

CURRICULUM VITAE

Dr. Forrest D. Freund

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EDUCATION

- May, 2022: **PhD Integrative Biology (Botany)**, University of California, Berkeley, Berkeley, CA: Doctoral Dissertation: The genus *Isoetes* L., evolution, diversification and population structure in a free-sporing heterosporous lycophyte. Committee: Dr. Carl Rothfels (Chair), Dr. Rasmus Nielsen, Dr. Rosemary Gillespie.
- Aug, 2014: **MS Botany**, Claremont Graduate University, Claremont, CA: Master's thesis: Characterizing Quantitative Variation in the Glossopodia of Three Western North American *Isoetes* Species; Committee: Dr. James Mark Porter, Dr. James Travis Columbus, Dr. Lucinda McDade
- Dec, 2007: **BS Botany**, Humboldt State University, Arcata, CA: Senior thesis: Proxy Based Digestion: Bacterial Symbiosis of *Darlingtonia californica*; Advisor: Dr. Michael Messler

PRESENTATIONS

- **Freund, F.** D. Gates, M.G. Johnson, C. Rothfels. Finding hidden quillworts: Identifying *Isoetes* sp. using a systematic approach. California Botanical Society, Online Seminar, California, United States of America ([YouTube Recording](#))
- **Freund, F.**, D. Gates, C. Rothfels. 2023. Finding the hidden quillwort: identifying cryptic species in *Isoetes* using an integrative systematic approach. Botanical Society of America Conference, Boise, Idaho, United States of America
- **Freund, F.**, W. Freyman, C. Rothfels. 2017. Inferring the evolution of corm lobation in *Isoetes* using Bayesian model-averaged ancestral state reconstruction. Botanical Society of America Conference. Ft. Worth, Texas, United States of America
- Kao, T., **F. Freund**, C. Rothfels, M. Windham, and K. Pryer. 2017 Low-copy nuclear data for notholaenid ferns (Pteridaceae) corroborate plastid phylogeny over traditional morphological groupings. Botanical Society of America Conference. Ft. Worth, Texas, United States of America
- Columbus, J. T., A. Fisher, **F. Freund**, A. Ingram. 2014. Origin of the *Centropodia* clade (Poaceae). Botanical Society of America Botany Conference. Boise, Idaho, United States of America

PAPERS PUBLISHED

- **Freund, F. D.**, D. Gates, M. G. Johnson, and C. J. Rothfels. 2025. Phylogenetics and population structure of the western North American endemic Pacific Laurasian clade of *Isoetes*. American Journal of Botany 112(4): e70030. <https://doi.org/10.1002/ajb2.70030>
- Song, M.J., Y.C. Rizzieri, F.W. Li, **F.D. Freund**, M. Escalona, E. Toffelmier, C. Miller, H.B. Shaffer, O. Nguyen, M.P. Marimuthu, and N. Chumchim, 2025. The genome assembly of the duckweed fern, *Azolla caroliniana*. Journal of Heredity, p.esaf022.
- Song, M.J., **F.D. Freund**, C.M. Tribble, E. Toffelmier, C. Miller, H. Bradley Shaffer, F.W. Li, and C.J. Rothfels. 2025. The nitrogen-fixing fern *Azolla* has a complex microbiome characterized by varying degrees of cophylogenetic signal. American Journal of Botany, 112(3),

p.e70010.

- Song, M. J., **F.D. Freund**, C. M. Tribble, E. Toffelmier, C. Miller, H. B. Shaffer, F.-W. Li, and C. J. Rothfels. 2025. The nitrogen-fixing fern *Azolla* has a complex microbiome characterized by varying degrees of cophylogenetic signal. *American Journal of Botany* 112(3): e70010. <https://doi.org/10.1002/ajb2.70010>
- **Freund, F.D.**, D. Thomas. 2020. Noteworthy Collection - California. *Madroño* 67(2): 63-64
- Kao, T.T., K.M. Pryer, **F.D. Freund**, M.D. Windham, and C.J. Rothfels. 2019. Low-copy nuclear sequence data confirm complex patterns of fern evolution in notholaenid ferns (Pteridaceae). *Molecular Phylogenetics and Evolution*, 138, pp.139-155.
- **Freund, F.D.**, W.A. Freyman, and C.J. Rothfels. 2018. Inferring the evolutionary reduction of corm lobation in *Isoetes* using Bayesian model-averaged ancestral state reconstruction. *American Journal of Botany* 105: 275–286.
- **Freund, F.D.** 2016. Characterizing quantitative variation in the glossopodia of three Western North American *Isoetes* species. *American Fern Journal* 106: 87–115.

PROFESSIONAL EXPERIENCE

- **Research Associate (Botany), Plumas National Forest / Great basin Institute** (July, 2025 - Oct, 2025) - Supervisor: Emily Doe, GS5 equivalent position. Duties include field surveying for rare plants, vegetation mapping, seed collecting and herbarium vouchering. Most work conducted over rough, undeveloped terrain. (40hrs/week)
- **Adjunct Professor (Biological Sciences), Santa Rosa Junior College (SRJC)** (Jan, 2025 – May, 2025) - (Supervisor: Katy Jamshidi) - worked as a associate biology instructor at the Santa Rosa Junior College, Santa Rosa Campus. Duties include: lecture and lab instruction and preparation. (12hrs/week)
- **Research Associate (Botany), Bureau of Land Management (BLM) / Great Basin Institute** (April, 2023 – Nov, 2023, Jan, 2024 – Sept, 2024) - Supervisors: Brooke Thompson and Alden Neil, GS5 equivalent position - worked as a seasonal botany technician for the BLM Redding Field Office. Duties include: rare, endangered and special status plant monitoring and discovery, including identification and mapping of new rare plant occurrences, including development of ArcGIS maps with occurrence locations drawn from written records, CNDDB and iNaturalist; vegetation monitoring / assessment for fuels reduction, species inventory, range health and restoration projects, including plant identification, inventory, plant list development and reporting, herbarium voucher preparation and entry into North American Network of Small Herbaria database; seed collection for Seeds of Success, including scouting species for seed collection, identification, collection, processing, and reporting; conducting Assessment, Inventory and Monitoring (AIM) plot assessments for long-term monitoring of restoration efforts on Redding FO lands; composition of NEPA and vegetation monitoring reports. (40hrs/week)
- **Curatorial Assistant, Rancho Santa Ana Botanic Garden** (2014 – 2015)– Supervisor: Dr. Mare Nazaire - Digitization of Marcus E. Jones herbarium collection; specimen entry into the RSA herbarium database; Herbarium seed collection curation; duties include sorting and filing the seed collections for the RSA herbarium (20hrs/week).
- **Field Biology Intern, Ridgecrest Bureau of Land Management / Chichago Botanic Garden** (2009 – 2010) – Supervisors: Glenn Harris (Retired) and Shelly Ellis (deceased) - worked in the Ridgecrest field office; duties included management and curation of the field office herbarium, monitoring and surveying for rare, endangered and special status plants on

BLM lands. Other duties include managing the Seeds of Success program for the field office, monitoring of mine shafts for bat activity, fieldtrip guide to 3rd grade classes and noxious weed removal from BLM lands (40hrs/week).

RESEARCH ASSISTANTSHIPS

- **California Conservation Genomics Project: *Azolla*** (Aug, 2020 – Jan 2021) – U.C. Berkeley - PI: Dr. C. Rothfels - Conducted extensive field sampling of *Azolla* from across California for the CCGP. Duties included, securing permits/permission for sampling on federal, state, county and private land, and developing a field collection protocol that would keep the *Azolla* from breaking apart in transit. Other significant duties included conducting field collections throughout California, including week-long trips from the Bay Area, microscopy work to examine microscopic characters including photographic documentation at multiple magnifications, prepping and extracting DNA/RNA from samples, making vouchers for placement into the UC herbarium, and maintaining a spreadsheet of localities sampled (20hrs/week).
- ***Loesellia* L. (Polemoniaceae) Morphometric and Molecular study** (Feb – May, 2012)
- Claremont Graduate University - PI: Dr. J.M. Porter – Extensive survey of the seed coat and internal structure of the seeds of various *Loesellia* species, using both light and scanning electron microscopy. Additionally, performed DNA extractions and Sanger sequencing of several *Loesellia* species provided by the project's PI (20hrs/week).
- **Molecular Phylogenetics of *Barleria* L. (Acanthaceae Juss.)** (Aug – Nov, 2012) - Claremont Graduate University – PI: Dr. L. McDade - Contributed to an ongoing project in the molecular systematics of the *Barleria* genus in Acanthaceae. Major duties were extraction of DNA from silica dried & herbarium materials using both CTAB and extraction kit protocols, amplification of regions as assigned by the PI, and conducting cycle sequencing of amplification products using Sanger sequencing methods (20hrs/week).
- **Lab Manager's Assistant** (Aug – Dec, 2011) - Claremont Graduate University PI: Dr. L. McDade – Assisted lab manager at Rancho Santa Anna Botanic Garden with running the Molecular and Anatomy lab facilities at the school. Duties included chemical inventory, preparation of communal reagents, maintaining lab equipment, and monthly billing of research accounts (20hrs/week).

FELLOWSHIPS

- **Smithsonian Institution Summer Research Fellowship** (May – Aug, 2013) – PI: Dr. Elizabeth Zimmer (retired) and Dr. W. Carl Taylor (retired) - A paid fellowship at the Smithsonian Natural History Museum working with Dr. Elizabeth Zimmer and Dr. W. C. Taylor on the phylogeny of *Isoetes* in the new world. This fellowship included training at the NMNH, sequencing of the ITS, LFY, AT103 nuclear genes, and the atpF, matK, psbK, rpoC1 and the psbA-trnH and atpB-rbcL intergenic spacers from the chloroplast. Additionally, images of the megaspores from all described species of *Isoetes* from the continental USA were captured using the scanning electron microscope facilities at the institute.