

Dr. Carl Boettiger

Curriculum Vitae

ESPM Department, University of California,
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WORK EXPERIENCE

CURRENT, FROM JULY 2021 (FT)
University of California, Berkeley
Associate Professor
Department of Environmental Science, Policy and Management

2015 - 2021 (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

2022 - 2025 **NSF, \$1,303,971**
CISE Frameworks

2022 - 2025 **NASA, \$136,221**
TOPS

2022 - 2025 **USGS, \$174,577**
Cooperative Ecosystem Studies Unit

2020 - 2025 **NSF, \$504,335**
CAREER Fellowship

2019 - 2020 **Chan-Zuckerberg Initiative, \$75,912**
Essential Open Source Software for Science

2018 - 2022 **NSF, \$1,301,737**
Coupled Natural Human Systems #CNH-1824871

2019 - 2021 **Helmsley Charitable Trust, \$1,000,000**
The rOpenSci Project

2018 **Berkeley Institute for Data Science, \$67,000**

2018 - 2021 **The Hellman Foundation, \$37,600**

PUBLICATIONS (50)

Thomas, **Boettiger**, Carey, Dietze, Johnson, Kenney, McLachlan, Peters, Sokol, Weltzin, Willson, Woelmer, and Challenge Contributors. (2023) The NEON Ecological Forecasting Challenge. *Frontiers in Ecology and Environment*. 21, (3) pp 112-113. doi:10.1002/fee.2616

Chapman, **Boettiger**, Brashares. (2023). Leveraging private land conservation to meet 2030 biodiversity targets in the United States. *Conservation Science and Practice*. doi:10.1111/csp2.12

Benjamin S. Halpern, **Carl Boettiger**, Michael C. Dietze, Jessica A. Gephart, Patrick Gonzalez, Nancy B. Grimm, et al. (116 co-authors) (2023). Priorities for synthesis research in ecology and environmental science. *Ecosphere*. doi:10.1002/ecs2.434

Lapeyrolerie, **Boettiger**. (2022) Limits to Ecological Forecasting: Estimating Uncertainty for Critical Transitions with Deep Learning. *Methods in Ecology and Evolution*. doi:10.1111/2041-210X.14013

Lapeyrolerie, Chapman, Norman, **Boettiger** (2022). Deep Reinforcement Learning for Conservation Decisions. *Methods in Ecology and Evolution*. doi:10.1111/2041-210X.13954

Boettiger (2022). The Forecast Trap. *Ecology Letters* 25, 1655-1664, doi:10.1111/ele.14024

Chapman, Wiltshire, Baur, Bowles, Carlisle, Castillo, Esquivel, Gennet, Iles, Karp, Kremen, Liebert, Olimpi, Ory, Ryan, Sciligo, Thompson, Waterhouse, **Boettiger**. (2022). Social-ecological feedbacks drive tipping points in farming system diversification. *One Earth* doi:10.1016/j.oneear.2022.02.007

Chapman, Scoville, Lapeyrolerie, **Boettiger**. (2021). Power and Accountability in Reinforcement Learning Applications to Environmental Policy. *35th Conference on Neural Information Processing Systems (NeurIPS 2021)*

Lapeyrolerie, **Boettiger**. (2021) Teaching machines to anticipate catastrophes. *Proceedings of the National Academy of Sciences* doi:10.1073/pnas.2115605118

Chapman, Oestreich, Frawley, **Boettiger**, Diver, Santos, Scoville, Armstrong, Blondin, Chand, Haulsee, Knight, Crowder (2021). Promoting equity in the use of algorithms for high seas conservation. *One Earth* doi:10.1016/j.oneear.2021.05.011.

Karatayev, Baskett, Kushner, Shears, Caselle, **Boettiger** (2021). Grazer behavior can regulate large-scale patterning of community states. *Ecology Letters* doi:10.1111/ele.13828.

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

Junior Faculty Fellowship

- 2015 – 2018 **Helmsley Charitable Trust, \$2,875,071**
The rOpenSci Project, #2016PG-BR1004
- 2015 – 2018 **National Science Foundation, \$165,782**
The CodeMeta Project #ACI-1549758
- 2014 **Alfred P. Sloan Foundation, \$300,000**
The rOpenSci Project Phase II funding
- 2013 **Alfred P. Sloan Foundation, \$180,000**
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

Reimer, Arroyo-Esquivel, Jiang, Scharf, Wolkovich, Zhu, **Boettiger** (2021). Noise can create or erase long transient dynamics. *Theoretical Ecology* doi:10.1007/s12080-021-00518-6.

C Scoville, M Chapman, R Amironesei, **C Boettiger** (2021). Algorithmic conservation in a changing climate. *Current Opinion in Environmental Sustainability* 51, 30-35. doi:10.1016/j.cosust.2021.01.009.

C Boettiger (2020). [Rp] Fluctuation domains in adaptive evolution. *ReScience C* 6, 1, (15)

Pascal, Memarzadeh, **Boettiger**, Lloyd, Chadès (2020). A Shiny r app to solve the problem of when to stop managing or surveying species under imperfect detection *Methods in Ecology and Evolution*. doi:10.1111/2041-210X.13501

C Boettiger (2020). Ecological management of stochastic systems with long transients. *Theoretical Ecology*. doi:10.1007/s12080-020-00477-4

K Norman, S Chamberlain, **C Boettiger** (2020). taxadb: A high-performance local taxonomic database interface. *Methods in Ecology and Evolution* doi:10.1111/2041-210X.13440

Pascal, Memarzadeh, **Boettiger**, Lloyd, Chades (2020). A Shiny r app to solve the problem of when to stop managing or surveying species under imperfect detection *Methods in Ecology and Evolution*. doi:10.1111/2041-210X.13501

de Aguiar, Newman, Pires, Yeakel, **Boettiger**, Burkle, Gravel, Guimarães Jr, O'Donnell, Poisot, Fortin, Hembry (2019). Revealing biases in the sampling of ecological interaction networks, *PeerJ*, doi:10.7717/peerj.5566

M Memarzadeh, G Britten, B Worm, **C Boettiger** (2019). Rebuilding global fisheries under uncertainty. *Proceedings of the National Academy of Sciences*. doi:10.1073/pnas.1902657116

C Boettiger, R 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

M Memarzadeh, **C Boettiger** (2019). Resolving the Measurement Uncertainty Paradox in Ecological Management. *American Naturalist*. doi:10.1086/702704.

D Sholler, K Ram, **C. Boettiger**, DS 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

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.)

K Ram, **C Boettiger**, S Chamberlain, N Ross, M Salmon, & S 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

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

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

C Boettiger (2018). From noise to knowledge: how randomness generates novel phenomena and reveals information. *Ecology Letters*. doi:10.1111/ele.13085

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

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

B Marwick, **C Boettiger**, L Mullen (2017). Packaging data analytical work reproducibly using R (and friends). *The American Statistician*. doi:10.1080/00031305.2017.1375986.

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.

TA Perkins, **C Boettiger**, BL 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.

C Boettiger, M Bode, JN Sanchirico, J LaRiviere, A Hastings, and PR Armsworth (2016). Optimal management of a stochastically varying population when policy adjustment is costly. *Ecological Applications* 26 (3) 808-817. doi:10.1890/1523-1739-2015-0236.

C Boettiger, S Chamberlain, R Vos and H 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.

C Boettiger, S Chamberlain, E Hart, K Ram (2015). Building Software, Building Community: Lessons from the rOpenSci Project. *Journal of Open Research Software* 3: e8, doi:10.5334/jors.bu

C Boettiger (2015). An introduction to Docker for reproducible research. *ACM SIGOPS Operating Systems Review* 49(1), 71-79. doi:10.1145/2723872.2723882.

C Boettiger, M Mangel, S 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.

C Boettiger, A 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.

C Boettiger, N Ross, A Hastings (2013). Early warning signals: The charted and uncharted territories. *Theoretical Ecology* doi:10.1007/s12080-013-0192-6.

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

C Boettiger, A 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.

C Boettiger, D Temple Lang, P 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.

C Boettiger, D 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.2012.00247.x.

C Boettiger, A 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.

JM Beaulieu, DC Jhwueng, **C Boettiger**, B 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

C Boettiger, G Coop, P 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,

C Boettiger, J Dushoff, JS Weitz (2010). Fluctuation domains in adaptive evolution, *Theoretical Population Biology* 77 (1) 6-13. doi:10.1016/j.tpb.2009.10.003.

JJ Wray, NA Bahcall, P Bode, **C Boettiger**, P Hopkins (2006). The Shape, Multiplicity, and Evolution of Superclusters in Lambda-CDM Cosmology, *The Astrophysical Journal* 652 (2) 907-916. doi:10.1086/50860.

BOOK CHAPTERS

C 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