

The Department of Mechanical Engineering  
College of Engineering and Applied Sciences  
Stony Brook University

## Mechanical Engineering Seminar



**Dr. Makoto Kaneko**  
Professor

**Department of Mechanical Engineering at Osaka University**

### **Lecture Title: Beyond Robotics**

**Friday, April 24, 2015 at 11AM, Room 173 Light Engineering Building**

#### **Abstract**

When we discuss “Beyond Human”, we need to know how human perception looks like, because a perception should be a starting point toward an appropriate human action. This talk begins by showing the capability of human tactile perception and the recognition speed of human eye, especially for the viewpoint of limitation of perception. As for tactile perception, it is well known that human fingertip can sense even if the amplitude of vibration is 0.1 micrometer under the frequency of 250 Hz, which is amazingly high sensitivity. Through palpation, medical doctors often utilize for detecting where the tumor is and how much the size is. Such a palpation perhaps comes from the extremely high sensitivity of fingertip tactile sensation. On the other hand, as for the recognition speed of human eye, there is an upper limitation, which is at most 15 frames/sec. Due to such slow recognition speed of human eye; we often miss what is happening when we observe a high-speed phenomenon. A high-speed vision is a kernel technology to make clear such a high-speed phenomenon. Knowing of such characteristics of human perception, we discuss how to design an artificial system leading to “Beyond Human”. We introduce a couple of examples in both robotics and bio/medical fields together with video demonstration.

#### **Biography**

Makoto Kaneko is a Professor of the Department of Mechanical Engineering at Osaka University. In 1981 he received his Ph.D. degree from the University of Tokyo. From 1990 to 1993 he was an Associate Professor at Kyushu Institute of Technology and from 1993 to 2006 he was Professor at Hiroshima University. He is interested in dynamic active sensing by utilizing a high speed vision and a high speed actuator, and their implementation into bio/medical system. He served as the Editor-in-Chief of Journal of Robotics and Mechatronics, an associate editor of the IEEE Transaction on Robotics and Automation, and an editorial member of Robotics and Automation Magazine. He is currently serving as a part editor of handbook of robotics. He was the Director of the Hyper Human Research Project Center and the Project Leader of the 21century COE on “Hyper Human Technology toward the 21st Century Industrial Revolution”. He was a Vice President of IEEE Robotics and Automation Society during 2004 through 2005. Since 2013, he has been an honorable doctor at Technical University of Darmstadt. He got over 30 awards including Humboldt Research Award, IEEE Best Paper Awards (ICRA, ICIA, ISATP, ICMA) and IEEE RAS Best Transactions Paper Award.

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