

The Joint Symposium of 10th International Symposium on Medical, Bio- and Nano-Electronics, and 7th 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

Information Biotronics Seminar

Cooperative Society

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

> March 1-3, 2016 Sendai, Japan

The Joint Symposium of

10th International Symposium on Medical, Bio- and Nano-Electronics, and 7th International Workshop on Nanostructures & Nanoelectronics

March 1-3, 2016

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

Organizer:

Symposium Chairs

Michio Niwano, Tohoku Univ.

Shin-ichiro Umemura, Tohoku Univ.

Program Committee

Michio Niwano, Tohoku Univ. Shin-ichiro Umemura, Tohoku Univ. Ayumi Hirano-Iwata, Tohoku Univ. Shin Yoshizawa, Tohoku Univ.

Organizing Committee

Shin-ichiro Umemura, Tohoku Univ.
Ayumi Hirano-Iwata, Tohoku Univ.
Shin Yoshizawa, Tohoku Univ.
Ryo Takagi, Tohoku Univ.
Teng Ma, Tohoku Univ.
Daisuke Tadaki, Tohoku Univ.

Program

March 1 (Tuesday)

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

13:30 ~ 13:35	Opening Remarks
	Michio Niwano (Tohoku University, Japan)
(Chair: Shin-ichi	iro Umemura)
13:35 ~ 14:20	Acoustic Holography by Two-Dimensional Ultrasound Array Synthesis <u>Oleg A. Sapozhnikov^{1,2}</u> , Sergey A. Tsysar1, Vera A. Khokhlova ^{1,2} , and Wayne Kreider ² (¹ Physics Faculty, Moscow State University, Moscow, Russia, ² Center for Industrial and Medical Ultrasound, Applied Physics Laboratory, University of Washington, Seattle, USA)
14:20 ~ 14:50	Reconstruction of Ultrasound Pressure Field by Combination of Optical Phase Contrast Measurement and Acoustic Holography
	<u>Shin Yoshizawa</u> ¹ , Seiji Oyama ¹ , Jun Yasuda ¹ , Hiroki Hanayama ¹ , and Shin-ichiro Umemura ² (¹ Department of Communications Engineering, Tohoku University, Sendai, Japan, ² Department of Biomedical Engineering, Tohoku University, Sendai, Japan)
14:50 ~ 15:20	Numerical Simulation for Development of Advanced HIFU Therapy <u>Kohei Okita¹</u> , Takashi Azuma ² , Shu Takagi ² , Yoichiro Matsumoto ³ (¹ Nihon University, Chiba, Japan, ² The University of Tokyo, Tokyo, Japan ³ RIKEN, Tokyo, Japan)
15:20 ~ 15:35	Coffee break
(Chair: Shin Yos	hizawa)
15:35 ~ 16:20	Image Guided Therapeutic Applications of High Intensity Focused Ultrasound <u>Narendra T. Sanghvi</u> , (SonaCare Medical, Indianapolis, USA)
16:20 ~ 16:40	Monitoring of High-intensity Focused Ultrasound Lesion Formation Using Decorrelation between High-speed Ultrasonic Images by Parallel Beamforming <u>Ryo Takagi</u> ¹ , Ryosuke Iwasaki ² , Shin Yoshizawa ¹ , and Shin-ichiro Umemura ² (¹ Graduate School of Engineering, ² Graduate School of Biomedical Engineering, Tohoku University, Sendai, Japan)
16:40 ~ 17:10	Plasma Agricultural Applications using Reactive Species Controlled by Atmospheric Pressure Air Discharge <u>K. Takashima¹</u> , K. Shimada ¹ , H. Konishi ¹ , and T. Kaneko ¹ (¹ Department of

Electronic Engineering, Tohoku University, Sendai, Japan)

March 2 (Wednesday)

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

(Chair: Teng Ma)

9:30 ~ 10:15	Self-organized TiO ₂ nanotube arrays: Latest features and applications <u>Patrik Schmuki</u> (Department of Materials Science WW-4, LKO, University of Erlangen-Nuremberg, Erlangen, Germany)
10:15 ~ 11:00	Emerging Applications of Nanostructured Silicon <u>Nobuyoshi Koshida</u> (Graduate School of Engineering, Tokyo University of Agri.& Tech., Tokyo, Japan)
11:00 ~ 11:15	Coffee break
(Chair: Patrik Schi	nuki)
11:15 ~ 11:35	Crystal growth and interfacial modification for highly efficient perovskite solar cells
	Teng Ma ¹ , Daisuke Tadaki ² , Ayumi Hirano-Iwata ² , and Michio Niwano ^{1,2}
	(¹ Research Institute of Electrical Communication, Tohoku University, Sendai,
	Japan, ² Graduate School of Biomedical Engineering, Tohoku University, Sendai,
	Japan)
11:35 ~ 11:55	Improved Process of Fabricating Silicon Chips with Micro-Apertures for Formation of Mechanically Stable Bilayer Lipid Membranes
	<u>Daisuke Tadaki</u> ¹ , Ayumi Hirano-Iwata ¹ , Kenichi Ishibashi ² , Shun Araki ¹ , Miyu Yoshida ¹ , Kohei Arata ¹ , Takeshi Ohori ³ , Hideaki Yamamoto ^{1,4} , and Michio
	Niwano ³ (¹ Graduate School of Biomedical Engineering, Tohoku University,
	Sendai, Japan, ² Hang-Ichi Corporation, Yokohama, Japan, ³ Research Institute of
	Electrical Communication, Tohoku University, Sendai, Japan, ⁴ Frontier Research
	Institute for Interdisciplinary Sciences, Tohoku University, Sendai, Japan)
11:55 ~ 13:30	Lunch
13:30 ~ 15:00	Poster session
(Chair: Maurits de	Planque)
15:00 ~ 15:45	Polymer-Stabilized Lipid Membranes: Enabling Platforms for Nanopore Sensors
	and Beyond
	L. Kofi Bright, Benjamin A. Heitz, Mark T. Agasid, S. Scott Saavedra and Craig A.
	Aspinwall
	(Department of Chemistry and Biochemistry, University of Arizona, Tucson, USA)

15:45 ~ 16:15	Observation of Supported Lipid Bilayer Membranes Incorporated with Membrane
	Proteins
	Ryugo Tero ^{1,2} , Kohei Fukumoto ¹ , Yuya Suzuki ¹ , Yuya Niiyama ¹ (¹ Department of
	Environmental and Life Sciences ² Electronics-Inspired Interdisciplinary Research
	Institute, Toyohashi University of Technology, Toyohashi, Japan)

16:15 ~ 16:45 Integration of human ion channels in bilayer lipid membranes formed in microfabricated apertures
 <u>Ayumi Hirano-Iwata</u>,¹ Miyu Yoshida,¹ Shun Araki,¹ Daisuke Tadaki,¹ K. Ishibashi², Hideaki Yamamoto,³ and Michio Niwano^{1,4}(¹Graduate School of Biomedical Engineering, Tohoku University, Sendai, Japan, ²Hang-Ichi Corporation, Kanagawa, Japan, ³Frontier Research Institute for Interdisciplinary Sciences, Tohoku University, Sendai, Japan, ⁴Laboratory for Nanoelectronics and Spintronics, Research Institute of Electrical Communication, Tohoku University, Sendai, Japan)

(Chair: Ryo Takagi)

- 16:45 ~ 17:15 Pulse driven light-addressable potentiometric sensors for chemical imaging <u>Carl Frederik Werner</u>¹, Torsten Wagner², Michael J. Schöning², Ko-ichiro Miyamoto¹, Tatsuo Yoshinobu¹ (¹Department of Biomedical Engineering, Tohoku University, Sendai, Japan, ²Institute of Nano- and Biotechnologies (INB), FH Aachen, Jülich, Germany)
- 17:15 ~ 17:45 Non-invasive measurement of blood glucose level based on mid-infrared spectroscopy using optical-fiber probe
 Saiko Kino and <u>Yuji Matsuura</u> (Graduate School of Biomedical Engineering, Tohoku University, Sendai, Japan)

March 3 (Thursday)

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

(Chair: Ayumi Hirano-Iwata)

- 9:30 ~ 10:15 Molecular diagnostics with nanopore electronics
 <u>Maurits de Planque</u> (Electronics and Computer Science & Institute for Life Sciences, University of Southampton, United Kingdom)
- 10:15 ~ 11:00 Sensor Arrays for Stochastic Detection from Neurotransmitters to Nanoparticles Kay Krause, Alexey Yakushenko, <u>Bernhard Wolfrum</u> (¹Institute of Bioelectronics (PGI-8/ICS-8) and JARA—Fundamentals of Future Information Technology, Jülich, Germany, ²Neuroelectronics, IMETUM, Department of Electrical and Computer Engineering, Technical University of Munich (TUM), Boltzmannstr. 11, 85748 Garching, Germany & Bernstein Center for Computational Neuroscience Munich)

11:00 ~	11:15
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Coffee break

(Chair: Michio Niwano)

11:15 ~ 11:45	Characterization of Exosomes using Atomic Force Microscopy and Scanning
	Electron Microscopy
	Toshio Ogino ¹ , Kazuki Ito ¹ , Keiji Yokota ¹ , Yuta Ogawa ¹ , Sachiko Matsumura ² ,
	Tamiko Minamisawa ² , Kanako Suga ² , Kiyotaka Shiba ² , Yasuo Kimura ³ , Ayumi
	Hirano-Iwata ⁴ (¹ Yokohama National University, ² Japanese Foundation for Cancer
	Research, ³ Tokyo University of Technology, ⁴ Tohoku University)
11:45 ~ 12:15	Characteristics of single electron device fabricated by repeated dispersion of gold nano particles
	Masataka Moriya ¹ , Tran Thi Thu Huong ¹ , Kazuhiko Matsumoto ¹ ,
	HiroshiShimada ¹ , Yasuo Kimura ² , Ayumi Hirano-Iwata ³ , and Yoshinao Mizugaki ¹
	(¹ The Univ. of Electro-Comm. , ² Tokyo Univ. Technology, ³ Tohoku Univ.)
12:15 ~ 12:45	RT atomic layer deposition of TiO ₂ and its application to nanoparticle coating
	K. Kanomata, K. Kikuchi, B. Ahmmad, S. Kubota, F. Hirose (Graduate School of
	Science and Engineering, Yamagata University, Yamagata, Japan)

12:45 ~ 12:50 Closing

Poster Presentation

[P-1]	Depth Profile of B Concentration in Heavily B-Doped Si Epitaxial Film Grown on Si(100)
	Using ECR AF Plasma CVD without Substrate Heating
	K. Motegi, <u>M. Sakuraba</u> , H. Akima and S. Sato
[P-2]	Characterization of S1 and S1-Ge Alloy Heterostructures Formed on S1(100) by ECR Ar Plasma
	CVD without Substrate Heating
	N. Ueno, <u>M. Sakuraba</u> , H. Akima and S. Sato
[P-3]	Preparation and thermoelectric properties of $Cr_{1-x}Nb_xS_{12}$
	<u>H. Nagai</u> , T. Takamatsu, Y. Iijima, K. Hayashi, Y. Miyazaki
[P-4]	Operation to motor-protein in neurons by electro-magnet
	Shin Hasegawa, Kumiko Hayashi
[P-5]	Focal Spot Visualization and Treatment Evaluation in Ultrasonically Thermal Therapy Using
	Tissue Elasticity Imaging
	Ryosuke Iwasaki, Ryo Takagi, Ryo Nagaoka, Hayato Jimbo, Shin Yoshizawa, Yoshifumi
	Saijo, and Shin-ichiro Umemura
[P-6]	Confocal ultrasonic setup for doxorubicin anti-tumor potentiation
	Maxime Lafond, Jacqueline Ngo, Fabrice Prieu, Cécile Fant, Bernadette Rogez, Jean-Louis
	Mestas, Cyril Lafon
[P-7]	Estimation of tissue degeneration area using simulation of tissue temprerature increase by HIFU
	exposure
	Kentaro Tomiyasu, Ryo Takagi, Shin Yoshizawa, Shin-ichiro Umemura
[P-8]	In-situ Monitoring of Crevice Corrosion by Chemical Imaging Sensor
	Sakura Sakakita, Ko-ichiro Miyamoto, and Tatsuo Yoshinobu
[P-9]	Photoacoustic applications for dentistry -pulp vitality test and hidden caries detection-
	<u>Azusa Yamada</u> , Satoko Kakino, Yuji Matsuura
[P-10]	Vessel Filtering and Reconstruction of 3D Photoacoustic images
	Israr Ul Haq, Ryo Nagaoka, Takahiro Makino, Takuya Tabata, Mototaka Arakawa, Yoshifumi
	Saijo
[P-11]	Visualization of Shear Wave Propagation by Dual Acoustic Radiation Pressure
	Yuta Mochizuki, Hirofumi Taki, and Hiroshi Kanai
[P-12]	Formation of Stable Artificial Bilayer Lipid Membranes in Nano-Tapered Microapertures
	Araki Shun, Ayumi Hirano-Iwata, Daisuke Tadaki, Kenichi Ishibashi, Hideaki Yamamoto
	and Michio Niwano
[P-13]	Study on Basic Characteristics of Nano-Bubbles Generated by Porous Alumina Thin Film
	Natsuki Yamada, H. Saito, Teng Ma, Hideaki Yamamoto, Kenichi Ishibashi, Ayumi
	Hirano-Iwata, and Michio Niwano
[P-14]	Recording Multi-and Single-Channel Currents of Human Ion-Channels in Solvent-Free Bilayer
	Lipid Membranes in Tapred Microapertures
	Miyu Yoshida, Shun Araki, Ayumi Hirano-Iwata, Hideaki Yamamoto and Michio
	Niwano
[P-15]	STM Tip-induced Deformation of a Single Ag Nanoparticle Investigated by STM Light Emission

Spectroscopy <u>Masaki Hotsuki</u>, Satoshi Katano, and Yoichi Uehara

 [P-16] Nano-scale Structural and Electronic Properties of Graphene Oxide Investigated by Scanning Tunneling Microscopy
 <u>Tao Wei</u>, Satoshi Katano, and Yoichi Uehara