Eeman Abbasi

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Education

University of Pennsylvania **expected Nov 2024**
Ph.D. Candidate, Biological Sciences, GPA: 3.98 *Philadelphia, PA*

Mount Holyoke College **Sep 2015 – May 2019**
B.A.,magna cum laude, Computer Science and Biology, GPA: 3.90 *South Hadley, MA*

Recipient of DAAD Rise Fellowship

Research Experience

Data Science Intern | Concerto Biosciences **April 2024 - Present**

- Analyzed **fluorescence-tagged image-based** datasets to uncover biological signatures and assess microbial synergy through **Python**-based data analysis, leveraged **AWS** for data processing and storage.
- Conducted **bioinformatic analysis** on **WGS** and **16s** microbial data, and identified key microbial candidate combinations for disease indications. Analyses contributed to product development initiatives, and presented key insights to company leadership.
- Collaborated with the Senior Data Scientist and the experimental discovery team to enhance data filtering methods and develop new **machine learning** approaches for optimizing the data discovery process.

Ph.D. Candidate, Akçay Lab | UPenn **Sep 2019 – Present**

- Developed mathematical models and applied statistical techniques to investigate microbial interactions and the role of the immune response in shaping the microbiome. Key research contributions include:
  - Microbiome-Immune ODE Model: Developed an ODE model in **Python** to simulate within-microbiome interactions and the impact of the host immune response. Insights from this work were selected for presentation at the Young AMICI Symposium.
  - Multi-omics Analysis of Cancer Microbiome Data: Applied advanced statistical techniques and bioinformatics tools in **Python** and **R** for **predictive modeling**, and **metabolic modeling**. Utilized large scale **TCGA** cancer microbiome datasets (both **16S** and **WGS**) and immune **RNA-seq** expression data to explore the impact of microbial features on patient outcomes. Identified microbial richness and abundance as significant predictors of patient survival and prognosis.
  - Agent-Based Simulation of Microbiome Exchange across social networks: Developed a **Python-based agent-based model** simulating microbiome exchanges between individuals in environments with varying pathogen pressures. This model examined how social interactions and pathogen exposure influence microbiome composition and social network modularity.

Research Intern | NIMBioS **May 2018 - Dec 2020**

- Developed a **discrete time population dynamics model** in **R** for simulating plant-seed disperser dynamics in hunting and harvesting regimes
- Performed sensitivity analysis using real-world parameter ranges to identify the most critical parameter of plant and seed disperser growth for targeted conservation efforts
- Collaborated and co-authored a publication with five researchers and presented findings to over 150 attendees at the Doctoral Consortium on Computational Sustainability

Women Summit Fellow, Data Science for all | Correlation One **Aug 2020 - Oct 2020**

- Partnered with four women summit fellows to quantify the impact of public sentiment in New York and California on COVID-19 case counts and mobility patterns

Leadership, and Community Engagement

Probono Consultant, Penn Biotech Group Healthcare Consulting | Wharton **Aug 2022 – May 2024**

- Collaborated with a team of nine professionals to perform market analysis and recommend 100+ potential clients to a health-tech company. Conducted patient journey analysis for a gene therapy client to identify treatment experiences
- Collaborated with a team of four professionals as part of the mini capstone MBA project to conduct epidemiology analysis , asset evaluation, and an overview of the competitive landscape, to evaluate the potential acquisition of a biotech company.

Career and Wellness Coordinator, Biology Graduate Group | UPenn **Aug 2022 - May 2023**

- Planned and executed a department-wide career seminar series and two wellness workshops, catering to more than 25 individuals in the biology graduate community

Graduate Resident Advisor | UPenn **Aug 2022 - Present**

- Led emergency responses and provided support to 24 students. Coordinated a social programming committee for the entire hall and executed 12 successful events for 500 house residents

Teaching Assistant | UPenn **Aug 2020 - May 2023**

- Designed and implemented course curriculum and provided mentorship for six core courses in ecology, environmental science, and evolution. Led weekly recitation sessions, and taught microbial ecology as a guest speaker

Additional Information

Languages and Frameworks: Java, Julia, Python (including packages such as pandas, numpy, scipy, biopython, scikit-learn, statsmodels, matplotlib, seaborn, plotly, scikit-bio, and scikit-learn), R, Unix, Linux, AWS, Slurm Scheduler

Interests: Running, hiking, zumba, and interested in increasing participation and retention in Environmental Data Science community

Publications

- **Abbasi, E.**, Akcay, E. Host control and species interactions jointly determine microbiome community structure. (2024) . *Theoretical Population Biology*, https://doi.org/10.1016/j.tpb.2024.06.006
- **Abbasi, E.**, The Role of Competition and Mutualism in Microbiome and Host Immune Interactions.(2024) Manuscript in prep.
- **Abbasi, E.**, The Impact of Social Microbial Transmission on Host Immunity and Network Structure. (2024) Manuscript in prep.
- Fong, C., Galaz, C., **Abbasi, E.**, Gubbins, N., and Jouzi, Z. Broadening participation in environmental data science: insights from practitioners. (2024). *Environmental Data Science*, Accepted, waiting to be published
- Kevin De Angeli, **Eeman Abbasi**, Alan Gan, Daniel J. Ingram, Xingli Giam, Charlotte H. Chang. (2021). Modeling the impact of wild harvest on plant–disperser mutualisms: Plant and disperser co-harvest model. *Ecological Modelling*, 439. https://doi.org/10.1016/j.ecolmodel.2020.109328