

Department of Electrical and Computer Engineering



TEXAS TECH UNIVERSITY

Edward E. Whitacre Jr.
College of Engineering

Fall 2026 Seminar Series

Seminar Title: *Simulations - Approaches, best practices, examples*

Time: 2:00-2:50 PM, Monday, Oct 5, 2026

Location: ECE 101

Speaker:

Mary C. Baker, Ph.D., P.E., is a Professor of Electrical and Computer Engineering at Texas Tech University

Abstract:

What and why we want to simulate (economics/cost benefit, analytically difficult or unsolvable problems), software tools we have available (matlab, simulink, and ANSYS) and some that I wish we had available (COMSOL, CST), strengths and weaknesses of different tools. What multiphysics and multiscale models bring to the table, which ones are integrating AI tools, the role of physics informed neural networks, and, machine learning approaches to simulation and optimization.

Speaker Bio:

Mary C. Baker, Ph.D., P.E., is a Professor of Electrical and Computer Engineering at Texas Tech University, where she has served on the faculty since 1989. She earned her doctorate in Electrical Engineering from the University of Texas at Arlington and her bachelor's and master's degrees in Engineering Physics and Applied Physics from Texas Tech. Her research spans biomedical signal processing, neuroimaging, cognition, and computational modeling, building on an early career in pulsed power and plasma physics.

Dr. Baker's interdisciplinary research applies engineering methods to understanding brain function and interpreting complex physiological measurements. Her publications include studies of EEG patterns in mild cognitive impairment, EEG microstates in autism, and functional MRI investigations of attention and sensory processing. This work connects signal analysis and mathematical modeling with questions in neuroscience and human cognition. Her recent research includes analytical and numerical head models, EEG source localization, synthetic datasets for evaluating machine-learning methods, and physics-informed approaches to inverse problems. She also investigates electromagnetic energy absorption and the resulting thermal and acoustic responses in biological tissue through multiphysics simulation.

Alongside her research, Dr. Baker teaches courses in electromagnetics, circuit analysis, biomedical signal processing, bioelectrics, and engineering modeling and simulation. Her teaching emphasizes connecting physical principles with computational tools and critically

evaluating model assumptions and results. She has received several teaching and research honors, including the Halliburton Award for Teaching and Research and the Butler Award for Excellence in Teaching.