

Virtual

GRAPHENE AND BEYOND

May 12-14, 2021

From Atoms to Applications

AGENDA

DAY 1 – Wed, May 12, 2021

9:00am-4:00pm EDT

Eastern Daylight Savings Time

9:00-9:10a Graphene and Beyond Workshop – Welcome

Joshua Robinson, Professor, Dept. of Materials Science & Engineering; Associate Director, Center for Two Dimensional and Layered Materials; Director of User Programs, 2D Crystal Consortium-Materials Innovation Platform; Co-Director, NSF-I/UCRC Center for Atomically Thin Multifunctional Coatings; Materials Research Institute, The Pennsylvania State University (USA)

9:10-9:20a NSF 2D Crystal Consortium- Materials Innovation Platform (2DCC-MIP)

Joan Redwing, Professor of Materials Science and Engineering and Electrical Engineering; Director 2D Crystal Consortium-Materials Innovation Platform, Materials Research Institute, The Pennsylvania State University (USA)

9:20-11:00a SYNTHESIS & PROPERTIES

Moderator: *Yu-Chuan Lin*, The Pennsylvania State University (USA)

9:20-9:40a *Su Ying Quek*, Associate Professor, Department of Physics, National University of Singapore (Singapore)
Presentation: *"Bottom-up Design of 2D Material Functionalities from First Principles"*

9:40-10:00a *Tanushree Choudhury*, Assistant Research Professor, 2D Crystal Consortium, Materials Research Institute, The Pennsylvania State University (USA)
Presentation: *"Controlling oriented growth of wafer-scale transition metal dichalcogenides by MOCVD"*

10:00-10:20a *Camilla Coletti*, Senior Scientist, Istituto Italiano di Tecnologia (IIT) (Italy)
Presentation: *"Synthesis of Large-Scale Monolayer 1T'-MoTe₂ and Its Stabilization via Scalable hBN Encapsulation"*

10:20-10:40a *Roman Engel-Herbert*, Associate Professor, Materials Science and Engineering, The Pennsylvania State University (USA)
Presentation: *"Growth of Mono- & Dichalcogenide thin films by molecular beam epitaxy"*

10:40-11:00a *Thomas Kempa*, Assistant Professor, Department of Chemistry, John Hopkins University (USA)
Presentation: *"Manipulation of dimensionality and strain in transition metal dichalcogenide nanocrystals"*

11:00a-12:00p **POSTER SESSION I**

Moderators: Tianyi Zhang, Tomotaroh Granzier, Nick Simonson, Cindy Chen

Meet the presenters live in [Gather.Town](#)

12:00-12:45p **BREAK**

12:45-1:00p **2D Highlights at Penn State**

Mauricio Terrones, Verne M. Willaman Professor of Physics, Distinguished Professor of Physics, Chemistry and Materials Science & Engineering; Director, Center for Two Dimensional and Layered Materials; Director, NSF-I/UCRC Center for Atomically Thin Multifunctional Coatings; Co-Director, CRAFT Center, Materials Research Institute, The Pennsylvania State University (USA)

1:00-1:20p **NANOTECHNOLOGY**

Moderator: Joshua Robinson, Professor, Dept. of Materials Science & Engineering, The Pennsylvania State University (USA)

Andrea Ferrari, Professor of Nanotechnology, University of Cambridge (United Kingdom)

Presentation: "Advances in Graphene Technology"

1:20-2:00p **KEYNOTE**

Moderator: Joshua Robinson, Professor, Dept. of Materials Science & Engineering, The Pennsylvania State University (USA)

Dimitri Basov, Higgins Professor and Chair of Physics; Director, Energy Frontiers Research Center, Columbia University (USA)

Presentation: "Live from New York: Programmable Quantum Materials"

2:00-3:00p **THEORY**

Moderator: Matt Mancini, The Pennsylvania State University (USA)

2:00-2:20p *Kristian Sommer Thygesen*, Professor, Department of Physics, Technical University of Denmark (Denmark)

Presentation: "Understanding light-matter interactions in 2D materials"

2:20-2:40p *Yuanyue Liu*, Assistant Professor, Advanced Materials Science and Engineering, Walker Department of Mechanical Engineering, The University of Texas at Austin (USA)

Presentation: "First-Principles Simulations of Electron Transport and Electrocatalysis of 2D Materials"

2:40-3:00p *Angelika Knothe*, Research Associate, Condensed Matter Physics Group, Department of Physics & Astronomy, The University of Manchester (United Kingdom)

Presentation: "Transport in electrostatically induced bilayer graphene quantum dots"

2:50-3:00p **BREAK**

3:00-4:00p **MAGNETISM & SUPERCONDUCTIVITY**

Moderator: Yuanxi Wang, The Pennsylvania State University (USA)

3:00-3:20p *Alberto Morpurgo*, Professor, Department of Condensed Matter Physics, University of Geneva (Switzerland)

Presentation: "2D Magnetic Materials"

3:20-3:40p *Folkert de Vries*, Postdoctoral Scholar, Department of Physics, ETH Zurich (Switzerland)

Presentation: "Gate-defined Josephson junctions in magic-angle twisted bilayer graphene"

3:40-4:00p

Zhong Lin, Postdoctoral Scholar, University of Washington (USA)

Presentation: "Magnetic, Electronic, and Structural Coupling effects in the 2D Ising Ferromagnetic Insulator VI3"

4:00p

Day 1 Closing Remarks

DAY 2 – Thu, May 13, 2021

9:00am-4:00pm EDT

Eastern Daylight Savings Time

9:00-9:40a

KEYNOTE

Moderator: Joshua Robinson, Professor, Dept. of Materials Science & Engineering, The Pennsylvania State University (USA)

Goki Eda, Associate Professor, Dean's Chair Professor, Department of Chemistry, National University of Singapore (Singapore)

Presentation: "Engineering 2D materials: from photonics to magnetism"

9:40-11:40a

PROPERTIES

Moderator: Furkan Turker, The Pennsylvania State University (USA)

9:40-10:00a

Mark Edmonds, Lecturer, School of Physics and Astronomy, Monash University (Melbourne)

Presentation: "Crossover from 2D ferromagnetic insulator to wide bandgap quantum anomalous Hall insulator in ultra-thin MnBi₂Te₄"

10:00-10:20a

Bruno Schuler, Research Scientist, Empa Materials Science and Technology (Switzerland)

Presentation: "The Carbon Radical Ion (CRI) in Monolayer WS₂"

10:20-10:40a

Ursula Wurstbauer, Chair of Prof. Dr. Alexander Holleitner, Walter Schottky Institute, Technical University of Munich (Germany)

Presentation: "Degenerate many-body states and multi-valley physics of excitons in vdW hetero-bilayers"

10:40-11:00a

Ajit Srivastava, Associate Professor, Department of Physics, Emory University (USA)

Presentation: "Interacting Excitons in van der Waals Heterostructures of TMDs"

11:00-11:20a

Kenneth L. Knappenberger, Professor of Chemistry, The Pennsylvania State University (USA)

Presentation: "Atomic-level Structure Determines the Nonlinear Optical Properties of 2D Polar-Metal Heterostructures"

11:20-11:40a

Nicholas Glavin, Functional Materials Division, Air Force Research Laboratory (USA)

Presentation: "Bridging scale and precision in 2D TMD sensors"

11:40a-12:45p

BREAK

12:45-2:45p

DEVICES & PROPERTIES

Moderator: Yu-Chuan Lin, The Pennsylvania State University (USA)

12:45-1:05p

Frank Koppens, Group Leader, ICREA Professor, ICFO- The Institute of Photonic Sciences (Spain)

Presentation: "Nanocavities and photodetection with indirectly-patterned hyperbolic media"

1:05-1:25p

Bruno Paulillo, Postdoctoral Researcher, PROBIST Fellow, ICFO- The Institute of Photonic Sciences (Spain)

Presentation: "Plasmonic mid-IR sensing using graphene and related materials"

1:25-1:45p	Stephen Wu, Assistant Professor, Department of Electrical and Computer Engineering, Department of Physics and Astronomy, University of Rochester (USA) Presentation: "Strain engineering 2D van der Waals based devices"
1:45-2:05p	Xiaogan Liang, Associate Professor, Mechanical Engineering, University of Michigan (USA) Presentation: "Analogue Ionically-Coupled Multi-Terminal Memristors Based on Plasma-Treated MoS ₂ Layers"
2:05-2:25p	Rehan Kapadia, Assistant Professor, Electrical and Computer Engineering, University of Southern California (USA) Presentation: "Efficient Graphene Hot Electron Devices: Electrochemistry and Electron Emission"
2:25-2:45p	Saptarshi Das, Assistant Professor, Engineering, Science & Mechanics, The Pennsylvania State University (USA) Presentation: "2D Material-based Smart Sensors and Computing Devices for Hardware Artificial Intelligence"
2:45-3:00p	Break
3:00-4:00p	POSTER SESSION II Moderators: Tianyi Zhang, Tomotaroh Granzier, Nick Simonson, Cindy Chen Meet the presenters live in Gather.Town
4:00p	Day 2 Closing Remarks

DAY 3 – Fri, May 14, 2021

9:00am-2:05pm EDT

Eastern Daylight Savings Time

9:00-11:00a	PROPERTIES Moderator: Yu Lei, The Pennsylvania State University (USA)
9:00-9:20a	Giulio Cerullo, Professor, Politecnico di Milano (Italy) Presentation: "Ultrafast charge transfer in heterostructures of two-dimensional materials"
9:20-9:40a	Roman Gorbachev, Senior Research Fellow, Manchester University (United Kingdom) Presentation: "Atomic reconstruction in twisted TMD interfaces and their electronic properties"
9:40-10:00a	Jonathan Coleman, Professor of Chemical Physics, CRANN Institute and AMBER, Trinity College Dublin (Ireland) Presentation: "Electrical and electrochemical applications of liquid exfoliated nanosheets"
10:00-10:20a	Bernd Beschoten, Chair for Experimental Physics (Solid State Physics) and II. Physics Institute, RWTH Aachen University (Germany) Presentation: "Toward ballistic spin transport in bilayer graphene"
10:20-10:40a	Saroj Prasad Dash, Associate Professor at the Department of Microtechnology and Nanoscience, Quantum Device Physics Laboratory, Chalmers University of Technology (Sweden) Presentation: "2D heterostructure with topological materials and magnets"
10:40-11:00a	Inna Vishik, Assistant Professor, University of California, Davis (USA) Presentation: "Shear displacement driven by surface electron doping in WTe ₂ "

11:00a-12:00p BREAK

12:00-12:45p KEYNOTE

Moderator: Joshua Robinson, Professor, Dept. of Materials Science & Engineering, The Pennsylvania State University (USA)

Geoffrey Pourtois, Scientific Director, IMEC (Belgium)

Presentation: *"An atomistic incursion into the 2D world: when simulations meet material reactivity"*

12:45-2:05p PROPERTIES & DEVICES

Moderator: Mauricio Terrones, Verne M. Willaman Professor of Physics, Distinguished Professor of Physics, Chemistry and Materials Science & Engineering, The Pennsylvania State University (USA)

12:45-1:05p *Annick Loiseau*, Research Director, ONERA (France)

Presentation: *"Hexagonal boron nitride for 2D devices: learnings from optical optics"*

1:05-1:25p *Coskun Kocabas*, Professor of 2D Device Materials, The University of Manchester (United Kingdom)

Presentation: *"Graphene-based adaptive optics for long-wavelength light"*

1:25-1:45p *Marco Romagnoli*, Principal Investigator, National Inter-University Consortium for Telecommunications (CNIT) (Italy)

Presentation: *"Graphene photonics for optical high-speed transceivers"*

1:45-2:05p *Hailong Fu*, Postdoctoral Scholar, Department of Physics, The Pennsylvania State University (USA)

Presentation: *"Gapless spin wave transport through a quantum canted-antiferromagnet"*

2:05p Graphene and Beyond Workshop – Closing Remarks

Joshua Robinson, Professor, Dept. of Materials Science & Engineering; Associate Director, Center for Two Dimensional and Layered Materials; Director of User Programs, 2D Crystal Consortium-Materials Innovation Platform; Co-Director, NSF-I/UCRC Center for Atomically Thin Multifunctional Coatings; Materials Research Institute, The Pennsylvania State University (USA)

Mauricio Terrones, Verne M. Willaman Professor of Physics, Distinguished Professor of Physics, Chemistry and Materials Science & Engineering; Director, Center for Two Dimensional and Layered Materials; Director, NSF-I/UCRC Center for Atomically Thin Multifunctional Coatings; Co-Director, CRAFT Center, Materials Research Institute, The Pennsylvania State University (USA)