

IEEE ICMA 2017 Conference

Tutorial Workshops on Systems Science of Bio-navigation

Sunday, August 6, 2017

14:00 - 17:00

Conference Room 61, 6F

Sunport Takamatsu Symbol Tower, Takamatsu, Japan

Organizers:

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About the workshop:

The purpose of this workshop is to introduce systems science of bio-navigation. We are trying to develop the foundation of research scheme that integrates robotics, data science, ecology, and neuroscience, with the theme of navigation. In navigation, animals as well as humans properly and promptly perform the following: the acquisition of dynamically-changing information from external and internal environment, the choice of route and destination based on the information, and the behavioral regulation to reach the destination, all of which can be modified by their memory, emotions etc. Thus, through the study of navigation, we can also analyze a variety of brain functions. In this workshop, we will introduce the incredible abilities of animals during navigation, and ongoing research projects understanding and applying them.

Dr. Kotaro Kimura

Dr. Kimura received his B.S., M.S. and Ph.D. from The University of Tokyo (Tokyo) in 1990, 1992 and 1995, respectively. He then worked as a postdoc with Prof. Gary Ruvkun at Harvard Medical School / Massachusetts General Hospital at Boston, USA, where he started working on the nematode *C. elegans* as a simple model animal. He came back to Japan and worked at Nagoya University, National Institute of Genetics, and joined Osaka University, where he is currently an Associate Professor in the Department of Biological Sciences. Dr. Kimura's interests include basic principles of brain functions, such as memory, emotion, and decision-making, as well as the genetic mechanism of ageing. He has published 3 papers in Science, one of which has been cited more than 1,400 times (Kimura et al., Science 1997).

Dr. Koichi Hashimoto

Dr. Hashimoto received his B.S., M.S. and Ph.D. from Osaka University in 1985, 1987 and 1990, respectively. He became an assistant professor at Osaka University and joined Okayama University as an associate professor in 1994. He moved to The University of Tokyo in 1990. He is now a professor at Tohoku University since 1994. He is interested in robotics and computer vision, which are very important technologies in bio-navigation. Drs. Kimura and Hashimoto jointly developed a robotic microscope system with projection mapping to reveal the mechanics of sensor-motor coordination of small animals.

List of Speakers and Schedule

Time	Topics	Speaker List
14:00-14:10	Welcome speech	
14:10-14:30	Robotic microscope for measuring and manipulating neural activity during navigation	Prof. Koichi Hashimoto Tohoku University, Japan
14:30-14:50	Robot technology enhancing bio-logging science	Prof. Yuichi Tsumaki Yamagata University, Japan
14:50-15:10	Knowledge discovery from animal locomotion data	Prof. Takuya Maekawa Osaka University, Japan
15:10-15:30	Coffee break	
15:30-15:50	Tuning of a Fuzzy Controller for Collision Free Navigation of a Mobile Robot in Constraint Environment	Prof. Gancho Vachkov Baku Higher Oil School (BHOS) Azerbaijan
15:50-16:10	Measuring the "attention" during 3D navigation of bats	Prof. Shizuko Hiryu Doshisha University, Japan
16:10-16:30	Memory of places in rats	Prof. Susumu Takahashi Doshisha University, Japan
16:30-16:50	Differential equations for decision-making in worms' navigation	Prof. Kotaro Kimura Osaka University, Japan
16:50-17:00	Panel Discussion	Moderators: All speakers