

# Philosophy of Science

## Intercollegiate lectures

### Convenor: Dr Carl Hoefer

**Lecturers:** Prof. Nancy Cartwright (Michaelmas term)  
Dr Carl Hoefer (Lent term)

Lectures: Tuesday, 6-7pm, A220

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## INTRODUCTION

This course will present some core subject areas of Anglo-American philosophy of natural science. In the first term, Prof. Cartwright will cover central topics in philosophy of science, with special emphasis on the issues of realism/anti-realism. In the second term, Dr. Hoefer will lecture on two specific sub-fields: Philosophy of Biological Sciences, and Philosophy of Space & Time (a part of Philosophy of Physics). For both terms, no knowledge of the *details* of *any* science is presupposed for this course, nor are any maths beyond basic algebra. Keep this in mind and do not give in to equation-phobia when the occasional

formula or equation appears in lectures or readings!

## **TERM INFORMATION:**

### **Michelmas**

*Aims:* During the course of the term you should become familiar with a number of viewpoints concerning realism and relativism in science. More importantly, we hope you will come to understand how to think about these issues and how to evaluate claims and argue coherently about them.

*Readings:* We will march through Daniel Rothbarts's collection, *Science, Reason and Reality*.

### **Schedule:**

Weeks One, Two and Three. *Theory and Observation*

**Required readings:** Section 2, *Carnap*; Section 3, *Popper*; Section 5, *Hanson*; Section 6 *Putnam*; Section 7 *Suppe*

**Recommended readings:** *Hume*, Section 2 in Rothbart; Dudley Shapere, "The Concept of Observation in Science and Philosophy", *Philosophy of Science* 49 (1982) 485-525; Stathis Psillos, Chapter 12 ("The Reference of Theoretical Terms") in S. Psillos, *Scientific Realism*, 1999, Routledge

## Weeks Four and Five. *Scientific Explanation*

**Required Readings:** Section 8, *Hempel*; Section 9, *Scriven*; Section 11, *Kitcher*

**Recommended Readings:** Philip Kitcher, Chapter 6 (“Scientific Significance”) in P. Kitcher, *Science, Truth and Democracy*, 2001, Oxford University Press

## Weeks Six and Seven. *The Growth of Scientific Knowledge*

**Required readings:** Sections 15,16, *Kuhn*; Section 18 *Popper*; Section 4, *Lakatos*

**Recommended Readings:** Imre Lakatos, “Falsification and the Methodology of Scientific Research Programmes” (91-196) in I. Lakatos and A. Musgrave (eds.) *Criticism and the Growth of Knowledge*, 1970, Cambridge University Press

## Weeks Eight and Nine. *Realism*

**Required readings:** Section 24, *van Fraassen*; Section 28, *Hacking*; Section 25, *Churchland*; Section 26, *Giere*; Section 27, *McMullin*

**Recommended Readings:** Stathis Psillos, Chapter 7 (“Worrall’s Structural Realism”) in S. Psillos, *Scientific Realism*, 1999, Routledge

## Week Ten. *Science as a Social Enterprise*

**Required readings:** Section 19, *Barnes and Bloor*; Section 20, *Latour*

**Recommended Readings:** *Goodman*, Section 22 in Rothbart; Harry Collins, *Changing Order*, 1985, Sage

# Lent

*Aims:* A large part of contemporary philosophy of science involves philosophical reflection on particular content and issues *within* the natural and social sciences themselves. This term, we will cover in as much depth as possible some key issues in philosophy of biology and philosophy of space/time.

## Philosophy of Biology

We will cover as much as possible of *Sex and Death*, a recent textbook by Paul Griffiths and Kim Sterelny. Tentative schedule:

**Week one. Introduction to the field; Darwinism, 19<sup>th</sup> – 21<sup>st</sup> century.**

**Reading:** *S&D* Chapter 1

**Week two. Some details of evolutionary theory; case studies of evolutionary explanation.**

**Reading:** *S&D* Chapter 2; *Introduction to the Philosophy of Science*, ch. 8.

**Week three. The levels of selection debates: Genic selectionism.**

**Reading:** *S&D* chapters 4, 5.

**Week four. The levels of selection debates cont'd: group selection.**

**Reading:** *S&D* chapters 8, 9.

Week five. **Adaptationism and its critics.**

**Reading:** *S&D*, chapters 10, 12 (optional); J. Dupre, reading in PH 201 public folder.

For an excellent annotated bibliography of further readings, see the end of each chapter in *S&D*.

## **Philosophy of Space/Time**

The philosophy of space and time have a long history, and has always been a crucial part of humanity's drive to understand the cosmos. Since the time of Newton, advances in physics have set the agenda for philosophy, a trend that grew even stronger in the 20<sup>th</sup> century because of Einstein's two relativity theories. We will cover some of the most celebrated views and arguments, using two good, non-technical text sources: *Time, Space and Philosophy* by Christopher Ray; and *Space from Zeno to Einstein*, by Nick Huggett.

Week six. **Geometry, Space and Time before Descartes.**

**Reading:** Huggett, chapters 4, 5; 1 (optional).

Week seven. **Descartes, Newton, Leibniz: absolute vs. relational space.**

**Reading:** Huggett, chapters 6, 7

Week eight. **Newton and Leibniz cont'd.**

**Readings:** Huggett, chapter 8; backup: Ray, chapter 5

Week nine. **Mach, Relativity, and Einstein.**

**Readings:** Huggett, chapters 9, 10; backup: Ray, chapters 6, 7.

Week ten. **Kant, Hands, and absolute space.**

**Readings:** Huggett, chapter 11; Hofer (2000) (in public folders; optional)

For further readings suggestions, contact Dr. Hofer.