Department of Electrical and Computer Engineering

TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr.
College *of* Engineering™

Spring 2026 Seminar Series

Seminar Title: ***New Tools from Old Ideas: Input-Output Theory for Robust Networked and Learning-Based Control***

Time: 2:00-2:50 PM, Monday, Feb 2, 2026
Location: ECE 101

Speaker:
Leila Bridgeman
Duke University

Abstract:
The advent of 'big data' and learning-based methods that train neural network controllers have brought leaps in performance in many areas. However, there's still much to be gained from diving into the classic literature – even when confronting modern problems in control. This talk will explore three instances of this: how a shift in perspective turns traditional robust control theory into an ideal framework for distributed control for large networks of interacting agents; how insights from finite element methods can provide new tools for stable, data-driven control of nonlinear systems; and how quadtree data structures enable model-free, deterministic safety assurances… even without constructing a barrier function!

Speaker Bio:
Leila Bridgeman is an assistant professor of Mechanical Engineering and Materials Science at Duke University. She earned B.Sc. and M.Sc. degrees in Applied Mathematics in 2008 and 2010 from McGill University, Montreal, QC, Canada, where she completed her Ph.D. in Mechanical Engineering, earning McGill's 2016 D.W. Ambridge Prize for outstanding dissertation in the physical sciences and engineering. She was a recipient of a 2023 ONR Young Investigator Prize. Through her research, Leila strives to bridge the gap between theoretical results in robust and optimal control and their use in practice. She explores how the tools of numerical analysis, input-output stability theory, and set invariance can be applied through practical, computationally-tractable algorithms. Resulting publications have considered applications of this work to robotic, process control, and time-delay systems and the development of autonomous ultrasound and laser actuated robotics.