

Department of Electrical and Computer Engineering



TEXAS TECH UNIVERSITY

Edward E. Whitacre Jr.
College of Engineering

Spring 2026 Seminar Series

Seminar Title: *Molecular Dynamics, Material Point Method, and Electromagnetism: A Journey Tied Together with Tensors*

Time: 2:00-2:50 PM, Monday, Feb 23, 2026

Location: ECE 101

Speaker:

Michael W. Roth

University of Illinois Springfield

Abstract:

Join the speaker as results from two distinctly different numerical techniques, Molecular Dynamics and the Material Point Method are discussed, and how they are connected through the elegance and power of tensors. The presentation starts with phase transitions of alkanes deposited on a graphite substrate and the mesophases they exhibit, followed by the dynamics and behavior of selected graphitic systems. Then the presentation moves to the framework and results of Material Point Method simulations of grazing impacts and antipodal events on Mars. Finally, tensors are discussed, including ones used in the simulations as well as for electromagnetism, including their utility and the deep physical insight they provide.

Speaker Bio:

Dr. Michael Roth earned a B.S. in Physics with minors in Mathematics and Chemistry in 1986 and a Ph.D. in Physics in 1992, both from Colorado State University. He has held faculty positions in Colorado, New Mexico, Texas and Iowa from 1990-2012 and administrative positions in Kentucky, Iowa, Colorado and Illinois from 2014-present, with software engineering position from 2012-2014. He enjoys team building, working with people, navigating difficult conversations, teaching, and research. He remains research-active and has involved a large and diverse group of students and collaborators in his computational physics modeling and simulation-based research program. He also collects old family vehicles, antique science books, and antique laboratory equipment.



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