SEMINAR SERIES

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ROBUST, STRETCHABLE ELECTRONICS FOR WEARABLE BIOMONITORING APPLICATIONS

Featuring Dr. Eric Markvicka

University of Nebraska at Omaha

April 2nd, 2021 | 12:00 - 1:00 pm

Zoom Link: https://unomaha.zoom.us/j/95561454801

ABOUT DR. MARKVICKA

Dr. Eric Markvicka is an Assistant Professor in the Department of Mechanical and Materials Engineering at the University of Nebraska-Lincoln. He directs the Smart Materials and Robotics Laboratory, an interdisciplinary research lab that is creating the next generation of wearable electronics and robotics that are primarily composed of intrinsically soft materials. Prior to arriving at UNL, he received his M.S. and Ph.D. degrees in Robotics from Carnegie Mellon University. He received his B.S. and M.S. degrees in Mechanical Engineering from the UNL. Dr. Markvicka has been a visiting researcher at the Air Force Research Laboratory, NASA Jet Propulsion Laboratory, NASA Johnson Space Center, and Honeybee Robotics.

ABSTRACT

Emerging applications in wearable computing, human-machine interaction, and soft robotics will increasingly rely on new soft-matter technologies that are primarily composed of intrinsically soft materials to provide a conformal, unobtrusive, and compliant means of interfacing with the human body. These soft-matter technologies have the potential to unlock a wide range of new applications, including discrete information access, health monitoring, human performance augmentation, and fashion. As compared to traditional machines and electronics, these systems must be lightweight and match or exceed the mechanical properties of the human body to achieve structural conformity without interfering with the body's natural motion. While these materials enable elastic compliance and deformability, they are vulnerable to wear and tear of daily use and unexpected damage, which ultimately results in failure and disposal. As the performance, complexity, and expected lifespan of these soft-matter systems continues to increase, new material architectures are needed that mimic the biological response to damage. In this talk, I will share new techniques to create fully integrated wearable electronic bandages for health monitoring, soft mechanically robust circuity that can remain electrically functional even when damaged by tearing or puncture, and new lightweight, thermally conductive materials for large area thermal management.

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