ISE Seminar Speaker Series
Dr. Dongping Du

Dr. Dongping Du is an Associate Professor in the Department of Industrial, Manufacturing and Systems Engineering at Texas Tech University. She received her Ph.D. in Industrial Engineering from the University of South Florida and her bachelor's and master's degrees in Electrical Engineering from the China University of Mining and Technology. Her research interests include applied statistics, AI/ML, risk assessment and survival analysis, modeling and simulation with their applications in health care and biopharmaceutical manufacturing. Her research program is supported by the National Science Foundation, Department of Energy, and Department of Defense.

Title: Clinical Data Analysis to Advance Cardiac Care

ABSTRACT

The electronic health record (EHR) provides a rich source of patient information and is increasingly utilized in cardiac care. Various longitudinally aggregated data within the EHR play a critical role in defining disease phenotypes, care signatures, and their association with clinical outcomes. However, EHR data has complex structures and contains extensive uncertainty due to data errors and missing values, which poses significant challenges in data analysis and data-driven decision-making. This talk will present a pipeline for EHR data analysis to address current challenges and showcase the use of advanced data analysis techniques in post-operative risk assessment and treatment outcome prediction for heart failure patients. It will cover a Gaussian process latent variable model-based approach for handling incomplete data, a neural network-based survival model for predicting adverse events after heart surgeries from highly imbalanced data, and a scalable Dirichlet process mixture survival model for risk prediction using large clinical datasets with complex data structures. The research creates new analytical methods that contribute to various aspects of cardiac care, thereby maximizing the benefits of data analysis to advance clinical outcomes for cardiac patients.

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