

## “Edible Electronics: Bioinspired Materials and Structures for Ingestible Batteries”

Carnegie Mellon University  
Associate Professor of Materials Science  
and Biomedical Engineering

Host: Tijana Grove



**Abstract:** Ingestible electronic devices have the potential to obviate many of the challenges associated with chronic implants such as risk of infection, chronic inflammation, and costly surgical procedures. Examples of ingestible electronics include edible cameras, ingestible event monitors, and integrated smart drug delivery systems. Commodity polymers and off-the-shelf electronic components currently limit the prospective scope of these devices. This talk will describe recent advances in bioinspired materials for potential use in edible electronic devices. Highlights will include melanin-based pigments as materials for on-board energy storage systems. Structure-property-processing relationships for ingestible energy storage materials will be presented and new insights into the supramolecular structure of natural pigments will be identified. Prospective uses for these application-specific materials will also be discussed.

**Bio:** Christopher Bettinger is an Associate Professor at Carnegie Mellon University in the Departments of Materials Science and Biomedical Engineering. He directs the laboratory for Biomaterials-based Microsystems and Electronics at CMU, which is broadly interested in the design of novel materials and interfaces to integrate medical devices with the human body. Recent efforts focus on addressing materials challenges in the design and deployment of flexible and biodegradable electronic materials for flexible and edible electronics. Chris has received honors including

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the National Academy of Sciences Award for Initiatives in Research, the ACS AkzoNobel Award for Polymer Chemistry, 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, LLC, a medical device company based in Pittsburgh, PA. 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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