



61ST ELECTRONIC MATERIALS CONFERENCE

June 26-28, 2019 // University of Michigan, Ann Arbor // Ann Arbor, MI

WELCOME TO THE CONFERENCE!

It is with great pleasure that we welcome you to the **61st Electronic Materials Conference (EMC 2019)**, being held at the University of Michigan, Ann Arbor. We expect this Conference to follow in EMC's long tradition of offering premier research on the preparation, characterization and use of electronic materials. Below we have outlined highlights we believe will be of interest to you.

Conference Chair

Suzanne Mohney The Pennsylvania State University

Program Chair

Kris Bertness National Institute of Standards and Technology

CONFERENCE HIGHLIGHTS

The 61st EMC Program

Scientists from around the world will converge at the University of Michigan, Ann Arbor this week to share ideas, present technical information and contribute to the advancement of electronic materials research. Featuring over **350 oral/poster presentations**, the 61st EMC will offer a strong program with **47 technical sessions** focused on: Electronic Materials Science and Technology, Energy Storage and Conversion Materials, Nanoscale Science and Technology, Organic Materials and Thin-Film Technology, Oxide Semiconductors and Dielectrics, and Wide Bandgap Semiconductors.

EMC Awards Ceremony & Plenary Session

The 61st EMC kicks off Wednesday morning with the Awards Ceremony & Plenary Session. First, the **2018 Best Student Presentation Award** winners, as well as the **2018 Journal of Electronic Materials Best Paper Award** and the **2018 NIST Uncertainty Analysis Student Award** winners, will be announced and honored. The Plenary Lecture follows, where Dmitri N. Basov, Columbia University, will give his presentation, *Programmable Quantum Materials*.

Welcome Reception/Poster Session

Join us for a **Welcome Reception** on Wednesday evening from 6:00 pm to 8:00 pm in the Michigan League Ballroom. During this time, poster authors will be available for in-depth discussions at the **Poster Session**, also located in the Ballroom. Both of these events are great for meeting with long-time colleagues, making new connections and sharing information. Light snacks and refreshments will be served.

Exhibit

Be sure to visit the **EMC exhibitors** Wednesday and Thursday in the Michigan League Ballroom. Learn more about the latest products and services in the rapidly evolving world of electronic materials. See page 18 for exhibit hours.

Conference Dinner Reception

Don't miss this year's Conference Dinner Reception, Thursday evening from 6:30 pm to 9:30 pm at the **Henry Ford Museum**. Full Conference registration includes one Dinner Reception ticket. Subject to availability, Dinner Reception tickets will be available for purchase at the EMC Registration Desk for \$90 per person. Round-trip transportation will be provided. Meet at the Circle Drive front entrance of the Michigan League at 5:45 pm.

Save the Date

The **62nd Electronic Materials Conference (EMC 2020)** will be June 24-26, 2020, at The Ohio State University in Columbus, Ohio. Mark your calendar today!

To make sure you receive **EMC 2020 updates**, including calls for papers and meeting and registration alerts, update your email preferences near registration. See page 17 for details.

EMC is being coordinated with the Device Research Conference (DRC 2019), held at the University of Michigan from June 23-26. Badges will be accepted for admittance to both Conferences on Wednesday, June 26.

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The 61st EMC has been managed by



CONFERENCE SERVICES

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mrs.org/conference-services

COMMITTEES

Executive Committee

Chair	Suzanne Mohnhey The Pennsylvania State University
Vice-Chair	Kris Bertness National Institute of Standards and Technology
Secretary	Lisa Porter Carnegie Mellon University
Treasurer	Joshua Zide University of Delaware

ELECTRONIC MATERIALS SCIENCE AND TECHNOLOGY

Contacts to Semiconductor Epilayers, Nanostructures and Organic Films

Shadi Dayeh, University of California, San Diego
Chris Hinkle, The University of Texas at Dallas
Suzanne Mohnhey, The Pennsylvania State University
Lisa Porter, Carnegie Mellon University
Tae-Yeon Seong, Korea University
Jerry Woodall, University of California, Davis

Embedded Nanoparticles and Nanocomposite Films

Seth Bank, The University of Texas at Austin
Matt Doty, University of Delaware
Kurt Eyink, Air Force Research Laboratory
Minjoo (Larry) Lee, University of Illinois at Urbana-Champaign
Roberto Myers, The Ohio State University
Joshua Zide, University of Delaware

Epitaxial Materials and Devices

Seth Bank, The University of Texas at Austin
Kurt Eyink, Air Force Research Laboratory
Archie Holmes, University of Virginia
Sriram Krishnamoorthy, The University of Utah
Charles Lutz, Lumentum Operations LLC
Siddharth Rajan, The Ohio State University
Shadi Shahedipour-Sandvik, State University of New York Polytechnic Institute
Stephanie Tomasulo, U.S. Naval Research Laboratory
Christine Wang, Lincoln Laboratory, Massachusetts Institute of Technology
Kin-Man Yu, City University of Hong Kong

Materials for Memory and Computation

Ritesh Agarwal, University of Pennsylvania
Andrew Allerman, Sandia National Laboratories
Alan Doolittle, Georgia Institute of Technology
Susan Fullerton, University of Pittsburgh
Matthew Marinella, Sandia National Laboratories

Materials Integration

Daniel Ewing, Department of Energy's Kansas City National Security Campus
Mark Goorsky, University of California, Los Angeles
Doug Hall, University of Notre Dame
Karl Hobart, U.S. Naval Research Laboratory
Becky L. Peterson, University of Michigan
Nate Quitrino, McGill University
Steve Ringel, The Ohio State University
Patrick Shea, Northrop Grumman Corporation
Jerry Woodall, University of California, Davis

Metamaterials and Materials for THz, Plasmonics and Polaritons

Joshua Caldwell, Vanderbilt University
Kurt Eyink, Air Force Research Laboratory
Rachel Goldman, University of Michigan
Anthony Hoffman, University of Notre Dame
Stephanie Law, University of Delaware
Berardi Sensale Rodriguez, The University of Utah
Jason Valentine, Vanderbilt University
Daniel Wasserman, The University of Texas at Austin
Huili Grace Xing, Cornell University

Nano-Magnetic, Magnetic Memory and Spintronic Materials

Mona Ebrish, IBM T.J. Watson Research Center
Michael Flatte, The University of Iowa
Roland Kawakami, The Ohio State University
Xinyu Liu, University of Notre Dame

Nanofabrication and Processing

Bruno Azeredo, Arizona State University
Kris Bertness, National Institute of Standards and Technology
Xiuling Li, University of Illinois at Urbana-Champaign
Parsian Mohseni, Rochester Institute of Technology

Narrow Bandgap Materials and Devices

Ganesh Balakrishnan, The University of New Mexico
Brian Bennett, U.S. Naval Research Laboratory
Bob Biefeld, Retired
Sanjay Krishna, The Ohio State University
Kunal Mukherjee, University of California, Santa Barbara
Gregory Triplett, Virginia Commonwealth University
Daniel Wasserman, The University of Texas at Austin

Point Defects, Doping and Extended Defects

Andrew Armstrong, Sandia National Laboratories
Ramon Collazo, North Carolina State University
Rachel Goldman, University of Michigan
Lincoln Lauhon, Northwestern University
Kunal Mukherjee, University of California, Santa Barbara
Steve Ringel, The Ohio State University
Shadi Shahedipour-Sandvik, State University of New York Polytechnic Institute
Jun Suda, Kyoto University
Christian Wetzel, Rensselaer Polytechnic Institute
Jerry Woodall, University of California, Davis

Quantum Materials

Matt Doty, University of Delaware
Michael Gerhold, U.S. Army Research Office
Rachel Goldman, University of Michigan
Anthony Hoffman, University of Notre Dame
Stephanie Law, University of Delaware

Transparent Conductors

Suprem Das, Kansas State University
David Janes, Purdue University
Becky L. Peterson, University of Michigan
Lisa Porter, Carnegie Mellon University
Angel Yanguas-Gil, Argonne National Laboratory

ENERGY STORAGE AND CONVERSION MATERIALS

Chalcopyrite and Related Semiconductors and Devices

Steve Durbin, Western Michigan University
Minjoo (Larry) Lee, University of Illinois at Urbana-Champaign
Mike Scarpulla, The University of Utah

Electrochemical Energy Storage and Conversion

Susan Fullerton, University of Pittsburgh
David Gundlach, National Institute of Standards and Technology
Louis Piper, Binghamton University, The State University of New York
Edward Yu, The University of Texas at Austin

Energy Harvesting

Alan Doolittle, Georgia Institute of Technology
Ken Jones, U.S. Army Research Laboratory
Jamie Phillips, University of Michigan
Shadi Shahedipour-Sandvik, State University of New York Polytechnic Institute
Michael Spencer, Cornell University

Photovoltaics—Organic and Hybrid

David Gundlach, National Institute of Standards and Technology
Tina Ng, University of California, San Diego
Oleg Rubel, McMaster University
Adrienne Stiff-Roberts, Duke University
Wei You, University of North Carolina

Solar Cell Materials and Devices

Geoffrey Bradshaw, Air Force Research Laboratory
Rachel Goldman, University of Michigan
Mark Goorsky, University of California, Los Angeles
Debdeep Jena, Cornell University
Steve Ringel, The Ohio State University
Oleg Rubel, McMaster University
Mike Scarpulla, The University of Utah
Christian Wetzel, Rensselaer Polytechnic Institute
Mark Wistey, Texas State University
Jerry Woodall, University of California, Davis

Thermoelectrics and Thermal Transport

Joe Feser, University of Delaware
Ferdinand Poudeau, University of Michigan
Xiaoqia Wang, University of Minnesota
Yaguo Wang, The University of Texas at Austin
Joshua Zide, University of Delaware

NANOSCALE SCIENCE AND TECHNOLOGY

Graphene, BN, MoS₂ and Other 2D Materials and Devices

Thomas Beechem, Sandia National Laboratories
Kevin Daniels, University of Maryland
Mona Ebrish, IBM T.J. Watson Research Center
Randall Feenstra, Carnegie Mellon University
Susan Fullerton, University of Pittsburgh
Manos Kioupakis, University of Michigan
Rachel Koltun, Guardian Industries
Lincoln Lauhon, Northwestern University
Suzanne Mohnhey, The Pennsylvania State University
Siddharth Rajan, The Ohio State University
Joan Redwing, The Pennsylvania State University
Joshua Robinson, The Pennsylvania State University
Michael Spencer, Cornell University
Christine Wang, Lincoln Laboratory, Massachusetts Institute of Technology
Huili Grace Xing, Cornell University

Low-Dimensional Structures— Quantum Dots, Wires and Wells

Ganesh Balakrishnan, The University of New Mexico
Matthew Doty, University of Delaware
Kurt Eyink, Air Force Research Laboratory
Michael Gerhold, U.S. Army Research Office
Rachel Goldman, University of Michigan
Lincoln Lauhon, Northwestern University
Minjoo (Larry) Lee, University of Illinois
at Urbana-Champaign
Zetian Mi, University of Michigan
Jamie Phillips, University of Michigan
Paul Simmonds, Boise State University
Daniel Wasserman, The University of Texas at Austin

Materials Integration

Daniel Ewing, Department of Energy's
Kansas City National Security Campus
Mark Goorsky, University of California, Los Angeles
Doug Hall, University of Notre Dame
Karl Hobart, U.S. Naval Research Laboratory
Becky L. Peterson, University of Michigan
Nate Quitoriano, McGill University
Steve Ringel, The Ohio State University
Patrick Shea, Northrop Grumman Corporation
Jerry Woodall, University of California, Davis

Nanoscale Characterization—Scanning Probes, Electron Microscopy and Other Techniques

Thomas Beechem, Sandia National Laboratories
Rachel Goldman, University of Michigan
Lincoln Lauhon, Northwestern University
James LeBeau, North Carolina State University
Anders Mikkelsen, Lund University
Jay Mody, GLOBALFOUNDRIES
Volker Rose, Argonne National Laboratory
Rainer Timm, Lund University
Heayoung Yoon, The University of Utah
Edward Yu, The University of Texas at Austin

Nanowires and Nanotubes— Growth, Processing, Characterization and Devices

Kris Bertness, National Institute of Standards
and Technology
Matt Brubaker, National Institute of Standards
and Technology
Xiuling Li, University of Illinois at Urbana-Champaign
Zetian Mi, University of Michigan
Anders Mikkelsen, Lund University
Parsian Mohseni, Rochester Institute of Technology
Roberto Myers, The Ohio State University
Nate Quitoriano, McGill University
Rainer Timm, Lund University
George Wang, Sandia National Laboratories
William Wong, University of Waterloo

ORGANIC MATERIALS AND THIN-FILM TECHNOLOGY

Electronic Materials for Bio

Francesca Cavallo, The University of New Mexico
Tzahi Cohen-Karni, Carnegie Mellon University
Shadi Dayeh, University of California, San Diego
David Estrada, Boise State University
David Gundlach, National Institute of Standards
and Technology
Thomas Jackson, The Pennsylvania State University
David Janes, Purdue University

Flexible, Printed and/or Dissolvable Thin Films or Nanomembranes

Suprem Das, Kansas State University
Daniel Ewing, Department of Energy's
Kansas City National Security Campus
Thomas Jackson, The Pennsylvania State University
Thomas Kuech, University of Wisconsin
Becky L. Peterson, University of Michigan
Sarah Swisher, University of Minnesota
William Wong, University of Waterloo

Organic Devices and Molecular Electronics

David Gundlach, National Institute of Standards
and Technology
Thomas Jackson, The Pennsylvania State University
David Janes, Purdue University
Ioannis Kymissis, Columbia University
Takhee Lee, Seoul National University
Francois Leonard, Sandia National Laboratories
Tina Ng, University of California, San Diego
Brendan O'Connor, North Carolina State University
Curt Richter, National Institute of Standards
and Technology
Adrienne Stiff-Roberts, Duke University

OXIDE SEMICONDUCTORS AND DIELECTRICS

Dielectrics and Multifunctional Oxides

Joshua Caldwell, Vanderbilt University
John Conley, Oregon State University
Alan Doolittle, Georgia Institute of Technology
Doug Hall, University of Notre Dame
Anderson Janotti, University of Delaware
David Lederman, University of California, Santa Cruz
Patrick Lenahan, The Pennsylvania State University
Joseph Ngai, The University of Texas at Arlington
Nicholas Strandwitz, Lehigh University

Gallium Oxide

Shizuo Fujita, Kyoto University
Masataka Higashiwaki, National Institute of
Information and Communications Technology
Sriram Krishnamoorthy, The University of Utah
Shin Mou, Air Force Research Laboratory
Becky L. Peterson, University of Michigan
Lisa Porter, Carnegie Mellon University
Marko Tadjer, U.S. Naval Research Laboratory
Hongping Zhao, The Ohio State University

Oxide Semiconductors—Growth, Doping, Defects, Nanostructures and Devices

Leonard Brillson, The Ohio State University
John Conley, Oregon State University
Steve Durbin, Western Michigan University
Thomas Jackson, The Pennsylvania State University
Anderson Janotti, University of Delaware
Mark Losego, Georgia Institute of Technology
Becky L. Peterson, University of Michigan
Louis Piper, Binghamton University,
The State University of New York
Shayla Sawyer, Rensselaer Polytechnic Institute
Sarah Swisher, University of Minnesota

WIDE BANDGAP SEMICONDUCTORS

Group III-Nitrides—Growth, Processing, Characterization, Theory and Devices

Srabanti Chowdhury, University of California, Davis
Theeradetch Detchprohm, Georgia Institute
of Technology
Alan Doolittle, Georgia Institute of Technology
Russell Dupuis, Georgia Institute of Technology
Daniel Ewing, Department of Energy's
Kansas City National Security Campus
Qhalid Fareed, Texas Instruments
Daniel Feezell, The University of New Mexico
Hiroshi Fujioka, The University of Tokyo
Jennifer Hite, U.S. Naval Research Laboratory
Andrew Koehler, U.S. Naval Research Laboratory
Xiaohang Li, King Abdullah University of Science
and Technology
Michael Manfra, Purdue University
Siddharth Rajan, The Ohio State University
Shadi Shahedipour-Sandvik, State University of
New York Polytechnic Institute
Andrei Vescan, RWTH Aachen University
Christian Wetzel, Rensselaer Polytechnic Institute
Jonathon Wierer, Lehigh University
Huili Grace Xing, Cornell University

Silicon Carbide—Growth, Processing, Characterization, Theory and Devices

Joshua Caldwell, Vanderbilt University
MVS Chandrashekhara, University of South Carolina
Sarit Dhar, Auburn University
Michael Dudley, Stony Brook University,
The State University of New York
Daniel Ewing, Department of Energy's
Kansas City National Security Campus
Nadeemullah Mahadik, U.S. Naval Research
Laboratory
Michael Spencer, Cornell University
Jun Suda, Kyoto University

MAP & TRAVEL RESOURCES

Michigan League

Second Level

Awards Ceremony,
Plenary Session
& Technical Sessions..... Lydia Mendelssohn
Theatre

Registration Concourse
Welcome Reception Ballroom
Poster Session Ballroom
Refreshment Breaks Ballroom
Exhibit..... Ballroom
Technical Sessions Hussey
Technical Sessions..... Kalamazoo
Technical Sessions..... Michigan
Technical Sessions..... Vandenberg

Third Level

Technical Sessions..... Henderson
Technical Sessions..... Koessler
Technical Sessions..... Room D

Rackham Building

Fourth Level

Technical Sessions..... Amphitheatre
Technical Sessions..... Assembly Hall

Residence Hall Housing

North Quad Residence Hall

Parking Structures ★

Liberty Square Parking Structure
Maynard Parking Structure
Palmer Structure



TRAVEL RESOURCES

The Conference does not endorse or sponsor any of the listings below. Information is provided as a courtesy to attendees.

INTERNET ACCESS

Complimentary internet access is available campus wide to Conference attendees. Network name: MGuest. No password is required. Complimentary internet access is also available in the residence halls.

DINING OPTIONS

Located on the first floor of Michigan League, **Maizie's Kitchen and Market** is the quintessential gathering place for people who enjoy the art of great food. The menu features Peet's Coffee, specialty made-to-order and grab-and-go entrees, soups, sandwiches, salads and convenience items. Perfect for a casual bite morning, noon or night.

In addition, Ann Arbor enjoys a **diverse international food scene** with over 300 restaurants, plus a wide variety of cafes, farmers markets, food trucks, bakeries, microbreweries, pubs and more. Visit visitannarbor.org/splash/eat for details.

PUBLIC TRANSPORTATION

Downtown Ann Arbor is accessible by public transit operated by **TheRide**. The fare for a one-way trip on a fixed-route service is \$1.50 cash. Learn more at theride.org.

PARKING

The nearest public Parking Structures to Michigan League are Maynard and Liberty Square.

Maynard Parking Structure*

- \$1.20 hourly rate, Monday-Saturday
- 24-hour parking rate, Monday-Saturday, \$28.80
- Sunday free
- Electric charging stations also available

Liberty Square Parking Structure*

- \$1.20 hourly rate until 3:00 pm, Monday-Friday
- \$3.00 flat rate entry fee after 3:00 pm Monday-Friday and all day Saturday
- Sunday free

Public parking is also available on Central Campus at the **Palmer Structure***, located on Palmer Drive just west of Washtenaw Avenue. Payment required 7:00 am – 9:00 pm daily; \$.85 per half hour.

* Parking Structure noted on above map with a ★

EMC AWARDS CEREMONY & PLENARY SESSION

Wednesday, 8:20 am – 9:20 am
Michigan League, 2nd Floor
Lydia Mendelssohn Theatre



PLENARY SPEAKER

Dmitri N. Basov
Columbia University

Programmable Quantum Materials

Dmitri N. Basov (PhD 1991) is a Higgins Professor of Physics at Columbia University and the Director of the Department of Energy Frontiers Research Center on Programmable Quantum Materials. He served as professor (1997-2016) and Chair of Physics (2010-2015) at the University of California, San Diego. Basov's research interests include physics of quantum materials, superconductivity, two-dimensional materials and infrared nano-optics. Basov's prizes and awards include the Sloan Fellowship (1999), Genzel Prize (2004), Humboldt Research Award (2009), Frank Isakson Prize, American Physical Society (2012), Moore Investigator (2014) and K.J. Button Prize (2019).

2018 BEST STUDENT PRESENTATION AWARDS

ORAL PRESENTATIONS

Brian Haidet

University of California, Santa Barbara

*Direct Observation of Recombination Enhanced
Dislocation Glide in GaAs/Si Thin Films Using
Electron Channeling Contrast Imaging*

Advisor – Kunal Mukherjee

Kyle McNicholas

The University of Texas at Austin

*BGaAs/GaP Heteroepitaxy for Strain-Free
Luminescent Layers on Si*

Advisor – Seth Bank

POSTER PRESENTATION

Anisha Kalra

Centre for Nano Science and Engineering (CeNSE),
Indian Institute of Science

*Demonstration of High Responsivity Epitaxial β -Ga₂O₃/
GaN Metal-Heterojunction-Metal (MHM) Broadband
UV-A/UV-C Detector*

Advisors – Digbijoy N. Nath and Srinivasan Raghavan

2018 JOURNAL OF ELECTRONIC MATERIALS BEST PAPER AWARD

Thomas Vandervelde

Tufts University

*Impact of Rotation Rate on Bismuth Saturation in
GaAsBi Grown by Molecular Beam Epitaxy*

Selected by the guest editors of the Special Issue of *Journal of
Electronic Materials* from the 60th Electronic Materials Conference

2018 NIST UNCERTAINTY ANALYSIS STUDENT AWARD

Jimmy Encomendero

Cornell University

*Resonant Tunneling Transport as a Sensitive
Measurement of the Internal Polarization Fields in
III-Nitride Tunneling Heterostructures*

Advisor – Huili Grace Xing

Sponsored by **NIST**



Student participation in this Conference
is partially supported by a grant from
the TMS Foundation

DAILY SCHEDULE OF EVENTS

TUESDAY

Registration	3:00 pm – 5:00 pm	Michigan League, 2nd Floor, Concourse
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WEDNESDAY

Registration	7:30 am – 5:00 pm	Michigan League, 2nd Floor, Concourse
Exhibit	9:00 am – 12:00 pm	Michigan League, 2nd Floor, Ballroom
A: EMC Awards Ceremony & Plenary Session	8:20 am – 9:20 am	Michigan League, 2nd floor, Lydia Mendelssohn Theatre
Refreshment Break	9:20 am – 10:00 am	Michigan League, 2nd Floor, Ballroom
Poster Set-up	9:30 am – 1:30 pm	Michigan League, 2nd Floor, Ballroom
DRC Session X: Steep Threshold/Logic 2	10:10 am – 11:30 am	Michigan League, 2nd Floor, Vandenberg
B: Control of Quantum Systems	10:00 am – 12:00 pm	Michigan League, 2nd floor, Lydia Mendelssohn Theatre
C: 2D Growth and Characterization	10:00 am – 12:00 pm	Michigan League, 2nd Floor, Hussey
D: Materials for Memory and Neuromorphic Computing Applications	10:00 am – 12:00 pm	Michigan League, 2nd Floor, Michigan
E: Energy Conversion and Storage	10:00 am – 12:00 pm	Michigan League, 3rd Floor, Henderson
F: Novel Nitride-Based Materials	10:00 am – 12:00 pm	Michigan League, 3rd Floor, Koessler
G: III-Nitride Electronics	10:00 am – 12:00 pm	Rackham Building, 4th Floor, Amphitheatre
Lunch	12:00 pm – 1:30 pm	(not provided by conference)
Exhibit	1:30 pm – 4:00 pm	Michigan League, 2nd floor, Ballroom
H: Chalcogenide Quantum Materials	1:30 pm – 4:50 pm	Michigan League, 2nd floor, Lydia Mendelssohn Theatre
I: Solar Cell Materials and Devices	1:30 pm – 5:10 pm	Michigan League, 2nd Floor, Hussey
J: Alloys for IR Applications	1:30 pm – 5:10 pm	Michigan League, 3rd Floor, Henderson
M: Characterization of Defects and Interfaces	1:30 pm – 3:10 pm	Rackham Building, 4th Floor, Amphitheatre
O: Gallium Oxide Devices and Transport	1:30 pm – 5:10 pm	Rackham Building, 4th Floor, Assembly Hall
K: Epitaxial Materials on Si	1:50 pm – 3:10 pm	Michigan League, 3rd Floor, Koessler
Refreshment Break	3:10 pm – 3:30 pm	Michigan League, 2nd Floor, Ballroom
General Poster Viewing	3:10 pm – 3:30 pm	Michigan League, 2nd Floor, Ballroom
L: Epitaxial Devices	3:30 pm – 5:10 pm	Michigan League, 3rd Floor, Koessler
N: III-Nitride Materials and Devices	3:30 pm – 5:10 pm	Rackham Building, 4th Floor, Amphitheatre
Welcome Reception/ Poster Session	6:00 pm – 8:00 pm	Michigan League, 2nd Floor, Ballroom
Exhibit	6:00 pm – 8:00 pm	Michigan League, 2nd Floor, Ballroom

THURSDAY

Registration	8:00 am – 5:00 pm	Michigan League, 2nd Floor, Concourse
P: Printed and Flexible Materials and Devices	8:20 am – 10:00 am	Michigan League, 2nd Floor, Kalamazoo
R: Probes for Nanoscale Phenomena	8:20 am – 12:00 pm	Michigan League, 2nd Floor, Michigan
S: 2D Devices and Interfacial Engineering	8:20 am – 12:00 pm	Michigan League, 2nd Floor, Vandenberg
T: Materials for Memristors and Computation	8:20 am – 10:00 am	Michigan League, 3rd Floor, Room D
V: Oxide Doping and Composites	8:20 am – 10:00 am	Michigan League, 3rd Floor, Henderson

THURSDAY (CONT.)

W: Materials for THz, Plasmonics and Polaritons	8:20 am – 12:00 pm	Michigan League, 3rd Floor, Koessler
X: III-Nitride Materials for Power Electronics	8:20 am – 12:00 pm	Rackham Building, 4th Floor, Amphitheatre
Y: Gallium Oxide Defects and UV Optoelectronics Materials	8:20 am – 12:00 pm	Rackham Building, 4th Floor, Assembly Hall
Exhibit	9:00 am – 12:00 pm	Michigan League, 2nd Floor, Ballroom
Refreshment Break	10:00 am – 10:20 am	Michigan League, 2nd Floor, Ballroom
General Poster Viewing	10:00 am – 10:20 am	Michigan League, 2nd Floor, Ballroom
Q: Electronic Materials for Bio	10:20 am – 12:00 pm	Michigan League, 2nd Floor, Kalamazoo
U: Low-Dimensional Structures— Quantum Dots, Wires, Wells	10:20 am – 12:00 pm	Michigan League, 3rd Floor, Room D
Lunch	12:00 pm – 1:30 pm	(not provided by conference)
Exhibit	1:30 pm – 4:00 pm	Michigan League, 2nd Floor, Ballroom
Z: Organic/Hybrid Materials and Devices	1:30 pm – 5:10 pm	Michigan League, 2nd Floor, Kalamazoo
AA: Electron Microscopy	1:30 pm – 3:10 pm	Michigan League, 2nd Floor, Michigan
CC: 2D Material Heterostructures and Optical Properties	1:30 pm – 5:10 pm	Michigan League, 2nd Floor, Vandenberg
DD: Thermoelectrics and Thermal Transport	1:30 pm – 3:10 pm	Michigan League, 3rd Floor, Room D
FF: Oxide Growth and Devices	1:30 pm – 5:10 pm	Michigan League, 3rd Floor, Henderson
GG: SiC and Related Materials, Characterization and Devices	1:30 pm – 5:10 pm	Michigan League, 3rd Floor, Koessler
HH: III-Nitride Growth	1:30 pm – 3:10 pm	Rackham Building, 4th Floor, Amphitheatre
JJ: Doping, Point and Extended Defects in Wide Bandgap	1:30 pm – 5:10 pm	Rackham Building, 4th Floor, Assembly Hall
Refreshment Break	3:10 pm – 3:30 pm	Michigan League, 2nd Floor, Ballroom
General Poster Viewing	3:10 pm – 3:30 pm	Michigan League, 2nd Floor, Ballroom
Poster Tear-Down Deadline	3:30 pm – 5:30 pm	Michigan League, 2nd Floor, Ballroom
BB: Nanofabrication	3:30 pm – 5:10 pm	Michigan League, 2nd Floor, Michigan
EE: Characterization of Epitaxial Materials	3:30 pm – 5:10 pm	Michigan League, 3rd Floor, Room D
II: Visible Emitters	3:30 pm – 5:10 pm	Rackham Building, 4th Floor, Amphitheatre
Conference Dinner Reception	6:30 pm – 9:30 pm	Henry Ford Museum (round-trip transportation provided)

FRIDAY

Registration	8:00 am – 10:30 am	Michigan League, 2nd Floor, Concourse
KK: Nanowires and Nanotubes— Growth, Processing, Characterization and Devices	8:20 am – 10:00 am	Michigan League, 2nd Floor, Michigan
LL: 2D Material Preparation and Applications	8:20 am – 10:00 am	Michigan League, 2nd Floor, Vandenberg
NN: Dielectrics and Multifunctional Oxides	8:20 am – 12:00 pm	Michigan League, 3rd Floor, Henderson
OO: Semiconductors, Metamaterials and Plasmonics	8:20 am – 10:00 am	Michigan League, 3rd Floor, Koessler
PP: III-Nitride UV Devices and Materials	8:20 am – 10:00 am	Rackham Building, 4th Floor, Amphitheatre
RR: Gallium Oxide Growth	8:20 am – 10:00 am	Rackham Building, 4th Floor, Assembly Hall
Refreshment Break	10:00 am – 10:20 am	Michigan League, 2nd Floor, Concourse
MM: 2D Materials Engineering	10:20 am – 12:00 pm	Michigan League, 2nd Floor, Vandenberg
QQ: III-Nitride UV Emitters	10:20 am – 12:00 pm	Rackham Building, 4th Floor, Amphitheatre
SS: Processing of III-Nitrides	10:20 am – 12:00 pm	Rackham Building, 4th Floor, Assembly Hall

PROGRAM AT-A-GLANCE

WEDNESDAY AM

A: EMC Awards Ceremony & Plenary Session			Michigan League, 2nd Floor, Lydia Mendelssohn Theatre
8:20 am			Awards Ceremony
8:30 am	Dmitri N. Basov	A01 ▲	Programmable Quantum Materials
9:20 am			Refreshment Break
B: Control of Quantum Systems			Michigan League, 2nd Floor, Lydia Mendelssohn Theatre
10:00 am	Joel I-Jan Wang	B01 ★	Coherent Control of Graphene-Based Van der Waals Heterostructures
10:40 am	Haiyi Liu	B02	(Student) Nonperturbative Multiphoton Absorption in Gallium Nitrides
11:00 am	Michael Scott Arnold	B03	Semiconducting Carbon Nanotube Polaritonics
11:20 am	Albert Liu	B04	(Student) Bright Triplet State Dynamics in Lead-Halide Perovskite Nanocrystals
11:40 am	Stephane Kena-Cohen	B05	Optical Nonlinearities in Room-Temperature Exciton-Polariton Platforms
C: 2D Growth and Characterization			Michigan League, 2nd Floor, Hussey
10:00 am	Ankit Rao	C01	(Student) Substrate Engineered and Thermodynamically Controlled Growth of Large Area Hexagonal Boron Nitride (h-BN) via Chemical Vapor Deposition
10:20 am	Sayema Chowdhury	C02	(Student) 2D to 3D Fractal Growth of WSe ₂ Using Chemical Vapor Deposition
10:40 am	David Arto Laleyan	C03	(Student) Optical Performance of Hexagonal Boron Nitride Light Emitting Devices Grown by Molecular Beam Epitaxy
11:00 am	Shashwat Rathkanthiwar	C04	(Student) Role of Surface Processes in Growth of Monolayer MoS ₂ for Device Applications
11:20 am	Neha Kondekar	C05	(Student) The Effect of Nickel on MoS ₂ Crystallization and Growth Revealed with <i>In Situ</i> TEM
D: Materials for Memory and Neuromorphic Computing Applications			Michigan League, 2nd Floor, Michigan
10:00 am	Aheli Ghosh	D01	(Student) Impact of Alloying Contact Metal on Non-Volatile Performance of Lithium Niobite Memristors for Neuromorphic Computing
10:20 am	Galo J. Paez Fajardo	D02	(Student) Evidence of a Second-Order Peierls-Driven Metal-Insulator Transition in Crystalline NbO ₂ —An Electroforming-Free Switching Mechanism for Analog Memristors
10:40 am	Ying-Chen Chen	D03	Energy Efficient Operation Schemes of Nonlinear Selectorless RRAM for Crossbar Array Applications
11:00 am	Bill Zivasatienraj	D04	(Student) Scalability of Non-Volatile Lithium Niobite Memristors—Potential for Millivolt Operation of Neuromorphic Devices
11:20 am	Fei Zeng	D05	Phase-Change Nano-Clusters Embedded Nitride Films Capable of Adaptive Learning and Signal Modulation
11:40 am	Jason Avila	D06	(LATE NEWS) Effect of Atomic Layer Deposition Grown VO ₂ Film Morphology and Crystallinity on Opto-Electronic Phase Transition
E: Energy Conversion and Storage			Michigan League, 3rd Floor, Henderson
10:00 am	Jie Chen	E01	(Student) Single-Crystalline III-N Thin Film-Based Flexible Piezoelectric Generators and Pulse Sensors
10:20 am	Srinivas Vanka	E02	(Student) Ultra-Stable and High Efficiency Si Photocathode Protected by Multifunctional GaN Nanostructures
10:40 am	Baowen Zhou	E03	An Artificial Photosynthesis System for Direct Conversion of CO ₂ to Formic Acid Under Sunlight Illumination
11:00 am	Sarah C Shidler	E04	Focusing on the Raman Spectroscopy of Lithium-Ion Batteries
11:20 am	Srinivas Vanka	E05	(Student) InGaN/Si Tandem Photocathode for High Efficiency Unassisted Solar Water Splitting
11:40 am	Kasey Hogan	E06	(Student) Increased Collection Efficiency by Design Improvements for Planar GaN-Based Betavoltaic Battery
F: Novel Nitride-Based Materials			Michigan League, 3rd Floor, Koessler
10:00 am	Zachary Biegler	F01	(Student) Tuning the Optical Properties of ScN Deposited on Al ₂ O ₃ with DC Reactive Magnetron Sputtering by Changing Sputter Power
10:20 am	Weijie Wang	F02	(Student) Polarization Modulation Effect of BeO on AlGaIn/GaN High-Electron-Mobility Transistors
10:40 am	James H. Edgar	F03	Properties of Bulk Scandium Nitride Crystals Grown by Physical Vapor Transport
11:00 am	Krystal Rose York	F04	(Student) Ternary Heterovalent Alternative Wide Band Gap Semiconductors
11:20 am	Md Rezaul Karim	F05	(Student) MOCVD Growth and Material Characterization of Wide Bandgap ZnGeN ₂ Films
11:40 am	Robert Makin	F06	(Student) Effects of Controlled Cation Ordering on Optical Properties of ZnSnN ₂
G: III-Nitride Electronics			Rackham Building, 4th Floor, Amphitheatre
10:00 am	Sandra M. Diez Pinzon	G01	(Student) Electron Transport in N-Polar GaN-Based Heterostructures
10:20 am	Shahadat H. Sohel	G02	(Student) LPCVD Passivation for High Linearity Graded AlGaIn Channel Field Effect Transistors with Improved Dispersion
10:40 am	Shahab Mollah	G03	AlGaIn MOSFETs with High-k ALD Oxides—Towards Enhancement Mode Ultra-Wide Bandgap Devices
11:00 am	Isra Mahaboob	G04	(Student) Integrated Body-Diode Back-Gate Control in AlGaIn/GaN HEMTs
11:20 am	Nayana Remesh	G05	(Student) Experimental and Analytical Determination of Optimum Carbon Doping Level AlGaIn/GaN HEMT on Silicon
11:40 am	Nayana Remesh	G06	(Student) Normally-Off AlGaIn/GaN HEMT on 200 mm Silicon with ON-Current 500 mA/mm and V _{th} > 5V
DRC Session X: Steep Threshold/Logic 2			Michigan League, 2nd Floor, Vandenberg
10:10 am	J. Gomez	X_-1	Significance of Multi and Few Domain Ferroelectric Switching Dynamics for Steep-Slope Non-Hysteretic Ferroelectric Field Effect Transistor
10:30 am	Junkyo Suh	X_-2	(Student) 3D-stacked Strained SiGe/Ge Gate-All-Around (GAA) Structure Fabricated by 3D Ge Condensation
10:50 am	U. Rana	X_-3	High Performance and Yield for Super Steep Retrograde Wells (SSRW) by Well Implant / Si-Based Epitaxy on Advanced Technology FinFETs
11:10 am	J. Bizindavyi	X_-4	Experimental Calibration of the Temperature Dependence of the Heterojunction Bandgap in III-V Tunneling Devices

▲ Plenary Talk ★ Invited Talk

PROGRAM AT-A-GLANCE

WEDNESDAY PM

H: Chalcogenide Quantum Materials			Michigan League, 2nd Floor, Lydia Mendelssohn Theatre
1:30 pm	Zhihong Chen	H01 ★	Observation of Valley Coupled Topological Current in 2D TMDs
2:10 pm	Rachel S. Goldman	H02	Probing Topological Surface States in Bi_2Te_3 - Bi_2Se_3 and Bi_2Te_3 - Sb_2Te_3 Alloy Films
2:30 pm	Sugata Chowdhury	H03	Effect of Spin-Orbit Coupling and Magnetic Strength on Weyl Semimetallic and Chern Insulating Phase of Magnetic Bi_2MnX_4 (X= Se, Te)
2:50 pm	Anupam Roy	H04	Epitaxial Growth and Characterization of Chromium Selenide Thin-Films on $\text{c-Al}_2\text{O}_3$ (0001)
3:10 pm			Refreshment Break
3:30 pm	Emanuel Tutuc	H05 ★	Rotationally Controlled van der Waals Heterostructures—Electron Physics and Device Applications
4:10 pm	Feng Wang	H06	Moiré Excitons in WS_2/WSe_2 Heterostructures
4:30 pm	Ping Wang	H07	Linearly Aligned Hexagonal Boron Nitride Quantum Dots Grown by Molecular Beam Epitaxy
I: Solar Cell Materials and Devices			Michigan League, 2nd Floor, Hussey
1:30 pm	Eunseong Moon	I01	(Student) GaAs Dual Junction Photovoltaic Modules for Bioimplantable Devices
1:50 pm	Vijay Saradhi Mangu	I02	(Student) Leakage Current Mechanisms in Pixelated Solar Cells
2:10 pm	Hui-Ying Siao	I03	(Student) GaP Schottky Diodes Solar Cells with High Quantum Efficiencies Fabricated by Liquid Phase Epitaxy (LPE)
2:30 pm	Masakazu Kobayashi	I04	Preparation of AgGaTe_2 Layers on Mo with Sputtered Ag_2Te Buffer Layers
2:50 pm	Akash Kumar	I05	Atomic Layer Deposited MoO_3 for Controlling O:Mo Ratio to Obtain Passivation and Hole Selectivity in Si Heterojunction Solar Cells
3:10 pm			Refreshment Break
3:30 pm	Joshua Letton	I06	(Student) Influence of PbS Quantum Dot Sensitization on Action Spectrum of Graphene/SiC Schottky Diodes
3:50 pm	Fiaz Ahmed	I07	(Student) Influence of Purification Methods on Optoelectronic Properties of PbS-QD Films
4:10 pm	Aboozar Mosleh	I08	Investigation of Boron Dopant Deactivation Through Atomic Hydrogen Diffusion in Si for Enhancement of Solar Cell Efficiency
4:30 pm	Lingjie J. Guo	I09	Trans-Reflective Solar Cells for High-Efficiency Decorative Silicon Solar Panels
4:50 pm	Daniel Lepkowski	I10	(LATE NEWS, Student) Progress toward >30% Efficient III-V/Si Tandem Photovoltaics
J: Alloys for IR Applications			Michigan League, 3rd Floor, Henderson
1:30 pm	Mark Wistey	J01	Accurate Unfolding of Dilute Highly Mismatched Alloy Band Structures
1:50 pm	Vinita Dahiya	J02	(Student) MOCVD Grown Metamorphic InAsSb Materials for Long Wave Infrared Detectors
2:10 pm	Gordon J. Grzybowski	J03	$\text{Ge}_{1-x}\text{Sn}_x$ Alloys on Si, Germanium, and Sapphire Substrates for Mid-IR Detector Applications Produced by Remote Plasma Enhanced Chemical Vapor Deposition (RPECVD)
2:30 pm	Justin Easley	J04	Prospects of InGaAs/GaAsSb Lattice-Matched to InP for Extended Range SWIR Detection
2:50 pm	Emma J. Renteria	J05	Raman Scattering Study to Optimize the Damage Recovery Treatment of Ion-Implanted GaSb Thermophotovoltaic Cells
3:10 pm			Refreshment Break
3:30 pm	Brandon Carter	J06	(Student) Microstructural and Morphological Variations in GaAsBi
3:50 pm	Ann Kathryn Rockwell	J07	(Student) Band Structure Influence on Noise Properties of III-V Digital Alloys
4:10 pm	Rachel S. Goldman	J08	Mapping the Composition-Dependence of the Energy Bandgap of GaAsNBi Alloys
4:30 pm	Stephen D. March	J09	(Student) Modeling and Measurement of Carrier Trapping and Tunneling in $\text{Al}_{1-x}\text{As}_{1-y}\text{Sb}_{1-y}$ Digital Alloys
4:50 pm	Andrew Frederick Briggs	J10	(Student) Externally Applied Strain on GaSb Based GaInAsSb Quantum Well Membranes
K: Epitaxial Materials on Si			Michigan League, 3rd Floor, Koessler
1:50 pm	Abbas Sabbar	K01	SiGe Growth on a Sapphire Substrate Using UHV-CVD Technique
2:10 pm	Nate Quitoriano	K02	A Growth Model Leading to Larger-Area, High-Quality, Laterally Grown Ge Films on Si
2:30 pm	Kyle Marshall McNicholas	K03	(Student) Progress Towards B-III-V Optoelectronic Devices on Silicon
2:50 pm	Inho Kim	K04	CBRAM Based on Single Crystalline Si Thin-Films Grown by Solid Phase Epitaxy
3:10 pm			Refreshment Break

★ Invited Talk



CONFERENCE BADGE

Badges must be worn at all times within the Conference venue, including all receptions.

RECORDING/PHOTO POLICY

Recording or photographing Conference presentations, posters or displays is strictly prohibited without prior permission of the presenter.

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The Materials Research Society (MRS), its meeting partners and event venues, are responsible for complying with the Americans with Disabilities Act ("ADA") including the "readily achievable" removal of physical barriers to access meeting rooms, sleeping rooms and common areas. This may also include reasonable provisions for auxiliary aids and services when necessary and where achievable without undue burden. MRS will make every attempt to ensure that disabled individuals are accommodated so that they can receive the full benefit of participation in our events, and will modify, where possible, the policies, practices and procedures as necessary to provide goods and services to disabled individuals. On-site needs will be met to the extent possible.

PROGRAM AT-A-GLANCE

WEDNESDAY PM

L: Epitaxial Devices			Michigan League, 3rd Floor, Koessler
3:30 pm	Guanyu Zhou	L01	High-Mobility ($> 700 \text{ cm}^2/\text{V-s}$) Helical Tellurium Field Effect Transistors Enabled by Transfer-Free, Low-Temperature (120°C) Direct Growth
3:50 pm	Kevin James Reilly	L02	(Student) Epitaxial Regrowth for Photonic Crystal Surface Emitting Lasers (PCSELS)
4:10 pm	Emma J. Renteria	L03	Etch and Surface Passivation Study of AlSb Diodes Grown on GaSb Substrates
4:30 pm	Suneel Joglekar	L04	All Solution-Processed MAPbI ₃ Perovskite Crystal with 2D Ruddlesden-Popper Coating for Low-Cost, High-Resolution Radiation Detectors
4:50 pm	John Klem	L05	Epitaxial AlAsSb for Spectroscopic Gamma Detectors
M: Characterization of Defects and Interfaces			Rackham Building, 4th Floor, Amphitheatre
1:30 pm	Alexander Chang	M01	Atom Probe Tomography Study of Dopant and Impurity Distributions Near Planar and Non-Planar GaN Homojunctions
1:50 pm	Sam Cyrus Sprawls	M02	(Student) Neutron and Gamma Radiation of Gallium Nitride with Varying Growth Orientations
2:10 pm	Kelsey Jane Mirrielees	M03	(Student) Properties of Oxide Reconstructions in AlN and GaN
2:30 pm	Benjamin McEwen	M04	(Student) Effects of Forming Gas Anneal on the Structure of Al ₂ O ₃ /GaN Interface
2:50 pm	Micah Haseman	M05	(Student) Native Point Defects of MOCVD-Grown ZnGeN ₂ and Their Substrate Dependence
3:10 pm			Refreshment Break
N: III-Nitride Materials and Devices			Rackham Building, 4th Floor, Amphitheatre
3:30 pm	Eric T. Reid	N01	(Student) Ultra-High Temperature Annealing of Aluminum Nitride Grown by Molecular Beam Epitaxy
3:50 pm	Zachary Engel	N02	(Student) Demonstration of High Quality Aluminum Indium Nitride with High Indium Content Grown via Metal Modulated Epitaxy
4:10 pm	Alexander Senichev	N03	Strain-Balanced Nonpolar InGaN/AlGaIn Heterostructures for Infrared Intersubband Devices
4:30 pm	Ping Chen	N04	Epitaxial Growth and Optically Pumped Stimulated Emission in AlGaIn/InGaIn Ultraviolet Multi-Quantum-Well Structures
4:50 pm	Kamruzzaman Khan	N05	(Student) Epitaxial Growth of Relaxed InGaIn Films on Zn-Face ZnO Substrate by Plasma-Assisted Molecular Beam Epitaxy
O: Gallium Oxide Devices and Transport			Rackham Building, 4th Floor, Assembly Hall
1:30 pm	Zhanbo Xia	001	(Student) β -Ga ₂ O ₃ Delta-Doped Field Effect Transistors with Cutoff Frequency of 27GHz
1:50 pm	Nidhin Kurian Kalarickal	002	High Electron Density β -(Al _{0.23} Ga _{0.77}) ₂ O ₃ /Ga ₂ O ₃ Modulation Doped Heterostructures
2:10 pm	Anna Hassa	003	(Student) Ternary Orthorhombic (In _x Ga _{1-x}) ₂ O ₃ and (Al _x Ga _{1-x}) ₂ O ₃ Thin Films—Growth and Material Properties
2:30 pm	Darpan Verma	004	(Student) Observation of the Franz-Keldysh Effect in β -Ga ₂ O ₃ Schottky Diode
2:50 pm	Hannah Nicole Masten	005	(Student) Deep Depletion and Hole Generation in β -Ga ₂ O ₃ MOS Capacitors
3:10 pm			Refreshment Break
3:30 pm	Masataka Higashiwaki	006	Unintentional Incorporation of Si and N Atoms in Ga ₂ O ₃ Films Grown by Plasma-Assisted Molecular Beam Epitaxy
3:50 pm	Kentaro Kaneko	007	Novel P-Type Oxides of Corundum-Structured α -Ir ₂ O ₃ for Gallium Oxide Electronics
4:10 pm	Anderson Janotti	008	The Effects of Bi on the Electronic Structure of In ₂ O ₃ and Ga ₂ O ₃
4:30 pm	Adam T. Neal	009	Magneto-Transport Studies of β -Ga ₂ O ₃
4:50 pm	Tobias Burger	010	(LATE NEWS, Student) Thin-Film Thermophotovoltaic Device Fabricated by Non-Destructive Epitaxial Lift Off



Join us for an informal (and free) social run on Thursday morning!

Meet at the Circle Drive front entrance of the Michigan League at 6:30 am. The run will take you through the Nichols Arboretum to the Huron River, including dirt trails and hills, with a total distance of around 5 kilometers.

Runners of all levels welcome: Drifters, Diffusers or Hot Carriers (no doping allowed!).

In the event of rain, the run will be canceled.

POSTER SESSION

WEDNESDAY PM | MICHIGAN LEAGUE, 2ND FLOOR, BALLROOM

General Viewing

Wednesday
3:10 pm – 3:30 pm

Poster Session
6:00 pm – 8:00 pm

Thursday
10:00 am – 10:20 am
3:10 pm – 3:30 pm

Poster Set-up

Wednesday, 9:30 am – 1:30 pm

Poster Tear Down

Thursday, no later than 5:30 pm

Remaining posters will be discarded.

Poster presenters should be standing with their poster.

Student poster presenters must attend from 6:00 pm to 8:00 pm to present poster and answer questions to be eligible for the Best Student Poster Presentation award.

Presenter	Paper #	Title
Akash Kumar	PS01	(Student) Effect of Deposition Pressure on Electrical Properties in Electron Selective La:BaSnO ₃ Thin-Films
Amelia Peterson	PS02	Semi-Empirical Model for ZnO Quantum Dot, Graphene Channel Photodetector
Amitesh Kumar	PS03	(Student) Sputter-Instigated Plasmonic Excitations in Ultra-Thin NMZO Thin Film—For Ultra-Thin Solar Cell Applications
Zhanbo Xia	PS04	(Student) MBE-Grown Self-Powered β -Ga ₂ O ₃ Schottky Solar Blind UV Detector with Rectification $> 10^7$
Tuerxun Ailihumaer	PS05	(Student) Relationship Between Basal Plane Dislocation Distribution and Local Basal Plane Bending in PVT-Grown 4H-SiC Crystals
Brandon A. Buchanan	PS06	(Student) Structural, Thermoelectric and Magnetic Properties of Mn _{1-x} Zn _x Sb ₂ Se ₄ (x = 0, 0.01, 0.03, 0.04, 0.05, 0.06, 0.08, 0.1, 0.15)
Won Hee Jeong	PS07	(Student) Binarized Neural Networks Enabled by Forming-Free Memristor
Christopher Lenyk	PS08	(Student) EPR and Optical Studies of Extrinsic (Fe, Cr, Ir, Mg) and Intrinsic Point Defects in β -Ga ₂ O ₃ Crystals
Daksh Agarwal	PS09	Stimulated Anti Stokes Raman Scattering in Silicon Nanowires
Eric Bretschneider	PS10	Predicting Chromaticity Shift Behavior of Phosphor Converted LEDs Using Differential Chromaticity Analysis
Erik Vyhmeister	PS11	(Student) Mesosstructural Visualization of Single-Crystal Diamond Irradiated by GeV Sn and Zr
Ying Liu	PS12	(Student) Synthesis of Ferrite-Ferroelectric Coaxial Nanofibers by Electrospinning and Studies on Magneto-Electric Interactions
Gun Hee Lee	PS13	(Student) Fabrication and Characterization of Ag Nanowires Integrated with ITO Nanodots for a Transparent Conductive Electrode in Ultraviolet Light-Emitting Diodes
Hogyoung Kim	PS15	Interfacial Characteristics of Thermal Atomic Layer Deposited AlN on n-GaN
Hyeong-Seop Im	PS16	(Student) Tuning Infrared Transmittance of ITO-Based Multilayer Films by Using Ag Disc Array
James R. Millard	PS17	(Student) Seebeck and Hall Coefficient Measurements on ZnSnN ₂ and MgSnN ₂ —Estimating the Density of States Effective Mass
Jeffrey Lindemuth	PS18	Variable Field Hall Measurements and Multi-Carrier Analysis for Low Mobility Material with FastHall™
Jihun Lim	PS19	(Student) Wide Bandgap and Uniform Nanocrystalline Zinc-Oxide for Nanocrystalline Inorganic Perovskite-Based LEDs
Jiyeon Ma	PS20	(Student) Surface Encapsulated β -Ga ₂ O ₃ Nanomembrane Field-Effect Transistor with Atomic-Layer Deposited Al ₂ O ₃
Joel N. Schrauben	PS21	Laser Seeding for the Preparation of Conductive Features on Glass Substrates
Jubin Hazra	PS22	(Student) Impact of Organic and Chlorine Based ALD Precursors on Hafnium Dioxide Based Nanoscale RRAM Devices
Kris Bertness	PS23	Resources for Uncertainty Analysis
Liz Margarita Montanez Huaman	PS25	(Student) Electronic Characteristics of Cu ₃ (BTC) ₂ Metal-Organic Framework Based Capacitors
Mack M. Marshall	PS26	(Student) Formation and Characterization of the Sm _x Mg _{1-x} Mg ₂ Sb ₂ System
Partha Goswami	PS27	(LATE NEWS) Surface Plasmon Wave Sensor Based on Graphene-TMD van der Waals Heterostructure
Mario Calderon Cueva	PS28	Crystal Growth and Lattice Dynamics of AMg ₂ Sb ₂ (X=Ca,Mg,Sr) Zintl Phases
Markus Borsch	PS29	(Student) Optoelectronic Excitations on the Nanoscale
Max Kneiß	PS30	(Student) Epitaxial Stabilization of κ -Ga ₂ O ₃ and κ -(Al _x Ga _{1-x}) ₂ O ₃ Thin Films for Heterostructure Device Applications by Tin-Assisted PLD on Different Substrates
Minsu Oh	PS31	(Student) All-Semiconductor Selective Metamaterial Emitter at 3.45 μ m with Larger Feature Sizes for Thermophotovoltaic Energy Conversion Applications
Mohamadali Malakoutian	PS32	(Student) Plasma Density Impact on the Polycrystalline Diamond Growth on GaN
Mujan Seif	PS33	(Student) Evaporation of Ba and Sc from Scandate Cathode Surfaces
Nick Pant	PS34	(Student) Surface Passivation of III-Nitride Nanowires for Enhanced Solar Water-Splitting
Anna Hassa	PS35	(Student) Influence of Oxygen Deficiency on the Rectifying Behavior of Transparent Oxide Semiconductor-Metal Interfaces—Case Study of Amorphous Zinc-Tin-Oxide
Anna Hassa	PS36	(Student) Electrical Properties of Different Dopants in κ -(In _x Ga _{1-x}) ₂ O ₃ Thin-Films Grown by CCS
Pegah S. Mirabedini	PS37	Theoretical Prediction of Intercalation Compounds Formed by Co-Intercalation of Mg Ions with Diamine into Graphite Anodes for Mg-Ion Batteries
Presenter	Paper #	Title
Pegah S. Mirabedini	PS38	(Student) Density Functional Theory Calculations of ZnO Nanopyramids—Crystal Growth and Improved Performance in Water Splitting

Ruiming Lu	PS39	(Student) Coherent Magnetic Nano-inclusions Induce Charge Localization Leading to High- T_c Ferromagnetism and Enhanced Thermoelectric Performance in Half-Heusler Alloys
Sara Pouladi	PS40	(Student) Low-Angle Grain Boundaries Effect on the Conversion Efficiency of Single-Crystal-Like GaAs Thin-Film Solar Cells on Flexible Metal Foil
Sebastian Husein	PS41	(Student) Structural and Electrical Property Control Through Varied Cation Ratio in Zinc-Tin Oxides
Semi Oh	PS42	Self-Standing ZnO Nanotube/SiO ₂ Core-Shell Arrays for High Photon Extraction Efficiency in III-Nitride Emitter
Seunghoe Koo	PS43	(Student) Development of Pico-Watt Heat Resolution STHM Probe to Investigate of Heat Transfer in Atomic Scale
Sevan Chanakian	PS44	(Student) N-Type Zintl Thermoelectric Compounds in the Eu-Ga-Sb Phase Space
Sung-Wei Yeh	PS45	Conformal Epitaxy of ZnO/III-Oxides Superlattices—Experiment Vis-à-Vis First-Principles Calculations
Sunjong Lee	PS46	High Hardness and Transparent Organic-Inorganic Hybrid Thin-Film for Antistatic Film
Surya Bhaskaram Duvvuri	PS47	(Student) Variable Range Hopping and Relaxation Dynamics of Charge Carriers in Graphene and Graphene Wrapped V ₂ O ₅ Nanoparticles
Tae Ju Lee	PS48	(Student) Effect of Oxygen Plasma-Treatment on the Electrical Characteristics of Ni Schottky Contact on n-GaN
Tetyana V. Torchynska	PS49	Si Quantum Dots and Light Emission in Nd Doped Si-Rich HfO ₂ Films Prepared by Magnetron Sputtering
Sarah Shidler	PS50	Reflectance and Raman Characterisation of Mechanically Exfoliated ReS ₂ Flakes
Sarah Shidler	PS51	Correlated Photocurrent and Raman Spectroscopy Mapping Measurements of Single Crystalline Silicon Solar Cells
Vikash Kapile	PS52	(Student) High Performance Organic Electrochemical Transistors—Working Mechanism and Future Applications as a Biosensor
Wanyue Peng	PS53	(Student) Temperature-Dependent Bond Strength and Sound Velocity in (GeTe) _m Sb ₂ Te ₃ Alloys
Weiwei Jiang	PS54	(Student) Ultrafast Nonperturbative Switching of Carbon Nanotube Excitons
Wenzhe Zang	PS55	(Student) Electrically Probing and Tuning of Molecular Physisorption on Graphene
Yiqiao Huang	PS56	(Student) Nitrogen, Sulfur Co-Doped Reduced Graphene Oxide/Hexagonal Tungsten Trioxide (WO ₃) Nanorods Nanocomposite as High-Performance Anode Materials for Lithium-Ion Batteries

Journal of Electronic Materials

A special issue of the *Journal of Electronic Materials* (JEM)* will be published with peer-reviewed papers from the 61st Electronic Materials Conference.

- Article submission date is **August 31, 2019**.
- Questions? Contact the 2019 Special Issue Editors listed below.

The *Journal of Electronic Materials* reports monthly on the science and technology of electronic materials, while examining new applications for semiconductors, magnetic alloys, dielectrics, nanoscale materials and photonic materials. The *Journal* welcomes articles on methods for preparing and evaluating the chemical, physical, electronic and optical properties of these materials. Specific areas of interest are materials for state-of-the-art transistors, nanotechnology, electronic packaging, detectors, emitters, metallization, superconductivity and energy applications. Review papers on current topics enable individuals in the field of electronics to keep abreast of activities in areas peripheral to their own.

Manuscripts for the 2019 EMC collection will be evaluated according to the same high standards as would be applied to any article submitted to the *Journal*. Authors are encouraged to read carefully and comply with the "Instructions for Authors" on the JEM website located at www.springer.com/materials/optical+electronic-materials/journal/11664. Submission of a manuscript implies that the work described has not been previously published and is not under consideration for publication elsewhere.

A FREE Springer book
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awarded for the
best paper from
this issue!

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TMS

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Editor-in-Chief—Shadi Shahedipour-Sandvik

PROGRAM AT-A-GLANCE

THURSDAY AM

P: Printed and Flexible Materials and Devices			Michigan League, 2nd Floor, Kalamazoo
8:20 am	Wenjun Xiang	P01	Inkjet Printed Graphene and Composite Graphene-Graphene Aerosol Gel for Enhanced Charge-Transfer Studies
8:40 am	Brent Cook	P02	(Student) Inkjet Printing of Inorganic Films and Nanomaterials for Optoelectronic Applications
9:00 am	Sunghwan Lee	P03	High Performance and Air-Stable Polymeric Thin-Film Transistors
9:20 am	Gerd Grau	P04	Carbon Fiber Electronics—Creating Multifunctional Materials Using Low-Cost Fabrication
9:40 am	Nitika Batra	P05	(Student) Lead-Free Tactile Sensors and Energy Harvesting Devices for Wearable and Flexible Electronics
10:00 am			Refreshment Break
Q: Electronic Materials for Bio			Michigan League, 2nd Floor, Kalamazoo
10:20 am	Takao Ono	Q01	Biosensor Array Using CVD-Grown Graphene for Influenza Virus Detection
10:40 am	Daewoo Han	Q02	Novel Drug Delivery System Prepared by Coaxial Electrospinning—Local Cancer Therapy, Multiple Drug Cocktail Therapy and “On-Demand” Therapy
11:00 am	Eric Frantz	Q03	(Student) Optimization of Organic Electrochemical Transistor Media for Bacterial Characterization
11:20 am	James Dylan Rees	Q04	Biosynthesis of Molybdenum Disulfide Nanoparticles Using The Metal-Reducing Bacterium <i>Shewanella Oneidensis</i> MR-1
11:40 am	Wenzhe Zang	Q05	(Student) A High Speed, High Sensitivity and Universal Graphene Vapor Sensor for Both Polar and Non-Polar Molecules
R: Probes for Nanoscale Phenomena			Michigan League, 2nd Floor, Michigan
8:20 am	Umberto Celano	R01	Ferroelectricity in Binary Oxides as Studied by Electrical Scanning Probe Techniques
8:40 am	Ryan Dwyer	R02	Modeling Scanned Probe Microscopy of Organic and Perovskite Semiconductors
9:00 am	Erfan Pourshaban	R03	(Student) Surface Potential Imaging of High-Aspect-Ratio Si Microwires Fabricated by Metal-Assisted Chemical Etching Process
9:20 am	David Julian Maggini	R04	(Student) Impact of Ar Ion Beam Milling on Surface Electronic Characteristics of Polycrystalline CdTe Solar Cells
9:40 am	Donghyeon Moon	R05	(Student) Atomic-Level Friction Imaging of Graphene and TMD Materials via Lateral Force Microscopy in Ambient Conditions
10:00 am			Refreshment Break
10:20 am	Norman Sanford	R06	Extreme-UV-Assisted Atom Probe Tomography
10:40 am	Christian Greenhill	R07	Influence of QD Morphology on Photoluminescence in GaSb/GaAs Multilayers
11:00 am	Torben Lennart Purz	R08	(Student) Measurement of Excitation Coherence Lengths Using Multi-Spatial-Mode Four-Wave Mixing
11:20 am	Yuzhou Wang	R09	(Student) Characterization of Polycrystalline Microstructure with Picosecond Ultrasonics
11:40 am	Sean McSherry	R10	(LATE NEWS, Student) Near-Field Coupled Thermal Transport in van der Waals Metamaterials
S: 2D Devices and Interfacial Engineering			Michigan League, 2nd Floor, Vandenberg
8:20 am	Curt Richter	S01	Measurement and Control of Chiral Edge States in Graphene
8:40 am	Omar Badr Mohammed	S02	(Student) Two Terminal Devices Based on Two-Dimensional Materials
9:00 am	Susan Fullerton	S03	Molecularly Thin All-Solid-State Non-Volatile Memory Gated by a Monolayer Electrolyte
9:20 am	Rui Ma	S04	(Student) Electric Characterization of In-Plane Few-Layer 2H-1T' MoTe ₂ Homo Junction Interfaces
9:40 am	Shruti Subramanian	S05	(Student) Direct Visualization of the Graphene/MoS ₂ Heterostructure Interface
10:00 am			Refreshment Break
10:20 am	Jack Alexander-Webber	S06	Engineering Charge Trapping in Low-Dimensional Semiconductors for Optoelectronic Devices
10:40 am	Alex Christopher De Palma	S07	(Student) Photoluminescence Properties of MoS ₂ Under Large Strain Gradients
11:00 am	Joseph Rachid Nasr	S08	(Student) Enabling High Performance 2D-TFTs on Glass Substrates via Hydrogen Silsesquioxane
11:20 am	Zhihui Cheng	S09	(Student) Convergent Ion-Beam Alteration of 2D Materials and Metal-2D Interfaces
11:40 am	Maya Narayanan Kutty	S10	The Effects of Gamma-Ray and Proton Radiation on hBN Encapsulated Graphene Field Effect Transistors
T: Materials for Memristors and Computation			Michigan League, 3rd Floor, Room D
8:20 am	Timothy Michael McCrone	T01	(Student) High Quality Lithium Niobate Grown by Liquid Phase Electroepitaxy for Use as a Memristor
8:40 am	Alex S. Weidenbach	T02	(Student) Evidence of Lithium Doping Gradients in Sputtered Lithium Niobate Memristors Resulting in Modification of Vertical Conductivity
9:00 am	Nitika Batra	T03	(Student) A Green Synthetic Pathway to V(IV) Oxide-Based Resistive Switching Devices
9:20 am	Amitesh Kumar	T04	Effect of Grain Surface Area on Ytria Based Resistive Switches
9:40 am	Mohsen Jafari	T05	(Student) Tunable Color Reflector Using GeTe in a Multi-Layer Structure
10:00 am			Refreshment Break
U: Low-Dimensional Structures—Quantum Dots, Wires, Wells			Michigan League, 3rd Floor, Room D
10:20 am	Pankul Dhingra	U01	(Student) InP Quantum Dots for Dislocation-Tolerant, Visible Light Emitters on Si
10:40 am	Rasha El-Jaroudi	U02	(Student) BGaInAs/GaAs Quantum Wells for 1.3μm Lasers
11:00 am	Lauren McCabe	U03	(Student) Spatially and Spectrally Controlled InAs Quantum Dot Molecules
11:20 am	Christopher F Schuck	U04	(Student) Anomalous Stranski-Krastanov Growth Mode of Tensile-Strained (111)-Oriented GaAs Quantum Dots
11:40 am	Hongling Lu	U05	Mechanisms of GaN Quantum Dot Formation During Nitridation of Ga Droplets

PROGRAM AT-A-GLANCE

THURSDAY AM

V: Oxide Doping and Composites			Michigan League, 3rd Floor, Henderson
8:40 am	Ivan Zhuravlev	V01	Role of Lithium and Sodium in InO-Based Amorphous Oxide Semiconductors from First Principles
9:00 am	Sebastian Husein	V02	(Student) Investigating Doping Effects of Hydrogen in Indium Oxide Through Electrochemical Capacitance-Voltage Profiling and UV-Irradiation Studies
9:20 am	Kingsley Egbo	V03	(Student) Improved P-Type Conductivity and Thermal Stability of Oxygen-Rich Nickel Oxide by Li Doping
9:40 am	Fabiola Navarro-Pardo	V05	Carbon/Cobalt-Based Nanohybrids for Solar-Driven Hydrogen Generation
10:00 am			Refreshment Break
W: Materials for THz, Plasmonics and Polaritons			Michigan League, 3rd Floor, Koessler
8:20 am	Michael Barrow	W01	(Student) Mid-Wave Infrared Filtering via Subwavelength Dielectric Zero-Contrast Gratings
8:40 am	Joseph R Matson	W02	(Student) Nanoscale Mapping and Spectroscopy of Non-Radiative Hyperbolic Modes in Hexagonal Boron Nitride
9:00 am	You Zhou	W03	(Student) Multilayer Dielectric Metasurfaces for Multiwavelength Metaoptics
9:20 am	Austin Howes	W04	(Student) All-Dielectric Metasurfaces for Narrow-Band Near-Unity Thermal Emissivity
9:40 am	Igor V Bondarev	W05	Quantum Confinement, Finite-Size and Anisotropy Effects in Ultrathin Plasmonic Films
10:00 am			Refreshment Break
10:20 am	Joshua Ryan Nolen	W06	(Student) Approaching Ultra-Strong Polaritonic Coupling within CdO Bilayers
10:40 am	Owen Dominguez	W07	Near-Monochromatic Multimode Optical Antennas on Epsilon-Near-Zero Thin Films
11:00 am	Irfan Khan	W08	(Student) Modeling and Characterizing Far-Infrared Optical Modes in ZnO Nanoparticles
11:20 am	Sergey Rudin	W09	Possibilities of p-Diamond as a Plasmonic Material for Terahertz Applications
11:40 am	Pramod Ravindra	W10	(LATE NEWS, Student) Temperature Dependence of Defect Luminescence in Semiconductor $Mn_2V_2O_7$
X: III-Nitride Materials for Power Electronics			Rackham Building, 4th Floor, Amphitheatre
8:20 am	Andrew D. Koehler	X01	Development and Characterization of GaN Photoconductive Switches
8:40 am	Yuxuan Zhang	X02	(Student) MOCVD Growth of Low Background Doping GaN on GaN Substrate
9:00 am	Matthew R. Peart	X03	(Student) AlInN for Vertical Power Electronic Devices
9:20 am	Christopher M. Matthews	X04	(Student) Rectification in Vertically Conducting Power GaN-on-Si Heterojunctions
9:40 am	Matthew R. Peart	X05	(Student) Polarization Edge Termination for GaN Vertical Power Devices
10:00 am			Refreshment Break
10:20 am	Chirag Gupta	X06	(In,Ga)N LEDs with Remote P-GaN:Mg Regions—Demonstration of a Novel P-Doping Approach
10:40 am	James C. Gallagher	X07	Ion Implantation and Activation in GaN
11:00 am	Kenneth A. Jones	X08	Topological and Electrical Effects of Annealing Capped GaN Films
11:20 am	Geoffrey Foster	X09	Bevel Junction Termination in GaN Devices to Reduce Peak Electric Fields Using 3D Nanoprinting of Grayscale Features
11:40 am	Alan G. Jacobs	X10	Implanted Mg Activation in Ga- and N-Polar GaN
Y: Gallium Oxide Defects and UV Optoelectronics Materials			Rackham Building, 4th Floor, Assembly Hall
8:20 am	Jinwoo Hwang	Y01	Atomic Scale Characterization of Point Defects and Their Complexes in β -Ga ₂ O ₃ Using Scanning Transmission Electron Microscopy
8:40 am	Hantian Gao	Y02	(Student) Neutron Irradiation and Thermal Anneal Impact on Ga ₂ O ₃ Deep Level Defects
9:00 am	Nadeemullah Mahadik	Y03	Investigation of Extended Defects in 20 μ m Thick β -Ga ₂ O ₃ Epilayer Using Ultraviolet Photoluminescence Imaging and X-Ray Topography
9:20 am	Ming-Hsun Lee	Y04	(Student) A Study of the Interface of β -Ga ₂ O ₃ with Ti/Au Contacts
9:40 am	Michael Evan Liao	Y05	(Student) Towards Using Ion Implantation for Controlled Exfoliation of β -Ga ₂ O ₃
10:00 am			Refreshment Break
10:20 am	Ryan Bunk	Y06	(Student) Effect of Hydrogen Annealing on Schottky Contacts to (-201) β -Ga ₂ O ₃
10:40 am	Kentaro Kaneko	Y07	Vacuum Ultraviolet Light Emission from MgZnO-Based Thin Films and Quantum Wells
11:00 am	Luke Andrew McClure Lyle	Y08	(Student) UV Photodetectors Based on (Al,Ga,In) ₂ O ₃ -Alloy Films
11:20 am	Anisha Kalra	Y09	(Student) Hybrid β -Ga ₂ O ₃ /AlGaIn Schottky Barrier Diodes for Broadband Deep-Ultraviolet Optoelectronics
11:40 am	Jianan Song	Y10	(LATE NEWS, Student) Self-Aligned Sidewall Ohmic Contact to AlGaIn/GaN Multichannel Structure

PROGRAM AT-A-GLANCE

THURSDAY PM

Z: Organic/Hybrid Materials and Devices			Michigan League, 2nd Floor, Kalamazoo
1:30 pm	Daekyoung Yoo	Z01	(Student) Highly Reliable Organo-Compatible Superhydrophobic Self-Cleaning Protection for Organic Field Effect Transistors
1:50 pm	Youngrok Kim	Z02	(Student) Improving Charge Injection Properties of Organic Field Effect Transistor by Molecular Implantation Doping
2:10 pm	Debdatta Panigrahi	Z03	Modulating Chain Conformations of Polyvinyl Alcohol Through Low Cost and Nontoxic Glyoxal Crosslinker—Application in High-Performance Organic Transistors
2:30 pm	Hongmo Li	Z04	(Student) Towards Metallic-Type Transport in Polymers—Establishing Structure/Property Interrelationships
2:50 pm	William R. Hollingsworth	Z05	Thermodynamics of Complexation in Donor-Acceptor Conjugated Polyelectrolyte Networks Showing Ultrafast Electronic Energy Transfer
3:10 pm			Refreshment Break
3:30 pm	Jaeyoung Yoon	Z06	(LATE NEWS, Student) Stretching-Insensitive Pressure Sensor Using Strain Engineering with Rigid Film Spacer
3:50 pm	Michael Roders	Z07	(Student) Charge-Transport Networks via Small-Molecule Self-Assembly in Conjugated Polymer Bulk Heterojunctions
4:10 pm	Akihiko Kikuchi	Z08	Growth and Fluorescence Sensitization of Wide-Bandgap Organic Single Crystals Co-Doped with Emissive and Assistant Dopants
4:30 pm	Spencer Ferguson	Z09	(Student) Effect of β -PFO Concentration on Device Performance in LEDs Fabricated by RIR-MAPLE
4:50 pm	Seonghoon Lee	Z10	Environmentally Benign Highly Luminescent Colloidal Quantum Dots, $\text{In}_{1-x}\text{Ga}_x\text{P@ZnS}$ and Their Application in QLEDs with Inverted Structure
AA: Electron Microscopy			Michigan League, 2nd Floor, Michigan
1:30 pm	Renliang Yuan	AA01	(Student) Scanning Electron Nanodiffraction Based High Resolution Strain Mapping on Semiconductor Devices—From 2D to 3D
1:50 pm	Tim B. Eldred	AA02	Imaging of Dopant Complexes and Strain Relaxation in Wide Bandgap Semiconductors with Scanning Transmission Electron Microscopy
2:10 pm	Jared Johnson	AA03	Direct Determination of Atomic Scale Structure and Properties of Point Defect Complexes in $\beta\text{-Ga}_2\text{O}_3$
2:30 pm	Gabriel Antonio Calderon Ortiz	AA04	(Student) Four-Dimensional Scanning Transmission Electron Microscopy Characterization of Molecular Ordering of Organic Semiconducting Polymers
2:50 pm	Brent Engler	AA05	(Student) Accelerated Electromigration Study of Cobalt Thin Films by <i>In Situ</i> TEM
3:10 pm			Refreshment Break
BB: Nanofabrication			Michigan League, 2nd Floor, Michigan
3:30 pm	Thomas S. Wilhelm	BB01	(Student) Simple and Cost-Effective III-V Compound Semiconductor Nanofabrication via Metal-Assisted Chemical Etching
3:50 pm	Aliaksandr Sharstniou	BB02	(Student) Silicon Waveguide Fabrication by Metal-Assisted Chemical Imprinting
4:10 pm	Alex Molina	BB03	(Student) Novel Vapor-Phase Passivation of (100) Germanium Surfaces with HBr
4:30 pm	Serdar Tort	BB04	A New Fabrication Method for Self-Inflating Floating Nanofiber Membranes
4:50 pm	Sunghyun Kim	BB05	(Student) Graphene Self-Folding by AFM Scanning
CC: 2D Material Heterostructures and Optical Properties			Michigan League, 2nd Floor, Vandenberg
1:30 pm	Lincoln Lauhon	CC01	Functional van der Waals Heterojunctions by Low-Temperature Epitaxial Growth of SnS on MoS_2
1:50 pm	Eric Martin	CC02	Encapsulation Narrows and Preserves the Intrinsic Exciton Linewidth in MoSe_2 Semiconducting Monolayer
2:10 pm	Hsun Jen Chuang	CC03	Indirect Transition and Opposite Circular Polarization of Interlayer Exciton in a hBN Encapsulated $\text{MoSe}_2/\text{WSe}_2$ van der Waals Heterostructure
2:30 pm	Joon Young Park	CC04	(Student) Topological Insulator/Hexagonal Boron Nitride/Topological Insulator Epitaxial van der Waals Heterostructures for Tunneling Spectroscopy Between Topological Surface States
2:50 pm	Long Zhang	CC05	Highly Valley-Polarized Singlet and Triplet Interlayer Excitons in van der Waals Heterostructure
3:10 pm			Refreshment Break
3:30 pm	Berend T. Jonker	CC06	Quantum Calligraphy—Writing Single Photon Emitters in a Two-Dimensional Materials Platform
3:50 pm	Markus Borsch	CC07	(Student) Lightwave Driven Valleytronic Qubit Flip
4:10 pm	Qiannan Wen	CC08	(Student) Hyperspectral Absorbers with Semiconductor Monolayer Crystals
4:30 pm	Brenton A. Noesges	CC09	(Student) Impact of H_2O Intercalation on Methyl Germanane Band Gap Luminescence
4:50 pm	Daniel Hashemi	CC10	Band Alignment in Black-Violet Phosphorous Heterostructures
DD: Thermoelectrics and Thermal Transport			Michigan League, 3rd Floor, Room D
1:30 pm	Alexandra Zevalink	DD01	Interplay Between Chemical Bonding and Thermal Transport in Layered Zintl Phases
1:50 pm	Mikihiko Nishitani	DD02	Thermoelectric Properties at Near Room Temperature on Mg_2Sn Thin Film Co-Doped with Ag and Cobalt
2:10 pm	Zachary Berquist	DD03	Plasmonic Multicomponent Aerogels for Solar Thermal Energy Conversion
2:30 pm	Vinay Singh Chauhan	DD04	(Student) Thermal Transport in Sapphire Irradiated by Swift Heavy Ions
2:50 pm	Xianghai Meng	DD05	(Student) Pressure Tuning of Thermal Properties Measured by Transient Thermorefectance in Diamond Anvil Cell
3:10 pm			Refreshment Break
EE: Characterization of Epitaxial Materials			Michigan League, 3rd Floor, Room D
3:30 pm	Hongyu Peng	EE01	(Student) Ray Tracing Simulation of Images of Dislocations and Precipitates on X-Ray Topographs of GaAs Epitaxial Wafers
3:50 pm	Kurt Eyink	EE02	Punctuated Growth of ErAs Nanoparticles on GaAs(001) Surfaces
4:10 pm	Shengyuan Bai	EE03	(Student) Mesostructural Visualization of Boundary Effects on Continuous Step-Flow Growth of CVD Diamond
4:30 pm	Zongjian Fan	EE04	(Student) Efficient Room Temperature Photoluminescence (PL) from MBE ZnSe Sandwiched Between Low-Temperature Migration Enhanced Epitaxy (LT-MEE) Grown GaAs
4:50 pm	Alec Mason Skipper	EE05	(Student) Epitaxial Integration of Arbitrarily Patterned Metal Nanostructures for Photonic Applications

FF: Oxide Growth and Devices			Michigan League, 3rd Floor, Henderson
1:30 pm	Mohit Tendulkar	FF01	(Student) ZnO TFTs on Curved Substrates Using Optical Lithography
1:50 pm	Quark Yungung Chen	FF02	Seeking Conformal Epitaxy of Heterostructures—Growth of ZnO/MoO _x Superlattices by Atomic Layer Deposition and Characterization of Their Physical Properties
2:10 pm	Christopher Allemang	FF03	(Student) Electrical Performance of Annealed Zinc-Tin-Oxide Thin-Film Transistors Made by H ₂ O-Based Thermal Atomic Layer Deposition
2:30 pm	Andre Zeumault	FF04	Preparation and Characterization of Zinc Oxide Glasses Through Kinetic-Control
2:50 pm	Raphael Müller	FF05	(Student) New CVD Based Growth Method for Highly Crystalline Epitaxial ZnO Layers on Various Substrates
3:10 pm			Refreshment Break
3:30 pm	Andrew Gayle	FF06	(Student) Atomic Layer Deposition of Bismuth Vanadate Photoanodes
3:50 pm	Junao Cheng	FF07	Enhancement Mode Perovskite Oxide BaSnO ₃ MOSFETs with Current On/Off Ratio of 10 ⁸
4:10 pm	Hareesh Chandrasekar	FF08	Velocity Saturation in BaSnO ₃ Thin Films
4:30 pm	Akash Kumar	FF09	(Student) Phase Evolution During Solution Processing of BaSnO ₃ Nanoparticles—Towards Low Temperature Synthesis of Transparent Conducting Oxides
4:50 pm	Debarghya Sarkar	FF10	(LATE NEWS, Student) Direct Growth of Crystalline III-Vs on Amorphous Dielectrics Using a Combination of Epitaxial and Non-Epitaxial Methods
GG: SiC and Related Materials, Characterization and Devices			Michigan League, 3rd Floor, Koessler
1:30 pm	Matthew Highland	GG01	Towards Precise Control of Hetero-Polytypic Structures During Synthesis of SiC for Scalable Quantum Information Platforms
1:50 pm	Peter L. Bonanno	GG02	Doping Dependence of Stacking Fault Expansion in 4H-SiC
2:10 pm	MVS Chandrashekar	GG03	Electrical Characterization of Single Crystal Boron Carbide Metal-Semiconductor Diodes
2:30 pm	Anthony Aiello	GG04	(LATE NEWS, Student) Extreme Confinement Characteristics of Deep-UV Emission from Monolayer GaN/Al(Ga)N Nanowire and Planar Heterostructures
2:50 pm	Jimmy Encomendero	GG05	(LATE NEWS, Student) Negative Differential Resistance and Sequential Resonant Tunneling Transport in GaN/AlGaN Heterostructures
3:10 pm			Refreshment Break
3:30 pm	Patrick M. Lenahan	GG06	Spin Dependent Trap Assisted Tunneling Measurements on Hot Carrier Injection-Induced Leakage Currents in SiO ₂ on 4H-SiC
3:50 pm	Tianshi Liu	GG07	(Student) Gate Oxide Reliability Assessments of Commercial 4H-SiC MOSFETs
4:10 pm	Susanna Yu	GG08	(Student) Time-Dependent Bias-Stress-Induced Threshold Voltage Instability of 4H-SiC MOSFETs
4:30 pm	Tom Oder	GG09	Effects of Deposition Temperature of Ti and Mo Schottky Contacts on Ti/SiC and Mo/SiC Schottky Diodes
4:50 pm	Kishwar Mashooq	GG10	(LATE NEWS, Student) High Quality N-Polar GaN Epilayer Grown Directly on Si Through Controlled Nanowire Coalescence
HH: III-Nitride Growth			Rackham Building, 4th Floor, Amphitheatre
1:30 pm	Ian Campbell	HH01	Preparation of Gallium Nitride via High Pressure Confined Chemical Vapor Deposition
1:50 pm	Ke Wang	HH02	(Student) Role of Ga Supersaturation on Facet Formation in GaN Epitaxial Lateral Overgrowth
2:10 pm	Fevzi Erdem Arkun	HH03	Growth and Characterization of Graded AlGaIn/GaN HEMT Structures on SiC for High Linearity Transistor Technologies
2:30 pm	Michael Evan Liao	HH04	(Student) Structural Differences Between Al-Rich and Ga-Rich AlGaIn Grown on (0001) Sapphire Substrates
2:50 pm	Ping Wang	HH05	Molecular Beam Epitaxy of High-Quality GaN and AlN on Monolayer Graphene
3:10 pm			Refreshment Break
II: Visible Emitters			Rackham Building, 4th Floor, Amphitheatre
3:30 pm	Xianhe Liu	II01	High Efficiency InGaIn Nanocrystal Green and Red Micro LEDs
3:50 pm	Mirsaeid Sarollahi	II02	(Student) Luminescent Properties of Zigzag—Graded InGaIn Quantum Wells
4:10 pm	Xiongliang Wei	II03	(Student) Room Temperature Luminescence of Passivated InGaIn Quantum Dots Formed by Quantum-Sized-Controlled Photoelectrochemical Etching
4:30 pm	Qing Li	II04	(Student) Flexible Inverted InGaIn Micro-LEDs Addressed by a-Si:H TFTs Pixel Circuits
4:50 pm	Shubhra S Pasayat	II05	(Student) Digital Growth of Smooth, High Quality Thick (200nm) N-Polar InGaIn Films by MOCVD
JJ: Doping, Point and Extended Defects in Wide Bandgap			Rackham Building, 4th Floor, Assembly Hall
1:30 pm	Ayush Pandey	JJ01	(Student) Enhanced Doping Efficiency of Ultrawide Bandgap Semiconductors by Metal-Semiconductor Junction Assisted Epitaxy
1:50 pm	Ji Hyun Kim	JJ02	(Student) Dependence of Electronic Bands and Defect Transition Energies with Varying Al Composition and Temperature in AlGaIn
2:10 pm	Sean Andrew Tozier	JJ03	(Student) Photoluminescence Characterization of High Temperature Microwave Annealed Homoepitaxially Grown Mg-Implanted GaN
2:30 pm	Jiaheng He	JJ04	(Student) Identifying Defects and Their Electronic Signatures in Regrown GaN Heterostructures
2:50 pm	Emma Rocco	JJ05	(Student) Impact of Hillock Density and Mg-Clustering on Properties of N-Polar GaIn:Mg
3:10 pm			Refreshment Break
3:30 pm	Pegah Bagheri	JJ06	Thermal Conductivity of HVPE Grown Single Crystal GaIn—Impact of Doping
3:50 pm	Eamonn T. Hughes	JJ07	(Student) Reducing Unwanted Motion of Dislocations Towards Reliable III-V Devices on Silicon
4:10 pm	Matthew Walton Day	JJ08	(Student) The Dependence of Optical Properties on Orientation and Strain in Silicon Vacancy Centers in Diamond
4:30 pm	Istvan Gulyas	JJ09	(Student) Ab Initio Calculations of BAs-GaAs Alloys

PROGRAM AT-A-GLANCE

FRIDAY AM

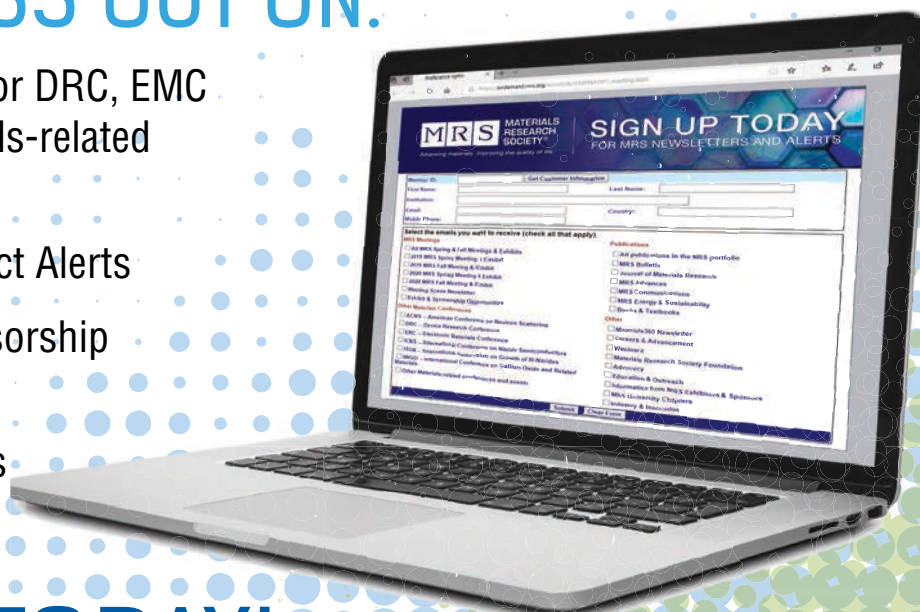
KK: Nanowires and Nanotubes—Growth, Processing, Characterization and Devices			Michigan League, 2nd Floor, Michigan
8:40 am	Matt Brubaker	KK01	Crystallographic Polarity Measurements in Two-Terminal GaN Nanowire Devices by Lateral Piezoresponse Force Microscopy
9:00 am	Sandra Benter	KK02	(Student) Atomic Scale Incorporation and Characterization of Bi in III-V Semiconductor Nanowire Surfaces
9:20 am	Anthony Aiello	KK03	(Student) High-Gain InGaN/GaN Disk-in-Nanowire Array Visible Photodetectors
9:40 am	Rachel S. Goldman	KK05	Nano-Wires to Film Transitions During Pulsed-Laser Deposition—Role of Ion Distribution
10:00 am			Refreshment Break
LL: 2D Material Preparation and Applications			Michigan League, 2nd Floor, Vandenberg
8:20 am	Gong Gu	LL01	Can Gold-Mediated Exfoliation Preserve the Integrity of Two-Dimensional Palladium Selenide?
8:40 am	Matěj Velický	LL02	Mechanism of Exfoliation of Centimeter-Sized MoS ₂ on Gold
9:00 am	Baowen Zhou	LL03	A Combined Theoretical and Experimental Study of Molybdenum Sulfides for High Efficiency Photoelectrochemical Water Splitting
9:20 am	Soaram Kim	LL04	MoS ₂ /Graphene Heterostructure for Gas Sensing
9:40 am	Azimkhan Kozhakhmetov	LL05	(LATE NEWS, Student) Scalable Synthesis of BEOL compatible 2D WSe ₂
10:00 am			Refreshment Break
MM: 2D Materials Engineering			Michigan League, 2nd Floor, Vandenberg
10:20 am	Nocona Sanders	MM01	(Student) Effect of Stacking Orientation on the Electronic and Optical Properties of 2D Nitride Heterostructures
10:40 am	Eunice Paik	MM02	Interlayer Exciton Laser with Extended Spatial Coherence in an Atomically-Thin Heterostructure
11:00 am	Frederick Aryeetey	MM03	Bandgap Tuning of 2D MoS ₂ by Defect Engineering and Doping
11:20 am	Hanna Gray Ruth	MM04	(Student) Measurement of Coherent Coupling and Interlayer Exciton Binding Energy in a MoSe ₂ /WSe ₂ Heterostructure
11:40 am	Connor Bailey	MM05	(LATE NEWS, Student) Low Off-Current and High On/Off Ratios in Monolayer MoSe ₂ and WSe ₂ Transistors
NN: Dielectrics and Multifunctional Oxides			Michigan League, 3rd Floor, Henderson
8:20 am	Christopher Adam Mizzi	NN01	(Student) Flexoelectric Bending in Lanthanide Scandates—How Charging Induces Large, Reversible Mechanical Deformations
8:40 am	Brenton A. Noesges	NN02	(Student) Near-Nanoscale Defect Tracking in Ultra-Thin Complex Oxide Films and Conducting Interfaces
9:00 am	Hantian Gao	NN03	(Student) Direct Observation of Vo Migration in Degraded SrTiO ₃ by Depth Resolved Cathodoluminescence Spectroscopy
9:20 am	Hua Zhou	NN04	Imaging and Crafting Dynamic Oxygen Vacancy Behaviour in a Memeristive Device
9:40 am	Marilyn Freeman	NN05	High Energy Density Electrostatic Capacitors with Polymer-Like Hydrogenated Carbon (PLCH) Dielectric Films
10:00 am			Refreshment Break
10:20 am	Zheng Hui Lim	NN06	(Student) Tunable Charge Transfer and Built-In Electric Fields Across a Semiconductor-Crystalline Oxide Heterojunction
10:40 am	Joseph Casamento	NN07	(Student) Molecular Beam Epitaxy Growth of LuFeO ₃ on GaN
11:00 am	Elizabeth Paisley	NN08	Epitaxial Gate Oxides for Enhancement Mode GaN and AlGaN Power Electronics
11:20 am	Peter Dickens	NN09	Structural and Electrical Properties of Epitaxial MgO on 4H-SiC
11:40 am	Kenneth Joseph Myers	NN10	(LATE NEWS, Student) An Electrically Detected Magnetic Resonance Investigation of Negative Bias Temperature Instability in Tri-Gate Metal Oxide Semiconductor Field Effect Transistors
OO: Semiconductors, Metamaterials and Plasmonics			Michigan League, 3rd Floor, Koessler
8:20 am	Yuejing Wang	0001	(Student) Short-Wave Infrared Plasma Wavelength in III-V Semiconductors Achieved via Embedding Lanthanide Monopnictide Nanoparticles into GaAs
8:40 am	Andrew Frederick Briggs	0002	(Student) Tunable InGaSb Emitters Coupled with InAs:Si Through Molecular Beam Epitaxy
9:00 am	Kun Li	0003	(Student) Interrogating Hyperbolic Metamaterials with Integrated Intersubband Transitions Using Thermal Emission Spectroscopy
9:20 am	Stephanie Law	0004	Thermal Emission of Si:InAs/AlSb Hyperbolic Metamaterial
9:40 am	Nadeemullah Mahadik	0005	Investigation of Microstructure and Composition of SiGeSn Metamorphic Buffer for GeSn Based Optoelectronics
10:00 am			Refreshment Break
PP: III-Nitride UV Devices and Materials			Rackham Building, 4th Floor, Amphitheatre
8:20 am	Marzieh Bakhtiary-Noodeh	PP01	(Student) Growth and Characterization of AlGaN p-i-n-i-n Separate Absorption and Multiplication Ultraviolet Avalanche Photodiodes
8:40 am	Anisha Kalra	PP02	(Student) Record High Zero-Bias External Quantum Efficiency of 88% for Al _{0.40} Ga _{0.60} N-Based p-i-n UV Detectors
9:00 am	Evan Clinton	PP03	(Student) Al _x Ga _{1-x} N (0≤x≤0.6) Homo Junction Tunnel Diodes Exhibiting Low Voltage Negative Differential Resistance—Progress towards Tunnel Contacts Compatible with Ultraviolet Optoelectronics
9:20 am	David Arto Laleyan	PP04	(Student) High-Quality AlN and Al-Rich AlGaN Epilayers Grown on Sapphire by High Temperature Molecular Beam Epitaxy
9:40 am	Yan Guan	PP05	Dislocation Recovery in Al-Rich AlGaN Films by High Temperature Annealing
10:00 am			Refreshment Break
QQ: III-Nitride UV Emitters			Rackham Building, 4th Floor, Amphitheatre

10:20 am	Hoon Jeong	QQ01	(Student) Growth and Characterization of III-Nitride UV Vertical Resonant Cavity Light Emitting Diodes with Hybrid Air-Gap/AlGaIn and Dielectric Distributed Bragg Reflectors
10:40 am	Richard Floyd	QQ02	(Student) Study of Optical Waveguiding Using DUV AlGaIn Integrated Optical Devices
11:00 am	Ayush Pandey	QQ03	(Student) High-Efficiency Tunnel-Injected Deep Ultraviolet LEDs at 265 nm
11:20 am	Logan Douglas Williams	QQ04	(Student) First Principles Calculations of Alloying Boron into Group III-Nitrides for Higher Efficiency Visible and UV LEDs
11:40 am	Walter Jin Shin	QQ05	(Student) Enhancement of Light Extraction Efficiency of Tunnel-Injected Deep Ultraviolet LEDs
RR: Gallium Oxide Growth			Rackham Building, 4th Floor, Assembly Hall
8:20 am	Kevin Leedy	RR01	Substrate Influence on Homoepitaxial Si-Doped β -Ga ₂ O ₃ by Pulsed Laser Deposition
8:40 am	Max Kneiß	RR02	(Student) Epitaxial κ -(In,Ga _{1-x}) ₂ O ₃ and κ -(Al,Ga _{1-x}) ₂ O ₃ Thin Films and Heterostructures Deposited by Tin-Assisted VCCS-PLD from Radially-Segmented Targets
9:00 am	Zixuan Feng	RR03	(Student) LPCVD Growth of Si Doped β -Ga ₂ O ₃ Thin Films with Superior Room Temperature Mobilities
9:20 am	Bahadır Kucukgok	RR04	Optical and Structural Properties of Epitaxial Growth of Si-Doped β -Ga ₂ O ₃ Thin Films on β -Ga ₂ O ₃ (010) by Halide Vapor Phase Epitaxy
9:40 am	Daesik Kim	RR05	(LATE NEWS, Student) Microcellulose/Single Walled Carbon Nanotube Based Flexible Pressure Sensor
10:00 am			Refreshment Break
SS: Processing of III-Nitrides			Rackham Building, 4th Floor, Assembly Hall
10:20 am	Evan Clinton	SS01	(Student) Plasma Control of Defects in InN—Correlation to Residual Electron Concentration and Moss-Burstein Effect
10:40 am	Daniel M. Dryden	SS02	(Student) Alternative, Benign Chemistries for the Photogalvanic Etching of n-GaN
11:00 am	Vincent E. Meyers	SS03	(Student) Removal of Electrically Damaged Surface Layer Induced by Dry Etching of p-GaN by Photoelectrochemical Etching
11:20 am	Matthew R. Peart	SS04	(Student) Wet Thermal Oxidation of AlInN
11:40 am	Mohsen Nami	SS05	Investigation of Contaminations and Damages on C-Plane GaN Induced by Dry Etching

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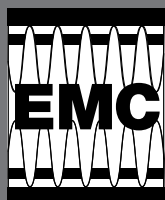
Literature will also be available from American Elements, FUJIFILM Dimatix, Inc.
and PSC Polysilane Chemistry GmbH.



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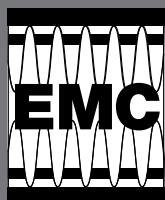
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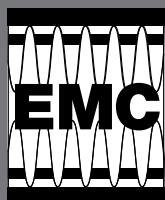
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