

**2015 CROSSCUTTING TECHNOLOGY RESEARCH REVIEW MEETING**

<b>MONDAY APRIL 27</b>	8:00 AM	<b>REGISTRATION AND CONTINENTAL BREAKFAST</b>													
	9:00 AM	1	<b>JOINT SESSION</b>	<b>KEYNOTE SPEAKER</b>						<b>Crosscutting Technology Research Program Speaker</b>					
				<b>Dr. Grace Bochenek</b> Director, National Energy Technology Laboratory						<b>Dr. Robert Romanosky</b> Deputy Director, NETL Office of Coal and Power R&D					
	10:00 AM	<b>MORNING BREAK</b>													
		<b>HIGH PERFORMANCE MATERIALS</b>						<b>SENSORS &amp; CONTROLS AND SIMULATION-BASED ENGINEERING</b>							
		<b>Breakout Session Number</b>	<b>Breakout Session Title</b>	<b>Moderator</b>	<b>Organization</b>	<b>Presentation Title</b>	<b>Presenter</b>	<b>Breakout Session Number</b>	<b>Breakout Session Title</b>	<b>Moderator</b>	<b>Organization</b>	<b>Presentation Title</b>	<b>Presenter</b>		
	10:30 AM	2	Advanced Manufacturing - Materials	Richard Dunst	The University of Texas at El Paso	Mechanically Activated Combustion Synthesis of MOSi2-Based Composites	Evgeny Shafirovich	3	SIMULATION-BASED ENGINEERING	Steven Seachman	Ames National Laboratory	Engineered Complex Systems: Development of a Cloud-Based Modeling Framework for Complex Advanced Power Systems	K. Mark Bryden		
					The University of Texas at El Paso	A Computational Experimental Study of the Plasma Processing of Carbides at High Temperatures	Arturo Bronson				Ames National Laboratory	Merged Environments for Simulation and Analysis: Building an Extensible Framework for Testing New Controls Algorithms	Paolo Pezzini		
	11:30 AM	<b>LUNCH</b>													
	1:00 PM	4	ADVANCED MANUFACTURING - MATERIALS	Richard Dunst	Energy Industries of Ohio Inc.	Benefits Of Tailoring Hot Isostatic Pressure/Powdered Metal (HIP/PM) and Additive Manufacturing (AM) To Fabricate Advanced Energy System Components	Horton, Nancy	5	SIMULATION-BASED ENGINEERING	Steven Seachman	Ames National Laboratory	Numerical Simulation of Polydisperse Gas-Particle Flow in a Vertical Riser with a Size-Velocity Quadrature-Based Moment Method	Bo Kong		
Ceralink, Inc.					Additive Manufacturing for Cost Efficient Production of Compact Ceramic Heat Exchangers and Recuperators	Shulman, Holly	National Energy Technology Laboratory				Recent Advances in MFI and Multiphase Flow Research	Mehrdad Shahnam			
The University of Texas at El Paso					Design Optimization of Liquid Fueled High Velocity Oxy-Fuel Thermal Spraying Technique for Durable Coatings for Fossil Power Systems	Choudhuri, Ahsan	National Energy Technology Laboratory				Carbon Capture Simulation Initiative (CCSI)	David Miller			
2:30 PM	<b>AFTERNOON BREAK</b>														
3:00 PM	6	COMPUTATIONAL MATERIALS	Jason Hissam	Purdue University	Predicting Microstructure-Creep Resistance Correlation in High Temperature Alloys Over Multiple Time Scales	Vikas Tomar	7	SIMULATION-BASED ENGINEERING	TBD	National Energy Technology Laboratory	National Risk Assessment Partnership (NRAP)	Grant Bromhal			
				Southern University and A&M College	Novel Nano-Size Oxide Dispersion Strengthened Steels Development Through Computational and Experimental Study	Shizhong Yang				Sandia National Laboratory	Coal Combustion and Gasification Science	Ethan Hecht			
				Texas A&M Engineering Experiment Station	Synergistic Computational and Microstructural Design of Next-Generation High-Temperature Austenitic Stainless Steels	Raymundo Arroyave				National Energy Technology Laboratory	IPT - Direct Power Extraction	Rigel Woodside			
				Southern University and A&M College	An Integrated Study on a Novel High Temperature High Entropy Alloy	Shizhong Yang									

**2015 CROSSCUTTING TECHNOLOGY RESEARCH REVIEW MEETING**

**TUESDAY APRIL 28**

**REGISTRATION AND CONTINENTAL BREAKFAST**

7:30 AM

8:30 AM

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**JOINT SESSION**

8:30 - 9:00 am

**Dr. William Peter**

Deputy Director, ORNL Manufacturing Demonstration Facility  
"Development in Additive Manufacturing for High Temp Alloys"

9:00 - 9:30 am

**Bruce R. Geil**

Associate Director, Sensors & Electronic Devices Directorate  
U.S. Army Research Laboratory

"Army Energy and Power Challenges, Perspectives and Opportunities"

9:30 - 10:00 am

**Erik Shuster**

NETL Office of Program Performance and Benefits  
"Benefits Analyses for Crosscutting Technology Research Program"

10:00 AM

**MORNING BREAK**

**HIGH PERFORMANCE MATERIALS**

**SENSORS & CONTROLS AND SIMULATION-BASED ENGINEERING**

Breakout Session Number	Breakout Session Title	Moderator	Organization	Presentation Title	Presenter	Breakout Session Number	Breakout Session Title	Moderator	Organization	Presentation Title	Presenter
9	STRUCTURAL MATERIALS	Jessica Mullen	University of Tennessee	Experimental and Computational Investigation of High Entropy Alloys for Elevated High Temp Applications	Peter Liaw	10	S&C Harsh Environment	Barbara Carney	Palo Alto Research Center	Ultra-High-Temperature Thermionic Sensors	Scott Limb
			University of Illinois	Serration Behavior of High-Entropy Alloys	Karin Dahmen				University of Maine	Harsh Environment SAW Wireless Sensor Array for Power Plant Applications	Mauricio Pereira da Cunha

11:30 AM

**LUNCH**

1:00 PM

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**FUNCTIONAL MATERIALS**

Jessica Mullen

Indiana University – Purdue University Indianapolis	Novel Functional-Gradient Thermal Barrier Coatings in Coal-Fired Power Plant Turbines	Zhang, Jing
Southern Illinois University	HVOF Thermal Spray TIC/TIB2 Coatings of Ausc Boiler/ Turbine Components for Enhanced Corrosion Protection	Tsai, Chung-Ying
Auburn University	Reaction of Lanthanide Zirconate Pyrochlore Environmental Barrier Coating Materials in CMAS	Fergus, Jeffrey

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**SENSORS & CONTROLS**

Steven Seachman

Case Western Reserve University	An Information Theoretic Framework and Self-Organizing Agent-Based Sensor Network Architecture for Power Plant Condition Monitoring	Richard Kolacinski
Texas Tech University	Model-Based Sensor Placement for Component Condition Monitoring and Fault Diagnosis in Fossil Energy Systems	Debangsu Bhattacharyya
Oregon State University	Evolving Robust and Reconfigurable Multi-Objective Controllers for Advanced Power Systems	Kagan Tumer

2:30 PM

**AFTERNOON BREAK**

3:00 PM

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**FUNCTIONAL MATERIALS**

Jason Hissam

Brown University	Advanced Thermal Barrier Coatings for Next Generation Gas Turbine Engines Fueled by Coal-Derived Syngas	Nitin Padture
University of Tennessee	Developing Novel Multifunctional Materials for High-Efficiency Electrical Energy Storage	Feng-Yuan Zhang
North Carolina State University	Mixed-Oxides for Carbonaceous Fuel Conversion with Integrated CO <sub>2</sub> Capture via Chemical Looping with Oxygen Uncoupling (CLOU)	Fanxing Li
Howard University	Novel Low Cost Environmentally Friendly Synthetic Approaches toward Core Shell Structured Micro-Particles for Fossil Energy Applications	Abu Kamara

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**SENSORS & CONTROLS**

Sydni Credle

University of Central Florida	Polymer-Derived Ceramic Wireless, Passive Strain Sensor for Turbine Engine Applications	Linan An
West Virginia University	Graphene-Based Composite Sensors for Energy Applications	Charter Stinespring
Sporian Microsystems Inc.	Advanced Ceramic Materials and Packaging Technologies for Realizing Sensors Operable in Advanced Energy Generation Systems	Michael Usrey
Tech4Imaging	Real-Time 3-D Volume Imaging and Mass-Gauging of High Temperature Flows and Power System Components in a Fossil Fuel Reactor Using Electrical Capacitance Volume Tomography	Qussai Marshdeh

**5:30 - 8:00 PM - POSTER SESSION AND RECEPTION**

**2015 CROSSCUTTING TECHNOLOGY RESEARCH REVIEW MEETING**

**WEDNESDAY APRIL 29**

REGISTRATION AND CONTINENTAL BREAKFAST													
HIGH PERFORMANCE MATERIALS							SENSORS & CONTROLS AND SIMULATION-BASED ENGINEERING						
Breakout Session Number	Breakout Session Title	Moderator	Organization	Presentation Title	Presenter	Breakout Session Number	Breakout Session Title	Moderator	Organization	Presentation Title	Presenter		
8:30 AM	15	ADVANCED ULTRA SUPER CRITICAL	Vito Cedro	Energy Industries of Ohio	Advanced Ultra-Supercritical Materials Program	Robert Purgert and John Shingledecker	16	SIMULATION-BASED ENGINEERING	Jason Hissam	University of Texas at San Antonio	The Effect of Closure Laws on the Simulation Results of MFX Two-Fluid Model of Gas-Solid Flows with Heat Transfer	Yifei Duan	
				Princeton University	Implementation and Refinement of a Comprehensive Model for Dense Granular Flows	Sankaran Sundaresan							
				Oak Ridge National Laboratory	Ni-Based Alloys for Advanced Ultra-Supercritical Steam Boilers	Peter Tortorelli				National Energy Technology Laboratory	Sensors Testing in Pressurized Combustion Facility at NETL	Benjamin Chorpeneing	
MORNING BREAK													
10:30 AM	17	ADVANCED ULTRA SUPER	Vito Cedro	Oak Ridge National Laboratory	Advanced Ultra-Supercritical Steam Cycle Turbine Materials	Philip Maziasz	18	S&C Harsh Environment	Barbara Carney	State University of New York Polytechnic Institute	Thermal Energy Harvesting Plasmonics-Based Chemical Sensors	Michael Carpenter	
				NETL - Office of Research & Development	Addressing Materials Processing Issues for Ultra-Supercritical Steam Turbines	Paul Jablonski				University of Utah	Ultrasound Measurements of Temperature Distribution and Heat Fluxes in Solids	Mikhail Skliar	
LUNCH													
1:00 PM	19	ADVANCED ULTRA SUPER CRITICAL	Vito Cedro	Babcock & Wilcox Power Generation Group	Component Test Facility (COMTEST) Phase 1 Engineering for 760°C (1400°F) Advanced Ultra-Supercritical Steam Generator Development	Paul Weitzel	20	SENSORS & CONTROLS	Steven Seachman	Oregon State University	Intelligent Coordination of Heterogeneous Sensors in Advanced Power Systems	Mitchell Colby	
				Alstom Power, Inc.	Advanced Ultra-Supercritical (A-USC) Tube Membrane Panel Development	James Pschirer				University of Illinois - Chicago	Multi-Objective Optimal Sensor Deployment under Uncertainty for Advanced Power Systems	Diwekar, Urmila	
				National Energy Technology Laboratory	Advanced Ferritic 9% Cr Steel	Jeffrey Hawk				West Virginia University	Development of Integrated Biomimetic Framework with Intelligent Monitoring, Cognition and Decision Capabilities for Control of Advanced Energy Plants	Debangsu Bhattacharyya	
AFTERNOON BREAK													
3:00 PM	21	COMPUTATIONAL MATERIALS	Sydni Credle	QuesTek Innovations LLC	ICME Based Computational Design of Advanced Alloys	Jiadong Gong	22	SENSORS & CONTROLS	Jessica Mullen	University of Connecticut	Metal Oxide/Nitride Heterostructured Nanowire Arrays for Ultra-Sensitive and Selective Multi-Mode High Temperature Gas Detection	Pu-Xian Gao	
				Ames National Laboratory	Computational and Experimental Development of Novel High Temperature Alloys	Matthew Kramer				Virginia Polytechnic Institute and State University	Distributed Fiber Optic Sensor for On-line Monitoring of Coal Gasifier Refractory Health	Zhihao Yu	
				Ames National Laboratory	Multiscale Design of Materials: Implementing a Basic Model Interface to Support the Rapid Use of Material's Models in Design	Richard LeSar				Virginia Polytechnic Institute and State University	Reduced Mode Sapphire Optical Fiber and Sensing System	Daniel Homa	
				Tennessee State University	Large Scale Screening of Low-Cost Ferritic Steels Designs for Advanced Ultra-Supercritical Boiler	Lizhi Ouyang				West Virginia University	Wireless Electrochemical Sensor to Monitor Hot Corrosion in Advanced Ultra-Supercritical Plants	Xingbo Liu	

**2015 CROSSCUTTING TECHNOLOGY RESEARCH REVIEW MEETING**

THURSDAY APRIL 30	7:30 AM	REGISTRATION AND CONTINENTAL BREAKFAST												
		HIGH PERFORMANCE MATERIALS						SENSORS & CONTROLS AND SIMULATION-BASED ENGINEERING						
	Breakout Session Number	Breakout Session Title	Moderator	Organization	Presentation Title	Presenter	Breakout Session Number	Breakout Session Title	Moderator	Organization	Presentation Title	Presenter		
	8:30 AM	23	STRUCTURAL MATERIALS	Richard Dunst	Oak Ridge National Laboratory	Corrosion Issues in Advanced Coal Fired Boilers	Bruce Pint	24	DOWNHOLE CO <sub>2</sub> SENSORS	Barbara Carney	New Mexico Institute of Mining & Technology	Development of a CO <sub>2</sub> Chemical Sensor for Downhole CO <sub>2</sub> Monitoring in Carbon Sequestration	Ning Liu	
			Oak Ridge National Laboratory	Advanced Alloy Design Concepts for High Temperature Fossil Energy Applications	Yukinori Yamamoto	Missouri University of Science and Technology	Robust Ceramic Coaxial Cable Down-Hole Sensors for Long-Term In Situ Monitoring of Geologic CO <sub>2</sub> Injection				Runar Nygaard			
			Argonne National Laboratory	Gas Turbine Materials Life Assessment and Non-Destructive Evaluation	Jiangang Sun	Intelligent Optical Systems Inc.	Intrinsic Fiber Optic Chemical Sensors for Subsurface Detection of CO <sub>2</sub>				Jesus Delgadom Alonso			
10:00 AM	MORNING BREAK													
10:30 AM	25	ADV MANF- MATERIALS	Vito Cedro	Pacific Northwest National Laboratory	Solid State Joining of Creep Enhanced Ferritic Steels	Glenn Grant	26	SENSORS & CONTROLS	Barbara Carney	National Energy Technology Laboratory	Novel Functional Sensors Materials Development for Advanced Fossil Power Generation and Carbon Captured Utilization and Storage	Paul Ohodnicki		
			Pacific Northwest National Laboratory	Low Cost Fabrication of ODS Materials	Glenn Grant	The University of Texas at El Paso				Investigation on Pyroelectric Ceramic Temperature Sensors for Energy System Applications	Yirong Lin			
11:30 AM	LUNCH													
1:00 PM	27	COMPUTATIONAL MATERIALS	TBD	National Energy Technology Laboratory	Phase-Field Electrochemical Modeling of Metal Oxidation at Elevated Temperatures	Youhai Wen	28	S & C -- ADVANCED MANUFACTURING	Richard Dunst	The University of Texas at El Paso	Gallium Oxide Nanostructures for High-Temperature Sensors	Chintalapalle Ramana		
			Oak Ridge National Laboratory	Creep-Fatigue-Oxidation Interactions: Predicting Alloy Lifetimes under Fossil Energy Service Conditions	Sebastien Dryepondt	United Technologies Research Center				Additive Manufacturing Enabled Ubiquitous Sensing in Aerospace Systems	Joseph Mantese			
			Oak Ridge National Laboratory	Weldability of Creep Resistant Alloys for Advanced Power Plants	Xinghua Yu	Clemson University				Additive Manufacturing of Smart Parts with Embedded Sensors for In-Situ Monitoring in Advanced Energy Systems	Hai Xiao			
2:30 PM	AFTERNOON BREAK													
3:00 PM	29	STRUCTURAL MATERIALS	TBD	National Energy Technology Laboratory	Enhanced Entropy Superalloy Development For Fossil Energy Applications	Joseph Licavoli	30	S & C -- ADVANCED MANUFACTURING	Sydni Credle	Virginia Polytechnic Institute and State University	Embedded Active Fiber Optic Sensing Network for Structural Health Monitoring in Harsh Environments	Chennan Hu		
			The Ohio State University	Effective Exploration of New 760 Degrees Celsius-Capability Steels for Coal Energy	Ji-Cheng Zhao	The University of Texas at El Paso				Investigation of "Smart Parts" with Embedded Sensors for Energy System Applications	Yirong Lin			
			Dartmouth College	The Effects of Thermo-mechanical Treatments on the Microstructure and Mechanical Properties of Iron Based Superalloys	Bin Hu	West Virginia University				Smart Refractory Sensor Systems for Wireless Monitoring of Temperature, Health and Degradation of Slagging Gasifiers	Edward Sabolsky			
						University of Florida				High-Temperature Sapphire Pressure Sensors for Harsh Environments	David Mills			