Rachel Deahl

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EDUCATION

M.S.	New Jersey Institute of Technology	May 2024

Biology, Concentration in Ecology & Evolution
Thesis: Automated Insect Classification Using Infrared Remote Sensing
Advisor: Dr. Gareth Russell

B.A.	New Jersey Institute of Technology	May 2022

Biology, Concentration in Ecology & Evolution
Minor in Environmental Studies & Sustainability

RESEARCH EXPERIENCE

Master's Thesis   September 2022 - Present
NJIT Urban Ecology Lab; Newark, NJ
Thesis: Automated Insect Classification Using Infrared Remote Sensing
Advisor: Dr. Gareth Russell

- Maintained equipment, data capture, and data processing
- Deployed the recorder in the field and maintained data capture
- Performed data preparation and processing through a low-pass filter and applying a DFT
- Managed machine learning tasks and handled a large volume of data (2,481 csv files)
- Developing classification models and evaluation metrics
- Gathering empirical wingbeat frequency data to create a distribution map
- Compiling agricultural and conservation impacts of insect demographics
- Review paper on monitoring devices' ecological applications in progress

NAGT-USGS CSFP Intern   June 2022 – August 2022
USGS Southwest Biological Science Center; Flagstaff, AZ
Advisor: Anya Metcalfe

- Utilized a microscope to process and identify benthic and drift samples of larval aquatic insects
- Operated a digital camera in tandem with the microscope to take macrophotographs of the specimens
- Assisted in benthic and drift samples of aquatic insects in Bright Angel Creek
- Performed data analysis on the Grand Canyon food web using excel and R
- Collected bat call data using Wildlife Acoustics Echo Meter Touch 2 and the Song Meter SM4BAT FS Ultrasonic Recorder; processed and analyzed data using Kaleidoscope and R
- Provided database maintenance as well as entry and analysis of fish tagging data

Undergraduate Research Assistant   October 2021 – May 2022
NJIT Urban Ecology Lab; Newark, NJ
- Served as team lead for Campus Survey project, where I assisted in the development of the protocol for field collection
- Collected and cataloged observations of plant life on campus, including photographs, geographic, taxonomic, and physical data
- Engaged in mentorship activities with the younger members of the lab

FELLOWSHIPS, AWARDS, AND HONORS

- *GirlHacks Hackathon, 3rd Place, 2023*
    - Project: FieldTracker, a digital companion for scientific documentation with geolocation functionality to store notes, media and audio clips within a secure database. Our mobile application front end was prototyped using Figma. We utilized Streamlit to create a functional frontend for our demo, and MongoDB for a backend.
- *NJIT Faculty Scholarship, 2017-2021*
- *LRIG John Morin Scholarships for Exemplary Robotics Students, 2016*

OUTREACH

- Served as an educator for undergraduate outreach at NJIT's 2022 and 2023 Bioblitz and NJIT Green's Earth Day Celebration in 2022 and 2023 with the Urban Ecology Lab
- Served as the lead USGS scientist during the June 2022 Grand Canyon Youth San Juan River Expedition
    - Taught youth attendees about using ultrasonic recorders to catalog and identify bat calls for population demographics and about the use of light traps to gather aquatic insect population data

LEADERSHIP

President   January 2022 – May 2022
Sigma Psi Kappa Sorority Inc.

Vice President   January 2020 – December 2021
Sigma Psi Kappa Sorority Inc.

Mentor   June 2017 – September 2020
High School Robotics Team of Central Jersey

RELEVENT COURSEWORK

Undergraduate: Database System Design & Management, Ecological Field Methods, Conservation Biology, Computer Organization & Architecture, Environmental Biology, Plant Kingdom, Microbiology, Mammalian Physiology, Genetics, Organic Chemistry I & II, Molecular Biology

Graduate: Biostatistics, Biological Applications of GIS, Machine Listening, Data Analytics Using R, Approaches to Quantitative Analysis in the Life Sciences

TECHNICAL & LAB SKILLS

Programming Languages: R, Python, MATLAB, Microsoft Access, SQL, Java, HTML, CSS,

Packages: SciPy, NumPy, Pandas, Matplotlib, scikit-learn, TensorFlow, PyTorch, seaborn, librosa, mir_eval, Dplyr, Ggplot2, RandomForest, caret, shiny, sparklyr

Software: ArcGIS, Kaleidoscope, Streamlit, MongoDB, Figma, Raspberry Pi OS

Lab Skills: Pit-tagging, light traps, ultrasonic recorders, microscopy, deploying scientific equipment

REFERENCES

Eric, Fortune, PhD
Associate Professor, Biological Sciences
New Jersey Institute of Technology
eric.s.fortune@njit.edu

Gareth, Russell, PhD
Associate Professor, Biological Sciences
Associate Chair and Undergraduate Director, Biological Sciences
New Jersey Institute of Technology
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