

285: Philosophy of Space, Time, and Spacetime

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Spring 2007

Class schedule: Th 1:00-3:50pm, HSS 7077 (Philosophy seminar room)
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What is the nature of space and time? This seminar will address this metaphysical question and survey the classic debates in the philosophy of space and time. As these debates are inextricably linked with developments in fundamental physics, we will try to understand whether, and if so, to what extent, these developments impose constraints on how metaphysical theories of space and time might look like.

Required texts

The readings will be made available through e-reserves. The Stanford Encyclopedia of Philosophy entries are downloadable from <http://plato.stanford.edu/>. Go to the course web page for links.

The format of the course

As I will be at the Pacific APA in the first week of term, the first class is canceled. This means, however, that we will fully jump in in week two and have no organizational meeting. So please come prepared to the first meeting!

The general format will be that of a typical seminar: I will give an introduction to the field, and the participants will introduce the readings and lead the discussion on the article(s) they present on. Presenters must provide a brief handout outlining a reconstruction of the main hypotheses and argument(s). They should meet with me a week in advance to go over their presentation. Every now and then, I will present some additional material such as an introduction to the main theories in physics as needed for our purposes.

Course requirements and evaluation

In order to obtain credit for this class, participants must give at least one class presentation and submit a term paper by Thursday, 14 June 2007, 12 noon. Participants must also submit a brief outline of their project for a term paper by 24 May 2007.

Tentative schedule

Please note that the topics listed may not map as directly to the dates given, some will take longer than others. Note also that there will be no meeting on 5 April. The reading list is tentative and may still slightly change.

Background reading: charting the territory (no date)

1. Ned Markosian, "Time," in E. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (2002), <<http://plato.stanford.edu/entries/time/>>.

The problem of change: transientism and permanentism (12 April)

1. Charles D Broad, *Scientific Thought* (Ch. 2 "The General Problem of Time and Change"), Harcourt, Brace and Company (1923), 53-84.
2. Donald C Williams, "The Myth of Passage," *Journal of Philosophy* **48** (1951), 457-472.
3. Abner Shimony, "The Transient Now," in his *Search for a Naturalistic World View*, Volume 2, Cambridge University Press (1993), 271-290.

McTaggart (19 April)

1. John M E McTaggart, "The Unreality of Time," *Mind* **18** (1908), 457-484.
2. Hugh Mellor, *Real Time II* (Ch. 7 "McTaggart's Argument" and Ch. 8 "Change"), Routledge (1998), 70-96.
3. Michael Dummett, "A Defense of McTaggart's Proof of the Unreality of Time," *The Philosophical Review* **69** (1960), 497-504.
4. E J Lowe, "The Indexical Fallacy in McTaggart's Proof of the Unreality of Time," *Mind* **96** (1987), 62-70.
5. Steven F Savitt, "A Limited Defense of Passage," *American Philosophical Quarterly* **38** (2001), 261-270.

Becoming in special relativity (26 April)

1. Michel Janssen, "Appendix A: Special Relativity," forthcoming in M. Janssen and C. Lehner, *The Cambridge Companion to Einstein*, Cambridge University Press.
2. Steven Savitt, "Being and Becoming in Modern Physics," in E. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (2006), <<http://plato.stanford.edu/entries/spacetime-bebecome/>>.

3. Hilary Putnam, "Time and Physical Geometry," *Journal of Philosophy* **64** (1967), 240-247.
4. Howard Stein, "On Relativity Theory and the Openness of the Future," *Philosophy of Science*, **58** (1991), 147-167.
5. Rob Clifton and Mark Hogarth, "The Definability of Objective Becoming in Minkowski Spacetime," *Synthese* **103** (1995), 355-387.

Presentism and eternalism (3 May)

1. Craig Callender, "Shedding Light on Time," *Philosophy of Science* **67** (2000), S587-S599.
2. Mark Hinchliff, "A Defense of Presentism in a Relativistic Setting," *Philosophy of Science* **67** (2000), S575-S586.
3. Steven F Savitt, "There's No Time Like the Present (in Minkowski Spacetime)," *Philosophy of Science* **67** (2000), S563-S574.
4. Yuri Balashov and Michel Janssen, "Presentism and Relativity," *British Journal for the Philosophy of Science* **54** (2003), 327-346.

Asymmetry and the direction of time (10 May)

1. Craig Callender, "Thermodynamic Asymmetry in Time," in E. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (2006), <<http://plato.stanford.edu/entries/time-thermo/>>.
2. Lawrence Sklar, "Up and Down, Left and Right, Past and Future," *Noûs* **15** (1981), 111-129.
3. Huw Price, *Time's Arrow and Archimedes' Point* (Ch. 2 "The Lessons of the Second Law"), Oxford University Press (1996), 22-48.
4. Craig Callender, "The View from No-when," *British Journal for the Philosophy of Science* **49** (1998), 135-159.

The Leibniz-Clarke correspondence: absolute v. relative space (17 and 24 May)

1. Isaac Newton, *Principia*, translated by A. Motte, in *Sir Isaac Newton's Mathematical Principles of Natural Philosophy and His System of the World*, edited by F. Cajori, The University of California Press (1934), pp. xvii-xviii, 6-14. [The Author's Preface, Scholium to the Definitions, Axioms, or Laws of Motion]
2. Nick Huggett, "Commentary to Chapter 7," in his *Space from Zeno to Einstein*, MIT Press (1999), pp. 126-140.

3. Excerpts from the Leibniz-Clarke Correspondence in Nick Huggett (ed.), *Space from Zeno to Einstein*, MIT Press (1999), pp. 143-158.
4. Nick Huggett, "Commentary to Chapter 8," in his *Space from Zeno to Einstein*, MIT Press (1999), pp. 159-167.
5. John Earman, *World Enough and Space-time*, (Ch. 1: "The Origins of the Absolute-Relational Controversy"), MIT Press (1989), pp. 6-20.
6. John Earman, *World Enough and Space-time*, (Ch. 6: "Substantivalism: Newton versus Leibniz"), MIT Press (1989), pp. 111-136.
7. Nick Huggett and Carl Hoefer, "Absolute and Relational Theories of Space and Motion," in E. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (2006), <<http://plato.stanford.edu/entries/spacetime-theories/>>.

The hole argument: substantivalism and relationalism (31 May)

1. John Norton, "The Hole Argument," in E. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (2004), <<http://plato.stanford.edu/entries/spacetime-holearg/>>.
2. John Earman and John Norton, "What Price Spacetime Substantivalism," *British Journal for the Philosophy of Science* **38** (1987), 515-525.
3. Jeremy Butterfield, "The Hole Truth," *British Journal for the Philosophy of Science* **40** (1989), 1-28.
4. Carl Hoefer, "The Metaphysics of Spacetime Substantivalism," *Journal of Philosophy* **93** (1996), 5-27.

Time travel and time machines (7 June)

1. David Lewis, "The Paradoxes of Time Travel," *American Philosophical Quarterly* **13** (1976), 145-152.
2. David Deutsch and Michael Lockwood, "The Quantum Physics of Time Travel," *Scientific American*, March 1994, 68-74.
3. Frank Arntzenius and Tim Maudlin, "Time Travel and Modern Physics," in E. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (2005), <<http://plato.stanford.edu/entries/time-travel-phys/>>.
4. John Earman and Christian Wüthrich, "Time Machines," in E. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (2004), <<http://plato.stanford.edu/entries/time-machine/>>.