



**Swiss-Japanese Workshop on  
“NANOSCIENCE: Materials Phenomena at Small Scale”  
9-11 October 2013  
National Institute for Materials Science NIMS,  
WPI-MANA, Tsukuba, Japan**

## Programme

### 9 October

- 09:00-09:15 **Opening**  
Sukekatsu Ushioda (President NIMS)  
Mauro Dell’Ambrogio (Swiss State Secretary for Education, Research and Innovation)
- 09:15-09:25 ***In memoriam Dr. Heini Rohrer***  
Masakazu Aono (NIMS MANA)
- 09:30-11:00 **Session 1: Low-dimensional Carbon and Other Materials** (Chair: Yoshio Bando)  
Sumio Iijima (Meijo University) 30’  
“Carbon Nanotubes: Science and Applications”  
Oliver Groening (Empa) 30’  
“On-surface chemical synthesis of graphene nanostructures: from metallic to insulating substrates”  
Kazuhiro Tsukagoshi (NIMS MANA) 15’  
“Semiconducting Property in Atomically Thin Films for Future Nano-electronics”  
Discussion
- 11:00-11:15 ***Coffee Break***
- 11:15-13:00 **Session 2: Quantum Electronics (1)** (Chair: Daniel Loss)  
Christian Schoenenberger (University of Basel) 30’  
“Suspended bilayer and monolayer graphene”  
Seigo Tarucha (Tokyo University) 30’  
“Hybrid Superconductor-Quantum Dot/Nanowire Devices”  
Jelena Klinovaja (University of Basel) 15’  
“Topological Superconductivity and Majorana Fermions in RKKY Systems”  
Michihisa Yamamoto (Tokyo University) 15’  
“Electron Flying Qubit and Measurement of Phase Shift through a Kondo State”  
Discussion

13:00-14:00 **Lunch**

14:00-16:00 **Session 3: Quantum Electronics (2)** (Chair: [Seigo Tarucha](#))

[Yasuhiko Arakawa](#) (Tokyo University) 30'

"Fabrication and Physics of Site-controlled GaN/AlGa<sub>N</sub> Nanowire Quantum Dots"

[Klaus Ensslin](#) (ETH Zurich) 30'

"Imaging integer and fractional quantum Hall edge states"

[Kohei M. Itoh](#) (Keio University) 30'

"Silicon Quantum Computers and Diamond Quantum Sensors"

[Clemens Rössler](#) (ETH Zurich) 15'

(Non-Equilibrium Single Electron Transfer)

Discussion

16:00-16:20 **Coffee Break**

16:20-18:05 **Session 4: Nano-Neuro-Med Fusion Science** (Chair: [Louis Schlapbach](#))

[Masakazu Aono](#) (NIMS MANA) 30'

"TT"

[Patrick Hunziker](#) (University of Basel) 30'

"TT intelligent nanomaterials for cancer therapy"

[Genki Yoshikawa](#) (NIMS MANA) 15'

"TT Ultrasensitive ultraparallel biomolecular sensing"

[Fabian Herzog](#) (University of Fribourg) 15'

"Nanomaterials at the bio-interface: risk assessment of silver nanoparticles released into the environment"

Discussion

## 10 October

08:30-10:30 **Session 5: Spintronics and Magnetism** (Chair: [Harald Brune](#))

[Hans-Joseph Hug](#) (Empa) 30'

"TT Giant exchange coupling between ferro- and ferrimagn thin films"

[Hideo Ohno](#) (Tohoku University) 30'

"Spintronics Devices for Nonvolatile CMOS VLSIs"

[Christian Degen](#) (ETH Zurich) 15'

"KW Magnetic resonance force microscopy"

[Shunsuke Fukami](#) (Tohoku University) 15'

"Current-Induced Magnetic Domain Wall Motion in Co/Ni Wire and Its Application to Nonvolatile Memory Devices"

[Kenji Tanabe](#) (Osaka University) 15'

"Spin Motive Force Induced by Gyration Magnetic Vortex"

Discussion

10:30-11:00 **Coffee Break**

11:00-13:00 **Session 6: Quantum Electronics (3)** (Chair: Masahiko Hara)

Yasunobu Nakamura (Tokyo University) 30'

"Hybridizing the Quantum World"

Daniel Loss (University of Basel) 30'

"Long-Range Interaction of Spin-Qubits via Ferromagnets"

Kensuke Kobayashi (Osaka University) 30'

"Current Fluctuation in Quantum Transport"

Jens Schindele (University of Basel) 15'

"Controlling spins in surface-adsorbed transition-metal complexes by coordination-chemistry"

Discussion

13:00-14:00 **Lunch**

14:00-15:45 **Session 7: Future Fields** (Chair: Masakazu Aono)

Matthias Kaiserswerth (IBM Zurich) 30'

"Four technologies that will change the world"

Masahiko Hara (Tokyo Institute of Technology) 30'

"TT Fusion and Post Nanotechnology"

Tsuyoshi Yamamoto (RIKEN) 15'

"Non-destructive Qubit Readout Using Josephson Parametric Amplifier"

Antje Rey (ETH Zurich/IBM Zurich) 15'

"Gold Nanorods as Bottom-Up Building Blocks for Molecular Electronic Devices"

Discussion

15:45-16:00 **Coffee Break**

16:00-18:00 **Session 8: New Electronic Materials** (Chair: Yoshinori Tokura)

Heike Riehl (IBM Zurich) 30'

"TT Semicond nanowire heterostructures on silicon - growth to devices"

Masashi Kawasaki (Tokyo University) 30'

"Exploration of Quantum Functionalities at the Oxide Interfaces"

Minoru Osada (NIMS MANA) 15'

"2D Oxide Materials and Devices Beyond Graphene"

Giorgio Signorello (IBM Zurich) 15'

"KW Strain on GaAs nanowires"

Soyeon Lee (Tokyo Institute of Technology) 15'

"LiMn<sub>2</sub>O<sub>4</sub> Nanowire Battery Sustainable for Cubic-Tetragonal Transformation"

Discussion

## 11 October

### 08:30-10:30 **Session 9: Nano-Electrochemistry and New Materials** (Chair: [Heike Riehl](#))

[Thomas Wandlowski](#) (University of Bern) 30'

"TT Charge Transport with Single Molecules and Cluster: a Nano- Electrochemical Approach"

[Kunio Takayanagi](#) (Tokyo Institute of Technology) 30'

"*In-situ* E-Microscopy of Nanocycles in Materials' Transport"

[Christoph Weder](#) (Adolphe Merkle Institute University of Fribourg) 30'

"KW biomimetic materials, nanocomposites, non-covalent interactions, supramolecular materials"

[Christian Waeckerlin](#) (EPF Lausanne) 15'

"Controlling spins in surface-adsorbed transition-metal complexes by coordination-chemistry"

Discussion

### 10:50-13:05 **Session 10: Title Emergent Materials Functionality** (Chair: TBD)

[Yoshinori Tokura](#) (RIKEN) 30'

"Topology Creates Nano Particles in a Magnet: Science of Skyrmion"

[Harald Brune](#) (EPF Lausanne) 30'

"Revealing the Molecular Nuclear Spin with the STM"

[Xiao Hu](#) (NIMS MANA) 30'

"Topological Materials Nanoarchitectonics"

[Takashi Uchihashi](#) (NIMS MANA) 15'

"Surface Superconducting Materials and Topological Nanoarchitectonics"

[Tomoko Shimizu](#) (NIMS) 15'

"Identification of Atomic Species and Adsorption Configuration of Molecules on TiO<sub>2</sub> Anatase by Means of Simultaneous AFM and STM"

Discussion

### 13:05-13:35 **Final Remarks & Conclusions**

[Michiharu Nakamura](#) (President JST)

[Louis Schlapbach](#) (ETH-Empa/NIMS)

[Masakazu Aono](#) (NIMS MANA)