

## Topics List

**Introduction: Philosophy of Science****TOPIC 1: Origin of Matter and Energy****TOPIC 2: Origin of a Habitable Planet****TOPIC 3: Origin of Simple Life****TOPIC 4: Origin of Complex Life****TOPIC 5: Origin of Ecological Environments****TOPIC 6: Origin of Societies****Conclusion: Science and Religion****Major Themes Used to Guide Seminar Discussion**

The following themes are relatively independent of the topics covered and will provide a context for discussion through the entire course.

1. *Design vs. Non-Design* – We will examine the anthropic principle and fine tuning arguments in light of the question “Can random processes and natural law give us the universe we know to exist?”
2. *Faith vs. Fact* – We will examine the role of assumptions and paradigms in relation to what we know to be truth (fact) and what we assume to be true (faith).
3. *Determinism vs. Randomness* – We will examine the implications of determinism (predestination) vs. randomness (free-will) in the development of the universe given the different origins models.
4. *Comprehensibility vs. Unknowability* – We will consider principles that make the universe knowable and principles that limit our knowledge. How does paradox and finiteness of man affect the scientific endeavor?
5. *Reductionism vs. Holism* – We will consider the issue of complex interactions giving rise to properties beyond the reductionistic properties of the parts. The role of emergence and vitalism will also be discussed.
6. *Interventionism vs. Secondary Causation* – We will consider the issue of divine action in a physical universe. To what extent is God’s intervention detectable and to what extent is it through Secondary causation (explainable by physical laws).

**Required Texts**

Smith, J. M., and E. Szathmary, 2000: *The Origins of Life: From the Birth of Life to the Origins of Language*. Oxford University Press, 180 pp.

Morowitz, H. J., 2002: *The Emergence of Everything: How the World Became Complex*. Oxford University Press, 209 pp.

Wise, K. P., 2002: *Faith, Form, and Time: What the Bible Teaches and Science Confirms About Creation and the Age of the Universe*. Broadman and Holman Publishers, 287 pp.

**Additional Key References**

- Denton, M. J., 1998: *Nature's Destiny*. The Free Press, 454 pp.
- Gould, S. J., 1997: Nonoverlapping Magisteria. *Natural History*, **106**, 16-22.
- Gould, S. J., 1999: Non-Overlapping Magesteria. *Skeptical Inquirer*, **23**, 55-61.
- Kauffman, S., 1995: *At Home in the Universe*. Oxford University Press, 321 pp.
- Linde, A., 1998: The Self-Reproducing Inflationary Universe. *Scientific American*, **9**, 98-103.
- Meyer, S. C., cited 2003: DNA, and the Origin of Life: Information, Specification, and Explanation. [Available online at <http://www.discovery.org/articleFiles/PDFs/DNAPerspectives.pdf>.]
- Peebles, P. J. E., D. N. Schramm, E. L. Turner, and R. G. Kron, 1998: The Evolution of the Universe. *Scientific American*, **9**, 86-91.
- Provine, W. B., and P. E. Johnson, cited 2003: Darwinism: Science or Naturalistic Philosophy? [Available online at <http://www.arn.org/docs/orpages/or161/161main.htm>.]
- Ward, P. D., and D. Brownlee, 2000: *Rare Earth: Why Complex Life is Uncommon in the Universe*. Copernicus Springer-Verlag, 333 pp.

**Useful Web Sites**

- [www.originstalk.org](http://www.originstalk.org) – Anti-creationist discussion website
- [www.trueorigin.org](http://www.trueorigin.org) – Creationist response to originstalk
- [www.answersingenesis.org](http://www.answersingenesis.org) – Answers in Genesis (Ken Ham – Recent Creation)
- [www.icr.org](http://www.icr.org) – Institute for Creation Research
- [www.creationresearch.org](http://www.creationresearch.org) – Creation Research Society
- [www.grisda.org](http://www.grisda.org) – Geoscience Research Institute (Loma Linda)
- [www.arn.org](http://www.arn.org) – Access Research Network (Intelligent Design)
- [www.asa3.org](http://www.asa3.org) – American Scientific Affiliation (Primarily Theistic evolution)
- [www.reasons.org](http://www.reasons.org) – Reasons to Believe (Hugh Ross – Progressive Creation)
- [www.ncseweb.org](http://www.ncseweb.org) – National Center for Science Education (Anti-creationist)
- [www.santafe.edu](http://www.santafe.edu) – Santa Fe Institute (Complexity studies)

**Week 1 and 2, Introduction and Philosophy of Science**

The first four sessions provide the context for the course by presenting key issues with respect to science, philosophy of science, and religion. The student will also be introduced to the reading assignments, the structure of the course, and the expectations for their contributions. These sessions will be divided evenly between lecture and discussion led by the instructor.

**Reading:**

Smith, ch. 1-2

Morowitz, ch. 1-3

Wise, ch. 1-3

*Philosophy of Science*

Carlson, R. F. ed., 2000: *Science and Christianity: Four Views*. InterVarsity Press, 276 pp.

Dembski, W. A., 1999: *Intelligent Design: The Bridge Between Science and Theology*. Inter-Varsity Press, 312 pp.

Kitcher, P., 1982: *Abusing Science: The Case Against Creationism*. MIT Press, 208 pp.

Manson, N. A. ed., 2003: *God and Design: The Teleological Argument and Modern Science*. Routledge, 376 pp.

Moreland, J. P., 1989: *Christianity and the Nature of Science: A Philosophical Investigation*. Baker Books, 270 pp.

Moreland, J. P. ed., 1994: *The Creation Hypothesis: Scientific Evidence for an Intelligent Designer*. InterVarsity Press, 332 pp.

Moreland, J. P. and J. M. Reynolds ed., 1999: *Three Views on Creation and Evolution*. Zondervan, 296 pp.

Polkinghorne, J., 2000: *Faith, Science and Understanding*. Yale University Press, 208 pp.

Ratzsch, D., 2000: *Science and Its Limits*. InterVarsity Press, 191 pp.

**Week 3 and 4, TOPIC 1: Origin of Matter and Energy**

This group of four sessions will address the beginning of the physical universe and the role played by physical law. The origin of material components of the universe will be discussed from scientific and theological perspectives. Ordering principles due to physical laws will be related to the forms of matter relevant for the existence of life. Two themes arise from this material. The first is the unity of fundamental physical properties and the apparent diversity that can arise through complex interactions. The second is whether physical laws imply a deterministic universe. Several models for the origin of the universe will be presented along with their supporting evidence. In presenting the

models students will be directed to evaluate what makes a good model and the certitude of known “truth.”

**Reading:**

Morowitz, ch. 4-7

Wise, ch. 4-6

Peebles, et.al., (1998) “The Evolution of the Universe,” *Scientific American*.

Retrieved Feb. 5, 2002 from the world wide web

(<http://www.sciam.com/specialissues/0398cosmos/0398peebles.html>)

Linde, (1998) “The Inflationary Universe,” *Scientific American*. Retrieved Feb.

5, 2002 from the world wide web

(<http://www.sciam.com/specialissues/0398cosmos/0398linde.html>)

*Origin of Matter and Energy*

Barrow, J. D., 1999: *Between Inner Space and Outer Space*. Oxford University Press, 274 pp.

Craig, W. L., 1979: *The Existence of God and the Beginning of the Universe*. Here’s Life, 107 pp.

Greene, B., 1999: *The Elegant Universe: Superstrings, Hidden Dimensions, and the Quest for the Ultimate Theory*. W. W. Norton and Co., 448 pp.

Hawking, S. W., 1988: *A Brief History of Time: From the Big Bang to Black Holes*. Bantam Books, 198 pp.

Humphreys, D. R., 1994: *Starlight and Time: Solving the Puzzle of Distant Starlight in a Young Universe*. Master Books, 137 pp.

Leslie, J. ed., 1998: *Modern Cosmology and Philosophy*. Prometheus Books, 363 pp.

Smolin, L., 1997: *The Life of the Cosmos*. Weidenfeld and Nicolson, 358 pp.

Vardiman, L., A. Snelling and E. F. Chaffin, 2000: *Radioisotopes and the Age of the Earth: Creationist Research*. Institute of Creation Research, 676 pp.

**Week 5 and 6, TOPIC 2: Origin of a Habitable Planet**

This group of four sessions will address the need for a suitable planet for the existence of life. At the level of planet formation and composition the role of deterministic laws is not obvious. The issue of a “fit” planet for the existence of life is discussed in the context of three views; design, fine-tuning and the anthropic principle. Such content as planet formation, the minimal set of elements required for life, the fitness and uniqueness of water for life and the terrestrial habitat, and the significance of hydrogen and its unique contribution to life’s essential “inorganic processes” is presented. In addition an

overview of the biogeochemical cycles of nitrogen, carbon and oxygen and their relevance to the origin of life will be provided.

**Reading:**

Morowitz, ch. 8-10

Wise, ch. 7,10,13

Denton, ch 4 (The Fitness of the Elements and the Earth)

Ward and Brownlee, ch 3 (Building a Habitable Earth)

*Origin of a Habitable Planet*

Barrow, J. D. and F. J. Tipler, 1988: *The Anthropic Cosmological Principle*, Oxford University Press, 736 pp.

Lovelock, J., 1995: *Gaia: A New Look at Life on Earth*. Oxford University Press, 148 pp.

Newsom, H. E., and J. H. Jones eds., 1990: *Origin of the Earth*. Oxford University Press, 378 pp.

Ross, H., 1993: *The Creator and the Cosmos: How the Greatest Scientific Discoveries of the Century Reveal God*. NavPress, 185 pp.

Ward, P. D. and D. Brownlee, 2002: *The Life and Death of Planet Earth: How the New Science of Astrobiology Charts the Ultimate Fate of Our World*. Times Books, 240 pp.

**Week 7 and 8, TOPIC 3: Origin of Simple Life**

This group of four sessions will address the beginnings of life itself. Moving from simple organic molecules to a self-replicating entity involves the convergence of a number of factors. The source of the necessary components for life will be discussed in light of current scientific theories. Next several theories for the self-replicating predecessors to life are presented. Barriers with regard to specified complexity must be overcome to move from non-life to life. The need for divine intervention will be explored and compared to continuity models, which can be either naturalistic or theistic in their viewpoint.

**Reading:**

Smith, ch. 3-5

Morowitz, ch. 11-12

Meyer, (DNA, and the Origin of Life: Information, Specification, and Explanation)

Kauffman, (At Home in the Universe, ch. 4 - Order for Free)

*Origin of Simple Life*

Dembski, W. A., 2002: *No Free Lunch: Why Specified Complexity Cannot Be Purchased Without Intelligence*. Baker and Taylor Books, 403 pp.

Holland, J. H., 1995: *Hidden Order: How Adaptation Builds Complexity*. Perseus Books, 185 pp.

Kauffman, S., 2000: *Investigations*. Oxford University Press, 287 pp.

Prigogine, I. And I. Stengers, 1984: *Order Out of Chaos: Man's New Dialogue with Nature*. Bantam Books, 349 pp.

Thaxton, C. B., W. L. Bradley, and R. L. Olsen, 1984: *The Mystery of Life's Origin: Reassessing Current Theories*. Lewis and Stanley, 228 pp.

Wolfram, S., 2002: *A New Kind of Science*. Wolfram Media, 1197 pp.

### **Week 9 and 10, TOPIC 4: Origin of Complex Life**

This group of four sessions will address the problem of diversification. The process whereby a simple single cell develops variation in its structure is central to evolutionary theory. Once a cell develops internal organelles it then is allowed to explore diversification in its own structure giving rise to colonies of specialized cells. In the geological column there is an abrupt appearance of a series of basic body plans, which represent the major phyla of the animal kingdom. This is often called the “Cambrian Explosion” and some would claim it causes a problem for evolutionary theory. To what degree can evidence and the lack thereof be used to confirm or invalidate a scientific model?

#### **Reading:**

Smith, ch. 6-8

Morowitz, ch. 13-15

Wise, ch. 8

#### *Origin of Complex Life*

Behe, M. J., 1996: *Darwin's Black Box: The Biochemical Challenge to Evolution*. Free Press, 307 pp.

Brand, L., 1997: *Faith, Reason, and Earth History: A Paradigm of Earth and Biological Origins by Intelligent Design*. Andrews University Press, 332 pp.

de Duve, C., 1995: *Vital Dust: Life As a Cosmic Imperative*. BasicBooks, 362 pp.

Roth, A. A., 1998: *Origins: Linking Science and Scripture*. Review and Herald Publishing Association, 384 pp.

Smith, J. M., and E. Szathmary, 1998: *The Major Transitions in Evolution*. Baker and Taylor Books, 360 pp.

Whitcomb, J. C., and H. M. Morris, 1961: *The Genesis Flood: The Biblical Record and Its Scientific Implications*. Baker Books, 518 pp.

**Week 11 and 12, TOPIC 5: Origin of Ecological Environments**

This group of four sessions will address the problem of survival of the fittest, which is the central tenet of Darwinian theory. Survival of the fittest only makes sense within the context of a given environment where competition for limited resources leads to progressively more fit species. How much of the diversity present in the biological world is the result of “frozen accidents,” emergence, and design?

**Reading:**

Smith, ch. 9-11

Morowitz, ch. 14-23

Wise, ch. 11-12, 14

*Origin of Ecological Environments*Dawkins, R., 1987: *The Blind Watchmaker*. Norton, 332 pp.Dawkins, R., 1996: *Climbing Mount Improbable*. W. W. Norton and Co., 340 pp.Gould, S. J., 1989: *Wonderful Life: The Burgess Shale and the Nature of History*. W. W. Norton, 347 pp.Lester, L. P., and R. G. Bohlin, 1989: *The Natural Limits to Biological Change*. Probe Books, 207 pp.Mayr, E., 2001: *What Evolution Is*. Basic Books, 318 pp.Paley, W., 1850.: *Natural Theology*. American Tract Society, 440 pp.Smith, J. M., 1993: *The Theory of Evolution*. Cambridge University Press, 354 pp.Wells, J., 2000: *Icons of Evolution: Science or Myth?* Regnery Publishing, Inc., 338 pp.**Week 13 and 14, TOPIC 6: Origin of Societies**

This group of four sessions will address the problem of socialization. Survival of the individual is enhanced as it cooperates with members of its own kind. This is observed from insect colonies to human interactions. The advantage here is similar to the advantage gained by multi-cellular organisms over unicellular organisms. Are these interactions basically the same as cooperating cells within the body or is there fundamentally something different at this level? If socialization is just another manifestation of physical law, what is the significance of the individual within its society?

**Reading:**

Smith, ch. 12-13

Morowitz, ch. 24-30

Wise, ch. 9,15

Origin of Societies

de Duve, C., 1995: *Vital Dust: Life As a Cosmic Imperative*. BasicBooks, 362 pp.

Penrose, R. 1989: *The Emperor's New Mind: Concerning Computers, Minds, and the Laws of Physics*. Oxford University Press, 466 pp.

Wilson, E. O., 2000: *Sociobiology: The New Synthesis*. Harvard University Press, 697 pp.

**Week 15, TOPIC 7: Science and Religion**

This final week provides an opportunity to evaluate the theological implications of the various theories of origins. Since the main body of the course is completed, a broader perspective can be used. The final readings draw out some basic worldview implications of the three origins perspectives.

**Reading:**

Morowitz, ch. 31-36

Debate between William B. Provine and Phillip E. Johnson (Darwinism: Science or Naturalistic Philosophy?)

Science and Religion

Geisler, N. L., 1997: *Creating God in the Image of Man?: The New "Open" View of God, Neo-Theism's Dangerous Drift*. Bethany House Publishers, 192 pp.

Gould, S. J., 1999: *Rocks of Ages: Science and Religion in the Fullness of Life*. Ballantine Books, 241 pp.

Hagopian, D. G. ed, 2001: *The Genesis Debate: Three Views on the Days of Creation*. Cruxpress, 319 pp.

Kelly, D. F., 1997: *Creation and Change: Genesis 1.1 – 2.4 in the Light of Changing Scientific Paradigms*. Mentor, 272 pp.

Miller, K. R., 1999: *Finding Darwin's God: A Scientist's Search for Common Ground Between God and Evolution*. Cliff Street Books, 338 pp.

Pigliucci, M., 2002: *Denying Evolution: Creationism, Scientism, and the Nature of Science*. Sinauer Associates, 338 pp.

Schaeffer, F. A., 1972: *Genesis in Space and Time: The Flow of Biblical History*. InterVarsity Press, 167 pp.

Ward, P. D., and D. Brownlee, 2002: *The Life and Death of Planet Earth*. Times Books, 240 pp.