

Novel Materials and Devices for Neuromorphic Applications

Date: 10:30 – 16:20, Friday September 6th, 2024

Venue: Auditorium, 1F, WPI-MANA Bldg., Namiki, NIMS

● Scope

Neuromorphic architectures, which mimic functions of neurons and synapses in human brains, have attracted much and renewed attention for applications in low energy consumption computing. To realize truly energy efficient neuromorphic computing, however, the introduction of novel materials and devices, other than conventional semiconductor-based devices, is crucial. This workshop will feature researchers from Taiwan and Japan, who do pioneer works on neuromorphic computing based on novel materials and devices such as 2D materials, organic semiconductors, ferroelectrics, iontronics, and spintronics. This workshop is supported by NSTC-JST collaborative research project on Nanoelectronics and System Integration for AI.

● Program

Time	Title	Speaker
10:20 – 10:30	Opening Remarks	Takashi Taniguchi, Executive Vice President, NIMS
Session I (Chair: Shu Nakaharai, Tokyo University of Technology)		
10:30 – 11:15	Physical Reservoir Computing Utilizing Spatio-Temporal Dynamics of Ions, Electrons, and Spins	Takashi Tsuchiya, NIMS
11:15 – 12:00	Analog-Based Synapse of Ferroelectric HfO ₂ Transistors for Neuromorphic Computing	Min-Hung Lee, National Taiwan University
12:00 – 13:00	Group Photo + Lunch Break	
Session II (Chair: Yutaka Wakayama, NIMS)		
13:00 – 13:45	Non-Volatile Photomemory with Ultrafast and Multi-Level Memory Behavior	Jung-Yao Chen, National Cheng Kung University
13:45 – 14:30	Conducting Polymer Wire Network and Physical Implementation of Reservoir Computing for Neuromorphic Wetware	Megumi Akai, Osaka University
14:30 – 14:45	Coffee Break	
Session III (Chair: Mahito Yamamoto, Kansai University)		
14:45 – 15:30	Antiambipolar Transistors: A New Strategy for Multifunctional In-Memory Logic Circuits	Ryoma Hayakawa, NIMS
15:30 – 16:15	Ambipolar 2D Transistors: Shaping the Future of Electronic Devices	Yen-Fu Lin, National Chung Hsing University
16:15 – 16:20	Closing Remarks	Mahito Yamamoto, Kansai University
16:30 – 17:30	Lab Tour	

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