

Secrets of the Mad Scientists' Club
A Proposed Freshman Seminar Syllabus
Spring Quarter 2007

Prof. John Beacom, Departments of Physics and Astronomy
beacom@mps.ohio-state.edu

- **Description:** Are scientists really mad? Yes, in that we have an unusual way of looking at the world, one that allows us to very successfully interpret the past and predict the future. Although everyone is well aware of the power of science, most people have little idea of what it really means to be a scientist. We'll explore this, and the ways that scientists think, from a humanistic perspective. Non-scientists are welcomed.
- **Goals:** For students of all backgrounds to gain understanding of how science works. We will focus on the human side, and some of the exciting "big ideas," rather than technical details, as our point of entry. The selected snapshots will be drawn from physics and astronomy.
- **Schedule:** We will meet once a week, for one hour, at a time and place to be determined.
- **Materials:** There is no textbook. A course packet will be prepared from many sources.
- **Assignments:** The primary requirement is to read the assigned materials before class, when we will discuss them as a group, and you are expected to raise questions and share opinions.
- **Grading:** Grades will be assigned 50% based on class participation, and 50% based on written reactions to five of the readings (I'll match assignments to students). These mini-essays should be a few paragraphs long, and will be due the day before class, so that they can be shared online with the other students. The course will be graded on a letter scale, and will be worth one credit hour.
- **Outline:**
 - Week 1: My Background and Research
My improbable path to this point, or, why I'm not still cooking fries today. Some examples of the fascinating things being researched at OSU and beyond. How to see the invisible Universe with neutrino particles. [Assigned reading: none.]
 - Week 2: Views of Scientists
The modest goal of understanding the Universe and (almost) everything in it. What are the *real* scientific methods? What would Sherlock Holmes do? Or the MythBusters? Are the sciences and humanities in opposition? [Assigned reading: selected shorts.]
 - Week 3: Fun with Feynman
Richard Feynman was one of the great geniuses of modern physics, and also a brilliant and entertaining writer. Some of his illustrative escapades and clear scientific explanations. [Assigned reading: selections from Feynman's books.]

- Week 4: Going Old-School
A visit to the old days, when we walked to school uphill both ways, and the Sun revolved around the Earth. Galileo the revolutionary, and why he faced being burned at the stake. [Assigned reading: selections from Rocky Kolb's *Blind Watchers of the Sky*.]
- Week 5: The Making of a Cosmologist Today
What makes a person think that when they grow up they can understand the Universe itself? What's it like when they're right? [Assigned reading: selections from Alan Lightman's *Origins: The Lives and Worlds of Modern Cosmologists*.]
- Week 6: Institutions of Science
How scientists are trained in the medieval apprentice, journeyman, and master tradition. How they are employed and funded, and the corresponding freedoms and responsibilities. The international aspects of science. [Assigned reading: selected shorts.]
- Week 7: Anthropology of the Particle Physics Tribe
Ok, scientists are a weird group of people, so much so that an anthropologist lived among them and survived to report back on their beliefs, culture, language, and strange customs. [Assigned reading: selections from Sharon Trawick's *Beamtimes and Lifetimes*.]
- Week 8: Where Are the Women Scientists?
There are relatively few women in physics. What's up with that? Why and by how much is this finally changing now? Who are some of the great women physicists, and what can we learn from them? [Assigned reading: selected shorts.]
- Week 9: Scientists and Societal Debates
Our technological world arose from and depends on the scientific approach. What happens when this collides with strong societal forces? How can the scientific perspective shed light on tough questions? The blogosphere. [Assigned reading: selected shorts.]
- Week 10: Unsolved Mysteries
What are the burning scientific questions for the next generation of scientists? These big-picture questions can be easily understood, even if their solutions will be technical. Why are these questions important to everyone? [Assigned reading: selected shorts.]

- **Policies:** Quoting from <http://artsandsciences.osu.edu/currofc/resources.cfm>:

Academic Misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term academic misconduct includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct

(http://studentaffairs.osu.edu/info_for_students/csc.asp).

Disability Services: Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901 (<http://www.ods.ohio-state.edu/>).