

CHAMPS, a Conformable, Highly Articulated, Multi-Purpose Scalable Robot Arm

Mark Yim

Asa Whitney Professor of Mechanical Engineering
University of Pennsylvania

Prof. Yim will talk about recent ideas about looking at the limits of articulated manipulator arm articulations and degrees of freedom. He proposes to build a snake-like arm with 100 articulations, somewhat similar to illustrations in the movie Spider-Man 2 with the robot arms on the back of Doc Ock. While most high DOF hyper-redundant and soft-robot arms can barely lift their own weight, this new design should be able to apply forces and carry a payload at the end-effector.

He will present a design that can theoretically not only control arbitrarily all 100 articulations as a hyper-redundant manipulator arm made of rigid segments yet also conform to objects as soft robot arms can do. And as a final bonus the arm promises to be low-cost.



Mark Yim is the Asa Whitney Professor of Mechanical Engineering in the School of Engineering and Applied Science at the University of Pennsylvania. He is the director of the GRASP Lab, the oldest robotics research laboratory in the country established in 1980. His group has demonstrated robots ranging from a humanoid on display at the Philadelphia Museum of Art to the smallest self-powered flying robot in the world. His current research focus includes reconfigurable truss robots that can help in search and rescue operations, highly conformable robot arms that can conform around objects and articulate into tight spaces, swarms of small flying robots that can group into shapes that interact with humans and swarms of microscopic robots that can build structures. His other research interests include product design, robotic performance art, novel locomotion, and steerable needles. Application areas include urban search and rescue as well as healthcare. He also serves as faculty director of the Integrated Product Design program and Co-director of Penn4C (a nursing, engineering, community collaboratory). Prior to Penn, he spent ten years in industry including positions as Principal Scientist at the Palo Alto Research Center (formerly Xerox PARC) and Virtual Technologies, a virtual reality startup company. He received his PhD from Stanford University in Mechanical Engineering.

FRIDAY
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