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

32. Milad Memarzadeh, Gregory L. Britten, Boris Worm, **Carl Boettiger** (2019). Rebuilding global fisheries under uncertainty. *Proceedings of the National Academy of Sciences*. doi:10.1073/pnas.1902657116

31. **Carl Boettiger**, Ryan Batt (2019). Bifurcation or state tipping: assessing transition type in a model trophic cascade. *Journal of Mathematical Biology*. doi:10.1007/s00285-019-01358-z (oa, code)

30. Milad Memarzadeh, **Carl Boettiger** (2019). Resolving the Measurement Uncertainty Paradox in Ecological Management. *American Naturalist*. doi:10.1086/702704. (oa, code, data)

29. Dan Sholler, Karthik Ram, **Carl Boettiger**, Daniel S Katz (2019). Enforcing public data archiving policies in academic publishing: A study of ecology journals. *Big Data & Society* 6(1) 1-18. doi:10.1177/2053951719836258

28. **Carl Boettiger** (2019). Ecological Metadata as Linked Data. *Journal of Open Source Software*, 4(34), 1276, doi:10.21105/joss.01276 (software).

27. Katz, Allen, Barba, Berg, Bik, **Boettiger**, et al. (2018). The principles of tomorrow's university. *F1000Research*, 7:1926 doi:10.12688/f1000research.17425.1. (32 co-authors.)

26. Karthik Ram, **Carl Boettiger**, Scott Chamberlain, Noam Ross, Maelle Salmon, & Stephanie Butland (2018). A Community of Practice Around Peer-review for Long-term Research Software Sustainability. *Computing in Science & Engineering*, 9615(c), 1–1. doi:10.1109/MCSE.2018.2882753

25. **Carl Boettiger** (2018). Managing Larger Data on a GitHub Repository. *Journal of Open Source Software*, 3(29), 971, doi:10.21105/joss.00971. (software).

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*. doi:10.32614/RJ-2017-065

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 (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* 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**, 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**, 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

The Influence of Conflicting Policies and Supply-Chain Pressures on Farmers' Decisions and Tradeoffs with Respect to Biodiversity, Profitability, and Sustainability. Timothy Bowles (PI), Alastair Iles, Claire Kremen, Carl Boettiger. (2018-2022). **National Science Foundation** #CNH-1824871 $1,301,737

The rOpenSci Project (2019-2021, Co-PI). **Helmsley Charitable Trust**, award 2016PG-BRI004. $1,000,000

Detecting Change in Global Biodiversity through Large Scale Network Analysis. (2018-2020) Berkeley Institute for Data Science, $67,000

Hellman Fellows Award (2018-2020) **The Hellman Foundation**. $37,600

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

Managing ecosystems under extreme uncertainty. (2016-03 - 2019-09) NSF **XSEDE** TG-DEB160003. NSF Estimated value of computing resources: $34,558

Reproducible and Collaborative Data Science. NSF **XSEDE** TG-DEB160021. NSF Estimated value of computing resources: $20,028

The rOpenSci Project (2015-2018, Co-PI). **Helmsley Charitable Trust**, award 2016PG-BRI004. $2,875,071

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

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

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

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

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

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

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. https://www.ucpress.edu/book.php?isbn=9780520294752

invited talks

2019

Transients in Ecology, Ecological Society of America Annual Meeting, Louisville, KY.
Ecological Forecasting Initiative Conference, Washington DC.
NIMBioS Transient Dynamics Workshop, Knoxville, TN.
Project EDDIE keynote speaker, Northfield MN.
COMPASS Workshop for scientific communication, Asilomar, CA.

2018

NSF SI2 PIs Meeting, Washington, DC.
rOpenSci unconference, Seattle, WA.
Faculty Learning Program Fellows Workshop Berkeley, CA.
GraphXD, Berkeley, CA.
Digital Data in Biodiversity UC Berkeley. (co-organizer)
Ecological Society of America Invited Symposium Addressing Outstanding Challenges to Operationalizing Resilience. New Orleans, LA.
Nonlinear Forecasting for Fisheries Applications, NOAA Southwest Fisheries Science Center, Santa Cruz, CA.

2017

CROSS Symposium Speaker Santa Cruz, CA.
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

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

Invited speaker, Berkeley Initiative for Global Change Biology Workshop (student organized), UC Berkeley, CA.

Invited speaker, DIMACS Global Change, Berkeley CA.
Invited speaker, Zoology Seminar, University of Wisconsin, Madison, WI.
Invited speaker, ESPM Seminar, UC Berkeley, CA.
rOpenSci unconference, San Francisco CA.
Reproducible Science: Curriculum & Workflow Workshop, NESCent, Durham, NC.
WSSSPE 2.0 Meeting. New Orleans, LA.
Workflows Working Group, NCEAS, Santa Barbara, CA.

2013 & prior

invited speaker, MBI, Sustainable Management of Living Natural Resources, Columbus, OH.
invited seminar speaker, WHOI, Woods Hole, MA.
invited seminar speaker, UC Davis Dept of Environmental Resources and Economics; Davis, CA.
invited speaker, SSB Symposium, Evolution Conference, Ottawa, CAN.
Sustainable Management of Living Natural Resources Workshop, MBI Columbus, OH.
Academic software & workforce development Workshop, ISEES. Oakland, CA.
Software Lifecycle Workshop, ISEES, Santa Barbara, CA.
Pretty Darn Good Control Working group, NIMBIOS, Knoxville, TN.
Stochastic spatial modeling in population dynamics Workshop, 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

campus

2019 Faculty Working Group for the formation of the Division of Data Science & Information
2018 - 2019 Faculty Task Force for Data Science Minor Design
2018 - current. Governance Committee for Data Science Programs
2017 - 2018. ESPM Remote Sensing Faculty Search, committee member & equity liaison
2017 - 2018. ad hoc Data Science Degree Proposal Committee
2015 - current. Berkeley Research Computing Advisory Committee

extra-campus

NCEAS Scientific Advisory Board
rOpenSci Leadership Team
Jetstream Cloud Computing Stakeholder Advisory Board, XSEDE.

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

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