



2018 Tohoku-Harvard Workshop

January 18 –19, 2018

Tohoku University & Hotel Hananoyu, Sendai



World Leading Research Center for Spintronics,
Tohoku University



Workshop Venue:

House of Creativity, Katahira Campus, Tohoku University, Sendai
2F Zao-no-ma, Hotel Hananoyu, Sendai

Workshop Program:

January 18

• Opening (9:30-10:00)

Tohoku University

Susumu Satomi (President, Tohoku University, Japan)

Hideo Ohno (Director, Research Institute of Electrical Communication,
Tohoku University, Japan)

Motoko Kotani (Director, AIMR, Tohoku University, Japan)

Harvard University

Robert M. Westervelt (Director, STC for Integrated Quantum Materials
Director, Center for Nanoscale Systems,
Harvard University, USA)

• Session I (10:00-12:00)

10:00-10:30

"Quantum Information Science & Technology Center" an overview of our STC"

Robert M Westervelt^{1,2}

¹STC for Integrated Quantum Materials, Harvard University, USA

²Center for Nanoscale Systems, Harvard University, USA

10:30-11:00

"Spintronics Nanodevice - faster, smaller and more intelligent"

Hideo Ohno¹⁻⁴

¹Laboratory for Nanoelectronics and Spintronics, RIEC, Tohoku University, Japan

²CSIS, Tohoku University, Japan

³CSRN, Tohoku University, Japan

⁴CIES, Tohoku University, Japan

⁵AIMR, Tohoku University, Japan

11:00-11:30

“Self-assembled phospholipid bilayer as a drug screening platform for ion channel proteins”

Ayumi Hirano-Iwata^{1,2}

¹AIMR, Tohoku University, Japan

²RIEC, Tohoku University, Japan

11:30-12:00

“Biological applications of solid-state systems”

Donhee Ham

Applied Physics and Electrical Engineering, Harvard University, USA

Move to HANANOYU (Akiu Resort near Sendai)

• **Poster Session (15:00-17:00)**

• **Session II (19:30-20:30)**

19:30-20:00

“Electronic states of novel atomic-layer materials studied by ARPES”

Takafumi Sato^{1,2}

¹Graduate School of Science, Tohoku University, Japan

²CSRN, Tohoku University, Japan

20:00-20:30

“Heterogeneous Integration for High-Performance Microsystems”

Gayatri Perlin

Material Science and Mechanical Engineering, School of Engineering and Applied Science (SEAS),
Harvard University, USA

• **Ad Hoc (20:30 -)**

January 19

• Session III (9:00-11:00)

9:00-9:30

“Spin transport in III-VI layered semiconductor GaSe”

Junsaku Nitta^{1,2}

¹Department of Materials Science, Tohoku University, Japan

²CSRN, Tohoku University, Japan

9:30-10:00

"Active Control of Electromagnetically Induced Transparency in Terahertz Metasurfaces"

Thomas A. Searles

Department of Physics & Astronomy, Howard University

10:00-10:30

“Imaging Electron Flow through Graphene - Collimation and Andreev Reflection”

Sagar Bhandari, Gil-Ho Lee, Kenji Watanabe, Takashi Taniguchi, Philip Kim, Robert Westervelt

¹STC for Integrated Quantum Materials, Harvard University, USA

²Center for Nanoscale Systems, Harvard University, USA

10:30-11:00

“Transport and resistively-detected NMR characteristics of III-V quantum structures”

Yoshiro Hirayama^{1,2}

¹Graduate School of Science, Tohoku University, Japan

²CSRN, Tohoku University, Japan

Poster Presentations (January 18, 15:00-17:00)

P1: "Optimization of nano- and micro-tapered structures at SiO₂/Si₃N₄ aperture edges for formation of mechanically stable lipid bilayer nano-membranes "

Daisuke Tadaki¹, Daichi Yamaura¹, Kohei Arata¹, Takeshi Ohori¹, Miki Kato¹, Teng Ma², Hideaki Yamamoto³, Michio Niwano⁴, Ayumi Hirano-Iwata^{1,2}

¹RIEC, Tohoku University, Japan

²AIMR, Tohoku University, Japan

³Frontier Research Institute for Interdisciplinary Sciences, Tohoku University, Japan

⁴Tohoku Fukushi University, Japan

P2: "Gigahertz Electromagnetic Structures via Direct Ink Writing for Radio-Frequency Oscillator and Transmitter Applications"

Chengye Liu, Nanjia Zhou, Jennifer A. Lewis, and Donhee Ham

John A. Paulson School of Engineering and Applied Sciences, Harvard University, USA

P3: "Superconducting and CDW proximity effects on ultrathin Rashba metals"

S. Souma^{1,2}, N. Shimamura³, K. Yamada³, C. Trang³, K. Nakayama³, K. Sugawara^{1,2}, T. Takahashi^{1,2,3}, and T. Sato^{1,3}

¹CSRN, Tohoku Univ., Japan

²AIMR, Tohoku Univ., Japan

³Dept. Phys., Tohoku Univ., Japan

P4: "Voltage control of rare-earth magnetic moments at the magnetic-insulator—metal interface."

Alejandro O. Leon¹, Adam B. Cahaya¹, Gerrit E. W. Bauer^{1,2}

¹ Institute for Materials Research, WPI-AIMR, and CSRN, Tohoku University, Japan

² Zernike Institute for Advanced Materials, University of Groningen,
The Netherlands

P5: "Structure of topological invariants in time-reversal symmetric Weyl semimetals"

Guo Chuan Thiang ¹, Koji Sato ², Kiyonori Gomi ³

¹ School of Mathematical Sciences, University of Adelaide, Australia

² Institute for Materials Research, Tohoku University, Japan

³ Department of Mathematical Sciences, Shinshu University, Japan

P6: "Inverse spin Hall effect in half-Heusler NiMnSb alloy films"

Zhenchao Wen^{1,2}, Zhiyong Qiu³, Takeshi Seki^{1,2}, Dazhi Hou³, Takahide Kubota^{1,2}, Eiji Saitoh^{1,2,3,4}, Koki Takanashi^{1,2}

¹CSRN, Tohoku University, Japan

²Institute for Materials Research, Tohoku University, Japan

³WPI-AIMR, Tohoku University, Japan

⁴Advanced Science Research Center, Japan Atomic Energy Agency, Tokai, Japan

P7: "Spin-orbit torque induced magnetization switching and its application"

Shunsuke Fukami^{1,2,3,4}, Chaoliang Zhang^{1,2}, William A. Borders¹, Aleksandr Kurenkov¹, Samik DuttaGupta^{1,3}, Butsurin Jinnai^{1,2}, Hideo Sato^{1,2,3,4}, and Hideo Ohno^{1,2,3,4,5}

¹Laboratory for Nanoelectronics and Spintronics, RIEC, Tohoku University, Japan

²CSIS, Tohoku University, Japan

³CSRN, Tohoku University, Japan

⁴CIES, Tohoku University, Japan

⁵WPI-AIMR, Tohoku University, Japan

P8: "Investigating the influence on magnetization switching of edge effects in nanoscale CoFeB/MgO perpendicular magnetic tunnel junctions"

J. Igarashi¹, J. Llandro^{1,2}, H. Sato^{1,4}, S. Fukami^{1,4} and H. Ohno^{1,5}

¹Laboratory for Nanoelectronics and Spintronics, RIEC, Tohoku University, Japan.

²CSRN, Tohoku University, Japan.

³CIES, Tohoku University, Japan.

⁴CSIS, Tohoku University, Japan.

⁵WPI-AIMR, Tohoku University, Japan.

P9: "Challenge to high-resolution magnetic field imaging using magnetic tunnel junction based sensors"

M. Oogane, Z. Jin, K. Fujiwara, and Y. Ando

Department of Applied Physics, Tohoku University, Japan

P10: "Electrical spin manipulation by spin-momentum locking in InGaAs-based two-dimensional electron gas"

Takanori Okayasu¹, Makoto Kohda^{1,2}, and Junsaku Nitta^{1,2}

¹Department of Materials Science, Tohoku University, Japan

²CSRN, Tohoku University, Japan

P11: “Electronic Thermal Conductance Measurement of Bilayer Graphene using Johnson Noise Thermometry”

Artem Talanov¹, Jesse Crossno¹, Kemen Linsuain¹, Jonah Weissman¹, Marine Arino¹, Hugo Bartolomei¹, Takashi Taniguchi², Kenji Watanabe², Kin Chung Fong³, Philip Kim¹

¹Harvard University, USA

²National Institute for Materials Science, Japan

³Raytheon BBN Technology, Cambridge, Massachusetts, USA

P12: “Scanning gate imaging of a hyperfine-coupled quantum Hall system”

K. Hashimoto^{1,2}, T. Tomimatsu¹, S. Taninaka¹, K. Sato¹, and Y. Hirayama^{1,2}

¹ Graduate School of Science, Tohoku University, Japan

² CSRN, Tohoku University, Japan