

Philosophy 190F/290F
Biotechnology, Climate Change and Consciousness: The Philosophical Questions

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The philosophy of biology is an exciting and growing field within philosophy. This is not surprising given the critically important and pressing going concerns arising in the contexts of (1) biotechnology, (2) global climate change, and (3) cognitive science/consciousness studies. We will explore key philosophical questions of each of these fields in turn:

(1) What is a gene? How much manipulative power can we legitimately hope to gain from genomics, or even proteomics? What are the strengths and weaknesses of *reductionistic* and *systemic* biotechnological research programs?

(2) How could we possibly use mathematical models to represent and manage the *complexity* of global climate change dynamics? How are mathematical models here and elsewhere tested and evaluated? What sorts of abstracting, idealizing, and reifying occur during the modeling process? Should we aim to unify diverse models or should we remain content with model "clusters"?

(3) What, if any, are the biological bases of consciousness and language? How did consciousness and language *evolve*? Could we ever tell cogent narratives of this evolution? Will we ever have enough data to adequately evaluate such narratives?

Careful reading of a few select texts will be emphasized in this discussion-intensive seminar. Technical concepts and methods will be explained on a per-need basis. Ethical questions will not be ignored. The hope is that the student will learn to apply her philosophical skills to serious biological issues impacting all of us as global citizens.

COURSE REQUIREMENTS

1. Three one-page summaries (roughly 30% of your grade)
2. A short (10-15 minute, 2-page) presentation. (15%)
3. Paper (5-7 pages), with rough draft. (40%)
4. Class participation. Attendance is mandatory. (15%)

GRADING POLICY

1. In order to pass the course, you must satisfy every requirement.
2. One third of a letter grade will be deducted per day for any late assignments (e.g., a B+ becomes a B, etc.).
3. No assignments will be accepted more than seven (7) days after the due date.

WARNING

Academic misconduct will not be tolerated. Please consult:

http://www.ucsc.edu/academics/academic_integrity/index.html

READINGS

Week 1. Introduction

3/31

Section 1: **Genetics, Evolution, and Biotechnology**

Week 2: *Reductionism*

4/7 Dawkins. R. 2006. *The Selfish Gene. 30th Anniversary Edition*. Oxford University Press, pp. 1-45.

Week 3: *Dialectical Biology*

4/14 Levins R, Lewontin R. *The Dialectical Biologist*. Harvard University Press, pp 58-63, 85-106, 267-288.

Week 4: *Systemic Darwinism*

4/21. Winther, RG. (Forthcoming). Systemic Darwinism. *Proceedings of the National Academy of Sciences (USA)*.

Winther, RG. Notes on "Darwin and His Bulldogs. A Critical Study of *The Selfish Gene*". Co-authored with Najmi, A. In progress.

Section 2: **Mathematical Modeling and Climate Change**

Week 5: *Modeling and Abstraction*

4/28 Guest Lecture: Hervé Kieffel, Department of Management Science and Engineering, Stanford University.

Levins, R. 2006. Strategies of Abstraction. *Biology and Philosophy* 21: 741-755.

Week 6: *Climate Change*

5/5 McGuffie K, Henderson-Sellers A. 1997. *A Climate Modelling Primer*. John Wiley & Sons, pp. 41-67.

Week 7: *Complexity in Modeling in Real World Computer Systems*

5/12 Guest Lecture: Amir Najmi, Google.

Reading TBA

Section 3: **The Evolution of Consciousness**

Week 8: *The "hard problem" of consciousness*

5/19 Chalmers, DJ. 1995. Facing Up to the Problem of Consciousness. *Journal of Consciousness Studies* 2: 200-19.

Week 9: *How could consciousness possibly have evolved?*

5/26 (Holiday, reschedule)

Polger T., Flanagan O. 1995. Zombies and the Function of Consciousness. *Journal of Consciousness Studies* 2: 313-321.

Nichols S, Grantham T. 2000. Adaptive Complexity and Phenomenal Consciousness. *Philosophy of Science* 67: 648-670.

Week 10: *DISCUSSION: "On Making the Philosophy of Biology Relevant"*