

2015 CROSSCUTTING TECHNOLOGY RESEARCH REVIEW MEETING

MONDAY APRIL 27

REGISTRATION AND CONTINENTAL BREAKFAST

KEYNOTE SPEAKERS

Dr. Sean Plasynski
Director, Strategic Center for Coal
National Energy Technology Laboratory

Mr. Regis Conrad
Director, Division of Advanced Energy Systems
U.S. Department of Energy

Dr. Robert Romanosky
Deputy Director, Office of Coal and Power R&D
National Energy Technology Laboratory

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
2	Advanced Manufacturing - Materials	Richard Dunst	The University of Texas at El Paso	Mechanically Activated Combustion Synthesis of MOSi ₂ -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	Kenneth "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

LUNCH

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	Nancy Horton	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	Nicole Ross				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	Diaaeldin Mohamed and Luisa Cabrera				National Energy Technology Laboratory	Carbon Capture Simulation Initiative (CCSI)	David Miller

AFTERNOON BREAK

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	Mehrdad Shahnam	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 Laboratories	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	REGISTRATION AND CONTINENTAL BREAKFAST											
8:30 AM	8	JOINT SESSION	8:30 - 9:00 am Dr. William Peter Deputy Director, ORNL Manufacturing Demonstration Facility <i>"Development in Additive Manufacturing for High Temp Alloys"</i>	9:00 - 9:30 am Mr. Bruce R. Geil Associate Director, Sensors & Electron Devices Directorate U.S. Army Research Laboratory <i>"Army Energy and Power Challenges, Perspectives and Opportunities"</i>	9:30 - 10:00 am Mr. Erik Shuster NETL Office of Performance and Benefits <i>"Benefits Analyses for Crosscutting Technology Research Program"</i>							

MORNING BREAK

10:00 AM	MORNING BREAK											
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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
				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

LUNCH

11:30 AM	LUNCH											
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1:00 PM	11	FUNCTIONAL MATERIALS	Jessica Mullen	Indiana University – Purdue University Indianapolis	Novel Functional-Gradient Thermal Barrier Coatings in Coal-Fired Power Plant Turbines	Jing Zhang		12	SENSORS & CONTROLS	Steven Seachman	Case Western Reserve University	An Information Theoretic Framework and Self-Organizing Agent-Based Sensor Network for Power Plant Condition Monitoring	Richard Kolacinski
				Southern Illinois University	HVOF Thermal Spray TIC/TIB ₂ Coatings of A-USC Boiler/Turbine Components for Enhanced Corrosion Protection	Chung-Ying Tsai					Texas Tech University	Model Based Sensor Placement for Component Condition Monitoring and Fault Diagnosis in Fossil Energy Systems	Debangsu Bhattacharyya
				Auburn University	Reaction of Lanthanide Zirconate Pyrochlore Environmental Barrier Coating Materials in CMAS	Jeffrey W. Fergus					Oregon State University	Evolving Robust and Reconfigurable Multi-Objective Controllers for Advanced Power Systems	Kagan Tumer

AFTERNOON BREAK

2:30 PM	AFTERNOON BREAK											
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3:00 PM	13	FUNCTIONAL MATERIALS	Jason Hissam	Brown University	Advanced Thermal Barrier Coatings for Next Generation Gas Turbine Engines Fueled by Coal-Derived Syngas	Nitin Padture		14	SENSORS & CONTROLS	Sydni Credle	University of Central Florida	Polymer-Derived Ceramic Wireless, Passive Strain Sensor for Turbine Engine Applications	Linan An
				University of Tennessee	Developing Novel Multifunctional Materials for High-Efficiency Electrical Energy Storage	Feng-Yuan Zhang					West Virginia University	Graphene-Based Composite Sensors for Energy Applications	Charter Stinespring
				North Carolina State University	Mixed-Oxides for Carbonaceous Fuel Conversion with Integrated CO ₂ Capture via Chemical Looping with Oxygen Uncoupling (CLOU)	Fanxing Li					Sporian Microsystems, Inc.	Advanced Ceramic Materials and Packaging Technologies for Realizing Sensors in Advanced Energy Generation Systems	Michael Usrey
				Howard University	Novel Low Cost Environmentally Friendly Synthetic Approaches toward Core Shell Structured Micro-Particles for Fossil Energy Applications	Abu Kamara					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

Time	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
7:30 AM	REGISTRATION AND CONTINENTAL BREAKFAST											
8:30 AM	15	ADVANCED ULTRA SUPER CRITICAL	Vito Cedro	Energy Industries of Ohio, Inc.	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 MFI Two-Fluid Model of Gas-Solid Flows with Heat Transfer	Yifei Duan
				Oak Ridge National Laboratory	Ni-Based Alloys for Advanced Ultra-Supercritical Steam Boilers	Peter Tortorelli				Princeton University	Implementation and Refinement of a Comprehensive Model for Dense Granular Flows	Sankaran Sundaresan
										National Energy Technology Laboratory	Sensors Testing in Pressurized Combustion Facility at NETL	Benjamin Chorpeneing
10:00 AM	MORNING BREAK											
10:30 AM	17	ADVANCED ULTRA SUPER CRITICAL	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
				National Energy Technology Laboratory	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
11:30 AM	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 at Chicago	Multi-Objective Optimal Sensor Deployment Under Uncertainty for Advanced Power Systems	Urmila Diwekar
				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
2:30 PM	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-Based 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 Fiber and Distributed Sensing System	Daniel Homa
				Tennessee State University	Large Scale Screening of Low-Cost Ferritic Steels for Advanced Ultrasupercritical Boiler	Lizhi Ouyang				West Virginia University	Wireless Electrochemical Sensor to Monitor Hot Corrosion in Advanced Ultra-Supercritical Plants	Xingbo Liu

WEDNESDAY APRIL 29

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 ₂ SENSORS	Barbara Carney	New Mexico Institute of Mining and Technology	Development of a CO ₂ Chemical Sensor for Downhole CO ₂ 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 ₂ 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 ₂	Jesus Delgado-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 Steel	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	David Alman	National Energy Technology Laboratory	Computational Modeling of Metal Oxidation at Elevated High 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 Fossil Power Plants	Xinghua Yu				University of Missouri System	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	Jeff Hawk	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	