Jennifer Dawkins

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EDUCATION

Massachusetts Institute of Technology, Boston, MA
- *PhD in Medical Engineering and Medical Physics through the Harvard-MIT Program in Health Science Technology, awarded May 2024*
- Dissertation: *Computational prediction of health status from the human gut microbiome and metabolome*
- Relevant courses: Algorithms for Inference, Statistics for Scientists & Engineers, Biomedical Signal and Image processing, Numerical Computing in Julia

University of California in San Diego, San Diego, CA
- *Graduate studies in Bioengineering*
- Relevant courses: Probabilistic Reasoning and Decision making, Machine Learning, Image recognition, Neural Networks for Pattern Recognition, Robot Reinforcement Learning

Rice University, Houston, TX
- *Bachelor of Science in Bioengineering awarded May 2017, 4.03 GPA (4.0 Scale)*
- Honors: Magna Cum Laude, Distinction in Research and Creative Works

RESEARCH EXPERIENCE

Gerber Lab
Graduate Research Assistant, May 2019 – May 2024; *Post Doctoral Researcher*, May 2024 – December 2024
- Used statistical and machine learning techniques to uncover predictive biomarkers of a gut bacterial infection (*Clostridioides difficile* infection) in humans from a multi-modal, longitudinal study
- Built a novel machine learning method that predicts a host outcome from multimodal measurements of the gut microbiome while maintaining interpretability
- Gained experience in synthetic and semi-synthetic data generation, nested cross-fold validation, Bayesian modeling and statistics, and implementing supervised and un-supervised machine learning methods in Python

Center for Microbiome Informatics and Therapeutics & HST
Member of Graduate Research Team, September 2019 – April 2023
- Conducted a study investigating the effects of clothing breathability on the vaginal microbiome through the CMIT-HST Clinical Study Award

Martinos Center Quantitative Translational Imaging in Medicine
Graduate Research Assistant, January 2019 – Feb 2019
- Evaluated saliency methods for deep learning on medical imaging data

MIT Biomechatronics Lab
Graduate Research Assistant, September 2018 – January 2019
- Used machine learning and deep learning for predicting terrain from accelerometer signals

MIT Human Systems Lab
Graduate Research Assistant, June 2018 – September 2018
- Determined subject-specific spinal loading from back profile images using OpenSim and MATLAB

University of California, San Diego
Contijoch Lab Research Assistant, January 2018 – March 2018
- Trained method of automatic segmentation of cardiac CT using U-Net Neural Networks

Modulated Imaging
Research Scientist, July 2017 – December 2017
- Used data and image analysis techniques to assess ulcerative risk in diabetic patients through correlating images of sub-dermal oxygenation with risk categories

Rice University Biosciences Research Collaborative
Qutub Systems Lab Research Assistant, May 2015 – July 2017
- Created predictive model for progression of acute myeloid leukemia (AML) through data analysis in *R*
- Conducted study to assess differences in how physicians and mathematical models make patient predictions

Rice University Senior Design Project
Team Member, August 2016 – May 2017
- Created sensor to continuously monitor breath sounds of neonatal infants on breathing support to alert when adequate support is not being provided

Wake Forest Center for Injury Biomechanics
Summer Research Intern, May 2016-August 2016
- Used feature extraction and data analysis to correlate rib cortical thicknesses to varying patient demographics

LEADERSHIP/ MENTORSHIP EXPERIENCE

Health Sciences and Technology Joint Council
Social events chair, October 2018 – October 2019
- Organized events for current and incoming MD, PhD, and MD/PhD students

Organic Chemistry Teaching Assistant (UCSD)
Graduate TA, September 2017 – June 2018
- Held review sessions for undergraduate students in organic chemistry, and created and graded quizzes

Jacobs Undergraduate Mentoring Program (UCSD)
Mentor, September 2017 – June 2018
- Graduate mentor to a group of undergraduate Bioengineering students

Rice University Academic Fellows
Chair of Head Fellow Council, Spring 2016 – Spring 2017
Head Fellow, Spring 2015 – Spring 2016
- Led and organized academic enrichment services for students campus-wide
- Provided tutoring and academic assistance in Organic Chemistry I and II

Rice University Orientation Week Advisor
Group leader, 2015 & 2016
- Mentored a group of freshmen during orientation and throughout their first year at Rice

Rice Empower
Member, Fall 2013 – Spring 2014, Fall 2015-Spring 2016
- Traveled to local high schools to do science experiments with students to encourage interest in STEM fields

SKILLS

- Python (incl. PyTorch, NumPy, Pandas, Scikit-Learn, SciPy), MATLAB, R, AutoCAD, Adobe Illustrator,

HONORS & FELLOWSHIPS

- Ralph G. and Claire Brindis Family Fellowship (2021)
- CMIT-HST Clinical Study Award (2019)
- National Science Foundation Graduate Research Fellowship Program (NSF-GRFP) (2017)
- Rice University President's Honor Roll (2017)
- Louis J. Walsh Scholarship in Engineering (2017)

SELECTED PRESENTATIONS

- Predicting host status from gut metabolites and microbial abundances. *EMBO | EMBL Symposium: The human microbiome.* Heidelberg, Germany (Poster, 2023); *MIT Microbiome Symposium.* Cambridge, MA (Poster, 2023)
- Predicting *Clostridioides difficile* recurrence from high dimensional microbiome data. *Women in Data Science.* Cambridge, MA (Poster & Flash talk, 2022)

PUBLICATIONS

- **Dawkins J**, Allegretti J, Gibson T, McClure E, Delaney M, Bry L, Gerber GK. Gut metabolites predict Clostridioides difficile recurrence. Microbiome. 10(1):87 (2022): doi: 10.1186/s40168-022-01284-1. PMID: 35681218; PMCID: PMC9178838.
- **Dawkins J**, Gerber GK. MMETHANE: predicting host status from microbial composition and metabolomics data with interpretable AI. [In Submission]. doi: https://doi.org/10.1101/2024.12.13.628441