



2020 AFOSR/NSF Review: Materials in Extreme Properties

Drs. Ali Sayir / Alexis Lewis | October 13-16, 2020 | Virtual



Tuesday, Agenda Day 1 | October 13, 2020

Time	Topic	Speaker
9:00	ZOOM LOGIN	
9:15	WELCOMING REMARKS	A. Lewis & A. Sayir
PREDICTIVE MATERIAL SCIENCE: NSF & AFOSR PART I - QUANTITATIVE REPRESENTATION OF MICROSTRUCTURE (QRM)		
9:30	QRM 18 Microstructural Quantification and Virtual Reconstruction	M. Maiaru U MASS LOWELL
10:00	QRM 18 Visual Info to Quantify Microstructure-Processing Relationship	E. Holm & B. Webler CMU
10:30	BREAK	
11:00	QRM 18 Hybrid Adversarial-Training Methods for 3D Microstructures	S. Niezgoda & D. Dimiduk OSU
11:30	QRM 18 Cellular Materials via a Multiscale Quantitative Representation	Y. Zhu & L. Li VIRGINIA TECH
12:00	BREAK	
12:30	QRM 18 Microstructure Manifold Analysis Using Hierarchical Set of Morphological, Topological, and Process Descriptors	O. Wodo & B. Ganapathysubramanian SUNY BUFFALO/ ISU
13:00	YIP A Machine Learning for Structure-Property Relationship	S. Patala NCSU
13:30	Locally Extracted Globally Organized Microstructure Models	V. Sundararaghavan U. MICHIGAN
14:00	BREAK	
14:15	YIP Electronic Structure Basis for Solubility-Phase Stability in Alloys	M. Ghazisaeidi OSU
14:45	EOARD Local Structure and Chemistry in Marginal Glass Forming Alloys	E. Kalay and I. Kalay ODTU
15:15	Q & A Covid Related Challenges	A. Lewis & A. Sayir
17:00	ADJOURN	



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Wednesday, Agenda Day 2 | October 14, 2020

Time	Topic	Speaker
8:15	ZOOM LOGIN	
PREDICTIVE MATERIAL SCIENCE PART II - MICROSTRUCTURE PROPERTY RELATIONSHIP - PROCESSING SCIENCE		
8:30	High Temperature and Pressure Multicomponent Alloy Design	S. Yang SU A&M
9:00	The Nature of Quasi-periodic Avalanche Bursts Fatigue Cracks	J. El-Awady JHU
9:30	Scientific Understanding of Interfaces	H. Sehitoglu UIUC
10:00	BREAK	
10:30	Quantifying the Defect Character of Grain Boundaries	H. B. Chew UIUC
11:00	Theory and Experimentation of High Temperature Shape Memory Alloys	I. Karaman TEXAS A & M
11:30	Quantification of Atom Probe Tomography Data	W. Windl & E. Marquis U. MICHIGAN / OSU
12:00	BREAK	
12:30	YIP Directionally-Solidified Spiral Eutectics: Chiral Metamaterials	A. Shahani U MICHIGAN
13:00	Short Range Order and Electronic Entropy: from Melts to Solids	A. Allanore MIT
13:30	Carbon Vacancies on Properties of Transition-Metal Carbides	S. Kodambaka UCLA
14:00	Computational-Experimental Reactive Wetting of Hf-Ti-Me Melts	V. Kumar and A. Bronson UTEP
14:30	BREAK	
15:00	High-Temperature Grain Boundaries with Electric Fields	J. Luo UCSD
15:30	Investigation to the Interfacial Understanding of Dissolution	C. Randall PSU
16:00	Advances In Green Processing to form Transparent Ceramics	R. Speyer GIT
16:30	Optical Ceramics Science for High-Power Lasers	R. Gaume UCF
17:00	ADJOURN	





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Thursday, Agenda Day 3 | October 15, 2020

Time	Topic	Speaker
8:45	ZOOM LOGIN	
EXTREME ENVIRONMENT MATERIALS PART I – FIELD EFFECTS & DIELECTRIC BREAKDOWN OF MATERIALS		
9:00	EOARD 2D Metal Carbides for EM Shielding	G. Buke & C. Cevik TOBB / ANADOLU U.
9:30	Ceramic Nanolaminates for EM Shielding for the RF	J. Kennedy, D. Nepal, R. Pachter, and R. Vaia, FRL
10:00	Mechanisms of Electrical Contact Resistance	M. Baykara & A. Martini UC MERCED
10:30	BREAK	
11:00	Composite Material and Interface Physics of Cathode	W. Tang & T. Back AFRL
11:30	Permittivity, Polarization and Gas Dynamics in Ceramics	B. Tilley WPI
12:00	Millimeter Wave Interactions with High Temperature Materials	B. Hoff AFRL
12:30	BREAK	
13:00	Spin Configuration and Synthesis under EM Field	D. Vashaee NCSU
13:30	Nonreciprocal Structures with Phase-Change Components	A. Chabanov & B. Stadler UTSA / U MINNESOTA
14:00	EOARD Surface Roughness Effects in Reflection and Emission of IR	K. Sendur SABANCI
14:30	Field Enhanced Optical Transmission in Metal	M. Berg KANSAS STATE
15:00	Hierarchical Evaporator for Extreme Thermal Management	E. Wang MIT
15:30	ADJOURN	

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Friday, Agenda Day 4 October 16, 2020		
Time	Topic	Speaker
8:45	ZOOM LOGIN	
	EXTREME ENVIRONMENT MATERIALS PART II – DIELECTRIC BREAKDOWN OF MATERIALS	
9:00	EOARD Defects on the Electrocaloric Relaxor Ferroelectrics	E. M. Alkoy & B. Misirlioglu GEBZE / SABANCI U.
9:30	EOARD Controlling Degradation of High-permittivity Dielectrics	A. Klein DARMSTADT
10:00	YIP Multiphysics Modeling of Insulation Materials	M. Ghassemi UVA
10:30	BREAK	
11:00	YIP Nanoscale Pyroelectric Hybrid Materials	J. Shi RPI
11:30	Co-doping Perovskite Dielectrics under Extreme Field	E. Dickey NCSU
12:00	Metal/Dielectric Interface Degradation and Breakdown	D. Irving NCSU
12:30	Nonlinear Optical Imaging of Breakdown in Dielectrics	S. Greenbaum and Y. Ren HUNTER COLLEGE
13:30	JOINT NSF & AFRL OPPORTUNITIES	D. Tilbury, NSF L. Sapochak, NSF P. Balan, NSF R. Vaia, AFRL V. Blackwood, AFOSR J. Maurice, IO - AFOSR
15:00	ADJOURN	

END OF WEEK 1