

Preface

The 5th international conference on cognitive neurodynamics (ICCN2015) was held in Sanya, China, from June 3 to 7, 2015. It is one of the series conferences held biennially since 2007, with support from the international journal “Cognitive Neurodynamics” (Springer).

The research field of cognitive neurodynamics is the frontier of combining experimental and computational neuroscience with cognitive neuroscience. It has been realized that our cognition happens in nonlinear and dynamic brain systems. It is essential to understand cognition from the view of its dynamic processes. Experimental researchers have developed various methods, such as patch clamp technology, single/multi-unit(s) recording, fMRI, EEG, and so on to collect huge data. At the same time, mathematical methods and modeling are applied to understand and reveal dynamic principles in brain structure, functions, and behavior. Undoubtedly, cognitive neurodynamics is highly interdisciplinary, where researchers from neuroscience, cognitive neuroscience, mathematics, physics, computer science, and so on contribute together to the advance in this field. The series conferences of ICCN provide very good opportunities for scientists from various fields to review their achievements, to share their ideas, and to promote the development of this field.

ICCN2015 was held in the southernmost city (Sanya) in Hainan Island. In total, more than 200 participants from over 20 countries participated in the conference. The local temperature was high in June. However, the hot atmosphere seemed to stimulate and inspire warm and creative discussions during the conference period. Participants shared the latest progress in their research fields, exchanged experiences and ideas in the conference rooms, on the tables beside the swimming pool, and at the seashore near the hotel.

In ICCN2015, there were 12 plenary talks by leading scientists in the field of cognitive neurodynamics, 17 oral min-symposiums, and one poster session. The plenary speakers were: Profs. Stephen Scott, Hans Liljenström, Barry Richmond, Aike Guo, Ichiro Tsuda, Stephen Grossberg, Masamichi Sakagami, Kenji Doya, Xiaojing Wang, Bernard Balleine, Wei Wang, and Dewen Hu. The organizers

of the min-symposiums were Drs. Taishin Nomura, Stephen Scott, Jan Lauwereyns, José M. Delgado-García, Yanchao Bi, Qingyun Wang, Jianzhong Su, Daishi Watabe, Tomasz M. Rutkowski, Jianting Cao, Hans Liljenström, Hans albert Braun, Masamichi Sakagami, Bernard Balleine, Yutaka Yamaguti, Yuichi Katori, Hiromichi Tsukada, Jianhua Zhang, Jochen Mau, Yuanqing Li, Cuntai Guan, Andizej Cichocki, Dezhong Yao, Daqing Guo, Changsong Zhou, Hongbo Yu, and Yufang Yang. The topics of the conference covered almost all the branches of cognitive neurodynamics, from micro-, meso- to macro-level dynamics, their applications and some related topics, especially including neural coding, realistic neural networks, oscillation and synchronization, neural population dynamics, sensory and motor dynamics, EEG, fMRI and brain imaging, global cognitive functions, multiscale neurodynamics, neural computing, brain computer interface, and cognition disorder.

This volume fairly well covered the large span of research presented in ICCN2015. The papers in this volume were organized as the following ten parts: (I) Plenary Talk; (II) Neural Dynamics in Motor and Sensory Systems; (III) Interactive Dynamics in Cognitive Functions; (IV) Neural Dynamics in Hippocampus; (V) Imaging Cognitive Networks; (VI) Advanced Brain Computer Interaction; (VII) Neuroinformation Computation and Neuroengineering; (VIII) Modeling Higher-order Functions and Dysfunctions; (IX) Multi-scale Neural Network Dynamics and (X) Oscillation, Synchronization and Synaptic Plasticity. It is our great pleasure to notice the high quality of the contributions. We would like to thank all the contributing authors.

Taking this opportunity, we wish to express our gratitude to all those who contributed to ICCN2015, especially to the plenary speakers, the min-symposium organizers, and the helpful students who assisted during the conference. We gratefully acknowledge support from East China University of Science and Technology, the journal “Cognitive Neurodynamics” by Springer, The National Natural Science Foundation of China, Chinese Society for Neuroscience, and Chinese Society of Theoretical and Applied Mechanics.

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