MAE Seminar SERIES

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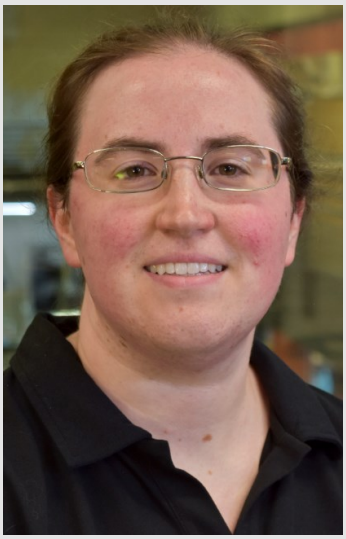

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SOFT STRUCTURES: THE BACKBONE OF SOFT ROBOTS

ABSTRACT

Soft robots use geometric and material deformation to absorb impacts, mimic natural motions, mechanically adapt to motion or unevenness and to store and reuse energy. Soft robots, by virtue of these traits, offer potential to grasp robustly, adapt to unstructured environments and work safely alongside, or are even worn by, humans. However, compliance breaks many of the assumptions underpinning traditional approaches to robot design, dynamics, control, sensing and planning, and new or modified approaches are required. During this talk, I will introduce the concept of soft robots as soft structures, with capabilities and behaviors derived from the type and organization of their active and passive elements. I will present my current and prior work on the development and analysis of soft robotic structures, with a particular focus on the mechanics of soft arms. I will discuss how structure and mechanics affect concepts critical to robotics, such as workspace size, applied force, control and planning.

BIO SKETCH

Dr. Gina Olson is a postdoctoral research scientist working in Prof. Carmel Majidi's Soft Machines Lab at Carnegie Mellon University. She earned her doctorate in Robotics and Mechanical Engineering at Oregon State University, where she was advised by Dr. Yiğit Mengüç and Prof. Julie A. Adams. She previously worked as a Technical Lead Engineer at Meggitt Polymers and Composites, where she developed fire seals for aircraft engines. Dr. Olson's current research interests are the soft and compliant structures within soft robots.

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