

# PHILOSOPHY 245: PHILOSOPHY OF SCIENCE

Instructor: Craig Callender  
Mondays 4-7, HSS 7077

Until recently, philosophy of natural science has mostly concentrated on big established theory, e.g., evolution, quantum mechanics. That work is fine, but it ignores the science most relevant to one of society's most pressing problems, the destruction of the natural environment. This quarter we will focus on environmental science and conservation. These are huge fields and the quarter is short. Hence we'll narrow focus to two areas, climate science and conservation biology. We'll examine philosophical questions that arise in both of these fields, with an eye on seeing where philosophy may contribute understanding. Since these fields bear directly on public policy, the hope is that this is a path via which philosophy of science may engage public policy.

Questions asked will range from general ones – is science value free? – to those about the nitty-gritty of climate modeling and definitions of biodiversity. Examples are: what is biodiversity, and why should we value it? what are the goals of ecological restoration? should these goals include Pleistocene “rewilding” or bringing back the mammoth?! what is an ecosystem? how does climate modeling work, and how does it bear on evidence? are computer simulations experiments? what kind of future discounting in cost-benefit analysis is justified? how should we understand idealization in climate and ecological models? is the so-called precautionary principle nonsense or something valuable?

Students will be expected to hand in one-page reactions to the reading prior to each class. They will also sign up for presentations on various readings. As practice for professional talks, these presentations will include a PowerPoint (or equivalent) demonstration. In consultation with the instructor, you will also design and write a term paper to be handed in June 12, 2014. The grade will be determined with the following weights: reactions (10%), presentations (30%), paper (60%).

## TENTATIVE SCHEDULE

### MTG 1 VALUES IN SCIENCE

- Heather Douglas (2007) “Rejecting the Ideal of Value-Free Science”
- Philip Kitcher (2007) “Scientific Research – Who Should Govern?”
- Richard Rudner (1953) The Scientist Qua Scientist Makes Value Judgments

See also: Jeffrey, Richard (1956), "Valuation and Acceptance of Scientific Hypotheses"; Daniel Steel, Epistemic Values and the Argument from Inductive Risk; Kuhn Objectivity, value judgment and theory choice; Helen Longino Cognitive and non-cognitive values in science: rethinking the dichotomy; Douglas, Heather (2009) Science, Policy and the Value-Free Ideal, ch. 5

## MTG 2 CLIMATE SCIENCE

- IPCC Summary for Policy Makers
- Spencer Weart (2010) "The Development of General Circulation Models of Climate"
- Wendy Parker (2011) "When Climate Models Agree: the Significance of Robust Predictions"
- Eric Winsberg (2012), Values and Uncertainties in the Predictions of Global Climate Models

See also: Elisabeth Lloyd "Confirmation and robustness of climate models"; Parker "Confirmation and adequacy for purpose in climate modeling"; Fitelson "A Bayesian account of independent evidence with applications"; Jim Woodward "Some Varieties of Robustness" Parker, Wendy (2013). Ensemble Modeling, Uncertainty and Robust Predictions. Charlotte Werndl and Katie Steele (2013) "Climate models, Confirmation and Calibration" Chris Hitchcock and Elliott Sober (2004) "Prediction versus Accommodation and the Risk of Overfitting"; Eric Winsberg, (2012) "Values and Uncertainties in the Predictions of Global Climate Change"

## MTG 3 FUTURE DISCOUNTING

- Steven Gardiner, "Cost-Benefit Paralysis", chapter 9 of A Perfect Moral Storm
- Lord Stern's Ely lecture  
<http://pubs.aeaweb.org/doi/pdfplus/10.1257/aer.98.2.1>

See also: Martin Weitzman "Some Basic Economics of Climate Change" Broome 'Counting the Cost of Global Warming' ch. 3; Weitzman 'GHG Targets as Insurance against Catastrophic Climate Damages'; Neumayer 'Global Warming: Discounting is not the Issue but Substitutability is'; Cohen and Parfitt 'Against Social Discount Rate'; Fleurbaey and Zuber, 'Climate Policies Deserve a Negative Discount Rate'

MTG 4 CLIMATE DISCUSSION: FRIGG AND FRISCH

Two philosophers of science will join us this week, Mathias Frisch (Maryland) and Roman Frigg (LSE). The special class will take place at noonish on Friday, April 18, in either the seminar room, dept library, or room tbd

- Mathias Frisch tbd
- Frigg tbd

MTG 5 ETHICS and JUSTICE

tbd

MTG 6 ECOLOGY AND THE ENVIRONMENT (Section under development)

- Emma Marris (2011) *Rambunctious Garden*, selection
- Jay Odenbaugh (2007) "Seeing the Forest and the Trees: Realism about Communities and Ecosystems" or (2010) "On the Very Idea of an Ecosystem"

See also: Elliott Sober (1986) "Philosophical Problems for Environmentalism"

MTG 7 WHAT IS BIODIVERSITY AND WHY SHOULD WE CARE ABOUT IT?

Professor Christopher Wills (Ecology, UCSD, author of *The Darwinian Tourist*, photographer) will join us.

- Wills, *Green Equilibria*, selections
- Sahotra Sarkar (2012) "Biodiversity and Conservation", ch. 5.

See also: John Baez's website on biodiversity

MTG 8 ENVIRONMENTAL RESTORATION: WHAT SHOULD WE DO?

- Emma Marris (2011) *Rambunctious Garden*, selection
- Sahotra Sarkar, (2012) "Environmental Restoration", ch. 6

- Thomas (2011) *Translocation of Species, Climate Change, and the End of Trying to Recreate Past Ecological Communities*.

See also: Ben Minteer, *Species Conservation, Rapid Environmental Change, and Ecological Ethics*; "The Pleistocene Re-wilding Gambit"; Tim Caro; "Managed Relocation: Integrating the Scientific, Regulatory, and Ethical Challenges"

## MTG 9 MODELS AND IDEALIZATION IN ECOLOGY

- Weisberg (2007) "Three Kinds of Idealization"
- Strevens (2008) "Problems of Abstraction in Regularity Explanation" in *Depth*, ch. 8

See also: Odenbaugh, "True Lies"

## MTG 10 PRECAUTIONARY PRINCIPLE

- Per Sandin et al (2002) "Five Charges Against the Precautionary Principle"
- Katie Steele (2010) "The Precautionary Principle"

See also: Steel "The precautionary principle and the dilemma objection"; Hansson "The limits of precaution"; Joyce, James "A Defence of Imprecise Credence"; Bradley, Seamus, "Weak Rationality and Imprecise Choice"