# 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
https://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 — NSF (DUE – 1833880)

2020, 2022

**College of Science Dean's Award of Excellence for Scholarship**

$5,500 — UVU

2019

**Presidential Fellowship for Faculty Scholarship**

$8,000 — UVU

2018 | 2017

**PI: SEED: Engaging undergraduates in advanced research**

$30,000 — UVU

2018

**PI: New methods to survey fungal endophytes in endangered cacti**

$2,550 — Capitol Reef National Park

2018

**Co-PI: Assessing Undergraduate Research Teams at an Open Enrollment Institution**

$29,327 — UVU

2016

**Translational Mycology Postdoctoral Award**

Plant conservation from a microbial perspective — Mycological Society of America

2015

**Co-PI: Restoration of endangered plants by manipulating foliar fungal symbionts**

$40,500 — Oahu Army Natural Resources Program

2014

**Japan Society for the Promotion of Science Travel Award**

$750 — Washington, D.C.

2013

**PI: The Importance of microbial interactions to soil carbon cycling on a warming planet**

$22,570 — NSF (OISE-1308856) / JSPS (SP01363)

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 **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 endemicity and vulnerability of soil fungi.**

Tedersoo 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.**

Tedersoo 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 Halophilia 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 synaptojanins 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

**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 (38 students)
- Lab alumni
- Junior faculty mentor (2023)

### Societies & Service

- Editor of *Mycologia*
- Education Committee - Mycological Society of America
- IUCN Species Survival Group - Slime Moulds Specialist
- Member: ISME, MSA, Intnl. 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)

## 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*