NICOLE FORDREE

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EDUCATION

A.B. in Environmental Biology, Minor in Chinese Language and Culture, GPA: 3.92 **May 2024**

Washington University in St. Louis, College of Arts and Sciences, St. Louis, MO

Thesis: *Investigating Taxonomic Relationships Between Candida Fungal Species Using Internal Transcribed Spacer (ITS) Regions*

Advisor: Gautam Dantas, Ph.D. Mentor: Yao-Peng Xue

Study Abroad **January 2023 – May 2023**

Trinity College Dublin, Schools of Biology, Botany, and Zoology Dublin, Ireland

HONORS

Magna Cum Laude with thesis and research emphasis in Biology, Washington University in St. Louis *May 2024*

Dean's List, Washington University in St. Louis *August 2020- May 2024*

RESEARCH EXPERIENCE

Biological Science Technician (Fisheries) **May 2025 - October 2025**

Grand Teton National Park *Moose, WY*

Conducted various fisheries-related projects to monitor the overall health of the cold water fishery in Grand Teton National Park. Monitored native trout spawning populations via setting up and synthesizing data from video Weirs. Set up and monitored pit tag sites to assess the movement of fish within the park. Conducted 60+ thorough daily boat inspections to prevent Aquatic Invasive Species (AIS) infiltration into the watershed. Surveyed park sites for invasive bullfrog egg clusters and adults, conducted bullfrog removal if necessary. Assisted with eDNA collection and early detection surveys for Dreissenid mussels. Deployed trail cameras in riparian areas to investigate the impacts of bear predation on native trout and sucker populations.

Biological Science Technician (Natural Resources) **June 2024- November 2024**

U.S. Forest Service Eastern Washington Ecology Program *Okanogan-Wenatchee & Colville National Forest*

Conducted long-term ecological monitoring projects in the Okanogan-Wenatchee National Forest, focusing on stand-level assessments of trees, understory vegetation, cultural plant resources, and fuel loads within pre- and post-treatment forest restoration areas and Late Successional Reserve (LSR) forest regions. Mapped and documented over 50 novel Whitebark Pine (*Pinus albicaulis*) populations, including assessing pine blister rust severity and other pest and disease pressures. Contributed to collaborative forest landscape restoration initiatives, examining the ecological effects of managed wildfires in wilderness areas of Northeast Washington. Assisted in population monitoring projects and deployment of acoustic recording units (ARUs) for endangered wildlife species of concern. Compiled detailed reports and graphs from collected field data for higher-level officials to assess the health of special management areas in the forest.

Undergraduate Research Assistant **August 2022 – May 2024**

Dantas Lab, Edison Family Center for Genome Sciences and Systems Biology *Washington University School of Medicine*

Advisors: Gautam Dantas, Ph.D. Mentor: Yao-Peng Xue

Independently designed and executed standard wet-laboratory procedures to extract and analyze Internal Transcribed Spacer (ITS) regions from over 200 *Candida* fungal samples across 14 species, enhancing understanding of fungal taxonomy, pathology, and ecology. Developed and implemented a comprehensive sequencing pipeline using Hierarchical Genome Assembly Processes (HGAP) to compile whole genome sequences (WGS) for *Candida* species, utilizing ITS1 and ITS2 as barcodes for precise species identification. Authored custom Python and R scripts to extract ITS sequences from whole genome sequences and compared them to PCR-amplified ITS sequences, validating the effectiveness of the genome assembly pipeline. Concluded ITS2 regions, an underutilized barcode relative to ITS1, may better determine *Candida* species identity, offering more accurate taxonomic comparisons.

Behavioral Genetics Laboratory **January 2024 – May 2024**

Advanced Laboratory Course, Department of Biology *Washington University in St. Louis*

Utilized Gal4/UAS and CRISPR/Cas9 knockout techniques to target and knock out receptors associated with aggressive behavior, aiming to unravel the neural mechanisms underlying aggression in male *Drosophila melanogaster*. Designed and executed experiments to observe and characterize aggression triggered by various stimuli (e.g., presence of female flies, food availability) among male flies. Analyzed video recordings of aggressive interactions, developing and applying metrics such as frequency, latency, number of bouts, and a novel measure of bout intensity to quantify and compare aggression levels. Preliminary experimental results indicated that knocking out Nicotinic Acetylcholine and Dopamine receptors reduces male aggression, suggesting these receptors may play a key role in modulating aggressive behavior.

Wildlife Survey Volunteer **June 2022 - August 2022**

Wildlife Division *Zion National Park*

Conducted habitat analysis to identify Mexican Spotted Owls (*Strix occidentalis lucida*) using visual cues. Performed auditory callback surveys by mimicking owl calls to locate male and female owls within known habitats. Monitored Pallid Bat (*Antrozous pallidus*) populations during dusk emergence surveys, contributing to species population tracking and habitat assessment.

LEADERSHIP & SERVICE

Teton Raptor Center

AmeriCorps Service Member **January 2025 - May 2025**

Assisted TRC staff with daily husbandry activities, including food preparation, assigning daily food measurements based on raptor weight, enclosure cleaning, and general organization of the roost building. Handled and trained 5 raptor species using on-glove training methods like kenneling for programs, flights, and sustaining time on a glove. Shadowed clinical procedures, i.e., handling injured and sick raptors, taking blood samples, feeding sick raptors, administering medications, performing physical therapy, replacing bandages, interpreting x-rays, processing fecal samples, and assisting with surgical procedures. Collaborated with research and education departments to develop new educational programming material focusing on raptor migration and habitats in the Greater Yellowstone Ecosystem.

Teton Science Schools **January 2025 - May 2025**

AmeriCorps Service Member

Facilitated place-based educational, ecologically-based activities for groups of 10+ visiting students in and across Jackson Hole and Grand Teton National Park. Planned lessons and activities for visiting student groups based on daily themes. Inspired students to be environmental stewards and find a passion for outdoor recreation.

American Cancer Society's Chapter of Relay for Life at WashU **September 2020 – May 2024**

Event Co-Chair *August 2022- December 2022*

Co-Chair *August 2023-May 2024*

Led the executive team and oversaw 50 committee members, collaborating with campus partners in weekly meetings to organize two major campus events and over 15 fundraisers and initiatives, raising funds and awareness for cancer research. Spearheaded the coordination of the second-largest student-run event on campus, managing all aspects from activities and performances to food, event facilities, and sustainability practices in partnership with campus and local organizations.

PRESENTATIONS

Oral Presentations

Fordree, N. (2024, 08). *Investigating Taxonomic Relationships Between Candida Fungal Isolate Species Using Intronic Transcribed Spacer (ITS) Regions,* Research Symposium, Dantas Lab, St. Louis, MO.

Poster Presentations

Fordree, N., Xue, Y.P., Newberry, M., Wallace, M., Hussain, T., Burnham, C.A., Dantas, G. (2024, 05). *Investigating Taxonomic Relationships Between Candida Fungal Isolate Species Using Intronic Transcribed Spacer (ITS) Regions*. Poster session presented at the Undergraduate Research Symposium, Washington University in St.

Louis Office of Undergraduate Research, St. Louis, MO

SKILLS

Computational: Python, Jupyter Notebooks, Rstudio protocols (taxonomic and statistical analysis), BASH, BLAST, Microsoft Office Suite, Cyberduck**,** ArcGIS software.

Laboratory: General experimental techniques in microbiology and mycology, high-throughput DNA sample preparation, PCR amplification, precision DNA quantification (QuBit, Picogreen), ITS sequencing library preparation, molecular cloning, gene editing (CRISPR/Cas9), fly rearing, microscopy, animal anesthetization, blood sampling, fecal sampling.

Field: clinometer, compasses, range finder, densitometer, DBH measurements, kestrels, night-vision goggles, USDA photo loading technique, plant identification using dichotomous key, tree insect/pathogen identification, identify animals by sight/sound, Fieldmaps, Survey123, Avenza, GPS units, operating 4WD trucks on paved and unpaved roads, Fist Aid CPR & AED certified, fisheries related research projects (building video weirs, monitoring data from pit-tag sites, etc.), deploying and analzyzing trail camera footage, deploying and analyzing owl calls from acoustic recording units (ARUs).