ROBOTICS

Organizers: Bryan Adams, One Plus Four Ventures, and Tomomichi Sugihara, Osaka University

Robotics, long a science fiction dream, is gradually moving from movies and books to academic labs and companies. While no agreed-upon scientific definition of "robot" exists, most would agree that "robots" today perform a variety of tasks, from mining and manufacturing to surgery and vacuuming.

Basic robotic technologies have improved enormously over the last twenty years; improvements in sensing (e.g., improved vision algorithms), actuation (e.g., motors of high power-weight ratio) and autonomy (e.g., fast, scalable navigation algorithms) have enabled new robot capabilities. Progress in system-level integration efforts have been demonstrated in government-sponsored projects such as the DARPA Grand Challenge in the US and HRP in Japan. But commercial progress has been slow outside of the long-standing factory automation market. In the US, military, surgical, and vacuuming robots have shown some early success. In Japan, there is demand for robots that will care for elders and assist our daily activities, though these robots are still not widely available to consumers. Almost everyone agrees that many more robot markets are ripe for exploration. What will bring these robot markets from hypothesis to product?

The talks in this series will focus on the transition of robots from the lab to the field. Each country will provide one speaker with a past story of success and one speaker who is currently working towards success. The talks, and ensuing discussion, will focus on recent technological advances, identify areas in need of progress, and consider the question of how to successfully transition robots from concept to reality.

The first talk will be by Dr. Eduardo Torres-Jara (Worcester Polytechnic Institute). Dr. Torres-Jara is a professor with expertise in sensing technology for robot manipulation who is also a part-time entrepreneur with ambitions to build a robot company. He will describe his research in robotic sensors for manipulation as well as the challenges he has faced bringing these sensors to market. His talk will be followed by a talk from Dr. Katsuya Kanaoka (MMSE Inc.)**.** Dr. Kanaoka is bringing an exoskeletal robot to market and will describe the challenges he has faced. After a break, we will hear from Dr. Matthew Williamson (Heartland Robotics). Dr. Williamson will describe his research and work in series elastic actuators (SEAs). This technology, now more than fifteen years old, has traced a path from invention and development at MIT through current commercialization in robotic companies. Dr. Williamson will describe this path while providing lessons learned along the way. Finally, Shingo Ando (Yaskawa Electric Corporation) will close the session. He will introduce a history of Yaskawa Electric Corp. and the practical applications of Yaskawa robots. The consecutive discussion will focus on the needs of human-like assembly control and its future.