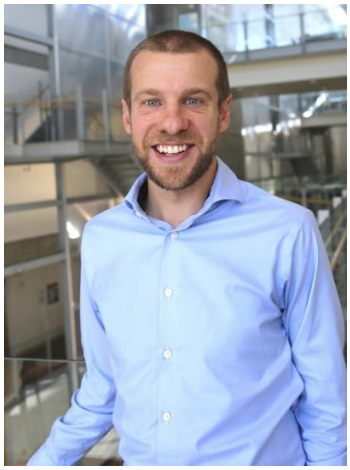
Maximizing Performance of Printed Electronic Sensors through Process, Material, and Device Innovation

Asst. Professor Joseph Andrews, Ph.D., Univ. of Wisconsin-Madison, USA

Abstract



Printing electronics, defined as the patterning of liquid electronic materials onto a substrate, offers a number of benefits. For example, the burgeoning fabrication paradigm allows for processing compatibility with flexible and large-area substrates while also reducing overall cost and energy consumption. In this talk, I will describe our lab's efforts to enhance the viability of printed electronic sensors through both process and material innovation. I will discuss our efforts to better understand and control a direct-write printing process called aerosol jet printing through droplet-level measurements. In addition, I will discuss the material and device innovations that our lab has investigated to enable better sensing technologies, focusing on applications such as soil health monitoring. Finally, I will conclude the talk with an outlook for the field of printed electronic sensors and a summary of the challenges left unsolved.

Biography

Joseph Andrews is an Assistant Professor at the University of Wisconsin-Madison, jointly appointed in the Mechanical Engineering and Electrical and Computer Engineering Departments. During his career, Joseph has experience in several successful and diverse projects in the printed electronic space, from the invention of printed tire tread-depth sensors to fully printed biological assays. His work has been recognized by multiple awards, including the NIH F31 Predoctoral Individual National Research Service Award and the IEEE Sensors Best Student Paper Award. His invention of the printed tire-tread depth sensor has also achieved commercial success and was commercialized through a company, Tyrata, Inc. Before joining UW-Madison, Joseph also worked with Microsoft Research, contributing to their efforts in the flexible electronics space. Currently, Joseph's group at UW-Madison is focused on impacting the field of printed electronics through developing new inks from nanomaterials, investigating methods to improve print processes, and validating new sensing paradigms.