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**Date:** Friday, Feb. 13, 2026

**Time:** 1 - 1:50 pm

**Location:** SW 101

## *Optimization Models to Improve Resource Utilization and Access to Care in Healthcare*

**Abstract:** The talk addresses two important problems in healthcare: (i) patient scheduling under unexpected situations in existing schedules and random arrival of urgent requests to improve utilization of expensive resources for healthcare providers; (ii) dealing with lower patient volumes and low utilization of expensive resources required to provide care services in rural hospitals.

A stochastic integer programming (SIP) based aggregated online scheduling method is proposed to handle the patient scheduling problem. The method is illustrated using an outpatient clinic block-wise scheduling system which is under a hybrid scheduling policy combining regular far-in-advance policy and an open-access policy. The SIP model accommodates uncertainties in the system, such as no-shows, cancellations and punctuality of previously scheduled patients, as well as random arrival and preference of new patients. To solve the SIP model, the deterministic equivalent problem formulations are solved using a novel bound-based sampling method.

A data-driven optimization model is presented to explore collaboration options between groups of nearby rural hospitals to achieve higher utilization of expensive medical resources. Such options will enable rural hospitals to provide the most crucial, and popular, set of services which are based on their specific patient needs. This will potentially help preserve access to local care with shorter distances and reduced travel times for residents. The collaboration options from the model provide valuable insights for hospital administrators on the patient volume and variety of services (volume-variety mix) along with potential risk factors for hospitals, and develop strategies to foster collaboration opportunities and sharing of medical resources. Data used in the model is publicly available and reduces the burden on the hospitals on collecting and reporting additional data.

**Biography:** Dr. Amarnath Banerjee is a Professor in the Wm Michael Barnes '64 Department of Industrial and Systems Engineering at Texas A&M University. He currently serves as the Associate Department Head of Undergraduate Affairs and is the interim director of the TEES Institute for Manufacturing Systems. His research interests are in modeling, simulation and visualization techniques, and their applications in manufacturing, information, and health care systems. His research has been funded by several federal and state agencies as well as industry worth over \$13M. He has published over 100 papers in journals, book chapters and conference proceedings. He teaches courses in manufacturing and production systems design and control, facilities planning, health care systems, and simulation. Dr. Banerjee led the effort to create and launch the new B.S. Data Engineering program. He was recognized as a Fellow of the Institute of Industrial and Systems Engineers in 2022.