University of Rochester

Department of Biomedical Engineering

Colloquium

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"Conformable ultrasound electronics: from design strategies to healthcare innovation"

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Dr. Lin Zhang is currently an Assistant Professor in the Department of Biomedical Engineering at the State University of New York at Buffalo. He received B. Eng. in Electronic Science and Technology and M. Sc. in Microelectronics and Solid-State Electronics both from Xi'an Jiaotong University (XJTU), China, and obtained his Ph.D. degree in Materials Engineering at Auburn University, USA. Prior to his role at UB, he served as a postdoctoral researcher in the Department of NanoEngineering at UC San Diego, the held the position of Research Assistant Professor in Electronic Materials Research Laboratory at XJTU, and worked as a Research Scientist at the Media Lab of the Massachusetts Institute of Technology. Dr. Zhang has authored over 100 peer-reviewed articles with an H-index of 51 (Google Scholar). He is leading a smart materials and intelligent electronics (SMILE) lab focusing on advanced sensors, actuators, and transducers for biomedical and healthcare applications.

Seminar Abstract: Conformable electronics have been considered as the future of personal healthcare monitoring and remote diagnosis tools. Nevertheless, numerous electronic devices primarily focused on biosignals originating from the surface layer of the human body, thereby providing only restricted understanding of the deep tissues and organs. Recently, there has been significant research on piezoelectric-based conformable ultrasonic electronics (cUSE) because of their distinct features, such as nonradiative monitoring, soft tissue imaging, deep signal decoding, portability, and biocompatibility. In this talk, Dr. Zhang will provide a detailed illustration of conformable ultrasonic electronics, including piezoelectric materials innovation, electromechanical principle, design strategies of ultrasound transducers and patches, with promising applications in bio-integrated electronics, such as blood pressure monitoring, bladder volume monitoring, early breast cancer detection, and other promising applications. The fabrication strategies and design concepts can be applied to various biological substrates and geometries of interest, and thus have the potential to broadly bridge the gap that exists between rigid, boxy electronics and soft, curvy biology. The progress made in the areas of piezoelectric materials, ultrasonic transducers, and conformable electronics are driving the emergence of a new era in medical devices for personal healthcare.

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