

Curriculum vitae of

# Geoffrey L. Zahn, Ph.D.

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<http://gzahn.github.io/>

Biology Department  
Utah Valley University  
800 W University Parkway - SB243c  
Orem, UT, 84058, USA

[zahn.geoff@gmail.com](mailto:zahn.geoff@gmail.com)

Phone: +001-417-738-6487

## PROFESSIONAL APPOINTMENTS

- 2017 - Current** Assistant Professor  
Utah Valley University – Biology Department
- 2018 - Current** Director of Environmental Biology  
GeoDataCrawler Research Institute
- 2015 - 2017** Postdoctoral Research Associate  
University of Hawaii at Manoa – Department of Botany  
Lab of: Dr. Anthony Amend

## 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)

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, Lufti Afq-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 Review

Ben Wainwright; Lutfi Afiq-Rosli; **Geoffrey Zahn**; Danwei Huang. Coral-associated bacteria in an urbanised marine environment show fine-scale community structure.

Cameron P. Egan\*, Jerry Koko\*, Geoffrey Zahn, Sean O.I. Swift, Anthony S. Amend, Nicole A. Hynson. Restoration of the endangered Hawaiian mint *Phyllostegia kaalaensis*' mycobiome increases its pathogen resistance. *Fungal Ecology*

Spencer McGee, Alyssa Tidwell, Natalie Blaine, Erin Riggs, Geoffrey Zahn. Recovery of soil fungal communities along a decadal fire chronosequence.

#### In Preparation

Harrison Haws, Joseph Jimenez, Geoffrey Zahn. The core human oral microbiome is resilient to lifestyle and demographics in healthy adults.

Joshua Zushi, Geoffrey Zahn. Commercial dental treats alter the canine oral microbiome.

Jonathan Wasden, Geoffrey Zahn. Fine-scale time-series reveals fungal colonization of soils after burns of increasing intensities.

Reagan Dodge, Geoffrey Zahn. Predator-prey interactions change bacterial community structure in warming soils.

Geoffrey Zahn, Reagan Dodge\*, Alyssa Tidwell\*, Benjamin Wainwright. Coral-associated bacteria in the remote Chagos Archipelago are influenced by bleaching events.

#### 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: \$1,164,037)

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

2020	Undergraduate Research Grant (URSCA) awarded to advisees Reagan Dodge and Natalia Backman ( <b>\$2,900</b> ) Converting cellulose waste into gourmet edible mushrooms
2020	Scholarly Activities Committee (SAC) Grant awarded to Sarah van Dijk ( <b>\$1,833</b> ) PI: "Determining the effect of different pathogens on <i>Arabidopsis thaliana</i> root architecture"
2020	Scholarly Activities Committee (SAC) Grant awarded to Logan Wesemann ( <b>\$439</b> ) PI: "Limiting ice nucleation from <i>P. syringae</i> using biocontrol"
2020	Scholarly Activities Committee (SAC) Grant awarded to Erika Lakin ( <b>\$1,440</b> ) PI: "Fungal endophytes and the hybrid advantage in crucifers"
2019	Undergraduate Research Grant (URSCA) awarded to advisee Connor Glassford ( <b>\$743</b> ) PI: "Novel antimicrobials from extremophilic fungi"
2019	Undergraduate Research Grant (URSCA) awarded to advisee Clayton Rawson ( <b>\$1,460</b> ) PI: "Survey of extremophilic fungi in Utah"
2019	Undergraduate Research Grant (URSCA) awarded to advisee McKenzie Bell ( <b>\$954</b> ) PI: "Fungal bioremediation of microplastics"
2019	Undergraduate Research Grant (URSCA) awarded to advisee Katia L'Ecuyer ( <b>\$854</b> ) PI: "Produce aisle endophytes"
2019	Board of Trustees Research Scholarship Award to advisee Jonathan Wasden ( <b>\$6,000</b> ) PI: "Forest fires and soil fungal recovery"
2019	Undergraduate Research Grant (URSCA) awarded to advisee Jonathan Wasden ( <b>\$1,987</b> ) PI: "Forest fires and endophytes"
2019	Undergraduate Research Grant (URSCA) awarded to advisees Natiri Swenson ( <b>\$840</b> ) PI: "Pathogenic nematode density under various orchard management strategies"
2018	Undergraduate Research Grant (URSCA) awarded to advisees Alyssa Tidwell and Jenni Lawrence ( <b>\$2,970</b> ) PI: "Fungal and bacterial community structure during wetland recovery"
2018	Undergraduate Research Grant (URSCA) awarded to advisees Spencer McGee ( <b>\$1,740</b> ) PI: "Soil microbial responses after the Pole Creek Fire in Utah"
2018	Undergraduate Research Grant (URSCA) awarded to advisee Garrett Matthews ( <b>\$978</b> ) PI: "Examining the roles of endophytes in leaf decomposition"
2018	Undergraduate Research Grant (URSCA) awarded to advisees Bryce Brunetti and Jordan Bayly ( <b>\$833</b> ) PI: "Underwater heroes: finding a chytrid antagonist"
2018	Undergraduate Research Grant (URSCA) awarded to advisees Nicholas Long and Harrison Haws ( <b>\$3,000</b> ) PI: "Lifestyle determinants of the human oral mycobiome"
2018	Undergraduate Research Grant (URSCA) awarded to advisees Alyssa Tidwell and Spencer McGee ( <b>\$3,000</b> ) PI: "Community assembly of soil fungi within a fire chronosequence"
2018	Undergraduate Research Grant (URSCA) awarded to advisee Bryce Brunetti ( <b>\$350</b> ) PI: "Construction of a mock fungal community for high-throughput amplicon research"

## PRESENTATIONS

### Invited Seminars:

2019	"Who's there and who cares: the how and why of fungal community structure" Brigham Young University, UT, USA
2018	<a href="#"><u>"The causes and consequences of fungal community structure"</u></a> 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**

- 2019** Workshop to enhance collaboration between the US and Indonesia. Bogor, Indonesia. <http://biodiversity.ipb.ac.id/>
- 2019** NSF Panel Reviewer
- 2018 – Current** Faculty Senate – Utah Valley University
- 2018** Faculty search committees for positions in Environmental Microbiology and Molecular Field Botany - 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

<b>2013 – 2016</b>	IUCN Species Survival Commission – Myxomycete group
<b>2012</b> Jul. – Aug.	Field Research – Tropical Lichen Ecology Organization for Tropical Studies, Costa Rica
<b>2011 – 2012</b> Jun. – May	National Science Foundation GK-12 Teaching Fellow University of Arkansas; Owl Creek Middle School, Fayetteville, AR
<b>2010</b> Jan. – Dec.	Undergraduate Research Assistant – Forest Fire Ecology Missouri State University Dept. of Biology
<b>2009</b> Jan. – Dec.	Undergraduate Research Assistant – Yeast Genetics Missouri State University Dept. of Biology

## MENTORING AND TEACHING EXPERIENCE

### Teaching website

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

### Mentorship

Undergraduate student mentor (31 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)

6<sup>th</sup> 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