



ROBOTICS SEMINAR

FRIDAY, March 7, 2014

1305 NEWELL-SIMON HALL

3:30-4:30 pm



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From Geometry to Startups -The Rise of a New Robotics Industry in China

ABSTRACT: Many problems in robotics, mechanism design and manufacturing research are geometric in nature: Rigid body motion, modeling, analysis and synthesis of both open-chain and closed-chain manipulators, grasping and manipulation with multifingered robotic hands, tolerance formulation and verification, design and control of five- axes machines, etc. In this talk, I will present an effort, which was initiated by R. Brockett of Harvard about 30 years ago, and continued by the Berkeley group and then my own group at HKUST for the last 20 years to develop a unified theory, using tools from differentiable manifolds and Lie groups, for robotics, mechanism design and manufacturing research. First, using intuitive examples, I will recollect some of the basic concepts of differentiable manifolds and their “engineering” classifications. Then, I will show how problems in robotics, mechanism design and manufacturing research can be modeled using various types of manifolds as their model spaces. Finally, I will highlight how geometric properties of these spaces are being exploited to provide more efficient solutions for optimization problems defined on these spaces. There are grand opportunities for robotic research in China. However, the biggest challenge lies in the creation of an eco-system that foster growth of many more startups from our research and teaching programs. A new robotics institute is being proposed at HKUST for such a purpose.

BIO: Zexiang Li attended the South-Central University in 1978, received his BS (with honor) degrees in Electrical Engineering and Economics from Carnegie-Mellon University in 1983, his MS degree in EECS in 1985, MA in mathematics and PhD in EECS in 1989, all from the University of California at Berkeley. He worked at ALCOA, the Robotics Institute of CMU and the AI Lab of MIT (89-90). He was an assistant professor at the Courant Institute of New York University (90-92). In 1992, he joined the Department of Electronic and Computer Engineering of the Hong Kong University of Science and Technology and is currently a professor of the department. He founded the Automation Technology Center(ATC) and currently serves as its director.

Host: WeiWei Wan

For Appointments: Jean Harpley (jean@cs.cmu.edu)