

# NAMBE 2022 Program Overview

Room /Time	Swan A & Sandpiper	Swan BC
MoM		<b>NM-MoM1: Nitrides</b> <b>GD-MoM2: Devices</b>
MoA		<b>ST-MoA1: MBE Technology</b> <b>NM-MoA2: Chalcogenides</b>
MoP	<b>POSTER SESSIONS</b>	
TuM		<b>NM-TuM1: Novel Materials</b> <b>NM-TuM2: Infrared Materials</b>
TuA		<b>NM-TuA1: Bismuthides</b> <b>NM-TuA2: Heterogenous Integration</b>
WeM		<b>NM-WeM1: Quantum-confined Structures</b> <b>NM-WeM2: Topological Insulators</b>

# Monday Morning, September 19, 2022

Room Swan BC		
7:45am	<b>NM-MoM1-1</b> Welcome, Introductions and Sponsor Thank Yous	<b>Novel Materials Session NM-MoM1</b> <b>Nitrides</b> <b>Moderator:</b> <b>Bharat Jalan, University of Minnesota</b>
8:00am	<b>INVITED: NM-MoM1-2</b> MBE Growth and Properties of Ultra-wide Bandgap Oxide Layers Spanning 5.0 - 9.0 eV Energy Gaps, <i>Debbeep Jena, J. McCandless, J. Rinno, Cornell University</i>	
8:30am	<b>NM-MoM1-4</b> Demonstration of $\text{Sc}_{0.2}\text{Al}_{0.8}\text{N}$ HEMT Structures with a Sheet Resistance of $150 \Omega/\square$ and a Sheet Charge of $5.9 \times 10^{13} \text{ cm}^{-2}$ with Phase Pure, Metal Rich Growth, <i>Zachary Engel, K. Motoki, W. Doolittle, Georgia Institute of Technology</i>	
8:45am	<b>NM-MoM1-5</b> Influence of Nucleation Schemes on Crystal Quality of Heteroepitaxial $\text{Sc}_{0.4}\text{Al}_{0.6}\text{N}$ , <i>Matthew Hardy, A. Lang, E. Jin, N. Nepal, S. Katzer, V. Wheeler, U.S. Naval Research Laboratory</i>	
9:00am	<b>NM-MoM1-6</b> Realization of AlN Homo Junction PN Diodes, <i>Christopher M. Matthews, Georgia Institute of Technology; H. Ahmad, Georgia Institute of Technology, Pakistan; Z. Engel, K. Motoki, S. Lee, W. Doolittle, Georgia Institute of Technology</i>	
9:15am	<b>NM-MoM1-7</b> MBE AlScN/GaN Heterostructures Showing High-K, Ferroelectricity, and High Mobility 2DEGs, <i>Joseph Casamento, H. Lee, V. Gund, T. Maeda, K. Nomoto, Cornell University; S. Mu, University of California, Santa Barbara; W. Turner, University of Notre Dame; L. van Deurzen, Y. Shao, T. Nguyen, B. Davaji, M. Javadi Asadi, J. Wright, Cornell University; P. Fay, University of Notre Dame; C. Van de Walle, University of California, Santa Barbara; A. Lal, D. Muller, H. Xing, D. Jena, Cornell</i>	
9:30am	<b>NM-MoM1-8</b> Realizing GaN/AlN Short Period Superlattices (SPSLs) Through Ga Surfactant Enhanced MME Growth of AlN, <i>Alexander Chaney, Azimuth Corporation; C. Bowers, UES; K. Mahalingam, UES; S. Mou, Materials and Manufacturing Directorate, Air Force Research Laboratory; K. Averett, Materials and Manufacturing Directorate, Air Force Research Laboratory</i>	
9:45am	<b>NM-MoM1-9</b> Cubic Boron Nitride Grown by Mg-Catalyzed MBE, <i>David Storm, S. Maximenko, A. Lang, N. Nepal, T. Feygelson, B. Pate, D. Meyer, U.S. Naval Research Laboratory</i>	
10:00am	<b>BREAK &amp; EXHIBITS</b>	
10:30am	<b>GD-MoM2-12</b> Growth and Characterization of $\text{Al}_{0.71}\text{In}_{0.29}\text{As}_{0.74}\text{Sb}_{0.26}$ Digital Alloy Lattice Matched to InAs Substrate, <i>Nathan Gajowski, M. Muduli, S. Lee, H. Jung, The Ohio State University; T. Basko, E. Cho, SK Infrared; D. Hollingshead, The Ohio State University; E. Fuller, SK Infrared; S. Krishna, The Ohio State University</i>	
10:45am	<b>GD-MoM2-13</b> A High-Performance Epitaxial Transparent Oxide Thin-Film Transistor Fabricated at Back-End-of-Line Temperature (< 450 °C) by Suboxide Molecular-Beam Epitaxy, <i>Felix V.E. Hensling, J. Park, P. Vogt, Cornell University; D. Schlom, Cornell University / Kavli Institute at Cornell for Nanoscale Science / Leibniz-Institut für Kristallzüchtung</i>	
11:00am	<b>GD-MoM2-14</b> Low Temperature Crack Formation in III-V Quantum Dot Lasers Epitaxially Grown on Silicon, <i>Rosalyn Koscica, C. Shang, K. Parto, G. Moody, J. Bowers, University of California, Santa Barbara</i>	
11:15am	<b>GD-MoM2-15</b> Thin Film Engineering in Er-Doped $\text{CeO}_2$ for Quantum Memory, <i>K. Sautter, Gregory Grant, Argonne National Laboratory; Pritzker School of Molecular Engineering, University of Chicago; S. Sullivan, Argonne National Laboratory; P. Nittala, C. Ji, M. Singh, F. Heremans, S. Guha, Argonne National Laboratory; Pritzker School of Molecular Engineering, University of Chicago</i>	
11:30am	<b>GD-MoM2-16</b> Hybrid MBE Growth of Metastable $\text{SrNbO}_3$ for High Mobility 2DEGs, <i>S. Thapa, Auburn University, Department of Physics; S. Mahatara, Department of Physics, New Mexico State University; P. Gempferline, Department of Physics, Auburn University; B. Kiefer, Department of Physics, New Mexico State University; Ryan Comes, Auburn University, Department of Physics</i>	
11:45am	<b>GD-MoM2-17</b> Vertical AlGaN Deep-UV LEDs Grown on Si Using Nanowire-Assisted AlN Template by Molecular Beam Epitaxy, <i>Qihua Zhang, H. Parimoo, S. Zhao, McGill University, Canada</i>	
12:00pm	<b>GD-MoM2-18</b> Long Lifetime Mid-Wave InGaAs/InAsSb Superlattice Photodetectors with a 2x Reduction in Proton Radiation Induced Quantum Efficiency Degradation, <i>A. Newell, G. Balakrishnan, Center for High Technology Materials, University of New Mexico; R. Carrasco, Air Force Research Laboratory, Space Vehicles Directorate; Z. Alsaad, A-Tech, LLC, a BlueHalo company (ATA BlueHalo); J. Logan, C. Morath, Air Force Research Laboratory, Space Vehicles Directorate; C. Hains, M. Milosavljevic, A-Tech, LLC, a BlueHalo company (ATA BlueHalo); S. Johnson, Center for Photonics Innovation &amp; Electrical, Computer, and Energy Engineering, Arizona State University; J. Duran, G. Ariyawansa, Air Force Research Laboratory, Sensors Directorate; D. Maestas, Preston T. Webster, Air Force Research Laboratory, Space Vehicles</i>	

# Monday Afternoon, September 19, 2022

Room Swan BC		
1:30pm	INVITED: ST-MoA1-1 NAMBE Innovator Awardee Talk: Physics and Technology of Antimonide Based Short Wave Infrared Avalanche Photodiodes on InP Substrates, <i>Sanjay Krishna</i> <sup>1</sup> , Ohio State University	<b>Science and Technology of MBE</b> <b>Session ST-MoA1</b> <b>MBE Technology</b> <b>Moderator:</b> <b>Paul Simmonds, Boise State University</b>
2:00pm	ST-MoA1-3 Overview of Virtual Substrate Technologies for 6.3 Angstrom Lattice Constant, <i>S. Svensson</i> , Army Research Laboratory; <i>N. Mahadik</i> , Naval Research Laboratory; <i>G. Kipshidze</i> , <i>Dmitri Donetski</i> , <i>G. Belenky</i> , SUNY at Stony Brook	
2:15pm	ST-MoA1-4 Measurement of Low Semiconductor Substrate Temperatures Using Reflectance Tracking of High Energy Critical Points, <i>Kevin Grossklous</i> , <i>J. McElearney</i> , <i>A. Lemire</i> , <i>T. Vandervelde</i> , Tufts University	
2:30pm	ST-MoA1-5 Perovskite Hetero-Chalco-Epitaxy Enabled by Self-Assembled Surface Passivation and Gas-Source MBE, <i>Ida Sadeghi</i> , <i>R. Jaramillo</i> , MIT	
2:45pm	ST-MoA1-6 Molecular Beam Epitaxy of Monocrystalline GaAs on Water Soluble NaCl Thin Films, <i>Brelon May</i> , National Renewable Energy Laboratory; <i>J. Kim</i> , Shell International Exploration and Production; <i>H. Moutinho</i> , <i>P. Walker</i> , <i>W. McMahon</i> , <i>A. Ptak</i> , <i>D. Young</i> , National Renewable Energy Laboratory	
3:00pm	ST-MoA1-7 Thermal Laser Epitaxy of Refractory Metals, <i>Lena Nadine Majer</i> , <i>H. Wang</i> , <i>W. Braun</i> , <i>P. van Aken</i> , <i>J. Mannhart</i> , <i>S. Smink</i> , Max Planck Institute for Solid State Research, Germany	
3:15pm	BREAK & EXHIBITS	
3:30pm	NM-MoA2-9 Growth of Ultrathin PtSe <sub>2</sub> using Molecular Beam Epitaxy, <i>Maria Hilse</i> , <i>K. Wang</i> , The Pennsylvania State University; <i>R. Engel-Herbert</i> , Paul-Drude-Institut für Festkörperelektronik, Germany	<b>Novel Materials</b> <b>Session NM-MoA2</b> <b>Chalcogenides</b> <b>Moderator:</b> <b>Maria Tamargo, City College of New York</b>
3:45pm	NM-MoA2-10 Ultra-thin Bi <sub>2</sub> Se <sub>3</sub> Films Grown by Molecular Beam Epitaxy, <i>Saadia Nasir</i> , <i>S. Law</i> , University of Delaware	
4:00pm	NM-MoA2-11 Molecular Beam Epitaxy Growth of Site-determined Wavelength-tunable Quantum Emitters in Atomically-thin Semiconductors, <i>Mingyu Yu</i> , <i>S. Law</i> , University of Delaware	
4:15pm	NM-MoA2-12 Epitaxial Growth of PbSnSe Ternary Alloys on III-V Substrates, <i>Pooja Reddy</i> , Stanford University; <i>B. Haidet</i> , University of California Santa Barbara; <i>K. Mukherjee</i> , <i>L. Nordin</i> , Stanford University	
4:30pm	NM-MoA2-13 Bi <sub>2</sub> Se <sub>3</sub> Growth on III-V Substrates, <i>Yongchen Liu</i> , <i>W. Acuna</i> , University of Delaware; <i>H. Zhang</i> , National Institute for Science and Technology (NIST); <i>D. Ho</i> , <i>R. Hu</i> , <i>Z. Wang</i> , <i>A. Janotti</i> , University of Delaware; <i>G. Bryant</i> , <i>A. Davydov</i> , National Institute for Science and Technology (NIST); <i>J. Zide</i> , <i>S. Law</i> , University of Delaware	
4:45pm	NM-MoA2-14 Structural and Optical Properties of CdSe Grown on InAs, <i>Zheng Ju</i> , <i>S. Schaefer</i> , <i>A. McMinn</i> , <i>X. Qi</i> , <i>D. Smith</i> , <i>Y. Zhang</i> , Arizona State University; <i>S. Grover</i> , First Solar, Inc.	
5:00pm	NM-MoA2-15 Measuring and Then Eliminating Twin Domains in SnSe Thin Films Using a Fast Optical Metrology and Molecular Beam Epitaxy, <i>Wouter Mortelmans</i> , MIT; <i>M. Hilse</i> , Penn State University; <i>Q. Song</i> , <i>S. Jo</i> , <i>K. Ye</i> , MIT; <i>D. Liu</i> , <i>N. Samarth</i> , Penn State University; <i>R. Jaramillo</i> , MIT	

## MBE-Grown Devices

### Room Swan A & Sandpiper - Session GD-MoP

#### MBE-Grown Devices Poster Session

5:15pm

**GD-MoP-1** High Power Sb-Based Mid-Wave Infrared Diode Laser Arrays, *Andy Lu, C. Yang*, Air Force Research Laboratory

**GD-MoP-3** Annealing Effect on the Magnetic Anisotropy of P Composition Graded GaMnAsP Layers, *Seul-Ki Bac*, Korea University; *S. Lee*, Korea University, Republic of Korea; *X. Liu, M. Dobrowolska*, Physics Department.; *J. Furdyna*, Physics department

## Novel Materials

### Room Swan A & Sandpiper - Session NM-MoP

#### Novel Materials Poster Session

5:15pm

**NM-MoP-1** Slow Photoluminescence Lifetime of Heavily Be-doped GaAsN, *Takashi Tsukasaki*, Waseda Univ., Japan; *H. Sumikura*, NTT Basic Laboratories, Nippon Telegraph and Telephone Corp., Japan; *T. Fujimoto*, Waseda Univ., Japan; *M. Fujita*, NIT Ichinoseki College, Japan; *T. Makimoto*, Waseda Univ., Japan

**NM-MoP-2** A Route Towards Actinide Heterostructure Synthesis and Science, *Brelon May, K. Vallejo, C. Dennett*, Idaho National Laboratory; *P. Simmonds*, Boise State University; *D. Hurlley, K. Gofryk*, Idaho National Laboratory

**NM-MoP-3** Epitaxial Growth of Antimony Selenide on Bismuth Selenide, *Zhengtianye Wang, S. Law*, University of Delaware

**NM-MoP-4** Defect Free InGaAs/InAlAs Superlattice on a Inp(111)B Substrate, *Ida Sadeghi*, MIT; *A. Pofelski*, Brookhaven National Laboratory; *H. Farkhondeh, A. Tam, K. Leung*, University of Waterloo, Canada; *G. Botton*, McMaster University, Canada; *Z. Wasilewski*, University of Waterloo, Canada

**NM-MoP-5** Site-Controlled InAs Quantum Dot Columns for Templating Self-Assembled Quantum Dots, *L.N. McCabe, Nazifa T. Arony, J. Zide*, University of Delaware

**NM-MoP-6** Characterizing SiGeSn Stability by Temperature Varying Spectroscopic Ellipsometry, *Amanda Lemire, K. Grossklaus, T. Vandervelde*, Tufts University

**NM-MoP-7** Band Structure and Strain Distribution of InAs Quantum Dots Encapsulated in (Al)GaAs Asymmetric Matrixes, *Pablo Olvera Enriquez, C. Mercado Ornelas*, Center for the Innovation and Application of Science and technology, UASLP, Mexico; *L. Espinoza Vega*, Facultad de Ciencias, Universidad Autónoma de San Luis Potosí (UASLP). Center for the Innovation and Application of Science and technology, UASLP, Mexico; *I. Cortes Mestizo*, CONACYT-Center for the Innovation and Application of Science and technology, UASLP, Mexico; *F. Perea Parrales, A. Belio Manzano*, Center for the Innovation and Application of Science and technology, UASLP, Mexico; *C. Yee Rendón*, Facultad de Ciencias Físico-Matemáticas, Universidad Autónoma de Sinaloa, Mexico; *V. Méndez García*, Center for the Innovation and Application of Science and technology, UASLP. Facultad de Ciencias, Universidad Autónoma de San Luis Potosí (UASLP), Mexico

**NM-MoP-8** High Temperature Growth of Thick AlN on Si, *Rohith Allaparthi, M. Ware*, University of Arkansas; *C. Taylor, H. Edwards*, Texas Instruments; *Y. Mazur, F. Maia de Oliveira, M. Refaei*, University of Arkansas

**NM-MoP-9** Correlating Charge Carrier Profiles and Elemental Compositions in MBE-grown GaN/AlGaIn Stacks, *Stefan Schmult*, TU Dresden, Germany; *P. Appelt, C. Silva, A. Großer, A. Wachowiak*, NaMLab gGmbH, Germany; *T. Mikolajick*, TU Dresden, Germany

**NM-MoP-10** Thin-film Growth of  $\zeta$ -Mn<sub>2</sub>N on MgO (001) Using Molecular Beam Epitaxy, *Ashok Shrestha, A. Smith*, Ohio University

**NM-MoP-11** Impurity Doping of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Thin Films, *Neeraj Nepal, . Downey, V. Wheeler, D. Katzer, E. Jin, . Hardy, V. Gokhale, T. Growden*, US Naval Research Laboratory; *K. Chabak*, Air Force Research Laboratory; *D. Meyer*, US Naval Research Laboratory

**NM-MoP-13** Tunable Electronic States and Instabilities in PbSnTe Heterostructures, *A. Al-Tawhid, A. Gonzalez, S. Poage*, NCSU; *Kaveh Ahadi*, NC State University

**NM-MoP-15** Controlling the Size and Density of InN QDs formed on Sapphire Substrate by Droplet Epitaxy, *Malak Refaei, A. Kuchuk, R. Allaparthi, M. Sarollahiad, M. Maruf, M. Ware*, University of Arkansas

**NM-MoP-17** Molecular Beam Epitaxy Grown Group-IV Alloys: Ideal Candidate for Momentum(k)-Space Carrier Separation Photodetectors, *Tyler McCarthy, Z. Ju, S. Schaefer, X. Qi, A. McMinn*, Arizona State University; *S. Yu*, University of Arkansas; *Y. Zhang*, Arizona State University

Monday Afternoon, September 19, 2022

## Science and Technology of MBE

### Room Swan A & Sandpiper - Session ST-MoP

#### Science and Technology of MBE Poster Session

5:15pm

**ST-MoP-1** Cryo-MBE: Ultra Low (<20k) Growth Temperatures for High Quality Metal Epitaxy, *Nils-Eike Weber*, Scienta Omicron, Germany; *D. Beaton*, Scienta Omicron; *M. Heiss*, Scienta Omicron, Germany

**ST-MoP-2** Vertical Cation Segregation in During A<sub>x</sub>B<sub>1-x</sub>N Epitaxy, *Christopher M. Matthews, Z. Engel, W. Doolittle*, Georgia Institute of Technology

**ST-MoP-3** Non-amphoteric N-type Doping with Sn of GaAs(631) Layers Grown by Molecular Beam Epitaxy, *Alan Cano Rico*, Facultad de Ciencias, Universidad Autónoma de San Luis Potosí (UASLP), Mexico; *L. Espinosa Vega*, Facultad de Ciencias, Universidad Autónoma de San Luis Potosí (UASLP). Center for the Innovation and Application of Science and technology, UASLP, Mexico; *I. Cortes Mestizo*, CONACYT-Center for the Innovation and Application of Science and technology, UASLP, Mexico; *R. Pinson Ortega*, Facultad de Ciencias, Universidad Autónoma de San Luis Potosí (UASLP), Mexico; *F. Perea Parrales*, Center for the Innovation and Application of Science and technology, UASLP, Mexico; *P. Olvera Enriquez*, Center for the Innovation and Application of Science and technology, UASLP, Mexico; *M. Villareal Faz*, Facultad de Ciencias, Universidad Autónoma de San Luis Potosí (UASLP), Mexico; *L. Hernández Gaytán, A. Belio Manzano*, Center for the Innovation and Application of Science and technology, UASLP, Mexico; *V. Méndez García*, Center for the Innovation and Application of Science and technology, UASLP. Facultad de Ciencias, Universidad Autónoma de San Luis Potosí (UASLP), Mexico

**ST-MoP-4** Uniformity: A Phenomenon That Arises from Anisotropy and De-Relaxation During Growth, *Felipe Perea Parrales, C. Mercado Ornelas, A. Belio Manzano*, Center for the Innovation and Application of Science and technology, Universidad Autónoma de San Luis Potosí (UASLP), Mexico; *I. Cortes Mestizo*, CONACYT-Center for the Innovation and Application of Science and technology, Universidad Autónoma de San Luis Potosí (UASLP), Mexico; *L. Vega Espinosa*, Center for the Innovation and Application of Science and technology, Universidad Autónoma de San Luis Potosí (UASLP), Mexico; *D. Valdez Perez*, Instituto de Física, Universidad Autónoma de San Luis Potosí, Instituto Politécnico Nacional, UPALM, Mexico; *C. Yee Rendón*, Facultad de Ciencias Físico-Matemáticas, Universidad Autónoma de Sinaloa, Mexico; *A. Cano Rico*, Facultad de Ciencias, Autonomous University of San Luis Potosí, Mexico; *V. Mendez Garcia*, Center for the Innovation and Application of Science and technology, Universidad Autónoma de San Luis Potosí (UASLP), Facultad de Ciencias, Autonomous University of San Luis Potosí, Mexico

**ST-MoP-5** Feature-Independent Molecular Beam Epitaxy Selective Area Regrowth Towards Embedding High Aspect Ratio Microstructures, *Ashlee Garcia, A. Skipper, D. Ironside, S. Bank*, University of Texas at Austin

# Tuesday Morning, September 20, 2022

Room Swan BC		
8:00am	<b>INVITED: NM-TuM1-1</b> Navigating MBE Growth of Atomically Precise Complex Oxides of Stubborn Metals Using Source Chemistry, <i>Bharat Jalan</i> , University of Minnesota, USA	<b>Novel Materials</b> <b>Session NM-TuM1</b> <b>Novel Materials</b> <b>Moderator:</b> <b>Debdeep Jena, Cornell University</b>
8:30am	<b>NM-TuM1-3</b> Pinhole-Seeded Lateral Epitaxy and Exfoliation on Graphene-Terminated Surfaces, <i>Sebastian Manzo</i> , <i>P. Strohbeen</i> , University of Wisconsin - Madison; <i>Z. Lim</i> , University of Wisconsin - Madison, Malaysia; <i>V. Saraswat</i> , University of Wisconsin - Madison, India; <i>D. Du</i> , <i>S. Xu</i> , University of Wisconsin - Madison, China; <i>N. Pokharel</i> , University of Wisconsin - Madison, Nepal; <i>K. Su</i> , <i>L. Mawst</i> , <i>M. Arnold</i> , <i>J. Kawasaki</i> , University of Wisconsin - Madison	
8:45am	<b>NM-TuM1-4</b> Molecular Beam Epitaxial Growth of Cr-Sn Thin Films on Al <sub>2</sub> O <sub>3</sub> , <i>Tyler Erickson</i> , <i>S. Upadhyay</i> , <i>A. Abbas</i> , <i>D. Ingram</i> , <i>A. Smith</i> , Ohio University	
9:00am	<b>NM-TuM1-5</b> Growth of Mn <sub>3</sub> Sn on Sapphire Using Molecular Beam Epitaxy, <i>Sneha Upadhyay</i> , Ohio University; <i>T. Erickson</i> , <i>D. Ingram</i> , Ohio University; <i>K. Sun</i> , University of Michigan, Ann Arbor; <i>A. Smith</i> , Ohio University	
9:15am	<b>NM-TuM1-6</b> Relaxed Epitaxial Constraints for Semi-freestanding Shape Memory Alloy Ni <sub>2</sub> MnGa Films Grown on Graphene/MgO, <i>Zachary LaDuca</i> , <i>S. Manzo</i> , <i>D. Du</i> , <i>K. Su</i> , <i>M. Arnold</i> , <i>J. Kawasaki</i> , University of Wisconsin - Madison	
9:30am	<b>NM-TuM1-7</b> Ferroelectricity at 900 °C in a 1 Unit-Cell-Thick Film, <i>Yilin Evan Li</i> , <i>R. Steinhardt</i> , Cornell University; <i>M. Holtz</i> , Cornell University; <i>P. Silva</i> , University of California, Berkeley; <i>Z. Xiao</i> , Lawrence Berkeley National Laboratory; <i>R. Ozgur</i> , University of California, Berkeley; <i>C. Brooks</i> , Cornell University; <i>D. Tenne</i> , Boise State University; <i>D. Muller</i> , Cornell University; <i>P. Shafer</i> , <i>E. Arenholz</i> , Lawrence Berkeley National Laboratory; <i>J. Mundy</i> , Cornell University; <i>R. Ramesh</i> , University of California, Berkeley, Lawrence Berkeley National Laboratory; <i>D. Schlom</i> , Cornell University, USA, Leibniz-Institut für Kristallzüchtung, Berlin, Germany	
9:45am	<b>NM-TuM1-8</b> Strange Metal YbRh <sub>2</sub> Si <sub>2</sub> Grown by Molecular Beam Epitaxy, <i>Stefania Isceri</i> , Institute of Solid State Electronics, Technische Universität Wien, Austria; <i>M. Giparakis</i> , Institute of Solid-State Electronics, Technische Universität Wien, Austria; <i>E. Bakali</i> , Institute of Solid-State Physics, Technische Universität Wien, Austria; <i>R. Svagera</i> , Institute of Solid-State Physics, Technische Universität Wien, Austria; <i>M. Waas</i> , Institute of Solid State Physics, Technische Universität Wien, Austria; <i>D. Nguyen</i> , Institute of Solid-State Physics, Technische Universität Wien, Austria; <i>H. Detz</i> , <i>W. Schrenk</i> , Institute of Solid State Electronics, Technische Universität Wien, Austria; <i>S. Buehler-Paschen</i> , Institute of Solid-State Physics, Technische Universität Wien, Austria; <i>G. Strasser</i> , <i>A. Andrews</i> , Institute of Solid-State Electronics, Technische Universität Wien, Austria	
10:00am	<b>BREAK &amp; EXHIBITS</b>	
10:30am	<b>NM-TuM2-11</b> Strain-Engineered MBE Growth of InAs Quantum Dots Emitting at Telecom Wavelengths, <i>Bianca Scaparra</i> , <i>A. Ajay</i> , <i>H. Riedl</i> , <i>G. Koblmüller</i> , <i>J. Finley</i> , <i>K. Mueller</i> , Walter Schottky Institut, Technische Universität München, Germany	
10:45am	<b>NM-TuM2-12</b> InP-based InAs Quantum Dot/dash Lasers Emitting in the O-band, <i>Sadhvikas Addamane</i> , Center for Integrated Nanotechnologies, Sandia National Laboratories; <i>S. Seth</i> , Center for High Technology Materials, University of New Mexico; <i>S. Hawkins</i> , <i>N. Collins</i> , Sandia National Laboratories; <i>C. Shang</i> , <i>Y. Wan</i> , University of California Santa Barbara; <i>G. Balakrishnan</i> , Center for High Technology Materials, University of New Mexico; <i>J. Klem</i> , Sandia National Laboratories; <i>R. Venables</i> , Intel Corp.; <i>J. Bowers</i> , University of California Santa Barbara	
11:00am	<b>NM-TuM2-13</b> Photonic Crystal Surface Emitting Lasers (PCSEs) grown by Molecular Beam Epitaxy, <i>Thomas J Rotter</i> , <i>S. Seth</i> , <i>K. Reilly</i> , <i>F. Ince</i> , University of New Mexico; <i>A. Kalapala</i> , <i>Z. Liu</i> , <i>W. Zhou</i> , University of Texas at Arlington; <i>G. Balakrishnan</i> , University of New Mexico	
11:15am	<b>NM-TuM2-14</b> Low Growth Temperature Epitaxial PbSe for Heterogeneous Mid-Infrared Emitters, <i>Leland Nordin</i> , <i>J. Meyer</i> , <i>P. Reddy</i> , <i>K. Mukherjee</i> , Stanford University	
11:30am	<b>NM-TuM2-15</b> Structural Properties of MBE-grown PbSnSe on GaAs (001) Films for Mid-infrared Optoelectronics Investigated by X-ray Diffraction, <i>Jarod Meyer</i> , Stanford University; <i>E. Hughes</i> , University of California at Santa Barbara; <i>L. Nordin</i> , <i>K. Mukherjee</i> , Stanford University	
11:45am	<b>NM-TuM2-16</b> MBE Growth and Characterization of an InAs/AlAs <sub>0.16</sub> Sb <sub>0.84</sub> Quantum Cascade Detector at 2.7 μm, <i>M. Giparakis</i> , <i>H. Knötig</i> , <i>S. Isceri</i> , <i>M. Beiser</i> , <i>H. Detz</i> , <i>W. Schrenk</i> , <i>B. Schwarz</i> , <i>G. Strasser</i> , <i>Aaron Maxwell Andrews</i> , Technische Universität Wien, Austria	
12:00pm	<b>NM-TuM2-17</b> Substrate Preparation and MBE Growth of High Quality α-Sn Topological Insulator Thin Films on InSb(001) Surfaces, <i>Aaron Engel</i> , <i>C. Dempsey</i> , University of California, Santa Barbara; <i>S. Nishihaya</i> , <i>Y. Chang</i> , University of California, Santa Barbara; <i>M. Hashimoto</i> , <i>D. Lu</i> , Stanford Synchrotron Radiation Lightsource; <i>C. Palmstrøm</i> , University of California, Santa Barbara	

# Tuesday Afternoon, September 20, 2022

Room Swan BC		
1:30pm	<b>INVITED: NM-TuA1-1</b> NAMBE Young Investigator Awardee Talk: Why do we Bother Using Costly MBE for Semiconductor Nanowires? , <i>Songrui Zhao</i> <sup>1</sup> , McGill University, Canada	<b>Novel Materials Session NM-TuA1 Bismuthides Moderator: Kevin Grossklau, Tufts University</b>
2:00pm	<b>NM-TuA1-3</b> Electrical Characterization of Doped GaSbBi Films Using High Resistivity AlGaSb Underlayers, <i>John McElearney, K. Grossklau, T. Vandervelde</i> , Tufts University	
2:15pm	<b>NM-TuA1-4</b> Influence of Growth Conditions on InAlBiAs Morphology and Electrical Properties, <i>James Bork, W. Acuna, J. Zide</i> , University of Delaware	
2:30pm	<b>NM-TuA1-5</b> ErAs:InGaAlBiAs materials for 1.55 $\mu\text{m}$ -pumped Terahertz Photoconductive Switches, <i>Wilder Acuna, J. Bork, J. Avenoso, L. Gundlach, J. Zide</i> , University of Delaware	
2:45pm	<b>NM-TuA1-6</b> Impact of Bi Surface Coverage During Growth on GaAsBi Diode Performance, <i>Robert Richards, N. Bailey, T. Rockett, M. Carr</i> , University of Sheffield, UK; <i>S. Hasegawa, H. Kawata, H. Nishinaka, M. Yoshimoto</i> , Kyoto Institute of Technology, Japan; <i>J. David</i> , University of Sheffield, UK	
3:00pm	<b>NM-TuA1-7</b> Towards Lattice-Matched Narrow Bandgap InAs <sub>y</sub> Sb <sub>1-x-y</sub> Bi <sub>x</sub> Photodetectors, <i>Corey White, M. Bergthold</i> , The University of Texas at Austin; <i>I. Okoro</i> , Texas State University; <i>Y. Wang</i> , The University of Texas at Austin; <i>L. Nordin</i> , Stanford University; <i>A. Muhowski</i> , Sandia National Laboratories; <i>D. Wasserman, S. Bank</i> , The University of Texas at Austin	
3:15pm	<b>BREAK &amp; EXHIBITS</b>	
3:45pm	<b>NM-TuA2-10</b> sub-Monolayer Surface Termination Control of Charge Transfer and Band Alignment Across a Semiconductor-Crystalline Oxide Heterojunction, <i>M. Chrysler</i> , University of Texas-Arlington; <i>T. Lee, J. Gabel</i> , Diamond Light Source, UK; <i>Z. Zhu, P. Sushko, S. Chambers</i> , Pacific Northwest National Lab; <i>Joseph Ngai</i> , University of Texas-Arlington	<b>Novel Materials Session NM-TuA2 Heterogenous Integration Moderator: Vladimir Vladimirovich Protasenko, Cornell University</b>
4:00pm	<b>NM-TuA2-11</b> Heteroepitaxial Growth of (111)-oriented Sr <sub>1-x</sub> Ca <sub>x</sub> TiO <sub>3</sub> Thin Films on III-Nitride Semiconductors, <i>Eric Jin, B. Downey, V. Gokhale, J. Roussos, M. Hardy, N. Nepal, D. Katzer, J. Calame, V. Wheeler, D. Meyer</i> , U.S. Naval Research Laboratory	
4:15pm	<b>NM-TuA2-12</b> MBE Growth and Electronic Properties of Epitaxial SrNiO <sub>3</sub> -based Heterostructures, <i>Le Wang, P. Sushko, S. Spurgeon, Y. Du, S. Chambers</i> , Pacific Northwest National Laboratory	
4:30pm	<b>NM-TuA2-13</b> Controlling Dislocation Formation and Dynamics in GaAs-Based Films on Silicon via Indium Alloying, <i>Eamonn Hughes, M. Dumont, J. Selvidge, J. Norman</i> , University of California, Santa Barbara; <i>Y. Hu</i> , Hewlett-Packard Labs; <i>C. Shang, D. Jung, A. Taylor, M. Kennedy</i> , University of California, Santa Barbara; <i>R. Herrick</i> , Intel Corporation; <i>D. Liang, R. Beausoleil</i> , Hewlett-Packard Labs; <i>J. Bowers</i> , University of California, Santa Barbara; <i>K. Mukherjee</i> , Stanford University	
4:45pm	<b>NM-TuA2-14</b> Grafted Si/GaN, AlN/Si, and GaAs/GeSn PN Junctions with Epitaxy-Like Interface Qualities, <i>Jie Zhou</i> , University of Wisconsin - Madison; <i>P. Wang, D. Wang</i> , University of Michigan, Ann Arbor; <i>T. Ng</i> , King Abdullah University of Science and Technology, Saudi Arabia; <i>H. Wang, S. Xu</i> , National University of Singapore; <i>S. Ojo</i> , University of Arkansas; <i>Z. Mi</i> , University of Michigan, Ann Arbor; <i>B. Ooi</i> , King Abdullah University of Science and Technology, Saudi Arabia; <i>X. Gong</i> , National University of Singapore; <i>S. Yu</i> , University of Arkansas; <i>T. Grotjohn</i> , Michigan State University; <i>Z. Ma</i> , University of Wisconsin - Madison	
5:00pm	<b>NM-TuA2-15</b> Integrating GaSb-Based Infrared Detectors with Si Substrates via Interfacial Misfit Arrays, <i>Trent Garrett, M. Drake</i> , Boise State University; <i>P. Reddy</i> , Stanford University; <i>K. Mukherjee</i> , Stanford University; <i>K. Grossklau</i> , Tufts University; <i>S. Maimon</i> , Netz Vision; <i>P. Simmonds</i> , Boise State University	
5:15pm	<b>NM-TuA2-16</b> Epitaxial Growth of Highly Mismatched Antimonide-Based Alloys Using Imf and Defect Filter Layers, <i>Fatih Ince, T. Rotter, A. Mansoori</i> , University of New Mexico; <i>S. Addamane</i> , Sandia National Laboratories; <i>D. Shima, G. Balakrishnan</i> , University of New Mexico	
5:30pm	<b>NM-TuA2-17</b> Controlling the Balance between Remote, Pinhole, and van der Waals Epitaxy of Heusler Films on Graphene/Sapphire, <i>D. Du, S. Manzo, T. Jung, X. Zheng, M. Arnold, Jason Kawasaki</i> , University of Wisconsin - Madison	
5:45pm	<b>NM-TuA2-18</b> Improved-Quality of 3D Semiconductors at Low Temperature Using Intermediate 2D Materials, <i>Guanyu Zhou, R. Younas, T. Sun, G. Harden, Y. Li, A. Hoffman, C. Hinkle</i> , University of Notre Dame	

<sup>1</sup> NAMBE Young Investigator Award

# Wednesday Morning, September 21, 2022

<b>Room Swan BC</b>			
<b>8:00am</b>	<b>NM-WeM1-1</b> Ultra-Strong Light-Matter Coupling in the THz with Continuously Graded $\text{Al}_x\text{Ga}_{1-x}\text{As}$ Parabolic Quantum Wells, <i>Chris Deimert</i> , University of Waterloo (currently at National Research Council Canada), Canada; <i>P. Goullain, M. Jeannin</i> , CNRS, Université Paris-Saclay, France; <i>W. Pasek</i> , University of Waterloo (currently at University of Campinas), Canada; <i>A. Bousseksou, R. Colombelli, J. Manceau</i> , CNRS, Université Paris-Saclay, France; <i>Z. Wasilewski</i> , University of Waterloo, Canada	<b>Novel Materials</b> <b>Session NM-WeM1</b> <b>Quantum-confined Structures</b> <b>Moderator:</b> <b>Joseph Ngai</b> , University of Texas-Arlington	
<b>8:15am</b>	<b>NM-WeM1-2</b> Molecular Beam Epitaxy and Characterization of $\text{Bi}_2\text{Se}_3$ and $\text{Sb}_2\text{Te}_3$ on $\text{In}_2\text{Se}_3$ Layers via Selenium Passivation of $\text{InP}(111)\text{B}$ Substrates, <i>Kaushini Wickramasinghe, C. Forrester, I. Levy, M. Tamargo</i> , City University of New York		
<b>8:30am</b>	<b>NM-WeM1-3</b> Manipulating Surface Diffusion for InAs Quantum Emitters at Telecommunication Wavelengths by Droplet Epitaxy, <i>Margaret Stevens</i> , NRC Postdoctoral Fellow residing at the Naval Research Laboratory; <i>W. McKenzie, G. Baumgartner</i> , Laboratory for Telecommunication Sciences; <i>J. Grim, S. Carter, A. Bracker</i> , Naval Research Laboratory		
<b>8:45am</b>	<b>NM-WeM1-4</b> Strained Ge Quantum Wells by Molecular Beam Epitaxy for Superconducting Quantum Circuits, <i>Patrick Strohbeen, M. Hatefipour, W. Strickland, I. Levy, J. Shabani</i> , New York University		
<b>9:00am</b>	<b>NM-WeM1-5</b> Vertical Transport in Bulk InAsSb and InAs/InAsSb and InGaAs/InAsSb Superlattices Grown on GaSb is Investigated using Photoluminescence Spectroscopy and Compared to Magnetoresistance Measurements, <i>Marko Milosavljevic</i> , Arizona State Univ.; <i>R. Carrasco, A. Newell</i> , Air Force Research Lab, USA; <i>J. Love</i> , New Mexico State Univ.; <i>S. Zollner</i> , Univ. of New Mexico; <i>C. Morath, P. Webster</i> , Air Force Research Lab, USA; <i>S. Johnson</i> , Arizona State Univ		
<b>9:15am</b>	<b>NM-WeM1-6</b> Tensile-Strained InGaAs Quantum Dots With Interband Emission in the Mid-Infrared, <i>Kevin Vallejo</i> , Idaho National Laboratory; <i>T. Garrett</i> , Boise State University; <i>C. Cabrerara-Perdomo</i> , Autonomous University of the State of Morelos, Mexico; <i>M. Drake</i> , Boise State University; <i>B. Liang</i> , University of California, Los Angeles; <i>K. Grossklous</i> , Tufts University; <i>P. Siimonds</i> , Boise State University		
<b>9:30am</b>	<b>NM-WeM1-7</b> High Quality Quantum Dot Formation on 300 Mm Si Photonic Wafers for Monolithic on-Chip Light Source, <i>Chen Shang, E. Hughes</i> , UC Santa Barbara; <i>A. Clark</i> , IQE Inc.; <i>R. Koszica, K. Feng</i> , UC Santa Barbara; <i>G. Leake, D. Harame</i> , SUNY Polytechnic Institute; <i>J. Bowers</i> , UC Santa Barbara		
<b>9:45am</b>	<b>NM-WeM1-8</b> Structural and Optical Properties of GaNAs Highly Mismatched Alloys Multi-Quantum Well Heterostructures., <i>Rolando Pinson Ortega</i> , Universidad Autónoma de San Luis Potosí, Mexico; <i>L. Espinosa Vega, E. Espinoza Figueroa, A. Belio Manzano, P. Olvera Enríquez, M. Villareal Faz, L. Hernández Gaytán, F. Perea Parrales</i> , Universidad Autónoma de San Luis Potosí (UASLP), Mexico; <i>C. Yee Rendón</i> , Universidad Autónoma de Sinaloa, Mexico; <i>I. Cortes Mestizo</i> , Universidad Autónoma de San Luis Potosí (UASLP), Mexico; <i>V. Méndez García</i> , Universidad Autónoma de San Luis Potosí (UASLP), Mexico		
<b>10:00am</b>			
<b>10:15am</b>	<b>BREAK</b>		
<b>10:30am</b>	<b>NM-WeM2-11</b> Structure-Property Relationship of the Magnetic Properties of Molecular Beam Epitaxy Grown $(\text{Sb}_2\text{Te}_3)_{1-x}(\text{MnSb}_2\text{Te}_4)_x$ Magnetic Topological Insulators, <i>Ido Levy</i> , City College of New York, City University of New York; <i>C. Forrester</i> , Graduate Center of CUNY and City College of New York and Lehman College; <i>X. Ding, K. Wickramasinghe</i> , City College of New York; <i>C. Testelin</i> , Sorbonne Université, CNRS; <i>D. Smith</i> , Arizona State University; <i>L. Krusin-Elbaum</i> , City College of New York, City University of New York; <i>M. Tamargo</i> , City College of New York	<b>Novel Materials</b> <b>Session NM-WeM2</b> <b>Topological Insulators</b> <b>Moderator:</b> <b>Kunal Mukherjee</b> , Stanford University	
<b>10:45am</b>	<b>NM-WeM2-12</b> High Curie Temperature $(\text{MnSb}_2\text{Te}_4)_x(\text{Sb}_2\text{Te}_3)_{1-x}$ Magnetic Topological Insulator Structures Growth by Molecular Beam Epitaxy, <i>Candice Forrester</i> , The Graduate Center (CUNY), The City College of New York, Lehman College; <i>I. Levy</i> , The Graduate Center (CUNY), The City College of New York; <i>G. Lopez-Morales</i> , The Graduate Center (CUNY), Lehman College; <i>X. Ding, K. Wickramasinghe</i> , The City College of New York; <i>C. Testelin</i> , Sorbonne Université, CNRS, Institut des NanoSciences de Paris; <i>D. Smith</i> , Arizona State University; <i>G. Lopez</i> , The Graduate Center (CUNY), Lehman College; <i>M. Tamargo</i> , The Graduate Center (CUNY), The City College of New York		
<b>11:00am</b>	<b>NM-WeM2-13</b> Structural and Magnetotransport Properties of $\text{MnBi}_2\text{Te}_4$ -based Heterostructure Grown by Molecular Beam Epitaxy, <i>Seul-Ki Bac, K. Koller, J. Wang, L. Riney, M. Zhukovskiy, T. Orlova, X. Liu, B. Assaf</i> , University of Notre Dame		
<b>11:15am</b>	<b>NM-WeM2-14</b> MBE Growth and Thermo-/Magneto-Transport Properties of Ternary $(\text{Bi,Sb})_2(\text{Te,Se})_3$ Films with High Mobility, <i>Patrick Taylor</i> , US Army Research Laboratory; <i>H. Chi</i> , Massachusetts Institute of Technology; <i>B. Wooten, J. Heremans</i> , Ohio State University; <i>H. Hier, O. Vail</i> , US Army Research Laboratory; <i>J. Moodera</i> , Massachusetts Institute of Technology		
<b>11:30am</b>	<b>NM-WeM2-15</b> MBE Growth of High Mobility Topological Crystalline Insulators in Proximity with a Magnetic Insulator, <i>J. Wang</i> , University of Notre Dame; <i>M. Ozerov</i> , National High Magnetic Fields Lab; <i>T. Wang, M. Zhukovskiy, T. Orlova</i> , University of Notre Dame; <i>D. Smirnov</i> , National High Magnetic Fields Lab; <i>V. Lauter</i> , Oak Ridge National Laboratory; <i>X. Liu, Badih Assaf</i> , University of Notre Dame		
<b>11:45am</b>	<b>NM-WeM2-16</b> Closing Remarks and Thank You		
<b>12:00pm</b>			

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