

Catherine A. Hernandez

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Education

- PhD 2021 **University of California, Berkeley (Berkeley, CA)**
Doctor of Philosophy in Integrative Biology
Advisor: Dr. Britt Koskella
Dissertation: “The relevance of context in the ecology and evolution of phage interactions with the bacterial plant pathogen *Pseudomonas syringae*”
- BS 2014 **University of Miami (Coral Gables, FL)**
Bachelor of Science in Biology, *summa cum laude*
Advisor: Dr. Alex C. C. Wilson
Honors Thesis: “The temporal and spatial expression of an amino acid transporter gene in asexual pea aphid embryos”

Professional Appointments

- 2021-present Postdoctoral Fellow at Yale University, Department of Ecology & Evolutionary Biology
Advisor: Dr. Paul E. Turner
Project: “Viral communities in a warming world”

Fellowships, Grants, and Awards

- 2021-2025 Yale Institute for Biospheric Studies (YIBS) Gaylord Donnelley Postdoctoral Environmental Fellowship and National Science Foundation (NSF) Postdoctoral Research Fellowship in Biology
- 2016-2021 NSF Graduate Research Fellowship
- 2015-2020 Berkeley Fellowship for Graduate Study
- 2017-2020 UC Berkeley Integrative Biology Department Summer Research Award (\$8441 total)
- 2020 Sigma Xi Berkeley Chapter Grants in Aid of Research (\$472)
- 2019 Plantae Conviron Seeding Discovery Competition Semi-Finalist
- 2019 ASM Microbe Outstanding Abstract Award
- 2019 Carl Storm Underrepresented Minority Fellowship (to attend Microbial Population Biology Gordon Research Conference)
- 2018 Australia-Americas PhD Research Internship Program (to work with Dr. Jeremy Barr, Monash University)
- 2010-2014 University of Miami Foote Fellow
- 2014 Phi Beta Kappa
- 2012-2013 Howard Hughes Medical Institute (HHMI) Exceptional Research Opportunities Program (EXROP) and Capstone (to work with Dr. Daniel Bolnick, University of Texas at Austin)

Publications

*Indicates undergraduate co-author

9. **Hernandez, C. A.**, Delesalle, V. A., Krukoni, G. P., DeCurzio, J. M.*, & Koskella, B. 2023. Genomic and phenotypic signatures of bacteriophage coevolution with the phytopathogen *Pseudomonas syringae*. In Press at Molecular Ecology. doi: [10.1111/mec.16850](https://doi.org/10.1111/mec.16850)
8. Koskella, B., **Hernandez, C. A.**, and Wheatley, R. M. 2022. Understanding the Impacts of Bacteriophage Viruses: From Laboratory Evolution to Natural Ecosystems. Annual Review of Virology 9:57-78. doi: [10.1146/annurev-virology-091919-075914](https://doi.org/10.1146/annurev-virology-091919-075914)
7. Debray, R., Socolar, Y., Kaulbach, G.*, Guzman, A., **Hernandez, C.A.**, Curley, R.*, Dhond, A.*, Bowles, T. and Koskella, B. 2022. Water stress and disruption of mycorrhizas induce parallel shifts in phyllosphere microbiome composition. New Phytologist 234(6):2018-2031. doi: [10.1111/nph.17817](https://doi.org/10.1111/nph.17817)
6. Bichet, M. C., Chin, W. H., Richards, W., Lin, Y.-W., Avellaneda, L., **Hernandez, C. A.**, Oddo, A., Chernyavskiy, O., Hilsenstein, V., Neild, A., Li, J., Voelcker, N. H., Patwa, R. and Barr, J. J. 2021. Bacteriophage uptake by mammalian cell layers represents a potential sink that may impact phage therapy. iScience 24(4):102287. doi: [10.1016/j.isci.2021.102287](https://doi.org/10.1016/j.isci.2021.102287)
5. Bartlett, L. J., Boots, M., Brosi, B. J., de Roode, J. C., Delaplane, K. S., **Hernandez, C. A.**, Wilfert, L. 2021. Persistent effects of management history on honeybee colony virus abundances. Journal of Invertebrate Pathology 179:107520. doi: [10.1016/j.jip.2020.107520](https://doi.org/10.1016/j.jip.2020.107520)
4. **Hernandez, C. A.**, Salazar, A. J.*, and Koskella, B. 2020. Bacteriophage-mediated reduction of bacterial speck on tomato seedlings. PHAGE 1(4):205-212. doi: [10.1089/phage.2020.0027](https://doi.org/10.1089/phage.2020.0027)
3. **Hernandez, C. A.**, and Koskella, B. 2019. Phage resistance evolution *in vitro* is not reflective of *in vivo* outcome in a plant-bacteria-phage system. Evolution 73:2461-2475. doi: [10.1111/evo.13833](https://doi.org/10.1111/evo.13833)
 Associated digest in Evolution: Wagner, K.-S., and Rajkov, J. 2019. Lab *versus* nature: Disease resistance evolution differs between environments.
2. Maciejewski, M. F., **Hernandez, C. A.**, and Bolnick, D. I. 2019. Investigating the association between armor coverage and parasite infection in an estuarine population of stickleback. Evolutionary Ecology Research 20:69-82.
1. Morella, N. M., Yang, S. C.*, **Hernandez, C. A.**, and Koskella, B. 2018. Rapid quantification of bacteriophages and their bacterial hosts *in vitro* and *in vivo* using droplet digital PCR. Journal of Virological Methods 259:18-24. doi: [10.1016/j.jviromet.2018.05.007](https://doi.org/10.1016/j.jviromet.2018.05.007)

Preprints

1. Shim, K. C., Weber, J. N., **Hernandez, C. A.**, and Bolnick, D. I. 2022. Population genomics of a threespine stickleback tapeworm in Vancouver Island. (bioRxiv, doi: [10.1101/2022.05.15.491937](https://doi.org/10.1101/2022.05.15.491937))

Presentations

- 2023 Gordon Research Conference on Microbial Population Biology, Andover, NH
Poster: "Intertidal microbes as a model for studying temperature-dependent phage interactions"
- 2022 Connections Across Borders: microbial communities at the interface between ecology and evolution, Mexico City, Mexico
Talk: "Correlated trait evolution impacts ecological interactions of the bacterial plant pathogen Pseudomonas syringae"
- 2022 Evolution Annual Meeting, Cleveland, OH
Poster: "Correlated trait evolution impacts ecological interactions of the plant pathogen Pseudomonas syringae"
- 2021 Yale Institute for Biospheric Studies Seminar Series, New Haven, CT
Talk: "The relevance of context for understanding environmental and host-associated bacteria-phage interactions"
- 2021 American Phytopathological Society Plant Health 2021, virtual
Invited talk, special session: *"Impacts of bacteriophages on plants: from environmental microbiomes to pathogen biocontrol"*
- 2020 Microbial Ecology and Evolution Virtual Conference (MEEvirtual)
Talk: "Revealing the missing links: genomic and phenotypic consequences of phage coevolution with a bacterial plant pathogen"
- 2020 Georgia Tech Center for Microbial Dynamics and Infection Seminar Series, virtual
Invited talk: *"Exploring bacteria-phage interactions and coevolution in the phyllosphere"*
- 2019 BioRad Droplet Digital PCR technical seminar, Berkeley, CA
Talk: "ddPCR as a tool for studying bacteria-phage interactions in vitro and in vivo"
- 2019 Gordon Research Conference and Seminar on Microbial Population Biology, Andover, NH
Poster and talk: "Strength of selection and costs of resistance shape the evolution of phage resistance in a bacterial plant pathogen"
- 2019 ASM Microbe, San Francisco, CA
Poster and lightning talk: "Strength of selection and costs of resistance shape the evolution of phage resistance in a bacterial plant pathogen"
- 2019 Bay Area Ecology and Evolution of Infectious Disease, Stanford, CA
Poster: "The genomic and fitness consequences of coevolution and single-sided parasite evolution in a bacteria-phage system"
- 2018 Monash University Microbiology Group Seminar, Melbourne, Australia
Talk: "Bacteria phage interactions and evolution in planta and in vitro"

- 2017 Stanford Microbiome Summit, Stanford, CA
Poster: “The role of the environment in bacteria-phage interactions: experimental evolution in the leaf apoplast (in planta) and in vitro”
- 2014 University of Miami Research, Creativity, and Innovation Forum, Coral Gables, FL
Poster: “The temporal and spatial expression of an amino acid transporter gene in asexual pea aphid embryos”
- 2013 HHMI EXROP Annual Meeting, Chevy Chase, MD
Poster: “Lateral plate morph and parasite load variation in three-spined stickleback”

Teaching Experience

UC Berkeley – Graduate Student Instructor

- Coevolution: from genes to ecosystems (Spring 2020)
 - Facilitated weekly discussion section and lecture activities for upper-level undergraduates.
- Introductory cell, molecular, and organismal biology lab (Fall 2019)
 - Taught two weekly lab sections covering introduction of topics such as cell structure and motility, photosynthesis, and basic anatomy and physiology.
- Introductory ecology, evolution, and plant biology lab (Fall 2016)
 - Co-taught one weekly lab section covering topics such as phylogenetics, species interactions, and ecosystems.

University of Miami – Undergraduate Teaching Assistant

- HHMI introductory biology lab (Spring 2013, Spring 2014)
 - Prepared materials and facilitated in-lab activities for this course-based undergraduate research experience (CURE).

Guest Lectures

- Yale University, Ecology and Evolution of Infectious Disease (April 7, 2022)
“Branching out: a canopy-level view of concepts in the ecology and evolution of plant diseases”

Professional Service

Peer Reviews

- Applied Soil Ecology
- Ecology and Evolution
- Virus Evolution
- eLife
- The ISME Journal
- Microbial Genomics
- PHAGE: Therapy, Applications, and Research
- Molecular Ecology
- NSF CAREER award ad hoc reviewer

Departmental and Society Service

- Society for the Study of Evolution Graduate Student Advisory Committee (2022-2023)

- Planning and running events at the annual Evolution meeting, including the Postdoc Fellowship Application Discussion Lunches
- Reviewer for the Graduate Research Excellence Grant (GREG) R. C. Lewontin Award (Spring 2022, Spring 2023), Early-Career Vocational Opportunities Workshops Grant (Spring 2022), Rosemary Grant Advanced Award (Fall 2022)
- UC Berkeley Integrative Biology Department Graduate Student Association Committee (2017-2018)
 - Planning and running social events for the Integrative Biology community, including weekly socials, monthly research chalk talks, the annual cookie bake-off (Fall 2017) and art and science show (Spring 2018)

Society Memberships

- American Society for Microbiology, Society for the Study of Evolution

Mentoring and Outreach

Research Mentoring

- Yale University: Jaime J. Cha (Yale First Year Summer fellow, Spring 2023-present), Kieren L. Dykstra (YIBS SURES program, Summer 2023-present), Kennedy Mitchell (STARS Program, Summer 2022-present)
- UC Berkeley: Aspen Pastore (URAP Program, Fall 2018-Spring 2022), Sophie Zhai (URAP Program, Spring 2019-Spring 2021; senior thesis mentor), Kore Lum (URAP Program, Fall 2017-Fall 2019), Andrea Salazar (NIH Bridge to Baccalaureate Program, Summer 2019), Priyanka Ranade (Summer 2016-Spring 2018), Reena Debray (Amgen Scholars Program, Summer 2017)
- University of Miami: Brianna Valdes (HHMI Research Training Program, Spring 2015-Summer 2015), Lily Acheampomaa-Piasare (Spring 2015)

Non-Research Mentoring

- Women in Science at Yale Mentoring Program (2021-2022)
 - Served as a postdoctoral mentor for two STEM graduate students at Yale. Meeting regularly to discuss research, academic life, career transitions, and other topics.
- EEB Mentor Match Program (2020, 2022)
 - Meeting regularly with recent graduates and providing advice on searching for graduate programs, contacting possible advisors, and preparing application materials.
- UC Berkeley LAGSES (Latino/a Association of Graduate Students in Engineering and Science) Graduate Fellowship Application Mentor (2017, 2019)
 - Providing feedback on graduate fellowship application materials.

Community Outreach

- Expanding Your Horizons (EYH) Recruitment, Materials, and Publicity Committee (2019-2021)
 - Contacting and visiting local schools to promote the one-day EYH STEM conference (Berkeley, CA) for middle school girls.
- Bay Area Scientists in Schools (2019)
 - One-hour visits to first grade classrooms with a lesson on animal traits and habitats.
- EYH Logistics Volunteer (2018, 2019)
 - Directed parents to the parent workshop location and sorted post-attendee surveys.
- Be a Scientist Program (2016)
 - Guided students as they ran and interpreted science experiments over a six-week span at Willard Middle School (Berkeley, CA).

Professional Development

- Ohio State University Viromics Workshop (2022)
 - Three-day workshop at Ohio State University (Columbus, Ohio) introducing participants to the field of viromics and available tools (primarily focused on viral metagenomics analyses).
- Graduate Student Inclusivity Training through the UC Berkeley Restorative Justice Center (2021)
 - Series of four workshops training graduate students how to use the principles of restorative justice to promote inclusivity in their communities. Using these skills, I developed a community building workshop for labs, which I facilitated in the Spring 2021 Koskella lab retreat.
- Joint Berkeley Initiative for Microbiome Sciences (JBIMS) workshops (2020)
 - Series of three workshops at UC Berkeley: “Theory for Microbiome Research”, “Model Systems for Microbiome Research”, “Data Science Practices in Microbiome Research”
- ReclaimingSTEM Diversity, Equity, and Inclusion Workshop Series (2020)
 - Series of four virtual workshops with active discussions about social justice topics relevant to STEM, including topics such as decolonial theory, disability in STEM, and advocacy in academia.
- Georgia Tech QBioS Epidemics Modeling Workshop (2020)
 - Hands-on modeling workshop teaching principles and methods of running SIR models in R, taught virtually by instructors at GA Tech.
- NSF-funded Research Mentoring Workshops (Bring out the Best in your Undergraduate Researchers: Teaching & Mentoring in Physical & Life Science Research Groups; 2019)
 - Series of five workshops at UC Berkeley training graduate students in evidence-based strategies for undergraduate research mentoring, with active discussions and assignments. Workshop participants implemented these strategies with their summer mentees and brought reflections for discussion each week.
- Teaching Workshops through the UC Berkeley Center for Teaching & Learning (2015)
 - Series of four workshops titled: “Developing a Statement of Teaching Philosophy”, “How Students Learn”, “Syllabus and Course Design”, “Working with Student Writing”