Data Science Seminar

Hosted by Department of Mathematical Sciences

- Date: Tuesday, November 2, 2021
- Time: 12:00pm – 1:00pm
- Room: Zoom
- Speaker: Dr, Yuanjia Wang (Columbia University)
- Title: Machine Learning Approaches for Optimizing Treatment Strategies for Mental Disorders

Abstract

Among currently available pharmacological and behavioral interventions for mental disorders, no single therapy is universally effective. Moreover, treatment responses are far from adequate across mental disorders. As such, there is an urgent need to optimize treatment responses. Various factors appear to be associated with positive treatment responses, thus providing evidence for improving response rate by incorporating patient-specific characteristics in treatment decisions in an effort to achieve precision psychiatry. However, individualized treatment decision-making for mental disorders faces challenges of extensive diagnostic heterogeneity, substantial between-patient variation in biological and clinical disease manifestation, and mismatch between diagnostic categorization and the underlying pathophysiology. We propose novel machine learning methods to address emerging challenges through probabilistic generative models and neural networks. We discuss several studies to discover reliable individualized treatment strategies that factor in a patient's clinical, psychosocial, and biological markers and integrate evidence from multi-domain data sources and multiple studies to increase generalizability and reproducibility.

Biography of the speaker: Dr. Wang is a Professor in the Department of Biostatistics and Department of Psychiatry at Columbia University, and a core member of the Division of Biostatistics at New York State Psychiatry Institute. Dr. Wang works on developing data-driven approaches to optimize treatment strategies and explore relationships between biomarkers, clinical markers, and health outcomes to assist discoveries in disease etiology and increase diagnostic capabilities of psychiatric and neurological diseases. Her methodological interests include statistical learning, analytics for precision medicine, network analysis, and novel design and analysis of clinical trials. Her substantive research area of interest includes psychiatric disorders and neurological disorders.