Carl Boettiger

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employment

2015-current Assistant Professor, Department of Environmental Science, Policy and Management, **University of California, Berkeley.**

2013-2015 NSF Post-doctoral Scholar in the Department of Applied Mathematics and Statistics, **University of California, Santa Cruz**. Mentors: Marc Mangel, Stephan Munch

education

2012 Ph.D Population Biology, **University of California, Davis**. Mentor: Alan Hastings

2007 A.B in Physics, **Princeton University**, with honors and certificates in *biophysics* and *applied and computational mathematics*.

publications

24. Milad Memarzadeh, **Carl Boettiger** (2018). Adaptive management of ecological systems under partial observability. *Biological Conservation*. 224, 9-15. doi:10.1016/j.biocon.2018.05.009. (software)

23. **Carl Boettiger** (2018). From noise to knowledge: how randomness generates novel phenomena and reveals information. *Ecology Letters*. doi:10.1111/ele.13085 (oa, code, data)

22. **Carl Boettiger**, Dirk Eddelbuettel (2018). An Introduction to Rocker: Docker Containers for R. *The R Journal*. `https://journal.r-project.org/archive/2017/RJ-2017-065/index.html`.

21. **Carl Boettiger** (2017). Generating Codemeta Metadata for R Packages. *The Journal of Open Source Software* 2 (19), 454, doi:10.21105/joss.00454

20. Getz, Marshall, Carlson, Giuggioli, Ryan, Romañach, **Boettiger**, Chamberlain, Larsen, D'Odorico, O'Sullivan, D. (2017). Making ecological models adequate. *Ecology Letters*. doi:10.1111/ele.12893

19. Ben Marwick, **Carl Boettiger**, Lincoln Mullen (2017). Packaging data analytical work reproducibly using R (and friends). *The American Statistician*. doi:10.1080/00031305.2017.1375986. (oa)

18. Hampton, Jones, Wasser, Schuldhauer, Supp, Brun, Herandez, **Boettiger**, Collins, Gross, Fernandez, Budden, White, Teal, Labou & Aukema. (2017) Skills and Knowledge for Data Intensive Research. *BioScience*. doi:10.1093/biosci/bix025. (oa)

17. T Alex Perkins, **Carl Boettiger**, Benjamin L. Philips. (2016) After the games are over: life-history trade-offs drive dispersal attenuation following range expansion. *Ecology and Evolution* 6 (18) 6425-6434. doi:10.1002/ece3.2314. (oa, code)

16. **Carl Boettiger**, Michael Bode, James N. Sanchirico, Jacob LaRiviere, Alan Hastings, and Paul Robert Armsworth. (2016) Optimal management of a stochastically varying population when policy adjustment is costly. *Ecological Applications* 26 (3) 808-817. doi:10.1890/15-0236. (oa, code)

15. **Carl Boettiger**, Scott Chamberlain, Rutger Vos and Hilmar Lapp. (2016) RNeXML: a package for reading and writing richly annotated phylogenetic, character, and trait data in R. Methods in Ecology and Evolution. doi:10.1111/2041-210X.12469. (oa, code, software)

14. **Carl Boettiger**, Scott Chamberlain, Edmund Hart, Karthik Ram. (2015) Building Software, Building Community: Lessons from the rOpenSci Project. *Journal of Open Research Software* 3: e8, doi:10.5334/jors.bu.

13. **Carl Boettiger**. (2015) An introduction to Docker for reproducible research. ACM SIGOPS Operating Systems Review, Special Issue on Repeatability and Sharing of Experimental Artifacts. 49(1), 71-79. doi:10.1145/2723872.2723882. (oa)

12. **Carl Boettiger**, Marc Mangel, Stephan Munch. (2015) Avoiding tipping points in fisheries management through Gaussian process dynamic programming. *Proceedings of the Royal Society B* 282(1801), 8–11. doi:10.1098/rspb.2014.1631. (oa, code, data)

11. **Carl Boettiger**, Alan Hastings. (2013) No early warning signals for stochastic transitions: insights from large deviation theory. *Proceedings of the Royal Society B*. doi:10.1098/rspb.2013.1372. (oa, code)

10. **Carl Boettiger***, Noam Ross*, Alan Hastings. (2013) Early warning signals: The charted and uncharted territories. *Theoretical Ecology* doi:10.1007/s12080-013-0192-6. (oa, code)

9. **Carl Boettiger**, Alan Hastings (2013). Tipping points: From patterns to predictions, *Nature* 493, 157–158. doi:10.1038/493157a.

8. **Carl Boettiger**, Alan Hastings (2012). Early Warning Signals and the Prosecutor's Fallacy, *Proceedings of the Royal Society B* 279 (1748) 4734-4739. doi:10.1098/rspb.2012.2085. (oa, code, data)

7. **Carl Boettiger**, Duncan Temple Lang, Peter Wainwright (2012). rfishbase: exploring, manipulating and visualizing FishBase data from R, *Journal of Fish Biology*. 81 (6) 2030–2039. doi:10.1111/j.1095-8649.2012.03464.x. (oa, code, software)

6. **Carl Boettiger**, Duncan Temple Lang (2012). Treebase: An R package for discovery, access and manipulation of online phylogenies, *Methods in Ecology and Evolution* 3 (6) 1060–1066. doi:10.1111/j.2041-210X.2012.00247x. (oa, code, software)

5. **Carl Boettiger** and Alan Hastings (2012). Quantifying Limits to Detection of Early Warning for Critical Transitions, *Journal of the Royal Society: Interface* 9 (75) 2527-2539. doi:10.1098/rsif.2012.0125. (oa, code)

4. Jeremy M. Beaulieu, Dwueng-Chwuan Jhwueng, **Carl Boettiger** and Brian O'Meara, (2012). Modeling Stabilizing Selection: Expanding the Ornstein-Uhlenbeck Model of Adaptive Evolution, *Evolution* 66 (8) 2369-2383. doi:10.1111/j.1558-5646.2012.01619.x (software)

3. **Carl Boettiger**, Graham Coop, Peter Ralph (2012) Is your phylogeny informative? Measuring the power of comparative methods, *Evolution* 66 (7) 2240-51. doi:10.1111/j.1558-5646.2011.01574.x, (oa, code, data)

2. **Carl Boettiger**, Jonathan Dushoff, Joshua S Weitz (2010) Fluctuation domains in adaptive evolution, *Theoretical Population Biology* 77 (1) 6-13. doi:10.1016/j.tpb.2009.10.003. (oa, code, data)

1. James J. Wray, Neta A. Bahcall, Paul Bode, **Carl Boettiger**, Phillip Hopkins. (2006) The Shape, Multiplicity, and Evolution of Superclusters in Lambda-CDM Cosmology, *The Astrophysical Journal* 652 (2) 907-916. doi:10.1086/50860. (oa)

grants

Hellman Fellows Award (2018). *37,600 USD*

Berkeley Collegium Award for Excellence in Undergraduate Education. (2018-2019) *16,867.50 USD*

Managing ecosystems under extreme uncertainty. (2016-03 - 2018-09) NSF XSEDE TG-DEB160003. NSF Estimated value *16,690 USD*

Reproducible and Collaborative Data Science. NSF XSEDE TG-DEB160021. NSF Estimated value *20,028 USD*

The rOpenSci Project (2015-2018, Co-PI). Helmsley Trust *2,900,000 USD*.

The Codemeta project (2015). National Science Foundation #ACI-1549758 *165,782 USD*. (proposal)

The rOpenSci Project, Phase II funding (2014, Co-PI). Alfred P. Sloan Foundation *300,000 USD*.

NSF Biology Post-doc (2013-2015). National Science Foundation #DBI-1306697, *138,000 USD*. (proposal)

The rOpenSci Project Phase I funding (2013, Co-PI). Alfred P. Sloan Foundation *180,000 USD*.

IIASA YSSP fellowship (2009). National Academy of Sciences, OISE-0738129, *8,000 USD*. (proposal)

Computational Science Graduate Fellowship (2008). Department of Energy, #DE-FG02-97ER25308, *149,000 USD*. (proposal)

book chapters

Carl Boettiger (2017). A Reproducible R Notebook Using Docker. In J. Kitzes, D. Turek, & F. Deniz (Eds.), The Practice of Reproducible Research: Case Studies and Lessons from the Data-Intensive Sciences (1st ed., pp. 109–117). Oakland, CA: UC Press. Retrieved from https://www.ucpress.edu/book.php?isbn=9780520294752

invited talks

2017

CROSS Symposium Speaker UC Santa Cruz.

2015

Empirical Dynamical Modeling and Forecasting in Nonlinear Systems, NTU, Taiwan.

2014

Berkeley Initiative for Global Change Biology (student organized), UC Berkeley, CA.
DIMACS Global Change, Berkeley CA.
Zoology Seminar, University of Wisconsin, Madison, WI.
ESPM Seminar, UC Berkeley, CA.

2013 & prior

MBI speaker, Sustainable Management of Living Natural Resources, Columbus, OH.
WHOI Seminar speaker, Woods Hole, MA.
UC Davis Dept of Environmental Resources and Economics; Davis, CA.
SSB Symposium speaker, Evolution Conference, Ottawa, CAN.

invited & organized workshops

2018

NSF SI2 PIs Meeting, Washington, DC
rOpenSci unconference, Seattle, WA

Faculty Learning Program Fellows Berkeley, CA
GraphXD, Berkeley, CA
Digital Data in Biodiversity UC Berkeley. (co-organizer)

2017

Imagining Tomorrow's University Chicago, IL.
rOpenSci unconference, Los Angeles, CA
Prov-a-thon: Practical Tools for Reproducible Science, Tamaya, NM.
NSF Translational Data Science Workshop, Berkeley Institute for Data Science, Berkeley, CA.

2016

Force16 Codemeta Workshop, Portland OR (organizer)
CodeMeta NSF Workshop Portland, OR (organizer)
rOpenSci unconference, San Francisco, CA

2015

Moore-Sloan Data Science Environments: Second Annual Data Science Summit
Data Intensive Training Workshop, NCEAS, Santa Barbara, CA
NSF Big Data Hubs Design Charette, Western Region.
rOpenSci unconference, San Francisco CA.
Pretty Darn Good Control Working group, NIMBIOS, Knoxville TN

2014

rOpenSci unconference, San Francisco CA.
Reproducible Science: Curriculum & Workflow, NESCent, Durham, NC.
WSSSPE 2.0. New Orleans, LA.
Workflows Working Group, NCEAS, Santa Barbara, CA.

2013 & prior

Sustainable Management of Living Natural Resources, MBI Columbus, OH.
Academic software & workforce development, ISEES. Oakland, CA.
Software Lifecycle, ISEES, Santa Barbara, CA.
Pretty Darn Good Control Working group, NIMBIOS, Knoxville, TN
Stochastic spatial modeling in population dynamics, AIM, Palo Alto, CA.

awards

2011 *Volterra Award* (Best student talk, ESA Theory Section)
2007 Elected to Membership in the Society of *Sigma Xi*
2007 Allen G. Shenstone Prize in Physics, Princeton University
2007 The Class of 1870 Old English Prize, Princeton University
2006 Kusaka Memorial Prize in Physics, Princeton University
2006 Plasma Physics Fellow, PPPL

service

national

NCEAS Scientific Advisory Board
rOpenSci Leadership team

Jestream NSF cloud computing Stakeholder Advisory Board

campus

2018 ESPM Remote Sensing Faculty Search Committee member & Equity Liason.
2017 - current. UC Berkeley Data Science Degree proposal Comittee
2015 - current. UC Berkeley, Berkeley Research Computing Advisory Committee

reviewer for:

2018 Bull. Mathematical Biology, Oikos, Ecology Letters, CiSE, Theoretical Ecology, Methods in Ecology & Evolution, CJFAS, NERSC.

2017 National Science Foundation, Nature Climate Change, Nature Ecology & Evolution, Proceedings of the Royal Society B, rOpenSci Onboarding, Theoretical Ecology, Bull Math Bio, Oikos, NERSC, Ecology Letters

2016 Bioscience, National Science Foundation

2015 Proceedings of the National Academy of Sciences, Journal of Statistical Software, Bioinformatics, Chapman & Hall, Ecology Letters, Ecology, PeerJ, F1000 Research, Journal of Librarianship & Scholarly Communication, Nature Communications, Theoretical Ecology, Trends in Ecology & Evolution, Grid Computing

2014 Theoretical Ecology, Biodiversity Data Journal, Ecology Letters, Journal of Theoretical Biology, American Naturalist, Proceedings of the National Academy of Sciences, Proceedings of the Royal Society B

2013 Theoretical Ecology, Francis & Taylor, Ideas in Ecology and Evolution, The R Journal, National Science Foundation, Proceedings of the Royal Society B, Journal of Open Research Software, Canadian Journal of Fisheries and Aquatic Sciences

2012 Theoretical Ecology, Evolution, Methods in Ecology and Evolution, Proceedings of the Royal Society B, PLoS ONE, Ecology, Conservation Letters, Ecology Letters

2011 Theoretical Ecology, Ecological Modelling, Evolution, Methods in Ecology and Evolution, Ecosphere

2010 & prior Theoretical Ecology, Journal of Mathematical Biology, Ecological Modelling, Ecology

selected software projects

2012 - current: The rOpenSci Project, co-founder. https://ropensci.org
2014 - current: Carl Boettiger, Dirk Eddelbuettel. The Rocker Project: Docker images for the R environment. https://rocker-project.org
2015 - current: Carl Boettiger, Matt Jones, et al. The CodeMeta Project: Software Metadata Exchange https://codemeta.github.io

My software impact is also measured relative to other academics by depsy.org

theses

Carl Boettiger, David Huse (2006) Clonal Interference Models in Population Genetics. *Princeton Physics Dept*. doi:10.6084/m9.figshare.678305.
Carl Boettiger, Joshua Weitz, Simon Levin (2007) Adaptive Dynamics: Branching Phenomena and the Canonical Equation *Princeton Physics Dept*. doi:10.6084/m9.figshare.678306.
Carl Boettiger, Stephen Pacala, David Huse (2007) Ensemble Behavior from Individual Dynamics in Multispecies Forest Populations. *Princeton Physics Dept*. doi:10.6084/m9.figshare.678304.
Carl Boettiger (2012). Regime shifts in ecology and evolution (PhD Dissertation). doi:10.6084/m9.figshare.97218.

media interviews

Seltenrich, N. (2016). "Scaling the Heights of Data Science." *Breakthroughs Magazine*. https://nature.berkeley.edu/breakthroughs/opensci-data

Tachibana, C. (2014). "The paperless lab" *Science* 345(6195) pp. 468-470. 10.1126/science.opms.p1400087

Mascarelli, A. (2014) "Research tools: Jump off the page." *Nature* 507, 523–525. doi:10.1038/nj7493-523a

Check Hayden E (2013). "Mozilla Plan Seeks to Debug Scientific Code." *Nature*, 501, pp. 472-472. doi:10.1038/501472a

Van Noorden R (2013). "Data-Sharing: Everything on Display." *Nature*, 500, pp. 243-245. doi:10.1038/nj7461-243a

Gewin, Virginia (2013). "Turning Point: Carl Boettiger" *Nature*, 493 p 711 doi:10.1038/nj7434-711a

Wald, Chelsea (2010). "Scientists Embrace Openness" *Science*. doi:10.1126/science.caredit.a1000036

Updated May 30, 2018