MICAH G. FREEDMAN

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EDUCATION AND TRAINING

Postdoctoral Fellow	University of British Columbia Department of Botany Vancouver, BC, Canada **Supervisor: Dr. Amy Angert**	2022-Present
NSF Postdoctoral Fellow	University of Chicago Department of Ecology & Evolution Chicago, IL USA **Supervisor: Dr. Marcus Kronforst**	2020-2022
Ph.D., Population Biology	University of California, Davis Department of Evolution and Ecology Davis, CA USA **Advisors: Dr. Sharon Strauss, Dr. Santiago Ramírez** Dissertation: Contemporary Evolution During Global Range Expansion in the Monarch Butterfly	2014-2020
Bachelor of Science	Cornell University College of Agriculture and Life Sciences Ithaca, NY USA **Majors: Entomology, Plant Sciences**	2009-2013

PEER-REVIEWED PUBLICATIONS

(*corresponding author; †equal contribution; ^undergraduate mentee)

Submitted

Guizar-Amador, M.F., Linden, T.A., Cridland, J., Hetherington-Rauth, M., **Freedman, M.G.**, Saleh, N.W., Eltz, T., Pupulin, F., Zerbe, P., Dean, C.A. & S.R. Ramírez (2023). Floral scent regulates fine-scale niche partitioning of bee pollinators and reproductive isolation among sympatric *Gongora* orchids.

Freedman, M.G.*, Choquette, S.^, Hunter, M.D., Strauss, S.Y., Ramírez, S.R. & R.L. Vannette (2022). Population-specific patterns of cardenolide sequestration in monarch butterflies from around the world. **In revision**. Link to preprint: https://www.biorxiv.org/content/10.1101/2021.10.15.464593v2.

Published

Robinson, M.L., Weber, M.G., **Freedman, M.G.**, Ashlock, S., Jordan, E., Yonenaga, J. & S.Y. Strauss (2023). Broadscale evolution of coloration in caterpillars reflects their interactions with plants and supports classic tenets of plant defense theory. *Proceedings of the Royal Society B* 290, 20222293. doi.org/10.1098/rspb.2022.2293.

- Cover feature for the January 2023 issue

Hemstrom, W.B., **Freedman, M.G.†*,** Zalucki, M.P., Ramírez, S.R. & M.R. Miller (2022). Population genetics of a recent range expansion in monarch butterflies. *Molecular Ecology* 31, 4544-4557. doi.org/10.1111/mec.16592.

Pocius, V.M., Majewska, A.A. & **M.G. Freedman** (2022) The role of experiments in monarch butterfly conservation: a review of recent studies and approaches. *Annals of the Entomological Society of America* 115, 10-24. doi.org/10.1093/aesa/saab036

Freedman, M.G.*, De Roode, J.C., Forsiter, M.L., Kronforst, M.R., Pierce, A.A., Schultz, C.B., Taylor, O.R. & E.E. Crone (2021). Are eastern and western monarch butterflies distinct populations? A review of evidence for ecological, phenotypic, and genetic differentiation and implications for conservation. *Conservation Science and Practice*, 3:e432. doi.org/10.1111/csp2.432

- Cover feature for the July 2021 issue

Freedman, M.G.*, Dingle, H., Strauss, S.Y. & Ramírez, S.R (2020). Two centuries of monarch butterfly collections reveal contrasting effects of range expansion and migration loss on wing traits. *Proceedings of the National Academy of Sciences, USA* 117, 28887-28893. doi.org/10.1073/pnas.2001283117.

- Featured by UC Davis, San Jose Mercury News, Santa Cruz Sentinel, East Bay Times, Davis Enterprise

Freedman, M.G.*, Jason, C.^, Ramirez, S.R. & S.Y. Strauss (2020). Host plant adaptation during contemporary range expansion in the monarch butterfly. *Evolution* 74, 377-391. doi.org/10.1111/evo.13914.

Freedman, M.G.* & H. Dingle. (2018). Wing morphology in migratory North American monarchs: characterizing sources of variation and understanding changes through time. *Animal Migration* 5, 61-73. doi.org/10.1515/ami-2018-0003

- Featured by National Geographic and as part of a television production by the Japanese National Broadcasting Corporation (NHK)

Freedman, M.G.*, Miller, R.H. & H.S. Rogers. (2018). Landscape-level bird loss increases the prevalence of honeydew-producing insects and invasive ants. *Oecologia* 188, 1263-1272. doi.org/10.1007/s00442-018-4273-5.

Freedman, M.G.*, Dingle, H., Chiu, J.C., Tabuloc, C. Yang, L.H. & M.P. Zalucki. (2018). Non-migratory monarch butterflies retain developmental and transcriptional mechanisms associated with migration. *Biological Journal of the Linnean Society* 123, 265-278. doi.org/10.1093/biolinnean/blx148.

In Preparation

Freedman, M.G., Ramírez, S.R. & S.Y. Strauss. Parallel reductions in physical and chemical defenses against herbivores in flora from the California Channel Islands. (Draft and code posted publicly on Github).

Hemstrom, W.B., **Freedman, M.G.**, Zalucki, M.P. & M.R. Miller. Novel genetic control of migratory diapause in Australian monarch butterflies.

FUNDED RESEARCH PROPOSALS

Using stable isotopes and cardenolide fingerprinting to identify natal origins of western monarch butterflies. Co-PI with Drs. Louie Yang, Emily Meineke, and Chris Funk. 2022-2023. **$19,250**. Awarded by the United States Fish and Wildlife Service.

FELLOWSHIPS AND AWARDS

NSF Postdoctoral Research Fellowship in Biology - **$138,000**	**2020-2022**
Center for Population Biology Summer Research Award - **$1,693**	**2019-2020**
Center for Population Biology Summer Research Award - **$1,700**	**2018-2019**
Center for Population Biology Summer Research Award - **$1,800**	**2017-2018**
National Geographic Society Exploration Grant - **$4,750**	**2017-2018**
NSF EAPSI Australia Fellowship - **$5,400**	**2016**
SSE Rosemary Grant Award - **$2,250**	**2016-2017**
Mildred E. Mathias Research Award - **$2,752**	**2016-2017**
Center for Population Biology Summer Research Award - **$1,800**	**2015-2016**

National Science Foundation Graduate Research Fellowship	**2015-2019**
Davis Botanical Society Award - **$1,690**	**2015-2016**
Hunter Rawlings Cornell Presidential Research Scholarship - **$32,000**	**2009-2013**
Garden Club of America Summer Environmental Scholarship - **$2,000**	**2011**

INVITED SEMINARS AND LECTURES

"Global range expansion, loss of migration, and adaptation in the monarch butterfly (*Danaus plexippus*)." Invited seminar, University of Colorado Denver, Department of Integrative Biology, October 7, 2022.

"Toxin sequestration and its importance in plant-animal interactions." Invited guest lecture for EEB440: Ecology and Evolution of Plant-Animal Interactions, University of Toronto, September 23, 2022.

"Global range expansion in the monarch butterfly: ecological and evolutionary implications." Invited seminar, University of Illinois at Chicago Department of Biological Sciences, October 26, 2021.

"Contemporary evolution during global range expansion in the monarch butterfly." Eco-Evo Lunch Seminar Series, Stanford University, March 3, 2020.

"Contemporary evolution of monarch butterflies in North America and abroad." Invited seminar, Iowa State University Department of Ecology, Evolution, and Biodiversity, December 12, 2019.

"The ecology and evolution of monarch butterflies on Pacific islands." POETS seminar series, University of Guam, June 1, 2018.

CONFERENCE PRESENTATIONS

Freedman, M.G., Agrawal. A.A., Hastings, A.P., Papa, R. & M.R. Kronforst. Functional genomics of cardenolide sequestration in monarch butterflies (*Danaus plexippus*). Oral presentation at the 2022 Entomological Society of America Meeting, Vancouver, BC.

Freedman, M.G., Choquette, S., Hunter, M.D., Strauss, S.Y., Ramírez, S.R. & R.L. Vannette. Population-specific patterns of cardenolide sequestration in monarch butterflies from around the world. Oral presentation at the 2022 Evolution Meeting, Cleveland, OH.

Freedman, M.G., Hemstrom, W.B., Miller, M.R., Zalucki, M.P., Ramírez, S.R. & S.Y. Strauss. Standing genetic variation in monarch butterflies and its conservation

implications. Invited oral presentation at the 2019 Entomological Society of America Meeting, Saint Louis, MO.

Freedman, M.G., Jason, C., Ramirez, S.R. & S.Y. Strauss. Host plant adaptation during global range expansion in the monarch butterfly. Oral presentation at the 2019 Evolution Meeting, Providence, RI.

Freedman, M.G., Jason, C., Ramirez, S.R. & S.Y. Strauss. Host plant adaptation during global range expansion in the monarch butterfly. Poster presented at the 2019 Gordon Conference on Plant-Herbivore Interactions, Ventura, CA.

Freedman, M.G. Parallel loss of defenses against ungulate herbivores in chaparral shrubs from the Channel Islands, California, USA. Oral presentation at the 2017 Ecological Society of America Meeting, Portland, OR.

Freedman, M.G. Contemporary evolution of monarch butterflies in their introduced range. Oral presentation at the 2017 Evolution Meeting, Portland, OR.

Freedman, M.G., Miller, R.H. & H.S. Rogers. Assessing the importance of "unwanted" mutualisms between invasive ants and honeydew-producing insects in native forests of the Northern Mariana Islands. Poster presented at the 2014 Ecological Society of America Conference, Sacramento, CA.

Freedman, M.G., Campbell, S.A., Halitschke, R. & A. Kessler. Evolution of reduced floral scent emission under multiple independent transitions from outcrossing to selfing in the wild nightshades (Solanaceae). Poster presented at the 2014 Gordon Conference on Plant Volatiles, Ventura, CA.

REVIEWER EXPERIENCE

Manuscript reviews:

- *Cell*
- *Proceedings of the National Academy of Sciences USA*
- *Biological Invasions*
- *Journal of Biogeography*
- *Ecology and Evolution*
- *Scientific Reports*
- *Ecological Entomology*
- *Journal of Tropical Ecology*
- *Journal of Thermal Biology*
- *Journal of Tropical Biology and Conservation*
- *Frontiers in Ecology and Evolution*

Funding proposal reviews:

- European Research Council ad hoc review (2022)
- National Geographic Explorer Award (2022)

TEACHING EXPERIENCE

Teaching Assistant: EVE 100 – Introduction to Evolution	Fall 2019
Assistant instructor: UC Davis R Bootcamp	Winter 2017
Reader: EVE 181 – Plant-Animal Interactions	Fall 2016
Reader: EVE 101 – Introduction to Ecology	Spring 2016
Teaching assistant: EVE 100 - Introduction to Evolution	Fall 2015

MENTORSHIP

Thesis committees:

- Christiana-Jo Quintana, M.S. (Iowa State University), 2022

Undergraduate mentees:

- Asia Jones (UC Davis)
- Christopher Jason (UC Davis)
- Sue-Ling Choquette (UC Davis)
- Chandler Puritty (Howard University)
- Nia Johnson (Howard University)
- Anika Hamilton (Howard University)

Graduate Student Mentor: UC Davis EEGAP (Evolution and Ecology Graduate Admissions Pathways) partnership with Howard University**,** UC Davis SEEDS (Strategies for Ecology Education, Diversity, and Sustainability) undergraduate club

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SERVICE ACTIVITIES

Professional service activities:

- Workshop participant, review of IUCN Red List assessment for the monarch butterfly (*Danaus plexippus*), December 2022

Outreach activities:

- Invited speaker for CIM^{2}AS student interns at University of Illinois, Chicago (2022)
- Presentation to the Jackson Park Advisory Council on monarch butterfly conservation, Chicago (2021)
- Panel participant on how to find a postdoc (2021 Evolution meeting)

- Volunteer at UC Davis Picnic Day (2015, 2018, 2019)
- UC Davis Biodiversity Museum Day (2019)
- UC Davis BioBlitz (2016)
- Science Exploration Day, Chabot Space and Science Center, Oakland, CA (2017)

PROFESSIONAL MEMBERSHIPS

Entomological Society of America	October 2019 - Present
Society for the Study of Evolution	March 2015 - Present
Ecological Society of America	August 2014 – Present