SOPHIE KEARNEY

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EDUCATION

Baylor University, Waco TX Aug 2020 - May 2024
B.S. Science Research Fellows conc. Bioinformatics
Minors in Biology, Math, and Computer Science
Overall GPA: 4.0
Relevant Coursework: Genetics, Genomics and Bioinformatics, Introduction to Computational Biology (Python), Molecular Genetics and Genomics, Introduction to Computer Science I & II (C++), Introduction to Data Science (R), Data Structures (C++), Computational Methods in Statistics (R), Database Design & Application (SQL and Python), Algorithms (C++), Probability and Statistics, Neurobiology of Aging, Introduction to Data Mining (Python)

HONORS

Dean's List for all semesters
Ampersand Society
Alpha Lambda Delta Honor Society
Provost's Scholars
Intel International Science and Engineering Fair 2019 3rd Place in Microbiology

PRESENTATIONS AND PUBLICATIONS

Harvard AMR-Educate Workshop Poster Session July 2023
"ROMAR (Regimen Optimizer to Minimize Antibiotic Resistance): A Web Based Antibiotic Stewardship Platform"
Harvard Phase for Life Quantitative Microscopy Conference Poster Aug 2023
"Quantifying NDMA-Induced DNA Damage and Cell Proliferation using a Machine Learning-Based ImageJ Plugin"
BMC Research Notes Publication Sept 2023
"AON: A service to augment Alliance Genome Resource data with additional species"

RESEARCH EXPERIENCE

Baylor University Undergraduate Researcher Jan 2021 - Present
Advisor: Dr. Erich Baker *Waco,TX*

- Expanded access to cross-species genomic data with an application user interface (API) that removes user burden of data processing, defining orthologous relationships, and integrating new species data.
- Investigated the genetic link between humans and mice for Alzheimer's Disease, identifying related mouse variants from a list of human variants using genomic graph data.
- Functional enrichment tests revealed shared biological pathways mirroring the phenotypic expression of Alzheimer's, with graph embedding techniques used to rank the resulting variants based on their topological and phenotypic relation to human variants.

Harvard Systems Biology Summer Internship June 2023 - Aug 2023
Advisor: Dr. Dushan Wadduwage *Boston, MA*

- Deep learning techniques were utilized to automate nuclei segmentation of immunofluorescent stained mouse liver cell images exposed to NDMA, a carcinogen, with the Wadduwage lab's innovative approach employing a convolutional neural network and semi-supervised learning algorithm for high-throughput analysis of time-course data.

- Implemented this pipeline into an ImageJ plugin that expands the nuclei segmentation algorithm's functionality to offer customization options and provide insightful visualizations, including dimensionality reduction to understand morphological similarities in classifications of nuclei response.

Rural Health Equity Research Collaborative Statistician Aug 2022 - Present

- 4-week educational intervention for 5th-8th grade students living on the border between Texas and Mexico was conducted to introduce students to healthcare careers.
- Performed statistical analysis on the pre-intervention and post-intervention survey data to determine significant shifts in attitudes towards healthcare careers. Visualized the data to interpret patterns and correlations.

Regeneron Bioinformatics Intern June 2022-Aug 2022
Upstream Quality Control *Rensselaer, NY*

- Automated data parsing, wrangling, visualization, and modeling to investigate the Proven Acceptable Range for quality control variables in the manufacturing process of drugs in production using Python.
- The software provided a standardized methodology for data processing and significantly reduced the amount of time spent analyzing data.

MOWaTER Data Science Fellows Program June 2021-July 2021

- Analyzed data to increase the cost-efficiency of a wastewater treatment facility's disinfection process by improving the accuracy of response variables to Peracetic Acid dosing.
- Published a Shiny app with a broad range of data manipulations to visualize correlations.
- Created empirical models in R to accurately predict response variables measuring disinfection and created transformations to the mechanistic model to test for improved precision.

LEADERSHIP

Co-President of Students for Environmental and Wildlife Protection Jan 2022 - Present

- Planned appearances at conferences and other local events. Organized service activities for members such as weekly river trash pickups and serving at a local hydroponic community garden. Delegated tasks within the executive board of the student organization.

Research Director of March for Science March 2021 - May 2023

- Launched a student-driven research program, the Waco Water Quality Project, to allow undergraduates without previous research experience to participate in wet and dry lab research. Lead students in collecting water samples at the local wetlands, chemically processing the samples in a lab, and performing statistical analysis and data exploration using R to understand how climate change has affected local water resources over the past 20 years.

Volunteer Science Teacher for CWJC December 2020 - Present

- Designed a curriculum for the science portion of the GED exam specifically targeting women who have recently been released from prison and did not graduate high school. Held weekly classes and extra tutoring sessions to provide students with the necessary tools and knowledge to obtain a GED and enter the workforce.

TECHNICAL STRENGTHS

Python: 6 years of experience. Proficient in building APIs, websites, and GUIs. Experience using Flask, SQLAlchemy, PySimpleGUI, pandas, Tensorflow, SciKitLearn, Numpy, etc.
R: 3 years of experience. Proficient in data parsing, visualization, and statistical analysis. Experience using ggplot2 and Shiny.
C++: 3 years of experience. Proficient in problem-solving, data structures, and algorithms
HTML, CSS, Java, Celery, Neo4j, SQL, Unix, and Linux scripting