Soft Robots: Increasing Robot Diversity with Soft Materials

Daniela Rus

Computer Science and Artificial Intelligence Laboratory (CSAIL), Massachusetts Institute of Technology (MIT), USA
rus@csail.mit.edu

Keynote Abstract

While the last 60 years have defined the field of industrial robots, and empowered hard bodied robots to execute complex assembly tasks in constrained industrial settings, the next 60 years will be ushering in our time with Pervasive robots that come in a diversity of forms and materials, helping people with physical tasks. The past 60 years have mostly been inspired by the human form but the animal kingdom with its form diversity has broader potential. For example the boneless octopus is legendary for its ability to squeeze through cracks. With the development of soft materials, machines and materials are coming closer together with machines becoming compliant and fluid like materials and materials becoming more intelligent and this raises an interesting question: what is a robot? Traditionally we have considered industrial manipulators and robots on wheels but what about robots made our of food or paper or ice, or giving everyday objects the ability to move and compute so they become intelligent and autonomous? Soft materials allow us to expand the diversity of robots. In this talk I will discuss *(1)* what is a soft robot, *(2)* how do we build soft robots, *(3)* how do we control soft robots, and *(4)* what are the challenges and opportunities around soft robots.

Daniela Rus is the Andrew (1956) and Erna Viterbi Professor of Electrical Engineering and Computer Science, Director of the Computer Science and Artificial Intelligence Laboratory (CSAIL) at MIT, and Deputy Dean of Research in the Schwarzman College of Computing at MIT. Rus' research interests are in robotics and artificial intelligence. The key focus of her research is to develop the science and engineering of autonomy. Rus is a Class of 2002 MacArthur Fellow, a fellow of ACM, AAAI and IEEE, a member of the National Academy of Engineering, and of the American Academy of Arts and Sciences. She is a senior visiting fellow at MITRE Corporation. She is the recipient of the Engelberger Award for robotics. She earned her PhD in Computer Science from Cornell University.