Grant Foster

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Interests

Ecological Networks • Theoretical Ecology • Community Assembly Dynamics • Disease Ecology • Undergraduate Biology/Ecology Education

Education

2022 – Present **University of South Carolina** – Columbia, South Carolina
Ph.D. Biology (in progress)
Advisor: Dr. Tad Dallas. *GPA: 4.00/4.00*

2020 – 2021 **Louisiana State University** – Baton Rouge, Louisiana
Ph.D. Biology (in progress)
Advisor: Dr. Tad Dallas. *GPA: 4.11/4.30.*

2016 – 2020 **University of Georgia** – Athens, Georgia
B.S. Ecology; B.S. Biology
Marine Science Emphasis
Highest Honors Graduation Distinction, *summa cum laude*
Research Mentors: Dr. Andrew Park, Dr. William Fitt. *GPA: 3.93/4.00.*

Teaching experience

Spring 2024, 2025 **Co-Instructor of Record, Parasitology (University of South Carolina)**
Co-teaching an upper level undergraduate/graduate course on Parasitology and Ecology of Infectious Diseases alongside Dr. Tad Dallas. Responsible for creating all lab materials and assessments, as well as contributed to lecture materials and assessments. Instructed all laboratory sections, as well as a number of lectures. All materials created for the course are freely available at https://dallaslab.github.io/diseaseEcology/.

Spring 2023 - Fall 2023; Fall 2024 **TA, Ecology and Evolution Laboratory (University of South Carolina)**
Supervisor: Dr. Trey Franklin (University of South Carolina)

Fall 2022 **TA, Principles of Biology II Laboratory (University of South Carolina)**
Supervisor: Dr. Eilea Knotts (University of South Carolina)

May 2019 **TA, Tropical Marine Invertebrates (University of Georgia)**
Supervisor: Dr. Bill Fitt (University of Georgia)

Spring 2019 **TA, Ecological Basis of Environmental Issues (University of Georgia)**
Supervisor: Dan Hawkins (University of Georgia)

March 2023 **Guest Lecturer, Theoretical Ecology (University of South Carolina)**
Instructor: Dr. Tad Dallas
Gave guest lecture to class of 12 graduate students on creating and analyzing generalized Lotka-Volterra models of multispecies communities.

March 2024 **Lecturer, Parasitology (University of South Carolina)**
Lecture on link prediction in host-parasite interaction networks

Pedagogical Training

August 2024 Workshop: Pedagogical Strategies for Supporting Students' Emotional Wellbeing
American Academy of Sciences IUSE Webinar

August 2024 — Workshop: If All Plants are an Exception to the Rule, Maybe We Need to Change the Rule? Centering Biological Diversity and Science as a Socio-Cultural Practice in Biology and Ecology Courses
Ecological Society of America Meeting

May 2024 — Workshop: Building connections and community to make your classes more welcoming and inclusive
Society for the Advancement of Biology Education: Eastern Conference

Awarded Spring 2024 — Certificate: Intercultural Inclusion and Diversity Learning Series
USC Center for Teaching Excellence
Part of a cohort of educators meeting for monthly seminars (8hrs) and group discussions centering on themes diversity, inclusion, and creating learning environments that foster the co-creation of knowledge with a diverse set of learners

Fall 2023 — Course: Scientific Teaching and Pedagogy (BIOL757)
University of South Carolina
Was one of 3 students in a semester-long, discussion-based course designed to introduce graduate students to best practices in scientific teaching and pedagogy in order to prepare them to serve as Instructors of Record (IoR) at USC following successful completion.

Awarded Fall 2023 — Certificate: Teaching Towards Inclusive Excellence
USC Center for Teaching Excellence
Participated in a series of eight seminars (10hrs) united under themes of integrating pedagogical principles aligned with inclusive excellence into the classroom environment.

Awarded Spring 2023 — Certificate: Fostering Proactive Learning Environments
USC Center for Teaching Excellence
Participated in a series of six seminars (8hrs) united under themes of proactive are reactive strategies for handling student misconduct, avoiding and addressing classroom conflicts, and fostering a sense of belonging in the classroom.

Awarded Spring 2023 — Certificate: Integrative and Experiential Learning
USC Center for Teaching Excellence
Participated in a series of six seminars (8hrs) united under themes of encouraging students to explore, reflect on, and transfer knowledge between learning experiences within and beyond their academic curriculum.

Awarded Spring 2023 — Certificate: Mental Health & Well-being Competency
USC Center for Teaching Excellence
Participated in a series of five seminars (7hrs) united under themes of helping instructors feel better equipped to talk about and respond to the growing mental health needs of today's students.

October 2022 — USC OktoberBest Teaching Symposium
Attendee

August 2022 — Short Course: Bringing computational data sciences to your undergraduate ecology classroom
Ecological Society of America Meeting

Publications

2024 — **Preparing for the next pandemic: Learning lessons from the recent past**
Bret Elderd, Tad Dallas, **Grant Foster**, and Robert L. Richards.
Chapter in *Handbook of Visual, Experimental and Computational Mathematics*
https://doi.org/10.1007/978-3-030-93954-0$_4$9 – 1

2022 — **Epidemic time series similarity is related to geographic distance and age structure**
Tad Dallas, **Grant Foster**, Robert L. Richards, and Bret Elderd.
Infectious Disease Modeling
https://doi.org/10.1016/j.idm.2022.09.002

2022 **Estimating R0 from Early Exponential Growth: Parallels between 1918 Influenza and 2020 SARS-CoV-2 Pandemics**
Grant Foster, Bret Elderd, Tad Dallas, Robert L. Richards.
PNAS: Nexus
https://doi.org/10.1093/pnasnexus/pgac194

2020 **What determines parasite species richness across host species?**
Tad Dallas, Lauren Holian, **Grant Foster**.
Journal of Animal Ecology.
https://doi.org/10.1111/1365- 2656.13216

In prep. **Comparing Waves of COVID-19 in the US: Scale of response changes over time**
Robert L. Richards, **Grant Foster**, Bret Elderd and Tad Dallas.
Manuscript submitted for publication https://doi.org/10.1101/2022.03.01.22271713

In Revision **Comparing the power of phylogenies, species traits, and network structure to predict plant-frugivore interactions**
Grant Foster and Tad Dallas
Manuscript submitted for publication

In prep. **Variation in effectiveness of epidemic model parameter estimation with model complexity and data availability**
Robert L. Richards, **Grant Foster**, Bret Elderd and Tad Dallas.
Manuscript in Preparation

Presentations

March 2025 **Science in Your Hands: Using iNaturalist to Contribute Biodiversity Data from Your Backyard**
Grant Foster, Zack Radford.
South Carolina Midlands Native Plants Society. Invited Talk.

February 2025 **Using iNaturalist to participate in the 2025 Columbia City Nature Challenge**
Grant Foster, Sierra Jaeger.
USC Student Sustainability Summit. Talk.

November 2024 **Range Size-Centrality Relationships in Plant-Pollinator Networks & Searching for Rate-Induced Phase Transitions in Yeast Populations**
Grant Foster, Tad Dallas.
USC Ecology and Evolutionary Biology Seminar. Talk.

August 2024 **From Potential to Realized: Understanding Ecological Interactions Across Geographic Ranges**
Grant Foster, Tad Dallas.
Ecological Society of America Meeting. Poster.

August 2024 **Connecting Students Lived Experiences, Climate Change, and Shifting Species Distributions**
Grant Foster
16th Annual Resources for Ecology Education – Fair and Share Workshop (REEFS). Talk and Panelist.

May 2024 **Citizen Science in a Changing World**
Grant Foster
Society for Philosophy of Science in Practice Conference. Invited Talk and Panelist.

May 2024 **Feathers, Fruits, and Functions: Mapping Species Interactions in Brazil & Assessing Data Science Skills in Life Science Classrooms**
Grant Foster, Tad Dallas.
USC Ecology and Evolutionary Biology Seminar. Talk.

August 2023 **Interaction specificity in assembling mutualist metacommunities with competition-mediated dispersal**
Grant Foster, Tad Dallas.
Ecological Society of America Meeting. Talk.

April 2023 **Population dynamics of functionally equivalent species: a laboratory experiment of pigmented brewer's yeast *(Sacchromyces cervisia)***
Grant Foster, Tad Dallas.
USC Discover Day. Poster.

October 2022 **'Linking' things together: Predicting interactions and assembly dynamics in bipartite mutualist networks.**
Grant Foster, Tad Dallas.
USC Ecology and Evolutionary Biology Seminar. Talk.

August 2022 **Comparing the power of phylogenies, species traits, and network structure to predict plant-frugivore interactions**
Grant Foster, Tad Dallas.
Ecological Society of America Meeting. Talk.

June 2021 **Estimating R0 from Early Exponential Growth: Parallels between 1918 Influenza and 2020 SARS-CoV-2 Pandemics**
Grant Foster, Bret Elderd, and Tad Dallas.
Ecology and Evolution of Infectious Disease. Virtual Poster.

April 2021 **Estimating R0 from Early Exponential Growth: Parallels between 1918 Influenza and 2020 SARS-CoV-2 Pandemics**
Grant Foster, Bret Elderd, and Tad Dallas.
LSU Biology Graduate Student Symposium . Virtual Talk.

January 2020 **Cestode parasites become more specialist as they ascend host food webs**
Grant Foster, Andrew Park.
Odum School of Ecology Graduate Student Symposium. Poster.

Mentored Student Research Projects

August 2024 **Quantify the effect of storm-water alterations on sediment, nutrient, and biotic conditions in an urban stream**
Francesca Melia*, Kyriq Smith*, Natalie Moore*, Jason Czerwinski* **Grant Foster**, Bailey Parker. *Supported by Youth Climate Action Fund Grant ($5000).*

April 2024 **Estimating how lockdown procedures affected COVID-19 case counts and predicting the case burden due to asymptomatic individuals through continuous time compartmental modeling**
Rebecca Luebke, **Grant Foster**, Tad Dallas.
Presented at USC DiscoverDay.

April 2024 **Exploring Growth Dynamics: The Potential for Nutrient-Mediated Differences in Growth Rates and Carrying Capacity in a Brewer's Yeast Experimental System**
Baig, Nabeeha, **Grant Foster**, Tad Dallas.
Presented at USC DiscoverDay.

Technical skills and Certifications

Programming languages
Proficient in base **R**, 'tidyverse' suite, as well as classic packages designed for community ecology ('vegan'), phylogenetic analysis ('ape', 'picante'), network analysis ('igraph', 'bipartite'), and spatial analysis ('terra').
Familiar with **Python**

Software
Proficient in LaTeX, git, GitHub, JAGS, STAN, SoftMax Pro, and ImageJ
Familiar with ArcGIS, Hugo, and Quarto

Analyses
Proficient in: Machine Learning Approaches, Bayesian Statistical Methods, Multilevel Modeling, Differential Equation Modeling, Matrix-based Compartmental Models

Ongoing Projects

Predicting species interactions in Plant-Frugivore networks
Collaborators: Dr. Tad Dallas (University of South Carolina)
Serving as primary investigator for a project comparing different types of information in predicting avian-plant frugiovry interacions in the Brazilian Atlantic forest. See the code here

Assembly of Mutualistic Networks across Space
Collaborators: Dr. Tad Dallas (University of South Carolina)
Serving as primary investigator for a project modeling mutualistic network assembly dynamics in a spatial metacommunity context, investigating the way structural properties and dispersal regimes affect species and interaction persistence through time. See the code here

Strategies for Assessing Data Science Skills in Life Science Classrooms
Collaborators: Dr. Ellen Bledsoe (UAZ), Dr. Max Czapanskiy (UC Santa Cruz), DrLea Richardson (CSU Northridge), Dr. Yingying Xie (N. KYU).
Contributing author on a project looking to review different ways to assess data science skills in life sciences and ways they can be incoroprated into the classroom. We ultimately intend to turn this work into a public-facing resource and corresponding paper.

Modeling Plant-Pollinator Interactions Across Space
Collaborators: Dr. Tad Dallas(University of South Carolina)
Serving as primary investigator for a project modeling plant-pollinator interactions using an SDM framework, and linking species traits to resultant performances. See the code here

The Effect of Geographic Range Species Positions in Pollination Networks
Collaborators: Dr. Tad Dallas, Cleber Ten Caten (University of South Carolina)
Serving as primary investigator for a project investigation how species traits like geographic range size or dispersal ability relate to their position within both local and aggregate plant-pollinator networks. See the code here

Using Brewer's Yeast to Empirically Test Expecations of Neutral Theory
Collaborators: Dr. Tad Dallas, Nabeeha Baig(University of South Carolina)
A series of projects using strains of *Saccharomyces cerevisiae* genetically modified to express different pigment pathways to test theoretical expectations of community assembly patterns.

Honors and scholarships

2024 Graduate Teaching Assistant Teaching Resource Development Grant
Awarded for the development of an interdisciplinary climate change learning module where students analyze and communicate real-world data from South Carolina ($1000).

2024 Jeffrey Barnsdale Memorial Fellowship
Awarded for superior and effective performance as an instructional assistant ($1000).

2024 Elsie Taber Fellowship (USC)
Awarded for travel to Ecological Society of America Meeting ($1807).

2024 BEDE Network Annual Meeting Travel Award
Awarded for travel to attend the 2024 BEDE Network Annual Meeting.

2024 Elsie Taber Fellowship (USC)
Awarded for travel to Society for the Advancement of Biology Education: Eastern Conference Meeting ($802).

2023 USC Graduate School Travel Grant
Awarded for travel to Ecological Society of America Meeting ($500).

2023 Elsie Taber Fellowship (USC)
Awarded for travel to Ecological Society of America Meeting ($1,964).

2023 BEDE Network Annual Meeting Travel Award
Awarded for travel to attend the 2023 BEDE Network Annual Meeting.

2023 ESIIL Travel Award
Awarded for travel to attend the 2023 ESIIL Innovation Summit ($1,000).

2022 Elsie Taber Fellowship (USC)
Awarded for travel to Ecological Society of America Meeting ($2,303).

2020 Highest Honors Graduation (University of Georgia)
Awarded for outstanding academic merit and completion of graduate coursework capstone.

2019 Thelma Richardson and Frank Golley Undergraduate Support Award (Odum School of Ecology) *Awarded for excellence in undergraduate studies in Ecology ($1,000).*

2016 – 2020 HOPE and Zell B. Miller Scholarship

2016 Cherokee County Farm Bureau Scholarship ($1,000)

Mentorship and service

Spring Summer – Spring 2025 **Head Organizer - Columbia City Nature Challenge**
Initiated and led a team of 5 graduate students to organize Columbia SC's first year participating in Cal Academy of Sciences City Nature Challenge program, a global initiative to catalog urban biodiversity. Worked with over a dozen local partners to develop and schedule nature programming, started and ran social media and web presence, developed and implemented community outreach and tabling programs, as well as created and implemented a "iNaturalist ambassador" training program, which had 43 participants this first year. Final event included 16 events attended by 301 partREEicipants, cataloging over 9k observations of 1,723 species of wildlife. For more details, see the website I created or read our challenge results here.

Spring 2024 –Present **Technical Committee - Gills Creek Watershed Association**
Part of interdisciplinary committee formed to provide technical advice to the Gill's Creek Watershed Association board and members as well as also to initiate and follow field-oriented projects in the watershed that are important to its restoration and/or conservation.

Fall 2023 – Spring 2024 **Service Chair - Graduate Association of Biological Sciences**
Responsible for organizing graduate association outreach, volunteer, and charity events. These including a K-8 interdisciplinary STEM Outreach fair, a graduate student BioBlitz, organizing installation of own nest boxes, and organizing holiday donation drives.

March 2024 **USC Region II Science and Engineering Fair Judge (Junior, Senior, and Senior Finalist Judge)**
Judged both junior and senior science fair students from across 9 counties, including serving as a finalist judge for both divisions.

March 2024 **Crayton Middle School Science and Engineering Fair Judge**
Judged 6th-8th grade individual and group science fair projects

March 2023 **USC Region II Science and Engineering Fair Judge (Junior and Senior Divisions Judge)**
Judged both junior and senior science fair students from across 9 counties

Fall 2022 **Family Day Volunteer**
Guided tours of undergraduates and their families across USC Biology research labs, collections, and courses.

Spring 2021 – Fall 2021 **LSU Biology CodeFest & Makerspace Volunteer**
Volunteered in series of bi-monthly events helping facilitate standalone projects for Biology undergraduate and graduate students to build data analysis and hardware skills.

Fall 2019 **Ecology Undergraduate Mentorship Program (Founding Organizer)**
Founded an undergraduate peer-mentorship program within the Odum School of Ecology, connecting students new to the school with Junior and Seniors with similar interests and professional goals

Spring 2018 – Fall 2019 **UGA EcoReach (Member)**
Participated in ecological outreach programs for middle and highschool students in Athens, GA by partnering with local schools and libraries

Professional Meeting Attendance

May 2024, June 2023 — **BEDE Network Annual Meeting**
A NSF Research Coordination Network, Biological and Environmental Data Education (BEDE) Network's main objective is to support instructors as they integrate data science skills across undergraduate biology and environmental science curricula, through instructor training, curricular maps, and a network of supportive colleagues.

May 2024 — **Society for the Advancement of Biology Education Research: East**
The inaugural Eastern conference meeting for SABER proper, this conference focused on ongoing research into how to improve life science education in higher ed.

May 2023 — **ESIIL Innovation Summit**
The Environmental Data Science Innovation & Inclusion Lab (ESIIL) is an NSF-funded data synthesis center and aims to enable a global community of environmental data scientists to leverage the wealth of environmental data and emerging analytics to develop science-based solutions to solve pressing challenges in biology and other environmental sciences.

June 2022 — **Ecology of Emerging Infectious Diseases Conference**

Recreational Naturalism

In addition to my research and teaching, I've enjoyed getting outside and learning to identify the flora and fauna I encounter in the Southeast, particularly birds!

While studying at USC, I've used ebird to log 250+ bird checklists in South Carolina, and have logged 151 species (and counting) in Richland County alone! Check out my account at ebird.com

I've participated in a number of Audubon Society observation programs, including Christmas Bird-counts in Amicalola GA, Columbia SC, and Pinewoods SC. I've also participated in great-backyard bird counts, global big day, and monitored for eastern towhee *(Pipilo erythrophthalmus)* as part of Audubon's ClimateWatch program.

I'm also a bit of a iNat addict, and have identified over 20,000 records from across the Southeastern US. Connect with me on iNat here!