

PHIL 8400: Seminar in Philosophy of Science
Spring 2008
Tuesday, 12:30–3:15 pm
219 Peabody Hall
Instructor: Yuri Balashov
Office Hours: Tuesday, 11:00 am – 12:30 pm, and by appointment
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TOPIC: PHILOSOPHY OF SPACE AND TIME

Philosophy of Space and Time has been a big and flourishing industry in the last hundred years. Much of it obviously to do with revolutionary events in modern physics. But the field has also been shaped by important developments in general philosophy of science and metaphysics in the 20th century.

At the present time the most interesting contributions to the Philosophy of Space and Time come from scientifically-minded metaphysicians and metaphysics-friendly physicists and philosophers of physics. Much of the discussion proceeds in the framework of a general foundational approach laid out by some prominent physicists (including John Anderson and Robert Geroch) and philosophers (including Michael Friedman, John Earman, Lawrence Sklar, and Roberto Torretti) in the 1960s–1980s. But the discussion also tends to have a historical dimension going back to the famous debate between Newton and Leibniz about the nature of space and time. Overall, contemporary philosophy of space and time is an exciting mix of history and foundations.

We will start by creating the relevant background, more or less from scratch. This may take 4–6 weeks, depending on how deep we want to go. No knowledge of physics beyond high school will be presupposed, but the willingness to learn some simple facts and formalism would be helpful. Once the background is in place, we'll be ready to take up *some* of the following topics:

- Contemporary debate between Substantivalism and Relationalism about space, time and spacetime. The “Hole Argument” and its ontological implications. This would include reading and discussion of works by John Earman, John Norton, Howard Stein, Tim Maudlin, Robert Rynasiewicz et al.
- Conventionalism and the nature of spacetime geometry (Henri Poincaré, Hans Reichenbach, David Malament et al.)
- Implications of spacetime theories for the metaphysics of time and persistence. This is a booming industry in and of itself. Some classical sources include the “Putnam-Stein debate.” From there one can go in different directions (one including recent work by Modest Instructor and his critics).
- Implications of spacetime theories for mereology (a formal theory of parts and wholes) and location (a fundamental relation between a material entity and a region of space or spacetime it occupies).
- Contemporary Zeno-style paradoxes. (This is a lot of fun! If interested, take a look at Frank Arntzenius’s article in the 2006 volume of *Phil. Perspectives*).

The participants in the seminar will be expected to do some or all of the following: lead our class discussions from time to time, complete occasionally some short exercise sets, and write a take-home midterm exam + a final exam or a course paper.

READINGS:

- Robert Geroch, *General Relativity from A to B* (Chicago, 1978).
- Nick Huggett, ed., *Space from Zeno to Einstein* (MIT Press, 1999)
- Various journal articles available for downloading from electronic journal sites with Galileo password
- Notes and handouts (to be provided by instructor)

WORK AND EVALUATION:

- Occasional exercises and problem sets: 25%
- Leading discussions & class participation: 25%
- Take-home midterm: 25%
- Research paper or final take-home exam: 25%