

MATERIALS SCIENCE AND ENGINEERING (MS&E) SEMINAR SERIES
Friday October 29, 2021 at 3:00 pm in room ESB 251**“Flexible Adhesive Electronics for Electrophysiological Monitoring”**

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Abstract: Reliable recording and modulation of excitable tissue using implantable electronic devices have implications in diagnosing and treating many types of diseases. The advent of flexible electronics has enabled new concepts in interfacing devices with soft tissues. However, to date, most flexible electronics achieve mechanical compliance by using substrates composed of thin curable resins or elastomers. These materials are suboptimal for tissue interfacing because they: (1) exhibit Young’s moduli that are orders of magnitude larger than many excitable tissues, such as peripheral nerves; (2) are difficult to integrate with hydrated tissue in vivo. Here I will present recent advances in materials and fabrication from our lab to address current limitations in flexible electronics. Specifically, the synthesis and formulation of adhesive hydrogels and transfer printing to create ultracompliant peripheral nerve interfaces will be described. Details regarding the in vitro and in vivo performance of ultracompliant electronics will be presented. Future prospective applications for this concept will also be highlighted, too.

Bio: Christopher Bettinger is a Professor at Carnegie Mellon University in the Departments of Materials Science and Engineering and Biomedical Engineering. He directs the laboratory for Biomaterials-based Microsystems and Electronics at CMU, which designs materials and interfaces to integrate medical devices with the human body. Chris has published over 90 articles and has been issued over 10 patents. Chris has received honors including the National Academy of Sciences Award for Initiatives in Research, the MIT Tech Review TR35 Top Young Innovator under 35, and the DARPA Young Investigator Award. Prof. Bettinger is also a co-inventor on several patents and Co-Founder and CTO of Ancure, an early stage medical device incubator. Prof. Bettinger received an S.B. in Chemical Engineering, an M.Eng. in Biomedical Engineering, and a Ph.D. in Materials Science and Engineering as a Charles Stark Draper Fellow, all from the Massachusetts Institute of Technology. He completed his post-doctoral fellowship at Stanford University in the Department of Chemical Engineering as an NIH Ruth Kirschstein Fellow.

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