

Melissa R. Kardish

PhD Candidate, Population Biology Graduate Group
University of California, Davis
One Shields Avenue, Davis, CA, 95616
mrkardish@ucdavis.edu | mkardish.github.io | +1 443-694-3024

PROFESSIONAL INTERESTS

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

- 2014-present** University of California, Davis, Advisor: Dr. John J. Stachowicz
PhD Candidate, Population Biology Graduate Group, GPA: 4.0/4.0
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

- 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.
- 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.
- 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.
- 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.
- 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.

SUBMITTED/IN REVIEW MANUSCRIPTS

- Schenck, F.R., Dubois, K., **Kardish, M.R.**, Stachowicz, J.J., Hughes, A.R. The effect of warming on seagrass wasting disease depends on host genotypic diversity and identity. Submitted to *GCB*.
- Barrett B., Kubik, T., Kellner, K. **Kardish, M.R.**, Mueller, U.G. Ant genotype contributes to nestmate recognition in the asexual fungus-farming ant, *Mycocetopus smithii* (Hymenoptera: Formicidae). Submitted to *Behavioral Ecology and Sociobiology*.

Mueller, U.G., Juenger, T., **Kardish, M.R.**, Carlson, A., Burns, K., Edwards, J., Smith, C., Fang, C., Des Marais, D. Artificial Microbiome-Selection to Engineer Microbiomes That Confer Salt-Tolerance to Plants. Submitted to *Methods in Ecology and Evolution*.

OTHER WRITING AND ARTICLES

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

AWARDS AND GRANTS

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), \$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, 2015-2018, \$5,843 (total value)
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

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

TEACHING POSITIONS

STEMinist R-Workshop: Co-developed and taught 2-3 day introductory R workshop to underrepresented undergraduates interested in Data Science (4x)
University of California Davis: Principles of Ecology & Evolution (4x), Marine Ecology, Ecology, Introduction to Ecology (1x)
University of Chicago: Human Genetics & Developmental Biology, Genetics (2x); Cell and Molecular Biology (2x); Research in the Biological Sciences; Intro to Human Genetics

SELECTED RECENT PRESENTATIONS

Kardish, M.R. (*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 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

- | | |
|----------------|---|
| 2020 | Mentor , UC Davis Evolution and Ecology Graduate School Preview, 2 students |
| 2019-2020 | Scientist Writer , Letters to a PreScientist |
| 2016 – present | Member , Population Biology Student Diversity Committee |
| 2018—2019 | Student Representative , CPB postdoc search committees |
| 2015—2017 | Mentor , Population Biology Graduate Group, 2 incoming students |
| 2015 – 2017 | Webmaster , Bodega Marine Student Association |
| 2015 – 2016 | Mentor , Women in Science and Engineering undergraduate |
| 2015 – 2018 | Picnic Day Volunteer , Bodega Marine Lab Exhibit, UC Davis |
| 2016 | Volunteer , California Academy of Science Nightlife, for Bodega Marine Lab |
| 2016 | Volunteer , Algae pressing Science&Art event by Bodega Marine Sciences Association |
| Winter 2016 | Member , Student advising panel for candidates for college dean |
| 2015, 2017 | Member , Organizing Committee, Center for Population Biology Proutfest |
| 2015 | Member , Planning Committee, Questions and Methods in Ecological |

2014 Genetics, Center for Population Biology Mini-Conference
Exhibitor, UC Davis Marine Sciences at the Exploratorium, San Francisco
2014 **Exhibitor**, Stachowicz Lab, Bodega Marine Lab Open House
2013 **Facilitator**, international film crew visit Mueller Lab
2011 **Panelist**, Undergraduate Research Panel, University of Chicago
2011 **Organizer and Volunteer**, Knowledge is Power Program middle schoolers
visit University of Chicago

STUDENTS MENTORED

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

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

PRESENTATIONS MENTORED

Kawahara, Mackenzie A., Kardish, M.R., Stachowicz, J.J. The Recolonization of microbial communities after bleach surface sterilization. UC Davis Undergraduate Research Symposium. April 24, 2020. <https://youtu.be/oqDlqTDimdE>

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 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

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

SKILLS

R; QIIME; UNIX; Adobe Photoshop, InDesign, Illustrator; Mr. Bayes; FigTree; Codon Code Aligner; MacClade; Mesquite; Geneious; Sequencher; Garli; MrModelTest

MANUSCRIPTS REVIEWED FOR

Estuaries and Coasts, Environmental Microbiology, PLoS ONE (2), The Science of the Total Environment, Ecology, Environmental Microbiology Reports, Journal of Soils and Sediments, Marine Environmental Research

UC DAVIS AFFILIATIONS

Center for Population Biology, Coastal and Marine Science Institute, Bodega Marine Lab, Bodega Marine Science Association, Data Science Initiative, Microbiome Special Research Program

PROFESSIONAL MEMBERSHIP

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