Crosscutting Research, Rare Earth Elements, Gasification Systems, and Transformative Power Generation
AGENDA AT A GLANCE

TUESDAY, APRIL 9

	TRACK A: SENSORS AND CONTROLS — TRANSFORMATIVE POWER GENERATION CROSSCUTTING RESEARCH				TRACK B: MATERIALS AND MODELING — CROSSCUTTING RESEARCH				TRACK C: RARE EARTH ELEMENTS				TRACK D GASIFICATION SYSTEMS			
8:00AM - 9:30 AM	**PLENARY SESSION:** WELCOME AND OPENING REMARKS - Angelos Kokkinos, Director, Office of Advanced Fossil Technology Systems, U.S. Department of Energy Technology Overviews: Briggs White, Crosscutting Research -- John Rockey, Transformative Power Generation -- David Lyons, Gasification Systems / National Energy Technology Laboratory															
9:30 AM	AM BREAK															
	SESSION A1: Power Plant Sensors Analysis				**SESSION B 1: High Performance Materials**				**SESSION C1: Small Pilot, High Purity, REE Separation Systems**				**SESSION D1: Air Separation/Oxygen Production Session I**			
	Organization	Title	Presenter	Moderator	Organization	Title	Presenter	Moderator	Organization	Title	Presenter	Moderator	Organziation	Title	Presenter	Moderator
10:00 AM	National Energy Technology Laboratory (NETL)	Existing Plants - Fleet Assessment	Jeff Hoffman	Benjamin Chorpening	Energy Industries of Ohio	Advanced Ultra-Supercritical Component Testing	Horst Hack	Maria Reidpath	National Energy Technology Laboratory (NETL)	Rare Earth Elements Program Overview	Mary Anne Alvin	Richard Dunst	Thermosolv, LLC	Low-Cost Oxygen (LCO) for Small-Scale Modular Gasification Systems	Vijay Sethi	Seth Lawson
10:30 AM	National Energy Technology Laboratory (NETL)	Advanced Sensors And Controls - Market and Benefits Analysis	Erik Shuster		Lawrence Livermore National Laboratory	HPC4Materials - Program Overview	Robin Miles		Marshall Miller	Products from Coal and Coal Byproducts in the U.S. Using Advanced Separation Processes	Steven Keim		Thermosolv, LLC	Advanced Sorbents for Modular Oxygen Production for Radically Engineered Modular Systems (REMS) Gasifiers	Vijay Sethi	
11:00 AM	National Energy Technology Laboratory (NETL)	Dynamic Modeling of Steam-based Power Plants	Steve Zitney		National Energy Technology Laboratory (NETL)	Advanced Alloy Development - export analysis	Christa Court		Inventure Renewables	Recovery of Rare Earth Elements from Coal Mining Waste Materials	William Sutterlin		North Carolina State University	Radically Engineered Modular Air Separation System Using Tailored Oxygen Sorbents	Fanxing Li	
11:30 AM	Electric Power Research Institute (EPRI)	Evaluation of Steam Cycle Upgrades to Improve the Competitiveness of US Coal Fired Power Plants	Horst Hack		Oak Ridge National Laboratory (ORNL)	Materials Issues in Supercrtical CO2	Bruce Pint		**SESSION C2-1: Conventional REE Separation Systems**				Research Triangle Institute (RTI)	Oxygen Binding Materials and Highly Efficient Modular System for Oxygen Production	Shaojun (James) Zhou	
									West Virginia University	Recovery of Rare Earth Elements from Coal Mine Drainage	Paul Ziemkiewicz	Richard Dunst				
NOON	LUNCH															
	SESSION A2: Sensors and Controls				**SESSION B2: Multiphase Flow Modeling**				**SESSION C2-2: Conventional REE Separation Systems**				**SESSION D2: Air Separation/Oxygen Production Session I**			
1:00 PM	National Energy Technology Laboratory (NETL)	Advanced Sensors & Controls - Field Testing of Raman Gas Analyzer	Benjamin Chorpening	Karol Schrems	National Energy Technology Laboratory (NETL)	Advanced Reaction Systems (MFIX)	Mehrdad Shahnam	Jason Hissam	University of North Dakota	Investigation of Rare Earth Element Extraction from North Dakota Coal- Related Feedstocks	Nolan Theaker	Charles Miller	Research Triangle Institute (RTI)	Pilot Testing of a Modular Oxygen Production System Using Oxygen Binding Adsorbents	Shaojun (James) Zhou	Seth Lawson
1:30 PM	Opto-Knowledge Systems, Inc.	Mid Infra-Red Laser Sensor for Continuous Sulfur Trioxide Monitoring to improve Coal-Fired Power Plant Performance During Flexible Operations	Jason Kriesel		University of Colorado	MFIX-DEM Enhancement for Industry-Relevant Flows	Christine Hrenya		Physical Sciences, Inc.	High Yield and Economical Production of Rare Earth Elements from Coal Ash	Prakash Joshi		University of South Carolina	Modularization of Ceramic Hollow Fiber Membrane Technology for Air Separation	Xingjian (Chris) Xue	
2:00 PM	University of Utah	Ultrasonic Measurements of Temperature Profile and Heat Fluxes in Coal-Fired Power Plants	Mikhail Skliar		University of Wyoming	Implementing General Framework in MFiX for Radiative Heat Transfer in Gas-Solid Reacting Flows	Michael Stoellinger		University Kentucky	Pilot-Scale Testing of An Integrated Circuit for the Extraction of Rare Earth Minerals and Elements from Coal and Coal By-products Using Advanced Separation Technologies	Rick Honaker		National Energy Technology Laboratory (NETL)	Development of Oxygen Carriers for Coal Conversion to Syngas	Jonathan Lekse	
2:30 PM	SparkCognition, Inc.	Application of Artificial Intelligence Techniques Enabling Coal-Fired Power Plants the Ability to Achieve Higher Efficiency, Improved Availability, and Increased Reliability of Their Operations	Stuart Gillen		University of North Dakota Energy and Environmental Research Center (UNDEERC)	Interfacing MFIX with PETSC and HYPRE Linear Solver Libraries	Gautham Krishnamoorthy		**SESSION C3-1: Novel REE Separation & Advanced Sensor Development**				**SESSION D3-1: Reactor Engineering Design Session I**			
									LANL	Evaluation of Novel Strategies and Processes for Separation of REE from Coal-Related Materials	Hakim Boukhalfa	Charles Miller	TDA Research, Inc.	Integrated Water-Gas-Shift (WGS) / Pre-Combustion Carbon Capture Process	Gokhan Alptekin	Steven Markovich
3:00 PM	PM BREAK															
	SESSION A3: Sensors and Controls				**SESSION B3: Advanced Process Simulation**				**SESSION C3-2: Novel REE Separation & Advanced Sensor Development**				**SESSION D3-2: Reactor Engineering Design Session I**			
3:30 PM	West Virginia University Research Corporation	High Temperature Electrochemical Sensors for In-situ Corrosion Monitoring in Coal-Based Power Generation Boilers	Xingbo Liu	Omer Bakshi	National Energy Technology Laboratory (NETL)	Overview of DOE's Institute for the Design of Advanced Energy Systems	David Miller	Jason Hissam	LANL	Evaluation of Laser-Based Analysis of REE in Coal-Related Materials	George Guthrie	Anthony Zinn	Research Triangle Institute (RTI)	Advance Syngas Cleanup for Radically Engineered Modular Systems (REMS)	Atish Kataria	Steven Markovich
4:00 PM	Microbeam Technologies, Inc.	Improving Coal Fired Plant Performance through Integrated Predictive and Condition-based Monitoring Tools	Shuchita Patwardhan		National Energy Technology Laboratory (NETL)	Advanced Modeling and Optimization to Support the Existing Fleet	Anthony Burgard		INL-LLNL	New sensing Mechanisms for REE Detection in Coal and Coal By-Products	Yoshiko Fujita		TDA Research, Inc.	Warm Gas Multi-Contaminant Removal System	Gokhan Alptekin	
4:30 PM	GE/Alstom	Extended Low Load Boiler Operation to Improve Performanced and Economics of an Exisitng Coal Fired Power Plant	Robert Murphy		National Energy Technology Laboratory (NETL)	Design and Optimization of Coal Plants of the Future	Jaffer Ghouse		LLNL	Application of Biosorption of REE Recovery from Coal By-Products	Yongqin Jiao		TDA Research, Inc.	Poison Resistant Water-Gas-Shift Catalysts for Biomass and Coal Gasification	Girish Srinivas	
5:30:00 PM - 7:30 PM	**POSTER SESSION** **5:30 pm to 7:30 pm**															

Crosscutting, Rare Earth Elements, Gasification Systems, and Transformative Power Generation
AGENDA AT A GLANCE

WEDNESDAY, APRIL 10

	TRACK A: MATERIALS CROSSCUTTING RESEARCH				TRACK B: WATER MANAGEMENT CROSSCUTTING RESEARCH				TRACK C: RARE EARTH ELEMENTS				TRACK D: GASIFICATION SYSTEMS			
8:00 AM	**WELCOME: Randall Gentry, Deputy Director & Chief Research Officer, National Energy Technology Laboratory** **KEYNOTE: STEVEN WINBERG, ASSISTANT SECRETARY FOR FOSSIL ENERGY, U.S. DEPARTMENT OF ENERGY**															
	SESSION A4: eXtremeMat				**SESSION B4: Energy-Water Nexus**				**SESSION C4: Transformational REE Separation**				**SESSION D4: Air Separation/Oxygen Production Session II**			
	Organization	**Title**	**Presenter**	**Moderator**	**Organization**	**Title**	**Presenter**	**Moderator**	**Organization**	**Title**	**Presenter**	**Moderator**	**Organization**	**Title**	**Presenter**	**Moderator**
8:30 AM	eXtremeMAT National Laboratory Consortium - NETL	Overview of eXtremeMAT project	Jeff Hawk	Karol Schrems	National Energy Technology Laboratory (NETL)	Water Demand Coefficients of Power Generation	Tim Skone	Barbara Carney	Virginia Tech	Feasibility of Recovering Rare Earth Elements from Thickener Underflow	Roe-Hoan Yoon, Aaron Noble, and Jerry Luttrell	Charles Miller	Air Products and Chemicals, Inc.	Development of a Two-Phase Dense Fluid Expander for Advanced Cryogenic Air Separation and Low-Grade Heat Recovery	Ravi Patula	Venkat Venkataraman
9:00 AM	eXtremeMAT National Laboratory Consortium - LANL	Computational Modeling and Simulation	Laurent Capolungo		Sandia National Laboratory	Water Atlas Extension	Vincent Tidwell		University of Kentucky	Low Temperature Plasma Treatment for Enhanced Recovery of Highly Valued Critical REEs from Coal	Rick Honaker		Idaho National Laboratory (INL)	Advanced Oxygen Separation from Air Using a Novel Mixed Matrix Membrane	Frederick Stewart	
9:30 AM	eXtremeMAT National Laboratory Consortium - PNNL	Data Science and Analytics	Ram Devanathan		National Energy Technology Laboratory (NETL)	2018 Water Brief	Jocelyn Mackay		Virginia Tech	Development of a Cost-Effective Extraction Process for the Recovery of Heavy and Critical REEs from the Clays and Shales Associated with Coal	Aaron Noble		Los Alamos National Laboratory (LANL)	High Selectivity and High Throughput Carbon Molecular Sieve Hollow Fiber Membrane based Modular Air Separation Unit for Producing High Purity O2	Rajinder P. Singh	
10:00 AM	**AM BREAK**															
	SESSION A5: Systems Analysis and Discussion				**SESSION B5: Sensors**				**SESSION C5: Transformational REE Separation**				**SESSOIN D5: Air Separation/Oxygen Production Session II**			
10:30 AM	National Energy Technology Laboratory (NETL)	Facilitated HPM Discussion	Briggs White	Vito Cedro	NanoSonic, Inc.	Wireless Networked Sensors in Water for Heavy Metal Detection	Hang Ruan	Jessica Mullen	Research Triangle Institute	Low Cost REE Recovery from Acid Mine Drainage Sludge	Zachary Hendren	Anthony Zinn	Pacific Northwest National Laboratory (PNNL)	Pressure Driven Oxygen Separation	David Reed	Venkat Venkataraman
11:00 AM	National Energy Technology Laboratory (NETL)	COE Sensitivity to Advanced Alloy Component Installed Costs	Eric Lewis		University of Alabama at Birmingham	Continuous Water Quality Sensing for Flue Gas Desulfurization (FGD) Wastewater	Samuel Misko		University of North Dakota	Economic Extraction and Recovery of REEs and Production of Clean Value- Added Products from Low-Rank Coal Fly Ash	Bruce Folkedahl		Pacific Northwest National Laboratory (PNNL)	Magnetocaloric Cryogenic System for High Efficiency Air Separations.	Jamie Holladay	
11:30 AM	National Energy Technology Laboratory (NETL)	Advanced Alloy Development - AUSC manufacturing cost analysis	Michael Verti		University of California - Los Angeles	Applying Anodic Stripping Voltammetry to Complex Wastewater Streams for Rapid Metal Detection	David Jassby		The Ohio State University	Concentrating Rare Earth Elements in Acid Mine Drainage Using Coal Combustion By-Products Through Abandoned Mine Land Reclamation	Chi Min Cheng		Pacific Northwest National Laboratory (PNNL)	Reliability and Durability Testing of Glass Ceramic Seals for Praxair's Oxygen Transport Membranes	David Reed	
NOON	**LUNCH**															
	SESSION A6: Materials Research				**SESSION B6: Condensers**				**SESSION C6: Transformational REE Separation**				**SESSION D6: Reactor Engineering Design Session II**			
1:00 PM	Oak Ridge National Laboratory (ORNL)	Creep-Fatigue-Oxidation Interactions: Predicting Alloy Lifetimes under Fossil Energy Service Conditions	Sebastien N. Dryepondt	Paul Jablonski	Advanced Cooling Tech.	A Novel Steam Condenser with Loop Thermosyphons and Firm-Forming Agents for Improved Heat Transfer Efficiancy and Durability	Richard Bonner	Richard Dunst	University of Utah	Economic Extraction, Recovery, and Upgrading of Rare Earth Elements from Coal-Based Resources	Michael Free	Charles Miller	Oak Ridge National Laboratory (ORNL)	Experimental Validation of Coal Gasification with Neutron Imaging	James E. Parks, II	Steven Markovich
1:30 PM	Florida International University	The Novel Hybrid Start-off Model of High Performance Structural Alloys Design for Fossil Energy Power Plants	Yu Zhong		Interphase Materials, Inc.	Application of Heat Transfer Enhancement (HTE) System for Improved Efficiency of Power Plant Condensers	Kasey Catt		Wayne State University	Coupled Hydrothermal Extraction and Ligand-Associated Organosilica Media Recovery of REEs from Coal Fly Ash	Timothy Dittrich		University of Kentucky Research Foundation	Gasification Combined Heat and Power from Coal Fines	Heather Nikolic	
2:00 PM	National Energy Technology Laboratory (NETL)	Materials Performance in sCO2 power cycles	Omer Dogan		Oceanit	Advanced Anti-Fouling Coatings to Improve Coal-Fired Condenser Efficiency	Ken Cheung		Battelle Memorial Institute	Recovery of High Purity Rare Earth Elements (REEs) from Coal Ash via a Novel Electrowinning Process	Rick Peterson		University of Alaska Fairbanks	Making Coal Relevant for Small Scale Applications: Modular Gasification for Syngas/Engine CHP Applications in Challenging Environments	Brent Sheets	
2:30 PM	National Energy Technology Laboratory (NETL)	Fe-9Cr Steels with Increased Service Temperature Capability	Jeff Hawk		Virginia Polytechnic Institute and State University	Novel Patterned Surfaces for Improved Condenser Performance in Power Plants	Sandeep Hatte		West Virginia University	At-source Recovery of Rare Earth Elements from Coal Mine Drainage	Paul Ziemkiewicz		Southern Research Institute	Small-Scale Engineered High Flexibility Gasifier	Santosh Gangwal	
3:00 PM	**PM BREAK**															
	SESSION A7: Materials Research				**SESSION B7: Cooling and BEST**				**SESSION C7: Process Economics & Embedded REE Demand**				**SESSION D7: Reactor Engineering Design Session II**			
3:30 PM	Pennsylvania State University	High Throughput Computational Framework of Materials Properties for Extreme Environments	Zi-Kui Liu	Karol Schrems	National Energy Technology Laboratory (NETL)	Dry and Hybrid Cooling System Analysis Activity at NETL	Eric Grol	Jessica Mullen	University of North Dakota–Energy & Environmental Research Center	Sampling, Characterization and Round Robin Analyses of Domestic U.S. Coal Based Resources Containing High Rare Earth Element (REE) Concentrations	Chris Zygarlicke	Anthony Zinn	University of Kentucky Research Foundation	Staged Opposed Multi Burner (OMB) for Modular Gasifier/Burner	Andrew Placido	Diane Revay Madden
4:00 PM	Electric Power Research Institute, Inc	Characterization of Long-Term Service Coal Combustion Power Plant Enextre Environment Materials (EEMs)	Steve Kung		Electric Power Research Ins	Phase II Field Demonstration at Plant Smith Generating Station Assessment of Opportunities for Optimal Reservoir Pressure Control, Plume Management and Produced Water Strategies	Robert Trautz		National Energy Technology Laboratory (NETL)	Rare Earth Elements (REE) from Coal and Coal By-Products - Techno-Economic & Embedded Demand Analysis	Morgan Summers		National Energy Technology Laboratory (NETL)	Advancements in Microwave-Assisted Catalysis	Mark Smith	
4:30 PM	Oak Ridge National Laboratory (ORNL)	Corrosion issues of EEMs in advanced coal fired boilers	Bruce Pint		University of North Dakota	Developing and Validating Pressure Management and Plume Control Strategies in the Williston Basin Through a Brine Extraction and Storage Test (BEST)	John Hamling									

Crosscutting Research
AGENDA AT A GLANCE

THURSDAY, APRIL 11

TRACK A: SENSORS AND CONTROLS CROSSCUTTING RESEARCH

SESSION A8: Monitoring and Controls

	Organization	Title	Presenter	Moderator
8:00 AM	National Energy Technology Laboratory (NETL)	Advanced Sensors & Controls - Agent-based Controls and System Identiifcation	David Tucker	Jessica Mullen
8:30 AM	Georgia Tech Research Corporation	Real-Time Health Monitoring for Gas Turbine Components using Online Learning and High Dimensional Data	Benjamin Peters	
9:00 AM	Georgia Tech Research Corporation	Expedited Real Time Processing for the NETL Hyper Cyber-Physical System	Jesus Arias	
9:30 AM	National Energy Technology Laboratory (NETL)	Regulatory control of a 10 MWe supercritical CO2 recompression closed Brayton cycle	Eric Liese	
10:00 AM	AM BREAK			

SESSION A9: Fiber Optic Sensors and Discussion

10:30 AM	National Energy Technology Laboratory (NETL)	Facilitated Sensors & Controls Discussion	Briggs White	Richard Dunst
11:00 AM	National Energy Technology Laboratory (NETL)	Advanced Sensors & Controls – Optical Fiber Sensors for Harsh Fossil Energy Environments	Paul Ohodnicki	
11:30 AM	University of Pittsburgh	Engineering Metal Oxide Nanomaterials for Fiber Optical Sensor Platforms	Peng Chen	
NOON	LUNCH			

SESSION A10: Optical and Wireless Sensors

1:00 PM	University of Central Florida	In-Situ Optical Monitoring of Operating Gas Turbine Blade Coatings Under Extreme Environments	Sandip Haldar	Sydni Credle
1:30 PM	Carnegie Mellon University (CMU)	Low-Cost Efficient and Durable High Temperature Wireless Sensors by Direct Write Additive Manufacturing for Application in Fossil Energy Systems	Rahul Panet	
2:00 PM	University of Connecticut (UConn)	Wireless 3D Nanorod Composite Arrays-Based High-Temperature Surface Acoustic Wave Sensors for Selective Gas Detection Through Machine Learning Algorithms	Yu Lei	
2:30 PM	West Virginia University	Passive Wireless Sensors Fabricated by Direct-Writing for Temperature and Health Monitoring of Energy Systems in Harsh-Environments	K S V Idahim and Daryl Reynolds	
3:00 PM	PM BREAK			

SESSION A11: Wireless Sensors

3:30 PM	Siemens Corporation	Novel Temperature Sensors and Wireless Telemetry for Active Condition Monitoring of Advanced Gas Turbines	Anand Kulkarni	Sydni Credle
4:00 PM	University of Maine System	Technology Maturation of Wireless Harsh-Environment Sensors for Improved Conditioned-based Monitoring of Coal-Fired Power Generation	Mauricio Pereira da Cunha	
4:30 PM	West Virginia University	High Temperature Gas Sensor for Coal Combustion System	Yi Wang	

TRACK B: MATERIALS AND DIRECT POWER EXTRACTION CROSSCUTTING RESEARCH

SESSION B8: Creep Fatigue

Organization	Title	Presenter	Moderator
University of Texas at El Paso	A Guideline for the Assessment of Uniaxial Creep and Creep-Fatigue Data and Models	Md Abir Hossain	Vito Cedro
QuesTek Innovations, LLC	Improved Models of Long-Term Creep Behavior of High Performance Structural Alloys for Existing and Advanced Technologies Fossil Energy Power Plants	Abhinav Saboo	
University of Texas at El Paso	An Accelerated Creep Testing Program for Advanced Creep Resistant Alloys for High Temperature Fossil Energy Applications	Jacob Pellicotte and Robert Mach	
Oak Ridge National Laboratory (ORNL)	Weldability of Creep Resistant Alloys for Advanced Power Plants	Zhili Feng	

SESSION B9: Computational Modeling

University of California - Riverside	Large-Scale, Graphics Processing Unit (GPU)-Enhanced Density Functional Tight Binding (DFTB) Approaches for Probing Multi-Component Alloys	Anshuman Kumar and Bryan Wong	Omer Bakshi
Florida International University	The Fundamental Creep Behavior Model of GR.91 Alloy by Integrated Computational Materials Engineering (ICME) Approach	Jiuhua Chen	
Michigan Technological University	Development of a Physically-Based Creep Model Incorporating ETA Phase Evolution for Nickel-Base Superalloys	Ninad Mohale	

SESSION B10: Creep Fatigue and DPE Materials

Missouri State University	Multi-modal Approach to Modeling Creep Deformation In Ni-Base Superalloys	Ridwan Sakidja	Barbara Carney
Ohio State University	ICME for Creep of NI-Base Superalloys in Advanced Ultra-Supercritical Steam Turbines	Pengyang Zhao	
University of Nebraska Lincoln	Vertically-Aligned Carbon-Nanotubes Embedded in Ceramic Matrices for Hot Electrode Applications	Yongfeng Lu	
University of Texas at El Paso	Combustion Synthesis of Boride-Based Electrode Materials for Magneto Hydrodynamic (MHD) Direct Power Extraction	Gabriel Llausas	

SESSION B11: Direct Power Extraction (DPE)

Florida International University	Novel High Temperature Carbide and Boride Ceramics for Direct Power Extraction Electrode Applications	Jose Belisario	Jason Hissam
National Energy Technology Laboratory (NETL)	Simulation & Validation of MHD flows and materials	Rigel Woodside	
National Energy Technology Laboratory (NETL)	Overview of Direct Power Extraction Systems Engineering & Analyses	Nathan Weiland	

TRACK C: MATERIALS AND WATER MANAGEMENT CROSSCUTTING RESEARCH

SESSION C8: Advanced Manufacturing

Organization	Title	Presenter	Moderator
Oak Ridge National Laboratory (ORNL)	Demonstrate feasibility of additive manufacturing of high nickel alloys for FE components	Sebastien N. Dryepondt	Barbara Carney
Oak Ridge National Laboratory (ORNL)	Additive Manufacturing of High Gamma Prime Alloys	Sebastien N. Dryepondt	
Lawrence Livermore National Laboratory	Additive Manufacturing of New Structures for Heat Exchange	Joshuah Stolaroff	
University of Texas at El Paso	Additive Manufacturing of Energy Harvesting Material System for Active Wireless Microelectro-mechanical Systems (MEMS) Sensors	Luis Chaves	

SESSION C9: Water Management and Discussion

University of California	U.S.-China Clean Energy Research Center - Water and Energy Technolgies	Ashok Rao	Maria Reidpath
National Energy Technology Laboratory (NETL)	Powerplant. Status Update of Effluent Limitation Guideline – Regulations and Analysis Activity at NETL Effluents	Eric Grol	
National Energy Technology Laboratory (NETL)	Facilitated Water Tech Discussion	Briggs White	

SESSION C10: Membrane Water Treatment

National Energy Technology Laboratory (NETL)	Water Management At Coal Power Systems	Nicolas Siefert	Omer Bakshi
University of Illinois at Urbana-Champaign	Energy Efficient Waste Heat Coupled Forward Osmosis for Effluent Water Management at Coal-Fired Power Plants	Nandakishore Rajagopalan	
Los Alamos National Laboratory	Water Treatment and Water-Vapor Recovery Using Advanced Thermally Robust Membranes for Power Production	Rajinder Singh	
SRI International	Development of a High Efficient Membrane-Based Wastewater Management System for Thermal Power Plants	Indira Jayaweera	

SESSION C11: Wastewater

University of New Mexico	Flue Gas Desulfurization Wastewater Treatment, Reuse and Recovery	Ayush Shahi	Nicolas Siefert
University of Kentucky Research Foundation	Intensified Flue Gas Desulfurization Water Treatment for Reuse, Solidification, and Discharge	Xin Gao	
West Virginia State University	Dev. Cost-Effective Biological Removal Technology for Selenium & Nitrate from Flue Gas Desulfurization Wastewater from Existing Power Generating Facility	Sanju Adagoor Sanjaya	