THE 8TH INTERNATIONAL CONGRESS ON COGNITIVE NEURODYNAMICS

ICCN 2021 HOMEPAGE

Studying cognition from a dynamic point of view has become a trend currently,and rapiddevelopments have taken place in nonlinear dynamics and cognitive science.In order topromote the integration of cognitive science and neurodynamics as a whole, the 8th International Conference on Cognitive Neurodynamics 2021 (ICCN 2021)to be planned as May of 2022.

The conference will provide a forum for scientists and engineers working in this area and its related fields to review the latest progress and development and to exchange their experience, research progress and ideas.

ICCN 2021 Program

7-May

Time			
		Session 1 (Chairs: Dr Y Hu）	
8:50	9:00	**Opening ceremony**	
9:00	9:15	Nicotinic acetylcholine receptors to regulate important brain activities by controlled releasing of acetylcholine from subcortical neurons; what occurs in molecular level ?	Shigetoshi NARA
9:15	9:30	A Novel Threshold Across which the Negative Stimulation Evokes Action Potential Near a Saddle-Node Bifurcation in a Neuronal Model with Ih Current	Linan Guan
9:30	9:45	An EEG Power Analysis with Hyperscanning EEG-Motion-Gaze data in Embodied Synchronization: A Pilot Study for Intentional Switching with "Look This Way!" Game	Masayuki Fujiwara
9:45	10:00	Disynaptic Inhibition Effect of Hilar Mossy Cells on Pattern Separation in The Hippocampal Dentate Gyrus	Woochang Lim
10:00	10:15	Classifying Sympathetic Neural Signals Through Action Potential Detection and Characterization	Lacey Eagan
10:15	10:30	Dynamics mechanism of the action potentials conduction failure related to pain perception	Xinjing Zhang
10:30	10:45	Break	
		Session 2 (Chair: Dr Tianming Yang)	
10:45	11:00	Neurodynamics of Orbitofrontal Cortex Reflects Value-Based Decision-Making Process	Tianming Yang
11:00	11:15	Quantifying the attractor landscape and transition path of distributed working memory from large-scale brain network	Leijun Ye
11:15	11:30	Striatal cholinergic interneurons regulate reinforcement learning in two-action selection	Qinghua Zhu
11:30	11:45	Lifespan associations of resting-state brain functional networks with ADHD symptoms	Rong Wang
11:45	12:00	The functional connectivity of resting-state epileptic brain network is qualitively altered: an MEG analysis	Denggui Fan
12:00	14:00	Lunch time	
		Symposium: Machine learning /deep learning in Neural-signal classification (Chairs: Dr Gan Huang）	
14:00	14:15	Embedding newly spatial channel matrix in hand gesture classification for artificial prosthesis training	Xiaojun Wang
14:15	14:30	M3CV: Benchmarks for Machine Learning in EEG Commonality and Variability	Gan Huang
14:30	14:45	Bispectrum based channel selection algorithm for SSVEP-BCI	Ke Qin
14:45	15:00	Multimodal information fusion-based emotion recognition models in affective human-computer interaction	Zhen Liang
15:00	15:15	EEG activity during semantic and episodic memory retrieval in creative	Yuan Yin
15:15	15:30	Energy Consumption Prediction by Use of Deep Neuroevolution Strategy	Alexander Soudaei
15:30	15:45	Human intention estimation based on surface electromyography classification in elderly during sit-to-stand	Tinghan Xu
15:45	16:00	Break	
		Symposium: Brain imaging for neurodynamics (Chairs: Dr Guang Ouyang, Prof.Changsong Zhou）	
16:00	16:20	When cognitive science meets modern neurophysiological signal analysis	Christian Beste
16:20	16:40	EEG brain network analysis and its application	Peng Xu
16:40	17:00	Finding structure in time: Humans, machines, and language	Bingjiang Lyu
17:00	17:20	Reconciliation of multilevel reliable stimulus-evoked dynamics in excitation-inhibition balanced neural networks at criticality	Junhao Liang
17:20	17:40	Decoding Space–time–frequency Features of EEG Signals Based on Deep Learning	Dongye Zhao
17:40	18:00	How ERP waveform mis-represents brain response and how to improve it: perspectives from signal composition in single trials.	Guang Ouyang

Disynaptic Inhibition Effect of Hilar Mossy Cells on Pattern Separation in The Hippocampal Dentate Gyrus

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We consider a spiking neural network of the hippocampal dentate gyrus (DG). The principal granule cells (GCs) in the DG perform pattern separation, transforming similar overlapping input patterns into distinct non-overlapping output patterns. The hilar mossy cells (MCs) project disynaptic inhibition to the GCs, mediated by the inhibitory basket cells (BCs). We investigate the disynaptic inhibition effect of the MCs on pattern separation. By changing the synaptic strength $K^{(BC,MC)}$ (from the pre-synaptic MC to the post-synaptic BC), we investigate the change in the pattern separation degree S_d. When decreasing $K^{(BC,MC)}$ from its default value, S_d is found to decrease (i.e., pattern separation is reduced). On the other hand, as $K^{(BC,MC)}$ is increased from the default value, pattern separation becomes enhanced (i.e., S_d increases). Moreover, by varying $K^{(BC,MC)}$, we also investigate the population activity of sparsely synchronized rhythm of the GCs appearing during the pattern separation, and find that its synchronization degree, M_a, is correlated with the pattern separation degree S_d. Consequently, the larger the synchronization degree of the sparsely synchronized rhythm becomes, the more the pattern separation becomes enhanced.

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