

59th Electronic Materials Conference

EMC Awards Ceremony and Plenary Session
Wednesday Morning, June 28, 2017
Mendoza College of Business, Jordan Auditorium

8:20 AM Awards Ceremony

8:30 AM *PL.1

First-Principles Theory of Wide Bandgap Materials Chris G. Van de Walle; Materials Department, University of California, Santa Barbara, Santa Barbara, California, United States

9:20 AM BREAK

A: Gallium Oxide—Devices
Session Chairs: Masataka Higashiwaki and Marko Tadjer
Wednesday Morning, June 28, 2017
DeBartolo Hall, Room 102

10:00 AM A1

(Student) Demonstration of a β -(AlGa)₂O₃/Ga₂O₃ Heterojunction Field Effect Transistor Zhanbo Xia¹, Sriram Krishnamoorthy¹, Siddharth Rajan^{1,2} and Mark Brenner¹; ¹Department of Electrical and Computer Engineering, The Ohio State University, Columbus, Ohio, United States; ²Department of Materials Science and Engineering, The Ohio State University, Columbus, Ohio, United States

10:20 AM A2

Germanium Doped β -Ga₂O₃ MOSFETs with Mobility of 111 cm²/Vs Jonathan P. McCandless¹, Neil A. Moser², Kelson D. Chabak³, Kevin D. Leedy³, Andrew J. Green¹, Antonio Crespo³, Elaheh Ahmadi⁴, James Speck⁴ and Gregg H. Jessen³; ¹KBRWyle, Wright-Patterson AFB, Ohio, United States; ²Electrical Engineering, George Mason University, Fairfax, Virginia, United States; ³Air Force Research Laboratory, Wright-Patterson AFB, Ohio, United States; ⁴Materials Science, University of California, Santa Barbara, Santa Barbara, California, United States

10:40 AM A3

Investigation of Nitrogen Ion Implantation for Current Blocking in Vertical Ga₂O₃ Transistors Man Hoi Wong¹, Chia-Hung Lin¹, Akito Kuramata², Shigenobu Yamakoshi² and Masataka Higashiwaki¹; ¹National Institute of Information and Communications Technology (NICT), Koganei, Tokyo, Japan; ²Tamura Corporation, Sayama, Japan

11:00 AM A4

(Student) Characterization of ZrO₂ and HfO₂ MOS Capacitors Deposited by ALD on (-201) β -Ga₂O₃ Substrates David I. Shahin¹, Marko J. Tadjer², Virginia D. Wheeler², Travis J. Anderson², Andrew D. Koehler², Karl D. Hobart², Charles R. Eddy², Fritz J. Kub² and Aris Christou¹; ¹Materials Science and Engineering Department, University of Maryland, College Park, Maryland, United States; ²U.S. Naval Research Laboratory, Washington, District of Columbia, United States

11:20 AM A5

(Student) Demonstration of Quasi-2-Dimensional β -Ga₂O₃ Solar-Blind Photodetectors with Metal-Semiconductor-Metal Structure Sooyeoun Oh, Gahyun Shin and Jihyun Kim; Korea University, Seoul, Korea (the Republic of)

11:40 AM A6

(Student) Very Thin Suspended β -Ga₂O₃ Nano Diaphragms for Mechanical Resonator and Ultraviolet Sensing Applications Xu-Qian Zheng, Jaesung Lee, Subrina Rafique, Lu Han, Christian A. Zorman, Hongping Zhao and Philip X. Feng; Electrical Engineering and Computer Science, Case Western Reserve University, Cleveland, Ohio, United States

B: Narrow Bandgap Materials and Devices
Session Chairs: Ganesh Balakrishnan and Daniel Wasserman
Wednesday Morning, June 28, 2017
DeBartolo Hall, Room 136

10:00 AM B1

(Student) Large-Area Deposition of Cadmium Arsenide Films Using Thermal Deposition Ashish Chanana², Joshua Winger³, Prashanth Gopalan¹, Ajay Nahata¹, Michael Scarpulla^{1,3} and Berardi Sensale-Rodriguez¹; ²Electrical and Computer Engineering, University of Utah, Salt Lake City, Utah, United States; ³Materials Science and Engineering, University of Utah, Salt Lake City, Utah, United States

10:20 AM B2

(Student) Carrier Transport Measurements on Low Doped HgCdTe Justin Easley¹, Erdem Arkun², Michael Carmody² and Jamie Phillips¹; ¹University of Michigan, Ann Arbor, Michigan, United States; ²Teledyne Imaging Sensors, Camarillo, California, United States

10:40 AM B3

Tl₆Si₄, A Promising Semiconductor Compound for γ -Ray Detection at Room Temperature Wenwen Lin¹, Zhifu Liu², Constantinos C. Stoumpos¹, Sanjib Das², Yihui He¹, Kyle M. McCall¹, Bruce W. Wessels² and Mercouri G. Kanatzidis¹; ¹Chemistry, Northwestern University, Evanston, Illinois, United States; ²Northwestern University, Evanston, Illinois, United States

11:00 AM B4

(Student) Carrier Lifetime and Photoconductivity Measurements in Short-Period InAsSb-Based SLS Grown on Metamorphic Buffers Catherine Ye Xu¹, Alex Frenkel¹, Youxi Lin¹, Dmitri Donetsky¹, Leon Shterengas¹, Sergey Suchalkin¹, Gela Kipshidze¹, Gregory Belenky¹, Stefan P. Svensson² and Wendy L. Sarney²; ¹Department of Electrical and Computer Engineering, Stony Brook University, Stony Brook, New York, United States; ²U.S. Army Research Laboratory, Adelphi, Maryland, United States

11:20 AM B5

Integration of Thin Film Narrow-Bandgap Photodiodes to CVD Diamond Heat Spreaders—A Comparison between GaSb and InGaAs Emma J. Renteria, Sadhvikas J. Addamane, Darryl M. Shima, Amy L. Soudachanh, Ahmad Mansoori and Ganesh Balakrishnan; Center for High Technology Materials, University of New Mexico, Albuquerque, New Mexico, United States

C: Processing and Characterization of 2D and Thin-Film Devices
Session Chairs: Ioannis Kymissis and William Wong
Wednesday Morning, June 28, 2017
DeBartolo Hall, Room 138

10:00 AM C1

(Student) Electrical Characterization of Benzenedithiolate Molecular Electronic Devices with Multilayer Graphene Electrodes Yeonsik Jang, Hyunhak Jeong, Dongku Kim, Wang-Taek Hwang, Jun-Woo Kim and Takhee Lee; Seoul National University, Seoul, Korea (the Republic of)

10:20 AM C2

(Student) Epitaxial Bismuth Transfer to Arbitrary Substrates Using Thermal Release Tape Sarah E. Muschinske¹, Emily S. Walker¹, Seung Ryul Na², Stephen D. March¹, Andrew F. Briggs¹, Deji Akinwande¹, Kenneth M. Liechti² and Seth R. Bank¹; ¹Department of Electrical and Computer Engineering, The University of Texas at Austin, Austin, Texas, United States; ²Department of Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, Austin, Texas, United States

10:40 AM C3

(Student) Gate-Dependent Asymmetric Electrical Properties in Pentacene Barristors with Graphene Electrodes Wang-Taek Hwang¹, Hyunhak Jeong¹, Dongku Kim¹, Yeonsik Jang¹, Jun-Woo Kim¹, Seungjun Chung¹, Gunuk Wang² and Takhee Lee¹; ¹Seoul National University, Seoul, Korea (the Republic of); ²Korea University, Seoul, Korea (the Republic of)

11:00 AM C4

High Performance Short Wavelength Infrared Photosensor Based on Novel Conjugated Polymers Zhenghui Wu¹, Weichuan Yao¹, Jason D. Azoulay² and Tse Nga Tina Ng¹; ¹ECE, University of California, San Diego, San Diego, California, United States; ²School of Polymer and High Performance Materials, University of Southern Mississippi, Hattiesburg, Mississippi, United States

11:20 AM C5

Signature of Singlet Fission in Magnetoconductance of Single Crystalline Tetracene Field-Effect Transistors Hyuk-Jae Jang^{1,2}, Emily G. Bittle¹, Qin Zhang^{1,2}, David J. Gundlach¹ and Curt A. Richter¹; ¹National Institute of Standards and Technology, Gaithersburg, Maryland, United States; ²Theiss Research, La Jolla, California, United States

D: Novel Nanostructured 2D Materials and Devices
Session Chairs: Siddharth Rajan and Huili Grace Xing
Wednesday Morning, June 28, 2017
DeBartolo Hall, Room 141

10:00 AM D1

(Student) Fabrication and Device Applications of Organic/MoS₂ van der Waals Heterostructures Itamar Balla¹, Tejas A. Shastry¹, Hadallia Bergeron¹, Samuel H. Amsterdam², Xiaolong Liu³, Gavin P. Campbell¹, Michael J. Bedzyk^{1,4,3}, Tobin J. Marks^{1,2} and Mark C. Hersam^{1,2,5}; ¹Department of Materials Science and Engineering, Northwestern University, Evanston, Illinois, United States; ²Department of Chemistry, Northwestern University, Evanston, Illinois, United States; ³Graduate Program in Applied Physics, Northwestern University, Evanston, Illinois, United States; ⁴Department of Physics, Northwestern University, Evanston, Illinois, United States; ⁵Department of Electrical Engineering and Computer Science, Northwestern University, Evanston, Illinois, United States

10:20 AM D2

Building Wafer-Scale Films Layer-by-Layer by Stacking Three-Atom-Thick Semiconductors Kibum Kang¹, Kan-Heng Lee², Yimo Han², Hui Gao², Saïen Xie², David Muller² and Jiwoong Park^{1,2}; ¹University of Chicago, Chicago, Illinois, United States; ²Cornell University, Ithaca, New York, United States

10:40 AM D3 WITHDRAWN

(Student) Three-Atom-Thick Epitaxial Superlattices with Coherent Lattice Saïen Xie^{1,2}, Yimo Han², Lijie Tu², Robert DiStasio², David Muller² and Jiwoong Park¹; ¹University of Chicago, Chicago, Illinois, United States; ²Cornell University, Ithaca, New York, United States

11:00 AM D4

(Student) Tuning Electronic Properties of Directly Grown Lateral 2D Heterostructures Based on Graphene and Transition Metal Dichalcogenides Shruti Subramanian; The Pennsylvania State University, State College, Pennsylvania, United States

11:20 AM D5

(Student) Lateral Superlattices of Monolayer Semiconducting Transition Metal Dichalcogenides (TMDCs) via Elastic Strain Engineering Michael Cai Wang, Juyoung Leem, Satoshi Takekuma and SungWoo Nam; University of Illinois at Urbana-Champaign, Urbana, Illinois, United States

11:40 AM D6

Band Shifts and Localized States Arising from Moiré Patterns in MoS₂-WSe₂ Heterojunctions Yi Pan¹, Stefan Foelsch¹, Yifan Nie², Yu-Chuan Lin³, Bhakti Jariwala³, Kehao Zhang³, Kyeongjae Cho², Joshua . Robinson³ and Randall M. Feenstra⁴; ¹Paul Drude Institute, Berlin, Germany; ²Materials Science and Engineering, The University of Texas at Dallas, Dallas, Texas, United States; ³Materials Science and Engineering, The Pennsylvania State University, University Park, Pennsylvania, United States; ⁴Physics, Carnegie Mellon University, Pittsburgh, Pennsylvania, United States

NOTES

E: Ultra Wide Bandgap and Power Electronic Devices
Session Chair: F. Shadi Shahedipour-Sandvik and Doug Hall
Wednesday Morning, June 28, 2017
DeBartolo Hall, Room 155

10:00 AM E1

Polarization-Induced Electrical Conductivity in Ultra-Wide Band Gap AlGa_xN Alloys Andrew M. Armstrong and Andrew A. Allerman; Sandia National Laboratories, Albuquerque, New Mexico, United States

10:20 AM E2

Vertical Al_xGa_{1-x}N (x = 0.3 and x = 0.7) PiN Diodes for Power Electronics Applications Gregory W. Pickrell, Andrew A. Allerman, Mary H. Crawford, Andrew M. Armstrong, Jeremy R. Dickerson, Michael P. King, K. C. Cross, C. E. Glaser, Michael Van Heukelom and Robert J. Kaplar; Sandia National Laboratories, Albuquerque, New Mexico, United States

10:40 AM E3

(Student) Vertical 19 μm Thick GaN Trench Gate MISFETs on Si Woojin Choi¹, Atsunori Tanaka², Renjie Chen¹ and Shadi Dayeh^{1,2}; ¹Electrical and Computer Engineering, University of California, San Diego, San Diego, California, United States; ²Material Science Program, University of California, San Diego, San Diego, California, United States

11:00 AM E4

High P-Type Activation Efficiency in GaN via Multicycle Rapid Thermal Annealing—Implant Damage Recovery and Conductivity Mark Goorsky¹, Tingyu Bai¹, Chao Li¹, Marko Tadjer², Karl Hobart², Jennifer Hite², Travis Anderson² and Boris Feigelson²; ¹MSE, University of California, Los Angeles, Los Angeles, California, United States; ²U.S. Naval Research Laboratory, Washington, District of Columbia, United States

11:20 AM E5

***In Operando* Imaging of Field Spreading and Carrier Transport in GaN-Based Pin Diodes** Kimberlee C. Collins¹, Francois Leonard¹, Jeremy R. Dickerson², Michael P. King², Mary H. Crawford², Andrew M. Armstrong², Andrew A. Allerman², Ozgur Aktas³, Isik C. Kizilyalli³, Robert J. Kaplar² and A. A. Talin¹; ¹Sandia National Laboratories, Livermore, California, United States; ²Sandia National Laboratories, Albuquerque, New Mexico, United States; ³Avogy, Inc., San Jose, California, United States

11:40 AM E6

Stress Engineered AlN/AlGa_xN Superlattices as High-Voltage Current Blocking Layers on 200 mm Silicon Jie Su¹, Hu Liang², Niels Posthuma², Dirk Wellekens², Stefaan Decoutere², Soo Min Lee¹ and Ajit Paranjpe¹; ¹Veeco Instrument Inc, Somerset, New Jersey, United States; ²imec, Leuven, Belgium

F: Gallium Oxide—Epitaxial Growth and Characterization
Session Chairs: Rebecca Peterson and Marko Tadjer
Wednesday Afternoon, June 28, 2017
DeBartolo Hall, Room 102

1:30 PM F1

Highly Conductive Homoepitaxial Ga₂O₃:Si on (010) β-Ga₂O₃ by Pulsed Laser Deposition Kevin D. Leedy¹, Kelson D. Chabak¹, Vladimir Vasilyev¹, David C. Look², John J. Boeckl¹, Jeff L. Brown³, Stephen E. Tetlak¹, Andrew J. Green³, Neil A. Moser⁴, Antonio Crespo¹, Robert C. Fitch¹, Jonathan P. McCandless³ and Gregg H. Jessen¹; ¹Air Force Research Laboratory, WPAFB, Ohio, United States; ²Wright State University, Dayton, Ohio, United States; ³KBRwyle, Beavercreek, Ohio, United States; ⁴George Mason University, Fairfax, Virginia, United States

1:50 PM F2

(Student) N-Type β-Ga₂O₃ Thin Films Grown via Low Pressure Chemical Vapor Deposition Subrina Rafique, Lu Han, Jonathon R. Grgat and Hongping Zhao; EECS, Case Western Reserve University, Cleveland, Ohio, United States

2:10 PM F3

(Student) Epitaxial Growth and Characterization of α-, β- and ε-Phases of Ga₂O₃ Grown Using MOCVD and HVPE Techniques Yao Yao¹, Luke A. Lyle¹, Serdal Okur², Gary S. Tompa², Tom Salagaj², Nick Sbrockey², Robert F. Davis¹ and Lisa M. Porter¹; ¹Materials Science and Engineering, Carnegie Mellon University, Pittsburgh, Pennsylvania, United States; ²Structured Materials Industries, Inc., Piscataway, New Jersey, United States

2:30 PM F4

Conductivity Control for Devices Based on Corundum-Structured α-Ga₂O₃ on Sapphire Kentaro Kaneko¹, Takayuki Uchida¹, Shin-ichi Kan¹, Toshimi Hitora² and Shizuo Fujita¹; ¹Kyoto University, Kyoto, Japan; ²FLOSFA, Inc., Kyoto, Japan

2:50 PM F5

(LATE NEWS, Student) Gallium Oxide on Silicon Films Formed through Direct GaAs Thermal Oxidation and Wafer Bonding Yuan Tian, Sergei Rouvimov, Jinyang Li and Doug Hall; Department of Electrical Engineering, University of Notre Dame, Notre Dame, Indiana, United States.

3:10 PM BREAK

3:30 PM F6

Unintentional Shallow Donors in β-Ga₂O₃ Adam T. Neal^{1,2}, Jian V. Li³ and Shin Mou¹; ¹Materials and Manufacturing Directorate, Air Force Research Lab, Wright-Patterson AFB, Ohio, United States; ²Universal Technology Corporation, Dayton, Ohio, United States; ³Department of Physics, Texas State University, San Marcos, Texas, United States

3:50 PM F7

Structural Characteristics of HVPE-Grown Ga₂O₃ Films on Native Substrates with Different Crystallographic Orientations Nadeemullah Mahadiq, Marko J. Tadjer, Jennifer Hite and Karl D. Hobart; U.S. Naval Research Laboratory, Washington, District of Columbia, United States

4:10 PM F8

Thermal Expansion Coefficients of Beta-Ga₂O₃ Wafers Determined Using High Resolution X-Ray Diffraction Mark Goorsky¹, Chao Li¹, Eva Rosker¹, Marko Tadjer² and Karl Hobart²; ¹MSE, University of California, Los Angeles, Los Angeles, California, United States; ²U.S. Naval Research Laboratory, Washington, District of Columbia, United States

4:30 PM F9

(Student) Phonon and Near-Edge Optical Properties of Ga₂O₃ Kelsey Mengle, Guangsha Shi, Dylan Bayerl and Emmanouil Kioupakis; Materials Science and Engineering, University of Michigan, Ann Arbor, Michigan, United States

G: Epitaxial Materials and Devices
Session Chairs: Rachel Goldman and Christine Wang
Wednesday Afternoon, June 28, 2017
DeBartolo Hall, Room 136

1:30 PM G1

(Student) Growth of AlInSb Metamorphic Buffers Using Digital Alloy Technique Vinita Dahiya¹, Sadhvikas Addamane^{2,4}, Bed N. Pantha³, Sen Mathews⁴, Julia Deitz⁵, Tyler J. Grassman^{5,1}, John A. Carlin⁶, Nathaniel R. Miller³, Ganesh Balakrishnan^{2,4} and Sanjay Krishna¹; ¹Department of Electrical and Computer Engineering, The Ohio State University, Columbus, Ohio, United States; ²Department of Electrical and Computer Engineering, University of New Mexico, Albuquerque, New Mexico, United States; ³SolAero Technologies Corp, Albuquerque, New Mexico, United States; ⁴Center for High Technology Materials, University of New Mexico, Albuquerque, New Mexico, United States; ⁵Department of Materials Science Engineering, The Ohio State University, Columbus, Ohio, United States; ⁶Institute for Materials Research, The Ohio State University, Columbus, Ohio, United States

1:50 PM G2

(Student) The Effects of a Bismuth Flux on Strained-Layer III-V Optical Materials Scott D. Sifferman¹, Ann K. Rockwell¹, Kyle M. McNicholas¹, Yukun Sun^{2,3}, Rodolfo Salas¹, Scott J. Maddox¹, Hari P. Nair⁴, Minjoo Larry Lee² and Seth R. Bank¹; ¹Microelectronics Research Center and ECE Department, The University of Texas at Austin, Austin, Texas, United States; ²Department of ECE, University of Illinois at Urbana-Champaign, Urbana, Illinois, United States; ³Department of EE, Yale University, New Haven, Connecticut, United States; ⁴Materials Science and Engineering, Cornell University, Ithaca, New York, United States

2:10 PM G3

(Student) Surfactant-Mediated Epitaxy of III-V Digital Alloys Ann K. Rockwell¹, Maddy Woodson², Min Ren², Scott Sifferman¹, Scott Maddox¹, Joe Campbell² and Seth Bank¹; ¹Electrical and Computer Engineering, The University of Texas at Austin, Austin, Texas, United States; ²Electrical and Computer Engineering, University of Virginia, Charlottesville, Virginia, United States

2:30 PM G4

Crystal Growth Mechanism of ZnTe Epilayers on Sapphire Substrate Taizo Nakasu¹, Keisuke Odaka¹, Masakazu Kobayashi^{1,2} and Toshiaki Asahi³; ¹Electrical Engineering and Bioscience, Waseda University, Tokyo, Japan; ²Research Institute for Materials Science and Technology, Waseda University, Tokyo, Japan; ³JX Nippon Mining & Metals Corporation, Tokyo, Japan

2:50 PM G5**Density Enhancements in GeTe Films Using DI Water**

Treatment Nadeemullah Mahadik, Laura Ruppalt and James Champlain; U.S. Naval Research Laboratory, Washington, District of Columbia, United States

3:10 PM BREAK**3:30 PM G6****Growth and Characterization of GePb Alloy Using Layer**

Inversion Method Hakimah Alahmada^{2,4}, Murtatha Alher³, Sattar AlKabi^{2,4}, Seyed Amir Ghetmiri⁴, Aboozar Mosleh¹, Shui-Qing Yu⁴ and Hameed Naseem⁴; ¹Electrical Engineering, Arkansas Tech University, Russellville, Arkansas, United States; ²Microelectronics-Photonics Graduate Program, University of Arkansas, Fayetteville, Arkansas, United States; ³Department of Mechanical Engineering, University of Kerbala, Kerbala, Iraq; ⁴Electrical Engineering, University of Arkansas, Fayetteville, Arkansas, United States

3:50 PM G7

Structural, Optical and Electrical Characterization of GeSn and SiGeSn Thin Films of Varying Composition Deposited by CVD Technique Jignesh Vanjaria¹, Tom Salagaj², Nick Sbrockey², Gary Tompa² and Hongbin Yu¹; ¹Arizona State University, Tempe, Arizona, United States; ²Structured Materials Industries, Inc., Piscataway, New Jersey, United States

4:10 PM G8**Investigation of High Voltage GaN Photoconductive Semiconductor Switches** Andrew D. Koehler¹, Travis J.

Anderson¹, Anindya Nath², Marko J. Tadjer¹, Karl D. Hobart¹ and Fritz J. Kub¹; ¹U.S. Naval Research Laboratory, Washington, District of Columbia, United States; ²George Mason University, Fairfax, Virginia, United States

4:30 PM G9**(Student) Demonstration of H-Terminated Single Crystal Diamond Hole-Channel MESFET with ~40mA/mm and 121 kV/cm** Harshad Surdi¹, Maitreya Dutta² and Srabanti Chowdhury²;

¹School of Electrical, Energy and Computer Engineering, Arizona State University, Tempe, Arizona, United States; ²Department of Electrical, Computer and Energy Engineering, University of California, Davis, Davis, California, United States

4:50 PM G10**(LATE NEWS) Temperature Dependent Thermal**

Conductivity of AlGaN Alloys Christopher B Saltonstall, Andrew Allerman and Thomas Beechem; Sandia National Laboratories, Albuquerque, New Mexico, United States.

H: Processing and Characterization of Thin-Film Devices
Session Chairs: Adam Biacchi and David Gundlach
Wednesday Afternoon, June 28, 2017
DeBartolo Hall, Room 138

1:30 PM H1**Surface Chemical Modification of Organic Semiconductors as Replacements for Injection, Adhesion or Passivation Layers**

Jacob W. Ciszek; Chemistry and Biochemistry, Loyola University Chicago, Chicago, Illinois, United States

1:50 PM H2**(Student) High Q Factor Microwave Excitations in Organic Ferrimagnet Vanadium Tetracyanoethylene** Andrew

Franson¹, Na Zhu², Ezekiel Johnston-Halperin¹ and Hong Tang²; ¹Physics, The Ohio State University, Columbus, Ohio, United States; ²Electrical Engineering, Yale University, New Haven, Connecticut, United States

2:10 PM H3**(Student) Epitaxial Growth and Transfer of Bi_{1-x}Sb_x Thin**

Films Emily S. Walker¹, Sarah Muschinske¹, Narae Yoon¹, Christopher J. Brennan¹, Seung Ryul Na¹, Stephen D. March¹, Yukun Sun^{2,3}, Andrew F. Briggs¹, Erica Davis¹, Deji Akinwande¹, Minjoo Larry Lee^{2,3}, Kenneth J. Liechti¹, Edward T. Yu¹, Daniel Wasserman¹ and Seth R. Bank¹; ¹The University of Texas at Austin, Austin, Texas, United States; ²The University of Illinois at Urbana Champagne, Urbana, Illinois, United States; ³Yale University, New Haven, Connecticut, United States

2:30 PM H4**(Student) Electrical Transport and Power Dissipation in Aerosol-Jet-Printed Graphene Interconnects** Twinkle

Pandhi¹, Eric Kreit⁵, Roberto Aga⁵, Kiyo Fujimoto¹, Mohammad Sharbati⁴, Samane Khademi⁴, Feng Xiong⁴, Jessica Koehne³, Emily M. Heckman² and David Estrada¹; ¹Micron School of Material Science and Engineering, Boise State University, Boise, Idaho, United States; ²Air Force Research Laboratory, Sensors Directorate, Wright-Patterson AFB, Ohio, United States; ³NASA Ames Research Center, Moffett Field, California, United States; ⁴Swanson School of Engineering, University of Pittsburgh, Pittsburgh, Pennsylvania, United States; ⁵KBRWyle, Dayton, Ohio, United States

2:50 PM H5**Purification and Ligand Exchange Chemistry of Colloidal Quantum Dots for Fluorescence and Optoelectronic**

Applications Andrew B. Greytak, Megan Y. Gee, Adam Roberge, Yi Shen, John H. Dunlap and Mathew L. Kelley; Chemistry and Biochemistry, University of South Carolina, Columbia, South Carolina, United States

3:10 PM BREAK

I: Electronic Materials for Bio
Session Chairs: Tzahi Cohen-Karni and David Janes
Wednesday Afternoon, June 28, 2017
DeBartolo Hall, Room 138

J: Computational Materials Theory
Session Chair: Chris Van de Walle and Oleg Rubel
Wednesday Afternoon, June 28, 2017
DeBartolo Hall, Room 140

3:30 PM I1

Reaction of Viral Proteins and Sialoglycan on Biomimetic Graphene Surface Measured by Liquid Atomic Force Microscope and Graphene Field-Effect Transistor Kaho Kamada¹, Takao Ono¹, Ryota Hayashi¹, Yasushi Kanai¹, Koichi Inoue¹, Yasuhide Ohno^{1,2}, Kenzo Maehashi^{1,3}, Yohei Watanabe⁴, Shin-ichi Nakakita⁵, Yasuo Suzuki⁶, Toshio Kawahara⁷, Sonia A. Contera⁸ and Kazuhiko Matsumoto¹; ¹The Institute of Scientific and Industrial Research, Osaka University, Osaka, Japan; ²Graduate School of Science and Technology, Tokushima University, Tokushima, Japan; ³Institute of Engineering, Tokyo University of Agriculture and Technology, Tokyo, Japan; ⁴Graduate School of Medical Science, Kyoto Prefectural University of Medicine, Kyoto, Japan; ⁵Life Science Research Center, Kagawa University, Kagawa, Japan; ⁶College of Life and Health Sciences, Chubu University, Aichi, Japan; ⁷College of Engineering, Chubu University, Aichi, Japan; ⁸Department of Physics, University of Oxford, Oxford, United Kingdom

3:50 PM I2

Measurement of Enzymatic Reaction Using Graphene Field-Effect Transistor and Microwell for Detection of *Helicobacter Pylori* Takao Ono¹, Yasushi Kanai¹, Yasuhide Ohno^{1,2}, Kenzo Maehashi^{1,3}, Koichi Inoue¹ and Kazuhiko Matsumoto¹; ¹The Institute of Scientific and Industrial Research, Osaka University, Osaka, Japan; ²Graduate School of Science and Technology, Tokushima University, Tokushima, Japan; ³Institute of Engineering, Tokyo University of Agriculture and Technology, Tokyo, Japan

4:10 PM I3

(Student) Translation of PEDOT/Parylene C ECoG Microelectrode Arrays for Recording Auditory Cognitive Activity in Birds Lorraine A. Hossain¹, Ezequiel Arceodo², Nick Rogers³, Mehran Ganji⁴, John Hermiz⁴, Vikash Gilja⁴, Timothy Gentner² and Shadi A. Dayeh^{1,4}; ¹Materials Science and Engineering, University of California, San Diego, La Jolla, California, United States; ²Biocircuits Institute, University of California, San Diego, La Jolla, California, United States; ³Department of Physics, University of California, San Diego, La Jolla, California, United States; ⁴Department of Electrical and Computer Engineering, University of California, San Diego, La Jolla, California, United States

4:30 PM I4

(Student) Size Effects in Scaling Electroencephalography Arrays of PEDOT:PSS/Au, PEDOT:PSS/Pt, Au and Pt Mehran Ganji, Atsunori Tanaka, Ahmed Youssef, Vikash Gilja, Eric Halgren and Shadi Dayeh; ECE, University of California, San Diego, San Diego, California, United States

4:50 PM I5

(Student) Implications of Using High Reaction Rate Amperometric Micro-Electrode Array for Measurement of Local Concentration Variations of Bioanalytes Jose F. Rivera¹, David B. Janes¹, Siddharth V. Sridharan¹, Jenna L. Rickus² and James Nolan²; ¹Electrical and Computer Engineering, Purdue University, West Lafayette, Indiana, United States; ²Agricultural and Biological Engineering, Purdue University, West Lafayette, Indiana, United States

1:30 PM J1

Characteristics of Electronic Localization in Semiconductor Alloys—Design Principles Oleg Rubel and Christopher Pashartis; Materials Science and Engineering, McMaster University, Hamilton, Canada

1:50 PM J2

(Student) Electron Localization in 2-D GaN III/V Alloys Christopher L. Pashartis and Oleg Rubel; Materials Science and Engineering, McMaster University, Hamilton, Canada

2:10 PM J3

(Student) Phase-Influenced Thermal Conductivity of Bulk VO₂ from First-Principles Lattice Dynamics Calculations Jorge O. Morales^{1,2}, Francisco Herrera¹, Donovan E. Diaz-Droguett^{3,4}, Diego Celentano^{2,4}, David B. Go^{1,5} and Tengfei Luo^{1,5}; ¹Aerospace and Mechanical Engineering, University of Notre Dame, South Bend, Indiana, United States; ²Mechanical Engineering, Pontificia Universidad Catolica de Chile, Santiago, Chile; ³Fisica, Pontificia Universidad Catolica de Chile, Santiago, Chile; ⁴Centro de Investigación en Nanotecnología y Materiales Avanzados (CIEN-UC), Pontificia Universidad Catolica de Chile, Santiago, Chile; ⁵Center for Sustainable Energy of Notre Dame (eSEND), University of Notre Dame, Notre Dame, Indiana, United States

2:30 PM J4

Electronic Properties of Two-Dimensional Bi-Layered Silicene on Various Substrates Zhonghang Ji¹, Lok C. Lew Yan Voon² and Yan Zhuang¹; ¹Electrical Engineering, Wright State University, Dayton, Ohio, United States; ²University of West Georgia, Carrollton, Georgia, United States

2:50 PM J5

(Student) Excess Charges at the Interface of Half Heusler Semiconductors Abhishek Sharan¹ and Anderson Janotti²; ¹Department of Physics and Astronomy, University of Delaware, Newark, Delaware, United States; ²Department of Materials Science and Engineering, University of Delaware, Newark, Delaware, United States

3:10 PM BREAK

3:30 PM J6

(Student) Hybrid Functional Study of the Electronic Structure of Rare-Earth Pnictides Shoaib Khalid^{2,1} and Anderson Janotti¹; ¹Department of Material Science and Engineering, University of Delaware, Newark, Delaware, United States; ²Department of Physics and Astronomy, University of Delaware, Newark, Delaware, United States

3:50 PM J7

Electrical Properties of a Functionalized UiO-66 Metal-Organic Framework Terence D. Musho, Al Yasin and Nianqiang Wu; Mechanical and Aerospace Engineering, West Virginia University, Morgantown, West Virginia, United States

4:10 PM J8

Large-Scale DFT Simulation of Organic Molecules Encapsulated in SWCNT as Electrode Material of Rechargeable Battery Shuji Ogata, Takahiro Tsuzuki and Syota Oyaizu; Department of Physical Science and Engineering, Nagoya Institute of Technology, Nagoya, Japan

4:30 PM J9 WITHDRAWN

(Student) Defective Graphene and Graphene Allotropes as High-Capacity Anode Materials for Mg Ion Batteries Dequan Er, Eric Detsi, Hemant Kumar and Vivek B. Shenoy; MSE, University of Pennsylvania, Philadelphia, Pennsylvania, United States

4:50 PM J10

(Student) DFT and TD-DFT Studies of Optical Absorption Spectral and Electronic Properties of Some Selected Anthocyanin Family Used in DSSC Aanuoluwapo R. Obasuyi and Norma Flores-Holguin; Material Science, Centro de Investigación en Materiales Avanzados, S.C., Chihuahua, Mexico

K: Novel 2D Processing and Devices

Session Chairs: Roberto Myers and Michael Spencer

Wednesday Afternoon, June 28, 2017

DeBartolo Hall, Room 141

1:30 PM K1

(Student) Effects of Processing Conditions on Metal-TMD Interface Chemistry and Band Alignment Christopher M. Smyth¹, Rafik Addou¹, Lee A. Walsh¹, Stephen McDonnell², Jiyoung Kim¹, Christopher L. Hinkle¹ and Robert M. Wallace¹; ¹Materials Science and Engineering, The University of Texas at Dallas, Dallas, Texas, United States; ²Materials Science and Engineering, University of Virginia, Charlottesville, Virginia, United States

1:50 PM K2

Passivation of Graphene Films and Their Visibility Isaac Ruiz, Michael Goldfalm, Bruce L. Draper and Stephen W. Howell; Sandia National Laboratories, Albuquerque, New Mexico, United States

2:10 PM K3

(Student) Effective Passivation of Black Phosphorus by a Double Boron Nitride and Sapphire Coating Sampath Gamage^{1,2}, Alireza Fali^{1,2}, Neda Aghamiri^{1,2}, Lingming Yang³, Peide Ye³ and Yohannes Abate^{1,2}; ¹Physics and Astronomy, Georgia State University, Atlanta, Georgia, United States; ²Center for Nano-optics, Georgia State University, Atlanta, Georgia, United States; ³School of Electrical and Computer Engineering, Purdue University, West Lafayette, Indiana, United States

2:30 PM K4

(Student) Controlled Modification of Large-Area MoS₂ Monolayers Using He-Ion Irradiation Frederick Aryeetey, Kyle Nowlin and Shyam Aravamudhan; Nanoengineering, North Carolina Agricultural and Technical State University, Greensboro, North Carolina, United States

2:50 PM K5

Midwave Infrared Absorption of Thin Graphene Oxide Thermally Reduced in Ultra-High Vacuum Erin R. Cleveland, Jill A. Nolde, Glenn G. Jernigan and Edward H. Aifer; U.S. Naval Research Laboratory, Washington, District of Columbia, United States

3:10 PM BREAK**3:30 PM K6**

High-Sensitivity Optical Detection Using Charge-Coupled Graphene-Based Sensors Stephen W. Howell¹, Thomas E. Beechem², Isaac Ruiz¹, Paul Davids¹, Richard K. Harrison³, Sean Smith⁴, Nicholas J. Martinez¹ and Jeffrey B. Martin³; ¹Applied Photonic Microsystems, Sandia National Laboratories, Albuquerque, New Mexico, United States; ²Nanoscale Sciences Department, Sandia National Laboratories, Albuquerque, New Mexico, United States; ³Nuclear Forensics Research and Development, Sandia National Laboratories, Albuquerque, New Mexico, United States; ⁴Electronic, Optical and Nano, Sandia National Laboratories, Albuquerque, New Mexico, United States

3:50 PM K7

Millisecond Pulse Dynamics of Electric Double Layers Formed on Graphene Field-Effect Transistors Ke Xu¹, Yu-Chuan Lin³, David Guzman⁴, Alejandro Strachan⁴, Joshua Robinson³, Alan Seabaugh² and Susan K. Fullerton Shirey¹; ¹University of Pittsburgh, Pittsburgh, Pennsylvania, United States; ²University of Notre Dame, Notre Dame, Indiana, United States; ³The Pennsylvania State University, University Park, Pennsylvania, United States; ⁴Purdue University, West Lafayette, Indiana, United States

4:10 PM K8

Controlled Doping of Two-Dimensional (2D) Materials with Molecular Reductants and Oxidants Siyuan Zhang¹, Meng-Yen Tsai², Steve Barlow², Eric Vogel², Seth Marder², Christina A. Hacker¹ and Sujitra Pookpanratana¹; ¹National Institute of Standards and Technology, Gaithersburg, Maryland, United States; ²Georgia Tech, Atlanta, Georgia, United States

4:30 PM K9

(Student) Interface Passivation and Trap Reduction in Molybdenum Disulfide/ Silicon Oxide Back-Gate Transistors by Hydrogen Fluoride Treatment Yaoqiao Hu, Pak San Yip, Chak Wah Tang, Kei May Lau and Qiang Li; Department of Electronic and Computer Engineering, Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong

4:50 PM K10

Enhanced Carrier Mobility of Multilayer MoS₂ and MoSe₂ Thin-Film Transistors by Al₂O₃ Encapsulation Seong Yeoul Kim, Hyun Ah Lee and Woong Choi; Kookmin University, Seoul, Korea (the Republic of)

L: AlGaIn/GaN HEMTs

Session Chairs: Andrew Koehler and Zlatko Sitar

Wednesday Afternoon, June 28, 2017

McKenna Hall, Auditorium

1:30 PM L1

(Student) N-Polar High-Electron-Mobility Transistors with GaN/InGaN Composite Channels Haoran Li, Steven Wienecke, Brian Romanczyk, Elaheh Ahmadi, Matthew Guidry, Xun Zheng, Stacia Keller and Umesh K. Mishra; Electrical and Computer Engineering, University of California, Santa Barbara, Santa Barbara, California, United States

1:50 PM L2**(Student) Design and Bottom-Up Development of Stretchable Geometry AlGaIn/GaN High Electron Mobility Transistors**

Isra Mahaboob¹, Jonathan Marini¹, Kasey Hogan¹, Emma Rocco¹, F. Shadi Shahedipour-Sandvik¹, Randy Tompkins² and Nathan Lazarus²; ¹Nanoscale Science and Engineering, Colleges of Nanoscale Science and Engineering, State University of New York Polytechnic Institute, Albany, New York, United States; ²U.S. Army Research Laboratory, Adelphi, Maryland, United States

2:10 PM L3**Suppression of Self-Heating Effect in Flexible GaN-Based HFETs with Metal Substrates**

Seungkyu Oh^{1,2}, Moon Uk Jo², Taehoon Jang³, Jie Chen¹, Weijie Wang¹, Shahab Shervin¹, Sara Pouladi¹, Joon Seop Kwak² and Jae-Hyun Ryou^{1,4}; ¹Department of Mechanical Engineering and Materials Science, University of Houston, Houston, Texas, United States; ²Department of Printed Electronics Engineering, Suncheon National University, Suncheon-Si, Korea (the Republic of); ³Semiconductor Physics Research Center, Chonbuk National University, Jeonju-Si, Korea (the Republic of); ⁴Texas Center for Superconductivity at the University of Houston (TeSUH), University of Houston, Houston, Texas, United States

2:30 PM L4**(Student) GaN/AlN Quantum Well FETs on AlN/SiC Platform Using High Temperature MBE Growth**

Reet Chaudhuri¹, S.M. Moududul Islam¹, Samuel Bader², Austin L. Hickman¹, Shyam Bharadwaj¹, Huili Grace Xing^{1,3} and Debdeep Jena^{1,3}; ¹Electrical and Computer Engineering, Cornell University, Ithaca, New York, United States; ²Applied and Engineering Physics, Cornell University, Ithaca, New York, United States; ³Material Science and Engineering, Cornell University, Ithaca, New York, United States

2:50 PM L5**(LATE NEWS, Student) Abrupt p-GaN:Mg/GaN Junctions via Flow Modulation MOCVD**

Anchal Agarwal¹, Chirag Gupta¹, Cory Lund², Abdullah Alhassan³, Tom Mates³ and Stacia Keller¹; ¹Electrical and Computer Engineering, University of California, Santa Barbara, Santa Barbara, California, United States.

3:10 PM BREAK

M: AlGaIn Optoelectronics

Session Chairs: Andrew Koehler and Zlatko Sitar

Wednesday Afternoon, June 28, 2017

McKenna Hall, Auditorium

3:30 PM M1**(Student) Electrical Characterization of Polarization Doped Al-Rich n-AlGaIn for Deep UV LEDs**

Shyam Bharadwaj, S.M. M. Islam, Vladimir Protasenko, Huili Grace Xing, Debdeep Jena and Kevin Lee; Cornell University, Ithaca, New York, United States

3:50 PM M2**(Student) Molecular Beam Epitaxial Growth and Characterization of AlN Nanowall Deep UV Light Emitting Diodes**

Xianhe Liu, Songrui Zhao, Binh H. Le and Zetian Mi; Department of Electrical and Computer Engineering, McGill University, Montreal, Canada

4:10 PM M3**(Student) Tunnel-Injected Sub-260 nm Ultraviolet Light Emitting Diodes**

Yuewei Zhang¹, Sriram Krishnamoorthy¹, Fatih Akyol¹, Sanyam Bajaj¹, Zane Jamal-Eddine¹, Andrew A. Allerman², Michael Moseley², Andrew Armstrong² and Siddharth Rajan¹; ¹Electrical and Computer Engineering, The Ohio State University, Columbus, Ohio, United States; ²Sandia National Laboratories, Albuquerque, New Mexico, United States

4:30 PM M4**(Student) Deep-UV Emission and Optical Gain Measurements in Optically-Pumped AlN/GaN Quantum Well Structures**

Galen Harden¹, S.M. Moududul Islam², Kevin Lee², Vladimir Protasenko², Huili Grace Xing², Debdeep Jena² and Anthony J. Hoffman¹; ¹University of Notre Dame, Notre Dame, Indiana, United States; ²Cornell University, Ithaca, New York, United States

4:50 PM M5**Al_{0.73}Ga_{0.27}N/AlN Distributed Bragg Reflectors Grown by Metalorganic Chemical Vapor Deposition for Deep-UV Lasers**

Young Jae Park¹, Theeradetch Detchprohm¹, Karan Mehta¹, Shuo Wang², Oliver Moreno¹, Yuh-Shiuan Liu¹, Shyh-Chiang Shen¹, P. Douglas Yoder¹, Fernando Ponce² and Russell D. Dupuis¹; ¹Georgia Institute of Technology, Atlanta, Georgia, United States; ²Arizona State University, Tempe, Arizona, United States

5:10 PM M6**(LATE NEWS) Impact-Ionization Induced UV-Vis Electroluminescence in Unipolar GaN/AlN Resonant Tunneling Diodes**

Jimmy Encomendero¹, Faiza A. Faria², S.M. Islam¹, Vladimir Protasenko¹, Sergei A. Rouvimov², Patrick A. Fay², Debdeep Jena¹, Huili Grace Xing¹; ¹School of Electrical and Computer Engineering, Cornell University, Ithaca, New York, United States; ²Department of Electrical Engineering, University of Notre Dame, Notre Dame, Indiana, United States.

N: Silicon Carbide

Session Chairs: Nadeemullah Mahadik and MVS Chandrashekar

Wednesday Afternoon, June 28, 2017

DeBartolo Hall, Room 155

1:30 PM N1**(Student) Mapping of Lattice Strain Variation in 4H-SiC Commercial Wafers by Synchrotron Double-Crystal X-Ray Topographic Contour Mapping**

Jianqiu Guo, Yu Yang, Balaji Raghathamachar and Michael Dudley; Materials Science and Chemical Engineering Department, Stony Brook University, Stony Brook, New York, United States

1:50 PM N2**Investigation of Shockley Stacking Fault Expansion in 4H-SiC Substrates**

Nadeemullah Mahadik¹, Robert Stahlbush¹ and Siddharth Sundaresan²; ¹U.S. Naval Research Laboratory, Washington, District of Columbia, United States; ²GeneSiC Semiconductor Inc., Dulles, Virginia, United States

2:10 PM N3**Lattice Parameter and Doping Concentration Measurement Inside Highly N-Doped Facet Region of 4H-SiC Commercial Wafers Using X-Ray Topographic Contour Mapping**

Yu Yang, Jianqiu Guo, Balaji Raghathamachar and Michael Dudley; Material Science and Engineering, Stony Brook University, Stony Brook, New York, United States

2:30 PM N4

(Student) A Comparison of High and Low Frequency Electrically Detected Magnetic Resonance and Near-Zero Field Magnetoresistance Phenomena in SiC pn Junctions Ryan J. Waskiewicz¹, Mark A. Anders¹, Patrick M. Lenahan¹ and Corey J. Cochrane²; ¹Engineering Science and Mechanics, The Pennsylvania State University, State College, Pennsylvania, United States; ²NASA Jet Propulsion Laboratory, Pasadena, California, United States

2:50 PM N5

(Student) Sub-Bandgap Response of Graphene/SiC Schottky Emitter Bipolar Phototransistor Examined by Scanning Photocurrent Microscopy Bobby G. Barker¹, Venkata S.N. Chava², MVS Chandrashekhar² and Andrew B. Greytak¹; ¹Chemistry and Biochemistry, University of South Carolina, Columbia, South Carolina, United States; ²Electrical Engineering, University of South Carolina, Columbia, South Carolina, United States

3:10 PM BREAK**3:30 PM N6**

(Student) CCDLTS Measurements of Silicon Carbide (4H-SiC) MOS Capacitors with Phosphosilicate Glass Dielectric Asanka Jayawardena¹, Chunkun Jiao¹, Patricia M. Mooney² and Sarit Dhar¹; ¹Department of Physics, Auburn University, Auburn, Alabama, United States; ²Department of Physics, Simon Fraser University, Burnaby, Canada

3:50 PM N7

(Student) Performance Improvement of 10 kV 4H-SiC Rectifiers with High Schottky Barrier Height Yifan Jiang¹, Woongje Sung², Jayant Baliga¹, Sizhen Wang¹, Bongmook Lee¹ and Alex Huang¹; ¹Electrical and Computer Engineering, North Carolina State University, Raleigh, North Carolina, United States; ²State University of New York Polytechnic Institute, Albany, New York, United States

4:10 PM N8

(Student) Voltage Tunable Solar-Blindness in a UV Detector Using a TFS Grown Epitaxial Graphene (EG)/SiC Heterojunction Bipolar Phototransistor Venkata S.N. Chava, Anusha Balachandran, Sakib M. Muhtadi, Asif Khan and MVS Chandrashekhar; Electrical Engineering, University of South Carolina Columbia, Columbia, South Carolina, United States

4:30 PM N9

(Student) TEM-EELS Investigation of B, P and Sb-Passivated 4H-SiC/SiO₂ Interface Structures Christopher J. Klingshirn¹, Joshua A. Taillon^{2,1}, Gang Liu³, Sarit Dhar⁴, Leonard C. Feldman³, Tsvetanka S. Zheleva⁵, Aivars J. Lelis⁵ and Lourdes G. Salamanca-Riba¹; ¹Materials Science and Engineering, University of Maryland, College Park, Maryland, United States; ²Materials Measurement Science Division, National Institute of Standards and Technology, Gaithersburg, Maryland, United States; ³Institute for Advanced Materials, Rutgers University, New Brunswick, New Jersey, United States; ⁴Physics, Auburn University, Auburn, Alabama, United States; ⁵U.S. Army Research Laboratory, Adelphi, Maryland, United States

4:50 PM N10

Deep Reactive Ion Etching of 4H-SiC via Cyclic SF₆/O₂ Segments Lunet E. Luna¹, Marko J. Tadjer², Travis J. Anderson², Karl D. Hobart² and Fritz J. Kub²; ¹Postdoctoral Fellow residing at Naval Research Laboratory, Washington, District of Columbia, United States; ²U.S. Naval Research Laboratory, Washington, District of Columbia, United States

PS: Poster Session
Wednesday, June 28, 2017
6:00 – 8:00 PM
McKenna Hall, Rooms 100-104

PS1

(Student) High Temperature Operation of n-Al_{0.65}Ga_{0.35}N Channel Metal Semiconductor Field Effect Transistors on Low-Defect AlN Templates with Regrown Graded Contacts Sakib Muhtadi, S. Hwang, A. Coleman, F. Asif, A. Lunev, MVS Chandrashekhar and Asif Khan; Electrical Engineering, University of South Carolina, Columbia, South Carolina, United States.

PS2

(Student) Solar Blind UV Detection Using High-Al Content Al_xGa_{1-x}N Devices—Towards Responsivity >10⁶A/W Sakib Muhtadi, S. Hwang, A. Coleman, F. Asif, A. Lunev, Venkata S.N. Chava, MVS Chandrashekhar and Asif Khan; Electrical Engineering, University of South Carolina, Columbia, South Carolina, United States.

PS3

(Student) Characterization of Dislocation Configurations in GaN Substrates by X-Ray Topography Shuang Wu¹, Balaji Raghathamachar¹, Michael Dudley¹, Jaime A. Freitas², Tomasz Sochacki³ and Michal Bockowski³; ¹Department of Materials Science and Chemical Engineering, Stony Brook University, Stony Brook, New York, United States; ²U.S. Naval Research Laboratory, Washington DC, District of Columbia, United States; ³Institute of High Pressure Physics, Polish Academy of Science, Warsaw, Poland.

PS4

(Student) Radiative and Auger Recombination in Indium Nitride from First-Principles Andrew McAllister¹, Dylan Bayer^{1,2} and Emmanouil Kioupakis²; ¹Applied Physics, University of Michigan, Ann Arbor, Michigan, United States; ²Materials Science and Engineering, University of Michigan, Ann Arbor, Michigan, United States.

PS5

Fast Hall—A High Speed Hall Measurement for Material Characterization Jeffrey Lindemuth; Lake Shore Cryotronics, Westerville, Ohio, United States.

PS6

The Effect of the Undoped GaN/Buffer-Layer Interface on the Operation of Schottky Diodes and MESFET Devices Jian Xu; The Pennsylvania State University, State College, Pennsylvania, United States.

PS7

(Student) Enhanced Light Extraction Efficiency of AlGaIn-Based Deep Ultraviolet Light-Emitting Diodes with Sidewall Roughed Sapphire Substrates Shuai Wang; Wuhan National Laboratory for Optoelectronics, Huazhong University of Science and Technology, Wuhan, China.

PS8

(Student) Beta-Gallium Oxide Films Prepared by Anodization and Annealing of Gallium Arsenide Ryan J. Bunk, Jerry M. Woodall and Muhammad S. Islam; ECE, University of California, Davis, Davis, California, United States.

PS9

(Student) N-Type Quasi-2D β -Ga₂O₃ / p-Silicon Heterojunction P-N Diodes Gahyun Shin and Jihyun Kim; Korea University, Seoul, Korea (the Republic of).

PS10

(Student) A New Descriptor for High-Throughput Screening of P-Type Oxide Semiconductors Yong Youn, Kanghoon Yim, Miso Lee and Seungwu Han; Seoul National University, Seoul, Korea (the Republic of).

PS11

(Student) Color Centers and Defect Complexes in Sn:ZnO Single Crystals Micah Haseman¹, Pooneh Saadatkia², Jack Warfield¹, Joseph Lawrence³, Armando Hernandez², Gerald Jellison⁴, Lynn Boatner⁴ and Farida Selim^{1,2}; ¹Physics, Bowling Green State University, Napoleon, Ohio, United States; ²Center for Photochemical Sciences, Bowling Green State University, Bowling Green, Ohio, United States; ³Center for Materials and Sensors Characterization, University of Toledo, Toledo, Ohio, United States; ⁴Materials Science and Technology Division, Oak Ridge National Lab, Oak Ridge, Tennessee, United States.

PS12

(Student) Developing Inexpensive and Easy Hole Conducting Transparent Electronics by Rusing Copper with Iodine Sebastian Howard, Matthew Wahila and Louis Piper; Physics, Binghamton University, State University of New York, Astoria, New York, United States.

PS13

Structural and Optical Properties of Hafnia-Based Thin Films with Embedded Si Nanoclusters and Rare-Earth Ions Larysa Khomenkova¹, Christophe Labbe², Xavier Portier² and Fabrice Gourbilleau²; ¹V.E. Lashkaryov Institute of Semiconductor Physics, Kyiv, Ukraine; ²CIMAP/Ensicaen, Caen, France.

PS14

(Student) Non-Thermal Plasma Based Surface Modification of ZnO-Epoxy-Graphene Flexible Nano-Composite Thin Films Sanjeev Kumar^{1,2}, Walker Tuff^{1,2}, Daniel R. Apuan^{1,2} and Sankha Banerjee^{1,2}; ¹Mechanical Engineering, California State University, Fresno, Fresno, California, United States; ²Energy Engineering Research Group, California State University, Fresno, Fresno, California, United States.

PS15

Exploring Sub-10[nm] Oxygen Clusters in Czochralski Silicon Phil Fraundorf, Jamie Roberts and David Osborn; Physics and Astronomy, University of Missouri Saint Louis, Saint Louis, Missouri, United States.

PS16

Structural and Optical Properties of Al-Doped ZnO Nanocrystals Prepared by Ultrasound Spray Pyrolysis Tetyana Torchynska², Brahim El Filali¹ and Juan Antonio J. Gomez¹; ¹UPIITA, Instituto Politecnico Nacional, Ciudad de México, Mexico; ²ESFM, Instituto Politecnico Nacional, CDMX, Mexico.

P17

(Student) Fundamental Bounds for the Resonance Strength in Graphene Plasmonic Structures Sara Arezoomandan and Berardi Sensale-Rodriguez; Department of Electrical and Computer Engineering, The University of Utah, Salt Lake City, Utah, United States.

PS18

(Student) Novel Material Combinations for Narrowband Metamaterial Absorbers/Emitters Nicole A. Pfeister, Dante DeMeo, John Chivers, Emily Carlson and Thomas E. Vandervelde; Tufts University, Medford, Massachusetts, United States.

PS19

(Student) Metamaterial Bandpass Filters in Optical Frequencies Minsu Oh, Richard Liptak and Sergio Granieri; Physics and Optical Engineering, Rose-Hulman Institute of Technology, Terre Haute, Indiana, United States.

PS20

(Student) Thermoelectric Transport Properties of Single Layer 2D Chalcogenides and Dichalcogenides Jorge O. Morales^{1,2}, Donovan E. Diaz-Droguett^{3,4}, Diego Celentano^{2,4} and Tengfei Luo^{1,5}; ¹Aerospace and Mechanical Engineering, University of Notre Dame, South Bend, Indiana, United States; ²Mechanical Engineering, Pontificia Universidad Catolica de Chile, Santiago, Chile; ³Fisica, Pontificia Universidad Catolica de Chile, Santiago, Chile; ⁴Centro de Investigación en Nanotecnología y Materiales Avanzados (CIEN-UC), Pontificia Universidad Catolica de Chile, Santiago, Chile; ⁵Center for Sustainable Energy of Notre Dame (cSEND), University of Notre Dame, Notre Dame, Indiana, United States.

PS21

Seebeck Coefficient Measurements on Thin Films of ZnSnN₂ and the Density of States Effective Mass Jeffrey S. Dyck¹, John W. Cencer¹, Robert A. Makin², Nathaniel Feldberg³ and Steven Durbin²; ¹Department of Physics, John Carroll University, University Heights, Ohio, United States; ²Department of Electrical and Computer Engineering, Western Michigan University, Kalamazoo, Michigan, United States; ³Department of Physics, State University of New York, Buffalo, New York, United States.

PS22

(Student) Thermal Oxidation of A-Oriented ZnO Thin Films—Exploring the Anisotropy of Optical and Electrical Properties Wan-Chen Hsieh¹, Paritosh Wadekar¹, Chiung-Wen Chang¹, Chun-Fu Chang¹, Hui-Chun Huang¹, Sung-Wei Yeh², Hye-Won Seo³, Wei-Kan Chu⁴ and Quark Y. Chen^{1,4}; ¹National Sun Yat-sen University, Kaohsiung, Taiwan; ²National Kaohsiung University, Kaohsiung, Taiwan; ³Jeju National University, Jeju, Korea (the Republic of); ⁴University of Houston, Houston, Texas, United States.

PS23

(Student) Dilute GeSn—A Study on the Effects of Adding Stannic Chloride to UHV-CVD Growth Perry Grant^{1,2,3}, Wei Dou³, Joshua Grant^{2,3}, Bader Alharthi³, Aboozar Mosleh³, Wei Du⁴, Baohua Li¹, Mansour Mortazavi⁴, Hameed Naseem³ and Shui-Qing Yu³; ¹Arktonics LLC, Fayetteville, Arkansas, United States; ²Microelectronics-Photonics Program, University of Arkansas, Fayetteville, Arkansas, United States; ³Electrical Engineering, University of Arkansas, Fayetteville, Arkansas, United States; ⁴Chemistry and Physics, University of Arkansas at Pine Bluff, Pine Bluff, Arkansas, United States.

PS24

Comparative Studies of Cu₂O Epitaxial Thin Films on MgO and r-Al₂O₃ Substrates Paritosh Wadekar¹, Wan-Chen Hsieh¹, Chaio-Wei Lin¹, Chun-Fu Chang¹, Hui-Chun Huang¹, Sung-Wei Yeh², Li-Wei Tu¹, Hye-Won Seo³, Wei-Kan Chu⁴ and Quark Y. Chen^{1,4}; ¹National Sun Yat-sen University, Kaohsiung, Taiwan; ²National Kaohsiung University, Kaohsiung, Taiwan; ³Jeju National University, Jeju-si, Korea (the Republic of); ⁴University of Houston, Houston, Texas, United States.

PS25

Low Temperature Ge Growth Using Plasma Enhanced UHV-CVD Technique Bader Alharthi¹, Joshua M. Grant¹, Wei Dou¹, Perry C. Grant², Aboozar Mosleh¹, Hameed Naseem¹ and Shui-Qing Yu¹; ¹Electrical Engineering, University of Arkansas Fayetteville, Fayetteville, Arkansas, United States; ²Arktonics LLC, Fayetteville, Arkansas, United States.

PS26

(Student) Characterization of Contact Metallizations on SnS Nanoribbons Jenifer R. Hajzus¹, Adam J. Biacchi², Son T. Le², Curt A. Richter², Angela R. Hight Walker² and Lisa M. Porter¹; ¹Materials Science and Engineering, Carnegie Mellon University, Pittsburgh, Pennsylvania, United States; ²Engineering Physics Division, National Institute of Standards and Technology (NIST), Gaithersburg, Maryland, United States.

PS27

(Student) Novel Photolithographic Techniques Using Polymethyl Methacrylate Daniel Carbaugh, Faiz Rahman, Sneha Pandya and Savas Kaya; Ohio University, Athens, Ohio, United States.

PS28

(Student) Effects of Forming Voltage and Oxide Microstructure on Conductive Filament Shape in p+Si/HfO₂/Cu Filamentary Resistance Switches Heidi Clarke, Timothy Brown and Patrick Shamberger; Materials Science, Texas A&M University, College Station, Texas, United States.

PS29

New Precursor for Low Temperature Deposition of SiO₂ Layer Using Thermal and Plasma Enhanced ALD Techniques Hima Lingam, Venkateswara R. Chitturi and Patrick Cobb; Nova-Kem, Germantown, Wisconsin, United States.

PS30 WITHDRAWN

Growth and Characterization of 3D Topological Insulator Bi₂Se₃ on Surface Passivated ZnO Hsin-Yen Lee^{1,2}, Ying-Chen Lee³, Albert Davydov¹ and Yuan-Huei Chang³; ¹National Institute of Standards and Technology, Gaithersburg, Maryland, United States; ²Theiss Research, La Jolla, California, United States; ³Department of Physics, National Taiwan University, Taipei, Taiwan.

PS31

(Student) Modeling Hexagonal Boron Nitride Based Thin Electroluminescence Devices for Deep Ultra Violet Light Generation Thushan Wickramasinghe; Electrical Engineering and Computer Science, Ohio University, Athens, Ohio, United States.

PS32

(Student) Electronic and Optical Properties of Two-Dimensional GaN from First-Principles Calculations Nocona Sanders, Dylan Bayerl, Guangsha Shi and Emmanouil Kioupakis; Materials Science and Engineering, University of Michigan, Ann Arbor, Michigan, United States.

PS33

(Student) Graphene as Contact Electrode Material for CNTFET Applications Phani Raghavendra Yasasvi Gangavarapu, Punith Chikkahalli Lokesh, K N Bhat and Akshay Naik; Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore, India.

PS34

(Student) Enhancement of QDs Size and Coupling Due to Ultrathin GaAs Barrier (4-4.5nm) of the Bilayer InAs QDs Heterostructure Binita Tongbram and Subhananda Chakrabarti; Indian Institute of Technology, Powai, India.

PS35

(Student) Impact of Growth Pause on the Performance of InAs/GaAs Based Multi-Layer Quantum Dots Infra-Red Photodetectors Binita Tongbram and Subhananda Chakrabarti; Indian Institute of Technology, Powai, India.

PS36

(Student) Probing the Origin of Magnetism in FeSb₂Bi_xSe₄ Ferromagnetic Semiconductors Juan S. Lopez¹, Pierre Ferdinand Poudeu-Poudeu¹, Alexander Page² and Ctirad Uher²; ¹Materials Science and Engineering, University of Michigan, Ann Arbor, Michigan, United States; ²Physics, University of Michigan, Ann Arbor, Michigan, United States.

PS37

(Student) Dye Sensitized Nanoparticles for Solar Driven Chemical Energy Storage George Hargenrader; Chemistry, Bowling Green State University, Bowling Green, Ohio, United States.

PS38

(Student) Surface Functionalization Approaches for Quantitative Sensing of Bioanalytes Using Amperometric Micro-Electrode Arrays Siddarth Sridharan¹, Jose F. Rivera¹, David B. Janes¹ and Jenna L. Rickus²; ¹ECE, Purdue University, West Lafayette, Indiana, United States; ²ABE, Purdue University, West Lafayette, Indiana, United States.

PS39

(Student) Enhanced Signal-to-Noise Ratio Using Nanomaterial-Based Passive Neural Electrodes Sepideh Rastegar¹, Justin Stadlbauer¹, Kari McLaughlin², Kiyo Fujimoto², David Estrada² and Kurtis D. Cantley¹; ¹Electrical and Computer Engineering, Boise State University, Boise, Idaho, United States; ²Micron School of Materials Science and Engineering, Boise State University, Boise, Idaho, United States.

PS40

Systematic Approach for Printing Solar Cells from Perovskite Precursors Tara Holeman¹, Jason Wright¹, Juvinch Vicente², Jixin Chen², Savas Kaya¹ and Wojciech M. Jadwisieniczak¹; ¹EECS, Ohio University, Athens, Ohio, United States; ²Department of Chemistry and Biochemistry, Ohio University, Athens, Ohio, United States.

PS41 WITHDRAWN

(Student) Artificial Photosynthesis—Utilizing NAD⁺/NADH Analogs for the Solar Fuel Forming Reductions Stefan Ilic and Ksenija Glusac; Chemistry, Bowling Green State University, Bowling Green, Ohio, United States.

PS42

(Student) Novel Approach of Photolithography to Realize Patterned All-Solution Based Organic Thin-Film Transistors Anuj Rajpoot and Soumya Dutta; Electrical Engineering, Indian Institute of Technology, Madras, Chennai, India.

PS43 TRANSFERRED TO W1**PS44**

(Student) Synthesis and Electro-Optic Properties of Novel Polyimides Containing Dicyanovinylresorcinoyl Groups with Highly Enhanced Thermal Stability of Dipole Alignment Jung-Eun Kim and Ju-Yeon Lee; Inje University, Gimhae, Korea (the Republic of).

PS45

(LATE NEWS, Student) Dependence of Internal Crystal Structures of InAs Nanowires on Electrical Characteristics of Field Effect Transistor Sangmoon Han¹, Kwanjae Lee¹, Ilgyu Choi¹, Cheul-Ro Lee¹, Jin Soo Kim¹, Seoung-Ki Lee² and Jeongwoo Hwang³; ¹Division of Advanced Materials Engineering & Research Center of Advanced Materials Development, Chonbuk National University, Jeonju, Korea (the Republic of); ²Korea Institute of Science and Technology Jeonbuk Branch, Wanju 55324, Republic of Korea; ³Korea Photonics Technology Institute, Gwangju 61007, Republic of Korea

PS46 WITHDRAWN

(LATE NEWS) Low Bandgap Polymer/Polymer, Polymer/Fullerene Phase Diagrams—Effect of Phase Separation on Photovoltaic Performance Getachew Muleta Fanta¹; ¹Polymer Engineering, Silesian University of Technology, Gliwice, Poland.

PS47

(LATE NEWS) Nanostructured AlGaIn UV-LEDs with Reduced Surface Trap States Based on Polarity Control Scheme Wei Guo, Zhenhai Yang, Junmei Li, Xi Yang, Feng Huang and Jichun Ye; Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences, Ningbo, China.

PS48

(LATE NEWS, Student) Effects of Substrate Type and Temperature Growth on the Microstructure and Characteristics of Pulsed Laser Deposited TiO₂ Films and their Role as Buffer Layers for Conductive Films

Sahil Agarwal¹, Micah Haseman², Pooneh Saadatkia¹, Dave Winarski¹, Eryn Doyle², Le Zhang^{2,3}, Kevin Leedy⁴ and Farida A. Selim^{1,2}; ¹Center for Photochemical Sciences, Bowling Green State University, Bowling Green, Ohio, United States; ²Department of Physics and Astronomy, Bowling Green State University, Bowling Green, Ohio, United States; ³Jiangsu Key Laboratory of Advanced Laser Materials and Devices, School of Physics and Electronic Engineering, Jiangsu Normal University, Xuzhou, China; ⁴Air Force Research Laboratory Sensors Directorate, Wright-Patterson Air Force Base, Dayton, Ohio, United States.

NOTES

O: Multifunctional Oxides and Dielectrics
Session Chairs: Patrick Lenahan and Farida Selim
Thursday Morning, June 29, 2017
DeBartolo Hall, Room 102

8:20 AM O1

(Student) External Strain-Induced Energy Shifts in $\text{LaNiO}_3/\text{La}_{2/3}\text{Sr}_{1/3}\text{MnO}_3//\text{SrTiO}_3$ Heterostructures Hantian Gao¹, Thaddeus J. Asel¹, Molly Ball², Jason Hoffman³, Anand Battacharya⁴, Wolfgang Windl² and Leonard Brillson^{5,1};
¹Department of Physics, The Ohio State University, Columbus, Ohio, United States; ²The Department of Material Science and Engineering, The Ohio State University, Columbus, Ohio, United States; ³Department of Physics, Harvard University, Boston, Massachusetts, United States; ⁴Materials Science Division, Argonne National Laboratory, Argonne, Illinois, United States; ⁵Department of Electrical and Computer Engineering, The Ohio State University, Columbus, Ohio, United States

8:40 AM O2

(Student) Thickness Dependent Metal-Insulator Transition of a Correlated Oxide Heterostructure Integrated Directly on Si Kamyar Ahmadi-Majlan¹, Tongjie Chen², Ricky Hensley¹, Patrick Conlin¹, Zheng Hui Lim¹, Reza Moghadam¹, Dong Su³, Divine P. Kumah², Hanghui Chen⁴ and Joseph H. Ngai¹; ¹Physics, University of Texas at Arlington, Arlington, Texas, United States; ² Physics, North Carolina State University, Raleigh, North Carolina, United States; ³Center for Functional Nanomaterials, Brookhaven National Laboratory, Upton, New York, United States; ⁴Institute of Physics, New York University Shanghai, Pudong, China

9:00 AM O3

(Student) Optical Probe of Temperature Dependent Magnetization in $\text{La}_{2/3}\text{Sr}_{1/3}\text{MnO}_3$ and Related Perovskite Heterostructures Matthew Sheffield¹, Jason Hoffman², Hantian Gao¹, Michael Swartz¹, Leonard Brillson¹, Anand Bhattacharya² and Ezekiel Johnston-Halperin¹; ¹Physics, The Ohio State University, Columbus, Ohio, United States; ²Argonne National Laboratory, Argonne, Illinois, United States

9:20 AM O4

2 DEG at the Interface of SrTiO_3 and Al_2O_3 Heterostructures Farida Selim¹, David Winarski¹, Pooneh Saadatkia¹ and Kevin Leedy²; ¹Center for Photochemical Sciences, Bowling Green State University, Bowling Green, Ohio, United States; ²Air Force Research Laboratory, Dayton, Ohio, United States

9:40 AM O5

(Student) Ferroelectric Metal-Oxide-Semiconductor Capacitors Using Ultrathin Single Crystalline $\text{SrZr}_x\text{Ti}_{1-x}\text{O}_3$ Reza M. Moghadam^{1,2}, Zhiyong Xiao⁴, Kamyar Ahmadi-Majlan², Everett D. Grimley³, Mark Bowden⁵, Phuong-Vu Ong⁶, James M. Lebeau³, Scott A. Chambers⁶, Xia Hong⁴, Peter V. Sushko⁶ and Joseph H. Ngai²; ¹Electrical Engineering, The University of Texas at Arlington, Arlington, Texas, United States; ²Physics, University of Texas at Arlington, Arlington, Texas, United States; ³Materials Science and Engineering, North Carolina State University, Raleigh, North Carolina, United States; ⁴Physics and Astronomy, University of Nebraska Lincoln, Lincoln, Nebraska, United States; ⁵Environmental Molecular Sciences Laboratory, Pacific Northwest National Laboratory, Richland, Washington, United States; ⁶Physical Sciences Division, Physical and Computational Sciences Directorate, Pacific Northwest National Laboratory, Richland, Washington, United States

10:00 AM BREAK

10:20 AM O6

(Student) Diamond-Like Carbon and Amorphous Hydrogenated Carbon Thin Films Studied with Electrically Detected Magnetic Resonance and Near-Zero Field Magnetoresistance Charles McLemore¹, Patrick M. Lenahan¹ and Sean W. King²; ¹Engineering Science and Mechanics, The Pennsylvania State University, University Park, Pennsylvania, United States; ²Logic Technology Development, Intel Corporation, Hillsboro, Oregon, United States

10:40 AM O7

(Student) Tunable Traps in Solution Processed Spin-Coated Aluminium Oxide Phosphate Sandip Mondal and V Venkataraman; Department of Physics, Indian Institute of Science, Bengaluru, India

11:00 AM O8

(Student) DLTS Analysis and Interface Engineering of Solution Route Fabricated Zirconia Based MIS Devices Using Plasma Treatment Arvind Kumar, Sandip Mondal and KSR Koteswara Rao; Physics, Indian Institute of Science, Bangalore, India

11:20 AM O9

(Student) Formation Mechanism of Atomically Flat Si(100) Surface by Annealing in Ar/H₂ Ambient Sohya Kudoh and Shun-ichiro Ohmi; Department of Electrical and Electronic Engineering, Tokyo Institute of Technology, Yokohama, Japan

11:40 AM O10

High-Dielectric Materials for Fabrication by Two-Photon Polymerization Eric M. Weis¹, Kevin M. Hubbard¹, Matthew J. Herman¹, Reuben J. Peterson¹, Ghanshyam Pilania⁵, Dmitry Shchegolkov², Ting S. Luk³, Anatoly V. Efimov⁴ and Evgenya I. Simakov²; ¹MST-7 Engineered Materials, Los Alamos National Laboratory, Los Alamos, New Mexico, United States; ²AOT-AE: Accelerators and Electrodynamics, Los Alamos National Laboratory, Los Alamos, New Mexico, United States; ³CINT, Sandia National Laboratories, Albuquerque, New Mexico, United States; ⁴MPA-CINT Center for Integrated Nanotechnologies, Los Alamos National Laboratory, Los Alamos, New Mexico, United States; ⁵MST-8: Materials Science in Radiation & Dynamics Extremes, Los Alamos National Laboratory, Los Alamos, New Mexico, United States

P: Low-Dimensional Structures
Session Chairs: Kris Bertness and Jian Xu
Thursday Morning, June 29, 2017
DeBartolo Hall, Room 136

8:20 AM P1

(Student) Semi-Empirical Growth Rate Modelling for Self-Assisted Growth of GaAs, GaAs/GaAsSb Core-Shell, GaAsSb Axial NW Using MBE Manish Sharma¹, Md Rezaul Karim¹, Pavan K. Kasanaboina² and Shanthy Iyer^{2,1}; ¹Nanoengineering, North Carolina Agricultural and Technical State University, Greensboro, North Carolina, United States; ²Electrical and Computer Engineering, North Carolina Agricultural and Technical State University, Greensboro, North Carolina, United States

8:40 AM P2

The Effect on Carrier Transport Properties of Nanowire Scaling Using Strained, Lattice-Mismatched Semiconductor Interfaces Erin I. Vaughan¹, Mahmoud Behzadirad^{2,3}, Clay Mayberry¹, Danhong Huang^{1,2} and Ashwani Sharma^{1,4}; ¹Air Force Research Laboratory, Albuquerque, New Mexico, United States; ²Center for High Technology Materials, Albuquerque, New Mexico, United States; ³Optical Science and Engineering, University of New Mexico, Albuquerque, New Mexico, United States; ⁴Electrical and Computer Engineering, University of New Mexico, Albuquerque, New Mexico, United States

9:00 AM P3

(Student) Infrared Absorption of 3-D Core-Shell ZnO – a-Si:H Nanowire Structures Bright C. Iheanacho, Czung-Ho Lee and William S. Wong; Electrical and Computer Engineering, University of Waterloo, Waterloo, Canada

9:20 AM P4

(Student) In Situ Fabrication and Defect Characterization of Pt-Based Ohmic and Schottky Contacts to ZnO Nanowires Jon W. Cox¹, Geoffrey M. Foster², Alexander Jarjour², Holger von Wenckstern³, Marius Grundmann³ and Leonard J. Brillson^{1,2}; ¹Department of Electrical and Computer Engineering, The Ohio State University, Columbus, Ohio, United States; ²Department of Physics, The Ohio State University, Columbus, Ohio, United States; ³Institut für Exp. Physik II, Universität Leipzig, Leipzig, Germany

9:40 AM P5

(Student) Flexible Shear Force Sensor Arrays Using Position- and Morphology-Controlled ZnO Nanotubes Grown on Graphene Films Jun Beom Park, Youngbin Tchae, Hee-Hoon Kim and Gyu-Chul Yi; Department of Physics and Astronomy, Institute of Applied Physics, Research Institute of Advanced Materials (RIAM), Seoul National University, Seoul, Korea (the Republic of)

10:00 AM BREAK**10:20 AM P6 WITHDRAWN**

Growth of AAO Template Assisted Ordered ZnO Nanowires and ZnO/rGO Nanocomposites for Gas Sensors Ghanshyam D. Varma¹, Nagesh Kumar², Bipin K. Gupta³, Arvind K. Srivastava⁴ and Jyoti Jyoti¹; ¹Physics, I.I.T. Roorkee, Roorkee, India; ²National Chiao Tung University, Hsinchu, Taiwan; ³National Physical Laboratory, New Delhi, India; ⁴Raja Ramanna Centre of Advanced Technology, Indore, India

10:40 AM P7

(Student) Studying Morphology-Dependent Carrier Dynamics of Semiconductor Nanocrystals for Efficient Photon Upconversion Zhuohui Li, Eric Y. Chen, Christopher C. Milleville and Matthew F. Doty; Materials Science and Engineering, University of Delaware, Newark, Delaware, United States

11:00 AM P8

Modification of Light Emitting Mechanisms versus Stoichiometry of Si-Rich Silicon Nitride Films Tetyana V. Torchynska¹, Jose Luis Casas Espinola¹, Larysa Khomenkova² and A. Slaoui³; ¹Physics, Instituto Politecnico Nacional, Mexico City, Mexico; ²Photoelectronics, V. Lashkaryov Institute of Semiconductor Physics at NASU, Ukraine, Kiev, Ukraine; ³Semiconductors, ICube, Strasbourg, France

11:20 AM P9

(Student) Characterization of Self-Doping in Ge Microwires Grown by Electrochemical Liquid-Liquid-Solid (ec-LLS) Saurabh Acharya¹ and Stephen Maldonado^{2,3}; ¹Department of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, Ann Arbor, Michigan, United States; ²Department of Chemistry, University of Michigan, Ann Arbor, Ann Arbor, Michigan, United States; ³Applied Physics Program, University of Michigan, Ann Arbor, Ann Arbor, Michigan, United States

11:40 AM P10

(Student) Thread-Like Carbon Nanotube-Based Fiber Field-Effect Transistors and Complementary Circuits for High Performance Wearable E-Textile Devices Jae Sang Heo, Insik Hwang, Jun-Ho Lee and Sung Kyu Park; Chung-Ang University, Seoul, Korea (the Republic of)

Q: Photovoltaics—Organic and Hybrid
Session Chairs: David Gundlach and Adrienne Stiff-Roberts
Thursday Morning, June 29, 2017
DeBartolo Hall, Room 138

8:20 AM Q1

(LATE NEWS) Molecular Electronic Devices from Selectively Fluorinated Self-Assembled Monolayers with Controllable Surface Dipoles Robert Bruce¹, Lin You^{1,2}, Sujitra Pookpanratana¹, Olivia Pomeroy¹ and Christina A. Hacker¹; ¹Engineering Physics Division, National Institute of Standards and Technology, Gaithersburg, Maryland, United States; ²Theiss Research, La Jolla, California, United States

8:40 AM Q2

(Student) Structure-Property Studies of Fluorinated Azadipyrromethene Derivatives as N-Type Acceptors in Organic Photovoltaics Sandra Pejic, Forrest S. Etheridge, Chunlai Wang, Roshan Fernando and Genevieve Sauve; Chemistry, Case Western Reserve University, Cleveland, Ohio, United States

9:00 AM Q3

(Student) High Dielectric Constant Organic Semiconductors for Electronic Application Chunlai Wang¹, Zhongbo Zhang², Sandra Pejic¹ and Genevieve Sauve¹; ¹Chemistry, Case Western Reserve University, Cleveland, Ohio, United States; ²Macro, Case Western Reserve University, Cleveland, Ohio, United States

9:20 AM Q4

(Student) Deposition of Crystalline Organic-Inorganic Hybrid Materials by RIR-MAPLE Enrique T. Barraza¹, Wiley Dunlap-Shohl², Yuankai Liu¹, David B. Mitzi² and Adrienne D. Stiff-Roberts¹; ¹Electrical and Computer Engineering, Duke University, Durham, North Carolina, United States; ²Mechanical Engineering and Materials Science, Duke University, Durham, North Carolina, United States

9:40 AM Q5

Interfacial Interactions at Reduced Graphene Oxide/Perovskite Interfaces for Photovoltaics Muge Acik and Richard A. Rosenberg; Argonne National Laboratory, Lemont, Illinois, United States

10:00 AM BREAK

10:20 AM Q6

(Student) Probing Coupled Slow and Fast Charge Dynamics in Cesium Lead Halide Perovskite Using Scanning Kelvin Probe Microscopy Ali Moeed Tirmzi¹, Ryan P. Dwyer¹, Tobias Hanrath² and John Marohn¹; ¹Chemistry and Chemical Biology, Cornell University, Ithaca, New York, United States; ²School of Chemical and Biomolecular Engineering, Cornell University, Ithaca, New York, United States

10:40 AM Q7

Enhanced Photocarrier Lifetime with Fullerenes in Polymer/MoS₂ Heterojunctions Chengmei Zhong^{1,2}; ¹Chemistry, Northwestern University, Evanston, Illinois, United States; ²South China University of Technology, Guangzhou, China

11:00 AM Q8

A Model for the Frenkel-Charge-Transfer Exciton Intermixing in Periodic Organic Chains—Application to Crystalline Copper Phthalocyanine Adrian Popescu and Igor Bondarev; North Carolina Central University, Durham, North Carolina, United States

11:20 AM Q9

Temperature and Light Intensity Dependent Current-Voltage Behavior in PBDDT-DPP Photovoltaic Cells—Effects of Side-Chain Architecture, Cathode Interlayer and Solvent Additive Bryan Paulsen; Loyola University Chicago, Chicago, Illinois, United States

11:40 AM Q10 WITHDRAWN

(Student) Investigation of Photoconductivity of Lead-Free Halide Perovskite Semiconductors Emilio A. Codecido², Eric T. McClure¹, Patrick M. Woodward¹ and Roberto C. Myers³; ¹Department of Chemistry, The Ohio State University, Columbus, Ohio, United States; ²Department of Physics, The Ohio State University, Columbus, Ohio, United States; ³Department of Materials Science and Engineering, The Ohio State University, Columbus, Ohio, United States

R: Energy Harvesting and Storage
Session Chairs: Jamie Phillips and Louis Piper
Thursday Morning, June 29, 2017
DeBartolo Hall, Room 140

8:20 AM R1 WITHDRAWN

Superior Lithium Intercalation Capacity of Incommensurate Graphene Layers Tereza Paronyan, Arjun K. Thapa, Andriy Sherihy, Jacek B. Jasinski and John S. Jangam; University of Louisville, Louisville, Kentucky, United States

8:40 AM R2

(Student) On-Chip Energy Storage with Microsupercapacitor Based on Vacuum Annealed Graphene Hao Yang and Wu Lu; The Ohio State University, Columbus, Ohio, United States

9:00 AM R3

X-Ray Spectroscopy Studies of Nano-Engineered Lone Pair Active Photo-Catalysts for More-Efficient Water Splitting Louis Piper¹, Sarbjit Banerjee² and David Watson³; ¹Binghamton University, Binghamton, New York, United States; ²Texas A&M, College Station, Texas, United States; ³University at Buffalo, Buffalo, New York, United States

9:20 AM R4

(Student) Demonstration of GaAs Nanowire Photoanode for the Oxygen Evolution Reaction Joy S. Zeng¹, Xiaoqing Xu^{2,3}, Vijay Parameshwaran⁴, Jon Baker¹, Stacey Bent¹, H. S. P. Wong² and Bruce Clemens⁵; ¹Chemical Engineering, Stanford University, Silver Spring, Maryland, United States; ²Electrical Engineering, Stanford University, Stanford, California, United States; ³Stanford Nanofabrication Facility, Stanford University, Stanford, California, United States; ⁴U.S. Army Research Laboratory, Adelphi, Maryland, United States; ⁵Materials Science and Engineering, Stanford University, Stanford, California, United States

9:40 AM R5

(Student) What is the Role of Aluminum at the Electrode-Electrolyte Interfaces of Li_{1-x}Ni_{0.80}Co_{0.15}Al_{0.05}O₂? Zachary Lebens-Higgins¹, Nicholas Faenza², Shawn Sallis³, Nathalie Pereira², Glenn G. Amatucci² and Louis F. Piper^{1,3}; ¹Physics, Applied Physics, and Astronomy, Binghamton University, Binghamton, New York, United States; ²Energy Storage Research Group, Materials Science and Engineering, Rutgers University, North Brunswick, New Jersey, United States; ³Materials Science and Engineering, Binghamton University, Binghamton, New York, United States

10:00 AM BREAK**10:20 AM R6**

(Student) AlN Thin-Film-Based Flexible Piezoelectric Generators Jie Chen¹, Shahab Shervin¹, Seungkyu Oh^{2,3}, Sara Pouladi¹, Weijie Wang² and Jae-Hyun Ryou^{1,2,4}; ¹Materials Science and Engineering Program, University of Houston, Houston, Texas, United States; ²Department of Mechanical Engineering, University of Houston, Houston, Texas, United States; ³Department of Printed Electronics Engineering, Suncheon National University, Suncheon, Korea (the Republic of); ⁴Texas Center for Superconductivity at UH (TcSUH), University of Houston, Houston, Texas, United States

10:40 AM R7

Towards Infrared Rectennas for Use in Energy Harvesting Applications Dante F. DeMeo, Nicole A. Pfiester, Corey M. Shemelya and Thomas E. Vandervelde; Electrical Engineering, Tufts University, Somerville, Massachusetts, United States

11:00 AM R8

Photovoltaic Infrared Energy Harvesting for Bio-Implantable Devices Eunseong Moon, David Blaauw and Jamie Phillips; Electrical Engineering, University of Michigan, Ann Arbor, Michigan, United States

11:20 AM R9

Porous Carbon Cloth for Energy Storage and Conversion Muhammad-Sadeeq A. Balogun, Hongbing Ji and Yexiang Tong; Physical Chemistry, Sun Yat-sen University, Guangzhou, China

11:40 AM R10

(LATE NEWS, Student) Outstanding High Temperature Performance of Nonpolar and Semipolar InGaN Solar Cells Xuanqi Huang¹, Houqiang Fu¹, Hong Chen¹, Zhijian Lu¹, Jossue Montes¹, Michael Iza², Steven P. DenBaars², Shuji Nakamura², and Yuji Zhao¹; ¹School of Electrical, Computer and Energy Engineering, Arizona State University, Tempe, Arizona, United States; ²Materials Department, University of California, Santa Barbara, Santa Barbara, California, United States.

S: BN, BP, TMD and Novel 2D Materials
Session Chairs: Susan Fullerton Shirey and Christopher Hinkle
Thursday Morning, June 29, 2017
DeBartolo Hall, Room 141

8:20 AM S1

Probing Out-of-Plane Charge Transport in Black Phosphorus/Graphene Vertical Heterostructures Junmo Kang¹, Deep Jariwala¹, Christopher R. Ryder¹, Spencer A. Wells¹, Yongsuk Choi^{2,4}, Euyheon Hwang^{2,3}, Jeong Ho Cho^{2,4}, Tobin J. Marks^{1,5} and Mark C. Hersam^{1,5,6}; ¹Department of Materials Science and Engineering, Northwestern University, Evanston, Illinois, United States; ²SKKU Advanced Institute of Nanotechnology, Sungkyunkwan University, Suwon, Korea (the Republic of); ³Department of Physics, Sungkyunkwan University, Suwon, Korea (the Republic of); ⁴School of Chemical Engineering, Sungkyunkwan University, Suwon, Korea (the Republic of); ⁵Department of Chemistry, Northwestern University, Evanston, Illinois, United States; ⁶Department of Electrical Engineering and Computer Science, Northwestern University, Evanston, Illinois, United States

8:40 AM S2

(Student) Defects and Surface States in the 2D Semiconductor Germanane Thaddeus J. Aseel¹, Aldriel Barnum^{1,2}, Eric Yanchenko¹, Shishi Jiang³, Kevin Krymowski⁴, Wolfgang Windl⁴, Joshua E. Goldberger³ and Leonard J. Brillson^{1,2}; ¹Department of Physics, The Ohio State University, Columbus, Ohio, United States; ²Department of Electrical and Computer Engineering, The Ohio State University, Columbus, Ohio, United States; ³Department of Chemistry and Biochemistry, The Ohio State University, Columbus, Ohio, United States; ⁴Department of Materials Science and Engineering, The Ohio State University, Columbus, Ohio, United States

9:00 AM S3

Large Area Growth and Characterization of Mo_xW_{1-x}Te₂ for Phase Change Applications Rachel Koltun¹, Xiang Zhang², Claire Pettiette-Hall¹, Teresa Ha¹, Pulickel M. Ajayan² and Vincent Gambin¹; ¹NG Next, Northrop Grumman Aerospace Systems, Redondo Beach, California, United States; ²Materials Science and Nanoengineering, Rice University, Houston, Texas, United States

9:20 AM S4

(Student) Growth Optimization of Epitaxial Bismuth Thin Films towards the 2D Limit Emily S. Walker¹, Christopher J. Brennan¹, Anupam Roy¹, Jeff Damasco², Stephen D. March¹, Andrew F. Briggs¹, Erica Davis¹, Weinan Zhu¹, Deji Akinwande¹, Nadya Mason², Edward T. Yu¹ and Seth R. Bank¹; ¹Electrical and Computer Engineering, University of Texas at Austin, Austin, Texas, United States; ²Physics, University of Illinois at Urbana-Champaign, Urbana, Illinois, United States

9:40 AM S5

(LATE NEWS, Student) Ohmic Contact between Mechanically Exfoliated Tungsten Diselenide and Epitaxial Graphene Dacen Waters, Jun Li, Sergio C. de La Barrera and Randall M. Feenstra, Department of Physics, Carnegie Mellon University, Pittsburgh, Pennsylvania, United States.

10:00 AM BREAK

10:20 AM S6 WITHDRAWN

(Student) Chemical Vapor Deposition Growth of Large Single-Crystal Monolayer and Bilayer Hexagonal Boron Nitride Yanxin Ji, Brian Calderon and Michael Spencer; Electrical and Computer Engineering, Cornell University, Ithaca, New York, United States

10:40 AM S7

(Student) High Mobility CVD Grown Boron Nitride Devices Brian R. Calderon, Yanxin Ji, Athith Krishna, Joon Young Kwak, Jeonghyun Hwang, Hussain Alsaman, Xian Xu and Michael G. Spencer; Engineering, Cornell University, Ithaca, New York, United States

11:00 AM S8

Effects of Temperature and Ammonia on Metal-Organic Chemical Vapor Deposition of Hexagonal Boron Nitride Anthony Rice, Andrew A. Allerman, Mary H. Crawford, Thomas Beechem, Taisuke Ohta, Douglas Medlin, Catalin Spataru, Jeffrey Figiel and Michael Smith; Sandia National Laboratories, Albuquerque, New Mexico, United States

11:20 AM S9

(Student) Substrate Impact on Charge Density Wave Phase Transitions in 1T Tantalum Disulfide (1T-TaS₂) Rui Zhao¹, Benjamin Grisafe², Donna Deng¹, Yi Wang¹, Long-Qing Chen¹, Zi-Kui Liu¹, Suman Datta² and Joshua Robinson¹; ¹Materials Science and Engineering, The Pennsylvania State University, University Park, Pennsylvania, United States; ²Department of Electrical Engineering, University of Notre Dame, Notre Dame, Indiana, United States

11:40 AM S10

(Student) Molecular Beam Epitaxy of MoSe₂ Directly on Si Brelon J. May¹ and Roberto C. Myers^{1,2}; ¹Materials Science and Engineering, The Ohio State University, Columbus, Ohio, United States; ²Electrical and Computer Engineering, The Ohio State University, Columbus, Ohio, United States

T: Characterization of III-Nitrides
Session Chairs: Andrew Allerman and Christian Wetzel
Thursday Morning, June 29, 2017
McKenna Hall, Auditorium

8:20 AM T1

(Student) Characterizations of Kerr Refractive Index and Nonlinear Absorption on GaN Crystals in Polar, Nonpolar and Semipolar Orientations Hong Chen, Xuanqi Huang, Houqiang Fu, Zhijian Lu, Jossue Montes and Yuji Zhao; Electrical Engineering, Arizona State University, Tempe, Arizona, United States

8:40 AM T2

(Student) Investigation of Polarization Field in AlGaIn Multiple Quantum Wells Qiang Guo¹, Ronny Kirste², Seiji Mita², Pramod Reddy², Ramon Collazo¹ and Zlatko Sitar^{1,2}; ¹Department of Materials Science and Engineering, North Carolina State University, Raleigh, North Carolina, United States; ²Adroit Materials, Cary, North Carolina, United States

9:00 AM T3

Transient Hall Effect Characterization of Photogenerated Carriers in GaN /AlGaIn 2DEGs David R. Daughton, BoKuai Lai and Jeffrey Lindemuth; Lake Shore Cryotronics, Westerville, Ohio, United States

9:20 AM T4

(Student) Structural and Electronic Properties of BInGaN Alloys Lattice-Matched to GaN Logan D. Williams and Emmanouil Kioupakis; MSE, University of Michigan, Ann Arbor, Michigan, United States

9:40 AM T5

(Student) Terahertz Spectroscopy of Strained AlN/GaN/AlN Quantum Wells Hugo Condori¹, Ashish Chanana¹, S.M. Moududul Islam², Ajay Nahata¹, Debdeep Jena² and Berardi Sensale-Rodriguez¹; ¹Department of Electrical and Computer Engineering, The University of Utah, Salt Lake City, Utah, United States; ²Department of Electrical and Computer Engineering, Cornell University, Ithaca, New York, United States

10:00 AM BREAK

U: Nitride Wide Bandgap Characterization
Session Chairs: Andrew Armstrong and Brendan Gunning
Thursday Morning, June 29, 2017
McKenna Hall, Auditorium

10:20 AM U1

(Student) Observing E_c -0.57 eV Trapping in Cross-Sectioned AlGaIn/GaN Schottky Contacts Using Nanometer-Scale Scanning Kelvin-Deep Level Transient Spectroscopy with *In Situ* Biasing Darryl A. Gleason¹, Kevin Galiano¹, Jeff L. Brown², Albert M. Hilton², Eric R. Heller³, Donald L. Dorsey³ and Jonathan P. Pelz¹; ¹Department of Physics, The Ohio State University, Columbus, Ohio, United States; ²KBRwyle Aerospace Group, Dayton, Ohio, United States; ³Materials and Manufacturing Directorate, Air Force Research Laboratory, Dayton, Ohio, United States

10:40 AM U2

Comparison of the Experimental and Theoretical Recombination Dynamics in Deep UV Emitting AlGaIn Quantum Wells Chelsea R. Haughn¹, Gregory Rupper¹, Sergey Rudin¹, Thomas Wunderer², Zhihong Yang², Noble M. Johnson², Michael Wraback¹ and Gregory Garrett¹; ¹U.S. Army Research Laboratory, Adelphi, Maryland, United States; ²Palo Alto Research Center, Palo Alto, California, United States

11:00 AM U3

(Student) Impact of Al Composition of Al_{1-x}Ga_xN Alloys and GaN Polarity on Thermoelectric Properties of III-Nitrides Sean Tozier, Matthew J. Rivera, Isra Mahaboob, Kasey Hogan, Emma Rocco, Jonathan Marini and F. Shadi Shahedipour-Sandvik; Nanoscale Engineering, Colleges of Nanoscale Science and Engineering, State University of New York Polytechnic Institute, Middletown, New York, United States

11:20 AM U4

(Student) Structural and Electrical Characterization of Ion Implanted n-AlN Mathew H. Breckenridge¹, Biplab Sarkar¹, Shun Washiyama¹, Ronny Kirste², William Mecouch², James Tweedie², Ramon Collazo¹ and Zlatko Sitar¹; ¹Material Science and Engineering, North Carolina State University, Raleigh, North Carolina, United States; ²Adroit Materials, Inc., Apex, North Carolina, United States

11:40 AM U5

Improving the Output Power of Ultraviolet AlGaIn-Based Light-Emitting Diode by Employing Ag Nanodots-Based Electrodes Jae-Seong Park¹, Jin-Young Na², Sun-Kyung Kim² and Tae-Yeon Seong¹; ¹Korea University, Seoul, Korea (the Republic of); ²Kyunghee University, Yongin, Korea (the Republic of)

V: Oxide Semiconductors—Defects, Characterization and Devices
Session Chairs: Lisa Porter and Jamie Phillips
Thursday Afternoon, June 29, 2017
DeBartolo Hall, Room 102

1:30 PM V1

(LATE NEWS, Student) Solid Photoelectrochemical Cell Based on α -Hematite-Molybdenum Disulfide and Titanium Oxide Nanocomposite Films for Photoelectrochemical Applications Hussein Alrobei^{1,2}, Manoj K. Ram³; ¹Department of Mechanical Engineering, University of South Florida, Tampa, Florida, United States; ²Department of Mechanical Engineering, Sattam Bin Abdulaziz University, Al-Kharj, Saudi Arabia; ³Clean Energy Research Center, University of South Florida, Tampa, Florida, United States.

1:50 PM V2

(Student) Impact of Native Defects on Schottky Barriers at IrO_x/ZnO Interfaces Geoffrey M. Foster¹, Grace Mackessy², Alana Hyland^{3,4}, Martin Allen^{3,4}, Buguo Wang⁵ and Leonard J. Brillson^{1,6}; ¹Department of Physics, The Ohio State University, Columbus, Ohio, United States; ²Columbus School for Girls, Columbus, Ohio, United States; ³Department of Electrical and Computer Engineering, University of Canterbury, Christchurch, New Zealand; ⁴The MacDiarmid Institute for Advanced Materials and Nanotechnology, Wellington, New Zealand; ⁵Semiconductor Research Center, Wright State University, Dayton, Ohio, United States; ⁶Department of Electrical and Computer Engineering, The Ohio State University, Columbus, Ohio, United States

2:10 PM V3

(Student) Native Point Defect Formation, Thermal Runaway and Dielectric Breakdown in Flash Sintered ZnO Hantian Gao¹, Thaddeus Asel¹, Jon Cox², Yuanyao Zhang³, Jian Luo³ and Leonard J. Brillson^{2,1}; ¹Department of Physics, The Ohio State University, Columbus, Ohio, United States; ²Department of Electrical and Computer Engineering, The Ohio State University, Columbus, Ohio, United States; ³Department of NanoEngineering Program of Materials Science and Engineering, University of California at San Diego, San Diego, California, United States

2:30 PM V4

(Student) *In Situ* Oxidation, Reduction and Diffusion between Bottom Electrodes and Solution-Processed Amorphous Oxide Semiconductor Youngbae Son and Rebecca L. Peterson; Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, Ann Arbor, Michigan, United States

2:50 PM V5

(Student) Luminescence of SrTiO₃ During Phase Transition and the Role of Lattice Relaxation Pooneh Saadatkia^{1,2}, David Winarski^{1,2} and Farida Selim^{1,2}; ¹Center for Photochemical Sciences, Bowling Green State University, Bowling Green, Ohio, United States; ²Physics and Astronomy, Bowling Green State University, Bowling Green, Ohio, United States

3:10 PM BREAK

W: Materials for Memory and Computation
Session Chair: Suzanne Mohney
Thursday Afternoon, June 29, 2017
DeBartolo Hall, Room 102

3:30 PM W1

(Student) Self-Healing Proteinaceous Materials for Reversible Thermal Switching John Tomko¹, Abdon Pena-Francesch³, Melik Demirel³ and Patrick Hopkins²; ¹Materials Science and Engineering, University of Virginia, Charlottesville, VA, United States; ²Mechanical and Aerospace Engineering, University of Virginia, Charlottesville, VA, United States; ³Materials Science and Engineering, The Pennsylvania State University, University Park, PA, United States.

3:50 PM W2

Stress Induced Resistive Switching in Pt/HfO₂/Ti Devices Gilad Zeevi², Alexander Katsman¹ and Yuval Yaish²; ¹Materials Science and Engineering, Technion—Israel Institute of Technology, Haifa, Israel; ²Department of Electrical Engineering, Technion—Israel Institute of Technology, Haifa, Israel

4:10 PM W3

Effects of RRAM Electroforming and Switching Methods on Device Performance Elucidated with Ultrafast Current Measurements Robin Jacobs-Gedrim, Stephen DiGregorio, Michael Van Heukelom, Conrad James and Matthew Marinella; Sandia National Laboratories, Albuquerque, New Mexico, United States

4:30 PM W4

Improving Phase Change Material-Based RF Switch Reliability via In-Depth Morphological Analysis Matthew King^{1,2}, Nabil El-Hinnawy^{1,3}, Pavel Borodulin¹, Andy Ezis¹, Carlos Padilla¹, Vivien Luu¹, Doyle Nichols¹, Elizabeth Dickey², Jon-Paul Maria² and Robert Young¹; ¹Northrop Grumman, Linthicum, Maryland, United States; ²North Carolina State University, Raleigh, North Carolina, United States; ³Carnegie Mellon University, Pittsburgh, Pennsylvania, United States

4:50 PM W5

Effects of Oxygen Vacancies on the Electronic Structure of Metal Insulator Metal (MIM) Systems and the Formation of a Conductive Filament Handan Yildirim and Ruth Pachter; Materials and Manufacturing Division, Air Force Research Laboratory, Wright-Patterson AFB, Ohio, United States

X: Rare Earth Nanocomposites and Films
Session Chair: Joshua Zide
Thursday Afternoon, June 29, 2017
DeBartolo Hall, Room 136

1:30 PM X1

(Student) Growth Rate Dependent Surface Morphology of Rare Earth Arsenide Films Kyle M. McNicholas¹, Rodolfo Salas¹, Scott D. Sifferman¹, Daehwan Jung², Minjoo Larry Lee³ and Seth R. Bank¹; ¹Microelectronics Research Center and Department of Electrical and Computer Engineering, The University of Texas at Austin, Austin, Texas, United States; ²The Institute for Energy Efficiency, The University of California Santa Barbara, Santa Barbara, California, United States; ³Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Urbana, Illinois, United States

1:50 PM X2

(Student) Optical and Transport Properties of ErAs and TbAs Thin Films Yuejing Wang¹, Silvia Hertel², Bo E. Tew¹, Dongxia Wei¹, Stephanie Law¹ and Joshua Zide¹; ¹Materials Science and Engineering, University of Delaware, Newark, Delaware, United States; ²Fraunhofer Institute for Electronic Nanosystems (ENAS), Chemnitz, Germany

2:10 PM X3

Surface Reconstruction Driven Dewetting of Thin GaAs Layers from Single Layer ErAs/GaAs Nanocomposites Kurt Eyink, Yuanchang Zhang, Brittany Urwin, Krishnamurthy Mahalingam, Madelyn J. Hill and Lawrence Grazulis; AFRL/RXAN, Air Force Research Laboratory, Wright-Patterson AFB, Ohio, United States

2:30 PM X4

Characterization of Heavily Doped GaAs:Er Devices for THz Generation Pumped with 1550nm Laser W.D. Zhang¹, A Mingardi¹, Elliott R. Brown¹, Buguo Wang³, David Look³, Ari Feldman², Todd Harvey² and Richard Mirin²; ¹THz Sensors Lab, Wright State University, Dayton, Ohio, United States; ²Quantum Electronics and Photonics Division, National Institute of Standards and Technology, Boulder, Colorado, United States; ³Semiconductor Research Center, Wright State University, Dayton, Ohio, United States

2:50 PM X5

(Student) The Path to Growth of Metal/Semiconductor Nanocomposite Materials by Liquid Phase Epitaxy Bo E. Tew, Matthew R. Lewis and Joshua Zide; Materials Science and Engineering, University of Delaware, Newark, Delaware, United States

3:10 PM BREAK

Y: Nano-Magnetic and Spintronic Materials
Session Chair: Ezekiel Johnston-Halperin and Patrick Lenahan
Thursday Afternoon, June 29, 2017
DeBartolo Hall, Room 136

3:30 PM Y1

(Student) Determining the Gilbert Damping Constant in Perpendicularly Magnetized W/CoFeB/MgO Films with High Thermal Stability Dustin Lattery¹, Delin Zhang², Jie Zhu¹, Jian-Ping Wang² and Xiaojia Wang¹; ¹Mechanical Engineering, University of Minnesota Twin Cities, Minneapolis, Minnesota, United States; ²Electrical Engineering, University of Minnesota Twin Cities, Minneapolis, Minnesota, United States

3:50 PM Y2

(Student) Dependence of Ferromagnetic Properties on Strain Profile of Ga_{1-x}Mn_xAs_{1-y}P_y with Various P Concentrations Xiang Li, Xinyu Liu, Sining Dong, Jacek K. Furdyna and Malgorzata Dobrowolska-Furdyna; Department of Physics, University of Notre Dame, Notre Dame, Indiana, United States

4:10 PM Y3

Structural Evolution from 2D to 3D of Dilute Magnetic (Sn,Mn)Se Films Grown by Molecular Beam Epitaxy Sining Dong; Department of Physics, University of Notre Dame, Notre Dame, Indiana, United States

4:30 PM Y4

Shape Anisotropy in Patterned Ferromagnetic GaMnAsP Films with Perpendicular Anisotropy Xinyu Liu, Xiang Li, Sining Dong, Malgorzata Dobrowolska-Furdyna and Jacek Furdyna; Physics, University of Notre Dame, Notre Dame, Indiana, United States

Z: III-V and Chalcopyrite Photovoltaic Materials
Session Chairs: Steven Durbin and Jeffrey Dyck
Thursday Afternoon, June 29, 2017
DeBartolo Hall, Room 138

1:50 PM Z1

Chalcopyrite Interfaces Studied by Synchrotron Radiation Christian Pettenkofer; EEIS, Helmholtz-Zentrum Berlin, Berlin, Germany

2:10 PM Z2

(Student) Plasma Assisted Molecular Beam Epitaxy Growth Space of ZnSnN₂ Robert Makin¹, Krystal York¹, Steven Durbin¹, Nancy Senabulya², James Mathis², Roy Clarke², Nathaniel Feldberg³ and Patrice Miska³; ¹Electrical and Computer Engineering, Western Michigan University, Kalamazoo, Michigan, United States; ²University of Michigan, Ann Arbor, Michigan, United States; ³Institut Jean Lamour, University of Lorraine, Vandoeuvre, France

2:30 PM Z3

(Student) Optical Characterization of Epitaxial ZnSnN₂ Films Roy Clarke¹, James P. Mathis¹, Nancy Senabulya¹, Robert A. Makin², Steven Durbin², Nathaniel Feldberg³ and Roger Reeves⁴; ¹Department of Applied Physics, University of Michigan, Ann Arbor, Michigan, United States; ²Department of Electrical and Computer Engineering, Western Michigan University, Kalamazoo, Michigan, United States; ³Department of Physics, University at Buffalo, Buffalo, New York, United States; ⁴Department of Physics, University of Canterbury, Christchurch, New Zealand

2:50 PM Z4

(Student) ALD Grown, Band-Tunable Indium Oxysulfide (In₂(O-S)₃)—A Nontoxic Electron Transport Layer for the Chalcogenide Absorbers SnS and CZTS-Se Ashwin N. Jayaraman¹, Sang B. Kim², Richard Haight³, Oki Gunawan³ and Roy Gordon²; ¹John A. Paulson School of Engineering and Applied Sciences, Harvard University, Cambridge, Massachusetts, United States; ²Harvard University, Cambridge, Massachusetts, United States; ³International Business Machines Corporation, Yorktown Heights, New York, United States

3:10 PM BREAK

3:30 PM Z5

Heterogeneous Sources of Misfit Dislocations in GaAs Wafers and Their Impact on Wide Bandgap Metamorphic AlInP Solar Cells Kunal Mukherjee¹, Michelle Vaisman² and Minjoo Larry Lee^{3,2}; ¹Department of Materials, University of California Santa Barbara, Santa Barbara, California, United States; ²Department of Electrical Engineering, Yale University, New Haven, Connecticut, United States; ³Department of Electrical and Computer Engineering, University of Illinois, Urbana, Illinois, United States

3:50 PM Z6

(Student) **Effect of Rapid Thermal Annealing on AlGaInP Solar Cells Grown by Molecular Beam Epitaxy** Yukun Sun^{1,2}, Joseph Faucher¹, Shizhao Fan², Ryan Hool³ and Minjoo Larry Lee²; ¹Department of Electrical Engineering, Yale University, New Haven, Connecticut, United States; ²Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, Urbana, Illinois, United States; ³Department of Materials Science and Engineering, University of Illinois at Urbana-Champaign, Urbana, Illinois, United States

4:10 PM Z7

Flexible III-V Solar Cells Developed from Single-Crystal-Like Thin-Film Material Directly Grown on Hastelloy Tape Sara Pouladi, Mojtaba Asadirad, Monika Rathi, Seungkyu Oh, Devendra Khatiwada, Pavel Dutta, Shahab Shervin, Yao Yao, Jie Chen, Venkat Selvamani and Jae-Hyun Ryou; Mechanical Engineering, University of Houston, Houston, Texas, United States

4:30 PM Z8

(Student) **High Temperature Characterization of InGaN/GaN Multi-Quantum-Well Solar Cell** Ehsan Vadiiee¹, Heather McFavilen², Alec Fischer³, Joshua J. Williams¹, Christiana Honsberg¹ and Stephen Goodnick¹; ¹Electrical and Computer Engineering, Arizona State University, Atlanta, New Mexico, United States; ²Photonitride Devices Inc., Tempe, Arizona, United States; ³Department of Physics, Arizona State University, Tempe, Arizona, United States

4:50 PM Z9

(LATE NEWS, Student) **Growth and Properties of Boron-III-As Alloys** Kyle Marshall McNicholas, Rasha H. El-Jaroudi, Andrew Briggs, Stephen March, Scott Sifferman and Seth Bank; Microelectronics Research Center and Department of Electrical and Computer Engineering, The University of Texas at Austin, Austin, Texas, United States.

AA: Thermoelectric Materials

Session Chairs: Mark Losego and Charles Lutz

Thursday Afternoon, June 29, 2017

DeBartolo Hall, Room 140

1:30 PM AA1

Non-Equilibrium Processing Leads to Record High Thermoelectric Figure of Merit in PbTe-SrTe Gangjian Tan¹, Fengyuan Shi², Shiqiang Hao², Li-Dong Zhao³, Hang Chi⁴, Xiaomi Zhang², Ctirad Uher⁴, Chris Wolverton², Vinayak Dravid² and Mercuri Kanatzidis^{1,5}; ¹Chemistry, Northwestern University, Evanston, Illinois, United States; ²Materials Science and Engineering, Northwestern University, Evanston, Illinois, United States; ³Materials Science and Engineering, Beihang University, Beijing, China; ⁴Physics, University of Michigan, Ann Arbor, Michigan, United States; ⁵Materials Science Division, Argonne National Laboratory, Argonne, Illinois, United States

1:50 PM AA2

(Student) **Thermoelectric Properties of the NaPb_mSbTe_{m+2} (m=0.25-20) System** Tyler Slade¹, Jann Grovogui², Shiqiang Hao², Chris Wolverton², Vinayak Dravid² and Mercuri G. Kanatzidis¹; ¹Chemistry, Northwestern University, Evanston, Illinois, United States; ²Materials Science and Engineering, Northwestern University, Evanston, Illinois, United States

2:10 PM AA3

(Student) **The Effects of Substrate Porosity on the Thermal Conductivity of PbSe/PbTe Superlattice Thin Films** Mallory E. DeCoster¹, Xin Chen², Kai Zhang², Helmut Baumgart³ and Patrick E. Hopkins¹; ¹Mechanical and Aerospace Engineering, University of Virginia, Crozet, Virginia, United States; ²Applied Research Center, Old Dominion University, Newport News, Virginia, United States; ³Electrical and Computer Engineering, Old Dominion University, Newport News, Virginia, United States

2:30 PM AA4

(Student) **Grain Boundary Scattering Effects of Mobility in P-Type Polycrystalline SnSe** Si Wang^{1,2}, Si Hui¹, Kunling Peng³, Xiaoyuan Zhou³, Xinfeng Tang² and Ctirad Uher¹; ¹Department of Physics, University of Michigan, Ann Arbor, Michigan, United States; ²State Key Laboratory of Advanced Technology for Materials Synthesis and Processing, Wuhan University of Technology, Wuhan, China; ³College of Physics, Chongqing University, Chongqing, China

2:50 PM AA5

Atomic Layer Deposited (ALD) Al₂O₃ Thin Films as an Efficient Environmental Barrier Coating for PbTe Based Thermoelectric Materials Sumanta Sarkar¹, Duyen Cao¹, Muhammad S. Islam¹, Christos Malliakas¹, Xiaomi Zhang², Vinayak P. Dravid² and Mercuri G. Kanatzidis¹; ¹Department of Chemistry, Northwestern University, Evanston, Illinois, United States; ²Department of Materials Science and Engineering, Northwestern University, Evanston, Illinois, United States

3:10 PM BREAK

3:30 PM AA6

High Thermoelectric Performance in N-Type PbTe-GeTe Alloys Zhongzhen Luo^{1,2}; ¹Department of Chemistry, Northwestern University, Singapore, Singapore; ²Nanyang Technological University, Singapore, Singapore

3:50 PM AA7

High Thermoelectric Performance of PbSe-MSe Systems (M = Mg, Hg)—New Insights into the Electronic and Thermal Transport Properties of Lead Chalcogenides James M. Hodges and Mercuri Kanatzidis; Chemistry, Northwestern University, Evanston, Illinois, United States

4:10 PM AA8

A Chemical Understanding for the Band Convergence in Thermoelectric CoSb₃ Skutterudites—Influence of Electron Population, Local Thermal Expansion and Bonding Interactions Riley Hanus², Xingyu Guo¹, Yinglu Tang³, Guodong Li¹, G. Jeff Snyder¹ and Wolfgang Zeier⁴; ¹Materials Science, Northwestern University, Chicago, Illinois, United States; ²Materials Science, Northwestern University, Evanston, Illinois, United States; ³EMPA Swiss Federal Laboratories, Dübendorf, Switzerland; ⁴Physikalisch-Chemisches Institut, Giessen, Germany

4:30 PM AA9

Thermoelectric and Magnetic Properties of Nanostructured n-Type Ti_{0.25}Zr_{0.25}Hf_{0.5}(Ni,Fe)_{0.975}Sb_{0.025} Half-Heusler Alloys Ruiming Lu and Pierre Ferdinand Poudeu-Poudeu; Materials Science and Engineering, University of Michigan, Ann Arbor, Michigan, United States

BB: Nanoscale Characterization
Session Chairs: Paul Blanchard and Randy Feenstra
Thursday Afternoon, June 29, 2017
DeBartolo Hall, Room 141

1:30 PM BB1

III-V Semiconductor Nanowires—An Exciting Toolbox for Heterostructure Design Studied by Scanning Tunneling Microscopy Johan Knutsson¹, Sarah McKibbin¹, Martin Hjort¹, Olof Persson¹, Sebastian Lehmann¹, Nate S. Wilson², Christopher J. Palmstrom^{2,3}, Anders Mikkelsen¹ and Rainer Timm¹;
¹Department of Physics and NanoLund, Lund University, Lund, Sweden; ²Materials Department, University of California, Santa Barbara, Santa Barbara, California, United States; ³Department of Electrical and Computer Engineering, University of California, Santa Barbara, Santa Barbara, California, United States

1:50 PM BB2

Complete *In Situ* Surface Characterization of III-V Nanowire Devices Sarah McKibbin, Jovana Colvin, Johan Knutsson, Andrea Troian, James Webb, Anders Mikkelsen and Rainer Timm; Department of Physics, Lund University, Lund, Sweden

2:10 PM BB3

Towards Single Dopant Devices for Quantum Information and Metrology—Weak Localization in Embedded Phosphorus Delta Layers in Silicon Joseph A. Hagmann¹, Xiqiao Wang¹, Pradeep Nambodiri¹, Jonathan Wyrick¹, Roy Murray², Michael D. Stewart², Richard M. Silver¹ and Curt A. Richter¹;
¹Engineering Physics Division, National Institute of Standards and Technology, Gaithersburg, Maryland, United States; ²Quantum Measurement Division, National Institute of Standards and Technology, Gaithersburg, Maryland, United States

2:30 PM BB4

(Student) Probing Out-of-Plane Electromechanical Response and Flexoelectricity of Monolayer MoS₂ Using Piezoresponse Force Microscopy Christopher J. Brennan¹, Rudresh Ghosh^{1,2}, Kalhan Koul¹, Sanjay K. Banerjee¹, Nanshu Lu³ and Edward T. Yu¹;
¹Electrical and Computer Engineering, The University of Texas at Austin, Austin, Texas, United States; ²NovaCentrix, Austin, Texas, United States; ³Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, Austin, Texas, United States

2:50 PM BB5

Non-Uniform Piezoelectricity in PVDF Thin Film Zhonghang Ji, Robert Goldenberg and Yan Zhuang; Electrical Engineering, Wright State University, Dayton, Ohio, United States

3:10 PM BREAK

3:30 PM BB6

Scanning Capacitance Characterization of Vacuum-Channel Nanoelectronic Transistor Gerald Pascual, Byong Kim and Keibock Lee; Technical Marketing, Park Systems, Inc., Santa Clara, California, United States

3:50 PM BB7

(Student) Tip-Enhanced Raman Spectroscopy of Monolayer and Bilayer MoS₂ Zhongjian Zhang¹, Christopher J. Brennan¹, Rudresh Ghosh^{1,2}, Sanjay K. Banerjee¹ and Edward T. Yu¹;
¹Electrical and Computer Engineering, University of Texas at Austin, Austin, Texas, United States; ²NovaCentrix, Austin, Texas, United States

4:10 PM BB8

(Student) Heterojunction Electronic Properties and Compositional Differences of CdCl₂ Post-Treated CdTe Solar Cells Dean Collett¹, Jeffery A. Aguiar^{2,3}, Brian v. Devener⁴, Yohan Yoon^{5,6}, Paul Haney⁶, Nikolai Zhitenev⁶, Michael Scarpulla^{1,3}, Prakash Koirala⁷, Robert W. Collins⁷ and Heayoung P. Yoon¹;
¹Electrical and Computer Engineering, University of Utah, Salt Lake City, Utah, United States; ²Fuel Design and Development Department, Idaho National Laboratory, Idaho Falls, Idaho, United States; ³Department of Materials Science and Engineering, University of Utah, Salt Lake City, Utah, United States; ⁴Utah Nanofab, University of Utah, Salt Lake City, Utah, United States; ⁵Maryland NanoCenter, University of Maryland, College Park, Maryland, United States; ⁶Center for Nanoscale Science and Technology, National Institute of Standards and Technology, Gaithersburg, Maryland, United States; ⁷Department of Physics and Astronomy, Center for Photovoltaics Innovation and Commercialization, University of Toledo, Toledo, Ohio, United States

4:30 PM BB9

Laser-Assisted Atom Probe Tomography of AlN and AlGaN Norman Sanford, Paul Blanchard and Albert Davydov; National Institute of Standards and Technology, Boulder, Colorado, United States

4:50 PM BB10

Atomic-Scale Characterization of Contaminants at the Nanowire/Substrate Regrowth Interface in GaN Grown by Selective Area Growth Molecular Beam Epitaxy Paul T. Blanchard, Matthew D. Brubaker, Todd E. Harvey, Alexana Roshko, Norman A. Sanford, Joel C. Weber and Kris A. Bertness; National Institute of Standards and Technology (NIST), Boulder, Colorado, United States

CC: Nitride Wide Bandgap Epitaxy

Session Chairs: Theeradetch Detchprohm and Xiaohang Li
Thursday Afternoon, June 29, 2017
McKenna Hall, Auditorium

1:30 PM CC1

(Student) Selective Area Growth and Characterization of Over 15 μm Thick Vertical GaN Diodes on Si Atsunori Tanaka¹, Shadi A. Dayeh^{1,2} and Renjie Chen²;
¹Materials Science and Engineering, University of California, San Diego, La Jolla, California, United States; ²Electrical and Computer Engineering, University of California, San Diego, San Diego, California, United States

1:50 PM CC2

(Student) Direct Growth of Single-Crystal-Like III-Nitride Thin Films on Copper Foil Shahab Shervin¹, Kamrul Alam¹, Kaveh Shervin¹, Jie Chen¹, Seung-Hwan Kim², Tae Hoon Chung³, Sara Pouladi¹, Ruiteng Li¹, Rebecca Forrest¹, Jiming Bao¹ and Jae-Hyun Ryou¹;
¹University of Houston, Houston, Texas, United States; ²Hongik University, Seoul, Korea (the Republic of); ³Korea Photonics Technology Institute, Gwangju, Korea (the Republic of)

2:10 PM CC3

Nitrogen-Rich Growth of Smooth GaN Layers by Plasma-Assisted MBE Henryk Turski^{1,2}, Anna Feduniewicz-Zmuda², Debdeep Jena^{1,3} and Czeslaw Skierbiszewski^{2,4}; ¹Electrical and Computer Engineering, Cornell University, Ithaca, New York, United States; ²Institute of High Pressure Physics, Polish Academy of Sciences, Warsaw, Poland; ³Department of Material Science and Engineering, Cornell University, Ithaca, New York, United States; ⁴Top GaN Ltd., Warsaw, Poland

2:30 PM CC4

(Student) Strain Balancing in InGaN-Based Multiple Quantum Wells Using AlGaIn Interlayers Syed Ahmed Al Mueyed¹, Wei Sun¹, Xiongliang Wei¹, Renbo Song¹, Nelson Tansu¹, Jonathan J. Wierer¹ and Daniel Koleske²; ¹Center for Photonics and Nanoelectronics, Department of Electrical and Computer Engineering, Lehigh University, Bethlehem, Pennsylvania, United States; ²Sandia National Laboratories, Albuquerque, New Mexico, United States

2:50 PM CC5

Growth and Electrical Characterization of Scandium Nitride Thin Films on Magnesium Oxide John S. Cetnar¹, David C. Look^{1,2}, Amber N. Reed³, Bruce Claffin¹, Vladimir Vasilyev¹ and Shivashankar Vangala^{1,4}; ¹Sensors Directorate, Air Force Research Laboratory, WPAFB, Ohio, United States; ²Wright State University, Dayton, Ohio, United States; ³Materials and Manufacturing Directorate, Air Force Research Laboratory, WPAFB, Ohio, United States; ⁴Azimuth Corporation, Dayton, Ohio, United States

3:10 PM BREAK**3:30 PM CC6**

Design, Epitaxy Growth and Characterization of Highly Reflective AlGaIn Based Distributed Bragg Reflectors Theeradetch Detchprohm¹, Karan Mehta¹, Yuh-Shiuan Liu¹, Young Jae Park¹, Shuo Wang², Oliver Moreno¹, Shyh-Chiang Shen¹, P. Douglas Yoder¹, Fernando Ponce² and Russell D. Dupuis¹; ¹Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, Georgia, United States; ²Physics, Arizona State University, Tempe, Arizona, United States

3:50 PM CC7

Structural Properties and Growth Modes of MOCVD-Grown AlN with TMAI Pretreatment of Sapphire Substrate Haiding Sun¹, Feng Wu¹, Talal M. Altahtamouni², Nasir Alfaraj¹, Theeradetch Detchprohm³, Russell Dupuis³ and Xiaohang Li¹; ¹King Abdullah University of Science & Technology, Thuwal, Saudi Arabia; ²Qatar University, Doha, Qatar; ³Georgia Institute of Technology, Atlanta, Georgia, United States

4:10 PM CC8 DISCUSSION TIME**4:30 PM CC9**

Growth of $B_xAl_{1-x}N$ Alloys by Metalorganic Vapor Phase Epitaxy—Towards a Lattice-Matched Ultra-Wide Bandgap Semiconductor Brendan Gunning, Andrew A. Allerman, Daniel Koleske, Jeffrey Kempisty and Anthony Rice; Sandia National Laboratories, Albuquerque, New Mexico, United States

4:50 PM CC10

Investigation of Microstructure, Strain and Defect of BAlN/Al(GaN) Heterostructures Haiding Sun¹, Feng Wu¹, Talal M. Altahtamouni², Dalaver H. Anjum¹, Theeradetch Detchprohm³, Russell Dupuis³ and Xiaohang Li³; ¹King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia; ²Qatar University, Doha, Qatar; ³Georgia Institute of Technology, Atlanta, Georgia, United States

DD: Point Defects, Doping and Extended Defects
Session Chairs: Mark Goorsky and Christian Wetzel
Friday Morning, June 30, 2017
DeBartolo Hall, Room 102

8:20 AM DD1

(Student) STM Studies of Individual Impurities in InSb Jacob Repicky, Sara Mueller, Anne Benjamin and Jay Gupta; Physics, The Ohio State University, Columbus, Ohio, United States

8:40 AM DD2

Temperature Dependent Charge Transport and Persistent Conductivity in Ti_6Se_4 Single Crystals Sanjib Das¹, John A. Peters¹, Wenwen Lin², Svetlana S. Kostina¹, Pice Chen¹, Joon-Il Kim¹, Mercuri Kanatzidis² and Bruce W. Wessels¹; ¹Materials Science and Engineering, Northwestern University, Evanston, Illinois, United States; ²Chemistry, Northwestern University, Evanston, Illinois, United States

9:00 AM DD3

(Student) Coloration and Defect Chemistry of Fe-Doped SrTiO_3 Jonathon N. Baker, Preston C. Bowes, Daniel M. Long, Joshua S. Harris, Ali Mobellegh, Elizabeth C. Dickey and Douglas L. Irving; Materials Science and Engineering, North Carolina State University, Raleigh, North Carolina, United States

9:20 AM DD4

(Student) Modeling the Influence of Background Impurities on High Temperature Equilibrium Conductivity in SrTiO_3 from First-Principles Preston C. Bowes, Jonathon N. Baker, Joshua S. Harris and Douglas L. Irving; Materials Science and Engineering, North Carolina State University, Raleigh, North Carolina, United States

9:40 AM DD5

(Student) Vacancy and Mass-Impurity Phonon Scattering in Self-Irradiated Silicon Ethan A. Scott¹, Khalid Hattar², John Gaskins¹ and Patrick Hopkins¹; ¹Mechanical and Aerospace Engineering, University of Virginia, Charlottesville, Virginia, United States; ²Sandia National Laboratories, Albuquerque, New Mexico, United States

10:00 AM BREAK

10:20 AM DD6

Point Defect Reduction in MOCVD GaN by Chemical Potential Control and Defect Quasi Fermi Level Control Pramod Reddy^{1,2}, Shun Washiyama¹, Felix Kaess¹, Ronny Kirste², Seiji Mita², Michael Gerhold³, James Tweedie², Ramon Collazo¹ and Zlatko Sitar¹; ¹Materials Science and Engineering, North Carolina State University, Raleigh, North Carolina, United States; ²Adroit Materials, Inc., Cary, North Carolina, United States; ³Army Research Office, Research Triangle Park, North Carolina, United States

10:40 AM DD7

(Student) Compensating Point Defect Reduction in High Al-Content Si Doped AlGaIn Grown by Metalorganic Chemical Vapor Deposition Shun Washiyama¹, Pramod Reddy^{1,2}, Qiang Guo¹, Andrew Klump¹, Biplab Sarkar¹, Ronny Kirste², Seiji Mita², Ramon Collazo¹ and Zlatko Sitar¹; ¹Materials Science and Engineering, North Carolina State University, Raleigh, North Carolina, United States; ²Adroit Materials, Cary, North Carolina, United States

11:00 AM DD8

(Student) Suppression of Mg Migration in Non-Interrupted MOCVD Grown GaN Andrew J. Klump¹, Felix Kaess^{1,2}, Pramod Reddy¹, Ramon Collazo¹ and Zlatko Sitar¹; ¹Materials Science and Engineering, North Carolina State University, Raleigh, North Carolina, United States; ²Technische Universität-Berlin, Berlin, Germany

11:20 AM DD9

(Student) First-Principles Study of Compensation in Si-Doped AlN Kelsey J. Mirrielees, Joshua S. Harris, Jonathon N. Baker, Dorian Alden, Ramon Collazo, Zlatko Sitar and Douglas L. Irving; Materials Science and Engineering, North Carolina State University, Raleigh, North Carolina, United States

11:40 AM DD10

Thermal Conductivity of Bulk GaN Robert Rounds¹, Luis Hernandez-Balderrama¹, Ronny Kirste¹, Alexander Franke¹, Tomasz Sochacki², Michal Bockowski², Ramon Collazo¹ and Zlatko Sitar¹; ¹Materials Science and Engineering, North Carolina State University, Raleigh, North Carolina, United States; ²Polish Academy of Sciences, Institute of High Pressure Physics, Warsaw, Poland

EE: Metamaterials and Materials for THz,
Plasmonics and Polaritons

Session Chairs: Stephanie Law and Berardi Sensale-Rodriguez
Friday Morning, June 30, 2017
DeBartolo Hall, Room 117

8:20 AM EE1

Nonlinear Plasmonic Effects and Low-Frequency Noise in Two-Dimensional Electron Gas Gregory Rupper¹, Michael Shur² and Sergey Rudin¹; ¹U.S. Army Research Laboratory, Adelphi, Maryland, United States; ²Rensselaer Polytechnic Institute, Troy, New York, United States

8:40 AM EE2

(Student) Investigation of Unpatterned Etching of Nanostructures in Immobilized Cubic-Boron Nitride for Infrared Nanophotonic Elements Athith Krishna¹, Ioannis Chatzakis², Nick Sharac², Brian R. Calderon¹, Joshua Caldwell² and Michael G. Spencer¹; ¹Electrical and Computer Engineering, Cornell University, Ithaca, New York, United States; ²U.S. Naval Research Laboratory, Washington, District of Columbia, United States

9:00 AM EE3

(Student) Epitaxial Integration of High-Contrast Photonic Structures Daniel J. Ironside, Alec M. Skipper, Emily S. Walker, Stephen D. March, Leland J. Nordin, Daniel Wasserman and Seth R. Bank; Microelectronics Research Center, The University of Texas at Austin, Austin, Texas, United States

9:20 AM EE4

(Student) UV Surface Plasmon Resonance Modification in Aluminum Nanohole-Arrays Using Graphene Sourangsu Banerji, Yunshan Wang, Jieying Mao, Sara Arezoomandan, Steve Blair and Berardi Sensale-Rodriguez; Department of Electrical and Computer Engineering, The University of Utah, Salt Lake City, Utah, United States

9:40 AM EE5

(Student) Gigahertz All-Optical Modulation Using Reconfigurable Plasmonic Metamolecules Xiangfan Chen, Biqin Dong, Fan Zhou, Chen Wang and Cheng Sun; Mechanical Engineering, Northwestern University, Evanston, Illinois, United States

10:00 AM BREAK**10:20 AM EE6**

(Student) Thickness Dependence of Coupled Dirac Plasmons in Bi₂Se₃ Thin Films Theresa P. Ginley and Stephanie Law; Material Science and Engineering, University of Delaware, Newark, Delaware, United States

10:40 AM EE7

(Student) Strong Absorption from Berreman Modes in Thin AlN Films Leland J. Nordin¹, Owen Dominguez², Sukrith Dev¹, Zuoming Dong¹, Anthony J. Hoffman² and Daniel Wasserman¹; ¹ECE, The University of Texas at Austin, Austin, Texas, United States; ²Electrical Engineering, University of Notre Dame, Notre Dame, Indiana, United States

11:00 AM EE8

(Student) Epsilon-near-Zero Mode Field Enhancement with Nanoantennas Owen Dominguez¹, Leland Nordin², Kaijun Feng¹, Junchi Lu¹, Daniel Wasserman² and Anthony Hoffman¹; ¹Electrical Engineering, University of Notre Dame, South Bend, Indiana, United States; ²Electrical Engineering, The University of Texas at Austin, Austin, Texas, United States

11:20 AM EE9

(Student) Excitation of High-*k* Modes in Semiconductor Hyperbolic Metamaterials Dongxia Wei¹, Christian Harris² and Stephanie Law¹; ¹Material Science and Engineering, University of Delaware, Newark, Delaware, United States; ²Lincoln University, Lincoln University, Pennsylvania, United States

11:40 AM EE10

Sub-Diffraction Confinement in all Semiconductor Hyperbolic Metamaterial Resonators Kaijun Feng¹, Galen Harden¹, Deborah L. Sivco² and Anthony J. Hoffman¹; ¹Electrical Engineering, University of Notre Dame, South Bend, Indiana, United States; ²Electrical Engineering, Princeton University, Princeton, New Jersey, United States

FF: III-V Nanowire Growth, Characterization and Devices
Session Chairs: Zetian Mi and Parsian K. Mohseni
Friday Morning, June 30, 2017
DeBartolo Hall, Room 119

8:20 AM FF1

(Student) 1.3 μm InN/InGaN/GaN Nanowire Array Diode Lasers and Photodiodes on (001) Silicon Arnab Hazari¹, Lifan Yan², Joanna M. Millunchick² and Pallab Bhattacharya¹; ¹Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, Michigan, United States; ²Material Science and Engineering, University of Michigan, Ann Arbor, Ann Arbor, Michigan, United States

8:40 AM FF2

(Student) Morphology and Strain Relaxation in High Lattice Mismatched InGaN Nanowire Heterostructures Lifan Yan¹, Arnab Hazari², Pallab Bhattacharya² and Joanna Millunchick¹; ¹Materials Science and Engineering, University of Michigan, Ann Arbor, Michigan, United States; ²EECS, University of Michigan, Ann Arbor, Michigan, United States

9:00 AM FF3

(Student) Photoinduced Thermodynamic Behavior in InGaN/GaN Double-Heterostructure Nanowires Nasir Alfaraj¹, Somak Mitra², Feng Wu¹, Idris A. Ajia², Bilal Janjua¹, Aditya Prabaswara¹, Renad A. Aljefri¹, Haiding Sun¹, Tien Khee Ng¹, Boon S. Ooi¹, Iman S. Roqan² and Xiaohang Li¹; ¹Computer, Electrical, and Mathematical Sciences and Engineering, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia; ²Physical Sciences and Engineering Division, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia

9:20 AM FF4

(Student) Current Conditioning of Nanowire-Based Optoelectronic Devices Brelon J. May¹, Matthew R. Belz², ATM Golam Sarwar⁴, Camelia M. Selcu³ and Roberto C. Myers^{1,2}; ¹Materials Science and Engineering, The Ohio State University, Columbus, Ohio, United States; ²Electrical and Computer Engineering, The Ohio State University, Columbus, Ohio, United States; ³Physics, The Ohio State University, Columbus, Ohio, United States; ⁴Intel, Portland, Oregon, United States

9:40 AM FF5

Optical and Electrical Characterization of GaN/InGaN Core-Shell Nanowire Light-Emitting Diodes Mohsen Nami¹, Ashwin Rishinaramangalam², Isaac Stricklin¹, Steve Brueck¹, Igal Brener³ and Daniel Feezell²; ¹Physics, The University of New Mexico, Center for High Technology Materials, Albuquerque, New Mexico, United States; ²Electrical and Computer Engineering, The University of New Mexico, Albuquerque, New Mexico, United States; ³Center for Integrated Nanotechnologies, Albuquerque, New Mexico, United States

10:00 AM BREAK**10:20 AM FF6**

(Student) Si Dopant Incorporation Limit Observed in Catalyst-Free InAs Nanowires Using Atom Probe Tomography Megan O. Hill¹, Max Sonner², Julian Treu², Jonathan Becker², Jonathan J. Finley², Gregor Koblmueller² and Lincoln J. Lauhon¹; ¹Materials Science and Engineering, Northwestern University, Evanston, Illinois, United States; ²Walter Schottky Institut and Physik Department, Technical University Munich, Garching, Germany

10:40 AM FF7

Parameter Space Mapping of InAsP Nanowire Arrays on Graphene, h-BN and MoS₂ Monolayers—Toward Selective Area van der Waals Epitaxy Mohadeseh Asadolahi-Baboli^{1,2}, Michael A. Slocum², Alessandro Giussani², Thomas S. Wilhelm^{1,2}, Hyun Kum², Seth M. Hubbard^{1,2} and Parsian Katal Mohseni^{1,2}; ¹Microsystems Engineering, Rochester Institute of Technology, Rochester, New York, United States; ²NanoPower Research Laboratories, Rochester Institute of Technology, Rochester, New York, United States

11:00 AM FF8

(Student) Single Nanowire Current-Voltage Measurements by C-AFM and Its Effect on the Output Characteristics of Solar Cells Based on Nanowire Ensembles Dmitry Mikulik¹, Maria Ricci², Pablo Romero-Gomez¹, Gozge Tutuncuoglu¹, Federico Matteini¹, Jelena Vukajlovic¹, Esther Alarcon-Llado³ and Anna Fontcuberta i Morral¹; ¹LMSC, EPFL, Lausanne, Switzerland; ²Cavendish Laboratory, University of Cambridge, Cambridge, United Kingdom; ³FOM Institute AMOLF, Amsterdam, Netherlands

11:20 AM FF9

(Student) Recording and Analysis of the Atomic Scale Dynamics of Contact Formation in the Cross-Section and Along InGaAs Nanowire Channels Renjie Chen¹, Katherine L. Jungjohann², William M. Mook², John Nogan² and Shadi A. Dayeh^{1,3,4}; ¹Department of Electrical and Computer Engineering, University of California, San Diego, San Diego, California, United States; ²Center for Integrated Nanotechnologies, Sandia National Laboratories, Albuquerque, New Mexico, United States; ³Department of NanoEngineering, University of California, San Diego, San Diego, California, United States; ⁴Materials Science and Engineering Program, University of California, San Diego, San Diego, California, United States

11:40 AM FF10

(Student) Bandgap Tuning of Optically Active Dilute-Antimonide GaSbN Nanowire Heterostructures for Visible Light Emitting Devices Mohammad F. Chowdhury¹, Qing Shi³, Sharif Sadaf¹, Hong Guo³ and Zetian Mi^{1,2}; ¹Electrical and Computer Engineering, McGill University, Montreal, Canada; ²Department of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, Michigan, United States; ³Department of Physics, McGill University, Montreal, Canada

GG: Transparent Conductors

Session Chairs: Rebecca Peterson and Angel Yanguas-Gil
Friday Morning, June 30, 2017
DeBartolo Hall, Room 138

8:20 AM GG1

(Student) Size Effects on Thermal Conductivity in Transparent Conducting Oxides David Olson, Chester Swejkowski, Jeffery Braun and Patrick Hopkins; Mechanical Engineering, University of Virginia, Charlottesville, Virginia, United States

8:40 AM GG2

(Student) Inkjet Printing of Photoconductive ZnO Thin Films on Flexible Substrates David Winarski^{1,2}, Emily Heckman³, Eric Kreit³ and Farida Selim^{1,2}; ¹Photochemical Sciences, Bowling Green State University, Bowling Green, Ohio, United States; ²Physics and Astronomy, Bowling Green State University, Bowling Green, Ohio, United States; ³Sensors Directorate, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio, United States

9:00 AM GG3

High-Throughput Screening of New p-Type Transparent Semiconducting Oxides Kanghoon Yim, Yong Youn, Miso Lee and Seungwu Han; Materials Science and Engineering, Seoul National University, Seoul, Korea (the Republic of)

9:20 AM GG4

(Student) Highly Conductive Metal Oxide Thin Films Using Low-Temperature Activated Catalytic Synthesis Seok Gyu Ban¹, Su-Min Jung¹, Jun-Ho Lee¹, Jeong-Wan Jo¹, Jaehyun Kim¹, Myung-Gil Kim² and Sung Kyu Park¹; ¹Electronic Electrical Engineering, Chung-Ang University, Seoul, Korea (the Republic of); ²Chemistry, Chung-Ang University, Seoul, Korea (the Republic of)

9:40 AM GG5

(LATE NEWS, Student) Lipid Membrane and Zinc Oxide Thin-Film Transistor Based Biosensors Akanksha Gupta¹, Esther Gomez¹ and Thomas Jackson²; ¹Chemical Engineering, Pennsylvania State University, State College, Pennsylvania, United States; ²Electrical Engineering, Pennsylvania State University, University Park, Pennsylvania, United States.

10:00 AM BREAK**10:20 AM GG6**

(Student) Optical and Electrical Characterization of CuNW/Graphene Hybrid Structure for Transparent Conductor Doosan Back¹, Yuki Mori², Kazuhiko Matsumoto² and David Janes¹; ¹School of Electrical and Computer Engineering and Birck Nanotechnology Center, Purdue University, West Lafayette, Indiana, United States; ²The Institute of Scientific and Industrial Research, Osaka University, Ibaraki, Japan

10:40 AM GG7

(Student) Transparent Electrodes Based on Silver Nanowire Networks—Physical Properties, Electrical Distribution and Integration into Devices Thomas Sannicolo^{1,2}, David Munoz-Rojas², Stephane Moreau³, Yves Brechet⁴, Ngoc Duy Nguyen⁵, Caroline Celle¹, Jean-Pierre Simonato¹ and Daniel Bellet²; ¹CEA Liten, Université Grenoble Alpes, Grenoble, France; ²CNRS LMGP, Université Grenoble Alpes, Grenoble, France; ³CEA Leti, Université Grenoble Alpes, Grenoble, France; ⁴CNRS SIMAP, Université Grenoble Alpes, Grenoble, France; ⁵Département de Physique, Université Liège, Liège, Belgium

11:00 AM GG8

(Student) Thermal Transient Response of Microscopic Hotspots in Silver Nanowire Transparent Conducting Electrodes Sajja Sadeque^{1,3}, Aaditya Candada^{2,3}, Yu Gong^{1,3}, Amir K. Ziabari^{1,3}, Kerry Maize^{1,3}, Ali Shakouri^{1,3}, Tim Fisher^{2,3} and David B. Janes^{1,3}; ¹School of Electrical and Computer Engineering, Purdue University, West Lafayette, Indiana, United States; ²School of Mechanical Engineering, Purdue University, West Lafayette, Indiana, United States; ³Birck Nanotechnology Center, Purdue University, West Lafayette, Indiana, United States

HH: Thermal Transport and New Thermoelectric Materials
Session Chairs: Xinyu Liu and Seth Bank
Friday Morning, June 30, 2017
DeBartolo Hall, Room 140

8:20 AM HH1

Thermal Conductivity and Optical Polarizability of Amorphous Titania Thin Films Prepared by Atomic Layer Deposition (ALD) Mark D. Losego¹, Brandon Piercy¹, Kelsey Meyer² and Patrick Hopkins²; ¹School of Materials Science and Engineering, Georgia Institute of Technology, Atlanta, Georgia, United States; ²Department of Mechanical and Aerospace Engineering, University of Virginia, Charlottesville, Virginia, United States

8:40 AM HH2

(Student) Impact of Oxygen Vacancies on Thermal Transport in $\text{La}_{0.5}\text{Sr}_{0.5}\text{CoO}_{3-x}$ Epitaxial Thin Films Xuewang Wu¹, Jeff Walter², Tianli Feng³, Jie Zhu¹, Xiulin Ruan³, Chris Leighton² and Xiaojia Wang¹; ¹Mechanical Engineering, University of Minnesota at Twin Cities, Minneapolis, Minnesota, United States; ²Department of Chemical Engineering and Material Science, University of Minnesota, Twin Cities, Minneapolis, Minnesota, United States; ³Department of Mechanical Engineering and the Birck Nanotechnology Center, Purdue University, West Lafayette, Illinois, United States

9:00 AM HH3

First-Principles Simulations of Non-Equilibrium Phonon Dynamics in III-V Materials Sridhar Sadasivam, Yi Xia, Maria K. Chan and Pierre Darancet; Center for Nanoscale Materials, Argonne National Laboratory, Lemont, Illinois, United States

9:20 AM HH4

(Student) Carrier Dynamics in Black Phosphorus for Applications in 2D Electronics Vasudevan Rajagopal Iyer^{1,2}, Xianfan Xu^{1,2} and Peide Ye^{2,3}; ¹Mechanical Engineering, Purdue University, West Lafayette, Indiana, United States; ²Birck Nanotechnology Center, Purdue University, West Lafayette, Indiana, United States; ³Electrical and Computer Engineering, Purdue University, West Lafayette, Indiana, United States

9:40 AM HH5

Single Crystal Microwire for Thermoelectric Applications Leonid Konopko^{1,2}, Albina Nikolaeva^{1,2}, Tito Huber³, Anna Kobylanskaya¹ and Oxana Botnari¹; ¹Ghitu Institute of Electronic Engineering and Nanotechnologies, Chisinau, Moldova (the Republic of); ²International Laboratory of High Magnetic Field and Low Temperatures, Wroclaw, Poland; ³Howard University, Washington, District of Columbia, United States

10:00 AM BREAK**10:20 AM HH6**

(Student) Optimizing the Thermoelectric Properties of a Computationally Predicted Material—The Case of AISb Trevor P. Bailey¹, Alan Olvera², Alexander A. Page¹, Pierre Ferdinand Poudeu-Poudeu² and Ctirad Uher¹; ¹Department of Physics, University of Michigan, Ann Arbor, Michigan, United States; ²Department of Materials Science and Engineering, University of Michigan, Ann Arbor, Michigan, United States

10:40 AM HH7

(Student) Thermoelectric Enhancement in Silicon Metamaterials via Phonon Localization and Resonance Blocking Taishan Zhu and Elif Ertekin; Mechanical Engineering, University of Illinois at Urbana Champaign, Champaign, Illinois, United States

11:00 AM HH8

(Student) Molecular Fin Effect on Interfacial Thermal Conductance across Hard-Soft Interfaces Xingfei Wei and Tengfei Luo; Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, Indiana, United States

11:20 AM HH9

(Student) Nanosecond Grating Imaging Technique for Measuring Thermal Transport Properties Jihoon Jeong¹, Ke Chen¹, Emily S. Walker², Seth R. Bank² and Yaguo Wang^{1,3}; ¹Department of Mechanical Engineering, The University of Texas at Austin, Austin, Texas, United States; ²Microelectronic Research Center and Department of Electrical and Computer Engineering, The University of Texas at Austin, Austin, Texas, United States; ³Texas Materials Institute, The University of Texas at Austin, Austin, Texas, United States

II: Transition Metal Dichalcogenide Growth, Characterization and Devices
Session Chairs: Mona Ebrish and Randall Feenstra
Friday Morning, June 30, 2017
DeBartolo Hall, Room 141

8:20 AM III

(Student) MBE Grown 2D Semiconductor/GaN Heterojunction Choong Hee Lee, Sriram Krishnamoorthy and Siddharth Rajan; The Ohio State University, Columbus, Ohio, United States

8:40 AM II2

(Student) Synthesis of Large-Area, Transfer-Free and Few Layers Thick MoS_2 for Enhanced Mobility Field Effect Transistors Ifat Jahangir¹, Goutam Koley² and MVS Chandrashekar¹; ¹University of South Carolina, Columbia, South Carolina, United States; ²Electrical and Computer Engineering, Clemson University, Clemson, South Carolina, United States

9:00 AM II3

Epitaxial Tungsten Diselenide (WSe_2) Film with Controlled Layer Growth and Interface Properties Bhakti Jariwala¹, Yu-Chuan Lin¹, Tanushree Choudhury¹, Xiaotian Zhang¹, Sarah Eichfeld¹, Boaming Wang², Jun Li³, Aman Haque², Randall M. Feenstra³, Joan M. Redwing¹ and Joshua A. Robinson¹; ¹Material Science and Engineering, Center for 2-Dimensional and Layered Materials, The Pennsylvania State University, State College, Pennsylvania, United States; ²Mechanical Engineering, The Pennsylvania State University, State College, Pennsylvania, United States; ³Department of Physics, Carnegie Mellon University, Pittsburgh, Pennsylvania, United States

9:20 AM II4

(Student) Growth and Characterization of Molecular Beam Epitaxy $\text{MoSe}_x\text{Te}_{2-x}$ Aditya Sundar³, Suresh Vishwanath^{1,2}, Long Yuan⁴, Xinyu Liu⁵, Edward Lochocki⁶, Huai-Hsun Lien³, Malgorzata Dobrowolska-Furdyna⁵, Jacek K. Furdyna⁵, Libai Huang⁴, Kyle M. Shen^{6,7}, Debdeep Jena^{1,3,2} and Huili Grace Xing^{1,3,2}; ¹School of Electrical Engineering, Cornell University, Ithaca, New York, United States; ²Department of Electrical Engineering, University of Notre Dame, Ithaca, New York, United States; ³Department of Materials Science and Engineering, Cornell University, Ithaca, New York, United States; ⁴Department of Chemistry, Purdue University, West Lafayette, Indiana, United States; ⁵Department of Physics, University of Notre Dame, South Bend, Indiana, United States; ⁶Department of Physics, Cornell University, Ithaca, New York, United States; ⁷Kavli Institute at Cornell for Nanoscale Science, Cornell University, Ithaca, New York, United States

9:40 AM II5

Ultrafast Dynamics of Exciton Capture by Mid-Gap Defects in CVD Grown MoSe₂ Ke Chen, Xianghai Meng, Feng He and Yaguo Wang; ME, The University of Texas at Austin, Austin, Texas, United States

10:00 AM BREAK**10:20 AM II6**

(Student) Direct Growth of High Quality 2D Materials-Based Metal-Semiconductor-Metal Photodiodes Sudiksha Khadka, Eric Stinaff, Martin Kordesch, Miles Lindquist, Thushan Wickramasinghe and Shrouq Aleithan; Ohio University, Athens, Ohio, United States

10:40 AM II7

Investigations on MOVPE Growth Parameters of 2D MoS₂ Matthias Marx¹, Annika Grundmann¹, You-Ron Lin¹, Michael Heuken², Holger Kalisch¹ and Andrei Vescan¹; ¹GaN Device Technology, RWTH-Aachen University, Aachen, Germany; ²AIXTRON SE, Herzogenrath, Germany

11:00 AM II8

Spectroscopic and Electrical Characterization of Solution-Synthesized Metal Chalcogenide Nanoelectronic Materials Adam Biacchi¹, Son T. Le¹, Joseph A. Hagmann¹, Brian G. Alberding², Sugata Chowdhury¹, Edwin J. Heilweil¹, Curt A. Richter¹ and Angela R. Hight Walker¹; ¹Engineering Physics Division, National Institute of Standards and Technology (NIST), Gaithersburg, Maryland, United States; ²Sensor Science Division, National Institute of Standards and Technology (NIST), Gaithersburg, Maryland, United States

11:20 AM II9

(LATE NEWS, Student) Study of Temperature Ramp Down Effects on Chemically Accelerated Epitaxial Graphene Grown on 4H-SiC Using TFS Towards High Power Applications Anusha Balachandran, Surya N. Chava, Joshua A. Letton and MVS Chandrashekhar; Electrical Engineering, University of South Carolina, Columbia, South Carolina, United States.

11:40 AM III10

(LATE NEWS, Student) Influenza Virus Detection System Using Graphene Field-Effect Transistor Takuya Kawata, The Institute of Scientific and Industrial Research, Osaka University, Osaka, Japan.

JJ: III-Nitride Optical Devices
Session Chairs: Nelson Tansu and Jonathan Wierer
Friday Morning, June 30, 2017
DeBartolo Hall, Room 155

8:20 AM JJ1

(Student) Growth and Characterization of GaN *p-i-p-i-n* Ultraviolet Avalanche Photodiodes Mi-Hee Ji¹, Jeomoh Kim², Theeradetch Detchprohm¹, Yuanzheng Zhu¹, Shyh-Chiang Shen¹ and Russell Dupuis¹; ¹Georgia Institute of Technology, Atlanta, Georgia, United States; ²Materials and Devices Advanced Research Institute, LG Electronics, Seoul, Korea (the Republic of

8:40 AM JJ2

(Student) Investigation of Surface Treatments for Improved Quantum Efficiency in III-N Photocathodes Emma Rocco¹, Jonathan Marini¹, Isra Mahaboob¹, Kasey Hogan¹, J. D. McNamara², M. A. Reshchikov², L. D. Bell³ and F. Shadi Shahedipour-Sandvik¹; ¹Colleges of Nanoscale Science and Engineering, State University of New York Polytechnic Institute, Albany, New York, United States; ²Physics, Virginia Commonwealth University, Richmond, Virginia, United States; ³Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California, United States

9:00 AM JJ3

(Student) Monte Carlo Simulation of III-Nitride Photocathodes Jonathan Marini², Isra Mahaboob², Kasey Hogan², Emma Rocco², L. D. Bell¹ and F. Shadi Shahedipour-Sandvik²; ¹Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California, United States; ²Colleges of Nanoscale Science and Engineering, State University of New York Polytechnic Institute, Albany, New York, United States

9:20 AM JJ4

(Student) Towards High Performance (Al)GaN Based Betavoltaic Device Kasey Hogan, Jonathan Marini, Isra Mahaboob, Emma Rocco and F. Shadi Shahedipour-Sandvik; Nanoscale Engineering, Colleges of Nanoscale Science and Engineering, State University of New York Polytechnic Institute, Albany, New York, United States

9:40 AM JJ5

(Student) Dependence of Electromagnetic Coupling of Flexible In_{1-x}Ga_xN Nanowire Light-Emitting Diodes Mohsen Asad¹, Renjie Wang², Yong-Ho Ra², Zetian Mi³ and William Wong¹; ¹Electrical and Computer Engineering, University of Waterloo, Waterloo, Canada; ²Electrical and Computer Engineering, McGill University, Montreal, Canada; ³Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, Michigan, United States

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