

9th International Workshop on Nanostructures & Nanoelectronics

**Laboratory for Nanoelectronics and Spintronics
Research Institute of Electrical Communication
Tohoku University**

Organized by

**Research Institute of Electrical Communication
Tohoku University**

Co-Organized by

**Nano-Spin Engineering Seminar
Cooperative Research Projects
Information Bionics Seminar**

Cooperative Society

**CREST “Construction of ion and electron nano-channels
in super-resistive lipid bilayers”, JST**

Division of Soft-Nanotechnology, The Surface Science Society of Japan

**March 1-2, 2018
Sendai, Japan**

9th International Workshop on Nanostructures & Nanoelectronics

March 1-2, 2018

**Site: Laboratory for Nanoelectronics and Spintronics, Research
Institute of Electrical Communication, Tohoku University,
Sendai, Japan**



Organizer:

Symposium Chairs

Ayumi Hirano-Iwata, Tohoku Univ.

Ryugo Tero, Toyohashi Univ. of Tech.



Program Committee

Ayumi Hirano-Iwata, Tohoku Univ.

Organizing Committee

Ayumi Hirano-Iwata, Tohoku Univ.

Ryugo Tero, Toyohashi Univ. of Tech.

Teng Ma, Tohoku Univ.

Daisuke Tadaki, Tohoku Univ.

Program

March 1 (Thursday)

Room: 4F, Conference Room, *Laboratory for Nanoelectronics and Spintronics*

13:00 ~ 13:05 Opening Remarks
Ayumi Hirano-Iwata (Research Institute of Electrical Communication / Advanced Institute for Materials Research, Tohoku University, Sendai, Japan)

(Chair: Craig Aspinwall)

13:05 ~ 13:45 Modulation of signal propagation in connected cell networks by localized heat stimulation
Philipp Rinklin¹, Kamy Dang¹, Nouran Adly¹, Korkut Terkan¹, Leroy Grob¹, Sabine Zips¹, and Bernhard Wolfrum^{1,2}
(¹Neuroelectronics - Munich School of Bioengineering, Department of Electrical and Computer Engineering, Technical University of Munich (TUM), Boltzmannstr. 11, 85748 Garching, Germany, ²Institute of Bioelectronics (PGI-8/ICS-8), Forschungszentrum Jülich, 52425 Jülich, Germany)

13:45 ~ 14:15 Development of bioanalytical platforms for extracellular vesicles
Takanori Ichiki^{1,2}
(¹Department of Materials Engineering, School of Engineering, The University of Tokyo, Japan, ²Innovation Center of Nanomedicine (iCONM), Kawasaki Institute of Industry Promotion, Kawasaki, Japan)

14:15 ~ 14:45 Mechanically stable solvent-free lipid bilayers for ion channel proteins
Ayumi Hirano-Iwata^{1,2}, Daisuke Tadaki², Daichi Yamaura², Takeshi Ohori², Kohei Arara², Miki Kato², Takafumi Deguchi², Teng Ma¹, Hideaki Yamamoto³, and Michio Niwano⁴
(¹Advanced Institute for Materials Research, Tohoku University, Sendai, Japan, ²Research Institute of Electrical Communication, Tohoku University, Sendai, Japan, ³Frontier Research Institute for Interdisciplinary Sciences, Tohoku University, Sendai, Japan, ⁴Kansei Fukushi Research Institute, Tohoku Fukushi University, Sendai, Japan)

14:45 ~ 15:00 Coffee Break

(Chair: Ayumi Hirano-Iwata)

- 15:00 ~ 15:20 Photomodulation of electrical conductivity across a PCBM doped free-standing lipid bilayer
Kensaku Kanomata¹, Takumi Haseyama¹, Masanori Miura¹, Takafumi Deguchi², Daichi Yamaura^{2,3}, Daisuke Tadaki², Teng Ma⁴, Ayumi Hirano-Iwata^{2,4}, and Fumihiko Hirose¹
(¹Graduate School of Science and Engineering, Yamagata University, Yonezawa, Japan, ²Research Institute of Electrical Communication, Tohoku University, Sendai, Japan, ³Japan Society for the Promotion of Science, Tokyo, Japan, ⁴Advanced Institute for Materials Research, Tohoku University, Sendai, Japan)
- 15:20 ~ 15:40 Microscopic morphology of polyethylene-glycol-modified lipids and its effects on macroscopic physical properties in supported lipid bilayers
Yasuhiro Kakimoto and Tero Ryugo
(Toyohashi University of Technology, Toyohashi, Japan)
- 15:40 ~ 16:10 Substrate-induced asymmetric and anisotropic diffusion in supported lipid bilayers
Ryugo Tero¹, Toshinori Motegi¹, Kenji Yamazaki², and Toshio Ogino³
(¹Toyohashi University of Technology, Toyohashi, Japan, ²Hokkaido University, Sapporo, Japan, ³Yokohama National University, Yokohama, Japan)
- 16:10 ~ 17:40 Poster Session

March 2 (Friday)

Room: 4F, Conference Room, *Laboratory for Nanoelectronics and Spintronics*

(Chair: Ryugo Tero)

- 9:00 ~ 9:40 Membrane Functionalized Sensor Architectures
Craig A. Aspinwall, Isen A. C. Calderon, Diem Nguyen, and Xuemin Wang
(University of Arizona, Departments of Chemistry and Biochemistry and Biomedical Engineering, Tucson, Arizona, USA)
- 9:40 ~ 10:10 Artificial bilayers on a substrate for channel recordings
Toru Ide¹ and Minako Hirano²
(¹Graduate School of Natural Science and Technology, Okayama University, Okayama, Japan, ²The Graduate School for the Creation of New Photonics Industries, Hamamatsu, Japan)
- 10:10 ~ 10:40 Noninvasive electrochemical characterization of multicellular spheroids and embryoid bodies
Hitoshi Shiku¹, Kosuke Ino¹, and Tomokazu Matsue²
(¹Graduate School of Engineering, Tohoku University, Sendai, Japan, ²Graduate School of Environmental Studies, Tohoku University, Sendai, Japan)
- 10:40 ~ 10:50 Coffee Break
- (Chair: Daisuke Tadaki)
- 10:50 ~ 11:20 Patterned model biological membrane on the solid substrate
Kenichi Morigaki^{1,2}
(¹Biosignal Research Center, Kobe University, Kobe, Japan, ²Graduate School of Agricultural Science, Kobe University, Kobe, Japan)
- 11:20 ~ 11:50 Numerical simulation for single-electron charging effects in random arrays of small tunnel junctions
Yoshinao Mizugaki¹, Masataka Moriya¹, Hiroshi Shimada¹, Kazuhiko Matsumoto¹, Makoto Moribayashi¹, Tomoki Yagai¹, Yasuo Kimura², Ayumi Hirano-Iwata³, and Fumihiko Hirose⁴
(¹The University of Electro-Communications (UEC Tokyo), Chofu, Japan, ²Tokyo University of Technology, Hachioji, Japan, ³Tohoku University, Sendai, Japan, ⁴Yamagata University, Yonezawa, Japan)