism and the interpretation of Scripture

- texts: Rheticus's "Treatise on Holy Scripture and the motion of the earth" and Galileo's "Letter to Christina"

7C. Special topic: Copernicanism and Lutheranism (24 October)

- Oslander's preface to Copernicus' *De revolutionibus*
- the "Wittenberg interpretation"
- Lutheran support for Copernicus

Goals for week 7:

- to revisit the connection between scriptural exegesis and interpretations of nature,

already established in week 4

-- to examine an historically-pivotal case study of the impact of science on religious thought

8A. Galileo and the Church (29 October)

- the main actors
- the Church's Aristotelian commitments
- theological and natural philosophical boundaries
- science versus religion, religion versus religion or science versus science?

8B. Seminar: the Galileo affair

- texts: correspondence and trial documents

8C. Special topic: the Galileo affair in history and interpretation (31 October)

- constructions and interpretations of the Galileo affair

Goals for week 8:

- to develop a sophisticated understanding of the much-misunderstood Galileo affair
- to prepare the ground for a public dialogue on Galileo and the Church

Public dialogue: Galileo and the Church (to be arranged for a weekday evening)

9A. The occult traditions and the rise of modern science (5 November)

- astrology
- magic (mathematical, natural and spiritual/demonic)
- witchcraft
- hermeticism and gnosticism
- microcosm/macrocosm
- alchemy and its religious goals

9B Seminar: the occult traditions

- texts: selections from Paracelsus, John Dee, Giambattista della Porta and alchemical writers

9C. Special topic: Johann Kepler's numerology and religious mysticism (7 November)

Goals for week 9:

- to move beyond tradition conceptions of religion to examine the influence of mystical and occult traditions on the rise of modern science

-- to reinforce an association between mysticism and aestheticism and science that will be explored later in the course

10A. God's Word and God's Works (12 November)

- the emblematic view of Nature
- the two Revelations
- the hermeneutics of Scripture and Nature
- natural theology and Design Argument
- the apologetics of physico-theology
- John Ray, *The wisdom of God manifested in the works of creation* (1691)
- William Derham, *Physico-theology* (1713) and *Astro-theology* (1715)

10B. Seminar: Protestantism and the rise of modern science

- religious ethics and the sociology of science
- texts: selections from the debate over the Merton thesis

10C. Special topic: the role of the Christian natural philosopher (14 November)

- Robert Boyle as "High Priest of Nature"
- Boyle's *Reconcilableness of Reason and Religion* (1675) and *The Christian virtuoso* (1690)

Goals for week 10:

-- to examine classic articulations of the Argument from Design, which will be discussed later in the course

-- to examine ways in which religious sensibilities (including Calvinist intra-mundane asceticism) can stimulate the pursuit of science

11A. Mechanism, materialism, dualism and the soul (19 November)

- scepticism, deism and atheism
- materialism and theological mortalism
- Pierre Gassendi and Christian Epicureanism (atomism)
- Baruch Spinoza and pantheism
- Blaise Pascal, fideism and the transcendence of the supernatural
- René Descartes and the mind/body problem
- the crisis of Cartesianism and mechanical philosophy

11B. Seminar: mind-body and spirit-matter dualism

- Descartes' *Meditations on first philosophy* (1641) and *Principles of philosophy* (1644)

11C. Special topic: resurrection and personal identity in the early modern period (21 November)

- guest lecturer: Professor John Barresi, Department of Psychology, Dalhousie University, co-author with R. Martin of *The naturalization of the soul: self and personal identity in the eighteenth century* (2000)



Goals for week 11:

-- to highlight the role non-religious thought played in the shaping of some forms of science and how religious scientists responded in order to preserve the religious content of science

-- to introduce the religious dimensions of the mind sciences, a subject explored further in week 20

12A. Newtonianism and the unity of God's Works (26 November)

-- Newton's theological and prophetic works

-- the religious meanings of Newton's Principia (1687) and Opticks (1704)

-- Absolute Space and God's omnipresence and (God's "sacred field" or the sensorium Dei)

-- Absolute Time and God's eternity

-- Richard Bentley's Boyle Lectures (1692)

-- William Whiston's, The astronomical principles of religion, natural and reveal'd (1717)

-- The Clarke-Leibniz debate (1717)

12B. Seminar: science and religious heresy

-- Copernicus, Bruno, Galileo, Descartes, Hobbes, Newton

-- text: Newton's General Scholium to the Principia (1713, 1726)

12C. Special topic: the disenchantment of the world (28 November)

-- David Hume's Natural history of religion and critique of the Design Argument

-- Immanuel Kant and the limits of the Design Argument

-- mechanism and the clockwork universe

-- Enlightenment legacies and the secularization of science

-- the desacralization of Newton's physics

-- Pierre-Simon de la Place and the redundancy of the "God hypothesis"

Goals for week 12:

-- to highlight the theological dimensions of Newton's Principia, the greatest work in the history of science

-- to account for the beginnings of the secularization of science and the roots of the conflict thesis

Contemporary Perspectives (Winter 2003)

13A. Orienting the contemporary debates (7 January)

-- overview of "Contemporary Perspectives" portion of the course

-- introduction for new students

-- review of lecture 1A (including methodology and historiography)

- methodological naturalism
- when science really does conflict with religion
- religion from science?

13B. Seminar: methodology

- texts: secondary readings on methodology (Barbour, Brooke, Osler, Van Huyssteen)

13C. Special topic: methodological gaps and common language (9 January)

- an account of contemporary approaches for building methodological and conceptual bridges between science and religion

Goals for week 13:

- to orient new and continuing students
- to introduce themes and methodology relevant to the study of contemporary science-religion issues

14A. Science and the world religions today: the religions of the West (14 January)

- Judaism (Orthodox, Conservative, Reformed)
- Christianity (Catholicism, Orthodoxy, Protestantism, Non-Conformity, Evangelicalism)
- Islam (Shiite, Sunni, Sufism)

14B. Seminar: science and western religion

- texts: representative contemporary documents from the great western traditions

14C. Special topic: Jewish, Christian and Muslim scientists (16 January)

Goals for week 14:

- to identify common themes and different perspectives relevant to science-religion dialogue among the great western religions
- to examine strategies employed by contemporary Jewish, Christian and Muslim scientists to integrate their faith with their science (such scientists will speak for themselves through texts, video or, whenever possible, personal visits to class)

15A. Science and the world religions today: the religions of the East (21 January)

- Hinduism
- Buddhism (Mahayana, Theravada, and Zen)
- Confucianism
- Taoism
- Shinto
- cycles versus linearity
- non-theist spirituality and nature

15B. Seminar: science and eastern religion

-- texts: representative contemporary documents from the great eastern traditions

15C. Special topic: Hindu, Buddhist, Taoist and Shinto scientists (23 January)

Goals for week 15:

-- to identify common themes and different perspectives relevant to science-religion dialogue among the great eastern religions

-- to examine strategies employed by contemporary Hindu, Buddhist, Taoist and Shinto scientists to integrate their faith with their science (such scientists will speak for themselves through texts, video or, whenever possible, personal visits to class)

16A. Genesis and Geology: Evangelical reconciliations of science and religion (28 January)

-- Scriptural geology and concordism

-- Calvinist "Christian philosophy" and openness to science

-- Alexander Chalmers

-- Hugh Miller

-- popular works of natural theology and natural history

-- the pre-Adamite theory (e.g., Isabelle Duncan's Pre-Adamite man, 1860)

16B. Seminar: Evangelical and Anglican natural theology

-- texts: selections from Chalmers, Miller and the Bridgewater treatises (1830s)

16C. Special topic: the religious and scientific career of Michael Faraday(30 January)

-- electromagnetics and election

Goals for week 16:

-- to recover the vibrant and positive culture of nineteenth-century Evangelical natural theology and natural history

-- to examine Michael Faraday's integration of his innovative scientific work at the Royal Institution and his deep commitments to his Sandemenian faith

17A. Darwin and the Origin of species (4 February)

-- Greek and Enlightenment proto-evolution

-- geology and theories of the earth

-- Romanticism and Nature

-- Chambers' deist Vestiges of Creation (1844)

-- the devolution of Darwin's faith

-- the natural theological and religion context of the Origin of species (1859)

-- differing religious responses to Darwin

- the apostles of secular Darwinism (Thomas Huxley and Ernst Haeckel)
- Alfred Russel Wallace and spiritism

17B. Seminar: evolutionary writings

- texts: selections from Chambers (*Vestiges*), Darwin (*Origin of species*, *Descent of man*), and Wallace (*Contributions to the theory of natural selection*)

17C. Special topic: the post-Darwinian controversies, 1860-1900 (6 February)

- the debate between Thomas Huxley and Bishop Wilberforce (Oxford, 1860)
- Christian attacks on evolutionary theory
- Christian Darwinism

Goals for week 17:

- to provide a balanced and sensitive account of an often controversial topic, the rise of Darwinism, through an exploration of the religious contexts of Darwin's work and the variegated religious response to it

- to provide a foundation for the discussion of Creationism in week 18 and biology in week 19

18A. The origins of scientific Creationism (11 February)

- fundamentalisms: Christian and Darwinian
- Flood Geology (Price, Morris and Whitcomb)
- taxonomy of Creationism (young earth, old earth, progressive)
- Creationist societies
- Creation and evolution in the school system
- the seven days of creation and seven hermeneutical strategies for Genesis 1

18B. Seminar: the Scopes' "Monkey" trial

- texts: *Inherit the wind* (film) and Edward J. Larson's *Summer for the gods* (1997)

18C. Special topic: Intelligent Design Theory (IDT) (13 February)

- Michael Behe's *Darwin's black box* (1996) and "irreducible complexity"
- William Dembski's *The design inference* (1998) and calculating probabilities
- Michael Denton's *Nature's destiny* (1998) and the biological anthropic principle

Goals for week 18:

- to outline the rise of Creationism in the wake of Darwin
- to examine the wide range of creationist and IDT points of view, hence discouraging an understanding of Creationism as a monolithic movement

Public dialogue: creation and evolution (to be arranged for a weekday evening)

Reading week: 17-21 February

19A. Science and biology (25 February)

- Genesis and genetics: the debate over human origins
- theistic evolution
- Teilhard de Chardin and the Omega Point
- the Human Genome Project and human identity
- sociobiology and evolutionary ethics
- bioethics and eugenics

19B. Seminar: bioethics

- discussion on religious and moral dynamics of biotechnology
- texts: material relevant to debates current in February 2003 (e.g., stem cells, human cloning)

19C. Special topic: evolutionary psychology and religion (27 February)

- guest lecturer: Dr Maureen O'Malley (Department of Biochemistry and Molecular Biology, Dalhousie)

Goals for week 19:

- to outline twentieth-century and current biological and biomedical trends that impact on religion
- to examine how evolutionary psychology is remapping such traditionally religious concerns as predestination and freewill

20A. Religion and the mind sciences (4 March)

- psychology
- psychoanalysis
- neuroscience
- human consciousness and the soul
- Freud on religion
- scientific interpretations of religion

20B. Seminar: the study of religious experience

- text: Fraser Watts and Mark Williams, *The psychology of religious knowing* (1988)

20C. Special topic: the science of religious experience (6 March)

- experiencing the divine and quantifying the transcendent
- miracles and faith healing
- prayer and illumination
- angels and visions
- near-death experiences
- insanity, demon-possession and exorcism

- astrology, voodoo and the occult
- Satan and the origin of evil

Goals for week 20:

- to build on material introduced in week 11 to examine current dialogue between religion and the mind sciences
- to focus on current theological and scientific explanations of religious experience

21A. The stewardship of creation (11 March)

- the death or birth of Nature?
- organic views of Nature
- green science and green religion
- Christian environmentalism
- environmental eschatology and eco-apocalypses
- science and Native American spirituality
- science and traditional African religion
- New Age spirituality
- the Gaia hypothesis

21B. Seminar: green religion

- texts: selections from the 1960s through 1990s

21C. Special topic: the “White thesis” revisited (13 March)

- Lynn White’s theory of the Christian roots of environmental exploitation
- White as a believing Christian
- learning from the White thesis

Goals for week 21:

- to explore contributions to environmentalism by religion and science and the possibility of a common ethic
- to analyse mis-readings of religion that have led to environmental exploitation and to examine ways in which religions and religious thinkers are seeking ways to recover a holistic view of humanity and nature

22A. Faith and physics (18 March)

- creation and cosmology
- astrophysics and large-number coincidences
- quantum mechanics
- relativity and religion
- entropy and heat death
- linearity and the thermodynamic arrow of time
- the religious implications of the Big Bang

- the anthropic principle in physics
- Frank Tipler's *The physics of immortality* (1994)

22B. Seminar: faith and physics

- texts: Paul Davies, *God and the new physics* (1983) and John Polkinghorne, *The faith of a physicist* (1994)

22C. Special topic: eschatology and the future of the cosmos (20 March)

- religious and scientific millenarianism
- meaning in the future of the cosmos

Goals for week 22:

- to highlight convergences between physics and religious motifs
- to compare ways in which religion and science view the future of the physical universe

23A. Science and religion in the media (25 March)

- breaking down common stereotypes
- science as a new religion
- religious metaphors and themes in science (e.g., Mitochondrial Eve, the "Book of Life")
- Klingon Gospel: theology in science fiction (Star Wars, Star Trek, Blade Runner, First Contact)
- religion, the plurality of worlds and the Search for Extra-Terrestrial Intelligence (SETI)
- Sci-Fi religious cults
- cyber faith: religion, and science and religion on the Internet

23B. Seminar: science and religion in the media

- texts: selections from print and television journalism

23C. Special topic: selections from film (27 March)

Goals for week 23:

- to dispel myths and misunderstandings of science and religion in the media (including the persistence of the Conflict Thesis)
- to examine news ways religious themes are resonating through science and science fiction

24A. Purpose and meaning in a postmodern scientific world (1 April)

- quantum theory
- indeterminacy (Werner Heisenberg's uncertainty principle)
- does God play dice?
- chaos theory

- the meanings of chance and change
- Artificial Intelligence (AI)
- human immortality and life after death
- the religious significance of human uniqueness
- the anthropic principle and the re-enthronement of humanity

24B. Seminar: the theology of aesthetics: beauty in Nature

- discussion of the status of beauty in Nature
- texts: visual images from the microcosmic to the macrocosmic (colour slide presentation)

24C. Science and religion: seeking common ground in the twenty-first century (3 April)

- the limits and uncertainties of science
- humility in science, humility in religion
- prospect for the re-enchantment of the world and the resacralization of science
- the religious significance of Nature's intelligibility
- when science and religion converge
- strategies of reconciliation and bridge-building

Goals for week 24:

- to examine current explorations by theologians and scientists of meaning in this postmodern age
- to set an agenda for future dialogue and local initiatives (including the foundation of a Society for Science-Religion Dialogue at King's and Dalhousie)