

Curriculum vitae of

Geoffrey L. Zahn, Ph.D.

Last updated: April, 2022

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Biology Department
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PROFESSIONAL APPOINTMENTS

- 2017 - Current** Assistant Professor
Utah Valley University – Biology Department
- 2018 - 2021** Director of Environmental Biology
GeoDataCrawler Research Institute
- 2015 - 2017** Postdoctoral Research Associate
University of Hawaii at Manoa – Department of Botany

EDUCATION

- 2015** PhD in Biology – Microbial and Molecular Ecology
University of Arkansas, Fayetteville, AR, USA
- 2010** Bachelor of Science in Biology – Ecology, Evolution and Systematics
Missouri State University, Springfield, MO, USA

RESEARCH FOCI:

Host-associated microbial community assembly
Microbe-climate feedback mechanisms

PUBLICATIONS (* denotes authors who contributed equally to a paper; † denotes student mentee authors)

Zahn, G. (2022). Marker Genes (16S and ITS) Protocol for Plant Microbiome Analyses. *BIO-PROTOCOL*, 12(8). <https://doi.org/10.21769/BioProtoc.4395>

Wilson, T., Poulson, A., Packer, C., Carlson, R., Davis, R., Dey, M.†, Owen, N.†, Smalley, S.†, Dodge, R.†, **Zahn, G.**, Baadsgaard, A., & Stevens, M. (2021). Essential oil, insect, and microbe relationships in *Juniperus osteosperma* (Cupressaceae) trees killed by wildfire. *Phytologia*, 103(4), 106–118.

Tedersoo, L., Mikryukov, V., Anslan, ... **Zahn G.**, ... Abarenkov, K. (2021). The Global Soil Mycobiome consortium dataset for boosting fungal diversity research. *Fungal Diversity*. <https://doi.org/10.1007/s13225-021-00493-7> (31/95 authors)

Quek, Z. B. R., **Zahn, G.**, Lee, N. L. Y., Ooi, J. L. S., Lee, J. N., Huang, D., & Wainwright, B. J. (2021). Biogeographic structure of fungal communities in seagrass *Halophila ovalis* across the Malay Peninsula. *Environmental Microbiology Reports*. <https://doi.org/10.1111/1758-2229.13003>

Sur, G. L., **Zahn, G.**, & Stacy, E. A. (2021). Examination of host-taxon, environment, and distance effects on leaf fungal endophytes in the dominant woody genus, *Metrosideros*, on O'ahu. *Fungal Ecology*, 53, 101093. <https://doi.org/10.1016/j.funeco.2021.101093>

Egan, C. P., Koko, J. H., Muir, C. D., **Zahn, G.**, Swift, S. O. I., Amend, A. S., & Hynson, N. A. (2021). Restoration of the mycobiome of the endangered Hawaiian mint *Phyllostegia kaalaensis* increases its resistance to a common powdery mildew. *Fungal Ecology*, 52. <https://doi.org/10.1016/j.funeco.2021.101070>

Tipton, L., **Zahn, G. L.**, Darcy, J. L., Amend, A. S., & Hynson, N. A. (2021). Hawaiian Fungal Amplicon Sequence Variants Reveal Otherwise Hidden Biogeography. *Microbial Ecology*. <https://doi.org/10.1007/s00248-021-01730-x>

Benjamin J. Wainwright, **Geoffrey L. Zahn**, Lufti Afq-Rosli, Jani Tanzil, Danwei Huang. (2020). Host age is not a consistent predictor of microbial diversity in the coral *Porites lutea*. *Scientific Reports*. <https://doi.org/10.1038/s41598-020-71117-4>

Darcy J L, Swift S, Cobian G M, **Zahn G**, Perry B A, Amend A. (2020). Fungal communities living within leaves of native Hawaiian dicots are structured by landscape-scale variables as well as by plant hosts. *Molecular Ecology*. <https://doi.org/10.1111/mec.15544>

Laura Tipton*, **Geoffrey Zahn***, Anthony Amend, Patrick Sheridan, Erin Datlof†, Nicole Hynson. (2020) Just passing through: neither time nor environment affect fungal aerobiota over a 13-year time series at the Mauna Loa Observatory. *PNAS*. <https://doi.org/10.1073/pnas.1907414116>

Benjamin J. Wainwright, **Geoffrey L. Zahn**, Joshua Zushi†, Nicole Li Ying Lee, Jillian Lean Sim Ooi, Jen Nie Lee, Danwei Huang. (2019). Seagrass-associated fungal communities show distance decay of similarity that has implications for seagrass management and restoration. *Ecology and Evolution*. <https://doi.org/10.1002/ece3.5631>

Wainwright, B. J., Bauman, A. G., **Zahn, G. L.**, Todd, P. A., & Huang, D. (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. *Marine Biodiversity*. <https://doi.org/10.1007/s12526-019-00992-6>

Benjamin J. Wainwright, Lutfi Afiq-Rosli, **Geoffrey Zahn**, Danwei Huang. (2019). Characterisation of coral-associated bacterial communities in an urbanised marine environment shows strong divergence over small geographic scales. *Coral Reefs*, 1-10. <https://doi.org/10.1007/s00338-019-01837-1>

Geoffrey Zahn, Anthony Amend. (2019). Foliar fungi alter reproductive timing and allocation in *Arabidopsis* under normal and water-stressed conditions. *Fungal Ecology*, 41, 101–106. <https://doi.org/10.1016/j.funeco.2019.04.002>

Wainwright BJ., **Zahn GL.**, Arlyza IS., Amend AS. (2018). Seagrass-associated fungal communities follow Wallace's line, but host genotype does not structure fungal community. *Journal of Biogeography*. <https://doi.org/10.1111/jbi.13168>.

Datlof, E. M., Amend, A. S., Earl, K., Hayward, J., Morden, C. W., Wade, R., **Zahn, GL.**, Hynson, N. A.. (2017). Uncovering unseen fungal diversity from plant DNA banks. *PeerJ*, 5, e3730. <https://doi.org/10.7717/peerj.3730>

Geoffrey Zahn, Anthony S Amend. (2017). Foliar microbiome transplants confer disease resistance in a critically-endangered plant. *PeerJ* 5: e4020. <https://doi.org/10.7717/peerj.4020>

Wainwright BJ., **Zahn GL.**, Spalding HL., Sherwood AR., Smith CM., Amend AS. (2017). Fungi associated with mesophotic macroalgae from the 'Au'au Channel, west Maui are differentiated by host and overlap terrestrial communities. *PeerJ* 5:e3532. <https://doi.org/10.7717/peerj.3532>

Geoffrey Zahn, Rota Wagai, Seiichiro Yonemura. (2016). The effects of amoebal bacterivory on carbon and nitrogen dynamics depend on temperature and soil structure interactions. *Soil Biology and Biochemistry*, 94: 133-137. <http://10.1016/j.soilbio.2015.11.021>

Geoffrey Zahn, Steven L. Stephenson, Frederick W. Spiegel. (2014). Ecological distribution of protosteloid amoebae in New Zealand. *PeerJ* 2:e296. <https://doi.org/10.7717/peerj.296>

Miriam De Haan, Christine Cocquyt, Alex Tice, **Geoffrey Zahn**, Frederick W. Spiegel. (2014). First records of Protosteloid Amoebae (Eumycetozoa) from the Democratic Republic of the Congo. *Plant Ecology and Evolution*, 147:1, 85-92. <https://doi.org/10.5091/plecevo.2014.883>

Erin R. Murphy, Jacob Boxberger, Robert Colvin, Suk Je Lee, **Geoffrey Zahn**, Fred Loor, Kyoungtae Kim. (2011). 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*, 90:10, 825-833. <https://doi.org/10.1016/j.ejcb.2011.06.006>

In Press

Spencer McGee, Alyssa Tidwell, Natalie Blaine, Erin Riggs, Geoffrey Zahn. Recovery of soil fungal communities along a decadal fire chronosequence. *Western North American Naturalist* (2022)

Marker genes (16S and ITS) protocol for plant microbiome analyses. Book Chapter. *Bio-Protocol* (2022)

TECHNICAL REPORTS

Geoffrey Zahn and Tyler Hacking. 2019. Development of non-detrimental methods to survey fungal endophytes in endangered cacti. Capitol Reef National Park Field Station Report.

Geoffrey Zahn, Anthony Amend. 2017. Role of fungal endophytes and epiphytes in endangered species conservation. O'ahu Army Natural Resources Program Year-End Report

Geoffrey Zahn, Anthony Amend. 2016. Molecular assessment of wild *Achatinella mustelina* diet. O'ahu Army Natural Resources Program Year-End Report

Geoffrey Zahn, Anthony Amend. 2015. Molecular assessment of wild *Achatinella mustelina* diet. O'ahu Army Natural Resources Program Year-End Report

CODE CONTRIBUTIONS AND TUTORIALS

Method for creating QIIME-compatible taxonomic databases from any subset of NCBI data.
<https://doi.org/10.5281/zenodo.3688556>

R for exploratory data analysis course
<https://gzahn.github.io/data-course/>

Collection of custom bioinformatics tools
<https://github.com/gzahn/tools>

Bioinformatics Data Skills course
<https://gzahn.github.io/binf-data-skills/>

AWARDS AND FUNDING (Total: \$1,169,092)

2022	College of Science Dean's Award of Excellence for Scholarship – Utah Valley University
2020	College of Science Dean's Award of Excellence for Scholarship – Utah Valley University (\$2,750)
2019	Presidential Fellowship for Faculty Scholarship – Utah Valley University (\$8,000) PI: "Soil microbial predation in a changing climate"
2018	NSF (DUE – 1833880) (\$972,287) PI: "Faculty-Mentored Experiences for Improving Undergraduate Biology Student Outcomes"
2018	SEED Grant for Engaged Learning (\$9,597) – Utah Valley University PI: "Engaging undergraduates in advanced research – Year two"
2018	Capitol Reef National Park Field Station Grant (\$2,550) PI: "Development of non-detrimental methods to survey fungal endophytes in endangered cacti"
2018	GREEN Grant (\$29,327) – Utah Valley University Co-PI: "Assessing the Implementation of Undergraduate Research Teams at an Open Enrollment Institution"
2018	SEED Grant for Engaged Learning (\$9,650) – Utah Valley University PI: "Engaging undergraduates in advanced research: The functional roles of halophilic fungi along a salinity gradient in the Great Salt Lake"
2016	Mycological Society of America Translational Mycology Postdoctoral Award (\$2,500) "Plant conservation from a microbial perspective"
2015	Oahu Army Natural Resources Program – Rare Plant Management (\$40,500) Co-Investigator and Writer - "Restoration of critically endangered Hawaiian native plants by understanding and manipulating foliar microbial symbionts"
2014	Japan Society for the Promotion of Science (JSPS) Alumnus Travel Award (\$750) Presentation: "Harnessing eukaryotic microbes in agricultural soils for reduced carbon turnover"
2014	Dept. of Energy Joint Genome Institute IMG Workshop Travel Award (\$425)
2013	JSPS Summer Research Fellowship (JSPS-SP01363) (\$12,500) Co-P.I. - "The Importance of Microbial Interactions to Soil Carbon Cycling on a Warming Planet"
2013	NSF EAPSI Grant (OISE-1308856) (\$5,070) P.I. - "The Importance of Microbial Interactions to Soil Carbon Cycling on a Warming Planet"
2013	<i>Clean Air – Cool Planet</i> Climate Fellowship (\$5,000) Fellowship: "Assessing the status of USDA Green Ribbon Schools nationally"

- 2011** Mycological Society of America Travel Award **(\$350)**
- 2011** NSF GK-12 Fellowship **(\$30,500)**
Fellowship: "Inquiry and Innovative Thinking by Design"

STUDENT MENTEE FUNDING

- 2022** Scholarly Activities Committee (SAC) Grant awarded to Samuel Anaya **(\$991)**
Evolutionary recovery of alcohol tolerance in yeast
- 2022** Scholarly Activities Committee (SAC) Grant awarded to Brittany Bugg **(\$256)**
Order of arrival and community assembly in wood decomposers
- 2022** Scholarly Activities Committee (SAC) Grant awarded to Miles Spencer **(\$958)**
Mammal dispersal of fungi in urban areas
- 2021** Undergraduate Research Grant (URSCA) awarded to advisee Magnolia Morelli **(\$1,944)**
Primate Mycophagy in the Tropics
- 2021** Scholarly Activities Committee (SAC) Grant awarded to Rollo Simmons **(\$375)**
Survey of aquatic fungi in Utah Lake
- 2021** Scholarly Activities Committee (SAC) Grant awarded to Branden Petersen **(\$906)**
MRSA antagonism in fungal species across Utah County
- 2020** Undergraduate Research Grant (URSCA) awarded to advisees Reagan Dodge and Natalia Backman **(\$2,900)**
Converting cellulose waste into gourmet edible mushrooms
- 2020** Scholarly Activities Committee (SAC) Grant awarded to Sarah van Dijk **(\$1,833)**
PI: "Determining the effect of different pathogens on *Arabidopsis thaliana* root architecture"
- 2020** Scholarly Activities Committee (SAC) Grant awarded to Logan Wesemann **(\$439)**
PI: "Limiting ice nucleation from *P. syringae* using biocontrol"
- 2020** Scholarly Activities Committee (SAC) Grant awarded to Erika Lakin **(\$1,440)**
PI: "Fungal endophytes and the hybrid advantage in crucifers"
- 2019** Undergraduate Research Grant (URSCA) awarded to advisee Connor Glassford **(\$743)**
PI: "Novel antimicrobials from extremophilic fungi"
- 2019** Undergraduate Research Grant (URSCA) awarded to advisee Clayton Rawson **(\$1,460)**
PI: "Survey of extremophilic fungi in Utah"
- 2019** Undergraduate Research Grant (URSCA) awarded to advisee McKenzie Bell **(\$954)**
PI: "Fungal bioremediation of microplastics"
- 2019** Undergraduate Research Grant (URSCA) awarded to advisee Katia L'Ecuyer **(\$854)**
PI: "Produce aisle endophytes"
- 2019** Board of Trustees Research Scholarship Award to advisee Jonathan Wasden **(\$6,000)**
PI: "Forest fires and soil fungal recovery"
- 2019** Undergraduate Research Grant (URSCA) awarded to advisee Jonathan Wasden **(\$1,987)**
PI: "Forest fires and endophytes"
- 2019** Undergraduate Research Grant (URSCA) awarded to advisees Natiri Swenson **(\$840)**
PI: "Pathogenic nematode density under various orchard management strategies"
- 2018** Undergraduate Research Grant (URSCA) awarded to advisees Alyssa Tidwell and Jenni Lawrence **(\$2,970)**
PI: "Fungal and bacterial community structure during wetland recovery"
- 2018** Undergraduate Research Grant (URSCA) awarded to advisees Spencer McGee **(\$1,740)**
PI: "Soil microbial responses after the Pole Creek Fire in Utah"
- 2018** Undergraduate Research Grant (URSCA) awarded to advisee Garrett Matthews **(\$978)**
PI: "Examining the roles of endophytes in leaf decomposition"
- 2018** Undergraduate Research Grant (URSCA) awarded to advisees Bryce Brunetti and Jordan Bayly **(\$833)**

PI: "Underwater heroes: finding a chytrid antagonist"

- 2018** Undergraduate Research Grant (URSCA) awarded to advisees Nicholas Long and Harrison Haws (**\$3,000**)
PI: "Lifestyle determinants of the human oral mycobiome"
- 2018** Undergraduate Research Grant (URSCA) awarded to advisees Alyssa Tidwell and Spencer McGee (**\$3,000**)
PI: "Community assembly of soil fungi within a fire chronosequence"
- 2018** Undergraduate Research Grant (URSCA) awarded to advisee Bryce Brunetti (**\$350**)
PI: "Construction of a mock fungal community for high-throughput amplicon research"

PRESENTATIONS

Invited Seminars:

- 2022** "Less content, more context: Research as pedagogy in undergraduate mycology courses"
Mycological Society of America, Gainesville, FL, USA
- 2019** "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, AR, USA
- 2018** "The causes and consequences of fungal community structure"
Missouri State University, USA
- 2016** "Picky Eaters: Prey choice by soil protists is altered by temperature and soil structure"
Cornell University, Ithaca, NY, USA
- 2015** "*Effects of belowground trophic complexity on carbon cycling under changing climatic and edaphic conditions*"
Joint Genome Institute, Walnut Creek, CA, USA
- 2015** "*The functional and distributional ecology of mycetozoans under changing edaphic and climatic dynamics*"
Climate Impact Research Center, Abisko, Sweden
- 2014** "*Public science literacy and targeted environmental initiatives*" NWA Environmental Programs Symposium
- 2014** "*The functional and distributional ecology of slime molds in a changing climate*" NIAES, Tsukuba, Japan
- 2013** "*The Ecology of Soil Mycetozoa*" Japan Agency for Marine-Earth Science and Technology, Yokosuka, Japan
- 2012** "*The Mycetozoans*" Organization for Tropical Studies, Las Cruces, Costa Rica

Posters and Talks:

- 2016** "Fungal endophytes and pathogens in endangered hawaiian endemics: Plant conservation from a microbial perspective" Mycological Society of America, Berkeley, CA, USA
- 2014** "*Amoebae in warming soils: interactive effects of the microbial food web and environmental factors on nutrient cycling in a changing climate*" A2C Research Symposium, Fayetteville, AR, 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** "*Application of high-throughput sequencing may explain carbon dynamics under predation and warming gradients via soil community shifts*" JSPS Multidisciplinary Science Forum 4; Washington, D.C., USA
- 2014** "*Using metagenomics and metatranscriptomics to uncover mechanisms of soil communities' effects on carbon cycling under warming conditions*" DOE Joint Genome Institute – Microbial Genomics and Metagenomics Workshop; Walnut Creek, 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; Fairbanks, AK, USA
- 2010** "*Pil1's Role on Regulating Membrane PIP2 Level*" INBRE Conference; Fayetteville, AR, USA

- 2010** "The Effects of Prescribed Fire on Overwintering Fungal Abundance and Diversity: A Baseline Study" CNAS Undergraduate Research Symposium; Springfield, MO, USA
- 2009** "Endocytic Roles of Pil1, the Main Organizer of Eisosomes" Arkansas INBRE Research Conference; Fayetteville, AR, USA

PROFESSIONAL DEVELOPMENT AND ACADEMIC SERVICE

- 2021 – 2025** IUCN SSC Chytrids, Zygomycetes, Downy Mildews, Slime Moulds Specialist Group
- 2019** Council for Undergraduate Research workshop – Spokane, WA, USA
- 2019** Workshop to enhance collaboration between the US and Indonesia. Bogor, Indonesia. <http://biodiversity.ipb.ac.id/>
- 2019** NSF Panel Reviewer
- 2018 – 2021** Faculty Senate – Utah Valley University
- 2018 – 2021** Faculty search committees for various tenure-track searches (5 searches) - UVU
- 2015 -- 2016** Endangered species conservation – Collaboration with US Army Environmental Division and the 'Oahu Natural Resources Program, Hawaii
- 2014 – 2015** Course Development – Online Biology Lab
University of Arkansas
- 2013** International Research – Soil Physiology and Ecology
May – Aug. National Institute for Agro-Environmental Sciences, Tsukuba, Japan
- 2013 – 2016** IUCN Species Survival Commission – Myxomycete group
- 2012** Field Research – Tropical Lichen Ecology
Jul. – Aug. Organization for Tropical Studies, Costa Rica
- 2011 – 2012** National Science Foundation GK-12 Teaching Fellow
Jun. – May University of Arkansas; Owl Creek Middle School, Fayetteville, AR
- 2010** Undergraduate Research Assistant – Forest Fire Ecology
Jan. – Dec. Missouri State University Dept. of Biology
- 2009** Undergraduate Research Assistant – Yeast Genetics
Jan. – Dec. Missouri State University Dept. of Biology

MENTORING AND TEACHING EXPERIENCE

Teaching website

<https://gzahn.github.io/coursemap>

Mentorship

Undergraduate student mentor (36 students)
Graduate Student Mentor (4 Masters, 3 PhD)

Courses

Bioinformatic Data Skills – UVU (Developed and taught)
Unix environment, data conversions, project workflows, HPC interaction

Introduction to undergraduate research – UVU (Developed and taught)
Research methods, graduate school preparation, lab rotations (1 semester)

Mycology – UVU (Developed and taught)
Integrated lecture/lab with molecular methods (1 semester)

Majors' Biology II – UVU (Developed and taught)
Large-format lecture (5 semesters)

Introduction to Data Analysis in R – UVU (Developed and taught)

Project-based BASH and R training with applied biostatistics (2 semesters)

Plant Pathology – UVU (Developed and taught)
Research-based course design (1 semester)

Online Biology Lab (Non-majors) – UArk (Developed and taught)
Developed, administered, and evaluated simulation-based labs for non-majors (1 semester)

Principles of Biology (Honors Undergraduate) – UArk Teaching Assistant
Lab for biology majors (5 semesters)

Comparative Botany (Graduate level) – UArk Teaching Assistant
Lab component (1 semester)

Mycology (Graduate level) – UArk Teaching Assistant
Lab component (1 semester)

Experimental Design (Undergraduate) – UArk Teaching Assistant (Taught)
Computer lab component (1 semester)

6th Grade Science and Math (NSF GK-12 Teaching Fellow)
Developed and taught inquiry-based lessons (1 year)

ACADEMIC AND OTHER SOCIETIES (Active participant)

International Society for Microbial Ecology
Mycological Society of America
International Society for Fungal Conservation
Japan Society for the Promotion of Science Alumni Association
International Union for Conservation of Nature (IUCN) – Species Survival Group (Myxomycetes)

OUTREACH & MEDIA

2019	"Excuse me... do you have a moment to talk about endophytes?" Stockman Grass Farmer Magazine Aug. 2019. https://bit.ly/2KsYIBB
2019	Funded S-STEM proposal featured by NSF at Council of Undergraduate Research Dialogues plenary session – Arlington, VA
2018	ScienceNews article on plant microbiomes featuring endangered plant work https://www.sciencenews.org/article/plant-microbes-crops-food-endangered-species?tgt=nr
2018	"In plaats van spuiten, planten helpen met micro-organismen" https://bit.ly/2leHlr4
2018	Trailside STEM Night – Park City, UT
2017	"Researchers find scores of potentially new species of fungi in deep waters off Maui" https://bit.ly/318xKQm
2017	Judge - Windward District Science and Engineering Fair, HI
2016	Research spotlight at 2016 IUCN Congress - "Using fungi to save endangered plants"
2016	Hawaii GENE-ious K-12 Curriculum Development
2014	Ten Thousand Microscopes Beta Tester – K-12 Content Generator
2011 – 2015	Judge – NWA Regional Science Fair
2008 – 2009	James River Basin Partnership Science Committee, Springfield, MO
2007	Research Technician - Missouri State University Greenhouse
2006	Volunteer Ecologist - Reserva Bosque Nuboso Santa Elena, Costa Rica

PEER REVIEW

Reviewer for:

- Soil Biology and Biochemistry (Distinguished Reviewer)
- PeerJ
- Pedobiologia (Distinguished Reviewer)
- Oikos
- ISME Journal
- Fungal Ecology (Distinguished Reviewer)
- Molecular ecology
- Ecology and Evolution
- American Fern Journal
- New Phytologist
- Phytobiomes