



Séminaires ISIR

Mardi 15 juillet 2014 à 14h00

Arianna Menciassi

Campus Jussieu, 4 place Jussieu, Paris
Salle de réunion 304

Title : Advanced materials and systems for biohybrid actuators and sensors

Abstract : Bio-hybrid systems represent an exciting novel paradigm for engineering, aiming at solving technological issues by means of integration of living biological components, which are already optimized by nature. This allows to exploit the unique features of living cells and tissues not for just mimicking them, but for physically integrating them in properly engineered and controllable artificial structures. The talk will focus on advanced materials and systems that can enable the development of biohybrid actuators, based on living contractile muscle cells, and biohybrid sensors, based on stimuli-sensitive cells. The interface between living and non-living entities, the methods used to properly engineer them and the materials needed to build up a series of enabling technologies around living cells, thus assuring their functionality, will be discussed. In addition, it will be highlighted how the keeping-alive of the living elements (absolutely crucial to maintain the system's overall functionality over extended periods of time) can be considered not only a technological constraint, but also an exciting opportunity, related to what can be called "bio-hybrid embodied cognition". This can represent a radical, promising, and entirely novel approach to the synthesis of artificial cognitive systems, in which the "being" (homeostasis, self-maintenance, survival) underlies the "doing" (acting in the world in the service of homeostatic maintenance), and both "being" and "doing" underlie the "knowing" (prediction of interoceptive and exteroceptive dynamics).

Short Bio : Arianna Menciassi received her Laurea Degree in Physics (with Honors) from the University of Pisa in 1995. In the same year, she joined the CRIM (formerly MiTech) Lab of the Scuola Superiore Sant'Anna (SSSA) in Pisa as a PhD student in bioengineering, with a research program on the micromanipulation of mechanical and biological micro objects. In 1999, she received her PhD degree by discussing a thesis titled "Microfabricated Grippers for Micromanipulation of Biological and Mechanical Objects". The main results of this activity have been awarded with the Best Manipulation Paper Award at the International Conference on Robotics and Automation in the year 2001. Her main research interests are in the fields of biomedical micro- and nano-robotics, microsystem technologies, nanotechnologies, biomimetics, micromechatronics. She is working on several European projects and international projects for the development of micro- and nano-robotic systems for medical applications. Arianna Menciassi is co-author of more than 80 international scientific papers, 30 of these on ISI journals, and she is co-inventor of 3 international Patents, 2 Italian Patents and 1 German Patent. She is also co-author of 5 book chapters on medical devices and micro-technologies and of one chapter on "Medical Robotics" in a Springer Handbooks on Robotics.

Sous la co-tutelle de