Department of Biomedical Engineering
UNIVERSITY OF WISCONSIN–MADISON

Fall 2026
Seminar Series

Network-Topology Design of Extreme Soft Materials for Merging Human-Machine Interface

Shaoting Lin, PhD
Assistant Professor
Department of Mechanical Engineering
University of Wisconsin-Madison



Interfacing electronic/robotic components with biological systems is extremely challenging due to the fundamentally contradictory properties between rigid manmade components and soft living tissues. At Lin Lab, we leverage theory-guided network-topology design, exploiting high-performing soft materials as an ideal material candidate to form long-term, high-efficacy, multi-modal interfaces between electronic/robotic components and biological systems. In the first part of the talk, I will present our recent computational and experimental studies on polymer networks with slipping cross-links, which reveal unconventional mechanical properties of soft materials. Building on the mechanics of slipping networks, I will introduce a gel-based chromoendoscopy that integrates fatigue-resistant photoelastic gels and physics-informed machine learning algorithms, enabling high-resolution and spatially resolved mapping of multi-physical properties of biological tissues. In the second part of the talk, I will discuss a molecule-engineered electrical tissue adhesive as a multimodal platform for site-specific drug delivery and in-situ biomolecule detection. Specifically, I will highlight design principles governing both single-type and multiple-type molecular transport, which underpin controlled drug release and specific biomolecule detection. I will conclude the talk with a perspective on how network-topology design of extreme soft materials can unlock new opportunities in precision healthcare and environmental sustainability.

ABOUT the SPEAKER

Dr. Shaoting Lin is an Assistant Professor in the Department of Mechanical Engineering at University of Wisconsin - Madison. He received his Ph.D. degree (2019) at MIT and got his M.S. degree (2013) and B.S. degree (2010) at Tsinghua University. Before joining UW-Madison in 2026, he was an Assistant Professor at Michigan State University from 2022 to 2026. Since establishing his independent research group in 2022, Dr. Lin has published 18 first/co-first/corresponding authored papers in leading journals such as Science, Sci. Adv., Nat. Commun., Adv. Mater., Adv. Sci., JMPS. Dr. Lin was the co-founder of the EASF_Young Webinar (2020), the Executive Editorial Board Member of Giant (2022), the Early Career Advisory Board of Extreme Mechanics Letters (2025), and the Chair of the ASME Technical Committee of Mechanics of Soft Materials (2026). His honors include the NSF Faculty Early Career Award (2024), the ACS PRF Award (2025), and the ASME Orr Early Career Award (2026).

Monday, November 23 at Noon
1003 Engineering Centers (Tong Auditorium)