

14th Annual ORPA Research Symposium

AGENDA

Wednesday, May 6 th , 2026 (Day 1)		
09:00 – 09:10	Research Symposium Overview Luis Caicedo Torres and Qixing (Jason) Wang	TN Rooms, Bld. 5200
09:20 – 09:40	Welcome Address Teja Kuruganti, <i>Director, Computational Sciences and Engineering Division</i>	TN Rooms, Bld. 5200
09:45 – 10:30	Keynote Address Bob Grove, <i>Chief Operating Officer, Fission and Fusion Energy Sciences Directorate</i>	TN Rooms, Bld. 5200

Oral Presentation Session I			
10:40 – 11:55	ML/AI I RM 202A	Biosciences and Ecology RM 202B	Materials Science RM 202C
Session Chairs	Jihoon Chung Luis Caicedo Torres	Beant Kapoor Mustapha Abdulmojeed Julian Cosner	Shaofei Wang Ralph Bulanadi
10:40 – 10:52	Timothy Robertson <i>Operational Machine Learning at the Spallation Neutron Source</i>	Kathryn Bazany <i>Populus trichocarpa selects unique microbial communities under different climate-induced abiotic stress conditions</i>	Sohee Kwon <i>Tunable Topological and Magnetic Properties of MnBi₂(Te_{1-x}Sex)₄</i>
10:52 – 11:04	Lalit Yadav <i>Automated Phase Detection and Magnetic Structure Refinement in Neutron Diffraction Data</i>	Delaney Beals <i>High-resolution metaproteomics reveals functional redundancy in a defined bacterial community</i>	Brianna Billingsley <i>Magnetic structure characterization of Shastry-Sutherland material BaRE₂ZnS₅ (RE=Nd, Ce)</i>
11:04 – 11:16	Hunor Csala <i>MATEY: Open-source Framework for Spatiotemporal Foundation models for Physical Systems</i>	Dipendra Bhandari <i>Advancing non-covalent inhibitors against SARS-CoV-2 main protease</i>	Ralph Bulanadi <i>Auto-3DPFM: Automating Polarization-Vector Mapping at the Nanoscale</i>

11:16 – 11:28	Nasik Muhammad Nafi <i>Enabling Large-Scale Pressure Prediction for Turbulent Flows using Vision Transformer</i>	Apurv Mhatre <i>Unraveling Soil Microbe Establishment: Leveraging Genetic Mapping to Identify Genetic Factors shaping the Soil Microbiome</i>	Nduka Ogbonna <i>Hydrophilically Engineered Polyamides for High-Yield Enzymatic Recycling and Critical Minerals Capture</i>
11:28 – 11:40	Emily Herron <i>CHUNKS: Functional Agents for Functional Materials</i>	Swetha Suresh Kumar <i>Systems genetics study of Winter and Summer regulatory networks controlling wood formation in Populus trichocarpa</i>	Muchu Zhou <i>Adsorption of hydroxamic acid ligands for improved extraction of rare earth elements from monazite ores</i>
11:40 – 11:52	Andrew Deas <i>Beyond Binary Prediction: Interpretable Machine Learning for Risk Stratification in Opioid Care</i>	Shane Franklin <i>Controlling matric potential in microfluidics to examine microbial dynamics in unsaturated porous media</i>	Valentin Pauly <i>Performance of a Dissimilar Metal Weld for Advanced Ultra-Supercritical Coal Power Plant Applications</i>

12:10 – 1:00	Sponsor Showcase - Working Lunch Jeffrey Willis , <i>Chairman, United Rare Earths, Inc.</i> Avery Brown , <i>Senior Mechanical Engineer, Endeavor Composites, Inc.</i>	TN Rooms, Bld. 5200
1:00 – 1:45	Keynote Address <i>Xiao-Ying Yu, Distinguished Scientist Group Leader, Advanced Nuclear Materials</i>	TN Rooms, Bld. 5200
1:45 – 2:00	Group Photo	TN Rooms, Bld. 5200
2:00 – 5:00	<p style="text-align: center;">Poster Sessions</p> <p style="text-align: center;">[Session 1] 2:15 – 3:15 Odd Numbered Posters [Session 2] 3:30 – 4:30 Even Numbered Posters</p> <p style="text-align: center;">Chairs: Juhyun Oh Hannah Musgrove Zechariah Kitzhaber Regan McDearis</p>	Main Street, Bld. 5700

Thursday, May 7th, 2026 (Day 2)

09:00 – 09:10	Research Symposium Overview Luis Caicedo Torres and Qixing (Jason) Wang	TN Rooms, Bld. 5200
09:10 – 09:25	Welcome Address Moody Altamimi, Director, Office of Research Education	TN Rooms, Bld. 5200
09:30 – 10:15	Keynote Address Mitchel Doktycz, Corporate Fellow and Section Head, Bioimaging and Analytics	TN Rooms, Bld. 5200

Oral Presentation Session II

	Building and Transportation Sciences RM 202A	Quantum Science and Physics RM 202B	Fission and Fusion Energy RM 202C
10:25 – 11:40			
Session Chairs	Saijan Pokhrel Doris Hung Shiwanka Wanasinghe	Aneesh Ramaswamy Nirjhar Sarkar	Shaileyee Battacharya Yadu Sasikumar
10:25 – 10:37	Shrikar Banagiri <i>Influence of operating conditions on ethanol-fired passive prechamber combustion engines</i>	Amit Jamadagni Gangapuram <i>Efficient representation of noisy quantum states at scale</i>	Gabriel Parker <i>Chemical, Mechanical, and Thermal Properties Evaluation of Lithium Ceramics as Solid Breeder Materials for Fusion Reactors</i>
10:37 – 10:49	Jihoon Chung <i>Bridging Advanced Building Control and Scalable Deployment: A Low-Cost, Open-Source Building Energy Management Framework for Small and Medium-Sized Commercial Buildings</i>	Anshumitra Baul <i>Entanglement benchmarking in Quantum Simulations of Spin Systems</i>	Daniel Schappel <i>Analysis of Fission Product Release from Furnace-Tested TRISO Particles</i>
10:49 – 11:01	Chih-Hsuan "Doris" Hung <i>From Materials to Megawatt-Hours: Modeling Sodium-Ion Batteries for Grid Applications</i>	Chiranjit Mondal <i>Two-band Euler Topology as a Source of Single-Band Quantum Geometry</i>	Yuchen Jiang <i>Transient plasma simulations for interaction with liquid metal in magnetic confinement fusion reactors</i>
11:01 – 11:13	Saijan Pokhrel <i>Numerical modeling of thermal energy extraction from abandoned mine shafts using closed-loop heat exchangers</i>	Deb Mallick <i>Microstructural-heterogeneity induced macroscopic angular magnetoresistance in conventional and unconventional superconductors</i>	Zechariah Kitzhaber <i>Staying in the Loop: Online Monitoring of Molten Salts via Laser-Induced Breakdown Spectroscopy</i>

11:13 – 11:25	Huixin Jiang <i>Multifunctional Metal Organic Framework Composites for Improving Indoor Air Quality</i>	DoHoon Kim <i>Discovery of quantum magnetic delafossites via High-throughput first-principles calculation</i>	
11:25 – 11:37	Karen P. Cortes Guzman <i>Phosphorous-based Flame Retardants as a Safe and High-performing Solution for Building Technologies</i>		

11:45 – 1:15	Reflections on Leadership Panel – Working Lunch Tara Pandya , Section Head, Nuclear Applications, Methods, and Data Melissa Cregger , Chief Science Officer, Center for Bioenergy Innovation Sarah Cousineau , Director, Research Reactor Division Mariam Kiran , Group Leader, Quantum Communications and Network	TN Rooms, Bld. 5200
1:15 – 2:00	Keynote Address Jon Taylor , Associate Lab Director, Neutron Sciences Directorate	TN Rooms, Bld. 5200

Oral Presentation Session III

	AI/ML II RM 202A	Chemistry and Chemical Ecology RM 202B	Nuclear Materials RM 202C
2:10 – 3:10			
Session Chairs	Hunor Csala Yunhan Wu	Rachel Gaines Nishu Devi Mustapha Abdulmojeed	Jing Lin Thiago Pinheiro dos Santos
2:10 – 2:22	Aaron Werth <i>Comparison and Analysis of Modern AI-Based Pentesting Tools</i>	Nishu Devi <i>Dopant-Guided Suppression of SO₂ Poisoning in Cu Catalysts for Electrochemical CO₂ Reduction</i>	Shaileyee Bhattacharya <i>Investigation of hydrogen retention and phase stability in neutron-irradiated yttrium hydrides: A synchrotron X-ray diffraction study</i>
2:22 – 2:34	Raymond Borges Hink <i>From Evidence to Vulnerability Candidates: An Explainable Local Pipeline for Cyber and OT Triage using Large Language Models</i>	Nicholas Gregorich <i>Repurposing Lithium Battery Recycling Wastewater for Marine Carbon Dioxide Capture and Storage</i>	Matthew deJong <i>Stability of neutron irradiated yttrium hydride under cyclic heating</i>

2:34 – 2:46	<p>Yunhan Wu <i>High-Resolution Modeling of Indoor Radon Exposure with Uncertainty Quantification in Utah</i></p>	<p>Noor Md Shahriar Khan <i>Theoretical investigation of molecular photoswitch for early detection of Alzheimer’s disease</i></p>	<p>Yuki Jimba <i>Effects of High Dose Neutron Irradiation at Light Water Reactor-Relevant Temperatures on the Mechanical Properties of SiC/SiC Composites</i></p>
2:46 – 2:58	<p>Zhongcan Xiao <i>Transforming Single Crystal Neutron Diffraction with Agentic AI</i></p>	<p>Molly Paul <i>Frontiers of particle analysis: an innovative device for single particle ICPMS</i></p>	<p>Logan Clowers <i>Fracture Toughness Testing of Nuclear Structural Materials in Extreme Environments Using Miniaturized Test Specimens</i></p>
2:58 – 3:10	<p>Gomathi Lakshmanan <i>Milo: An Intelligent Research CoPilot</i></p>	<p>Jinping Xue <i>Sorption-based removal of mercury species from aqueous solutions: Influencing factors and environmental implications</i></p>	<p>Thiago J. Pinheiro dos Santos <i>Accurate Prediction of Chemical and Redox Potentials in Molten Salts from DFT-Based Free Energy Simulations</i></p>

3:15 – 4:00	<i>[previous registration required]</i> Career Pathways Networking Event	TN Rooms Lobby, Bld. 5200
4:00 – 4:30	<p>Career Pathways Panel</p> <p>Burak Ozpineci, <i>Corporate Fellow</i> Budhu Bhaduri, <i>Chief Data Officer</i> Uday Vaidya, <i>Governor’s Chair</i> Amanda Thornton, <i>Project Management Specialist</i> Ziad Burbar, <i>Siemens Healthineer</i> Yadu Sasikumar, <i>R&D Staff Member</i></p>	TN Rooms, Bld. 5200
4:30 – 5:00	Closing Ceremony	TN Rooms, Bld. 5200

Poster Session – May 6th 2:00pm – 5:00pm – Main Street, Bld. 5700

1	Polina Shpilker	Designing a Metadata Schema and Metadata Tools for Post-Translational Modification Proteomics Workflow Discovery and Interoperability
2	Owen Johnson	Optimization of a Laminar Flow Cell for Shear-Dependent Neutron Reflectometry
3	Hannah Musgrove	Air blown ion plasma treatment of autoxidative inks to reduce setoff
4	Regan McDearis	Interactions Between Warming and Drying Affect Microbial Communities, Activity and Decomposition Processes in Peatland Soil
5	Kristyn Ardrey	Examining EBC Systems on SiC Substrates in Varying High Temperature Steam Environments
6	Emily Herron	SciEntropy: Calibrated Uncertainty Quantification for Trustworthy Scientific AI Agents
7	Qixing (Jason) Wang	Title: A Game-Theoretic Min-Max Framework for Large-Scale Freight Network Vulnerability Assessment
8	Preeti Sar	Developing a machine learning framework for accurately determining transport fluxes using the quasilinear TGLF model
9	Sanjay Das	AI-powered cosmological simulations for dark energy signatures
10	Latif Patwary	Understanding Spatially Varying Determinants of E-Scooter Ridership for Smarter Urban Mobility
11	Chandra Sekhar Somayajula	Cost competitiveness of remanufactured wood products: Techno-economic and macroeconomic analyses
12	Ernesto Camilo Zuleta Suarez	Evaluation of Anode Designs for Sodium Metal Hybrid Redox Flow Batteries
13	Aneesh Ramaswamy	Characterization of long timescale polarization drifts in aerial-inground fiber using machine learning
14	Xinju Dong	Understanding of Molecular Interactions in Quantum Chemistry on Frontier HPC
15	Abdulrasheed Sado	Physics-Informed Deep Learning for Geometric Deblurring in Hyperspectral Neutron Imaging
16	Farhin Farhad Riya	From Gradients to Representations: A Unified View of Privacy Leakage in Federated Learning
17	Shalika Meedin	Water-Ion Correlations and Structural Dynamics in Concentrated Salt Solutions
18	Debashish Sur	Is High Mo Content in Ni based alloys Sufficient to Ensure Corrosion Resistance in Molten Salt Reactor Salts?

19	Jonas Mart Linge	Gas Diffusion Electrode Study of Oxygen Reduction on PtNi and PtCo-based Catalyst Layers for High Temperature Proton Exchange Membrane Fuel Cells
20	Jessica LaFond	Using High-Throughput Phenotyping to Explore the Genetic Basis of Biological Nitrification Inhibition in Populus
21	Bal Maharjan	Plant RNA Vision 2.0
22	Shivam Pandit	Sequence-Encoded Molecular Switches Control Condensate Formation in Plant Stress Proteins
23	Adnan Muzaffar	A Multigene Stacking Approach to Increase Cutin Biopolymer in Poplar