

Tara E. Stewart Merrill

Ecology & Evolutionary Biology – University of Colorado Boulder – Boulder, CO 80309

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EDUCATION

Ph.D. in Ecology, August 2019, *University of Illinois at Urbana-Champaign*

B.A. in Biology, June 2011, *University of California, Santa Barbara*

B.F.A. in Dance, June 2008, *University of California, Santa Barbara*

PROFESSIONAL APPOINTMENTS

Life Sciences Research Foundation Postdoctoral Fellow (August 2019 – July 2022)

Research: Diversity-disease relationships in freshwater ecosystems

University of Colorado Boulder (Advisor: Pieter Johnson)

Lecturer, Ecology and Evolutionary Biology, University of Colorado Boulder (Jan 2020-May 2020)

National Science Foundation Graduate Research Fellow (August 2014 – July 2019)

Dissertation: Variable immunity and its consequences for pathogen dynamics in *Daphnia*

University of Illinois at Urbana-Champaign (Advisor: Carla Cáceres)

Laboratory Assistant (January 2014 – August 2014)

Research: Aquatic population, community and evolutionary ecology

University of Illinois at Urbana Champaign (Advisor: Carla Cáceres)

Laboratory Assistant (June 2011 – August 2013)

Research: Parasite and infectious disease ecology in California estuaries

University of California Santa Barbara (Advisors: Kevin Lafferty, Armand Kuris, Ryan Hechinger)

PEER-REVIEWED PUBLICATIONS

- (15) Rogalski, M., **T.E. Stewart Merrill**, C. Gowler, C.E. Cáceres & M.A. Duffy. 2021. Context dependent host-symbiont interactions: shifts along the parasitism-mutualism continuum. *American Naturalist* in press.
- (14) **Stewart Merrill, T.E.**, Z. Rapti & C.E. Cáceres. 2021. Host controls of within-host disease dynamics: insight from an invertebrate system. *American Naturalist* doi:10.1086/715355.
- (13) **Stewart Merrill, T.E.**, S.R. Hall & C.E. Cáceres. 2020. Parasite exposure and host susceptibility jointly drive the emergence of epidemics. *Ecology* doi:102:e03245.

- (12) **Stewart Merrill, T.E.** & P.T.J. Johnson. 2020. Towards a mechanistic understanding of competence: a missing link in diversity-disease research. *Parasitology* 147:1159-1170.
- (11) Rapti, Z., **T.E. Stewart Merrill**, B. Mueller-Brennan, J.H. Kavouras & C.E. Cáceres. 2019. Indirect effects in a planktonic disease system. *Theoretical Population Biology* 130:132-142.
- (10) **Stewart Merrill, T.E.**, S.R. Hall, L. Merrill & C.E. Cáceres. 2019. Variation in immune defense shapes disease outcomes in laboratory and wild *Daphnia*. *Integrative & Comparative Biology* 59:1203-1219.
- (9) Merrill, L., **T.E. Stewart Merrill**, A. Barger & T.J. Benson. 2019. Avian health across the landscape: nestling immunity covaries with changing landcover. *Integrative & Comparative Biology* 59:1150-1164.
- (8) **Stewart Merrill, T.E.** & C.E. Cáceres. 2018. Within-host complexity of a plankton-parasite interaction. *Ecology* 99:2864-2867.
- (7) Rosencranz, J.A., K.D. Lafferty, K.M. Thorne, K.J. Buffington, J. Takekawa, R.F. Hechinger, **T.E. Stewart**, R.F. Ambrose, G.M. MacDonald, M. Holmgren, J. Crooks & R. Patton. 2018. Sea-level rise, habitat loss, and potential extirpation of a salt marsh specialist bird in urbanized landscapes. *Ecology and Evolution* 8:8115-8125.
- (6) **Stewart, T.E.**, M.I. Torchin & C.E. Cáceres. 2018. Invisible parasites and their implications for coexisting water fleas. *Journal of Parasitology* 104:101-105.
- (5) Merrill, L., M. Naylor, M. Dalimonte, S. McLaughlin, **T. Stewart** & J. Grindstaff. 2017. Early life immune activation increases song complexity and alters phenotypic associations between sexual ornaments. *Functional Ecology* 31:2263-2273.
- (4) Buck, J.C., R.F. Hechinger, A.C. Wood, **T.E. Stewart**, A.M. Kuris & K.D. Lafferty. 2017. Host density increases parasite recruitment but decreases host risk in a snail-trematode system. *Ecology* 98:2029-2038.
- (3) **Stewart, T.E.** and S.A. Schnitzer. 2017. Blurred lines between competition and parasitism. *Biotropica* 49:433-438.
- (2) **Stewart, T.E.** and L. Merrill. 2015. Host sex and parasitism in Red-winged Blackbirds (*Agelaius phoeniceus*): examining potential causes of infection biases in a sexually dimorphic species. *Canadian Journal of Zoology* 93:21-29.
- (1) Merrill, L., **T.E. Stewart**, P.L. Gonzalez-Gomez, A.L. O'Loughlen, J.C. Wingfield, V.A. Ellis and S.I. Rothstein. 2014. Epulet size and current condition in Red-winged Blackbirds: examining a semi-static signal, testosterone, immune function, and parasites. *Physiological and Biochemical Zoology* 88:11-21.

PUBLICATIONS IN REVIEW, REVISION, OR IN PREPARATION

- (16) Rivera-Quiñones, V., **T.E. Stewart Merrill**, C.E. Cáceres & Z. Rapti. Host immunity suppresses epidemic size and stabilizes host-parasite interactions in an invertebrate disease model. In revision: *American Naturalist*.
- (17) Hobart, B.K., W.E. Moss, T. McDevitt-Galles, **T.E. Stewart Merrill** & P.T.J. Johnson. Consumption of free-living parasite stages protects hosts and benefits predators. In revision: *Journal of Animal Ecology*.
- (18) Hopkins, S., C. Wood, S. Olson, J. Buck, M. Childs, G. de Leo, J. Fornberg, A. Garchitorena, M. Howard, I. Jones, A. Kuris, L. Kwong, C. LeBoa, A. Leon, A. Lund, A. MacDonald, D. Metz, N. Nova, A. Peel, J. Remais, S. Sokolow, **T. Stewart Merrill**, M. Wilson, M. Bonds, A. Dobson, K. Fiorella, L. Mandle, H. Tallis & K. Lafferty. Viable win-win solutions for conservation and human health are ready for adaptive implementation. In review: *Lancet Planetary Health*.
- (19) Woodhams, D.C., N.B. McDonnell, M. Roberson, J.D. Jabon, O.O. Adigun, B.H. Silva, R. Correia, C.L. Shay & **T.E. Stewart Merrill**. Behavioral exposome shapes amphibian disease susceptibility. In revision.
- (20) **Stewart Merrill, T.E.**, C.E. Cáceres, S. Gray, V.R. Larid, Z.T. Schnitzler & J.C. Buck. Safety in numbers promotes future risk: an empirical test of how host density influences infection risk and parasite recruitment. In preparation (expected submission: Summer 2021).
- (21) Terrill, E., C.E. Cáceres, **T.E. Stewart Merrill**, J. Holmes, J. Drenovich & L.R. Strickland. Differential gene expression of *Daphnia dentifera* in response to *Metschnikowia bicuspidata* exposure. In preparation (expected submission: Fall 2021).
- (22) **Stewart Merrill, T.E.**, D. Calhoun & P.T.J. Johnson. On the reliability of competence for the dilution effect: amphibian competence is robust to parasite diversity and exposure dose, but individual variation can be broad. In preparation (expected submission: Fall 2021).

GRANTS, FELLOWSHIPS, AND AWARDS

- 2019 Life Sciences Research Foundation (sponsored by the Simons Foundation) **\$156,000** salary plus **\$30,000** research funds distributed over three years
Schmidt Science Fellows finalist (*final interview declined in lieu of LSRF*)
- 2017 NSF Doctoral Dissertation Improvement Grant **\$20,539**
Lebus Fund Award, University of Illinois **\$990**
Summer Research Grant, University of Illinois **\$1000**
- 2016 Dresden Student Travel Award, American Society of Parasitologists **\$600**

- Clark Research Award, University of Illinois **\$1000**
- 2016 IGERT research grant, University of Illinois **\$5,000**
- 2015 Summer Research Grant, University of Illinois **\$1000**
- 2014 NSF Graduate Research Fellowship, **\$102,000**
NSF IGERT Fellowship, **\$64,000**

INVITED PRESENTATIONS

- 2021 **UMass Lowell**, Biology Department, Lowell, MA: Seminar
Florida State University, Coastal and Marine Laboratory, Tallahassee, FL: Chalk talk
Florida State University, Coastal and Marine Laboratory, Tallahassee, FL: Seminar
University of Delaware, Entomology and Wildlife Ecology, Newark, DE: Seminar
University of Massachusetts Boston, Biology Department, Boston, MA: Seminar
Leibniz Institute of Freshwater Ecology, Berlin: Seminar and Discussion
- 2020 **Cornell University**, Ecology and Evolutionary Biology, Ithaca, NY: Chalk talk
Cornell University, Ecology and Evolutionary Biology, Ithaca, NY: Seminar
University of Michigan, Ecology and Evolutionary Biology, Ann Arbor, MI: Seminar
- 2019 **Society for Integrative and Comparative Biology Symposium**, Tampa, FL: Symposium
- 2018 **University of Illinois Mathematical Biology**, Urbana, IL: Seminar
- 2017 **Biomathematics & Ecology: Education and Research**, Bloomington, IL: Symposium

CONTRIBUTED PRESENTATIONS

**Denotes "Best talk" Award*

- 2021 Disentangling mechanisms in biodiversity-disease research: integrating transmission models, statistical analogs, lab experiments, and field manipulations. Life Sciences Research Foundation Annual Meeting (virtual poster)
- 2020 Toward a mechanistic understanding of competence: investigating a missing link in diversity-disease theory. Ecological Society of America, Salt Lake City, UT (virtual talk during COVID-19)
Building parasites into freshwater food webs: how a pathogenic chytrid fungus affects large-bodied *Daphnia* and their role in lake ecosystems (accepted abstract; conference cancelled due to COVID-19)
- 2019 Host competence: a missing link in biodiversity-disease research. Life Sciences Research Foundation Annual Meeting, Baltimore, MD (poster)
- 2018 Variable immunity and its consequences for parasite dynamics. UIUC Program in Ecology, Evolution & Conservation Biology seminar (talk)

- Exposure and susceptibility jointly drive epidemic emergence. Ecological Society of America, New Orleans, LA (talk)
- Exposure and susceptibility jointly drive epidemic emergence. UIUC Graduate Student Symposium, Urbana, IL (talk)**
- 2017 Plankton-parasite interactions: a window into the within-host dynamics. Ecology and Evolution of Infectious Disease, Santa Barbara, CA (talk)
- Plankton-parasite interactions: a window into the within-host dynamics. Association for the Sciences of Limnology and Oceanography, Honolulu, HI (talk)
- 2016 A closer look reveals a role for parasites in *Ceriodaphnia* competition. Association for the Sciences of Limnology & Oceanography, Santa Fe, NM (talk)
- Plankton-parasitoid interactions: a window into the within-host dynamics. American Society of Parasitologists, Edmonton, Alberta (talk)*
- Diving into *Daphnia* defenses: how a waterflea kills its parasitic invaders. UIUC Graduate Student Symposium, Urbana, IL (talk)**
- 2015 What's parasitizing tropical zooplankton? A survey of Cladocerans and their parasites from the bays of Barro Colorado Island. Ecological Society of America, Baltimore, MD (poster)
- 2014 Disease resistance is influenced by intestinal morphology in *Daphnia dentifera*. Ecological Society of America, Sacramento, CA (poster)
- 2013 Where are the birds in Carpinteria Salt Marsh? Mapping the estuary's avifauna in space and time. UCSB Natural Reserve Symposium, Santa Barbara, CA (talk)
- Where are the birds in Carpinteria Salt Marsh? Mapping the estuary's avifauna in space and time. UCSB Graduate Student Symposium, Santa Barbara, CA (poster)
- 2010 Sex-biased variation in parasitism of breeding Red-winged Blackbirds. UCSB College of Creative Studies Science Week, Santa Barbara, CA (poster)

TEACHING EXPERIENCE AND TRAINING

- 2021 **Invited guest lecturer:** Population Biology, UMass Boston
Invited guest lecturer: Disease Ecology, Purdue University
- 2020 **Lecturer appointment:** Parasitology, University of Colorado Boulder
- 2018 **Fellow:** Mobile Summer Institute on Scientific Teaching, University of Illinois
Invited guest lecturer: Marine Biology, University of Illinois
- 2016 **Instructor:** Epidemiology/Parasitology, University of Illinois
Teaching Assistant: Vertebrate Natural History, University of Illinois
Invited guest lecturer: Summer Illinois Mathematics Camp, University of Illinois
Invited guest lecturer: Ornithology, University of Illinois
- 2014 **Teaching Assistant:** Environmental Biology, University of Illinois

- 2009 **Instructor:** Physically Integrated Dance, Keshet Dance Company, Albuquerque, NM
Instructor: Dance, Title One Homeless Project, Albuquerque, NM
Instructor: Dance, Math, Language, and Conflict Resolution, Youth Diagnostic and Development Center, Albuquerque, NM
- 2008 **Instructor:** Dance, Title One Homeless Project, Albuquerque, NM
Instructor: Dance, Math, Language, and Conflict Resolution, Youth Diagnostic and Development Center, Albuquerque, NM

OUTREACH AND STUDENT-CENTERED ACTIVITIES

- 1) **Diversity and Inclusion Seminar:** Active participant in the CU Boulder Ecology and Evolutionary Biology “Diversity and Inclusion Seminar” which meets weekly to provide training and advance departmental diversity and inclusion efforts (2019-present)
- 2) **Undergraduate Research Mentor:** Participated in a university sponsored mentoring workshop to develop mentoring skills and closely mentored 24 students in science. Students receive interdisciplinary training in aquatic ecology, parasitology, and statistics, and contribute to laboratory projects, develop independent research, and complete honors theses. (2010-present)
- 3) **Illinois STEM Mentor Matching Engine:** Virtually mentored ten students from high schools across the state of Illinois working to complete group and independent projects (2015-18)
- 4) **Mobile Summer Institute Fellow:** Participated in a week-long training intensive, the *Summer Institute on Scientific Teaching*, which covered evidence-based teaching strategies, student diversity, and how to maintain equity in the classroom. As part of the intensive, I co-developed a 30-minute hands-on learning activity that will be made available for educators on the institute’s website (<https://www.summerinstitutes.org/teachable-tidbits>) (2018)
- 5) **Girls Explore Biology Instructor:** Volunteer instructor for the *Girls Explore Biology* summer camp for kindergarten to fourth grade girls in Champaign-Urbana, IL. I co-designed and implemented three hour-long teachable units in avian biology, including species identification, feeding strategies and morphology, and birdsong (2014; 2015; 2018)
- 6) **Mathematics Camp Instructor:** Volunteer instructor at the *Summer Illinois Mathematics Camp*, a free camp for middle to high school students exploring math and biology in Champaign-Urbana, IL. I presented a lecture on my collaborative research with mathematicians and facilitated a discussion on the nature and power of interdisciplinary research (2016)

UNDERGRADUATE AND GRADUATE MENTORING

- Brendan Hobart**, PhD Student, CU Boulder, 2021-present
Ty McCaffrey, NSF REU, CU Boulder, 2021-present
Christina Snow, Undergraduate Research, CU Boulder, 2021-present

Grace Westphal, NSF REU, U of Illinois, 2021-present
Madelyn McLaughlin, Undergraduate Research, CU Boulder, 2019-present
Delvecchio Wilson, NSF REU, CU Boulder, 2020-2021
Fox Freeman, Undergraduate Research, CU Boulder, 2020
Jackson McKinney, Undergraduate Research, CU Boulder, 2020
Margaret Paige Paulson, Undergraduate Research, CU Boulder, 2019-2020
Sarah Von Hoene, Undergraduate Honors Thesis, CU Boulder, 2019
Cecily Negri, Undergraduate Research, U of Illinois, 2018-2019
Samantha Gray, Undergraduate Research, U of Illinois, 2018-2019
Veronika Laird Undergraduate Research, U of Illinois, 2018-2019
Diana Oleksyn Undergraduate Research, U of Illinois, 2018-2019
Anna Osborn Undergraduate Research, U of Illinois, 2018-2019
Zoe Schnitzler Undergraduate Research, U of Illinois, 2018-2019
Krti Tallam, Udall Scholar, U of Illinois, 2016-2018
Gargi Sundaram, Undergraduate Honors Thesis, U of Illinois, 2015-2017
Kaileen Dinnon, Undergraduate Research, U of Illinois, 2015-2016
Peter Schmucker, Undergraduate Research, U of Illinois, 2015-2016
Samantha Kopec, Undergraduate Honors Thesis, U of Illinois, 2014-2016
Mariah Matthews, Undergraduate Research, U of Illinois, 2014
Jelena Verkler, Undergraduate Research, U of Illinois, 2014
Jessica Arbon, Science Horizons Research Fellow, UC Santa Barbara, 2012
Anushika Ganegoda, Undergraduate Research, UC Santa Barbara, 2010
Erin O’Leary, Undergraduate Research, UC Santa Barbara, 2010

PROFESSIONAL SERVICE AND ACTIVITIES

National and International Conferences

Session co-organizer/moderator: Uniting predator-prey and parasite-host theory under a general consumer-resource framework. Ecological Society of America, New Orleans, LA, 2018

Society Affiliations

American Ornithological Society, American Society of Parasitologists, Association for the Sciences of Limnology and Oceanography, Ecological Society of America, Society for Integrative and Comparative Biology

Journal Reviews

American Naturalist (3), Ecology (2), Ecology and Evolution (1), Evolutionary Ecology (1), Hydrobiologia (1), International Journal for Parasitology (2), Journal of Animal Ecology (1), Nature Scientific Reports (1), Parasitology (2), Parasitology Research (1), PLOS Computational Biology (1), Proceedings of the Royal Society B: Biological Sciences (1)

Institutional and Departmental Service

Graduate Admissions Committee for the Program in Ecology, Evolution & Conservation Biology at University of Illinois (2018), Organizer for the Graduate Student Symposium at University Illinois (2017), Events Coordinator for the Graduates in Ecology and Evolutionary Biology (2015-2016), Graduate Panelist at the Illini Wildlife and Conservation Club (2016)