

GEOFF ZAHN, PHD

Associate Professor of Biology | Assoc. Dept. Chair - UVU Biology

Translational microbial ecology | Microbiomes and symbiosis



PROFESSIONAL APPOINTMENTS

Current 2023	Associate Professor & Assoc. Dept. Chair Utah Valley University	📍 Orem, UT
2023 2017	Assistant Professor Utah Valley University	📍 Orem, UT
Current 2020	Private Consulting Forensic Bioinformatics / Data Science + App development	📍 Various
2021 2018	Director of Environmental Biology GeoDataCrawler Research Institute	📍 Athens, GA
2017 2015	Postdoctoral Associate University of Hawai'i at Mānoa	📍 Honolulu, HI

EDUCATION

2015	University of Arkansas Ph.D. in Biology	📍 Fayetteville, AR
2010	Missouri State University B.S. in Ecology, Evolution, and Systematics	📍 Springfield, MO

SELECTED FUNDING AND AWARDS

Total funding: \$1,193,494

Pending funding

Collaborative Research: Burning questions in microbial ecology: Ecological mechanisms that control microbiome transplant outcomes Co-PI | NSF DEB

S-STEM: Faculty-Mentored Experiences for Improving Undergraduate Biology Student Outcomes PI | NSF DUE (submitted for 6-year extension)

CONTACT INFO

✉ gzahn@uvu.edu
🌐 github.com/gzahn
🏠 gzahn.github.io
🆔 [ORCID](#)

SKILLS

💻 Computational:











R
Bash
SQL
Python
Unix admin
High-performance computing
Metagenomics /
Metabarcoding

🧪 Wet-lab:

DNA (extraction/prep/seq/etc.)
Culturing (Fungi and 'Protists')
Microscopy
(BF/DIC/Fluor/SEM)
Soil analysis
Microcosms

📖 Academic:

Course and program design
Active learning
Course-based undergraduate research
Mentoring
Lab management
Grants management

2023 2018	PI: Faculty-Mentored Experiences for Improving Undergraduate Biology Student Outcomes \$972,287 <div>  NSF (DUE – 1833880) </div>
2020, 2022	College of Science Dean's Award of Excellence for Scholarship \$5,500 <div>  UVU </div>
2019	Presidential Fellowship for Faculty Scholarship \$8,000 <div>  UVU </div>
2018 2017	PI: SEED: Engaging undergraduates in advanced research \$30,000 <div>  UVU </div>
2018	PI: New methods to survey fungal endophytes in endangered cacti \$2,550 <div>  Capitol Reef National Park </div>
2018	Co-PI: Assessing Undergraduate Research Teams at an Open Enrollment Institution \$29,327 <div>  UVU </div>
2016	Translational Mycology Postdoctoral Award Plant conservation from a microbial perspective <div>  Mycological Society of America </div>
2015	Co-PI: Restoration of endangered plants by manipulating foliar fungal symbionts \$40,500 <div>  Oahu Army Natural Resources Program </div>
2014	Japan Society for the Promotion of Science Travel Award \$750 <div>  Washington, D.C. </div>
2013	PI: The Importance of microbial interactions to soil carbon cycling on a warming planet \$22,570 <div>  NSF (OISE-1308856) / JSPS (SP01363) </div>
Current 2017	Student Mentee Funding Awards 138 undergrad mentees funded from a variety of internal and external programs



TEACHING AND MENTORING



Designed a new **Bioinformatics Degree Program**

Experienced with univ. curriculum processes and accreditation



R for Biologists

Intro to R language and data science, including dataviz & modeling (designed and taught)

Bioinformatics Data Skills

Unix/Bash and HPC use for bioinformatics (designed and taught)

Mycology

Research-based mycology (designed and taught)

Microbiome Boot Camp

Advanced R, numerical ecology, community ecology, scientific writing (designed and taught)

Bioinformatics Capstone

Project-based (designed and taught)

Organismal Biology

Intro biology II (taught)

Developed online lab for non-major's biology

University of Arkansas - asynchronous pedagogy practices



PUBLICATIONS

2023

Wallace's line is a barrier to the dispersal of seagrass-associated marine bacteria

Wainwright B, Leon J, Hickman KJE, Vilela E, Caldwell J, Aimone B, Bischoff P, Ohran M, Morelli M, Arlyza I, Marwayana O, & **Zahn G. *In Review***

2023

Ten simple rules for running a successful undergraduate research lab

Hickman KJE, **Zahn G *In Review***

2023

Connecting the multiple dimensions of global soil fungal diversity

Mikryukov, V., Dulya, O., Zizka, A., ... **Zahn, G.** ... Tedersoo, L. ***Science Advances*** 10.1126/sciadv.adj8016

2023

The core mangrove microbiome reveals shared taxa potentially involved in nutrient cycling and promoting host survival.

Wainwright BJ, Millar T, Bowen L, Semon L, Hickman KJE, Lee JN, Yeo ZY, & **Zahn G. *Environmental Microbiome*** 10.1186/s40793-023-00499-5.

2023

Inclusion of database outgroups reduces false positives in fungal metabarcoding taxonomic assignments.

Rawson C, & **Zahn G. *Mycologia*** 10.1080/00275514.2023.2206931




- 2022 ● **Long-term soil fungal community recovery after fire is impacted by climate change.**
McGee S, Tidwell A, Riggs E, Veltkamp H, & Zahn G. *Western North American Naturalist*
- 2022 ● **Marker Genes (16S and ITS) Protocol for Plant Microbiome Analyses.**
Zahn G. *BIO-PROTOCOL* 10.21769/BioProtoc.4395
- 2022 ● **Global patterns in endemism and vulnerability of soil fungi.**
Tederloo L, Mikryukov V, Zizka A, Bahram M, Hagh-Doust N, Anslan S, Prylutskyi O, Delgado-Baquerizo M, Maestre FT, Zahn G, ... Abarenkov K. *Global Change Biology* 10.1111/gcb.16398
- 2021 ● **The Global Soil Mycobiome consortium dataset for boosting fungal diversity research.**
Tederloo L, Mikryukov V, Anslan S, Bahram M, Khalid AN, Corrales A, Agan A, Vasco-Palacios A-M, Saitta A, Zahn G, ... Abarenkov K. *Fungal Diversity* 10.1007/s13225-021-00493-7
- 2021 ● **Examination of host-taxon, environment, and distance effects on leaf fungal endophytes in the dominant woody genus, *Metrosideros*, on O'ahu.**
Sur GL, Zahn G, & Stacy EA. *Fungal Ecology* 10.1016/j.funeco.2021.101093
- 2021 ● **Biogeographic structure of fungal communities in seagrass *Halophila ovalis* across the Malay Peninsula.**
Quek ZBR, Zahn G, Lee NLY, Ooi JLS, Lee JN, Huang D, & Wainwright BJ. *Environmental Microbiology Reports* 10.1111/1758-2229.13003
- 2021 ● **Restoration of the mycobiome of the endangered Hawaiian mint *Phyllostegia kaalaensis* increases its resistance to a common powdery mildew.**
Egan CP, Koko JH, Muir CD, Zahn G, Swift SOI, Amend AS, & Hynson NA. *Fungal Ecology* 10.1016/j.funeco.2021.101070
- 2021 ● **Hawaiian Fungal Amplicon Sequence Variants Reveal Otherwise Hidden Biogeography.**
Tipton L, Zahn G, Darcy JL, Amend AS, & Hynson NA. *Microbial Ecology* 10.1007/s00248-021-01730-x
- 2021 ● **Essential oil, insect, and microbe relationships in *Juniperus osteosperma* (Cupressaceae) trees killed by wildfire.**
Wilson T, Poulson A, Packer C, Carlson R, Davis R, Dey M, Owen N, Smalley S, Dodge R, Zahn G ... Stevens M. *Phytologia*
- 2020 ● **Host age is not a consistent predictor of microbial diversity in the coral *Porites lutea*.**
Wainwright BJ, Zahn GL, Afiq-Rosli L, Tanzil JTI, & Huang D. *Scientific Reports* 10.1038/s41598-020-71117-4

- 2020 ● **Fungal communities living within leaves of native Hawaiian dicots are structured by landscape-scale variables as well as by host plants.**
Darcy JL, Swift SOI, Cobian GM, **Zahn GL**, Perry BA, & Amend AS. *Molecular Ecology* 10.1111/mec.15544
- 2019 ● **Fungal aerobiota are not affected by time nor environment over a 13-y time series at the Mauna Loa Observatory.**
Zahn G, Tipton L, Datlof E, Kivlin SN, Sheridan P, Amend AS, & Hynson NA. *Proceedings of the National Academy of Sciences* 10.1073/pnas.1907414116
- 2019 ● **Foliar fungi alter reproductive timing and allocation in Arabidopsis under normal and water-stressed conditions.**
Zahn G, & Amend AS. *Fungal Ecology* 10.1016/j.funeco.2019.04.002
- 2019 ● **Characterization of fungal biodiversity and communities associated with the reef macroalga *Sargassum ilicifolium* reveals fungal community differentiation according to geographic locality and algal structure.**
Wainwright BJ, Bauman AG, **Zahn GL**, Todd PA, & Huang D. *Marine Biodiversity* 10.1007/s12526-019-00992-6
- 2019 ● **Characterisation of coral-associated bacterial communities in an urbanised marine environment shows strong divergence over small geographic scales.**
Wainwright BJ, Afiq-Rosli L, **Zahn GL**, & Huang D. *Coral Reefs* 10.1007/s00338-019-01837-1
- 2019 ● **Seagrass-associated fungal communities show distance decay of similarity that has implications for seagrass management and restoration.**
Wainwright BJ, **Zahn GL**, Zushi J, Lee NLY, Ooi JLS, Lee JN, & Huang D. *Ecology and Evolution* 10.1002/ece3.5631
- 2018 ● **Seagrass-associated fungal communities follow Wallace's line, but host genotype does not structure fungal community.**
Wainwright BJ, **Zahn GL**, Arlyza IS, & Amend AS. *Journal of Biogeography* 10.1111/jbi.13168
- 2017 ● **Foliar microbiome transplants confer disease resistance in a critically-endangered plant.**
Zahn G, & Amend AS. *PeerJ* 10.7717/peerj.4020
- 2017 ● **Uncovering unseen fungal diversity from plant DNA banks.**
Datlof EM, Amend AS, Earl K, Hayward J, Morden CW, Wade R, **Zahn G**, & Hynson NA. *PeerJ* 10.7717/peerj.3730

- 2017 ● **Fungi associated with mesophotic macroalgae from the 'Au'au Channel, west Maui are differentiated by host and overlap terrestrial communities.**
Wainwright BJ, **Zahn GL**, Spalding HL, Sherwood AR, Smith CM, & Amend AS. *PeerJ* 10.7717/peerj.3532
- 2016 ● **The effects of amoebal bacterivory on carbon and nitrogen dynamics depend on temperature and soil structure interactions.**
Zahn G, Wagai R, & Yonemura S. *Soil Biology and Biochemistry*
- 2014 ● **Ecological distribution of protosteloid amoebae in New Zealand.**
Zahn G, Stephenson SL, & Spiegel FW. *PeerJ*
- 2014 ● **First records of Protosteloid Amoebae (Eumycetozoa) from the Democratic Republic of the Congo.**
De Haan M, Cocquyt C, Tice A, **Zahn G**, & Spiegel FW. *Plant Ecology and Evolution*
- 2011 ● **Pil1, an eisosome organizer, plays an important role in the recruitment of synaptonemal complex proteins and amphiphysins to facilitate receptor-mediated endocytosis in yeast.**
Murphy ER, Boxberger J, Colvin R, Lee SJ, **Zahn G**, Loor F, & Kim K. *European Journal of Cell Biology*



SELECTED INVITED PRESENTATIONS

- 2023 ● **Translating mentored undergraduate research into student retention and success**
National Science Foundation S-STEM Symposium  Washington, D.C.
- 2022 ● **Less content, more context: Research as pedagogy in undergraduate mycology courses**
Mycological Society of America  FL, USA
- 2021 ● **Who's there and who cares: the how and why of fungal community structure**
Brigham Young University  UT, USA
- 2018 ● **The causes and consequences of fungal community structure**
University of Arkansas/Missouri State University  AR/MO, USA
- 2016 ● **Picky Eaters: Prey choice by soil protists is altered by temperature and soil structure**
Cornell University,  NY, USA

- 2015 ● **Effects of belowground trophic complexity on carbon cycling under changing climatic and edaphic conditions**
Joint Genome Institute CA, USA
- 2015 ● **The functional and distributional ecology of mycetozoans under changing edaphic and climatic dynamics**
Climate Impact Research Center Abisko, Sweden
- 2014 ● **Picky eaters: climate alters amoeba prey choice and the microbial loop**
NIAES Tsukuba, Japan
- 2012 ● **The Tropical Mycetozoans**
Organization for Tropical Studies Las Cruces, Costa Rica

SELECTED CONTRIBUTED PRESENTATIONS

- 2023 ● **Aquatic Plant-Associated Fungi Along an Urbanization Gradient**
Mycological Society of America AZ, USA
- 2023 ● **Metagenomic Tools for Mycobiome Analyses in Model vs. Non-Model Systems**
Mycological Society of America AZ, USA
- 2023 ● **Improving the Accuracy of Meta-Amplicon Taxonomic Assignments Through the Inclusion of Outgroups in Fungal Databases**
Mycological Society of America AZ, USA
- 2022 ● **Inspecting the microbiome and metabolomic compartments of Mediterranean sponge holobionts through an integrated 'omics approach**
International Sponge Symposium Leiden, Netherlands
- 2016 ● **Fungal endophytes and pathogens in endangered hawaiian endemics: Plant conservation from a microbial perspective**
Mycological Society of America, CA, USA
- 2014 ● **The interactive effects of protozoan predation pressure and environmental factors on carbon and nitrogen cycling in soils under warming conditions**
International Society for Microbial Ecology Seoul, South Korea
- 2014 ● **Using metagenomics and metatranscriptomics to uncover mechanisms of soil communities' effects on carbon cycling under warming conditions**
DOE Joint Genome Institute CA, USA

2013

● **The Role of Soil Amoebae in Nutrient Cycling on a Warming Planet**

Graduate University for Advanced Studies

📍 Sokendai, Japan

2011

● **The Protosteloid Amoebae of New Zealand**

Mycological Society of America

📍 AK, USA

</> **CODE CONTRIBUTIONS**

● **CommunityAssemblR (R package)**

<https://github.com/gzahn/CommunityAssemblR>

● **hubfindr (R package)**

<https://github.com/gzahn/hubfindr>

● **mycobank (R API package)**

<https://github.com/gzahn/mycobank>

● **Microbiome protocol for ITS/16S exploration**

https://github.com/gzahn/Microbiome_Workshop

● **R for exploratory data analysis course**

<https://gzahn.github.io/data-course/>

● **Collection of custom bioinformatics tools**

<https://github.com/gzahn/tools>

● **Tool for creating QIIME-compatible taxonomic databases from any subset of NCBI data.**

<https://doi.org/10.5281/zenodo.3688556>

● **Bioinformatics Data Skills course**

<https://gzahn.github.io/binf-data-skills/>



SYNERGISTIC ACTIVITIES

● **🧑🧑 Mentorship**

- Graduate committee member (4 MS, 3 PhD)
- Undergrad research mentor (39 students)
- [Lab alumni](#)
- Junior faculty mentor (2023)

🍏 Societies & Service

- Editor of *Mycologia*
- Education Committee - Mycological Society of America
- National Microbiome Data Collaborative Champion
- IUCN Species Survival Group - Slime Moulds Specialist
- Member: ISME, MSA, Intl. Soc. for Fungal Conserv., Japan SPS Alumni Assoc.
- NSF GK-12 Teaching Fellow (2011-2012)
- Faculty senator - UVU (2017-2020)
- Program and course development (Univ. of Arkansas, Utah Valley Univ.)
- Faculty search committees (Chair 1x, Member 6x)
- Council for Undergraduate Research (member)

🤝 Collaborations (current and past)

- National Univ. of Singapore
- Universiti Malaysia Terengganu
- Universiti Malaya, Kuala Lumpur
- Univ. of Hawai'i at Mānoa
- Oxford Univ.
- Univ. of Arkansas
- Univ. of Nevada, Las Vegas
- Okanagan College
- University of Colorado, Anschutz
- Stazione Anton Dorhn
- Washington State Univ.
- SUNY Syracuse
- Univ. of Colorado, Denver
- Pacific NW National Lab
- SoftCell, Inc.
- Young Living, Inc.

🗣️ Outreach

- Stockman Grass Farmer Magazine [Article](#)
- ScienceNews [Article](#) featuring work
- [Article](#) on my marine mycology discoveries
- Annual science fair judge
- 6th-grade teacher and inquiry-based lesson planning (2011-2012)
- Utah Fungus Fest speaker

✔ Peer review

- NSF panel reviewer & *ad hoc* reviewer
- NSF GRFP
- BARD US-Israel Agr. Dev. Fund
- Journals:
 - *Soil Biol. and Biochem. (Distinguished)*, *PeerJ*, *Pedobiologia (Distinguished)*, *Oikos*, *ISME Journal*, *Fungal Ecology (Distinguished)*, *Molecular ecology*, *Ecology and Evolution*, *American Fern Journal*, *New Phytologist*, *Phytobiomes*, *Microbiology Spectrum*