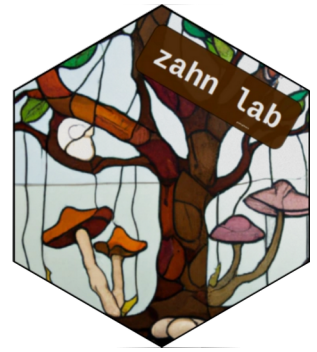


# Geoff Zahn, PhD

Translational mycology | Host-Microbe symbiosis

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<https://gzahn.github.io>



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## Professional Appointments

2024 – Current

**Visiting Faculty – Dartmouth College**

2023 – Current

**Associate Professor – Utah Valley University**

2017 – 2023

**Assistant Professor – Utah Valley University**

2020 – Current

**Consultant – Forensic bioinformatics and data science**

2018 – 2021

**Director of Environmental Biology -GeoDataCrawler Research Institute**

2015 – 2017

**Postdoc Associate – University of Hawai`i at Manoa (Amend Lab)**

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## Education

2015 PhD Biology

University of Arkansas

“The Functional and Distributional Ecology of Mycetozoans under Changing Edaphic and Climatic Dynamics”

2010 BS Ecology

Missouri State University

“Pil1 recruits synaptojanins and amphiphysins to facilitate receptor-mediated endocytosis in yeast”

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## Publications

\*mentee | †corresponding/senior author

[Google Scholar Profile](#) | **31 Peer-reviewed Publications** | **H-index: 15** | **i10-Index: 21**

Amend, A., Gunde-Cimerman, N., Dias-Coelho, M., Durkin, C., Ettinger, C., Gifford, H., Gladfelter, A., Gostincar, C., Granit, L., Grigoriev, I., Gutiérrez, M., Hickman, K., James, T., Jones, A., Levi, R., David-Palma, M., Peng, X., Quandt, A., Rama, T., Vargas-Gastelum, L., Whitner, S., Williams, A., Yarden, O., Yenewodage, A., [Zahn, G.](#) **The ten most pressing questions about marine Fungi (and how to answer them).** *Limnology and Oceanography Letters*. (In Review)

Mora, J\*. E., Olson, M., Rocks, S., & [Zahn, G.](#)† **Aquatic plant mycobiomes change with watershed urbanization.** *Science of the Total Environment* (In Review)

Pre-print: *bioRxiv*. <https://doi.org/10.1101/2024.06.23.600282>

Wainwright, B., Leon, J.\*, Vilela, E.\*, Hickman, KJE\*, ... [Zahn, G.](#)† (2024). **Wallace’s line structures seagrass microbiota and is a potential barrier to the dispersal of marine bacteria.** *Environmental Microbiome*.

Hickman, K. J. E.\* & [Zahn, G.](#)<sup>†</sup> **Ten simple rules for leading a successful undergraduate-intensive research lab.** *PLoS Computational Biology*. 2024

Wainwright BJ, Millar T\*, Bowen L\*, Semon L\*, Hickman KJE\*, Lee JN, [Zahn G.](#)<sup>†</sup> **The core mangrove microbiome reveals shared taxa potentially involved in nutrient cycling and promoting host survival.** *Environmental Microbiome*. 2023

Rawson C\*, [Zahn G.](#)<sup>†</sup> **Inclusion of database outgroups reduces false positives in fungal metabarcoding taxonomic assignments.** *Mycologia*. 2023

Mikryukov, V., Dulya, O., Zizka, A., ... [Zahn, G.](#) ... Tedersoo, L. **Connecting the multiple dimensions of global soil fungal diversity.** *Science Advances*. 2023

[Zahn G.](#)<sup>†</sup> **Marker Genes (16S and ITS) Protocol for Plant Microbiome Analyses.** *BIO-PROTOCOL*. 2022

Watmough, S., Gilbert-Parkes, S., Basiliko, N., Lamit, L. J., ... [Zahn, G.](#) **Variation in carbon and nitrogen concentrations among peatland categories at the global scale.** *PLOS ONE*, 17(11), e0275149. 2022.

Tedersoo, L., Mikryukov, V., Zizka, A., ... [Zahn, G.](#), ... Abarenkov, K. **Global patterns in endemism and vulnerability of soil fungi.** *Global Change Biology*. 2022

McGee, S.\* , Tidwell, A.\* , Riggs, E., Veltkamp, H.\* , [Zahn, G.](#)<sup>†</sup> **Long-term soil fungal community recovery after fire is impacted by climate change.** *Western North American Naturalist*. 2022

Sur G.L.\* , [Zahn G.](#) , Stacy EA. **Examination of host-taxon, environment, and distance effects on leaf fungal endophytes in the dominant woody genus, *Metrosideros*, on O'ahu.** *Fungal Ecology*. 2021

Wilson, T., Poulson, A., Packer, C., Carlson, R., Davis, R., Dey, M.\* , Owen, N.\* , Smalley, S.\* , Dodge, R.\* , Baadsgaard, A., Stevens, M., [Zahn, G.](#)<sup>†</sup> **Essential oil, insect, and microbe relationships in *Juniperus osteosperma* (Cupressaceae) trees killed by wildfire.** *Phytologia*. 2021

Tedersoo, L., Mikryukov, V., Anslan, ... [Zahn G.](#), ... Abarenkov, K. **The Global Soil Mycobiome consortium dataset for boosting fungal diversity research.** *Fungal Diversity*. 2021

Quek, Z., [Zahn, G.](#), Lee, N., Ooi, J., Lee, J., Huang, D., & Wainwright, B. **Biogeographic structure of fungal communities in seagrass *Halophila ovalis* across the Malay Peninsula.** *Environmental Microbiology Reports*. 2021

Egan, C., Koko, J., Muir, C., [Zahn, G.](#), Swift, S., Amend, A., Hynson, N. **Restoration of the mycobiome of the endangered Hawaiian mint *Phyllostegia kaalaensis* increases its resistance to a common powdery mildew.** *Fungal Ecology*. 2021

Tipton, L., [Zahn, G.](#), Darcy, J. L., Amend, A. S., & Hynson, N. A. (2021). Hawaiian fungal amplicon sequence variants reveal otherwise hidden biogeography. *Microbial Ecology*. 2021

Darcy, J., Swift, S., Cobian, G.\* , [Zahn, G.](#), Perry B., Amend, A. **Fungal communities living within leaves of native Hawaiian dicots are structured by landscape-scale variables as well as by host plants.** *Molecular Ecology*. 2020

Wainwright, B., [Zahn, G.](#), Afiq-Rosli, L., Tanzil, J., Huang, D. **Host age is not a consistent predictor of microbial diversity in the coral *Porites lutea*.** *Scientific Reports*. 2020

[Zahn G.](#), Tipton L., Datlof E.\* , Kivlin S., Sheridan P., Amend A., Hynson N. **Fungal aerobiota are not affected by time nor environment over a 13-y time series at the Mauna Loa Observatory.** *PNAS*. 2020

[Zahn G.](#)<sup>†</sup> , Amend A. **Foliar fungi alter reproductive timing and allocation in *Arabidopsis* under normal and water-stressed conditions.** *Fungal Ecology*. 2019

Wainwright, B., [Zahn, G.](#), Zushi, J.\* , Lee, N., Ooi, J., Lee, J.\* . **Seagrass-associated fungal communities show distance decay of similarity that has implications for seagrass management and restoration.** *Ecology and Evolution*. 2019

Wainwright, B., Bauman, A., [Zahn, G.](#), Todd, P., & Huang, D. **Characterization of fungal biodiversity and communities associated with the reef macroalga *Sargassum ilicifolium* reveals fungal community differentiation according to geographic locality and algal structure.** *Marine Biodiversity*. 2019

Wainwright, B., Afiq-Rosli, L., [Zahn, G.](#), Danwei Huang. **Characterisation of coral-associated bacterial communities in an urbanised marine environment shows strong divergence over small geographic scales.** *Coral Reefs*. 2019

Wainwright, B., [Zahn, G.](#), Arlyza, S., Amend, A. **Seagrass-associated fungal communities follow Wallace's line, but host genotype does not structure fungal community.** *Journal of Biogeography*. 2018

[Zahn, G.](#)†, Amend, A. **Foliar microbiome transplants confer disease resistance in a critically-endangered plant.** *PeerJ*. 2017

Datlof, E.\*, Amend, A., Earl, K., Hayward, J., Morden, C., Wade, R., [Zahn, G.](#), Hynson, N. (2017). **Uncovering unseen fungal diversity from plant DNA banks.** *PeerJ*. 2017

Wainwright, B., [Zahn, G.](#), Spalding, H., Sherwood, A., Smith, C., Amend, A. **Fungi associated with mesophotic macroalgae from the 'Au'au Channel, west Maui are differentiated by host and overlap terrestrial communities.** *PeerJ*. 2017

[Zahn, G.](#)†, Wagai, R., Yonemura, S. **The effects of amoebal bacterivory on carbon and nitrogen dynamics depend on temperature and soil structure interactions.** *Soil Biology and Biochemistry*. 2016

[Zahn, G.](#)†, Stephenson, S., Spiegel, F. **Ecological distribution of protosteloid amoebae in New Zealand.** *PeerJ*. 2014

De Haan, M., Cocquyt, C., Tice, A., [Zahn, G.](#), Spiegel, F. **First records of Protosteloid Amoebae (Eumycetozoa) from the Democratic Republic of the Congo.** *Plant Ecology and Evolution*. 2014

Murphy, E., Boxberger, J., Colvin, R., Lee, S., [Zahn, G.](#), Loor, F., Kim, K. **Pil1, an eisosome organizer, plays an important role in the recruitment of synaptojanins and amphiphysins to facilitate receptor-mediated endocytosis in yeast.** *European Journal of Cell Biology*. 2011

## **Code and software publications**

[CommunityAssemblR](#) – Simulations of microbiome biotic interactions

[mycobank](#) – Fungal name synonym and taxonomy correction

[hubfindr](#) – Identification of network hub taxa in microbial communities

[virulator](#) – Detection of novel virus signatures in metagenomes

[QIIME Database builder](#) – QIIME2 plugin for custom taxonomies

[Microbiome Workshop](#) – 2-day intro to microbiome data analysis

[Custom Unix tools](#) – Collection of bioinformatics scripts

[R for Biologists](#) – 16-week online course

[Bioinfo Data Skills Course](#) – 16-week online course

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## **Funding (Total \$3,372,199 awarded)**

**RCN: FOMO-Net: The fungal oceanic mycomass observation network for global quantification of marine fungal biomass and nutrient flux**

PI | NSF BIO | \$450,000 (Pending)

**ROA: Co-dispersal of bacteria and AM Fungal spores**

Co-PI | NSF Supplement to DEB-2205650 | \$80,000

**S-STEM: Faculty-Mentored Experiences for Improving Undergraduate Biology Student Outcomes**

PI | NSF (DUE – 2424080) | \$1,918,705

**Myco-Ed: Mycological Curriculum for Education and Discovery**

Senior Personnel | JGI

**Burning questions in microbial ecology: Ecological mechanisms that control microbiome transplant outcomes**

Co-PI | NSF BIO | \$878,200 (Declined, resubmitting)

**Molecular predictors of mangrove holobiont assembly**

Writer/Senior Personnel | Singapore MOE (IG20-SI003) | \$180,000

**GEL: Using neural networks to link host expression and microbiome assembly**

PI | UVU Grants for Engaged Learning (GEL-007) | \$30,000

*Previous external funding*

**Faculty-Mentored Experiences for Improving Undergrad Biology Student Outcomes** PI | NSF (DUE – 1833880) |

\$972,287

**Methods for fungal endophyte sampling from endangered cacti**

PI | 2019 | Capitol Reef National Park Field Station | \$3,000

**Assessing the Implementation of Undergraduate Research Teams at an Open Enrollment Institution**

Co-PI | 2018 | GREEN Grant, UVU | \$29,327

**Engaging undergraduates in advanced research**

PI | 2018 & 2019 | UVU Grants for Engaged Learning (GEL-002) | \$19,997

**Restoration of critically endangered Hawaiian native plants by understanding and manipulating foliar microbial symbionts**

Co-PI | 2015 | OANRP Rare Plant Management Grant | \$40,500

**JSPS alumni travel award**

PI | 2014 | Japan Society for the Promotion of Science | \$750

**JGI travel award**

PI | 2014 | Joint Genome Institute | \$450

**The Importance of Microbial Interactions to Soil Carbon Cycling on a Warming Planet**

PI | 2013 | JSPS Summer Fellowship | \$12,500

**The Importance of Microbial Interactions to Soil Carbon Cycling on a Warming Planet**

PI | 2013 | NSF EAPSI Fellowship | \$5,070 + living expenses

**Assessing the status of USDA Green Ribbon Schools nationally**

PI | 2013 | Clean Air, Cool Planet Climate Fellowship | \$5,000

**Mycological Society of America Travel Award**

PI | 2011 | \$350

**NSF GK-12 Fellowship**

PI | 2011 | \$30,500

**Awards**

**Dean's Award of Excellence for Faculty Scholarship – UVU**

Awarded 2020 & 2022 | \$5,500

**Presidential Award for Faculty Scholarship – UVU**

Awarded 2019 | \$8,000

**Plant conservation from a microbial perspective**

Awarded 2016 | MSA Translational Mycology Postdoctoral Award | \$2,500

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**Selected Presentations**

*Invited*

**Linking ecological lessons from natural microbial dispersal to microbiome transplantation success**

University of Maine

2025

<b>Using neural networks to detect biotic interactions during disruptive community assembly of fungi</b>	Mycological Society of America	2024
<b>Toward predictive modeling of mycobiome transplantations</b>	National Univ. of Singapore	2024
<b>Modeling community assembly processes for useful and reproducible microbiome transplantations</b>	NIAES, Japan	2024
<b>Translating mentored undergraduate research into student retention and success</b>	NSF S-STEM Symposium	2023
<b>Less content, more context: Research as pedagogy in undergraduate mycology courses</b>	Mycological Society of America	2022
<b>Who's there and who cares: the how and why of fungal community structure</b>	Univ. of Arkansas/Missouri State Univ	2018
<b>Plant conservation from a microbial perspective</b>	O`ahu Army Natural Resources Program	2016
		<i>Contributed</i>
<b>Metagenomic Tools for Mycobiome Analyses in Model vs. Non-Model Systems</b>	Mycological Society of America	2023
<b>Aquatic Plant-Associated Fungi Along an Urbanization Gradient</b>	Mycological Society of America	2023
<b>Improving the Accuracy of Meta-Amplicon Taxonomic Assignments Through the Inclusion of Outgroups in Fungal Databases</b>	Mycological Society of America	2023
<b>Inspecting the microbiome and metabolomic compartments of Mediterranean sponge holobionts through an integrated 'omics approach</b>	International Sponge Symposium, Netherlands	2022
<b>Fungal endophytes and pathogens in endangered hawaiian endemics: Plant conservation from a microbial perspective</b>	Mycological Society of America	2016
<b>The interactive effects of protozoan predation pressure and environmental factors on carbon and nitrogen cycling in soils under warming conditions</b>	ISME, South Korea	2014

## **Teaching and Mentoring**

### **Designed and director of Undergrad Bioinformatics Degree Program**

#### **Instructor of record for:**

##### **Mycology**

Course-based research experience – Fungal systematics, anatomy, physiology, and ecology

##### **Plant Pathology**

Course-based research experience – Fungal, protistan, bacterial, nematode, and viral pathogens

##### **Data Analysis for Biologists**

Data cleaning, visualization, modeling, and reporting (R language)

##### **Bioinformatics Data Skills**

Command-line data skills, bash scripting, metagenomic analysis, High-performance computing

##### **Microbiome Boot Camp**

Numerical ecology, community ecology analysis, spatial analysis, R package design, scientific writing

## **Organismal Biology**

Intro majors biology, evolution, phylogenetics, tree of life survey, intro ecology

### **Director and PI of NSF S-STEM Biology Program (UVU)**

Career and academic mentor to 41 NSF Scholars

Manage budget and reporting

### **Graduate committee member:**

Valerio Mazzella (Stazione Anton Dohrn)

Rae Berner (Washington State U)

Becca Evans (Washington State U)

Gary Sur (U Hawaii at Manoa)

Syrena Whitner (U Hawaii at Manoa)

Nichole Paulette

Lauren Groathouse

Nicholas Fryer

Zachary Petersen

Samuel Anaya

Miles Spencer

Rollo Simmons

Reagan Dodge

Natalia Backman

Sarah van Dijk

Logan Weseman

Erika Lakin

Clayton Rawson

Jonathan Wasden

Spencer McGee

Alyssa Tidwell

Harrison Haws

Nicholas Long

David Parker

Garrett Matthews

Bryce Brunetti

### **Undergraduate thesis supervisor:**

(External funding for mentees: \$110,630)

Taylor Fearn

Austen Miller

Jo Hickman

Josh Leon

Jacob Mora

Annette Lewis

Ozzly Rallis

Hayden Johnson

Whitney Kraatz

Magnolia Morelli

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## **Service**

### **Department**

Associate department chair – Utah Valley University (2023 – 2024)

Faculty search committees (Chair 1x, Member 6x)

Bioinformatics program development

Strategic planning committee

NSF S-STEM program director

### **College and University**

Faculty Senate (2017-2020)

High-performance computing committee chair (2020 – Current)

Program and course development (Univ. of Arkansas, Utah Valley Univ.)

### **Profession**

Associate Editor of *Mycologia*

Education Committee Mycological Society of America

Fungal Oceanic Mycological Observation Network

Consortium of Fungi

Champion, National Microbiome Data Collaborative

Mangrove Microbiome Initiative

IUCN SSC – Chytrids, Zygomycetes, Downy Mildews, Slime Moulds Specialist Group

Invited to 2024 White House Summit on STEMM Equity and Excellence

### **Society membership**

International Society for Microbial Ecology

Mycological Society of America  
International. Society for Fungal Conservation  
Japan Society for the Promotion of Science Alumni Assoc.  
Genetics Society of America  
Council for Undergraduate Research

### **Invited Reviewer**

NSF Panel and *ad hoc* reviews  
NSF GRFP  
BARD US-Israel Agricultural Development Fund  
*Soil Biol. and Biochem. (Distinguished)*  
*Pedobiologia (Distinguished)*  
*ISME Journal*  
*PeerJ*  
*Oikos*  
*Fungal Ecology (Distinguished)*  
*Molecular Ecology*  
*Ecology and Evolution*  
*American Fern Journal*  
*New Phytologist*  
*Phytobiomes*  
*Microbiology Spectrum*  
*PNAS*  
*PLOS Computational Biology*

### **Outreach**

Stockman Grass Farmer [Magazine](#)  
ScienceNews [Article](#)  
Hawaii [News Now](#)  
Science fair judge (annual)  
Utah Fungus Fest Speaker  
NSF GK-12 Fellow (6th-grade)  
Mycological art  
Poster judge (MSA meeting, annually)