ANTHROPOLOGY 261
MODELING THE EVOLUTION OF SOCIAL BEHAVIOR

Details

Instructor:	Richard McElreath (mcelreath@ucdavis.edu)
Time:	MW 10:30am–11:50am
Place:	Storer 2320 (Spieth room)
Website:	smartsite.ucdavis.edu

Summary

This graduate-level course provides a thorough introduction to the body of formal theory in the study of the evolution of social behavior in humans and other animals. The course is aimed at the student who maybe had calculus a long time ago but has forgotten most or all of it. Students will learn the basic machinery of game theoretic and simple population genetic models. From there, they will tour animal conflict, altruism, kinship, reciprocity, signaling, and group selection, deriving key results and seeing how evolutionary theories can be made into successful models. Students will learn a great deal of mathematical machinery that will allow them to intelligently read the primary literature and address problems beyond the course material.

The course material is relevant to problems commonly studied in animal behavior, behavioral ecology, primatology, economics, and evolutionary anthropology. If you use evolutionary theory to make predictions about social behavior—in any species—but cannot derive Hamilton's rule, this course will be of great use to you. The substantial material on cooperation will be of interest to economists, political scientists, sociologists, and human ecologists concerned with conservation and collective action in human societies.

Materials

The text we will use is a book I have written with Robert Boyd, *Mathematical Models of Social Evolution: A Guide for the Perplexed*. The chapters of this book contain the mathematical derivations, so students should be able to pay attention rather than madly scribble. Nevertheless, math is something best learned by doing, so periodic

homework sets will supplement the lectures. I encourage the students to work together on these assignments.

Evaluation

There will be one midterm and one final exam. Exams will be take-home format. Students must work on these exams individually. However each student is free to use other materials, including the lecture notes, previous homework, and published or online sources, to help them complete the exams.

More Information

Please contact the instructor (mcelreath@ucdavis.edu) or visit the class website.

Schedule of Lectures and Exams

Week	Topic
1	Chapter 1: Making and solving models
2	Chapter 2: Animal conflict
3	Chapter 3: Inclusive fitness (short week)
4	Chapter 3: Inclusive fitness
5	Chapter 4: Reciprocity
	Midterm exam starts Feb 6, due Feb 11
6	Chapter 5: Signaling
7	Chapter 6: Group selection
8	Chapter 7: Sex allocation (short week)
9	Chapter 7: Sex allocation
10	Chapter 8: Sexual selection
	Final exam starts March 18, due March 22