Grant Foster

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Research Interests

Ecological Networks • Quantitative Ecology • Community Assembly Dynamics • Disease Ecology • Biology Education • Global Change Biology • Plant-Animal Interactions

Education

2020 – Spring 2026 *(Antic.)*
University of South Carolina – Columbia, South Carolina
Ph.D. Biology (in progress)
Advisor: Dr. Tad Dallas. *Current GPA: 4.00/4.00*
Research Topics: Understanding the structural features of species interaction networks, the assembly processes that generate them, and their responses to global change through the analysis of large-scale biodiversity datasets.

2016 – 2020
University of Georgia – Athens, Georgia
B.S. Ecology; B.S. Biology
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
Instructor of Record, Parasitology (University of South Carolina)
Co-taught two sections per semester of an upper level undergraduate/graduate course on the ecology of parasites (4 sections total). Created and delivered all lab materials and assessments as well as contributed to lecture materials. Lab exercises include hands-on host dissections and parasite identifications, discussions of primary literature, and computational exercises modeling parasite burden and epidemiology. All materials created for the course are freely available at https://dallaslab.github.io/diseaseEcology/.

Spring 2023; Fall 2023, 2024, 2025
TA, Ecology and Evolution Laboratory (University of South Carolina)
Supervisor: Dr. Trey Franklin (University of South Carolina)
Administered two lab sections per semester (8 sections total), developed presentations and assessments, created and implemented R-based data analysis modules in two honors sections (23 students total), as well as created a new lab implemented across all sections focused on connecting students' lived excuses to climate-driven range shifts. This latter module's development was funded by an internal grant from USC's Center for Teaching Excellence, and all materials I created for this course are freely available on my personal website.

Fall 2022
TA, Biological Principles II Laboratory (University of South Carolina)
Supervisor: Dr. Eilea Knotts (University of South Carolina)
Administered two laboratory sections, created quizzes, and enhanced the presentation skills of students at the USC

May 2019
TA, Tropical Marine Invertebrates (University of Georgia)
Supervisor: Dr. Bill Fitt (University of Georgia)
Led class field trips and sampling bouts in Florida keys (including open-water snorkeling trips), prepared course lectures, graded assignments, and set up laboratory experiments.

Spring 2019
TA, Ecological Basis of Environmental Issues (University of Georgia)
Supervisor: Dan Hawkins (University of Georgia)
Led weekly class discussions and lectures on environmental issues geared towards a non-majors audience, prepared assessments and presentations, administered weekly lab sections.

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

March 2023
Guest Lecturer, Theoretical Ecology (University of South Carolina)
Instructor: Dr. Tad Dallas
Graduate course lecture on generalized Lotka-Volterra models of multispecies communities.

Mentorship

Spring 2023 – Spring 2025 **Nabeeha Baig**, B.S. Public Health, USC Magellan Scholar
Primary mentor for independent research on vital rate variation in *Saccharomyces cerevisiae* across environmental gradients. Trained in microbiology techniques, experimental design, data analysis, and scientific communication. Guided preparation of academic posters and secured two internal research grants.

Funding: Magellan Research Guarantee Grants ($2,000 each; 2023–2024, 2024–2025).
Presentations: **The Role of Nutrient Variability in Fungal Community Assembly**. Baig*, Foster, Dallas. USC DiscoverDay (Spring 2025).
Exploring Growth Dynamics: Nutrient-Mediated Differences in Yeast Growth Rates and Carrying Capacity. Baig*, Foster, Dallas. USC DiscoverDay (Spring 2024).

Spring 2023 – Spring 2025 **Cayden Scruggs**, B.S. Computer Science, USC Magellan Scholar
Secondary mentor for an independent research project on applying open-source computer imaging techniques to quantify *Saccharomyces cerevisiae* colony phenotypes. Guided analysis, preparation of academic posters, and assisted securing two internal research grants.

Funding: Magellan Research Guarantee Grants ($2,000 each; 2023–2024, 2024–2025).
Presentation: **Automated Yeast Colony Detection and Classification Using Machine Learning**. Scruggs*, Foster, Foster. USC DiscoverDay (Spring 2024)

Fall 2024 **Francesca Melia, Kyriq Smith, Natalie Moore, Jason Czerwinski**, *Gills Creek Watershed Association.* Co-advised student team (with Bailey Parker, GCWA) on student-led project of quantifying potential impacts of a proposed storm-water improvement plan.

Funding: Bloomberg Youth Climate Action Grant ($5,000).
Presentation: **Quantifying the Effect of Storm-Water Alterations on Sediment, Nutrient, and Biotic Conditions in an Urban Stream**. Melia*, Smith*, Moore*, Czerwinski*, Foster, Parker.

Spring 2024 **Rebecca Luebke**, B.S. Biological Sciences
Advised expansion of a course-based project into an independent research study modeling COVID-19 transmission across South Carolina counties using differential equations and public health data.

Presentation: **Estimating Impacts of Lockdown Procedures on COVID-19 Transmission via Continuous-Time Compartmental Models**. Luebke*, Foster, Dallas. USC DiscoverDay (Spring 2024).

Spring 2023 - Spring 2024 **Sayi Sathish Kumar**, B.S. Biological Sciences
Primary mentor for research on yeast community assembly dynamics. Provided training in microbiology methods and experimental design. Additionally, assisted in designing, 3D-printing, and assembling an interactive bio-art exhibit as part of Theme Semester Grant.

Funding: Spring 2023 Theme Semester Grant ($500).

Pedagogical Training

Spring 2026 (Anticipated) Preparing Future Faculty Certificate, *USC Center for Teaching Excellence*

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

August 2024 Workshop: 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 of diversity, inclusion, and co-creation of knowledge.
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.
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 and reactive strategies to handle student misconduct and facilitate a sense classroom belonging.
Awarded Spring 2023	Certificate: Integrative and Experiential Learning, *USC Center for Teaching Excellence*. Completed six-seminar (8hrs) series on strategies to help students explore, reflect on, and transfer knowledge across curricula
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 equip instructors to better 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

2025	**Comparing the power of phylogenies, species traits, and network structure to predict plant-frugivore interactions**. Foster and Dallas. *Oikos. Ahead of print.* *https://doi.org/10.1002/oik.11156*
2024	**Preparing for the next pandemic: Learning lessons from the recent past**. Elderd, Dallas, Foster, and 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** Dallas, Foster, Richards, and 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**. Foster, Elderd, Dallas, and Richards. *PNAS: Nexus.* *https://doi.org/10.1093/pnasnexus/pgac194*
2020	**What determines parasite species richness across host species?**. Dallas, Holian, Foster. *Journal of Animal Ecology.* *https://doi.org/10.1111/1365- 2656.13216*
Submitted	**The impacts of geographic and environmental range size on species centrality in floral visitation networks**. Foster, Dallas, and Ten Caten. *Submitted for publication*
Submitted	**Habitat-induced transgenerational effects stabilize beetle population dynamics**. Dallas, Pak, Kucinski, Holian, Foster, Ten Caten, and Pignatelli. *Submitted for publication*
In prep.	**From Potential to Realized: Understanding Ecological Interactions Across Geographic Ranges**. Foster and Dallas. *Manuscript in Preparation*
In prep.	**Scaling from Nutrient-Dependent Vital Rates to Community Assembly Processes in Experimental Yeast Communities**. Foster, Dallas, and Baig. *Manuscript in Preparation*
In prep.	**Competitor-mediated dispersal facilitates coexistence within an assembling mutualist metacommunity**. Foster and Dallas. *Manuscript in Preparation*
In prep.	**Structural Changes in Mutualistic Networks under Global Anthropogenic Pressure: A Synthetic Review**. Foster. *Manuscript in Preparation*

Science Communication and Pedagogy

January 2026 (Ahead of print) **Every bird counts: How everyday nature enthusiasts help scientists understand changing bird populations**. Foster. *South Carolina Wildlife Magazine. Invited Article*

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

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

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

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

Research Presentations

August 2025 **The impacts of geographic and environmental range size on species centrality in floral visitation networks**. Foster, Dallas, Ten Caten. *Ecological Society of America. Talk*

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

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

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

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

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

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

Service

Summer 2025-Present **Cultural Partner - South Carolina State Museum** Working with the South Carolina State Museum staff to develop programming and participatory science initiatives to accompany their upcoming Spring 2026 exhibit: *Bird Photographer of the Year & SC Wings of Wonder.*

Summer 2024 – Present **Head Organizer – Columbia City Nature Challenge**
Founded and led Columbia SC's first City Nature Challenge, coordinating a team of 5 graduate students and 12+ partner organizations. Developed outreach programs, social media presence, and an iNaturalist ambassador training (43 participants). The challenge weekend itself included 16 events with 301 attendees, generating 9k+ observations of 1,723 species. See our Website and Final Results.

Spring 2024 –Present **Technical Committee - Gills Creek Watershed Association**
Member of interdisciplinary committee providing technical advice to the Gill's Creek Watershed Association and initiating field projects for watershed restoration and conservation. Assisted with community outreach, including rain garden installations, stream biodiversity sampling, and K–8 watershed education.

Fall 2023 –Present
Midlands Nature and Bird Alliance - Working Group Member
Organize and lead birdwatching outings, public tabling events, and outreach/social media for Columbia Audubon. Serve on the forest management committee for Wannamaker Nature Preserve (540 acres), coordinating volunteer efforts in invasive species removal and habitat restoration, assisting with prescribed burns, developing an amphibian monitoring program, and contributing to the preserve's management plan, grants, and NRCS applications.

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 owl nest boxes, and organizing holiday donation drives.

March 2023, 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

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

Fall 2019 - Spring 2020
Ecology Undergraduate Mentorship Program (Founding Organizer)
Founded an undergraduate peer-mentorship program within the Odum School of Ecology, connecting new students new to peer mentors with similar interests and professional goals

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

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), spatial analysis (TERRA, SF).
Familiar with **Python**, including open-source image analysis software (MegaDetector, BioClip).

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

Analyses
Proficient in: Machine Learning Approaches, Bayesian Statistical Methods, Multilevel Modeling, Differential Equation Modeling, Matrix-based Compartmental Models, MaxEnt Species Distribution Modeling, Multi-Model Inference, Spatial Data Analysis

Laboratory Skills
Yeast culturing techniques, aseptic technique, serial dilution, cell counts, spectrophotometry, plating techniques.

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 biodiversity data from South Carolina ($1000).

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

2022, 2023, 2024, 2025 — USC Elsie Taber Fellowship
Awarded for travel to Ecological Society of America Meeting (2024, 2023, 2022). Awarded for travel to Society for the Advancement of Biology Education: Eastern Conference Meeting (2024). ($6,876 total)

2023, 2024, 2025 — BEDE Network Annual Meeting Support
Awarded for travel to attend the 2023, 2024, and 2025 BEDE Network Annual Meetings.

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

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

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

2019 — Thelma Richardson and Frank Golley 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)

Professional Meeting Attendance

June 2025, 2024, 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 that aims to enable a global community of environmental data scientists to leverage the wealth of environmental data and emerging analytics across research areas.

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

Professional Society Membership & Service

2021-Present — **Ecological Society of America.** Student Member.

2023-Present — **Biological and Environmental Data Education Network** Member.

Reviewer — **Journal of Animal Ecology**

Co-Reviewer — **Proceedings of the National Academy of Sciences**

Recreational & Community 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 at USC, I have organized and led numerous events aimed to engage student and community groups with their local flora and fauna through field-based programming, including birdwalks, moth lightsheeting events, night hikes, and bioblitzes.

I am an avid recreational birder. While studying at USC I've used ebird to log 350+ bird checklists in South Carolina, and have logged 172 species (and counting) in Richland County alone! Check out my account at ebird.com. I've engaged in a number of participatory science programs, including the USGS's breeding bird survey, Audubon's ClimateWatch program, and Christmas Bird-counts in Congaree National Park, Columbia SC, Pinewoods SC, and Amicalola GA.

I am also an active contributor to the platform iNaturalist, and have identified over 25,000 records from across the Southeastern US. Connect with me on iNat here!