

Harnessing Foundation and Generative Models to Accelerate Biomedical Research

Speaker: **Sazan Mahbub**

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Sazan Mahbub is currently a Computational Biology PhD student in the School of Computer Science at Carnegie Mellon University. He is advised by Prof. Eric P. Xing and works in the CMU SAILING Lab (Statistical Artificial Intelligence & Integrative Genomics Lab). Additionally, he is working as an AI Research Scientist Intern at GenBio-AI. His primary research focus is on developing novel generative and foundation models for life sciences research and adapting these models for real-world clinical applications.

Sazan completed his MS in Computer Science at the University of Maryland at College Park, in July 2023. He earned a B.Sc. degree in Computer Science and Engineering from Bangladesh University of Engineering and Technology in February 2021. His overarching

research goal is to develop novel AI systems that accelerate scientific research and knowledge discovery, particularly in the biomedical and healthcare domains. Since early 2018, Sazan has been tackling related research problems and has published 15 papers to date. His work has appeared in prestigious venues, including RECOMB, Bioinformatics (OUP), Briefings in Bioinformatics (OUP), Journal of Computational Biology, NeurIPS workshops, and Journal of Information and Software Technology. Sazan has been contributing to the research community by reviewing research articles for NeurIPS workshops and the ICML conference. He also served as a junior chair for a research roundtable at the 2024 ML4H symposium. Additionally, he is a member of the CMU AI Mentoring Program, where he serves as a mentor. More details about him can be found at: <https://sites.google.com/view/smahbub>.

Abstract

The rapid advancements in artificial intelligence are transforming biomedical research by enabling unprecedented insights and innovations. Traditional wet-lab methods, while essential, are often slow and costly, necessitating more efficient approaches. Foundation models and generative models have emerged as transformative tools to address these challenges and drive progress across various areas of biomedicine. Unlike task-specific models, which depend heavily on labeled datasets and have limited versatility, foundation models leverage vast amounts of unlabeled data to learn domain-specific priors, enabling them to tackle a range of biological tasks. Generative models, on the other hand, excel at creating novel data and simulations, facilitating breakthroughs in areas such as drug discovery, synthetic biology, and disease modeling. These approaches enable efficient in-silico hypothesis testing, reducing the search space for costly and time-intensive experiments while supporting tasks like designing new biomolecules, simulating cellular dynamics, and predicting molecular interactions. This seminar will explore how we can potentially harness foundation and generative models to accelerate biomedical research, address key challenges, and unlock new opportunities to advance human health.

When: Saturday, January 25, 2025 (2:30 PM - 3:30 PM)

Where: Hybrid Mode

Graduate Seminar Room (ECE 503), Department of CSE

Zoom Meeting

Meeting ID: 917 4209 8305

Password: 519910

Link: <https://bdren.zoom.us/j/91742098305?pwd=bC9vUGhpZ3ZuYnVGOGRPUFFQdThiZz09>

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