

Department of Electrical and Computer Engineering



TEXAS TECH UNIVERSITY

Edward E. Whitacre Jr.
College of Engineering

Spring 2026 Seminar Series

Seminar Title: *From Data to Better Models and from Models to Better Diagnostics*

Time: 2:00-2:50 PM, Monday, Mar 30, 2026

Location: ECE 101

Speaker:

Tanushree Roy

Department of Mechanical Engineering, TTU



Abstract:

Modern engineered systems are increasingly automated, interconnected, and complex, making them more vulnerable to anomalies arising from unforeseen degradation as well as disruption via adversarial actions. This talk explores two complementary directions in diagnosing these anomalies: building better models from data and harnessing those models to enable more powerful and reliable diagnostics. Building such models is particularly challenging in practice due to implementation constraints, limited availability of high-quality data, and, more fundamentally, limited sensing from systems. Although diagnostic algorithms inherit these challenges, it also introduces a distinct set of difficulties of their own. Conventional diagnostic methods often rely on the magnitude of the discrepancies between system measurements and model predictions to make diagnostic decisions. As a result, they can miss richer patterns in these discrepancies, which can delay anomaly detection. Furthermore, within the framework of these standard techniques, anomaly classification is inherently ill-posed and requires sensor redundancies. In this talk, I will show how Koopman operator theory can be integrated with advanced machine learning models to provide faster detection with analytical guarantees.

Speaker Bio:

Tanushree Roy, PhD, is an Assistant Professor in the Department of Mechanical Engineering at Texas Tech University. She completed her PhD in Mechanical Engineering from The Pennsylvania State University in 2022. She also received her master's degree in mathematics from the University of Central Florida in 2015. During the period of 2011-'13, she worked as a research consultant for the Indian Institute of Technology, Kharagpur, in collaboration with Texas Instruments. Her current research interests include control theory, system diagnostics, and data-driven learning with applications to transportation and energy.



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