

# Melissa R. Kardish

PhD Candidate, Population Biology Graduate Group  
University of California, Davis  
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## PROFESSIONAL INTERESTS

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I am a community ecologist who uses microbial community data to answer questions about how microbial communities assemble and interact with their hosts using bioinformatics, observational surveys and experimental manipulations. I am an engaged mentor and teacher and plan to continue to incorporate that in my career.

## EDUCATION

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- 2014-present** University of California, Davis, Advisor: Dr. John J. Stachowicz  
PhD Candidate, Population Biology Graduate Group, GPA: 4.0/4.0  
Affiliations: Center for Population Biology, Coastal and Marina Science Institute,  
Bodega Marine Lab, Bodega Marine Science Association, Data Science  
Initiative, Microbiome Special Research Program  
Thesis in progress: *Disentangling the ecological processes of community  
assembly in the microbial community of seagrasses*
- 2008-2012** University of Chicago, Chicago, IL, Advisor: Dr. Trevor D. Price  
Bachelor of Arts, Biology, GPA: 3.7/4.0  
Thesis: *Geographical variation in prevalence and diversity of malaria in two  
sympatric warbler species*

## PUBLICATIONS

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6. Mueller, U.G., **Kardish, M.R.**, Ishak, H.D., Wright, A. M., Solomon, S.E., Bruschi, S., Carlson, A.L., and Bacci, M. Phylogenetic patterns of ant-fungus associations indicate that farming strategies, not only a superior fungal cultivar, explain the ecological success of leafcutter ants. 2018 *Molecular Ecology*. 27(10): 2414-2434.
5. Mueller, U.G., Juenger, T., **Kardish, M.R.**, Carlson, A., Burns, K., Smith, C., De Marais, D. Artificial Microbiome-Selection to Engineer Microbiomes that Confer Salt-Tolerance to Plants. bioRxiv 081521.
4. Kellner, K., **Kardish, M.R.**, Seal, J.N., Linksvayer, T.A., and Mueller, U.G. Symbiont-mediate host-parasite dynamics in a fungus-gardening ant. 2017. *Microbial Ecology*, 1-14.
3. Fahimipour, A.K., **Kardish, M.R.**, Eisen, J.A., Lang, J.M., Green, J.L., and Stachowicz, J.J. Global-scale structure of the eelgrass microbiome. 2017. *Applied and Environmental Microbiology*, 03391-16.
2. **Kardish, M.R.**, Mueller, U.G., Amador-Vargas, S., Dietrich, E.I., Ma, R., Barrett, B., and Fang, C.-C. Blind trust in unblinded observation in Ecology, Evolution and Behavior. 2015, *Frontiers in Ecology and Evolution*, 3:51, doi:10.3389/fevo.2015.00051.
1. Scordato, E.S.C.\* and **Kardish, M.R.\*** Prevalence and beta diversity in avian malaria: host species is a better predictor than geography. 2014. *Journal of Animal Ecology*, 83(6):1387-1397. \*Both authors contributed equally to the work.

## OTHER WRITING AND ARTICLES

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**Kardish, M.R.** [Multi-species biofilm formation from seagrass-associated bacterial communities.](#) Microbial Diversity Course, August 2019.

## AWARDS AND GRANTS

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**Center for Population Biology, Hardman Foundation Research Award, \$1,450 (2017), \$1,378 (2019)**

**Center for Population Biology Travel Award, \$622 (2019)**

**Achievement Rewards for College Scientists (ARCS) Scholar (2018), Northern California Chapter, \$11,000**

**Microbial Diversity Travel Award** for post course research (2017), **\$3,115**

**S.O. Mast Scholarship** for the Microbial Diversity Course (2017), **\$6,611.25**

**XSEDE Allocation**, NSF, *TG-DEB160008*, Sole PI, 2016-2020, **\$4,614** (total value)

**Fellow**, Graduate Student Research Fellowship, NSF, 2016, **\$134,000**

**Center for Population Biology Research Award, \$1800 (2018) \$550 (2017) \$1,993 (2016), \$1500 (2015)**

**First Year Fellowship**, Population Biology Graduate Group, 2014-2015

**Honorable Mention**, Graduate Student Research Fellowship, NSF, 2014 & 2015

**Departmental and general honors**, University of Chicago, 2012

## RESEARCH AND FIELD EXPERIENCE

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**2014-present** Graduate Researcher, Stachowicz Lab, University of California, Davis

**2018** Visiting Researcher, O'Toole Lab, Geisel School of Medicine at Dartmouth

**2012-2014** Lab Manager, Mueller Lab, University of Texas, Austin

**2009-2012** Research Assistant, Price Lab, University of Chicago

**2012** Field Research Assistant, Dr. Shizuka, University of Nebraska-Lincoln

**2010** Field Research Assistant, Borevitz Lab, University of Chicago

## TEACHING POSITIONS

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**STEMinist R-Workshop:** Co-developed and taught 2-3 day introductory R workshop to underrepresented undergraduates interested in Data Science. UC Davis (March 2018), UC Berkeley (January 2018, May 2017), taught for Graduate Admissions Pathways exposing students from HBCUs doing summer research at UC Davis to R for the first time (July 2018)

### University of California Davis:

Intro to Biology: Principles of Ecology & Evolution (Lab TA: Winter 2016, Fall 2019)  
Marine Ecology (EVE115; Grader: Winter 2015)

### University of Chicago:

Human Genetics & Developmental Biology (TA: Spring 2012)  
Genetics (Lab TA: Winter 2011 & 2012)  
Cell and Molecular Biology (Lab TA: Fall 2010 and 2011)  
Research in the Biological Sciences (TA: Summer 2011)  
Introduction to Human Genetics (TA: Spring 2010)

## SELECTED PRESENTATIONS

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**Kardish, M.R. (talk)** Host disease susceptibility alters microbiome response to an experimental warming treatment. Population Biology Graduate Group Symposium, Davis, CA. December 7, 2019.

**Kardish, M.R.** and Stachowicz, J.J. (talk) Environment rather than host plant differences drive local scale variation in the eelgrass microbiome. Coastal and Estuarine Research Federation Meeting, Mobile, AL, Nov 11, 2019.

- Kardish, M.R.** (*invited talk*) Host disease susceptibility alters microbiome response to an experimental warming treatment. UC Davis Host Microbiome Retreat, Tahoe City, CA, October 25, 2019.
- Kardish, M.R.**, ZEN Partners, Duffy, J.E., Hovel, K.A., Eisen, J.A., Reynolds, P.L., Stachowicz, J.J. (*talk*) An integrated approach to community assembly across taxa: similarity patterns across plant genotypes, epifaunal invertebrate species and root-associated microbial taxa in eelgrass (*Zostera marina*) communities, Ecological Society of America Meeting, Louisville, KY, August 15, 2019.
- Kardish, M.R.** and Stachowicz, J.J. (*poster*) In Reciprocal Transplant Experiment, Eelgrass Microbiome Rapidly Adopts Community of Transplanted Site. American Society for Microbiology Meeting, San Francisco, CA June 22, 2019.
- Kardish, M.R.** and Stachowicz, J.J. (*poster*) Seagrass and their Bacterial Partners, Achievement Rewards for College Scientists (ARCS) Foundation Symposium, San Francisco, CA, April 29, 2018.
- Kardish, M.R.** and Stachowicz, J.J. (*talk*) Succeeding when you're away from home: Where you wind up matters for your growth and your microbes Population Biology Graduate Group Symposium, Davis, CA. December 9, 2018
- Kardish, M.R.** (*talk*) UnSeminar: When we can't see everything, we estimate, Data Science Initiative, UC Davis, November 29, 2018.
- Kardish, M.R.** (*talk*) Multi-species biofilm formation from seagrass-associated bacterial communities Population Biology Graduate Group Symposium, Davis, CA, December 9, 2017.
- Kardish, M.R.** (*talk*) Multi-species biofilm formation from seagrass-associated bacterial communities. Microbial Diversity Course, Woods Hole, MA, August 21, 2017.
- Kardish, M.R.** (*talk*) Disentangling the ecological processes driving the assembly of eelgrass bacterial communities. Center for Population Biology Seminar Series, University of California, Davis, Mar. 7, 2017.
- Kardish, M.R.** (*public talk*) The Eelgrass Microbiome. Pt. Reyes National Seashore Lectures, Mar. 2, 2017.
- Kardish, M.R.**, Fahimipour, A.K., Eisen, J.A., Reynolds, P.L., Hovel, K.A., Duffy, J.E., Stachowicz, J.J. (*talk*) Concordance of microbial communities, mesograzers, and genetic structure in worldwide sampling of *Zostera marina*. Western Society of Naturalists, Nov. 12, 2016.
- Kardish, M.R.** (*talk*) Geographical variation in prevalence and diversity of malaria in breeding populations of two sympatric warbler species. Senior thesis presentation, University of Chicago. April 2012.
- Kardish, M.R.**, Scordato, E.S.C., and Price, T.D. (*poster*) Haemosporidian Prevalence and Diversity in Phylloscopus Warblers. Midstates Consortium for Math and Sciences Undergraduate Research Symposium, October 2011.

## OUTREACH AND SERVICE

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2016 – present	<b>Member</b> , Population Biology Student Diversity Committee
2018—2019	<b>Student Representative</b> , CPB postdoc search committees
2015—2017	<b>Mentor</b> , Population Biology Graduate Group, 2 incoming students
2015 – 2017	<b>Webmaster</b> , Bodega Marine Student Association
2015 – 2016	<b>Mentor</b> , Women in Science and Engineering undergraduate
2015 – 2018	<b>Picnic Day Volunteer</b> , Bodega Marine Lab Exhibit, UC Davis

2016	<b>Volunteer</b> , California Academy of Science Nightlife, for Bodega Marine Lab
2016	<b>Volunteer</b> , Algae pressing Science&Art event by Bodega Marine Sciences Association
Winter 2016	<b>Member</b> , Student advising panel for candidates for college dean
2015, 2017	<b>Member</b> , Organizing Committee, Center for Population Biology Proutfest
2015	<b>Member</b> , Planning Committee, Questions and Methods in Ecological Genetics, Center for Population Biology Mini-Conference
2014	<b>Exhibitor</b> , UC Davis Marine Sciences at the Exploratorium, San Francisco
2014	<b>Exhibitor</b> , Stachowicz Lab, Bodega Marine Lab Open House
2013	<b>Facilitator</b> , international film crew visit Mueller Lab
2011	<b>Panelist</b> , Undergraduate Research Panel, University of Chicago
2011	<b>Organizer and Volunteer</b> , Knowledge is Power Program middle schoolers visit University of Chicago

## STUDENTS MENTORED

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*UC Davis*: Elizabeth Allen (2017-18; MS '17 Northeastern), Makenzie Kawahara (2017-20; BS expected '20), Thérèse Burns (2017-19; BS '19), Elizabeth Diaz (2018; BS '19), Felicia Pham (2018-20; BS expected '20), Harley Sui (2018-19; BS expected '20), Tina Nguyen (2018; BS expected '20), Hailey Adler (2019-20, BS expected '21)

*UT Austin*: Lesli Copp (BS '15), Kathy Sun (BS '16)

## PRESENTATIONS MENTORED

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Burns, Therese and Frey, Madeline. Differences in invertebrate composition on invasive algae, *Sargassum muticum*, and native algae in Bodega Bay. UC Davis Undergraduate Research Symposium. April 26, 2019.

Allen, Elizabeth A. Temporal and spatial variation in the relative abundance of key microbial functional genes in seagrass roots compared to adjacent sediments. Northeastern masters thesis defense December 2017.

Allen, Elizabeth A., Kardish, M.R., and Stachowicz, J.J. The relative abundance of nitrogen fixing and sulfur-oxidizing bacteria within northern California eelgrass beds. Western Society of Naturalists, Pasadena, CA November 2017.

## PROFESSIONAL TRAINING

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**Certified Carpentries Instructor** (March 2019)

**Quarter length participatory seminars at UC Davis**: Co-Evolution of Microbiomes and Hosts (fall '15), Landscape genomics, local adaptation, and climate (winter '15), Does phylogenetic history really inform ecological processes (fall '15), Invasion Genetics (spring '16), Mutualism (spring '17), Marine Microbial Ecology (winter '19), Designing an Introductory Biology Series (spring '19), Data Feminism (fall '19)

**Structural Equation Modeling Workshop**, *Bodega Bay Marine Lab*, Instructor: Dr. Jarrett Byrnes, March 2018

**Microbial Diversity Course**, *Marine Biological Laboratory*, Co-Directors: Drs. Dianne Newman and Jared Leadbetter, Summer 2017

**Meta-analysis of Ecological and Evolutionary Data**, *University of California, Davis*, 2015, Instructor: Dr. Heather Kharouba

**Social and Economic Networks: Models and Analysis**, Certificate of Completion with Distinction, Online course from Stanford University, Instructor: Dr. Matthew Jackson, 2013

**Intro to NGS Bioinformatics**, University of Texas, Austin, Instructor: Drs. Scott Hunickesmith and Jeff Barrick, 2012

**High Performance Computing for NextGen Sequence Analysis**, University of Texas, Instructors: Matt Vaughn, John Fonner, 2012

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**MANUSCRIPTS REVIEWED FOR**

*Estuaries and Coasts, Environmental Microbiology, PLoS ONE (2), The Science of the Total Environment, Ecology, Environmental Microbiology Reports*

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**PROFESSIONAL MEMBERSHIP**

Western Society of Naturalists,  
Ecological Society of America,  
American Society of Microbiologists,  
Coastal and Estuarine Research Society