

Carl Boettiger

6342 Storer Hall, 1 Shields Avenue
University of California, Davis
Davis, CA 96516
cboettig@ucdavis.edu
two.ucdavis.edu/~cboettig

2535 Westerness Rd
Davis, CA 96516
(610) 389-6087
cboettig@gmail.com



- Education** **University of California, Davis**, Davis, CA 95616 9/07 – current
Ph.D candidate, Population Biology Program
Advisor: Professor Alan Hastings
- Princeton University** Princeton, NJ 08544 9/03 – 6/07
A.B in Physics with Honors
Certificate in Biophysics
Certificate in Applied and Computational Mathematics
- Harrilton High School** Rosemont, PA 19010 9/98 – 6/03
International Baccalaureate Diploma
- Funding** **Department of Energy** 09/08 – current
Computational Sciences Graduate Fellowship
- Publications** Wray, J., Bahcall, N., Bode, P., Boettiger, C., Hopkins, P. (2006) "The Shape, Multiplicity, and Evolution of Superclusters in Λ CDM Cosmology." *Astrophysical Journal* 652, 907.
- Boettiger, C., Dushoff, J., Weitz, J. "Variation in the phenotypic dynamics of evolving populations," Proc. Roy. Soc. Lon. B, in review.
- Presentations** D. McGown, C. Boettiger, M. Davidson, E. Chan, T.C. Onstott, Princeton University. "Species Diversity and Sulfur Metabolism of Psychrophiles in a Deep Subpermafrost Brine in the Canadian Arctic", Presented at IPTAI Meeting, Washington DC, 26-30 March, 2006.
- Boettiger, C. From Individuals to Forests: Searching for Stable Coexistence. Pres. Princeton University Ecology Theory labtea series, March 2007.
- Research Experience** **Ensemble Behavior from Individual Dynamics in Forest Populations** 8/06 – 5/07
Advisor: Stephen Pacala Professor of Ecology & Evolutionary Biology, Princeton
I investigated the behavior of the corresponding "macroscopic equations" for forest behavior derived from individual-based models that underly successful forest simulators such as

SORTIE. Then using these macroscopic equations I was able to demonstrate they successfully predict common forest-level phenomena, such as succession, disturbance-mediated coexistence, and limiting similarity.

Fluctuations and Branching in Adaptive Dynamics Theory

2/06 – 6/06

Advisor: Joshua Weitz

Ecology & Evolutionary Biology, Princeton

I derived expressions for the stochastic correction to the canonical equation of Adaptive Dynamics (Dieckmann & Law 1996) and the associated variance in evolutionary trajectories. I also explored the stability of branching in a common model postulated for sympatric speciation, where I demonstrated that subsequent branches are also unstable. This work is currently in review for publication.

Clonal Interference Models

9/05 – 1/06

Advisor: David Huse

Professor of Physics, Princeton

I derive rates of evolution for bacterial populations with and without the effects of clonal interference, following two different approaches from the literature. Each approach gives qualitatively different behavior which I demonstrate corresponds to different regimes of interference phenomena.

Extremophile Phylogenetics

6/05 – 8/05

Advisor: Tullis Onstott

Professor of Geology, Princeton

I conducted DNA extraction, amplification, sequencing and phylogenetic analysis of bacteria collected from deep gold mines in Lupin, Canada, identifying several novel types to extreme environments (presented at IPTAI, March 2006).

Novel Numerical Solutions to BVPs

4/04 – 10/06

Advisor: Herschel Rabitz

Professor of Chemistry, Princeton

I demonstrated that coupling a reordering algorithm to a genetic algorithms can be used to solve difficult boundary value problems (BVPs) that foil conventional approaches.

Large-scale Structure of the Universe

6/04 – 8/04

Advisor: Neta Bahcall

Professor of Astrophysics, Princeton

I analyzed clustering patterns in simulations of the current model (Λ CDM) for the universe to characterize its large-scale structure. My work appeared in the *Astrophysical Journal* in December 2006.

Teaching Experience

Teaching Assistant, CLIMB Program

03/08 – 10/08

University of California, Davis

CLIMB stands for Collaborative Learning at the Interface of Mathematics and Biology, and is an NSF funded training program for undergraduates at UC Davis.

Teaching Assistant, Biosciences 1B

1/07 – 3/07

University of California, Davis

I ran two laboratory sections of this introductory zoology course.

First Aid Instructor

1/04 – 6/07

Princeton University Outdoor Action

I taught a regular wilderness first aid class for Princeton.

Leader Trainer

10/05 – 9/07

Princeton University Outdoor Action

I taught a wilderness skills class and lead a week long training trip to prepare Princeton students skills to lead Princeton's week-long freshman orientation trips.

	Climbing Instructor	6/04 – 9/07
	Princeton University Outdoor Action	
	I taught introductory rock climbing courses and also ran trips to local crags to introduce new climbers to outdoor climbing.	
Activities	Solar Community Housing Association	09/08 – current
	I am a director on the board of Solar Community Housing Association (SCHA) and currently serving as treasurer. SCHA is a 501(c)(3) nonprofit founded in 1979 to provide affordable, cooperative housing and support for the community and the environment. We own two houses in Davis, California and operate a \$30,000 budget for maintenance, education and outreach.	
	UC Davis Outdoor Adventures Guide	10/08 – current
	I am a rock climbing and a winter guide for UC Davis Outdoor Adventures.	
	Inner City Outings Leader	10/07 – current
	Inner City Outings (ICO) is a branch of the Sierra Club dedicated to taking children from homeless shelters on outdoor trips. I have been a volunteer on several trips with children from the St. Johns Shelter in Sacramento, and have recently completed ICO leader training.	
	Climbing Wall Coordinator	6/06 – 9/07
	I expanded staff, tripled the program size through expanded program offerings, oversaw the installation of a \$300,000 new climbing wall, made the Princeton Wall part of the national Climbing Wall Association and raised training and safety standards to meet or exceed their national standards.	
	Residential College Peer Advisor	8/06 – 6/07
	I worked in conjunction with a faculty member to advise a group of freshmen and sophomores in course selection, selection of their major, and other decisions faced by undergrads.	
	Leader Trainer Council Chair	4/06 – 9/07
	As chair of the leader trainer committee, I overhauled leader training curriculum, expanded trip offerings during the year, secured full financial aid for all qualified student participants on orientation trips, and oversaw the hire of a full time assistant director for Princeton Outdoor Action.	
	Odyssey of the Mind Coach	9/04 – 6/05
	I helped start and coach an Odyssey of the Mind (OM) team at an underprivileged school outside Trenton, where we proceeded to win our Regional and State competitions, to compete at the National level.	
	Science Olympiad Judge	1/07
	I served as a Judge for the 2007 New Jersey regional Science Olympiad competition. I designed the physics event in which teams from high schools across New Jersey compete in performing accurate physics experiments and calculations.	
Honors	<i>Computational Science Graduate Fellow</i>	2008 – current
	Department of Energy, Krell Institute	
	<i>Honorable Mention</i>	2008
	National Science Foundation Graduate Research Fellowship	
	Elected to Membership in the Society of <i>Sigma Xi</i>	2007

	<i>Allen G. Shenstone Prize in Physics,</i> Princeton Physics Department	2007
	<i>The Class of 1870 Old English Prize,</i> Princeton English Department	2007
	<i>Kusaka Memorial Prize in Physics,</i> Princeton Physics Department	2006
	<i>Plasma Physics Fellow,</i> Princeton Plasma Physics Laboratory	6/06 – 8/06
Certifications	First Aid Instructor American Safety and Health Institute	2006 – current
	Wilderness First Responder Wilderness Medical Associates	04 – 07, 07 – 10
Computer skills	Linux, Unix, Windows, Macintosh Python, C, MATLAB, R, L ^A T _E X, Mathematica, maxima, octave, phylip, MrBayes	
Foreign Languages	French, seven years of study	
Relevant Coursework, Princeton	MATH Analysis in a Single Variable, Honors Linear Algebra, Analysis in Several Variables, Complex Analysis with Applications, Differential Equations, Statistics in Biology, Mathematical Modeling	
	BIOLOGY Quant Principles in Cell Biology, Astrobiology, Advanced Lab in Molecular Biology, Honors Chemistry, Genetics, Method and Logic in Quantitative Biology*, Geomicrobiology*, Cellular and Biochemical Computation*	
	PHYSICS Mechanics, Electromagnetism, Computational Physics Seminar, Lagrangian Mechanics, Astronomy, Experimental Physics Seminar, Quantum Mechanics I, Quantum Mechanics II, Thermal Physics, Advanced Physics Lab, Advanced Electromagnetism, Biophysics*	
	HUMANITIES Intermediate French, Advanced French, History of Science, Cranks and Visionaries in Science, Social Revolution in Muslim World, Logic, Moral Philosophy, Shakespeare, Old English, Heroic Literature, Civilization Early Middle Ages	
	* = Graduate course	
Current Coursework, UC Davis	Population Biolgy Core Sequence, Mathematical Methods in Ecology, Theoretical Ecology, Synchrony in Ecology. Design and Analysis of Algorithms, Artificial Neural Networks, Large-Scale Scientific Computing. Stochastic Dynamics and Applications I & II, Mathematical Biology.	

References

Alan Hastings amhastings@ucdavis.edu
Department of Environmental Science and Policy, University of California, Davis
(Current Advisor)

Sebastian Schreiber sschreiber@ucdavis.edu
Department of Ecology and Evolution, University of California, Davis

Simon Levin slevin@princeton.edu
Department of Ecology and Evolutionary Biology, Princeton University

Stephen Pacala pacala@princeton.edu
Department of Ecology and Evolutionary Biology, Princeton University

Joshua Weitz jsweitz@gatech.edu
School of Biology, Georgia Tech

David Huse huse@princeton.edu
Professor of Physics, Princeton University

Herschel Rabitz hrabitz@princeton.edu
Professor of Chemistry, Princeton University

Richard Curtis rcurtis@princeton.edu
Director of Outdoor Action, Princeton University

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