Living Machines 2013

The International Conference on Biomimetics and Neurotechnology

29th July -2nd August 2013

The Natural History Museum of London

ISTITUTO ITALIANO DI TECNOLOGIA

FULL-DAY WORKSHOP ON

LEARNING FROM THE PLANT KINGDOM TO INVENT SMART ARTIFICIAL SOLUTIONS

July 29, 2013

Imperial College of London

Organizers

Barbara Mazzolai and Lucia Beccai
Coordinator and Researcher of the Center for Micro-BioRobotics
Istituto Italiano di Tecnologia (IIT)
Viale Rinaldo Piaggio 34
56025, Pontedera (Pisa) - Italy
http://mbr.iit.it

Preliminary Workshop programme

Time	Speaker	Affiliation	Topic	Status
8.40 -8.50	**Barbara Mazzolai Lucia Beccai**	Centre for Micro-BioRobotics of IIT@SSSA, Pontedera, Italy	Welcome and introduction to the Workshop	
8.50-9.40	**Barbara Mazzolai Lucia Beccai**	Centre for Micro-BioRobotics of IIT@SSSA, Pontedera, Italy	Robotics and ICT technologies inspired by plants	
9.40-10.25	**Stefano Mancuso**	Dpt. Plant, Soil & Environment Università di Firenze, Italy	Plant Computing	*Confirmed*
10.25-10.40	*COFFEE BREAK*			
10.40-11.25	**Dario Floreano**	Laboratory of Intelligent Systems, EPFL, Switzerland	Reverse engineering of root behavior by means of artificial evolution	*Confirmed*

11.25-12.10	**Simon Gilroy**	Department of Botany, University of Wisconsin, USA	Plant sensing and growth	*Confirmed*
12.10-12.55	**Yoël Forterre**	Groupe Ecoulements de Particules IUSTI, Polytech Marseille, France	Slow, fast and furious: understanding the physics of plant movements	*Confirmed*
12.55-14.15	*LUNCH BREAK*			
14.15-14.55	**George Jeronimidis**	Centre for Biomimetics, University of Reading, UK	Fibres for functional integration in plants: movement and shape adaptation in response to stimuli	*Confirmed*
14.55-15.40	**Kon-Well Wang**	Mechanical Engineering, University of Michigan, USA	Plant-inspired multifunctional adaptive structural systems	*Confirmed*
15.40-16.00	*COFFEE BREAK*			
16.00-16.40	**Fabio Fiorani**	Institute of Bio- and Geo-sciences, IBG2 Plant Sciences, Forschungszentrum Jülich GmbH Germany	Rich representation by non-invasive sensors provides insight into spatial and temporal dynamics of plant organ growth, development, and responses to environmental clues	*Confirmed*
16.40-17.25	**Virgilio Mattoli**	Centre for Micro-BioRobotics of IIT@SSSA, Pontedera, Italy	Plant-inspired actuators	*Confirmed*
17.25-18.10	**Camilla Pandolfi**	Dpt. Plant, Soil & Environment Università di Firenze, Italy	Bioinspiration from seed dispersal strategies	*Confirmed*
	END OF THE WORKSHOP			

Motivation and objectives

The aim of the Workshop is to present and discuss the importance of investigating plants for learning from their structure and behaviour, and for mimicking their features to develop new technologies and systems. Plants are the best example among living beings of efficient soil exploration and conquer of almost any surface of the planet. However plants have rarely been a source of inspiration for robotics and artificial intelligence, probably because of misconceptions on their capabilities and because of their radically different functional principles as compared to other living organisms. The challenge is to build from our understanding of plants into materials and new design targets, and hence new technology. In this Workshop a selected group of top-scientists, worldwide expert and active in the field, will contribute to discuss the best approaches and strategic priorities, in addition to identify potential application areas, in order to push the relevant scientific and technological frontiers of this field.

Main topics that will be covered are:

- ✓ *Plant-inspired robotics*
- ✓ *Plant sensing and growth*
- ✓ *Fibre hierarchies in plants*
- ✓ *Actuators inspired by osmosis principle*
- ✓ *Communication in plants*

- ✓ *Plant-inspired evolutionary algorithms*
- ✓ *Plant phenotyping*
- ✓ *Plant-inspired adaptive structures*

Primary/secondary audience

The novelty of the area and the multidisciplinary approach will stimulate creativity and interactions among participants, with the potentiality of a strong impact for different topics in engineering and ICT solutions. Academic researchers in different disciplines (robotics, biology, chemistry, biomimetics, etc.) represent the primary audience of the workshop. The high technological and scientific level of the topics addressed can make an impact on young researchers and students at Master and PhD level, who are encouraged to enter this emerging and challenging field of research.