

Mini Symposium  
"Robots, Brains and AI"

Details

**14:05-14:50 Human robotics**

Professor Etienne Burdet (Professor, Imperial College London)

Abstract: In this talk I will present how we use robotics to investigate human sensorimotor control, and create robots to help humans. In particular, I will describe how we translated human-like control adaptation to let robots interact skilfully with the environment in industrial tasks, and to adapt the control of rehabilitation robots. I will also present the rehabilitation devices we develop to assist upper limb neurorehabilitation from bedside to home.

Short cv: Dr. Etienne Burdet is Chair of Human Robotics at The Imperial College of Science, Technology and Medicine in UK. He is also a visiting Professor at Nanyang Technology in Singapore and at University College London. He holds an MSc in Mathematics (1990), an MSc in Physics (1991), and a PhD in Robotics (1996), all from ETH-Zürich. He was a postdoctoral fellow with TE Milner of McGill University, Canada, JE Colgate of Northwestern University, USA and Mitsuo Kawato of ATR in Japan. Professor Burdet's group uses an integrative approach of neuroscience and robotics to: i) investigate human motor control, and ii) design efficient systems for training and rehabilitation, which are tested in clinical trials.

**14:50-15:35 Human Centric robots: developing machines that understand human behaviours**

Dr. Ganesh Gowrishankar (Senior Researcher, CNRS-AIST, Human Center Robotics)

Abstract: How should rehabilitation, biomedical and social robots behave such that an interacting human is comfortable with them, feels safe with them and is willing to coexist and learn from them? The answer to this question is not trivial because human behaviors, both with their environment and other humans, have complex dynamics that change with an interacting individual's physiology, age, culture, emotions and pathology. Humans have the intelligence to understand a fellow human's behavior in all these aspects and interact with him/her accordingly. Through integrated research in neuroscience, psychology and robotics, my work aims to improve machines and endow them with similar intelligence to understand human behaviors when they interact with their environment and with humans. In this talk I will give a brief summary of the various projects we have for the development of human centric robotics.

Short cv: Gowrishankar Ganesh received his Bachelor and Master of Engineering degrees from Delhi University and National University of Singapore respectively. He received his PhD from Imperial College London in 2010. Between 2004 and 2013, he worked at ATR-Japan, followed by NICT- Japan as a researcher in Motor Neuroscience and Robotics. He joined the CNRS-France as a Senior Researcher in 2014 and is currently stationed at the CNRS-AIST joint robotics lab (JRL) in Tsukuba. He is a visiting researcher at the CINET in Osaka, ATR, and LIRMM in Montpellier. His research interests include human sensori-motor control, robot control, cognitive neuroscience and robot-human interactions.

**15:45-16:30 How humans communicate through touch**

Dr. Atsushi Takagi (Specially Appointed Associate Professor, Tokyo Institute of Technology)

Abstract: We interact with others on a daily basis using several senses. The least studied of these is touch or haptics, like when parents assist a child to take their first steps, and during tango dancing. Haptics is an important sensory modality to learn new skills and assist others, but how is the information from this sense used to facilitate physical interaction? In this talk, I will discuss the findings that were uncovered through behavioral experiments involving pairs of subjects. We will delve into computational models of interaction to understand what behaviors can explain the empirical data, and how our new understanding leads to applications in robotics and physical therapy.

Short cv: Atsushi Takagi received his MSc in Physics in 2011, and a PhD in 2016, from Imperial College London. His PhD focused on how humans communicate through haptics, the sensory modality of proprioception and touch, and how their behavior adapts across varying conditions. From 2017, he is based at the Tokyo Institute of Technology where he works on motor behaviour, adaptation and learning.