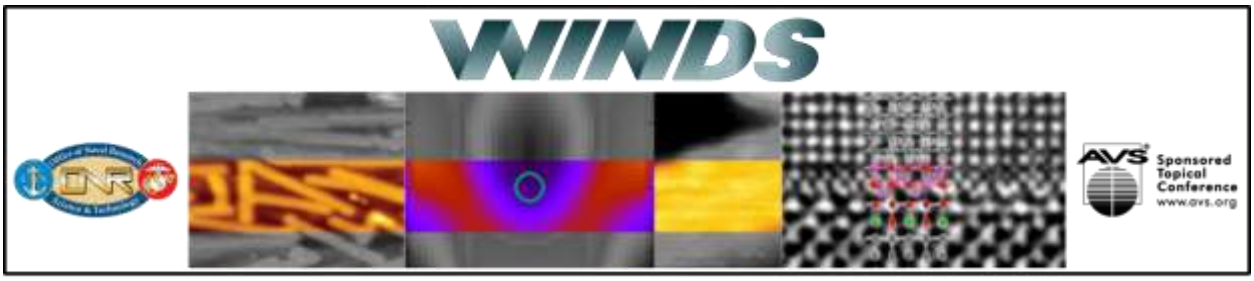
2019 Workshop on
Innovative Nanoscale Devices and Systems

WINDS

Final Program



December 1 – 6, 2019, Fairmont Orchid Hotel, Kohala Coast, Hawaii, USA

WINDS is an AVS Sponsored Topical Conference, with financial support from the Office of Naval Research.

WINDS 2019 Program

Sunday, December 1

16:00-18:00 Registration

18:00-20:00 Gala Reception

Monday, December 2

9:00-9:15 Welcome and Conference Overview, Stephen Goodnick and David Janes

Session 1. Topological and Quantum Systems - I

Session Chair: Jaroslav Fabian

9:15-9:45 Stuart Parkin, *Max Planck Institute, Germany* "Chiral and Spatial Spin Textures" (invited)

9:45-10:15 Barry Bradlyn, *University of Illinois at Urbana-Champaign, USA*, "Chiral Currents in a Correlated Compound: Weyl-Charge Density Waves" (invited)

10:15-10:30 Jukka Vayrynen, Roman Lutchyn, *Microsoft Quantum, Station Q, USA,* and Adrian Feiguin, *Northeastern University, USA*, "Microscopic Description of Coulomb Blockaded Topological Superconducting Island Coupled to Many Leads"

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

11:00-11:15 Daniel Vanmaekelbergh, Ingmar Swart, Cristiane Morais Smith, University of Utrecht, The Netherlands, and Christophe Delerue, Université Polytechnique Hauts-de-France, France, "2-D Electronic Systems with s- and p Orbital Dirac Physics Created in a Scanning Tunnelling Microscope"

11:15-11:30 Mi-Young Im, *Lawrence Berkeley National Laboratory and* Hee-Sung Lee, and Ki-Suk Lee, *Ulsan National Institute of Science and Technology, Republic of Korea*, "Dynamic Behavior of Topological Spin Singularity Studied by Soft X-ray Microscopy"

11:30-12:00 Denis R. Candido and J. Carlos Egues, *Universidade de São Paulo, Brazil* and Michael E. Flatté, *University of Iowa, USA*, "Topological and Nontopological Edge States in Ordinary Quantum Matter" (invited)

12:00-12:15 Igor Zutic, Tong Zhou, Jong Han, *University at Buffalo, USA,* and Matthieu C. Dartiailh, William Mayer, Andrew Kent, Javad Shabani, *New York University, USA,* and Narayan Mohanta, and Alex Matos-Abiague, *Wayne State University, USA*, "Scalable Majorana States and Phase Measurement of Topological Superconductivity"

12:15-12:30 Lingfei Zhao, Ethan Arnault, Alexey Bondarev, Andrew Seredinski, Trevyn Larson, Anne Draelos, Hengming Li, Takashi Taniguchi, Kenji Watanabe, François Amet, Harold Baranger and Gleb Finkelstein, *Duke University, USA, Appalachian State University, USA and Advanced Materials Laboratory, Japan*, "Detection of Chiral Andreev Edge States at the Quantum Hall – Superconductor Interface"

12:30-12:45 Matthew Gilbert, *Stanford University, USA,* "Coulomb Interactions in Magnetic Topological Heterostructures"

12:45-13:00 Kouichi Semba, *National Institute of Information and Communications Technology, Japan,* and Sahel Ashhab, *Hamad Bin Khalifa University, Qatar*, "Conical-intersection and Berry Phase in Deep-Strongly Coupled Superconducting-qubit-resonator System"

13:00- 19:00 Ad Hoc Session

Session 2: Emerging Device and Processing Technologies

Session Co-Chairs: Saulius Marcinkevičius and Kathleen McCreary

19:00-19:15 Thomas A. Zirkle, Matthew J. Filmer, Alexei O. Orlov, Alexander M. Mintairov and Gregory L. Snider, *University of Notre Dame, USA and Ioffe Institute, Russia*, "Application of RF Single Electron Devices for Scanning Probe Microscopy"

19:15-19:30 Robert Wolkow, *University Alberta, National Research Council, and Quantum Silicon Inc., Canada*, "Far Faster Fabrication of Binary Atomic Silicon Logic Circuitry"

19:30-19:45 Xujiao Gao, Denis Mamaluy, Evan Anderson, DeAnna Campbell, Albert Grine, Aaron Katzenmeyer, Tzu-Ming Lu, Scott Schmucker, Lisa Tracy, Daniel Ward, and Shashank Misra, *Sandia National Laboratories, USA,* "Modeling Assisted Atomic Precision Advanced Manufacturing (APAM) Towards Room Temperature Operation"

19:45-20:00 K.E.K. Holden, Y. Qi, M.A. Jenkins, and J.F. Conley, Jr., *Oregon State University, USA,* "Atomic Layer Deposition Engineering of Metal/Insulator/Metal (MIM) Diodes using Localized Impurity Defects"

20:00-20:15 Ryan J. Waskiewicz, Brian Manning, and Patrick M. Lenahan, *Pennsylvania State University, USA,* "Electrically Detected Electron Nuclear Double Resonance in Fully Processed Transistors"

Session 3: Quantum information systems

Session Co-Chairs: Kathleen McCreary and Saulius Marcinkevičius

20:15-20:30 Alexander Khitun, *University of California –Riverside, USA,* "Quantum Computing without Quantum Computers: Database Search and Data Processing Using Classical Wave Superposition"

20:30-20:45 Alexander Mintairov, *University of Notre Dame, USA, and Ioffe Institute, Russia,* "Probing of Composite Fermions in Natural InP/$GaInP_2$ Quantum Hall Puddles using Near-field Scanning Optical Microscopy"

Tuesday, December 3

Session 4: Special Topical Session

9:00-9:30 Chagaan Baatar, *Office of Naval Research, USA,* **"**Synthetic Electronics" (invited)

Session Chair: Stephen Goodnick

Session 5: Bioelectronics: interfaces and sensors

Session Chair: Wolfgang Porod

9:30-10:00 Masateru Taniguchi, *Osaka University, Japan,* "Quantitative Analysis of DNA via Single-molecule Quantum Sequencing" (invited)

10:00-10:30 Alex Smolyanitsky and Alta Fang, *National Institute of Standards and Technology, USA,* "Ion Transport Across Crown-like Sub-nanoscale Pores in 2D Materials" (invited)

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

11:00-11:30 H. Tom Soh, Stanford University, USA, "Real-time Biosensors for Continuous Measurements of Biomolecules in Live Subjects" (invited)

11:30-11:45 Son T. Le, *National Institute of Standards and Technology, USA and Theiss Research, USA,* Curt A. Richter Nicholas B. Guros and Arvind Balijepalli, *National Institute of Standards and Technology, USA* and Niranjana D. Amin, Harish C. Pant, National Institute of Neurological Disorders and Stroke, National Institutes of Health, USA, "High Performance Dual-Gate 2-Dimensional MoS_2 pH and Biosensors"

11:45-12:00 Kazuhiko Matsumoto, *Osaka University, Japan,* "Towards the Practical Use of Graphene Bio-Sensor for Virus Detection"

12:00-12:30 Vijay D. Bhatt, Saumya Joshi, Biresaw D. Abera, Giuseppe Cantarella and Paolo Lugli, *Free University of Bozen-Bolzano, Italy and Technical University of Munich, Germany* "Printed Biosensors: Applications and Perspectives" (invited)

12:30-12:45 Siddarth V. Sridharan, Jose F. Rivera, James Nolan, Stephen Miloro, Zheng (Cindy) Xing, Muhammad A. Alam, Jenna L. Rickus, Elizabeth Tran and David B.

Janes, *Purdue University, USA,* "Real-Time Measurements of Glucose Uptake in 2D Cell Cultures Using On-Chip Microelectrode Arrays"

12:45- 19:00 Ad Hoc Session

Session 6: Spintronics: materials and spin-based phenomena

Session Chair: Valeria Lauter

19:00-19:30 Deepak K. Singh, *University of Missouri, USA*, "New Artificial Magnetic Honeycomb Lattice for Emergent Physics and Spintronics Application" (invited)

19:30-19:45 Jaroslav Fabian, *University of Regensburg, Germany*, "Spin Physics in Ferromagnet/ Superconductor Tunnel Junctions"

19:45-20:00 Hadrian Aquino, David Connelly, Adam Papp, Markus Becherer, György Csaba, Jonathan Chisum, Alexei Orlov, Gary H. Bernstein, and Wolfgang Porod, *University of Notre Dame, USA, Pázmány University, Hungary and Technical University of Munich, Germany,* "Towards Spin-Wave-Based Devices: Experiments and Simulations"

20:00-20:15 Nargess Arabchigavkani, R. Somphonsane, H. Ramamoorthy, G. He, J. Nathawat, Shenchu Yin, Bilal Barut, J. Fransson and Jonathan P. Bird, *University at Buffalo, USA, King Mongkut's Institute of Technology, Thailand and Uppsala University, Sweden*, "Suppression of Weak Localization in Bilayer Graphene due to Proximity Induced Spin Orbit Coupling"

20:15-20:30 Yota Takamura, Juan Pedro Cascales, Rafael Gonçalves, Greg Stephen, Donald Heiman, Atilgan Altinkok, Clodoaldo I. L. de Araujo, Biswarup Satpati, Valeria Lauter, Jagadeesh S. Moodera, *Massachusetts Institute of Technology, Cambridge, USA, Tokyo Institute of Technology, Japan, Universidade Federal de Viçosa, Brazil, Northeastern University, USA, Giresun University, Turkey, Saha Institute of Nuclear Physics, India, and Oak Ridge National Laboratory, USA,* "Enhancement of the Interfacial Exchange Field in Superconducting Spin Valves of GdN/NbN/GdN trilayers"

20:30-20:45 Roberto Lacerda de Orio, Siegfried Selberherr, Johannes Ender, Simone Fiorentini, and Viktor Sverdlov, *TU Wien, Austria* and Wolfgang Goes, *Silvaco Europe Ltd., United Kingdom*, "Robustness of the Two-Pulse Switching Scheme for SOT-MRAM"

Wednesday, December 4

Session 7: Wide Bandgap and Oxide Materials and Devices

Session Chair: Viktor Sverdlov

9:00-9:30 Robert Kaplar, Andrew Armstrong, Albert Baca, Brianna Klein, Erica Douglas, Shahed Reza, Andrew Allerman, Mary Crawford, Jeramy Dickerson, Andrew Binder, Jack Flicker, Jason Neely, and Oleksiy Slobodyan, *Sandia National Laboratories, USA,* "Ultra-Wide-Bandgap Aluminum Gallium Nitride for High-Performance Power-Switching and Radio-Frequency Devices" (invited)

9:30-9:45 Saulius Marcinkevičius, Rinat Yapparov, *KTH Royal Institute of Technology, Sweden,* and Leah Y. Kuritzky, Shuji Nakamura, and James S. Speck, *University of California, Santa Barbara, USA,* "Carrier Transport Across Multiple InGaN Quantum Wells: Evidence of Ballistic Hole Transport"

9:45-10:15 Kookrin Char, *Seoul National University, Republic of Korea*, "Oxide Electronics Based on Wide Bandgap Perovskite $BaSnO_3$" (invited)

10:15-10:30 A. K. Hamze, K. D. Fredrickson, W. Li, and A. A. Demkov, *The University of Texas, USA,* "Pockels Effect in Si-integrated Perovskite Oxides"

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

11:00-11:30 Masataka Higashiwaki, Man Hoi Wong and Yoshinao Kumagai, *National Institute of Information and Communications Technology, Japan,* and Ken Goto, Hisashi Murakami, *Tokyo University of Agriculture and Technology, Japan*, "Vertical Ga2O3 MOSFETs Fabricated by Ion Implantation Process" (invited)

Session 8: Topological and Quantum Systems -- II

Session Chair: Matthew Gilbert

11:30-12:00 Claudia Felser, Kaustuv Manna, Enke Lui and Yan Sun, *Max Planck Institute Chemical Physics of Solids, Germany,* "Magnetic Weyl Semimetals!" (invited)

12:00-12:15 T. Wu, Z. Wan, A. Kazakov, Y. Wang, G. Simion, J. Liang, K.W. West, K. Baldwin, L.N. Pfeiffer, Y. Lyanda-Geller and L.P. Rokhinson, *Purdue University, USA,* "Formation of Helical States in the Fractional Quantum Hall Regime"

12:15-12:30 Yasuhiro Tokura, *University of Tsukuba, Japan,* "Quantum Adiabatic Pumping with Modulating Electron Phase"

12:30-12:45 Denis Mamaluy, Juan P. Mendez, Xujiao Gao, *Sandia National Laboratories, USA,* "Quantum Transport in APAM Wires"

12:45-13:00 Y.-H. Lee, S. Xiao, J. P. Bird, and J. E. Han, *University at Buffalo, USA,* K. W. Kim, *Institute for Basic Science (IBS), Republic of Korea,* J. L. Reno, *Sandia National Laboratories, USA,* "Giant Zero Bias Anomaly due to Coherent Scattering from Frozen Phonon Disorder in Quantum Point Contacts"

13:00-19:00 Ad Hoc Session

18:00-21:00 Conference Banquet

Thursday, December 5

Session 9: Two-dimensional materials and van der Waals heterostructures

Session Co-Chairs: Akira Oiwa and John Conley

9:00-9:30 Eric Pop, Stanford University, USA, "2D Materials for Nanoelectronics" (invited)

9:30-10:00 Robert M. Wallace, *Univ. of Texas at Dallas, USA*, "2D Materials for Nanoelectronics: Prospects and Materials Integration Challenges" (invited)

10:00-10:15 M. Ersfeld, L. Rathmann, F. Volmer. M. Heithoff, C. Stampfer, and B. Beschoten, *RWTH Aachen University, Germany* "Gate-dependent Valley Lifetimes in Monolayer WSe_2"

10:55-10:30 Victor Ryzhii, Taiichi Otsuji, *Tohoku University, Japan,* Maxim Ryzhii, *University of Aizu, Japan,* Vladimir Mitin, *University at Buffalo, USA,* and Michael S. Shur, *Rensselaer Polytechnic Institute, USA*, "Infrared Interband Photodetectors Based on Graphene/Black-AsP Heterostructures"

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

11:00-11:30 Matthew R. Rosenberger, Hsun-Jen Chuang, Madeleine Phillips, Saujan V. Sivaram, Kathleen M. McCreary, C. Stephen Hellberg, and Berend T. Jonker, *Naval Research Laboratory, USA*, and Chandriker Kavir Dass and Joshua R. Hendrickson, *Air Force Research Laboratory*, USA, "Moire Superpotentials and Quantum Calligraphy of Single Photon Emitters in van der Waals Heterostructures" (invited)

11:30-12:00 Tomoki Machida, University of Tokyo and CREST, Japan, and Rai Moriya, Momoko Onodera, Kei Kinoshita, Yusai Wakafuji, Sabin Park, Satoru Masubuchi, University of Tokyo, Japan, and Kenji Watanabe, and Takashi Taniguchi, National Institute for Materials Science, Japan, "Cyclotron Resonance Absorption of Mid-infrared Light in van der Waals Heterostructures of Graphene and 2D materials" (invited)

12:45-12:15 Saujan Sivaram, Aubrey Hanbicki, Matthew Rosenberger, Glenn Jernigan, Hsun-Jen Chuang, Kathleen McCreary, and Berend Jonker, *Naval Research Laboratory, USA*, and *Laboratory for Physical Sciences, USA*, "Spatially Selective Enhancement of Photoluminescence in MoS_2 by Exciton-Mediated Adsorption and Defect Passivation"

12:15-12:30 Carlos Marquez, Norberto Salazar, Farzan Gity, Carlos Navarro, Gioele Mirabelli, Ray Duffy, Jose C. Galdon, Paul Hurley and Francisco Gamiz, *University of Granada, Spain* and *University College Cork, Ireland*, "On the Reliability of Back-gated MoS_2 Field-effect Transistors"

12:30-12:45 Slava V. Rotkin, Xinyi Li, Natalie Briggs, Brian Bersch, Ana de la Fuente Duran, and Joshua Robinson, The Pennsylvania State University, USA, "sSNOM Multimodal Imaging of 2D Polar Metals"

12:45- 19:00 Ad Hoc Session

19:00-21:00 Session 10. Poster Session

Location:

P1 Honami Yanagisawa, Chang Liu, Qian Chen, Yang Wang, Narumasa Miyazaki, Yusuke Ootani, Nobuki Ozawa and Momoji Kubo, *Tohoku University, Japan,* "Molecular Dynamics Analysis of Effect of Dissolved Hydrogen on Deformation Behavior in Ni-based Superalloys"

P2 Sota Kimura, Wang Yang, Narumasa Miyazaki, Yusuke Ootani, Nobuki Ozawa and Momoji Kubo, *Tohoku University, Japan*, "Large-scale Molecular Dynamics Simulations on Chemical Mechanical Polishing Process of AlN Substrate with Nanobubbles"

P3 T. H. Park, T. H. Lee, M. S. Chae, and Tae Geun Kim, *Korea University, Republic of Korea, "*AlGaN-based UV Light-emitting Diodes using Nickel-doped Aluminum Zinc Oxide Electrodes"

P4 Woohui Lee, Changmin Lee, Jinyong Kim, Jehoon Lee, Deokjoon Eom, Jaechan Park, Daehyun Kim, Taejoo Park, and Hyoungsub Kim, *Sungkyunkwan University, Republic of Korea, and Hanyang University,* "Electrical Properties of HfO_2 Formed on the p-type $Si_{1-x}Ge_x$ Pretreated with H_2S Annealing"

P5 Kengo Nagai, Yang Wang, Narumasa Miyazaki, Yusuke Ootani, Nobuki Ozawa and Momoji Kubo *Tohoku University, Japan,* "Molecular Dynamics Simulation on Interfacial Reaction between LiC6 / Li3PS4 in All-Solid-State Li Ion Battery Anode"

P6 Shuro Yamashita, Yang Wang, Narumasa Miyazaki, Yusuke Ootani , Nobuki Ozawa, Momoji Kubo, *Tohoku University, Japan*, "Effect of Water in Grain Boundaries on Shear Failure Strength of Silica: Reactive Molecular Dynamics Simulation"

P7 K. Yamamoto, T. Ono, N. Miyakawa, Y. Kanai, T. Koyama, M. Tanioku, S. Ushiba, A.Shinagawa, K. Inoue, Y. Watanabe, S. Nakakita, T. Kawahara, Y. Suzuki, M. Kimura, D. Chiba, and K. Matsumoto, *Osaka Univ., Japan, Murata Mfg., Kyoto Prefecture Univ. of Medicine, Kagawa Univ. and Chubu Univ.*, "New Modification Method of Sugar Chain on Graphene FET for Selective Detection of Virus"

P8 Namdoo Kim, Hyung Jun Kim, Younggyu Kim, Kyung Suk Min and Seong Keun Kim, *Seoul National University, Republic of Korea and LumiMac, Inc.,* "Direct and Precise Length Measurement of Single, Stretched DNA Fragments by Dynamic Molecular Combing and STED Nanoscopy"

P9 Simone Fiorentini, Roberto Lacerda de Orio, Siegfried Selberherr, Johannes Ender, Wolfgang Goes, and Viktor Sverdlov, *TU Wien, Austria and Silvaco Europe Ltd.*, "Comprehensive Modeling of Switching in Perpendicular STT-MRAM"

P10 Donghyuk Shin, Hyerim Cho, Seran Park, Dae-Hong Ko and Hoon-Jung Oh, *Yonsei University, Republic of Korea,* "Properties of Gallium Oxide Grown by In-situ Plasma Oxidation and Its Effect on High-k MOS Capacitor on GaAs"

P11 Mauro Ballicchia, Mihail Nedjalkov, Siegfried Selberherr, and Josef Weinbub, *TU Wien, Austria*, "Potentials for Single Electron State Processing"

P12 V. A. Petrov, *Russian Academy of Sciences, Russia,* "On the Theory of the Energetic Spectrum of Vicinal Superlattices: the Role of Crystal Potential

P13 Wonsik Ahn, Hangsook Lee, Yeonchoo Cho, Hoijoon Kim, Mirine Leem, Heesoo Lee, Kyung-Eun Byun, Hyeon-Jin Shin, and Hyongsub Kim, *Sungkyunkwan University, Republic of Korea and Samsung Advanced Institute of Technology,* "Substrate-dependent Morphological Change of MoS_2 During Atomic Layer Deposition"

P14 Hoijoon Kim, Taejin Park, Mirine Leem, Hyangsook Lee, Wonsik Ahn, Eunha Lee, and Hyoungsub Kim, *Sungkyunkwan University, Republic of Korea, Samsung Electronics, and Samsung Advanced Institute of Technology*, "Synthesis of MoS2 via Sulfurization of a MoO2-evaporated Film*"*

P15 In Hwan Jung, *Kookmin University, Republic of Korea,* "Enhancement of Power Conversion Efficiency of Quantum-dot and Perovskite Solar Cells by Controlling Electron Transporting Layer"

P16 Young Wook Noh, Jae Woong Jung, *Kyung Hee University, Republic of Korea,* "Tailored Electronic Properties of Zr-doped SnO2 Nanoparticles for Efficient Planar Perovskite Solar Cells with Marginal Hysteresis"

P17 Jiwon Kim, Choong Ki Lee, and Young Jin Kim, *Kyonggi University, Republic of and Korea, Malvern Panalytical,* "The Modification of the Band Gap, Energy Transfer Between Dopants, and Crystal Structure Refinement of Ce3+ and Cr3+ Co-doped Lu3(Al,Ga)5O12 Persistent Luminescence Phosphors"

Friday, December 6

Session 11: Quantum Photonics

Session Chair: Tomoki Machida

9:00-9:30 Victor I. Klimov, *Los Alamos National Laboratory, USA,* "Nanocrystal Quantum Dot Lasing: From Novel Concepts to Novel Devices" (invited)

9:30-9:45 Masashi Kawasaki, Masao Nakamura, Hiroki Hatada, Sotaro Inagaki, Masato Sotome, Takahiro Morimoto, Tshio Kaneko, Naoki Ogawa, Naoto Nagaosa,

Yoshinori Tokura, *RIKEN Center for Emergent Matter Science (CMES), Japan,* and University of Tokyo, Japan, "Quantum Mechanical Shift Current in Polar Semiconductors"

9:45-10:00 Gabriel G. Maia and Akira Oiwa, *Osaka University, Japan,* and Kentarou Sawano, *Tokyo City University, Japan,* "Magneto-transports in a Light Irradiated Ge/SiGe Two-dimensional Hole System"

10:00-10:15 Riad Yahiaou, Zizwe A. Chase, Chan Kyaw and Thomas A. Searles, *Howard University, USA,* "Tunable Strong Coupling in Terahertz Metasurfaces"

10:15-10:30 G. T. Adamashvili, *Technical University of Georgia, Georgia,* "Optical Nonlinear Waves in a Graphene Waveguide"

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

11:00-11:15 Dmitri R. Gulevich, Yaroslav V. Zhumagulov, *ITMO University, Russia,* Alexei V. Vagov, *University at Bayreuth, Germany,* and Vasili Perebeinos, *University at Buffalo, USA,* "Bethe Salpeter calculations of Trions in MoS_2"

11:15-11:30 Vyacheslav Semenenko, and Vasili Perebeinos, *University at Buffalo, USA,* "Plasmon Reflection in Graphene Junctions: Transfer Matrix Approach"

Session 12: Energy conversion and harvesting

Session Chair: Victor Klimov

11:30-11:45 Abdul Rawoof Shaik and Dragica Vasileska, *Arizona State University, USA,* "PVRD-FASP: A Tool for Modeling Reliability and Durability of CdTe Solar Cells"

11:45-12:00 Takeyoshi Sugaya, Ryuji Oshima, Yasushi Shoji, Kikuo Makita, *National Institute of Advanced Industrial Science and Technology (AIST), Japan,* and Akinori Ubukata, *Taiyo Nippon Sanso Corporation,* "High-speed Growth of III-V Materials by HVPE for Low-cost Smart Stacked Multijunction Solar Cells"

12:00-12:15 Yongjie Zou, Reza Vatan Meidanshahi, Christiana Honsberg and Stephen Goodnick, *Arizona State University, USA,* "Lattice-Matched Dilute-N GaNPAs on Silicon for Tandem Solar Cells"

12:15-12:30 V. R. Whiteside, H. Esmaeilpour, and I. R. Sellers, *University of Oklahoma, USA,* and G. E. Eperon, M. C. Beard, *National Renewable Energy Laboratory, USA,* "Hot Carrier Dynamics in Bulk and 2D Perovskites"

12:30-12:45 D. K. Ferry, Arizona State University, USA, and H. Esmaielpour, K. R. Dorman, T. B. Mishima, M. B. Santos, V. R. Whiteside, and I. R. Sellers, Univ. of Oklahoma, USA, "Valley Photovoltaics: Evidence for a True Hot Carrier Solar Cell"

12:45-13:00 Concluding Remarks, Stephen Goodnick and David Janes