Department of Biomedical Informatics
School of Medicine and College of Engineering and Applied Sciences

SPECIAL SEMINAR

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Wake Forest University, Winston-Salem, NC

Bridging Biological Modeling with Machine Learning for Alzheimer's Disease Discovery

Wednesday, May 8, 2024
1:00 pm – 2:00 pm

Location: In Person Mart Building, Level 7M-0602
Join Zoom Meeting:

https://stonybrook.zoom.us/j/97193918205?pwd=b1JyS0RSY25xSy8xTFRrQjdoYW0rdz09

Meeting ID: 971 9391 8205   **Passcode: 180082**

Abstract: Machine learning has achieved unprecedented success due to its effectiveness in handling complex data, but its black-box nature ignores fundamental laws in science and often results in ill-posed and uninterpretable solutions. On the contrary, traditional biological modeling is constructed on fundamental theories and accumulated knowledge to explain the observation, but it relies on strong assumptions and hypotheses and suffers from massive design spaces in the absence of definitive evidence. This talk illustrates how the two approaches can complement and benefit from each other to overcome their inherent limitations and address the computational challenges in bio data analysis. We introduce a neural operator that enhances the robustness and interpretability of predictions for biological system dynamics. Additionally, we propose a model-guided deep learning approach for Alzheimer's disease to identify underlying mechanisms and improve human cognitive health. The talk will conclude with an overview of future research directions.

Bio: Dr. Minghan Chen is an assistant professor in the Computer Science Department at Wake Forest University. She received her Ph.D. degree in computer science from Virginia Tech in 2019. Her research focuses on science-guided machine learning, computational systems biology, and various biomedical applications. Dr. Chen is a recipient of the NSF CAREER award. She has a successful track record of mentoring undergraduate and graduate students and has published many articles in prestigious journals.