

BME Seminar

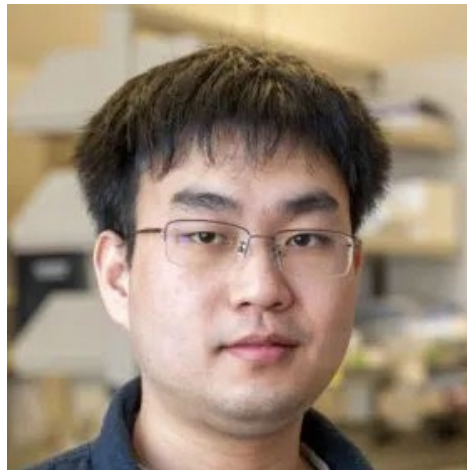
**Monday, March 9, 2026
2:00 – 3:00 pm, MJIS 2001
Microsoft Teams meeting**

Join: <https://teams.microsoft.com/join/29576486050725?p=8x7wzEiwd7p8GmY4WA>

Meeting ID: 295 764 860 507 25

Passcode: XW9iM6sh

“Generative AI for 3D Reconstruction in Cryo-Electron Microscopy”



Yilai Li, PhD

Research Scientist, ByteDance Seed, AI-for-Science

Abstract: Single-particle cryo-electron microscopy (cryo-EM) determines 3D biomolecular structure by computationally reconstructing it from extremely noisy experimental 2D projections of individual particles with unknown orientations. In real datasets, reconstructions are often limited by dataset-specific corruptions such as anisotropy from uneven viewing angles or spatially varying signal-to-noise ratios; more fundamentally, cryo-EM 3D reconstruction is an ill-posed inverse problem that benefits from informative priors. In this talk, I will introduce cryoFM, a generative foundation model trained on large collections of experimental electron density maps, and serves as a Bayesian prior for cryo-EM 3D reconstruction. By pairing this learned prior with different explicit measurement models, we use posterior sampling to address a range of reconstruction and map-improvement tasks. I will highlight representative examples where our approach improves cryo-EM 3D reconstruction under challenging conditions, and conclude with broader directions for extending generative priors and inference beyond the current reconstruction setting.

Bio: Dr. Yilai Li is a Research Scientist at ByteDance Seed developing AI/ML methods for cryo-electron microscopy (cryo-EM) reconstruction. He received his Ph.D. in Biophysics and completed postdoctoral training at the University of Michigan, where he worked on computational and automated methods for cryo-EM data acquisition and processing. His research focuses on combining modern AI with principled modeling to make cryo-EM analysis more accurate, robust, and accessible.