

2016 CROSSCUTTING RESEARCH AND RARE EARTH ELEMENTS PORTFOLIOS REVIEW

MONDAY APRIL 18

7:00 AM **REGISTRATION** – Grand Station Foyer **CONTINENTAL BREAKFAST** – Grand Station 3–5

8:30 AM	GENERAL SESSION Grand Station 1 & 2	Welcome and NETL Overview	Grace M. Bochenek, Ph.D. Director National Energy Technology Laboratory
		Program Overviews	<ul style="list-style-type: none"> Fossil Energy Advanced Energy Systems (FE AES) – <i>Regis Conrad, Division Director, FE AES</i> NETL Crosscutting Research and Analysis (CCRA) – <i>Robert Romanosky, Acting Portfolio Manager, CCRA</i> Rare Earth Elements (REE) – <i>Mary Anne Alvin, Portfolio Manager, REE</i> Radically Engineered Modular Systems – <i>Jenny Tennant, Portfolio Manager, Gasification and Fuels</i>
		Systems Analysis	<ul style="list-style-type: none"> Direct Power Extraction and Advanced Ultra-Supercritical Power Plants – <i>Nathan Weiland, Energy Process Analysis</i>

10:00 AM **MORNING BREAK**

TRACK A – Grand Station 1& 2

TRACK B – Admiral Room

	Breakout Session Number	Breakout Session Title	Moderator	Organization	Presentation Title	Presenter		Breakout Session Number	Breakout Session Title	Moderator	Organization	Presentation Title	Presenter
10:30 AM	1	Computational Materials Modeling	Charles Miller	Ames National Laboratory	The SMARTER Project – Science of Multicomponent Alloys: Roadmap for Theoretical and Experimental Research	Matthew Kramer		1	Optical Sensors	Barbara Carney	University of Missouri System	Robust Ceramic Coaxial Cable Down-Hole Sensors for Long-Term In Situ Monitoring of Geologic CO ₂ Injection	Runar Nygaard
				Southern University and A&M College	An Integrated Study on a Novel High Temperature High Entropy Alloy	Shizhong Yang					University of Florida	High-Temperature Sapphire Pressure Sensors for Harsh Environments	Justin Kiehne

11:30 AM **LUNCH** (On Your Own)

1:00 PM	2	Computational Materials Modeling	Vito Cedro	ORNL–Oak Ridge National Laboratory	Weldability of Creep Resistant Alloys for Advanced Power Plants	Xinghua Yu		2	Optical Sensors	Karol Schrems	University of Cincinnati	Robust Metal-Ceramic Coaxial Cable Sensors for Distributed Temperature Monitoring in Harsh Environments of Fossil Energy Power Systems	Adam Trontz
				General Electric Company	Modeling Long-Term Creep Performance for Welded Nickel-Base Superalloy Structures for Power Generation Systems	Chen Shen					Virginia Polytechnic Institute and State University	Reduced Mode Sapphire Optical Fiber and Sensing System	Daniel Homa
				ORNL–Oak Ridge National Laboratory	Corrosion Issues in Advanced Coal Fired Boilers	Bruce Pint					University of Massachusetts at Lowell	Distributed Fiber Sensing Systems for 3D Combustion Temperature Field Monitoring in Coal-Fired Boilers Using Optically Generated Acoustic Waves	Jingcheng Zhou

2:30 PM **AFTERNOON BREAK**

3:00 PM	3	Structural Materials	Sydni Credle	General Electric Company	A New Superalloy Enabling Heavy Duty Gas Turbine Wheels for Improved Combined Cycle Efficiency	Richard DiDomizio		3	Innovative Process Technologies	Karol Schrems	NETL Research & Innovation Center	Advanced Sensor Materials and Fiber Optic Sensors	Paul Ohodnicki
				ANL – Argonne National Laboratory	Development of Nondestructive Evaluation (NDE) Methods for Structural and Functional Materials	Jiangang Sun					NETL Research & Innovation Center	Creep Optimization in Haynes 282 Through Gamma Prime Coarsening Control: Preliminary Results	Jeff Hawk
				Electric Power Research Institute Inc.	Predicting the Oxidation/Corrosion Performance of Structural Alloys in Supercritical CO ₂	Steve Kung					NETL Research & Innovation Center	LIBS for Subterranean Measurements	Dustin McIntyre
				University of Illinois	Serration Behavior of High-Entropy Alloys	Karin Dahmen					NETL Research & Innovation Center	NETL Advanced 9% Cr Steel: Update and Current Development Status	Jeff Hawk

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TUESDAY APRIL 19

REGISTRATION – Grand Station Foyer CONTINENTAL BREAKFAST – Grand Station 3–5													
TRACK A – Grand Station 1& 2							TRACK B – Admiral Room						
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													
	8:30 AM	4	Advanced Manufacturing	Sydni Credle	Energy Industries of Ohio Inc.	Benefits of Hot Isostatic Pressure/ Powdered Metal (HIP/PM) and Additive Manufacturing (AM) to Fabricate Advanced Energy System Components	Nancy Horton Roy Sheppard	4	Novel Sensor Concepts	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
					Edison Welding Institute, Inc.	Additive Manufacturing of Fuel Injectors	Mahdi Jamshidinia				Palo Alto Research Center Incorporated	Heat Sensor-Harsh Environment Adaptable Thermionic Sensor	Scott Limb
Mohawk Innovative Technology, Inc.					High Temperature Ceramic Heat Exchanger for Solid Oxide Fuel Cell	Jose Luis Cordova	West Virginia University Research Corporation				Graphene-Based Composite Sensors for Energy Applications	Charter Stinespring	
10:00 AM	MORNING BREAK												
10:30 AM	5	Functional Materials	Jessica Mullen	Prairie View A&M University	Post Combustion Carbon Capture Using Polyethylenimine (PEI) Functionalized Titanate Nanotubes	Melisa Stewart	5	Novel Sensor Concepts	Benjamin Chorpeneing	University of Connecticut	Metal Oxide/Nitride Heterostructured Nanowire Arrays for Ultra-Sensitive and Selective Multi-Mode High Temperature Gas Detection	Bo Zhang	
				Auburn University	Reduced Cost Bond Layers for Multi-Layer Thermal/Environmental Barrier Coatings	Jeffrey Fergus				University of Texas at El Paso	Investigation on Pyroelectric Ceramic Temperature Sensors for Energy System Applications	Ricardo Martinez	
11:30 AM	LUNCH (On Your Own)												
1:00 PM	6	Functional Materials	Richard Dunst	North Carolina State University	Rational Design of Mixed-Metal Oxides for Chemical Looping Combustion of Coal Via Computational Experimental Studies	Fanxing Li	6	Novel Sensor Concepts	Sydni Credle	Sporian Microsystems Inc. (SBIR PROJECT)	Advanced Ceramic Materials and Packaging Technologies for Realizing Sensors Operable in Advanced Energy Generation Systems	Jason Fish	
				Delaware State University	Novel Silica Nanostructured Platforms with Engineered Surface Functionality and Spherical Morphology for Low-Cost High-Efficiency Carbon Capture	Nicholas Pizzi				Tech4Imaging (SBIR PROJECT)	Adaptive Electrical Capacitance Volume Tomography for Real-Time Measurement of Solids Circulation Rate at High Temperatures	Qussai Marashdeh	
				Southern Illinois University	HVOF Thermal Spray TIC/TIB2 Coatings of AUSC Boiler/Turbine Components for Enhanced Corrosion Protection	Chung-Ying Tsai				Tech4Imaging (SBIR PROJECT)	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 Marashdeh	
2:30 PM	AFTERNOON BREAK												
3:00 PM	7	Innovative Process Technologies	Karol Schrems	NETL Research & Innovation Center	Internal to External Oxidation Transition Modeling: Plasticity and Coherence Loss	Youhai Wen	7	Embedded Sensors	Maria Reidpath	United Technologies Corporation	Additive Topology Optimized Manufacturing with Embedded Sensing	Paul Attridge	
				NETL Research & Innovation Center	Serrated Plastic Flow in High Entropy Alloys	Joe Licavoli				University of Missouri System	Additive Manufacture of Smart Parts with Embedded Sensors for In Situ Monitoring in Advanced Energy Systems	Hai Xiao	
				NETL Research & Innovation Center	Advanced Controls and Cyber-Physical Systems	David Tucker				West Virginia University	Smart Refractory Sensor Systems for Wireless Monitoring of Temperature, Health and Degradation of Slagging Gasifiers	Edward Sabolsky	
				NETL Research & Innovation Center	IPT – Direct Power Extraction	Rigel Woodside				University of Texas at El Paso	Investigation of “Smart Parts” with Embedded Sensors for Energy System Applications	Yirong Lin	
5:00–6:45 PM – POSTER SESSION – Grand Station 3–5													

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WEDNESDAY APRIL 20

7:30 AM		REGISTRATION – Grand Station Foyer					CONTINENTAL BREAKFAST – Grand Station 3–5					
TRACK A – Grand Station 1& 2							TRACK B – Admiral Room					
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	8	Jason Hissam	Ames National Laboratory	Engineering of Complex Systems	Kenneth Bryden	8	Wireless Sensors	Benjamin Chorpeneing	University of Maine System	High-Temperature Wireless Sensor for Harsh Environment Condition Monitoring	Mauricio Pereira da Cunha	
				Process Systems Enterprise	Evaluation and Demonstration of Commercialization Potential of Carbon Capture Simulation Initiative Tools within gProms Advanced Simulation Platform				Alfredo Ramos Plasencia	Siemens Corporation	Novel Temperature Sensors and Wireless Telemetry for Active Condition Monitoring of Advanced Gas Turbines	Anand Kulkarni
										University of Texas at Arlington	Distributed Wireless Antenna Sensors for Boiler Condition Monitoring	Haiying Huang
10:00 AM MORNING BREAK												
10:30 AM	9	Richard Dunst	Ceramatec Inc.	Compact, Ceramic Microchannel Heat Exchangers	Charles Lewisohn	9	Advanced Process Controls	Maria Reidpath	Ohio State University	Advanced Control Architecture and Sensor Information Development for Process Automation, Optimization, and Imaging of Chemical Looping Systems	Tien-Lin Hsie	
				PNNL – Pacific Northwest National Laboratory	Solid State Joining of Creep Enhanced Ferritic Steels				Glenn Grant	West Virginia University	Development of Integrated Biomimetic Framework with Intelligent Monitoring, Cognition and Decision Capabilities for Control of Advanced Energy Plants	Debangsu Bhattacharyya
11:30 AM LUNCH (On Your Own)												
1:00 PM	10	Vito Cedro	Energy Industries of Ohio Inc.	Materials for Advance Ultrasupercritical Steam Turbines – Advanced Ultrasupercritical Component Demonstration	Horst Hack	10	Water Management	Charles Miller	Gas Technology Institute	Simultaneous Waste Heat and Water Recovery from Power Plant Flue Gases for Advanced Energy System	Dexin Wang	
				GE Power	Advanced Ultrasupercritical (AUSC) Materials Thick-Walled Cycling Header Development for ComTest-AUSC				Buchi (Reddy) Ganta	Southern Company Services, Inc.	Field Demonstration Study for Heat and Water Recovery at a Coal-Fired Power Plant	Russell Noble
				GE Power	Advanced Ultrasupercritical (AUSC) Tube Membrane Panel Development				Jim Pschirer	SNL – Sandia National Laboratories	Exploring Energy-Water Issues in the United States	Vince Tidwell
2:30 PM AFTERNOON BREAK												
3:00 PM	11	Vito Cedro	Babcock & Wilcox Power Generation Group, Inc.	Component Test Facility (ComTest) Phase 1 Engineering for 760 °C (1400 °F) Advanced Ultrasupercritical (AUSC) Steam Generator Development	Paul Weitzel	11	Advanced Process Controls / Sensor Placement & Networks	Sydni Credle	Oregon State University	Evolving Robust and Reconfigurable Multi-Objective Controllers for Advanced Power Systems	Kagan Tumer	
				ORNL–Oak Ridge National Laboratory	Ultra-Supercritical Steam Cycle Turbine Materials				Phil J. Maziasz	Case Western Reserve University	An Information Theoretic Framework and Self-Organizing Agent-Based Sensor Network Architecture for Power Plant Condition Monitor	Kenneth Loparo
				ORNL–Oak Ridge National Laboratory	Materials for Ultra-Supercritical Steam Power Plants				Peter Tortorelli	Ames National Laboratory	Sensors and Controls – Merged Environment for Simulation and Analysis IMESA	Paolo Pezzini
				ORNL–Oak Ridge National Laboratory	Creep-Fatigue-Oxidation Interactions: Predicting Alloy Lifetimes under Fossil Energy Service Conditions				Sebastien Dryepondt	University of Illinois	Multi-Objective Optimal Sensor Deployment under Uncertainty for Advanced Power Systems	Urmila Diwekar

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THURSDAY APRIL 21	7:30 AM	REGISTRATION – Grand Station Foyer						CONTINENTAL BREAKFAST – Grand Station 3–5							
		TRACK A – Grand Station 1& 2						TRACK B – Admiral Room							
	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	12	Jason Hissam	Ames National Laboratory	Kinetic Theory Modeling of Turbulent Multiphase Flow	Bo Kong	12	Water Treatment and Reuse	Barbara Carney	GE Global Research	Model-Based Extracted Water Desalination System for Carbon Sequestration	Ryan Adams			
				Arizona State University	MFIX-DEM PHI: Performance and Capability Improvements Towards Industrial Grade Open-Source DEM Framework with Integrated Uncertainty Quantification	Manogna Adepu Shaohua Chen							General Electric Company	Water Desalination Using Multi-Phase Turbo-Expander	Kimberly Hammer
				University of Colorado	MFIX-DEM Enhancement for Industry-Relevant Flows	Thomas Hauser							Ohio University	Advanced Integrated Technologies for Treatment and Reutilization of Impaired Water in Fossil Fuel-Based Power Plant Systems	Jason Trembly
	10:00 AM	MORNING BREAK													
	10:30 AM	13	Richard Dunst	Indiana University – Purdue University Indianapolis	Novel Functional-Gradient Thermal Barrier Coatings in Coal-Fired Power Plant Turbines	Jing Zhang	13	Water Treatment and Reuse	Jessica Mullen	University of Illinois	An Integrated Supercritical System for Efficient Produced Water Treatment and Power Generation	Seyed Dastgheib			
				West Virginia University	Ceramic High Temperature Thermoelectric Heat Exchanger and Heat Recuperators in the Power Generation Systems	Xueyan Song							Research Triangle Institute	Fouling-Resistant Membranes for Treating Concentrated Brines for Water Reuse in Advanced Energy Systems	Zachary Hendren
	11:30 AM	LUNCH (On Your Own)													
	1:00 PM	14	Vito Cedro	ORNL–Oak Ridge National Laboratory	Advanced Alloy Design Concepts for High Temperature Fossil Energy Applications	Yukinori Yamamoto	14	Water Treatment and Reuse	Maria Reidpath	Research Triangle Institute	Low-Energy Water Recovery from Subsurface Brines	Young Chul Choi			
				Electric Power Research Institute Inc.	Optimization of Advanced Steels for Cyclic Operation Through an Integration of Material Testing, Modeling and Novel Component Test Validation	John Siefert							Southern Research Institute	Treatment of Produced Water from Carbon Sequestration Sites for Water Reuse, Mineral Recovery and Carbon Utilization	James Irvin
				University of Tennessee	Experimental and Computational Investigation of High Entropy Alloys for Elevated High Temperature Applications	Prof. Peter K. Liaw							University of Pittsburgh	Development of Membrane Distillation Technology Utilizing Waste Heat for Treatment of High Salinity Wastewaters	Radisav Vidic
	2:30 PM	AFTERNOON BREAK													
	3:00 PM	15	Youhai Wen	Oregon State University	New Mechanistic Models of Long Term Evolution of Microstructure and Mechanical Properties of Nickel Based Alloys	Jamie Kruzic	15	Innovative Energy Concepts	Jason Hissam	University of Nebraska	Vertically-Aligned Carbon-Nanotubes Embedded in Ceramic Matrices for Hot Electrode Applications	Yongfeng Lu			
				University of Tennessee	Computational Design and Performance Prediction of Creep-Resistant Ferritic Superalloys	Peter Liaw							University of Texas at El Paso	High Temperature High Velocity Direct Power Extraction Using an Open Cycle Oxy Combustion System	Manuel Hernandez
				QuesTek Innovations LLC (SBIR PROJECT)	Computational Design of Weldable, High-Cr Ferritic Steel	David Snyder							University of Washington	Precursor-Derived Nanostructured Silicon Carbide Based Materials for Magnetohydrodynamic Electrode Applications	YiHsun Yang
				Tennessee State University	Large Scale Screening of Low Cost Ferritic Steels Designs for Advanced Ultra Supercritical Boiler Using First Principles Methods	Lizhi Ouyang							University of Idaho	Boride Based Electrode Materials with Enhanced Stability under Extreme Conditions for MHD Direct Power Extraction	Krishnan Raja

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2016 CROSSCUTTING RESEARCH AND RARE EARTH ELEMENTS PORTFOLIOS REVIEW													
FRIDAY APRIL 22	7:30 AM	REGISTRATION – Grand Station Foyer					CONTINENTAL BREAKFAST – Grand Station 3–5						
		TRACK A – Grand Station 1& 2						TRACK B – Admiral Room					
	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	16	Computational Materials Modeling	Charles Miller	Purdue University	Predicting Microstructure-Creep Resistance Correlation in High Temperature Alloys Over Multiple Time Scales	Vikas Tomar	16	Multiphase Flow	Mehrdad Shahn timer			
					Pennsylvania State University	Computational Design and Discovery of Ni-Based Alloys and Coatings: Thermodynamic Approaches Validated by Experiments	Bicheng Zhou				Florida International University	Development of Reduced Order Model for Reacting Gas-Solids Flow Using Proper Orthogonal Decomposition	Sohail Reddy
					Ames National Laboratory	Computational System Dynamics (Computational Design of Multiscale Systems)	Richard LeSar				University of Texas at San Antonio	Use of an Accurate DNS Method to Derive, Validate and Supply Constitutive Equations for the MFI Code	Yifei Duan
	10:00 AM	MORNING BREAK											
	10:30 AM	17	Multifunctional Materials	Sydni Credle	University of Tennessee	Developing Novel Multifunctional Materials for High-Efficiency Electrical Energy Storage	Feng-Yuan Zhang	17	Process Efficiency and Heat Utilization	Jessica Mullen	Carnegie Mellon University	Evaluating the Techno-Economic Feasibility of Forward Osmosis Processes Utilizing Low Grade Heat: Applications in Power Plant Water, Wastewater, and Reclaimed Water Treatment	Meagan Mauter
					Clark Atlanta University	Engineering Accessible Adsorption Sites in Metal Organic Frameworks for CO ₂ Capture	Saki Golafale				Idaho National Laboratory	The COHO – Utilizing Low-Grade Heat and Carbon Dioxide at Power Plants for Water Treatment	Aaron Wilson
	11:30 AM	ADJOURN											