NMDC 2018 Program

Meeting Rooms

NMDC 2018 technical program sessions are presented in four tracks.
Plenary sessions are in the Queen Marie room.

Meeting Rooms (Mezzanine Level unless noted)	**Arcadian Garden (LL2)** Breakfast, Lunch, Reception	**Mezzanine** Breaks, Interactive Presentations	**Queen Marie** Track 1	**Fireside** Track 2, Workshops	**Gevurz** Track 3	**Colonel Lindbergh** Track 4

Session Formats

There are four session formats in the conference:

4 Presentations: (invited speaker, 3 papers)

- Invited Speaker (30 min) (denoted by **)
- Contributed papers (3×20 min)

4 Presentations: (dual invited speakers, 2 papers) (T2-M1, T4-M1, T3-M2, T3-T1, T1-W3

- Invited Speaker (30 min) (denoted by **)
- Contributed papers (2×20 min)
- Invited Speaker (30 min) (denoted by **)

5 Presentations: (dual invited speakers, 3 papers) (T1-M3, T2-M3, T3-M3, T2-W3)

- Invited Speaker (30 min) (denoted by **)
- Contributed papers (3×20 min)
- Invited Speaker (30 min) (denoted by **)

NMDC 2018

Conference Program

Program Schedules

Sunday, October 14

Time	Arcadian Garden	Fireside
05:30 pm-07:00 pm	SR: *Welcome Reception*	
07:00 pm-08:30 pm		W1: *Career Panel* Navigating career pathways in Academia and Industry

Monday, October 15

Time	Track 1 Queen Marie	Track 2 Fireside	Track 3 Gevurz	Track 4 Colonel Lindbergh
08:00 am-08:20 am	MO: *Opening / Introductions*			
08:20 am-09:10 am	PL1: *Plenary Talk*			
09:10 am-10:00 am	PL2: *Plenary Talk*			
10:00 am-10:30 am	MB1: *Break* – *Mezzanine Level*			
10:30 am-12:10 pm	T1-M1: *Materials and Devices I*	T2-M1: *Properties / Fabrication I*	T3-M1: *Special Applications I*	T4-M1: *Nanotech Education*
12:10 pm-12:30 pm	MB2: *Break* – Mezzanine Level			
12:30 pm-01:30 pm	ML: *Lunch* - Arcadian Garden (LL2)			
01:30 pm-03:00 pm	T1-M2: *Materials and Devices II*	T2-M2: *Properties / Fabrication II*	T3-M2: *Special Applications II*	T4-M2: *Special Session I*
03:00 pm-03:30 pm	MB3: *Break* – Mezzanine Level			
03:30 pm-05:30 pm	T1-M3: *Materials and Devices III*	T2-M3: *Properties / Fabrication III*	T3-M3: *Modeling & Simulation I*	T4-M3: *Special Session II*
05:30 pm-07:00 pm	MR: *Reception* - Arcadian Garden (LL2)			

07:30 pm-09:30 pm	P1-M4: *Panel Session - Nanotechnology Education Worldwide* - Fireside

NMDC 2018

Conference Program

Tuesday, October 16

Time	Track 1 Queen Marie	Track 2 Fireside	Track 3 Gevurz	Track 4 Colonel Lindbergh
08:00 am- 08:20 am	TO: *Opening / Introductions*			
08:20 am- 09:10 am	PL3: *Plenary Talk*			
09:10 am- 10:00 am	PL4: *Plenary Talk*			
10:00 am- 05:00 pm	PS: *Interactive Presentations* 10:00am-5:00pm Mezzanine Level			
10:00 am- 10:30 am	TB1: *Break* - Mezzanine Level			
10:30 am- 12:10 pm	T1-T1: *Materials and Devices IV*	T2-T1: *Properties / Fabrication IV*	T3-T1: *Nanotech / Nanostructures I*	T4-T1: *Special Session III*
12:10 pm- 12:30pm	TB2: *Break* - Mezzanine Level			
12:30 pm- 01:30 pm	TL: *Lunch* - Arcadian Garden (LL2)			
01:30 pm- 03:00 pm	T1-T2: *Materials and Devices V*	T2-T2: *Nanotech / Nanostructures II*	T3-T2: *Modeling & Simulation II*	T4-T2: *Special Session IV*
03:00 pm- 03:30 pm	TB3: *Break* - Mezzanine Level			
03:30 pm- 05:00 pm	T1-T3: *Materials and Devices VI*	T2-T3: *Nanotech / Nanostructures III*	T3-T3: *Modeling & Simulation III*	T4-T3: *Special Session V*
05:30 pm- 07:00 pm	TR: *Reception* - Arcadian Garden (LL2)			

07:00 pm- 08:30 pm	W2: *Professional Workshop* - Fireside The “art” of Effective Negotiation: “Just ask for it”

NMDC 2018

Conference Program

Wednesday, October 17

Time	Track 1 Queen Marie	Track 2 Fireside	Track 3 Gevurz	Track 4 Colonel Lindbergh
08:00 am- 08:20 am	WO: *Opening / Introductions*			
08:20 am- 09:10 am	PL5: *Plenary Talk*			
09:10 am- 10:00 am	PL6: *Plenary Talk*			
10:00 am- 10:30 am	WB1: *Break* -Mezzanine Level			
10:30 am- 12:10 pm	T1-W1: *Materials and Devices VII*	T2-W1: *Properties / Fabrication V*	T3-W1: *Modeling & Simulation IV*	T4-W1: *Special Session VI*
12:10 pm- 12:30 pm	WB2: *Break* - Mezzanine Level			
12:30 pm- 01:30 pm	WL: *Lunch* - Arcadian Garden (LL2)			
01:30 pm- 03:00 pm	T1-W2: *Materials and Devices VIII*	T2-W2: *Emerging I*	T3-W2: *Modeling & Simulation V*	T4-W2: *Special Session VII*
03:00 pm- 03:30 pm	WB3: *Break* - Mezzanine Level			
03:30 pm- 05:00 pm	T1-W3: *Materials and Devices IX*	T2-W3: *Properties / Fabrication VI*	T3-W3: *Emerging II*	T4-W3: *Modeling & Simulation V*
05:30 pm- 07:00 pm	WR: *Reception* Arcadian Garden (LL2)			
05:30 pm- 07:00 pm	*PSU Tours* (PSU)			

Awards Banquet @ Portland State University

07:30 pm- 10:00 pm	PSU @ Smith Memorial Student Union 1825 SW Broadway Portland, OR 97201

NMDC 2018 **Conference Program**

PROGRAM SESSIONS

Sunday, October 14

Sunday, October 14 5:30 - 7:00

SR: Welcome Reception

Room: Arcadian Garden

Sunday, October 14 7:00 - 8:30

W1: Career Panel

Room: Fireside

Navigating career pathways in Academia and Industry

Organizer: Marilyn Rampersad Mackiewicz, PSU
Moderator: Jim Tung, Lacamas Laboratories

Panelists:

- Manoranjan Acharya (Intel)
- Erik Sanchez (Portland State University, Professor of Physics)
- Johanna Schwartz (Klarquist Sparkman, LLP)
- Jim Tung (Lacamas Laboratories)

NMDC 2018 **Conference Program**

Monday, October 15

Monday, October 15 8:00 - 8:20

MO: Opening / Introductions

Room: Queen Marie

Welcome Remarks, Jim Morris, NMDC 2018 Chair
Program Overview, Malgorzata Chrzanowska-Jeske, Program Chair

Monday, October 15 8:20 - 9:10

PL1: Plenary Talk

Room: Queen Marie

Chairs: Stephen Goodnick (Arizona State University, USA), Yonhua Tzeng (National Cheng Kung University, Taiwan)

Nanoscale III-V Electronics: InGaAs FinFETs and Vertical Nanowire MOSFETs
Jesus del Alamo , Massachusetts Institute of Technology

In the last few years, as Si electronics faces mounting difficulties to maintain its historical scaling path, III-V compound semiconductors, in particular InGaAs, have received a great deal of attention. Sub-10 nm CMOS applications require a 3D transistor geometry. In this regard, the vertical nanowire (VNW) MOSFET represents the ultimate scalable transistor. The gate-all-around nanowire configuration allows for the greatest degree of charge control in the channel. The vertical transport direction uncouples footprint scaling (on the plane of the wafer) from gate length scaling (normal to the wafer) leading to the best possible combination of transistor density and short-channel effects.

At MIT, we are investigating vertical nanowire InGaAs MOSFETs and FinFETs fabricated by a top-down approach. Towards this goal, we have developed Reactive Ion Etching technology for In-containing III-V compounds that yields high aspect ratio structures with vertical and smooth sidewalls. We have also perfected digital etch to controllably thin down fins and vertical nanowires to below 10 nm width/diameter. Using these technologies, we have demonstrated InGaAs VNW MOSFETs and FinFETs with sub-10 nm critical dimensions. In both families of transistors, we have obtained promising electrical characteristics. This talk will review these recent developments, put them in context of the overall progress of Si CMOS and outline the prospects and challenges of III-V transistors for future nanoscale logic.

Conference Program

Monday, October 15 9:10 - 10:00

PL2: Plenary Talk

Room: Queen Marie

Chairs: Stephen Goodnick (Arizona State University, USA), Yonhua Tzeng (National Cheng Kung University, Taiwan)

Beyond CMOS Materials and Devices for Energy Efficient Computing
Ian A. Young, Intel Corporation

An analysis of research in quantum materials for beyond CMOS devices (nanoelectronic and/or nanomagnetic) is presented. Some device proposals and demonstrations are reviewed and trends in this field are identified. Considerations guiding development of competitive computing technologies are described. Results of beyond-CMOS circuit benchmarking are reviewed.

Monday, October 15 10:00 - 10:30

MB1: Break

Room: Mezzanine

Monday, October 15 10:30 - 12:10

T1-M1: Materials and Devices I

Room: Queen Marie

Magnetic and Ferroelectric properties and effects
Chair: Jianying He (Norwegian University of Science and Technology, Norway)

**Advanced Nanoscale Magnetic Tunnel Junctions for Low Power Computing*
Zhaohao Wang, Shouzhong Peng, Mengxing Wang, Xueying Zhang, Wenlong Cai, Jiaqi Zhou and Kaihua Cao (Beihang University, P.R. China); Weisheng Zhao (Beihang Universiy, P.R. China)

Effect of Dy3+ Substitution on Structural Magnetic and Dielectric Properties of BiFeO3-PbTiO3 Multiferroics
Naveen Kumar (Punjab Engineering College, India); Sanjeev Kumar (Punjab Engineering College, Chandigarh, India); Bastola Narayan (Indian Institute of Science Banaglore, India); Shonak Bansal (Punjab Engineering College Chandigarh, India); Arun Kumar Singh (Punjab Engineering College, Chandigarh, India)

Effect of Zn Doping on Structural and Ferroelectric Properties of GaFeO3 for Futuristic Spintronic Applications
Nandni Sharma (Punjab Engineering College, India); Sanjeev Kumar (Punjab Engineering College, Chandigarh, India); Ashish Kumar Mall (IIT Kanpur, India); Prince

Jain (Punjab Engineering College, India); Arun Kumar Singh (Punjab Engineering College, Chandigarh, India); Rajeev Gupta (IIT Kanpur, India); Ashish Garg (Indian Institite of Technology Kanpur, India)

Magnetic Characterization of Cobalt Selenide and Nickel Selenide Thin Films

Michael Adventure Hopkins, Neal Kuperman, Raj Solanki and James Barnes (Portland State University, USA)

T2-M1: Properties / Fabrication I

Room: Fireside

Sensing for Biomedical Applications

Chair: Sorin Cotofana (Delft University of Technology, The Netherlands)

***Graphene Foam Based Biochemical Sensors and Energy Harvesting Devices*

Liang Dong (Iowa State University, USA)

Synthesis and Characterization of VO2 on III Nitride Thin Films Using Low Pressure Chemical Vapor Deposition for Sensing Applications

Rahul Singh, Digangana Khan, Durga Gajula, Ferhat Bayram and Goutam Koley (Clemson University, USA)

Silicon Nanowire-Based Biosensors for Low Concentration Detection of Salmonella and Escherichia Coli in Complex Mixtures

Thomas Daunais (Upland Nanotech, LLC, USA); Paul Bergstrom (Michigan Technological University, USA)

***Silicon Nanotechnology for Biomolecule Sensing*

Jan Linnros (Royal Instutute of Technology - KTH, Sweden); Apurba Dev, Ilya Sychugov, Miao Zhang, Amelie Eriksson Karlström and Sara Cavallaro (Royal Institute of Technology - KTH, Sweden)

T3-M1: Special Applications I

Room: Gevurz

From bulk CMOS throught FinFETs to MOS/SET

Chair: Malgorzata Chrzanowska-Jeske (Portland State University, USA)

***Some Considerations Regarding the Modeling and Characterization of Bulk CMOS Devices for High-Frequency Applications*

Roberto S Murphy and Reydezel Torres-Torres (INAOE, Mexico)

SPICE-Compatible Modeling of Silicene Field Effect Transistor and Analog Circuit Design

Zhou Zhao (Louisiana State University, Baton Rouge, USA); Ashok Srivastava and Lu Peng (Louisiana State University, USA)

A Quasi-Analytic Behavioral Model for the Single-electron Transistor for Hybrid MOS/SET Circuit Simulation
Francisco Castro and Ioannis Savidis (Drexel University, USA); Arturo Sarmiento (National Institute for Astrophysics Optics and Electronics, Mexico)

T4-M1: Nanotech Education

Room: Colonel Lindbergh

NanoTechnology Education from undergarduate to research university
Chairs: Milo Koretsky (Oregon State University, USA), Peter Moeck (Portland State University, Portland/Oregon, USA), Edward G Perkins (Self-employed, USA)

***Nanotech/Science Education at a Research University*
Peter Moeck (Portland State University, Portland/Oregon, USA)
Preparing 3D Print Files for Nano-Tech Education from Entries of Large Open-Access Crystallographic Databases at Dedicated Websites
Trevor Snyder (3D Systems Corporation, USA); Peter Moeck (Portland State University, Portland/Oregon, USA)
Graphene as a Reducing Agent for Electroless Plating of Metal
Udit Narula and Cher Ming Tan (Chang Gung University & Center for Reliability Sciences and Technologies, Taiwan); Eng Soon Tok (National University of Singapore, Singapore)
***Reshaping a Nanotechnology Undergraduate Program*
Milo Koretsky (Oregon State University, USA)

Monday, October 15 12:10 - 12:30

MB2: Break

Room: Mezzanine

Monday, October 15 12:30 - 1:30

ML: Lunch

Room: Arcadian Garden

NMDC 2018 **Conference Program**

Monday, October 15 1:30 - 3:00

T1-M2: Materials and Devices II

Room: Queen Marie

Investigating 2D materials
Chairs: James Morris (Portland State University, USA), Ryan Toonen (University of Akron, USA)

***2-Dimensional Materials a Journey Across Flatland*
Raj Solanki (Portland State University, USA)

Study of the Filtering and Noise Properties of a Series of Tunnel Barriers in a Graphene Ribbon
Paolo Marconcini and Massimo Macucci (University of Pisa, Italy)

TDDFT Studies on Sheet Size-Dependency of Optoelectronic Properties of 2D Silicon
MD Raiyan Alam and Aashka Bhandari (Texas A&M University-Kingsville, USA); Ganesh Subramanian Alwarappan (Texas A&M University- Kingsville, USA); Sunil Patil (University of Washington, USA); Sherin Alfalah, Mohamed Fathy Shibl and Walid M. I. Hassan (Qatar University, Qatar); Reza Nekovei and Amit Verma (Texas A&M University – Kingsville, USA)

Investigation of Electrostatic Gating in Two-Dimensional Transitional Metal Dichalcogenides (TMDC) Field Effect Transistors (FETs)
Arnob Islam and Xia Liu (Case Western Reserve University, USA); Bradley Odhner (Keithley Instruments, Tektronix, USA); Mary Anne Tupta (Keithley Instruments, Inc., USA); Philip Feng (Case Western Reserve University, USA)

T2-M2: Properties / Fabrication II

Room: Fireside

Developments in nanofabrication and nanopackaging
Chair: Raj Pulugurtha (Florida International University, USA)

***Technological Aspects of Silver Nanoparticles Sintering for Electronic Packaging*
Jan Felba (Wroclaw University of Science and Technology, Poland)

Ultrasound Thrombolysis with Magnetic Microbubbles Under a Rotational Magnetic Field
Bohua Zhang, Xiaoning Jiang and Huaiyu Wu (North Carolina State University, USA)

High-Photoresponsivity MoS2 / CdSe Quantum Dots Hybrid Phototransistor with Enhanced Photoresponse Speed
Jingyuan Wu, Feng Li, Meng Xiong, Tong Zhang and Xiaoyang Zhang (Southeast University, P.R. China)

High-conductance Two-Dimensional 1T'-MoTe2 Synthesized by Sputtering
Jyun-Hong Huang (National Chiao Tung University, USA); Hao-Hua Hsu (National Chiao Tung University, Taiwan); Yao Jen Lee (National Nano Device Laboratories,

Taiwan); Tuo-Hung Hou (National Chiao Tung University, Taiwan)

T3-M2: Special Applications II

Room: Gevurz

Biomedical Micro- and Nano-devices
Chair: Sorin Cotofana (Delft University of Technology, The Netherlands)

****Polymer Nanocomposites for Flexible and Wearable Fluidic and Biomedical Microdevices*
Bonnie Gray (Simon Fraser University, Canada)
Nanodevices and the Internet of Bio-Nano Things for Detecting and Measuring Anomalous Electrodynamics of Ca^2+ in Pancreatic beta-Cells
Huber Nieto-Chaupis (Universidad de Ciencias y Humanidades & Center of Research eHealth, Peru)
The Usage of Classical Electrodynamics to Characterize Bacteria Population Inside of an Internet of Bio-Nano Things Nanonetwork
Huber Nieto-Chaupis (Universidad de Ciencias y Humanidades & Center of Research eHealth, Peru)
****Nanomechanics of Metal Coated Polymer Particles*
Jianying He (Norwegian University of Science and Technology, Norway)

T4-M2: Special Session I

Room: Colonel Lindbergh

Thermal effects Part I
Chairs: Stephen Goodnick (Arizona State University, USA), Dragica Vasileska (Arizona State University, USA)

Session organizers: Steve Goodnick and Dragica Vasileska

****Recent Progress in High-Thermal Conductivity Materials Research*
Li Shi (University of Texas at Austin, USA)
Phonon Dynamics in Disordered Nanostructures: A Chaos Perspective
Irena Knezevic (University of Wisconsin at Madison, USA)
Extrinsic and Collective Effects on Thermal Transport in 2D/3D Alloys and Nanostructures
Zlatan Aksamija (University of Massachusetts Amherst, USA)
Transport Simulations in Hierarchically Disordered Nanostructures for Thermoelectric Material Design
Laura de Sousa Oliveira, Vassilios Vargiamidis and Neophytos Neophytou (University of Warwick, United Kingdom (Great Britain))

Conference Program

Monday, October 15 3:00 - 3:30

MB3: Break

Room: Mezzanine

Monday, October 15 3:30 - 5:30

T1-M3: Materials and Devices III

Room: Queen Marie

Solar Cell and ultra wide-band materials
Chair: Ryan Toonen (University of Akron, USA)

***A Unified Numerical Solver for Modeling Metastability and Reliability of CdTe Solar Cells*
Dragica Vasileska (Arizona State University, USA)

Solid Additive Incorporated Active Layer for High Efficiency Polymer Solar Cells
Binrui Xu, Hyun-Min Jeong, Sae-Wan Kim, Ju-Seong Kim, Jin-Beom Kwon and Shin-Won Kang (Kyungpook National University, Korea)

Electronic Structure and Carrier Transport Analysis in β-Ga2O3 Using a Two-Valley Ensemble Monte Carlo Framework
Zichang Zhang, Ye Wu, Shaikh Ahmed and Chao Lu (Southern Illinois University Carbondale, USA)

TDDFT Investigation of the Hybrid Organic Inorganic Perovskite: CH3NH3PbCl3
Ganesh Subramanian Alwarappan (Texas A&M University- Kingsville, USA); Aashik Padmanabhachary, MD Raiyan Alam and Aashka Bhandari (Texas A&M University-Kingsville, USA); Sunil Patil (University of Washington, USA); R. Jeyakumar (CSIR-National Physical Laboratory, Pusa Campus, India); Mohamed Fathy Shibl and Walid M. I. Hassan (Qatar University, Qatar); Reza Nekovei and Amit Verma (Texas A&M University – Kingsville, USA)

***Solution-processed Perovskite Optoelectronics*
Lih Lin and Chen Zou (University of Washington, USA)

T2-M3: Properties / Fabrication III

Room: Fireside

Fabrication and Investigation of Nanostructures for special applications
Chair: Kremena Makasheva (LAPLACE, CNRS, University of Toulouse, France)

***Nanostructures for Enabling Implantable Bioelectronic Systems*

Raj Pulugurtha (Florida International University, USA); Robert Spurney and Shreya Dwarakanath (Georgia Tech, USA); Rao Tummala (Georgia Institute of Technology, USA); Kathaperumal Mohanalingam (Georgia Tech, USA)

Ab-initio Calculation of Nonlinear Optical Susceptibilities in Germanium Quantum Dots

Shadli Islam and Harsh Shah (Texas A&M University-Kingsville, USA); Amit Verma (Texas A&M University – Kingsville, USA); Daryoush Shiri (Chalmers University of Technology, Sweden); Reza Nekovei (Texas A&M University – Kingsville, USA)

Fabrication, Characterization and Investigation of Novel PVDF/ZnO and PVDF-TrFE/ZnO Nanocomposites with Enhanced B-Phase and Dielectricity

Mingran Liu (Hong Kong Polytechnic University, Hong Kong)

Polymer-Nanocrystal Nanocomposite Capacitors and Their Applications in Energy Storage

Stephen Obrien (The City College of New York, USA)

***Biosourced Electroactive Materials Towards Green Electronics*

Clara Santato, Eduardo Di Mauro, Ri Xu, Abdelaziz Gouda and Manuel Reali (Polytechnique Montreal, Canada)

T3-M3: Modeling & Simulation I

Room: Gevurz

Nanowires, nanotubes and nanofiber for bio and nano applications

Chair: Martin Wybourne (Dartmouth College, USA)

***Carbon Nanotubes Directly Integrated in CMOS by Local Synthesis - Towards a Wafer-Level Process*

Knut Aasmundtveit, Avisek Roy and Bao Ta (University of South-Eastern Norway, Norway)

Lattice Thermal Conductivity Reduction Due to Diffusive Boundary Scattering in Nanowires

Mohammad Rashid and Shaikh Ahmed (Southern Illinois University Carbondale, USA)

Transversely Isotropic Elastic Properties of Vacancy Defected Boron Nitride Nanotubes Using Molecular Dynamics Simulations

Vijay Choyal, Vijay Kumar Choyal and Shailesh Ishwarlal Kundalwal (Indian Institute of Technology, Indore, India)

Direct Electrical and Mechanical Characterization of Carbon Nanofibers Turf Using a Probe Card and Nanoindentation

Muhammad Amin Saleem (Smoltek, Sweden); Sareh Shafiee (Smoltek AB, Sweden); Anqi Qiu (Hysitron, Inc, USA); Vincent Desmaris (Smoltek & Earth and Space Sciences Department, Sweden)

***Materials and Devices for Wearable Healthcare from the Skin to Below the Skin*

Sheng Xu (University of California, San Diego, USA)

NMDC 2018

Conference Program

Monday, October 15 3:30 - 5:00

T4-M3: Special Session II

Room: Colonel Lindbergh

Thermal effects Part II
Chair: Stephen Goodnick (Arizona State University, USA)
Session Organizers: Steve Goodnick and Dragica Vasileska

***Self-Heating in Devices Based on 2D and Phase-Change Materials*
Eric Pop (Stanford University, USA)
Self-Heating in SOI MOSFETs at the 45 nm Node
Xiong Zhang (ASU, USA); Payam Mehr and Dragica Vasileska (Arizona State University, USA); Trevor Thornton (ASU, USA)
Multi-scale Approach to Modeling Nanoscale SOI Heater-Sensor Thermometer
Katerina Raleva (UKiM, Macedonia, the former Yugoslav Republic of); Xiong Zhang (ASU, USA); Dragica Vasileska and Payam Mehr (Arizona State University, USA)
Thermal Management in 3D IC Designs for Nano-CMOS Technologies: Analysis on Graphene-Vs. Graphite-based TIM
Satya Keerthi Vendra and Malgorzata Chrzanowska-Jeske (Portland State University, USA)

Monday, October 15 5:30 - 7:00

MR: Reception

Room: Arcadian Garden

Monday, October 15 7:30 - 9:30

P1-M4: Panel Session - Nanotechnology Education Worldwide

Room: Queen Marie

Chairs: Malgorzata Chrzanowska-Jeske (Portland State University, USA), Milo Koretsky (Oregon State University, USA), Peter Moeck (Portland State University, Portland/Oregon, USA)

Panel Organizers:

- Peter Moeck, Portland State University, OR, USA

- Malgorzata Chrzanowska-Jeske, Portland State University, OR, USA
- Milo Koretsky, Oregon State University, OR, USA

Invited Speakers:

- Richard Jones, FRS, of Sheffield University, UK
- Cyrus Mody, Maastricht University, Netherlands

Panelists:

- Sorin Cotofana, Delft University of Technology, Delft, Netherlands
- Bonnie Gray, Simon Fraser University, BC, Canada
- Ricardo Reis, Federal University of Rio Grande do Sul, Porto Allegra-RS, Brazil
- Artunkumar Subramanian, University of Illinois at Chicago, IL, USA
- Tommy Tzeng, National Cheng Kung University, Taiwan
- Martin Wybourne, Dartmouth College, NH, USA

The panel starts with two invited 30 minutes invited talks. One discusses public engagement in nanotechnology and what is the right balance between emphasizing the potential of emerging technologies and cautioning against over-optimistic claims. The second reviews ethics in Nano Education and of Nano Education. Six panelists, from various part of the world, will present their views in response to 4 predefined questions on various aspects of Nanotechnology Education. It will be followed by 30 minutes Q&A session with questions from the audience.

Invited Presentations:

****Between Promise Fear and Disillusion Two Decades of Public Engagement Around Nanotechnology***

Richard Jones (United Kingdom, United Kingdom (Great Britain))

****Ethics in Nano Education, but First the Ethics of Nano Education***

Cyrus Mody (Maastricht University, The Netherlands)

Tuesday, October 16

Tuesday, October 16 8:00 - 8:20

TO: Opening / Introductions

Room: Queen Marie

Welcome Remarks, Jim Morris, NMDC 2018 Chair
Program Overview, Malgorzata Chrzanowska-Jeske, Program Chair

Tuesday, October 16 8:20 - 9:10

PL3: Plenary Talk

Room: Queen Marie

Chairs: Malgorzata Chrzanowska-Jeske (Portland State University, USA), Stephen Goodnick (Arizona State University, USA)

2D Materials for Smart Life
Kaustav Banerjee, UC Santa Barbara

Two-dimensional (2D) materials such as graphene and various transition metal dichalcogenides (such as MoS2) possess a wide range of remarkable properties that make them attractive for a number of applications, including sub-10 nm VLSI. I will highlight the prospects of 2D materials for innovating energy-efficient transistors, sensors, interconnects and passive devices targeted for next-generation electronics needed to support the emerging paradigm of the Internet of Things (IoT). More specifically, I will bring forward a few applications uniquely enabled by 2D materials and their heterostructures that have been demonstrated in my lab for realizing ultra-energy-efficient electronics. This will include the world's first Kinetic Inductor that exploits a low-dimensional material property of graphene to overcome a 200 years old limitation of the conventional Faraday-inductor and opens up a new pathway for designing ultra-compact IoT systems (Nature Electronics 2018), a 2D-channel band-to-band tunneling transistor that overcomes a fundamental power consumption challenge in all electronic devices since the invention of the first transistor (Nature 2015), the first 2D FET based biosensor with unprecedented sensitivity (ACS Nano 2014), as well as a breakthrough interconnect technology based on doped-graphene-nanoribbons, which overcomes the fundamental limitations of conventional metals and provides an attractive pathway toward an energy-efficient and highly reliable interconnect technology for next-generation integrated circuits (Nano Letters 2017). I will also discuss the prospects of monolithic 3D integration with 2D materials for realizing 3D ICs of ultimate thinness and integration density.

Tuesday, October 16 9:10 - 10:00

PL4: Plenary Talk

Room: Queen Marie

Chairs: Malgorzata Chrzanowska-Jeske (Portland State University, USA), Stephen Goodnick (Arizona State University, USA)

Metal Halide Perovskites at the Nanoscale: high quality optoelectronic materials with unique phase properties

Joseph M. Luther, National Renewable Energy Laboratory

The newly rediscovered perovskite semiconductor system has the potential to be extremely transformative for all optoelectronic devices, especially photovoltaics (PVs). Perovskite semiconductors of the form APbI3 where A is a large +1 charged cation, typically Cs, methylammonium, or formamidinium have had a huge resurgence among materials scientists for outstanding PV properties despite being overlooked for decades. Semiconductors containing the latter two A-site cations listed are hybrid organic-inorganic materials, and as such, are far less understood compared to conventional all inorganic or even organic material systems. Regardless of this spotty formal understanding, lead-halide perovskites have very rapidly been optimized to power conversion efficiency levels on par with all other materials even with extensive history of research. Perovskites show a unique tolerance to crystalline defects that cause trouble in most other semiconductors. Therefore the potential offered is that very high efficiency PVs can be fabricated in extremely fast and inexpensive ways, thus offering a revolution for the solar industry and a direct route toward producing the world's energy with a simple and clean technology. Long-term durability of the devices is the critical remaining challenge to be solved.1 Two examples of major instabilities in device performance are the volatility of the organic cation and the specific crystal habit in which the material embodies.

Nanoscale versions (often termed quantum dots (QDs)) of the all-inorganic metal halide perovskite (CsPbI3) tend to retain the desired cubic phase due to strain effects at the surface of the QDs whereas conventional films of the same material "relax" to an orthorhombic structure at room temperature. Therefore these QDs potentially solve both of the instability issues. The cubic CsPbI3 QD cells operate with a rather remarkable open-circuit voltage of >1.2 volts and have produced power conversion efficiencies over 13%.2,3 This customizable new nanomaterial system has incredible potential for many applications in optoelectronics, including photovoltaics, LEDs, displays and lasers. We describe the formation of α-CsPbI3 QD films with long range electronic transport that retain the high temperature phase in ambient conditions making up the active layer in optoelectronic devices. Perspectives on how this technology can become transformative will be discussed.

NMDC 2018

Conference Program

Tuesday, October 16 10:00 - 5:00

PS: Interactive Presentation Session

Chair: Satya Keerthi Vendra (Portland State University, USA)

1. *Trapping Individual Upconverters Using Rectangle Nanoapertures*
   Amirhossein Alizadehkhaledi, Adarsh Lalitha Ravindranath, Adriaan L. Frencken, Ali Khademi, Mirali Seyed Shariatdoust, Frank C J M van Veggel and Reuven Gordon (University of Victoria, Canada)
2. *A PCB Based Chemiresistive Carbon Dioxide Sensor Operating at Room Temperature Under Different Relative Humidity*
   Souvik Bag (Indian Institute of Technology Roorkee, India); Kaushik Pal (Indian Institute of Technology (IIT) Roorkee, Roorkee, Uttarakhand, India)
3. *Device Design and Photovoltaic Performance of Heterojunction Solar Cells Using Ultra-Thin Bi2S3 Photoabsorber*
   Sandip Das, Samuel McWhorter and Erik Riefe (Kennesaw State University, USA)
4. *Structural Study of MgO Barrier Layer in Magnetic Devices for Computing*
   Arifa Hoque and Sanjukta Bhanja (University of South Florida, USA)
5. *Geometric Property Estimation Based on Raman Spetra Measurement Using Machine Learning*
   Michael K Jo (Rose-Hulman Institute of Technology, USA); Umberto Ravaioli (University of Illinois at Urbana-Champaign, USA)
6. *Design of 8-Bit Reconfigurable ALU Using Quantum Dot Cellular Automata*
   Pandiammal K (Jerusalem College Of Engineering Chennai, India); Meganathan D (Anna University, India)
7. *Observation of Nonlinear Oscillations in Piezotransistive GaN Microcantilevers*
   Goutam Koley, Ferhat Bayram, Durga Gajula and Digangana Khan (Clemson University, USA)
8. *Fab-free, High Throughput Thin Metal Film Fabrication Method Using Reductive Metal Ion Ink Coating for Diverse Plasmonic and Electronic Applications*
   Jae Hyuk Lee, Jeong Dae Kim, Kangeun Yoo, Won Seok Lee, Min Cheol Kim, Daehun Kang, Ju-Hyoung Han, Jong Won Hur, Donghyun Park and Hyun Soo Chun (Seoul National University of Science and Technology, Korea); Hongseok Youn (HanBat University, Korea); Jong G. Ok (Seoul National University of Science and Technology, Korea)
9. *Effects of Environmental Factors on the Stability of Silver Nanowire Transparent Electrodes*
   Chiao-Chi Lin, Dong-Xuan Lin and Jing-Tang Jhan (Feng Chia University, Taiwan)
10. *Screen Printed, Flexible, All Metal-Oxide Capacitors for Printed Electronics*
    Jack McGhee (Loughborough University, United Kingdom (Great Britain))
11. *Synopsis of Multiphysics Deep Sub-Micron Failure Rate Modeling Technique for CFR and EOL Prediction*
    Mark Musil (Portland State University & IRT Saint-Exupery, France); Alain Bensoussan (IRT Saint Exupery, Toulouse & Thales Alenia Space, France); Joseph Bernstein (Ariel University, Israel); Fabio Coccetti (IRT Saint-Exupery, France)

12. *Modeling the Detection of Anomalous Flux of Proteins in the Human Kidney with the Diffusion's Equation and the Prospective Deployment of Nanodevices to Anticipate Diabetes Kidney Disease*
    Huber Nieto-Chaupis (Universidad de Ciencias y Humanidades & Center of Research eHealth, Peru)
13. *Subnanometer Gaps for Enhanced Raman Substrates*
    Eradzh Rakhmatov, Bruno Guilherme da Fonseca, Ali Khademi, Alexandre Brolo and Reuven Gordon (University of Victoria, Canada)
14. *Effects of White Noise Excitation on Tristable Piezoelectric Energy Harvesters with Asymmetric Potential Wells*
    Subramanian Ramakrishnan, Md Raf E Ul Shougat and Prasanth Sukumar (University of Minnesota Duluth, USA)
15. *The Hysteresis Phenomenon and Q Factor Enhancement in Nonlinear NEMS Resonators Driven by Levy Stable Stochastic Processes*
    Md Raf E Ul Shougat and Subramanian Ramakrishnan (University of Minnesota Duluth, USA)

Tuesday, October 16 10:00 - 10:30

TB1: Break

Room: Mezzanine

Tuesday, October 16 10:30 - 12:10

T1-T1: Materials and Devices IV

Room: Queen Marie

Latest News on Nanomaterials and Nanodevices
Chair: Xiaoning Jiang (North Carolina State University, USA)

***Nanomaterial Based Pressure Sensor for Sphygmographic Pulse Pattern Analysis*
Wen J Li (City University of Hong Kong)

Impact of Substrate Bias Polarity on Performance of Complementary Symmetric Lateral Bipolar on SiGe-OI Inverter
Lourembam Beloni Devi (Jawaharlal Nehru University, New Delhi, India); Kundan Singh (Jawaharlal Nehru University, New Delhi); Jitendra Kumar and Asutosh Srivastava (Jawaharlal Nehru University, New Delhi, India)

Super Nonlinear Mixed Ionic Electronic Conducting Thin-film Selector for Crosspoint Array
Xinglong Ji, Chao Wang, Li Song and Rong Zhao (Singapore University of Technology and Design, Singapore)

Polymer-based Soft Topographical Features Functionalized by Magnetron Sputtering

Deepak Rajput, Emmanuel Abdul, Srikar Darmakkolla, Fredrick DeArmond and Otto Zietz (Portland State University, USA); Lino Costa and Alexander Terekhov (University of Tennessee Space Institute, USA); Shankar Rananavare (Portland State University, USA)

T2-T1: Properties / Fabrication IV

Room: Fireside

Graphene Nanoelectronics
Chair: Benedicte Warot-Fonrose (CEMES-CNRS, France)

***A Strategic Approach for Low Temperature Graphene Growth Towards Direct Device Integration*
Jun Jiao, Otto Zietz and Samuel Olson (Portland State University, USA)

A Study of Field Effect on In-Plane Graphene Structure for RF Application
Nazir Hossain, Martin Margala and Jean Francois Millithaler (University of Massachusetts Lowell, USA)

Characterization of Graphene Conductance Using a Microwave Cavity
Jan Obrzut (National Institute of Standards and Technology, USA)

Engineering the Modal Shape of Graphene Nanoelectromechanical Systems Using Focused Ion Beam Milling
David Miller, Andrew Blaikie, Brittany Carter and Benjamin Aleman (University of Oregon, USA)

T3-T1: Nanotech / Nanostructures I

Room: Gevurz

Nanoelectronics for bio-applications
Chair: Martin Wybourne (Dartmouth College, USA)

***'Protein-adsorption Problem' Revealed by Using Plasma Deposited AgNPs-based Nanocomposites*
Kremena Makasheva (LAPLACE, CNRS, University of Toulouse, France); Marvine Soumbo (LAPLACE, University of Toulouse, France); Adriana Scarangella (LAPLACE, Université de Toulouse, France); Christina Villeneuve-Faure (LAPLACE, University of Toulouse, France); Laurine Martocq (LAPLACE, Université de Toulouse, France); Gaetan Laroche (Université Laval, Canada); Adnen Mlayah (CEMES-CNRS, University of Toulouse, France); Caroline Bonafos (CEMES-CNRS, France); Marie-Carmen Monje and Christine Roques (LGC, University of Toulouse, France)

Sensing Characteristic Enhancement of Oxygen Plasma Treated Graphene

Hongmei Li, Austin Singh, Anthony Childress and Goutam Koley (Clemson University, USA)

Characterizing Mutant Protein Activators Using Single Molecule Optical Trapping

Adarsh Lalitha Ravindranath, Amirhossein Alizadehkhaledi and Ali Khademi (University of Victoria, Canada); Sara Ibrahim Omar and Jack Tuszynski (University of Alberta, Canada); Reuven Gordon (University of Victoria, Canada)

***Applications of Nano-electronics in Electrophysiology and Mitochondrial Biology*

Peter Burke (University of California at Irvine, USA)

T4-T1: Special Session III

Room: Colonel Lindbergh

Noise in Nanodevices

Chair: Paolo Marconcini (University of Pisa, Italy)

Session organizer: Marconcini Paolo

***Current/voltage Fluctuations in Nanodevices: From Thermal and Shot Noise to Quantum Optics*

Bertrand Reulet (Université de Sherbrooke, Canada)

The Role of Noise in Determining Selective Ionic Conduction Through Nano-Pores

William A. T. Gibby, Miraslau Barabash and Carlo Guardiani (Lancaster University, United Kingdom (Great Britain)); Dmitry G. Luchinsky (Lancaster University, United Kingdom (Great Britain) & SGT, Ames Research Center, USA); Peter V. E. McClintock (Lancaster University, United Kingdom (Great Britain))

Modeling Techniques for Electronic Noise and Process Variability in Nanoscale Devices

Simona Donati Guerrieri, Fabrizio Bonani and Giovanni Ghione (Politecnico di Torino, Italy)

Study of the Signal to Noise Ratio of a Double-Dot Magnetic Detector

Massimo Macucci and Paolo Marconcini (University of Pisa, Italy)

Tuesday, October 16 12:10 - 12:30

TB2: Break

Room: Mezzanine

NMDC 2018

Conference Program

Tuesday, October 16 12:30 - 1:30

TL: Lunch

Room: Arcadian Garden

Tuesday, October 16 1:30 - 3:00

T1-T2: Materials and Devices V

Room: Queen Marie

Ultra shallow junctions and nano gaps
Chair: Georgios Sirakoulis (Democritus University of Thrace, Greece)

***Molecular Monolayer Doping for Forming Ultra Shallow Junctions in Silicon*
Santosh Kurinec (Rochester Institute of Technology, USA)

Multiple-Junction Single-Electron Charging in Electromigrated Series-Connected Nanogaps Operating at Room Temperature
Mitsuki Ito (Tokyo University of Agriculture and Technology, Japan); Mamiko Yagi (Ichinoseki College, Japan); Moe Shimada and Jun-ichi Shirakashi (Tokyo University of Agriculture and Technology, Japan)

Single-Electron Tunneling Effects in Electromigrated Coulomb Island Between Au Nanogaps
Soki Tani and Mitsuki Ito (Tokyo University of Agriculture and Technology, Japan); Mamiko Yagi (Ichinoseki College, Japan); Moe Shimada, Keita Sakai, Koji Minami and Jun-ichi Shirakashi (Tokyo University of Agriculture and Technology, Japan)

Feedback Controlled Break Junction in Au-Ag-Au Nanowires
Ramazan Kizil and Mehmet Konyar (Istanbul Technical University, Turkey); Emre Cetin (Spark Measurement, Turkey)

T2-T2: Nanotech / Nanostructures II

Room: Fireside

Nanoacoustic devices and nanomanufacturing developments for nevelty materials and devices
Chair: Kremena Makasheva (LAPLACE, CNRS, University of Toulouse, France)

***Nano-acoustics: Materials Devices and Applications*
Xiaoning Jiang (North Carolina State University, USA)

Nanotechnology-Enabled Additively-Manufactured RF and Millimeter-wave Electronics

Aline Eid, Bijan Tehrani, Jimmy Hester, Xuanke He and Manos M. Tentzeris (Georgia Institute of Technology, USA)

Atomic Layer Deposition of 2-Dimensional Semiconducting SnSe Thin Films

Shakila Afrin, Neal Kuperman and Raj Solanki (Portland State University, USA)

Nanoparticle Composites as Functional Materials for Novel Devices: Chemical Sensing and Optoelectronic Applications

Hendrik Schlicke and Tobias Jochum (Fraunhofer Center for Applied Nanotechnology, Germany); Sophia Bittinger and Tobias Vossmeyer (University of Hamburg, Germany); Jan Niehaus and Horst Weller (Fraunhofer Center for Applied Nanotechnology, Germany)

T3-T2: Modeling & Simulation II

Room: Gevurz

3D and FinFets versus HEMT and nanowire FETs

Chair: Roberto S Murphy (INAOE, Mexico)

***Back to the Future How FinFETs and 3DIC are Making It Difficult for Emerging Nanotechnologies*

Mircea Stan (University of Virginia, USA)

Analytical Modeling of Electrostatic Characteristics of Enhancement Mode GaN Double Channel HEMT

I. K. M. Reaz Rahman, Md. Irfan Khan, Marjana Mahdia and Quazi Khosru (Bangladesh University of Engineering and Technology, Bangladesh)

A Multi-Scale Simulation Study of the Strained Si Nanowire FETs

Jaehyun Lee and Cristina Medina-Bailon (University of Glasgow, United Kingdom (Great Britain)); Salim Berrada (, unknown); Hamilton Carrillo-Nunez (University of Glasgow, United Kingdom (Great Britain)); Toufik Sadi (AAlto University, Finland); Vihar Georgiev (University of Glasgow, United Kingdom (Great Britain)); Mihail Nedjalkov (Vienna University of Technology, Austria); A. Asenov (University of Glasgow, United Kingdom (Great Britain))

The Impact of Dislocation on bulk-Si FinFET Technologies: Physical Modeling of Strain Relaxation and Enhancement by Dislocation

Jeong Guk Min (Samsung, Korea)

T4-T2: Special Session IV

Room: Colonel Lindbergh

2D Materials and devices I
Chair: Huamin Li (University at Buffalo, USA)

Session organizer: Huamin Li

***A Guided Safari Through the Properties of over 1000 2D Materials Revealed by Data Mining Techniques*
Evan Reed, Gowoon Cheon and Daniel Rehn (Stanford University, USA)

Layer-number-dependent Light-Matter Interaction on 2D Monolayer and Multilayer HfSe2
Hemendra Nath Jaiswal (University at Buffalo, New York, USA); Maomao Liu and Simran Shahi (New York State University at Buffalo, USA); Fei Yao (University at Buffalo, USA); Xinlong Xu (Northwest University, P.R. China)

Using Ions to Control Transport in Two-Dimensional Materials for Ion-Controlled Electronics
Ke Xu, Eli Bostian, Aaron Woeppel and Hangjun Ding (University of Pittsburgh, USA); Md Mahbubul Islam and David Guzman (Purdue University, USA); Alan Seabaugh (University of Notre Dame, USA); Alejandro Strachan (Purdue University, USA); Eric Beckman and Susan Fullerton (University of Pittsburgh, USA)

Improvement of Metal-Semiconductor Contact from Schottky to Ohmic by Cu Doping in Transition Metal Dichalcogenide Transistors
Maomao Liu and Simran Shahi (New York State University at Buffalo, USA); Sara Fathipour (University of Notre Dame, USA); Wansik Hwang (Korea Aerospace University, Korea); Maja Remskar (Jozef Stefan Institute, Slovenia); Alan Seabaugh (University of Notre Dame, USA); Huamin Li (University at Buffalo, USA)

Tuesday, October 16 3:00 - 3:30

TB3: Break

Room: Mezzanine

NMDC 2018

Conference Program

Tuesday, October 16 3:30 - 5:00

T1-T3: Materials and Devices VI

Room: Queen Marie

Plasmonic absorption and other plasmonic effects
Chair: Antonio Di Bartolomeo (University of Salerno, Italy)

***Subnanometer Plasmonics: Quantum Regime Functional Metasurfaces and the Plasmonic Coulomb Blockade*
Reuven Gordon (University of Victoria, Canada)

Effect of Plasmonic Absorption on Photoacoustic Signal Generation
Digangana Khan, Durga Gajula, Ferhat Bayram, Soaram Kim and Goutam Koley (Clemson University, USA)

Plasmon Enhanced Dual Band Upconverters
Mirali Seyed Shariatdoust, Adriaan L. Frencken, Ali Khademi, Amirhossein Alizadehkhaledi, Frank C J M van Veggel and Reuven Gordon (University of Victoria, Canada)

Plasmonic Absorption Enabled Analyte Detection Using Piezotransistive Microcantilevers
Digangana Khan, Durga Gajula, Ferhat Bayram and Goutam Koley (Clemson University, USA)

T2-T3: Nanotech / Nanostructures III

Room: Fireside

Connectivity issues in Nanoelectronics
Chair: Mircea Stan (University of Virginia, USA)

***Power and Reliability Challenges in IoT Nanoelectronics*
Ricardo A L Reis (Universidade Federal do Rio Grande do Sul, Brazil)

Self Aligning Growth of Nanoparticle-Based Interconnects
Leslie Schlag and Nishchay Isaac (Technische Universität Ilmenau, Germany); Helene Nahrstedt (TU Ilmenau FG Nanotechnologie, Germany); Johannes Reiprich, Jörg Pezoldt and Heiko Jacobs (Technische Universität Ilmenau, Germany)

Through-Silicon Via-Aware Layout Design and Power Estimation in Sub-45 Nanometer 3D CMOS IC Technologies
Sucheta Mohapatra, Satya Keerthi Vendra and Malgorzata Chrzanowska-Jeske (Portland State University, USA)

Magnetic Field Dependence of Non-Reciprocal Propagation of Millimeter-Waves Through Arrays of Ferromagnetic Nanowires

Nitin Parsa (The University of Akron, USA); Michael Gasper and Ryan Toonen (University of Akron, USA); Venkata Sai Praneeth Karempudi (The University of Akron, USA)

T3-T3: Modeling & Simulation III

Room: Gevurz

Capacitive Neural Network and Capacitance effects in junction devices
Chair: Vihar Georgiev (University of Glasgow, United Kingdom (Great Britain))

***Pseudo-memcapacitive Neuro-transistor Based Capacitive Neural Network*
Zhongrui Wang (University of Massachusetts Amherst, USA); Mingyi Rao (University of Massachusetts, Amherst, USA); Jin-Woo Han (NASA, USA); Jiaming Zhang (Lam Research, USA); Huaqiang Wu (Tsinghua University, P.R. China); Qinru Qiu (Syracuse University, USA); R. Stanley Williams (Hewlett-Packard Laboratories, USA); Qiangfei Xia (University of Massachusetts, Amherst, USA); Joshua Yang (University of Massachusetts, USA)

Effects of uniaxial strain on gate capacitance and threshold voltage of double gate junctionless transistor
Md Mohsinur Rahman Adnan and Quazi Khosru (Bangladesh University of Engineering and Technology, Bangladesh)

Parametric Optimization of Self-Switching Diode
Sahil Garg, Bipan Kaushal, Arun Kumar Singh and Sanjeev Kumar (Punjab Engineering College, Chandigarh, India); Santanu Mahapatra (Indian Institute of Science, Bangalore, India)

A Highly Efficient Bilayer graphene-HgCdTe Heterojunction Based P+-N Photodetector for Long Wavelength Infrared (LWIR)
Shonak Bansal (Punjab Engineering College Chandigarh, India); Prince Jain (Punjab Engineering College, India); Neena Gupta (PEC University of Technology, India); Arun Kumar Singh (Punjab Engineering College, Chandigarh, India); Naveen Kumar (Punjab Engineering College, India); Sanjeev Kumar (Punjab Engineering College, Chandigarh, India); Neha Sardana (Indian Institute of Technology Ropar, India)

T4-T3: Special Session V

Room: Colonel Lindbergh

2D Materials and devices II
Chair: Huamin Li (University at Buffalo, USA)

Session organizer: Huamin Li

***2D Semiconductor and Van Der Waals Heterostructure Devices and Systems*
Philip Feng (Case Western Reserve University, USA)

Edge Effects in Graphene Nanodevices
José Caridad (Technical University of Denmark, Denmark)

Electronic Characteristics of MoSe2 and MoTe2 for Nanoelectronics Applications
Ratan Debnath (National Institute of Standards and Technology, USA); Shiqi Guo (George Washington University, USA); Asha Rani (The George Washington University & SEAS, USA); Sergiy Krylyuk (Theiss Research, La Jolla, California, USA); Kyle DiCamillo (Georgetown University, USA); Albert Davydov (National Institute of Standards and Technology, USA); Mona E Zaghloul (George Washington University, USA)

Characterization and Simulation of Permittivity Enhancements of SiO2/Si3N4 Nanolaminate Layers
Zeinab Mousavi Karimi, Devin Brown, Eric Woods, Blaine Costello, Walter Henderson and Jeffery Davis (Georgia Institute of Technology, USA)

Tuesday, October 16 5:30 - 7:00

TR: Reception

Room: Arcadian Garden

Tuesday, October 16 7:00 - 8:30

W2: Professional Workshop

Room: Fireside

The "art" of Effective Negotiation: "Just ask for it"
Marilyn Rampersad Mackiewicz (Research Assistant Professor in Chemistry, PSU)

NMDC 2018 **Conference Program**

Wednesday, October 17

Wednesday, October 17 8:00 - 8:20

WO: Opening / Introductions

Room: Queen Marie

Welcome Remarks, Jim Morris, NMDC 2018 Chair
Program Overview, Malgorzata Chrzanowska-Jeske, Program Chair

Wednesday, October 17 8:20 - 9:10

PL5: Plenary Talk

Room: Queen Marie

Chairs: Stephen Goodnick (Arizona State University, USA), Yonhua Tzeng (National Cheng Kung University, Taiwan)

Near-Zero-Index Photonic Materials and Devices
Nadar Engheta, ***IEEE Nanotechnology Council Pioneer Award Winner***, University of Pennsylvania

Metamaterials and metasurfaces have enabled scientists and technologists with unique tools to tailor and manipulate waves in unconventional ways, providing novel platforms with unprecedented wave physics and engineering for photonic materials, optical devices and components. One such platform is the near-zero-index photonics. In such media, the effective relative permittivity and/or relative permeability is engineered to be very low (i.e. near zero) at the operating frequency, which leads to the near-zero effective refractive index. As a result, in such epsilon-near-zero (ENZ), mu-near-zero (MNZ), and/or near-zero-index (NZI) structures the wavelength is "stretched", and consequently the phase distribution is effectively uniform throughout the structure's volume. A variety of unique phenomena including supercoupling, photonic doping, electric levitation, extreme quantum optics, thermal beaming, and giant nonlinearity is exhibited in such platforms. In this talk, I will present an overview of some of our results in these areas, and will discuss some of their potential applications.

Conference Program

Wednesday, October 17 9:10 - 10:00

PL6: Plenary Talk

Room: Queen Marie

Chairs: Stephen Goodnick (Arizona State University, USA), Yonhua Tzeng (National Cheng Kung University, Taiwan)

Optical properties of 2D materials and heterostructures
Tony F. Heinz, Stanford University

Wednesday, October 17 10:00 - 10:30

WB1: Break

Room: Mezzanine

Wednesday, October 17 10:30 - 12:10

T1-W1: Materials and Devices VII

Room: Queen Marie

Piezoelectric and piezotransitive, and for generation applications
Chair: Vihar Georgiev (University of Glasgow, United Kingdom (Great Britain))

***Conduction Current and Displacement Current Created in One Generator*
Qing Zhang (Nanyang Technological University, Singapore)

Functionalization of PDMS Nanocomposite Foams for Piezoelectric Applications
Taissa Michel, Joseph Nalbach, Harrison Hones, Anthony Salemo, Salvatore Catanzaro, Allison Tingley, Matthew Schwenger and Wei Xue (Rowan University, USA)

Piezotransistive GaN Microcantilever Based NO2 Sensing Using Functionalized Nanoscale Thin Films
Ferhat Bayram, Digangana Khan, Soaram Kim and Goutam Koley (Clemson University, USA)

Lorentz Based Metamaterials for Nonlinear Generation
Esmaeil Rahimi, Reuven Gordon, Haitian Xu and B Choi (University of Victoria, Canada)

T2-W1: Properties / Fabrication V

Room: Fireside

Field Effect transitors and fabrication issues for other devices
Chair: Jianying He (Norwegian University of Science and Technology, Norway)

**Persistent Photoconductivity, Hysteresis and Field Emission in MoS2 Back-Gate Field-Effect Transistors*
Antonio Di Bartolomeo (University of Salerno, Italy)

Application of Mono Layered Graphene Field Effect Transistors for Gamma Radiation Detection
Sonam Jain (Electrical Engineering, IIT Delhi, India); Vinit Shinde (Cypress Semiconductor Corporation, India); Ashwini Gajarushi (IIT Bombay, India); Ankur Gupta and V. Ramgopal Rao (IIT Delhi, India)

Nanoscale Fabrication of Microwave Detectors from Commercially-Available CVD-Grown Monolayer Graphene
Michael Gasper and Ryan Toonen (University of Akron, USA); Nicholas Varaljay and Robert Romanofsky (NASA Glenn Research Center, USA); Felix Miranda (NASA John H. Glenn Research Center, USA)

Methodology for Analysis of Electrical Breakdown in Micrometer Gaps in Tip-To-Plane Configuration
Kemas Muhammad Tofani (Bandung Institute of Technology & PT PLN, Indonesia); Jean-Pascal Cambronne (University of Toulouse III - Paul Sabatier & Laplace Laboratory, France); Sorin Dinculescu (LAPLACE, France); Ngapuli Sinisuka (Institute Technology Bandung, Indonesia); Kremena Makasheva (LAPLACE, CNRS, University of Toulouse, France)

T3-W1: Modeling & Simulation IV

Room: Gevurz

Photovoltaic devices, optical measurments and photoemission
Chair: Georgios Sirakoulis (Democritus University of Thrace, Greece)

**Nonequilibrium Electron and Phonon Dynamics in Advanced Photovoltaic Devices*
Stephen Goodnick (Arizona State University, USA)

Assessing Probe Damage in Constant Frequency and Frequency-Modulation Shear-force Acoustic Near-field Microscopy
Theodore Brockman, Andres H La Rosa, Jianghua Bai and Rodolfo Fernandez (Portland State University, USA)

Optical Measurement of Thermal Vibration Spectra to Determine Young's Modulus of Glass Microfibers
Sri Sukanta Chowdhury, Robert W. Cohn, Carlos Jarro and Andriy Sherehiy (University of Louisville, USA)

Controlling Localized Photoemission of Triangular Gold Antennas Through Polarization
Christopher M Scheffler, Rolf Könenkamp and Robert Word (Portland State University, USA)

T4-W1: Special Session VI

Room: Colonel Lindbergh

Graphene-material interface
Chair: Mingdi Yan (University of Massachusetts Lowell, USA)

Session organizer: Mingdi Yan

***Interfaces and Defects in 2D Materials*
Matthias Batzill (University of South Florida, USA)
The Effect of Environmental Contamination on the Intrinsic Surface Properties of 2D Materials
Haitao Liu and Lei Li (University of Pittsburgh, USA)
Van Der Waals Interactions and Graphene from Ultra-Long Ranged Attraction to Ultra-Strong Screening
Alberto Ambrosetti and Pier Luigi Silvestrelli (University of Padua, Italy)
Effect of Catalyst Morphology and Composition on the Formation of Graphene at Reduced Temperatures via Chemical Vapor Deposition
Samuel Olson, Otto Zietz and Jun Jiao (Portland State University, USA)

Wednesday, October 17 12:10 - 12:30

WB2: Break

Room: Mezzanine

Wednesday, October 17 12:30 - 1:30

WL: Lunch

Room: Arcadian Garden

NMDC 2018

Conference Program

Wednesday, October 17 1:30 - 3:00

T1-W2: Materials and Devices VIII

Room: Queen Marie

Batteries and Energy Harvesting
Chair: Georgios Sirakoulis (Democritus University of Thrace, Greece)

***Carbon Nanotechnology for Lithium Ion Battery*
Yonhua Tzeng (National Cheng Kung University, Taiwan)

Cathode Material Composed of Manganese Cobalt Hexacyanoferrate Nanoparticles for Aqueous Zinc Ion Intercalation Batteries
Neal Kuperman, Samuel Olson, Gary Goncher, Michael Adventure Hopkins, Dave Evans and Raj Solanki (Portland State University, USA)

Valence Band Anti-Crossing Analysis of Dilute Sulfur in ZnO1-xSx Alloys
Saad Alqahtani and Shaikh Ahmed (Southern Illinois University Carbondale, USA)

Multiple Energy Harvesting Applications Based on Piezoelectricity and TriboelectricityMulti-mode Integrated Energy Harvestor Utilizing Piezoelectricity and Triboelectricity
Soaram Kim, Sean Gorman, Goutam Koley, Yongchang Dong, Digangana Khan, Ferhat Bayram and Apparao M. Rao (Clemson University, USA)

T2-W2: Emerging I

Room: Fireside

Nanomaterials properties
Chair: Raj Solanki (Portland State University, USA)

***TEM Investigations for Nanomaterials Properties*
Benedicte Warot-Fonrose (CEMES-CNRS, France)

Information Theory Approach to Crystallographic Symmetry Classifications of Noisy 2D Periodic Images
Peter Moeck (Portland State University, Portland/Oregon, USA)

The First Principle Simulation Study on the Specific Grain Boundary Resistivity in Copper Interconnects
Jaehyun Lee, Michel Lamarche and Vihar Georgiev (University of Glasgow, United Kingdom (Great Britain))

Deterministic Oxidation of Hafnium Diselenide Field- Effect-Transistors
Malak Albagami and Abdullah Alrasheed (King Abdulaziz City for Science and Technology, Saudi Arabia); Moh. Amer (KACST-UCLA, Saudi Arabia)

T3-W2: Modeling & Simulation V

Room: Gevurz

Studying performance issues in FETs
Chair: Antonio Di Bartolomeo (University of Salerno, Italy)

****Electronic and Thermoelectric Transport in 2-Dimensional Materials and Heterostructures*
Zlatan Aksamija (University of Massachusetts Amherst, USA)

Quantum Mechanical Study of Impact of Surface Roughness on Electron Transport in Ultra-Thin Body Silicon FETs
Pratik B Vyas, Maarten L Van de Put and Massimo V Fischetti (The University of Texas at Dallas, USA)

Modeling and Simulation of Novel Ferroelectric Gate Stack in MOSFET for Enhanced Device Performance
Prianka Sengupta, Ruyan Guo and Amar Bhalla (University of Texas at San Antonio, USA)

Role of Interfacial and Intrinsic Coulomb Impurities in Monolayer MoS2 FET
Khadija Khair and Shaikh Ahmed (Southern Illinois University Carbondale, USA)

T4-W2: Special Session VII

Room: Colonel Lindbergh

AFM tracking of Nanomaterials and Devices
Chairs: Parthasarathi Chakraborti (Intel Corporation, USA), Malgorzata Chrzanowska-Jeske (Portland State University, USA)

Session organizer: Christine Villeneuve-Faure

****Characterization of the Electrical Behaviour of Thin Dielectric Films at Nanoscale Using Methods Derived from Atomic Force Microscopy: Application to Plasma Deposited AgNPs-based Nanocomposites*
Christina Villeneuve-Faure (LAPLACE, University of Toulouse, France); Kremena Makasheva (LAPLACE, CNRS, University of Toulouse, France); Cedric Djaou (Laplace, France); Laurent Boudou (LAPLACE, University of Toulouse, France); Gilbert Teyssedre (University of Toulouse & CNRS, LAPLACE & CNRS, Paul Sabatier University, France)

New Insights into Dielectric Nanocomposites by EFM Imaging and Spectroscopy
Richard Arinero (Université de Montpellier & Institut d'Electronique et des Systèmes CNRS, France); Diana El Khoury and Jérôme Castellon (Université de Montpellier, France)

Suspended Graphene Membranes for Strain Sensor Applications

Lina Tizani (Masdar Institute of Science and Technology part of Khalifa University, United Arab Emirates); Irfan Saadat (Faculty - Masdar Institute of Science and Technology, United Arab Emirates)

Impact of Particles Surface Functionalization on Interphase Properties of PI/Si3N4 Nanocomposites Using AFM

Mohammed Houssat (Laplace); Nadine Lahoud-Dignat (Laplace, France); Christina Villeneuve-Faure (LAPLACE, University of Toulouse, France); Jean-Pascal Cambronne (University of Toulouse III - Paul Sabatier & Laplace Laboratory, France)

Wednesday, October 17 3:00 - 3:30

WB3: Break

Room: Mezzanine

Wednesday, October 17 3:30 - 5:00

T1-W3: Materials and Devices IX

Room: Queen Marie

Devices for Terahertz applications

Chair: Qing Zhang (Nanyang Technological University, Singapore)

***Atomic Engineering of Gallium Nitride Semiconductors for Ultraviolet-to-Terahertz Photonics*

Can Bayram (University of Illinois at Urbana-Champaign, USA)

Highly Sensitive Ion Detection with Graphene/Si Schottky Junction Sensors

Hongmei Li, John B Hardaway and Goutam Koley (Clemson University, USA)

Dual Band Graphene Based Metamaterial Absorber for Terahertz Applications

Prince Jain (Punjab Engineering College, India); Sahil Garg (Punjab Engineering College, Chandigarh, India); Arvind Singh (Punjab Engineering College, India); Shonak Bansal (Punjab Engineering College Chandigarh, India); Krishna Prakash and Neena Gupta (PEC University of Technology, India); Arun Kumar Singh (Punjab Engineering College, Chandigarh, India); Nandni Sharma (Punjab Engineering College, India); Sanjeev Kumar (Punjab Engineering College, Chandigarh, India); Neha Sardana (Indian Institute of Technology Ropar, India)

***Plasmonic Enhanced Terahertz Devices*

Mona Jarrahi (University of California Los Angeles, USA)

T2-W3: Properties / Fabrication VI

Room: Fireside

Pressure sensors and 2D materials
Chair: Jianying He (Norwegian University of Science and Technology, Norway)

**On Energy Effective Graphene Based Boolean Gates*
Sorin Cotofana (Delft University of Technology, The Netherlands)

An RRAM with a 2D Material Embedded Double Switching Layer for Neuromorphic Computing
Po-An Chen (National Cheng Kung University, Taiwan); Rui-Jing Ge (University of Texas at Austin, USA); Jia-Wei Lee, Chun-Hsiang Hsu and Wei-Chou Hsu (National Cheng Kung University, Taiwan); Deji Akinwande (University of Texas at Austin, USA); Meng-Hsueh Chiang (National Cheng Kung University, Taiwan)

Design and Fabrication of Graphene Flakes-Based Microdevices for Detecting Heavy Metal Ions
Xiaolu Zhu, Chunwang Xu and Wenjie Zhao (Hohai University, P.R. China); Wenqiong Su and Xianting Ding (Shanghai Jiao Tong University, P.R. China)

Effect of Surface Adsorbates on Carrier Transport in Graphene
Hongmei Li, Digangana Khan and Goutam Koley (Clemson University, USA)

***Growth and Characterization of Semiconducting Carbon Nanotubes for Nanoelectronics*
Kaili Jiang (Tsinghua University, P.R. China)

T3-W3: Emerging II

Room: Gevurz

Switching devices, and electron transmission and breakdown in small gap devices
Chair: Liang Dong (Iowa State University, USA)

***Future and Emergent Materials and Devices for Resistive Switching*
Panagiotis Karakolis, Pascal Normand and Panagiotis Dimitrakis (NCSR Demokritos, Greece); Vasileios Ntinas, Iosif-Angelos Fyrigos, Ioannis Karafyllidis and Georgios Sirakoulis (Democritus University of Thrace, Greece)

Potential High-Speed Switching Nano-Device with Sub-Nanometer Gaps
Ali Khademi, Maximilien Billet, Adarsh Lalitha Ravindranath, Amirhossein Alizadehkhaledi, Mirali Seyed Shariatdoust, Nasrin Razmjooei and Reuven Gordon (University of Victoria, Canada)

Growth of Horizontally Suspended Multi-Walled Carbon Nanotubes for In-Situ Fabrication of Solar Devices
Jyotsna Iyer, Paul Comita, David Cooke and Laurence Cooke (NovaSolix, USA)

Modeling of Gate Effects on Electron Transport in a Single-Electron Transistor with Two Semiconducting Islands Between Two Semiconducting Electrodes
Paniz Khanmohammadi Hazaveh, Paul Bergstrom and John Jaszczak (Michigan Technological University, USA)

T4-W3: Modeling & Simulation V

Room: Colonel Lindbergh

Memrestive effects and quantum dots
Chair: Vihar Georgiev (University of Glasgow, United Kingdom (Great Britain))

**Fully Analytical Memristor Models: Advantages and Applications*
Arturo Sarmiento (National Institute for Astrophysics Optics and Electronics, Mexico)

Response of a Memristive Biomembrane and Demonstration of Potential Use in Online Learning
Md Sakib Hasan (University of Tennessee Knoxville, USA); Joseph Najem (Joint Institute for Biological Sciences, Oak Ridge National Laboratory, USA); Ryan Weiss (University of Tennesseee, USA); Catherine Schuman (Oak Ridge National Laboratory, USA); Alex Belianinov and Charles Collier (Center for Nanophase Materials Sciences, Oak Ridge National Laboratory, USA); Stephen Sarles and Garrett Rose (University of Tennessee, USA)

Adaptive Batch Training Rule-Based Detection Scheme for On-OFF-Keying Diffusion-Based Molecular Communications
Ghalib H Alshammri (Stevens Institute Of Technology, USA); Walid Ahmed (Broadcom Inc., USA); Victor Lawrence (Stevens Institute of Technology, USA)

Heat Diodes Made of Quantum-Dot Nanowires
David M.-T. Kuo (National Central University, Taiwan); Yia-Chung Chang (Research Center for Applied Sciences, Academia Sinica, Taiwan)

NMDC 2018

Conference Program

Wednesday, October 17 5:30 - 7:00

WR: Reception / PSU Tours

Room: Arcadian Garden

Tour PSU Labs:
Physics (Guides: Raj Solanki, Erik Sanchez)
Engineering (Guide: Jun Jiao).

Wednesday, October 17 7:30 - 10:00

BQ: Awards Banquet

Room: Smith Memorial Student Union

Portland State University
Smith Memorial Student Union
1825 SW Broadway
Portland, OR 97201