

## **Philosophy Preliminary Exam Syllabus**

### **Philosophy of Science with Computation**

This is a study in the epistemology of science. You ask what makes something a scientific explanation, and what is required for observations to confirm (support) a hypothesis. You ask how scientific models, experiments, and computer simulations are similar and different, and how and what scientists learn from each of these tools. You explore how computer simulation contributes something beyond calculation.

#### **Background**

John Earman and Wesley C. Salmon, "Probability," *Philosophy of Science*, Merrilee Salmon et al. eds., Hackett Press, Indianapolis, IN, 1999 pp. 66-101.

#### **Scientific Explanation**

Hempel, *Aspects of Scientific Explanation*, Free Press, 1965, 333-354, 412-415, 364-376, 376-403.

Salmon, 'Statistical Explanation,' *The Nature and Function of Scientific Theories*, R. Colodny ed., University of Pittsburgh Press, 1970, 173-231.

Kitcher, 'Explanatory Unification' *The Philosophy of Science*, R. Boyd et al. eds., MIT Press, 1991, 329-348.

Lewis, 'Causal Explanation,' from: *Philosophical Papers Volume II*, Oxford University Press, 1986, 214-240.

Craver, C.F. & Bechtel, W.P., 'Mechanism,' Sarkar & J. Pfeifer (eds.), in *Philosophy of Science: An Encyclopedia*. New York: Routledge, 469-478.

#### **Confirmation and Disconfirmation**

Hume, *An Enquiry Concerning Human Understanding*, T. L. Beauchamp ed., Oxford, 1999, 108-130 (§§ IV, V).

Popper, *Objective Knowledge*, ch. 1, Oxford University Press, 1979, 1-31.

Salmon, 'Rational Prediction,' *The Limitations of Deductivism*, A. Grünbaum and W. Salmon eds., University of California Press, Berkeley, 1988, 47-60.

Howson and Urbach, "Bayesian versus Non-Bayesian Approaches," *Scientific Reasoning*, Open Court, Chicago, 1993, 117-131.

Kendall, 'Designing a Research Project,' online

### **The Unit of Representation: Theories, Models, Templates**

Giere, 'Models and Theories,' Chapter 3 of *Explaining Science*, U. Chicago Press, Chicago and London, 1988, 62-91.

Bogen and Woodward, 'Saving the Phenomena,' online

Humphreys, 'Computational Science,' Chapter 3 of *Extending Ourselves: Computational Science, Empiricism, and Scientific Method*. Oxford University Press, Oxford, 2004, 49-104.

### **Experiment and Simulation**

Parker, 'Does Matter Really Matter?...', online

Winsberg, *Science in the Age of Computer Simulation*, U. Chicago Press, Chs. 1-4.

### **Online References**

Kendall, 'Designing a Research Project ...,' *Emergency Medical Journal* 20 (2003), 164-168. doi:10.1136/emj.20.2.164

Bogen and Woodward, 'Saving the Phenomena,' *Philosophical Review* (July 1988), 303-352.

Parker, 'Does Matter Really Matter? ...' *Synthese* 169 (2009), 483-496.