

# Dr. Carl Boettiger

## Curriculum Vitae

ESPM Department, University of California,  
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<https://carlboettiger.info>  
<https://github.com/cboettig>

### WORK EXPERIENCE

CURRENT, FROM JULY 2015 (FT)  
University of California, Berkeley  
**Assistant Professor**  
Department of Environmental Science, Policy and Management

2013-2015 (FT)  
University of California, Santa Cruz  
**NSF Post-doctoral Scholar**  
Department of Applied Mathematics and Statistics

### EDUCATION

2007 – 2012 **Doctor of Philosophy**  
Population Biology. Mentor: Alan Hastings  
*University of California, Davis*

2003 – 2007 **Bachelors of Physics**  
WITH HONOURS  
Physics, w/ Certs. in Applied Mathematics  
*Princeton University*

### GRANTS

2018 – 2022 **National Science Foundation, \$1,301,737**  
T. Bowles, A. Iles, C. Kremen, C. Boettiger  
*Coupled Natural Human Systems #CNH-1824871*

2019 – 2021 **Helmsley Charitable Trust, \$1,000,000**  
K. Ram, C. Boettiger, S. Chamberlain  
*The rOpenSci Project*

2018 **Berkeley Institute for Data Science, \$67,000**  
C. Boettiger, R. Gillespie, R. Nielsen

2018 – 2021 **The Hellman Foundation, \$37,600**  
C. Boettiger  
*Junior Faculty Fellowship*

2018 – 2019 **Berkeley Collegium \$16,867**  
C. Boettiger  
*Narrowing the Gap Between Teaching and Research*

2016 – 2019 **James S McDonnell Foundation, \$200,000**  
(Awarded to Allison Barner, who brought it to my team)  
*Post-doctoral Fellowship in Complex Systems*

2015 – 2018 **Helmsley Charitable Trust, \$2,875,071**  
K. Ram, C. Boettiger, S. Chamberlain  
*The rOpenSci Project, #2016PG-BRI004*

2015 – 2018 **National Science Foundation, \$165,782**

### 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

**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)

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

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

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

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.)

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

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

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)

**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)

**Carl Boettiger**, Dirk Eddelbuettel (2018). An Introduction to Rocker: Docker Containers for R. *The R Journal*. doi:10.32614/RJ-2017-065

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

Getz, Marshall, Carlson, Giuggioli, Ryan, Romañach, **Boettiger**, Chamberlain, Larsen, D'Odorico, O'Sullivan (2017).

C. Boettiger, M. Jones  
*The CodeMeta Project #ACI-1549758*

2014 **Alfred P. Sloan Foundation, \$300,000**  
 K. Ram, C. Boettiger, S. Chamberlain  
*The rOpenSci Project Phase II funding*

2013 **Alfred P. Sloan Foundation, \$180,000**  
 K. Ram, C. Boettiger, S. Chamberlain  
*The rOpenSci Project Phase I funding*

2013 – 2015 **National Science Foundation, \$138,000**  
*C Boettiger. NSF Biology Post-doc, #DBI-1306697*

2009 **National Academy of Sciences \$8,000**  
 IIASA YSSP fellowship  
*OISE-0738129*

2008 – 2012 **Department of Energy, \$149,000**  
 Computational Science Graduate Fellowship  
*#DE-FG02-97ER25308*

## INVITED TALKS AND WORKSHOPS

2019 Ecological Society of America invited OOS, Louisville, KY  
 Ecological Forecasting Initiative, Washington DC.  
 NIMBioS Workshop, UT Knoxville, TN.  
 Project EDDIE keynote speaker, Carlton, Northfield MN.  
 URSSI Workshop, NCEAS, Santa Barbara, CA.  
 COMPASS Workshop Asilomar, CA

2018 NSF SI2 PIs Meeting, Washington, DC.  
 rOpenSci unconference, Seattle, WA.  
 FLP Fellows Workshop Berkeley, CA.  
 GraphXD, Berkeley, CA  
 Digital Data in Biodiversity (co-org), Berkeley CA.  
 ESA Invited Symposium (Organizer). New Orleans, LA.  
 Nonlinear Forecasting, NOAA SFSC, Santa Cruz, CA

2017 CROSS Symposium Speaker Santa Cruz, CA  
 Imagining Tomorrow's University Chicago, IL  
 rOpenSci unconference, Los Angeles, CA  
 DataONE, Tamaya, NM.  
 NSF Translational Data Science, Berkeley, CA.

2016 Forcer6 Codemeta Workshop (organizer), Portland OR  
 CodeMeta NSF Workshop (Organizer) Portland, OR.  
 rOpenSci unconference, San Francisco, CA

2015 Empirical Dynamical Modeling, NTU, Taiwan  
 Moore-Sloan Second Annual Data Science Summit  
 Improving Data Intensive Training, NCEAS, Santa Barbara, CA  
 NSF Big Data Hubs Design Charette, Western Region  
 rOpenSci unconference, San Francisco CA  
 NIMBIOS Working Group, Knoxville TN

2014 Global Change Biology, UC Berkeley, CA  
 Zoology Seminar, University of Wisconsin, Madison, WI  
 DIMACS Global Change, Berkeley CA  
 ESPM Seminar, UC Berkeley, CA  
 rOpenSci unconf, San Francisco CA  
 Reproducible Science Curriculum, NESCent, Durham, NC

Making ecological models adequate. *Ecology Letters*.  
 doi:10.1111/ele.12893

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

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

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)

**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)

**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)

**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.

**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)

**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)

**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)

**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)

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

**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)

**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)

WSSSPE 2.0 Meeting. New Orleans, LA  
Workflows Working Group, NCEAS, Santa Barbara, CA

2013 MBI, invited speaker, Columbus, OH  
AND Seminar speaker, WHOI, Woods Hole, MA  
PRIOR Seminar speaker, Davis, CA  
SSB Symposium, Evolution Conference, Ottawa, CAN  
ISEES, Santa Barbara, CA

## SOFTWARE

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**emld**: Ecological Metadata as Linked Data. Carl Boettiger (2019).

**virtuoso**: Interface to Virtuoso using ODBC. Carl Boettiger (2019).

**rdflib**: Tools to Manipulate and Query Semantic Data. Carl Boettiger (2018).

**codemeta**: Generate CodeMeta Metadata for R Packages. Carl Boettiger, Maëlle Salmon (2018).

**EcoNetGen**: Simulate and Sample from Ecological Interaction Networks. Marcus de Aguiar, Erica Newman, Mathias Pires, Carl Boettiger (2018).

**piggyback**: Managing Larger Data on a GitHub Repository. Carl Boettiger (2018).

**arkdb**: Archive and Unarchive Databases Using Flat Files. Carl Boettiger (2018).

**EML**: Read and Write Ecological Metadata Language File. Carl Boettiger, Matt Jones (2016; v2 2019).

**RNeXML**: Semantically Rich I/O for the NeXML Phylogenetics Format. Carl Boettiger, Scott Chamberlain, Hilmar Lapp, Rutger Voss (2014).

**pmc**: Phylogenetic Monte Carlo. Carl Boettiger (2012).

**knitcitations**: Citations for Knitr Markdown Files. Carl Boettiger (2012).

**rfishbase**: R Interface to FishBase. Carl Boettiger, Scott Chamberlain, Duncan Temple Lang, Peter Wainwright (2011; v2 2015; v3 2019).

Carl Boettiger, Dirk Eddelbuettel. **The Rocker Project**: Docker images for the R environment. (Language: Dockerfile)

Carl Boettiger, Matt Jones, et al. **The CodeMeta Project**: Software Metadata Exchange. (Language: JSON-LD)

## SERVICE

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NCEAS Scientific Advisory Board. (2014 - Current)

rOpenSci Leadership Team. (2012 - Current)

Jetstream Cloud Computing Stakeholder Advisory Board, XSEDE, NSF. (2015 - Current)

Reviewer for over 40 journals, NSF review panelist, ad hoc reviewer for NSF, NERSC, NERC and UC-CCGA.

**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)

**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)

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)

**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)

**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)

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)

## BOOK CHAPTERS

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**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. ISBN:9780520294752