



**Thursday, February 18th**  
**3:00 PM Bowen Hall Rm 222**

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## Computational Tools for Robot Design: A Composition Approach

As robots become more prevalent in society, they must develop an ability to deal with more diverse situations. This ability entails customizability of not only software intelligence, but also of hardware. However, designing a functional robot remains challenging and often involves many iterations of design and testing even for skilled designers. My goal is to create computational tools for making functional machines, allowing future designers to quickly improvise new hardware in response to unexpected circumstances.

In this talk, I will discuss one possible approach to automated design using composition. I will describe our origami-inspired print-and-fold process that allows entire robots to be fabricated within a few hours, and I will demonstrate how foldable modules can be composed together to create foldable mechanisms and robots. The modules are represented parametrically, enabling a small set of modules to describe a wide range of geometries and also allowing geometries to be optimized in a straightforward manner. I will also introduce a tool that we have developed that combines this composition approach with simulations to help human designers of all skill levels to design and fabricate custom functional robots.

Cynthia Sung is a Ph.D. candidate in the Computer Science and Artificial Intelligence Laboratory at the Massachusetts Institute of Technology (MIT). She received a B.S. in Mechanical Engineering from Rice University in 2011 and an M.S. in Electrical Engineering and Computer Science from MIT in 2013. Her research interests include computational design, folding theory, and rapid fabrication, and her current work focuses on algorithms for synthesis and analysis of engineering designs.



*For inquiries, please contact the Dept. of Mechanical & Aerospace Engineering at 609-258-0315*

**ALL VISITORS ARE WELCOME!**