Plenary Talk 4

Prof. Aude Billard

EPFL, Switzerland

Aude Billard is full professor, head of the LASA laboratory and the Associate Dean for Education in School at the School of Engineering at the Swiss Institute of Technology Lausanne (EPFL). Prof Billard currently serves as the President of the IEEE Robotics and Automation Society, director of the ELLIS Robot Learning Program and co-director of the Robot Learning Foundation, a non-profit corporation that serves as the governing body behind the Conference on Robot Learning (CoRL), and leads the Innovation Booster Robotics, a program funding technology transfer in robotics and powered by the Swiss Innovation Agency, Innosuisse. Prof Billard holds a BSc and MSc in Physics from EPFL and a PhD in Artificial Intelligence from the University of Edinburgh. Prof Billard is an IEEE Fellow and the recipient of numerous recognitions, among which the Intel Corporation Teaching award, the Swiss National Science Foundation career award, the Outstanding Young Person in Science and Innovation from the Swiss Chamber of Commerce, the IEEE RAS Distinguished Award, and the IEEE- RAS Best Reviewer Award. Dr. Billard was a plenary speaker at major robotics, AI and Control conferences (ICRA, AAAI, CoRL, HRI, CASE, ICDL, ECML, L4DC, IFAC Symposium, ROMAN, Humanoids and many others) and acted on various positions on the organization committee of numerous International Conferences in Robotics. Her research spans the fields of machine learning and robotics with a particular emphasis on fast and reactive control and on safe human-robot interaction. This research received numerous best conference paper awards, as well as the prestigious King-Sun Fu Memorial Award for the best IEEE Transaction in Robotics paper, and is regularly featured in premier venues (BBC, IEEE Spectrum, Wired).

Toward Human-Like Dexterity for Robots and Beyond

This talk will present small steps we made to encompass robot hands with some of human dexterity, from the ability to hold objects in multiple ways, as well as hold multiple objects in hand, to the ability to manipulate objects in hand, predicting changes in mass distribution, adapting to unexpected disturbances, to moving objects across pairs of fingers. This work leverages on careful combination of machine learning to encapsulate models of uncertainty and control methods for stability. Yet, human dexterity still eludes largely robotics. This talk will conclude by discussing the way forward, illustrating this through key results from a study of human acquisition of fine manipulation skills in watchmaking, and in microsurgery. It will conclude by showing a new robot hand design that displays a dexterity beyond human's for some tasks.