Technical Program

Tuesday, May 6

Smith Seminar Room, 1080 Physics Research Building

3:30 PM	Welcome and introductions
3:45 PM	IMR Keynote Address **Real Materials under Real Conditions in Real Time: Studies with High Brightness, High Energy X-rays at the Advanced Photon Source** G. Brian Stephenson, Director, Advanced Photon Source at Argonne National Labs
5:00 PM	Welcome Reception — *Physics Research Building Atrium*

Wednesday, May 7

The Blackwell and Pfhal Hall

8:30 AM	Registration
8:45 AM	Introductions
9:00 AM	Cross Cutting Session I
11:30 AM	Lunch – on your own
1:00 PM	Focus Session 1-2
5:00 PM	Poster Session and Evening Reception — *Blackwell Ballroom and Lobby*

Cross Cutting Session I
Advances in In-Situ Characterization

09:00	Environmental Transmission Microscopy for Catalysis Research: The Example of Carbon Nanotubes Eric A. Stach, Brookhaven National Laboratory
10:00	Coupling Time-Resolved *In Situ* Experiments With Electron Tomography – A New Approach To Defect Evolution Studies Ian M. Robertson, University of Wisconsin-Madison
10:45	Micro– and Nanomechanical in situ Characterization of Materials Daniel Gianola, University of Pennsylvania

	Focus Session 1 **Computational Design of Materials for Energy**	Focus Session 2 **Materials in Medicine**
01:00	Towards Predicting the Voltage at Lithium Ion Battery Electrode/Electrolyte Interfaces in All-Atom Ab Initio Molecular Dynamics Simulations Kevin Leung, Sandia National Laboratories	Biomaterial Systems with Controlled Temporal and Spatial Signal Presentation for Regulating Stem Cell Behavior and Tissue Engineering Eben Alsberg, Case Western
	Transport of Ions and Penetrants Through Structured Polymeric Matrices: Interplay of Structure and Dynamics of Polymers Venkat Ganesan, University of Texas-Austin	Engineering Better Biomarkers David Wood, University of Minnesota
02:30	Break	Break
02:45	Molecular Modeling of Tapered Diblock Copolymers Lisa M. Hall, The Ohio State University	Mechanical Forces and Engineering Vascular Morphogenesis Jonathan Song, Harvard Medical School
	Understanding CO2 Electroreduction on Cu Electrodes through First-Principles Modeling Aravind Asthagiri, The Ohio State University	Historical Perspectives on Tissue Engineering at Ohio State: Humble Beginnings Are Being Realized Douglas Kniss, The Ohio State University
	Low-Dimensional Materials for Low-Energy Devices Wolfgang Windl, The Ohio State University	Conducting Polymers: Stretchable Polymeric Neural Electrode Array Liang Guo, The Ohio State University
	The Water-Amorphous Silica Interface: Analysis of the Stern Layer and Surface Conduction Sherwin Singer, The Ohio State University	Lipoplex Nanoparticles for Cancer/Disease Detection ANF Therapy L. James Lee, The Ohio State University

Thursday, May 8

The Blackwell and Pfhal Hall

8:30 AM	Registration
9:00 AM	Cross Cutting Session II
11:30 AM	Lunch – on your own
1:00 PM	Focus Session 3·4
5:00 PM	Poster Session and Evening Reception Including Posters from the Ohio Third Frontier Ohio Research Scholars Program *Physics Research Building Atrium*

Cross Cutting Session II
Computational Materials

09:00 How a Theorist Talks about Materials Design of Complex Oxides (and still keeps experimentalists as friends)
Craig J. Fennie, Cornell University

10:00 Biomateriomics: Multiscale Materials By Design
Markus J. Buehler, Massachusetts Institute of Technology

10:45 Materials Behavior from First Principles: Atomic-Scale Investigation of Deformation Mechanisms in Mg Alloys
Maryam Ghazisaeidi, The Ohio State University

	Focus Session 3 **Biopolymers and Polymers**	Focus Session 4 **Oxides and Interfaces**
01:00	Green Polymer Chemistry: Natural Rubber Biosynthesis Judit E. Puskas, University of Akron	Engineering spin-orbital magnetic insulator by tailoring superlattices Hae Young Kee, University of Toronto
	Angstrom- to Nanometer-Scale Mechanisms of Collagen Biomineralization in Skeletal Tissues Nita Sahai, University of Akron	Neutron Scattering Studies of Magnetism of Complex Oxide Interfaces — An Emergent Property or Materials Science? Michael Fitzsimmons, Los Alamos National Laboratory
02:30	Break	Break
02:45	Lessons from Biology – Approaches to Inhibit Inflammation and Scarring Alyssa Panitch, Purdue University	Time resolved dynamics of thin films of the topological insulator Bi_2Se_3 Rolando Valdes Aguilar, The Ohio State University
	Characterization of Novel Bioplastic Elastomer Blends of Poly-(3-hydroxybutyrate-*co*-3-hydroxyvalerate) and Hevea Natural Rubber Yael Vodovotz, The Ohio State University	Novel Magnetic State in d^4 Mott Insulators Oinam Nganba Meetei, The Ohio State University
	Matrix Microarchitecture is a Potent Regulator of Cellular Response Keith J. Gooch, The Ohio State University	Chiral Magnetism at Oxide Interfaces Sumilan Banerjee, The Ohio State University
		Discussion Panel

Technical Program

Friday, May 9

The Blackwell and Pfhal Hall

8:30 AM	Registration
9:00 AM	Focus Session 5·6
12:15 PM	Closing and Poster Awards

	Focus Session 5 **Lightweight Structures and Manufacturing**	Focus Session 6 **Spin-Mediated Thermal Properties**
09:00	Reducing Vehicle Weight: Technology Challenges and Opportunities Alan Taub, University of Michigan Designing a Lightweight Body Structure: Challenges and Opportunities Gregory E. Peterson, Lotus Engineering Break	Coupling of Heat and Spin Currents in Metallic Multilayers David G. Cahill, University of Illinois at Urbana-Champaign On the Temperature and Length Scales of the Spin Seebeck Effect Stephen R. Boona, The Ohio State University
10:30	Break	Break
10:45	Flexible Manufacturing for Advanced Material in Lightweight Structures Craig Redinger, Honda R&D Light Metals and Manufacturing for Lightweight Structures Alan Luo, The Ohio State University Welding and Additive Manufacturing of Advanced Structural Metals Wei Zhang, The Ohio State University	Probing the Spin Pumping Mechanism and Efficiency Using Magnetic Insulator $Y_3Fe_5O_{12}$ (YIG) Based Structures Chunhui Du, The Ohio State University Theory of Phonon Diamagnetism Wolfgang Windl, The Ohio State University Discussion Panel

Ohio Research Scholars – Technology Enabling & Emergent Materials (TEEM) Symposium

– Closed Session –

Friday, May 9

102 Pfahl Hall (Executive Board Room)

08:30 AM	Breakfast
09:00 – 11:00 AM	Presentations and Discussions

The Ohio Research Scholars hired through the Technology-Enabling and Emergent Materials award are:

- Rafael Bruschweiler, Ohio Research Scholar in Organic Synthesis, The Ohio State University
- Katrina Cornish, Ohio Research Scholar in Bio-Based Emergent Materials, The Ohio State University
- Scott Gold, Ohio Research Scholar in Multiscale Composites Processing, University of Dayton
- David McComb, Ohio Research Scholar in Nanoscale Materials Characterization, The Ohio State University
- Nita Sahai, Ohio Research Scholar in Polymer Science, University of Akron

The Ohio Research Scholars program is funded by the Ohio Third Frontier program and the Ohio Development Services Agency.

Ohio Third Frontier Innovation Creating Opportunity

Ohio Development Services Agency