Lauren Shoemaker **Curriculum Vitae**

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Department of Ecology and Evolutionary Biology
Interdisciplinary Quantitative Biology
University of Colorado, Boulder

Education:

2012-2017 **Ecology and Evolutionary Biology** Ph.D. Graduate Student, University of Colorado, Boulder
Thesis: *Stabilizing and equalizing mechanisms in community coexistence and macroevolutionary patterns*
Co-Major Advisors: Brett Melbourne and Aaron Clauset

2011-2017 **Interdisciplinary Quantitative Biology** Certificate Program through the BioFrontiers Institute, University of Colorado, Boulder

2007-2011 **Colorado College** summa cum laude, Biology and Mathematics double major
Biology honors thesis: *Determining optimum catch of the snapper-grouper fisheries complex utilizing an ecosystem-based fisheries management regime*
Co-advisors: Jim Ebersole and David Brown

Positions Held:

2017-present **Postdoctoral researcher**, University of Minnesota
Supervisors: Allison Shaw (primary), Elizabeth Borer, and Eric Seabloom

Publications:

In revision **Shoemaker*, L.G.,** Tillquist*°, R.C., and Clauset A. *In revision*. The evolution of primate body size: left-skewness, maximum size, and Cope's rule.
* denotes equal contribution
° denotes Interdisciplinary Quantitate Biology rotation student

2016 **Shoemaker, L.G.** and Melbourne, B.A. 2016. Linking metacommunity paradigms to spatial coexistence mechanisms. *Ecology* 97(9):2436-2446.

2016 Tucker, C.M.*, **Shoemaker***, **L.G.**, Davies, K.F., Nemergut, D.R., and Melbourne B.A. 2016. Differentiation between niche and neutral assembly in metacommunities using null models of beta diversity. *Oikos* 125:778–789 DOI: 10.1111/oik.02803.
* denotes equal contribution

2016 Turbek, S. Chock, T. Donahue, K, Havrilla, C. Oliverio, A. Polutchko, S. **Shoemaker, L.G.** and Vimercati, L. 2016. Scientific writing made easy: A step-by-step guide to undergraduate writing in the biological sciences. *The Bulletin of the Ecological Society of America* 97:417–426.

2015 Cantor, M., **L.G. Shoemaker**, R.B. Cabral, C.O. Flores, M. Varga, and Whitehead. H. 2015. Multilevel animal societies can emerge from cultural transmission. *Nature Communications* 6:1:1-10. DOI: 10.1038/ncomms9091.

- Results from this paper were highlighted in over 200 news outlets from 18 countries. News outlets include: BBC, Washington Post, Time Magazine, Newsweek, National Geographic, Die Welt, and Sydney Morning Herald; presented results at Whale Tales. Kapalua, HI, a public educational and fundraiser event; presented to an audience of ~850 attendees.

2014 **Shoemaker, L.G.** and Clauset, A. 2014. Body mass evolution and diversification within horses (family Equidae). *Ecology Letters* 17(2):211-220.

2012 Dodson R.B., Rozance P.J., Bradley S.F., Petrash C.C., **Shoemaker L.G.**, Kendall, S.H., and Ferguson V.L. 2012. Increased stiffness and extracellular matrix reorganization in intrauterine growth restricted (IUGR) fetal sheep. *Journal of Pediatric Research* sn1530-0447.

2011 Myerburg M.M., Ebersole J.J., **Shoemaker L.G.**, and Heschel M.S. 2011. Limited plasticity of biomass allocation in alpine forbs, Pikes Peak, Colorado, U.S.A. *Western North American Naturalist* 71(3):431-435.

Publications In Progress:

Shoemaker, L.G. and Clauset A. Universal processes govern body mass evolution in marine environments.

- Manuscript available upon request

Sullivan, L.L.*****, **Shoemaker, L.G.*,** Donohue, I. Juliano, C. Yang, Q. Kraft, James, A., N.J.B. Chase, J., Harpole, S., HilleRisLambers, J., Wiegand, T. and Abbott. K.C. Stochasticity in ecological communities: lessons learned from population ecology and applications for communities.

* denotes equal contribution

- Manuscript pre-proposal accepted at *Ecology Letters*

Educational Materials:

2009 **Shoemaker, L.G.** 2010. Fingerprints of emissions and the carbon cycle: Stable and Radiocarbon Isotopes of Carbon Dioxide. *Earth System Research Laboratory: Global Monitoring Division.* National Oceanic and Atmospheric Administration. http://www.esrl.noaa.gov/gmd/outreach/isotopes/.

Grants and Fellowships:

(Research Grant Total: $41,406; Fellowship Total: $511,146)

2017-present **James S. McDonnell Foundation Postdoctoral Fellowship in Studying Complex Systems** ($200,000)

2017-present **National Geographic Young Explorer** ($5,000)

- Evaluating the Roles of Water, Nutrients, and Termites in Fairy Circle Genesis and Maintenance (PI: L.G. Shoemaker)

2016-present **National Science Foundation (NSF) Dissertation Defense Improvement Grant** ($19,266)

- Quantifying the strength of spatial coexistence mechanisms in experimental metacommunities (PI: B.A. Melbourne, Co-PI: L.G. Shoemaker)

2016-present **University of Colorado Dean's Grant** ($9,918)
- The role of spatial structure in promoting biological diversity (PI: L.G. Shoemaker)

2016-2017 **University of Colorado Graduate School Dissertation Completion Fellowship** ($10,806)

2011-present **National Science Foundation (NSF) Graduate Research Fellowship** ($96,000 stipend over 3 years and $36,000 cost of education allowance)

2016 **Beverley Sear's Graduate School Grant** ($1,000 declined PI: L.G. Shoemaker)

2013-2015 **University of Colorado Ecology and Evolutionary Biology Departmental Research Grant** ($2,300 in 2013, $1,550 in 2014, and $2,500 in 2015; PI: L.G. Shoemaker)

2009-2011 **National Oceanic and Atmospheric Administration (NOAA) Ernest F. Hollings Undergraduate Scholarship** ($22,500 to provide practical educational training experience in NOAA-related sciences)

2007-2011 **Colorado College Margaret T. Barnes Scholarship for Natural Sciences** ($145,840 awarded as a 4-year, full-tuition scholarship)

Travel Grants (Total $2,582)

2017 German Centre for Integrative Biodiversity Reseach (iDiv) Synthesis Centre (sDiv) Writing Retreat (€800)

2012-2015 **Geological Society of America Rocky Mountain Section Student Travel Grant** ($250 in 2012, $50 in 2013 and $110 in 2015)

2014 University of Colorado Graduate School Travel Grant ($300)

2012 University of Colorado **Interdisciplinary Quantitative Biology Travel Funds** ($1,000)

Honors and Awards (selected):

2011 **Mary Alice Hamilton Award in Biology**, award to the top graduating biology major at Colorado College

2009 and 2010 **National Science Foundation Goldwater Scholarship Honorable Mention**

2007, 2008 and 2009 **Commitment and Contribution to the Community Award** for volunteering services, awarded by Colorado College's Center for Service and Learning

Invited Presentations:

2016 **Shoemaker, L.G.** and Melbourne, B.A. 2016. Linking metacommunity and spatial coexistence theory. The German Centre for Integrative Biodiversity Research. Leipzig, Germany 1 June. Oral Presentation.

Cantor, M. and **Shoemaker, L.G.** 2016. Clicks, codas, clans and culture: Social learning leads to complex societies in sperm whales. Whale Tales. Kapalua, HI. 14 Feb. Oral Presentation.
- Co-presentation; public educational and fundraiser event; talk attended by ~850 participants

2015 **Shoemaker, L.G.** Clauset, A. and Melbourne, B.A. 2015. The interplay of niche and neutral forces in determining diversity patterns. Helmholtz Centre for Environmental Research – UFZ. Leipzig, Germany. 28 May. Oral Presentation.

Shoemaker, L.G. and Melbourne, B.A. 2015. Quantifying coexistence mechanisms in spatially structured environments. The German Centre for Integrative Biodiversity Research. Leipzig, Germany. 26 May. Oral Presentation.

2013 Shoemaker, L.G. and Clauset, A. 2013. Cetacean body mass distributions: disparity, extinction, and superwhales. Annual Meeting, Geological Society of America. Denver, Colorado, USA. 27-30 October. Oral Presentation.

- Invited oral session: Beyond diversity curves: Exploring research opportunities within the paleobiology database

Contributed Presentations (selected):

2016 **Shoemaker, L.G.** Taubert, F. Huth, A. and Melbourne, B.A. 2016. A simulation approach for estimating the strength of spatial coexistence mechanisms in complex models. Annual Meeting, Ecological Society of America. Fort Lauderdale, Florida, USA. 7-12 August. Oral Presentation.

2015 **Shoemaker, L.G.** and Clauset, A. 2015. Universal processes govern body mass evolution in marine and terrestrial environments. Annual Meeting, Geological Society of America. Baltimore, Maryland, USA. 1-4 November. Oral Presentation.

Shoemaker, L.G. and Melbourne, B.A. 2015. Demographic and environmental stochasticity alter spatial coexistence strength via stabilizing mechanisms. Ecological Society of America. Baltimore, Maryland, USA. 9-14 August. Oral Presentation.

2014 **Shoemaker, L.G.**, Tucker, C.M., Davies, K.F., and Melbourne, B.A. 2014. Differentiating between niche and neutral assembly in metacommunities: When null models fall short. Ecological Society of America. Sacramento, California, USA. 10-15 August. Oral Presentation.

2013 **Shoemaker, L.G.** and Melbourne, B. 2013. Coexistence and spatial heterogeneity: A theoretical analysis of metacommunity paradigms. Annual Meeting, Ecological Society of America. Minneapolis, Minnesota, USA. 4-9 August. Oral Presentation.

2012 **Shoemaker, L.G.** and Clauset, A. 2012. Body mass evolution and diversification within Family Equidae. Annual Meeting, Geological Society of America. Charlotte, North Carolina, USA. 4-7 November. Oral Presentation.

Shoemaker, L.G. and Clauset, A. 2012. The Evolution of body mass distribution and diversification within the Equidae family. Annual Meeting, Society of Vertebrate Paleontology. Raleigh, North Carolina USA. 17-20 October. Oral Presentation.

Shoemaker, L.G. and Melbourne, B. 2012. Coexistence and Persistence: An Analysis of Metacommunity Paradigms. Annual Meeting, Guild of Rocky Mountain Ecologists and Evolutionary Biologists. Mountain Research Station at the University of Colorado. 14-16 September. Oral Presentation.

Shoemaker, L.G. and Clauset, A. 2012. The Evolution of body mass distribution and diversification within the Equidae family. Annual Meeting, Ecological Society of America. Portland, Oregon USA. 5-10 August. Oral Presentation.

Outreach:

2017-present Fairy Circle Science Outreach
- Maintain the blog, "Namibia fairy circles: Pattern formation in a barren grassland" https://fairycirclesblog.wordpress.com and have presented on the current state of fairy circle research to the Sossusvelei Desert Lodge safari guides.

2012-present **Annual Teaching Controversial Topics Workshop co-organizer**
- Assist in organizing an annual ½ credit workshop for K-12 science teachers throughout Colorado. The workshop focused on how to effectively teach evolution and climate change at various stages in the K-12 classroom. The workshop is attended by 40-70 K-12 educators annually and includes 2-3 concurrent sessions.
- Taught "Domesticating the Russian Fox: A Case Study for Teaching Natural Selection" (2014) and "From the pygmy shrew to the blue whale: The evolution of mammalian body size" (2015) at the workshop

2014-present **Volunteer for the University of Colorado, Boulder's Museum of Natural History**
- Assist in organizing and running the museum's annual family day focusing on Evolution: "Fit into Your World" (2014), "The Letter N" (2015), and "Coevolution" (2016)

2014-present **Mentor for Broomfield High School's Science Research Seminar**
- Mentored a high school senior working on an independent research project examining the affect of nutrient addition in Boulder grasslands

2013 **Volunteer science panel member at STEM Magnet School**, Thornton, Colorado

2010-2011 **Co-president of a mathematics tutoring program** that provides free tutoring services to inner-city middle schools in Colorado Springs, Colorado
- Organized and coordinated volunteers who traveled to Mann Middle School and Scholars to Leaders Academy twice a week to tutor 25-30 middle school students each session

2008-2009 **Girl's Day in the Lab** biology lab leader, where I created and led four different organismic and ecological labs for inner-city middle school girls

Academic and Institutional Service Work:

Referee for *The American Naturalist, Ecology, Ecology Letters, Oecologia, and Plant Ecology*

2016-present **Undergraduate Mentor**
- Mentor four undergraduate students, who assist in collecting data for a microcosm experiment examining spatial coexistence mechanisms in metacommunities.

2016-2017 Quantitative Think Tank organizer

- A weekly meeting of graduate students and postdocs from three departments on campus that meet to discuss quantitative techniques, experimental protocol, and data analysis.

2015 **Co-organizer of the Quantitative Biology Student Symposium**

- Organized the inaugural Quantitative Biology Student Symposium at the University of Colorado. The daylong symposium consisted of oral presentations, two poster sessions, and a keynote address and had 85 registered participants from 12 different departments and 3 different institutions.

2015-present **Interdisciplinary Quantitative Biology Student Rotation Mentor**

- Mentored a first-year graduate student rotation project, which has progressed into a continued collaboration and manuscript.

2012-present **Evolution Outreach Committee**

- Assist in incorporating evolution curriculum in the 2 semester introductory biology lab curriculum, organizing the Teaching Controversial Topics Workshop, family day at the Museum of Natural History, and Darwin Day.

Working Groups and Technical Training (Selected):

2016 **Postdocs in Complexity Conference,** Santa Fe Institute, New Mexico.

2016 **Expanding Neo-Chessonian coexistence theory towards a stochastic theory for species rich communities**, working group at the Synthesis Centre for Biodiversity Sciences, Leipzig, Germany.

Metacommunity 2.0, working group at the Synthesis Centre for Biodiversity Sciences, Leipzig, Germany.

2014-present **Nutrient Network**, current member; attended 2014 and 2015 working groups at the University of Minnesota, Saint Paul, Minnesota.

2013 **Complex Systems Summer School***,* Santa Fe Institute, New Mexico.

2012 **Stochastics Applied to Biological Systems**, summer graduate workshop joint sponsored by MBI, NIMBioS, and CAMBAM, Ohio.

Teaching Experience:

2016 Teaching assistant: *Biometry* (EBIO 4410/5410)

- Create and teach all labs for the combined graduate/undergraduate class. Labs use R and Rmarkdown to cover introductory statistics and programming, including generalized linear models, maximum likelihood, and best coding practices.

2016 Graduate co-instructor: *Graduate Writing Seminar* (EBIO 6100)

- Co-taught a seminar on writing scientific papers, grants, and writing for the public. The final, a group writing project entitled, “Scientific writing made easy: A step-by-step guide to undergraduate writing in the biological sciences” (see Educational Materials sections) is currently accepted at ESA Bulletin.

2014 Taught *Building an (Ecological) Model*, module for the Interdisciplinary Quantitative Biology Boot-camp

	Co-taught *Confronting Models with Data*, a two week module for Foundations in Interdisciplinary Quantitative Biology (PHYS 7810)
	Guest lecturer: *Hot Topics and Controversies in Community Ecology* (EBIO 4800/5800)
2012	Teaching assistant: *Quantitative Ecology and Evolutionary* (EBIO 5460)
2009-2011	Mathematics grader: Calculus I, Calculus II, Calculus III, Linear Algebra, and Number Theory classes