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Biologically Inspired Robotics:

From Soft Robotics to Swarms Robots that Assemble by Self-Folding

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ABSTRACT

Robotics has the potential to address many of today's pressing problems in fields ranging from healthcare to manufacturing to disaster relief. However, the traditional approaches used on the factory floor do not perform well in unstructured environments. I believe the key to solving many of these challenges will be to explore new, non-traditional designs. Fortunately, nature surrounds us with examples of novel ways to navigate and survive in the real world. Through evolution, biology has already explored myriad solutions to many of the challenges facing robotics. At the UC San Diego Bioinspired Robotics and Design Lab, we seek to borrow the key principles of operation from biological systems, and apply them to engineered solutions. In this talk I will discuss approaches to the design, fabrication, and control of soft robotic systems, as well as robotic swarm robots that self-assemble by folding.

SPEAKER BIO

Michael T. Tolley is Assistant Professor in Mechanical and Aerospace Engineering, and director of the Bioinspired Robotics and Design Lab at the Jacobs School of Engineering, UC San Diego. Before joining the mechanical engineering faculty at UCSD in the fall of 2014, he was a postdoctoral fellow and research associate at the Wyss Institute for Biologically Inspired Engineering and the School of Engineering and Applied Sciences, Harvard University. He received the Ph.D. and M.S. degrees in mechanical engineering with a minor in computer science from Cornell University in 2009 and 2011, respectively. He received the B. Eng. degree in mechanical engineering from McGill University in Montreal in 2005. His research interests include biologically inspired robotics and design, origami-inspired fabrication, self-assembly, and soft robotics. His work has appeared in leading academic journals including Science and Nature.