Data Integration and Artificial Intelligence in Precision Medicine

Abstract: Data integration and artificial intelligence (AI) are playing increasingly important roles in biomedical research. In this talk, I will present several studies that were designed to identify and validate clinically useful markers for prognosis and response to treatment in lung cancer patients, as a demonstration of how to use data integration and AI to facilitate biomedical research. We first used a systems biology approach to identify an 18-hub-gene signature that can robustly predict the prognosis of patients with early stage adenocarcinoma of the lung. Next, we integrated these hub genes with other types of data to derive a 12-gene set that is predictive for survival benefit with ACT with these datasets. Furthermore, we developed a clinical-grade assay for formalin-fixed paraffin-embedded samples and validated this predictive marker prospectively. We also developed AI models to analyze digital pathological image data and incorporate clinical and routine lab tests to predict outcomes for lung cancer and pediatric cancer. In this talk, I will also present our data integration infrastructure to support such research.

Short bio:

Education
Ph.D., Biostatistics, University of Minnesota, 2006, M.S., Biostatistics, University of Minnesota, 2003
M.S., Epidemiology, Chinese Academy of Medical Sciences & Peking Union Medical College, Beijing, China, 2000
M.D., Medicine, Peking University Health Science Center, Beijing, China, 1997

Research Interests
• Precision medicine in lung cancer
• Biomarker discovery and validation
• Genomic data analysis and data integration
• Predictive Modeling

Dr. Yang Xie is the founding director of the Quantitative Biomedical Research Center, Pediatric Cancer Data Core and the Harold C. Simmons Cancer Center Bioinformatics Shared Resources at UT Southwestern Medical Center. With training in biostatistics, medicine and epidemiology, Dr. Xie has an excellent understanding of translational research, developing predictive and prognostic biomarkers, and precision medicine. Her primary quantitative expertise is in integrated analysis of high-dimensional data, preprocessing and analysis of high-throughput data, prediction model building, and validation. She also has extensive experience with the design and analysis of clinical trials and epidemiological studies and the development and maintenance of comprehensive data commons. Dr. Xie is leading several large national/international research projects including one grant to use integrative approach to predict whether or not an individual lung cancer patient will benefit from adjuvant chemotherapy therapy.

Refreshments before the talk and socializing following the talk
https://www.uta.edu/math/events/seminars/