



EARLY CAREER
RESEARCHER
SYMPOSIUM

2019

ECRS
BROOKHAVEN NATIONAL LABORATORY



November 14, 2019

PROGRAM

LETTER FROM THE ORGANIZERS

Dear Guest,

Welcome and thank you for participating in the eighth annual Early Career Researcher Symposium (ECRS), presented by the Association of Students and Postdocs (ASAP).

This symposium is a showcase of the exceptional research that is performed by students and postdocs at Brookhaven National Laboratory (BNL). Today the BNL early career researcher community will present their recent work through 40 oral presentations and 20 posters. A career panel and a distinguished keynote lecture will complement this display of work.

Dr. Berndt Mueller, Associate Laboratory Director for Nuclear & Particle Physics, will give the opening remarks. The career panel will feature numerous professionals across a wide range of scientific backgrounds where students and postdocs will have the opportunity to learn from their experience. In the afternoon, Dr. Ashley Head, staff scientist at the Center for Functional Nanomaterials, will address the symposium. Laboratory Director Doon Gibbs will deliver the award ceremony and closing remarks, which will be followed by a networking reception.

The symposium was organized by a group of students and postdocs whose work and generous donation of time show great dedication to their fellow researchers. Financial support was provided by the sponsors listed on the back cover of this program. We encourage you to visit their booths throughout the day and explore the links provided on the ECRS website (<https://www.bnl.gov/ecrs2019/sponsors.php>). ASAP is an organization dedicated to ensuring a high quality of life for early career researchers at BNL. It is funded by Brookhaven Science Associates and supported by senior staff members. The ASAP board recognizes the importance of professional development to its members and it is in this spirit that we present the ECRS. Thank you for your participation and support for the ECRS. We hope that you enjoy your day.

Sincerely,

The ASAP Board



Lei Wang



Kyle Capobianco-Hogan



Liang Song



Feng Zhang



Matthew Musgrave



Prashanth Shanmuganathan

PROGRAM SCHEDULE

8:00-9:00	Registration Poster Hanging Breakfast	Lobby
9:00-9:15	Opening Remarks Dr. Berndt Mueller	Auditorium
9:20-11:10	Parallel Oral Sessions	A, B, C, Auditorium
11:10-12:00	Career Panel Dr. Kathleen Amm Dr. Priscilla Antunez Dr. Kathleen Flint Ehm Dr. Sanjaya Senanayake Dr. Rachel Stevenson	Auditorium
12:00-12:50	Poster Session A Odd numbered posters	Lobby
12:50-1:40	Poster Session B Even numbered posters	Lobby
1:40-3:30	Parallel Oral Sessions	A, B, C, Auditorium
3:30-3:50	Coffee Break Organizer & Volunteer Photo	Lobby
3:50-4:30	Keynote Address Dr. Ashley Head	Auditorium
4:30-5:00	Closing Remarks Dr. Doon Gibbs Awards Presentation	Auditorium
5:00-7:00	Reception	Lobby

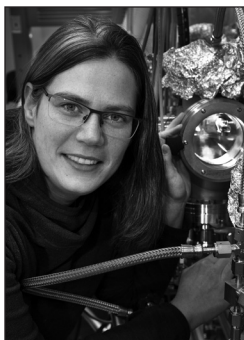
PARALLEL ORAL SESSIONS: MORNING

	Room A Session Chair: Maria Torres Arango	Room B Session Chair: Burcu Karagoz	Room C Session Chair: Andrea Mattera	Auditorium Session Chair: Seokjoon Oh
9:20-9:40	Nanoscale Chemical Imaging with Hard X-rays <i>Aliith Pattammattel</i> Photon Sciences	Studies of Heavy-Flavor Jet Modification Using DO-Hadron Correlations in Azimuth and Pseudorapidity in Au+Au Collisions at 200 GeV at the STAR Experiment <i>Alexander Jentsch</i> Physics Department	The Role of Electron Localization on Covalency and Electrochemical Properties of Lithium-Ion Battery Cathode Materials <i>Xuelong Wang</i> Chemistry Department	Describing the QCD structure of the proton <i>Abha Rajan</i> Physics Department
9:40-10:00	Multimodal Study of Structural and Chemical Evolutions in Next Generation Batteries through Synchrotron Characterizations <i>Cheng-Hung Lin</i> National Synchrotron Light Source II	Bi-continuous Pattern Formation in Thin Films via Solid-State Interfacial Dealloying <i>Changshang Zhao</i> Photon Sciences	The Chilling Recount of an Unexpected Discovery: First Observations of the Plasma-Cascade Instability in the Coherent Electron Cooling Experiment <i>Irina Petrushina</i> Collider Accelerator Department	Multimodal and In-Situ Characterization of the Morphological and Chemical Evolution of Ni and Ni-20Cr Microwires in Purified Molten KCl-MgCl ₂ <i>Arthur Ronne</i> Photon Sciences
10:00-10:20	Structure of Phospholipase D1 Provides Insight into PI(4,5)P ₂ and RhoA Based Activation <i>Forrest Bowling</i> Biology Department	Polarized Single-Particle Quantum Dot Emitters through Programmable Cluster Assembly <i>Hongshu Zhang</i> Center for Functional Nanomaterials	Longitudinal double-spin asymmetry for inclusive jet and dijet production in pp collisions at $\sqrt{s} = 510$ GeV <i>Zilong Chang</i> Physics Department	A PSS/E Based Python Tool for Probabilistic Contingency Analysis of Electric Power Systems With Variable Renewables <i>Junpeng Zhan</i> Sustainable Energy Technologies Department
10:20-10:40	Growth and Structural Studies of In/Au(111) Alloys and InOx/Au(111) Inverse Oxide/Metal Catalysts <i>Jindong Kang</i> Chemistry Department	Luminosity monitor for EIC at BNL <i>Jaroslav Adam</i> Physics Department	Understanding the complex of 3d transition metal dopants and sulfur vacancies in the activation of MoS ₂ basal plane for HER: from structures to intrinsic descriptors <i>Mingjie Liu</i> Center for Functional Nanomaterials	Improving WRF-Solar Model for Wind Forecast over Complex Terrains <i>Yunpeng Shan</i> Environment, Biology, Nuclear Science & Nonproliferation
10:40-11:00	Investigation of the Influences of Cloud Microphysics and Aerosol-Cloud Interactions on Solar Irradiance Using WRF-Solar Model <i>Xin Zhou</i> Environment, Biology, Nuclear Science & Nonproliferation	Study of Polyamidoamine on a Novel Nano-hybrid Coating for Corrosion Protection <i>Xiaoyang Liu</i> Photon Sciences	Atomic Layer Deposition (ALD) of TiO ₂ on Elastomeric Polybutadiene Substrate to Achieve Dental Pulp Stem Cell Differentiation <i>Ya-Chen Chuang</i> Center for Functional Nanomaterial	New Approach for Improving the Electrochemical Performance of Li Metal Anode <i>Zulpiya Shadlike</i> Chemistry Department

PARALLEL ORAL SESSIONS: AFTERNOON

Room A Session Chair: Tom Flynn	Room B Session Chair: Zulpiya Shadke	Room C Session Chair: Die Wang	Auditorium Session Chair: Xuelong Wang
RL Navigating Block Copolymer Morphologies <i>Atsuhiko Kakimoto</i> Computational Science Initiative	Curing dynamics of industrial 3D printed epoxy materials using X-ray photon correlation spectroscopy <i>Benjamin Yavitt</i> National Synchrotron Light Source II	Cloud microphysics and droplet growth using airborne holograms during ACE-ENA field campaign <i>Neel Desai</i> Environmental and Climate Sciences Department	Data analysis pipeline for scanning micro-diffraction measurements on plant <i>Jiliang Liu</i> National Synchrotron Light Source II
Hydrothermal Treatment of Two-Dimensional Silicate Frameworks <i>Angela M. Norton</i> Center for Functional Nanomaterials	Machine Learned Spectral Functions for the Quantum Impurity Problem <i>Erica Sturm</i> Condensed Matter Physics and Materials Science Department	Infiltration synthesis of metal-oxide hybrid resists for advanced nanolithography <i>Nikhil Twale</i> Center for Functional Nanomaterials	Two-dimensional silica for gas separation and heterogeneous catalysis <i>Wei Chen</i> Center for Functional Nanomaterials
Polarimetry for Ions at the EIC <i>Ana Sofia Nunes</i> Physics Department	In-situ Characterization of the M-CeO_x (M=Fe, Co, Ni) Catalysts in the Dry Reforming of Methane <i>Feng Zhang</i> Chemistry Department	Structure and Chemical Behavior of Cesium on Metallic and Oxidized Copper for CO₂ Conversion <i>Rebecca Hamlyn</i> Chemistry Department	STAR measurements on charge-dependent correlations in 27 GeV Au+Au collisions to search for the Chiral Magnetic Effect <i>Yu Hu</i> Physics Department
Nuclear data for theranostics: updating the decay scheme of ⁷¹As <i>Andrea Mattera</i> Nuclear Science and Technology Department	Investigating Fundamentals of Materials and Additive Manufacturing Using X-ray Photon Correlation Spectroscopy <i>Maria Torres Arango</i> Photon Sciences	Elucidation of Doping Effect on the Kinetic Transport Pathway in Fast Charging Lithium Titanate via <i>in-situ</i> X-ray Absorption Spectroscopy, Machine Learning and ab-initio Calculations <i>Shanshan Yao</i> Sustainable Energy Technologies Department	30-degree Twisted Bilayer Graphene: Atomic Crystal Structure, Electronic Structure and Plasmonic Interactions <i>Zhongwei Dai</i> Center for Functional Nanomaterials
Fabrication of Electroactive ZnO Nanowire Structures via Infiltration Synthesis into Self-Assembled Block Copolymer Thin Films <i>Ashwath Subramanian</i> Center for Functional Nanomaterials	A Polarized ³He⁺⁺ Ion Source for an EIC <i>Matthew Musgrave</i> Collider Accelerator Department	In situ Structure Tracking Aided Synthetic Design of High-Ni Cathodes for Lithium-Ion Batteries <i>Sungun Wi</i> Sustainable Energy Technologies Department	Chemistry in Two-Dimensional Confined Spaces <i>Zubin Darbari</i> Center for Functional Nanomaterials
1:40-2:00	2:00-2:20	2:20-2:40	2:40-3:00
3:00-3:20			

KEYNOTE SPEAKER



Dr. Ashley Head

Ashley Head is a staff scientist at the Center for Functional Nanomaterials. She supports users of infrared spectroscopy and ambient pressure X-ray photoelectron spectroscopy instrumentation. Additionally, she conducts her own research program focuses on understanding atomic layer deposition mechanisms and heterogeneous catalysis with metal organic frameworks.

Ashley received her Bachelor of Science degree in chemistry from James Madison University in 2005. For a year she worked in the quality control lab of a milk and dairy creamer factory before returning to graduate school. In 2006 she received her PhD in physical chemistry, studying the gas phase electronic structure of molecules. Exhausted from graduate school, she taught general chemistry lab courses at Howard County Community College in Maryland for a year. Refreshed from a break in research, Ashley spent 2 years as a postdoc in at Lund University in Sweden learning about synchrotrons and surface science. Wanting to return to the US, Ashley accepted a second postdoctoral position at Lawrence Berkeley National Laboratory where she studied how nerve agent simulants adsorbed onto model systems of gas mask filtration materials. She also had a daughter during this three-year postdoc appointment. In January 2018, she joined Brookhaven National Laboratory at the CFN.

CAREER PANEL SPEAKER

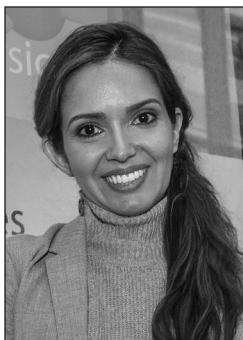


Dr. Kathleen Amm

Dr. Kathleen Amm obtained her Ph.D.-Condensed Matter Physics from Florida State University, and a B.Sc.-Mathematics and Physics-University of Toronto. She has over 18 years of experience in superconductivity and magnet design, and has published over 30 peer-reviewed publications and 22 patents in cryogenics and superconductivity. Her primary research areas of interest include: MRI and medical applications of superconductivity, superconducting electric machines, high temperature superconductivity, material properties at low temperatures, and permanent magnets. Kathleen is currently the Head of the Superconducting Magnet Division at Brookhaven National Laboratory where she works with her team on the design, production, and testing of superconducting magnets for particle accelerators and other applications.

Prior to joining BNL in 2018, she served as the Mission Leader for superconducting generators at GE Global Research where she worked with her team to deliver innovative superconducting technologies to GE businesses. Kathleen is a member of several professional societies - she is a senior member IEEE, an Applied Superconductivity conference board member, a former Cryogenic Engineering Conference Board member, a Superconductor Science and Technology Board member, a CSA member, an ASME member, a former GE Women's Network Steering Committee member. She is also DFSS Black Belt Certified and MATRIZ certified.

CAREER PANEL SPEAKER



Dr. Priscilla Antunez

Priscilla Antunez is an Assistant Director for Strategic Partnerships | Administration at the Center for Functional Nanomaterials (CFN). She is point of contact for Partnerships, Communications Liaison and Tech transfer Liaison at CFN. Additionally, her expertise includes solution-phase deposition of thin films, new materials development and process optimization for the fabrication of solar cell devices and synthesis, deposition, and characterization of colloidal nanomaterials and semiconducting thin films.

Priscilla received her first Bachelor of Science degree in Industrial and Management System Engineering from University of Sonora and her second Bachelor of Science degree in Chemistry from California State Polytechnic University-Pomona. In 2014, she received her Ph.D. degree in Chemistry from University of Southern California. She studied solution-phase synthesis and deposition of earth-abundant metal chalcogenide semiconductors during her Ph.D. In May 2015, she worked in IBM T.J. Watson Research Center as a postdoctoral researcher. Two years later, she became Business Development Executive in Argonne National Laboratory. In December 2018, she joined Brookhaven National Laboratory at the CFN as the Assistant Director for Strategic Partnerships.

She is passionate about sharing her experience with all students, postdocs and young researchers.

CAREER PANEL SPEAKER



Dr. Kathleen Flint Ehm

Kathleen Flint Ehm, PhD, is Director for Graduate and Postdoctoral Professional Development in the Graduate School at Stony Brook University. In this role, she fosters initiatives at the intersection of the university's research and education missions for students and postdocs, and directs the Office of Postdoctoral Affairs. She also teaches science communication for the Alan Alda Center for Communicating Science.

Dr. Flint Ehm specializes in postdoctoral policy and professional development for PhDs, including issues related to responsible conduct of research training, program and policy development, and fostering the advancement of postdoc women in academic science. She spent six years at the National Postdoctoral Association in Washington, DC, serving as project manager for grant-funded initiatives. In 2004, she spent a year in residence at the National Science Foundation where she was a Science and Technology Policy Fellow sponsored by the American Association for the Advancement of Science. There she specialized in issues concerning early-career scientists and helped manage one of NSF's newest postdoctoral fellowship programs.

An astronomer by training, Dr. Flint Ehm was a Postdoctoral Fellow at Gemini Observatory North and a Carnegie Fellow at the Carnegie Institution of Washington's Department of Terrestrial Magnetism. She holds a Ph.D. in Astronomy and Astrophysics from the University of California, Santa Cruz, and a B.S. in Math and Astronomy from the University of Arizona.

CAREER PANEL SPEAKER



Dr. Sanjaya D. Senanayake

Sanjaya Senanayake is a staff chemist at the Chemistry Division in Brookhaven National Laboratory and a PI in the Catalysis Reactivity and Structure Group. He conducts his research program focused on heterogeneous catalysis and surface science by using synchrotron techniques and electron microscopy of nanoparticles, metal oxides, model and powder catalysts.

Sanjaya received his Bachelor of Technology in Materials with Honours from The University of Auckland in 2001. In 2006 he received his PhD in Chemistry from The University of Auckland. Then he started his Postdoctoral Research Associate career at the Chemical Sciences Division in Oak Ridge National Laboratory (ORNL), during which he studied surface chemistry using X-rays. From 2008 to 2012, he worked as a Postdoctoral Research Associate in Brookhaven National Laboratory (BNL). Then he became an Assistant Chemist in 2012 and Associate Chemist in 2014. In 2018, he became a chemist in Brookhaven National Laboratory at the Chemistry Division. Sanjaya received the DOE Early Career Award in 2017.

He is passionate about communicating science to a variety of audiences and mentoring young scientists.

CAREER PANEL SPEAKER



Dr. Rachel Stevenson

Rachel Stevenson is a Data Scientist at Macy's. Before joining Macy's, she was a Research Scientist at Formulus Black, where she performed systematic benchmarking studies of the company's new in-memory-computing architecture.

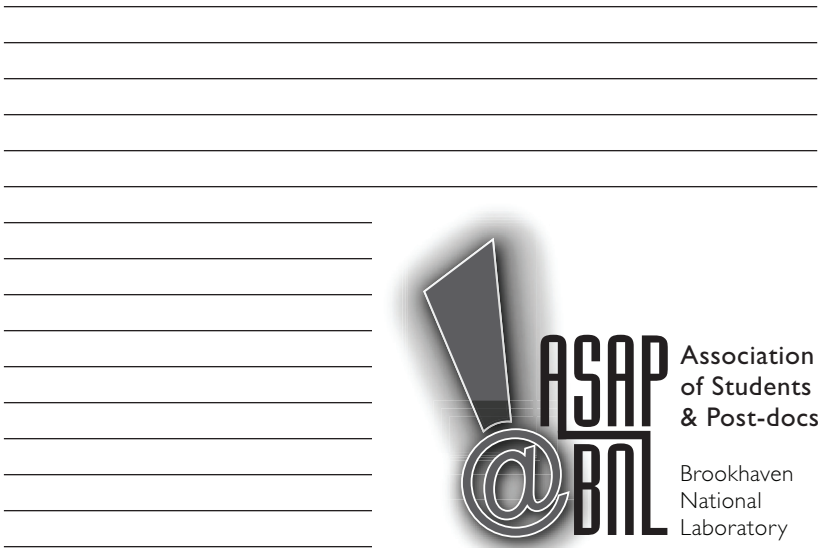
Rachel received her Bachelor of Science in Physics and Mathematics from Vanderbilt University in 2006. In 2013 she received her PhD in Condensed Matter and Materials Physics from The University of Tennessee-Knoxville studying the quantum Hall system. Then she started her Postdoctoral Research Associate career at Purdue University where she applied few-body-physics technique to the quantum Hall problem. From 2016 to 2017, she worked as a Postdoctoral Researcher at the University of Michigan developing numerical simulations of strongly interacting cold-atom condensates, and then returned to Purdue University as a Visiting Research Scholar in November of 2017 for half of a year. In 2018, she joined in Formulus Black and 9 months later, she joined Macy's as a Data Scientist.

POSTERS

1. **Very Forward Proton Detection and Interaction Region Requirements for an Electron Ion Collider**
Alexander Jentsch
2. **Identifying an Economic Mechanism for Providing Inertial Support for Modern Power Grid Through Renewable Energy Resources**
Amirthegunaraj Yogarathnam
3. **Influence of Multiple Equivalent Reaction Pathways on Rates of Proton Couple Electron Transfer**
Brian Dimarco
4. **Mechanism of the accelerated water formation reaction under interfacial confinement**
Chen Zhou
5. **Innovative methods for evaluating fission yields**
Gino Fabricante
6. **Electrochemical and Photochemical CO₂ Reduction with Ruthenium Catalysts Containing NHC Ligands**
Lei Zhang
7. **Iridium-Zinc Alloy Catalysts for Electro-oxidation of Ammonia in Alkaline Media**
Liang Song
8. **Addressing Multi-Functional Protein Families with Comparative Genomics, Biochemistry and Genetics**
Miriam Pasquini
9. **Machine Learning for Scientist & Engineers: All You Need to Know**
Odera Dim
10. **A new method to characterize the Rayleigh scattering for large-volume liquid scintillator detectors**
Sasmit Gokhale
11. **Realistic Uncertainty Determination of Nuclear Level Densities**
Sophia Hollick
12. **Evaluation of solvent contactors for separations of Ac-225 from Thorium and/or Radium**
Steven Slote
13. **Actinium-225 column automation and flow studies**
Theresa Grimaldi
14. **Synthesis of Two-dimensional Silica and Aluminosilicate Structures**
Yixin Xu

POSTERS

- 15. Collision geometry and breakup determination in eA collisions
Wan Chang
- 16. Confined Catalysis under 2D Silica: A CO Oxidation Study
Calley Eads
- 17. Enhancing User Interaction with Nuclear Physics Databases
Benjamin Shu
- 18. Forward Calorimeter System: Optimal Resolution for SiPM's
Roman BurrIDGE
- 19. Crystal structure of a lipin phosphatidic acid phosphatase provides insight into N-Lip function, membrane association, and disease mutations
Valerie Khayyo
- 20. 3D- morphology of Bimodal Porous Cu Fabricated via de-alloying Method
Lijie Zou

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THANK YOU

Tiffany Bowman	Barbara Chapman
Doon Gibbs	Katherine Hughes
Berndt Mueller	Forrest Bowling
Will Safer	Roger Stoutenburg
Chris Weaver	Jonathan Gentile
Kathleen Flint Ehm	Laura Rotundo
Shruti Sharma	

JUDGES

Nathalie Bouet	Dmitriy Polyanskiy
Anibal Boscoboinik	Gerald Manbeck
Bjoern Schenke	Deyu Lu
David J Schlyer	Jerzy Sadowski
Nicholas Camillone	Kotaro Sasaki
Qin Wu	Sooyeon Hwang
Salvadoe Fazio	Chang-jun Liu
Weiguo Yin	Crysten Blaby
Iradwikanari Waluyo	Mehmed Ertem
Fernando Camino	Miomir Vukmirovic
Daniel Mazzone	Enyuan Hu
David Grills	Esther Tsai

GUESTS

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Kathleen Amm
Priscilla Antunez
Kathleen Flint Ehm
Sanjaya Senanayake
Rachel Stevenson

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