

EML WEBINAR

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WEDNESDAY, 16 SEPTEMBER 2020

10 AM BOSTON, 3 PM LONDON, 10 PM BEIJING



ROBERT SHEPHERD

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OPTOELECTRONIC SENSING OF THE DEFORMATION OF SOFT ROBOTS, AND THEIR ELECTROHYDRAULIC POWER

A variety of stretchable sensors exist, typically used as “skins” for high density shape sensing measurements to improve control authority in high degree of freedom (passive or active) continuum structures and actuators. This talk will discuss the use of light as a sensing medium for measuring deformation in the “meat” of these compliant structures and actuators. Two classes of sensors will be presented, one that relies on the transmission of light through arrays of lossy optical lightguides, and another that uses a sort of diffusing wave spectroscopy in combination with machine learning to infer structure. After discussing sensing, I will then discuss how to increase the overall energy density of hydraulically powered robots. Use cases for these sensors and robots will be presented as well as discussion of their relative benefits, current challenges, and future directions as it pertains to soft actuators and deformable interfaces.

Rob Shepherd is an associate professor at Cornell University in the Sibley School of Mechanical & Aerospace Engineering. He received his B.S. (Material Science & Engineering), Ph.D. (Material Science & Engineering), and M.B.A. from the University of Illinois in Material Science & Engineering. At Cornell, he runs the Organic Robotics Lab (ORL: <http://orl.mae.cornell.edu>), which focuses on using methods of invention, including bioinspired design approaches, in combination with material science to improve machine function and autonomy. We rely on new and old synthetic approaches for soft material composites that create new design opportunities in the field of robotics. Our research spans three primary areas: bioinspired robotics, advanced manufacturing, and human-robot interactions. He is the recipient of an Air Force Office of Scientific Research Young Investigator Award, an Office of Naval Research Young Investigator Award, and his lab’s work has been featured in popular media outlets such as the BBC, Discovery Channel, and PBS’s NOVA documentary series.

Discussion leader: **Jamie Paik**, EPFL

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