# 2013 NETL $CO_2$ Capture Technology Meeting
# Sheraton Station Square, Pittsburgh, PA

## Monday, July 8, 2013 - Grand Station I & II

7:00 a.m. **Registration - Grand Station Foyer**
**Continental Breakfast - Grand Station III**

## Grand Station I and II

8:00 a.m. **Introduction**
*Lynn Brickett*, U.S. Department of Energy, National Energy Technology Laboratory

8:10 a.m. **DOE/NETL $CO_2$ Capture R&D Program**
*Shailesh Vora*, U.S. Department of Energy, National Energy Technology Laboratory

8:30 a.m. **New Coal Power R&D Goals for 2025 and Beyond**
*Kristin Gerdes*, U.S. Department of Energy, National Energy Technology Laboratory

8:50 a.m **NETL-RUA's Carbon Capture Solutions**
*David Luebke*, U.S. Department of Energy, National Energy Technology Laboratory

9:10 a.m. **$CO_2$ Capture R&D at EPRI**
*Abhoyjit Bhown*, EPRI

9:30 a.m. **EFRC-NETL Research on Carbon Capture and ARPA-e**
*Jeff Reimer*, University of California, Berkeley

9:50 a.m. **CCS Cooperation Opportunities US-Norway**
*Bjørn-Erik Haugan,* Gassnova SF

10:10 a.m. **BREAK - Grand Station III**

### Post-Combustion Sorbent-Based Capture

Moderator – *Andrew Aurelio*, U.S. Department of Energy, National Energy Technology Laboratory

10:30 a.m. **Accelerating Technology Development–Post-Combustion Capture Sorbents**
*David Miller*, U.S. Department of Energy, National Energy Technology Laboratory and *James Fisher,* URS, National Energy Technology Laboratory

11:20 a.m. **Bench-Scale Development and Testing of a Novel Adsorption Process for Post-Combustion $CO_2$ Capture**
*Ravi Jain*, InnoSepra, LLC

11:45 a.m. **Rapid Pressure Swing Adsorption for $CO_2$ Capture**
*James Ritter,* University of South Carolina

12:10 p.m. **LUNCH - Admiral Room**

Moderator – *Andrew O'Palko*, U.S. Department of Energy, National Energy Technology Laboratory

1:40 p.m. **Evaluation of $CO_2$ Capture From Existing Coal-Fired Plants by Hybrid Sorption Using Solid Sorbents**
*Steve Benson,* University of North Dakota, Institute for Energy Studies and *Srivants Srinivasachar,* Envergex, LLC

## Monday, July 8, 2013 - Grand Station I & II

2:05 p.m. **Evaluation of Solid Sorbents as a Retrofit Technology for $CO_2$ Capture**
*Sharon Sjostrom,* ADA-ES, Inc.

2:30 p.m. **A New Sorbent for Post-Combustion $CO_2$ Capture**
*Gökhan Alptekin*, TDA Research, Inc.

2:55 p.m. **Advanced Solid Sorbents and Process Designs for Post-Combustion $CO_2$ Capture**
*Thomas Nelson*, RTI International

3:20 p.m. **BREAK - Grand Station III**

Moderator – *Andrew O'Palko*, U.S. Department of Energy, National Energy Technology Laboratory

3:40 p.m. **Solid Sorbent for Post-Combustion $CO_2$ Capture**
*Jeannine Elliott,* TDA Research, Inc.

4:05 p.m. **Development of Advanced Carbon Sorbents for $CO_2$ Capture**
*Gopala Krishnan,* SRI International

4:30 p.m. **Rapid Temperature Swing Adsorption Using Polymeric-Supported Amine Hollow Fibers**
*Christopher Jones*, Georgia Tech

4:55 p.m. **ADJOURN**

5:00 p.m. **CCSI Demonstration - Woodlawn I**

## Tuesday, July 9, 2013 - Grand Station I & II

7:00 a.m. **Registration - Grand Station Foyer**
**Continental Breakfast - Grand Station III**

### Post-Combustion Solvent-Based Capture

Moderator – *Andrew Jones*, U.S. Department of Energy, National Energy Technology Laboratory

8:00 a.m. **$CO_2$-Binding Organic Liquids Gas Capture With Polarity-Swing-Assisted Regeneration**
*David Heldebrant,* Battelle Pacific Northwest Division

8:25 a.m. **Low-Energy Solvents for Carbon Dioxide Capture Enabled by a Combination of Enzymes and Ultrasonics**
*Sonja Salmon,* Novozymes North America, Inc.

8:50 a.m. **Bench-Scale Silicone Process for Low-Cost $CO_2$ Capture**
*Benjamin Wood*, GE Global Research

9:15 a.m. **Development of a Novel Gas Pressurized Stripping (GPS)-Based Technology for $CO_2$ Capture from Post-Combustion Flue Gases**
*Shiaoguo (Scott) Chen*, Carbon Capture Scientific, LLC

9:40 a.m. **Advanced Low-Energy Enzyme-Catalyzed Solvent for $CO_2$ Capture**
*John Reardon,* Akermin, Inc.

10:05 a.m. **BREAK - Grand Station III**

Moderator – *David Lang*, U.S. Department of Energy, National Energy Technology Laboratory

## Tuesday, July 9, 2013 - Grand Station I & II

10:25 a.m. **Development and Demonstration of Waste Heat Integration With Solvent Process for More Efficient $CO_2$ Removal From Coal-Fired Flue Gas**
*Todd Wall,* Southern Company Services, Inc.

10:50 a.m. **Application of a Heat-Integrated Post-Combustion $CO_2$ Capture System**
*Kunlei Liu,* University of Kentucky, Center for Applied Energy Research

11:15 a.m. **Status of the Carbon Dioxide Absorber Retrofit Equipment (CARE) Program**
*Andrew Awtry,* Neumann Systems Group

11:40 a.m. **Slipstream Pilot-Scale Demonstration of a Novel Amine-Based Post-Combustion Process Technology for $CO_2$ Capture from Coal-Fired Power Plant Flue Gas**
*Krish Krishnamurthy,* Linde, LLC

12:05 p.m. **LUNCH - Admiral Room**

Moderator – *Steven Mascaro*, U.S. Department of Energy, National Energy Technology Laboratory

1:35 p.m. **National Carbon Capture Center: Post-Combustion**
*John Wheeldon,* National Carbon Capture Center

2:00 p.m. **ION Novel Solvent System for $CO_2$ Capture**
*Nathan Brown,* ION Engineering, LLC

2:25 p.m. **Evaluation of Concentrated Piperazine for $CO_2$ Capture From Coal-Fired Flue Gas**
*Gary Rochelle,* University of Texas at Austin

2:50 p.m. **Bench-Scale Development of a Hot Carbonate Absorption Process With Crystallization-Enabled High Pressure Stripping for Post-Combustion $CO_2$ Capture**
*Yongqi Lu,* University of Illinois at Urbana-Champaign

3:15 p.m. **BREAK - Grand Station III**

Moderator – *Barbara Carney*, U.S. Department of Energy, National Energy Technology Laboratory

3:35 p.m. **Development of Additives for Reducing $CO_2$ Capture Costs**
*Yang Li,* Lawrence Berkeley National Laboratory

### $CO_2$ Compression

4:00 p.m. **Novel Concepts for the Compression of Large Volumes of Carbon Dioxide**
*J. Jeffrey Moore,* Southwest Research Institute

4:25 p.m. **Ramgen Supersonic Shock Wave Compression and Engine Technology**
*Aaron Koopman,* Ramgen Power Systems, LLC

4:50 p.m. **ADJOURN**

5:00 p.m. **Poster Session/Reception – Grand Station III**

## Wednesday, July 10, 2013 - Grand Station I & II

7:00 a.m. **Registration - Grand Station Foyer**
**Continental Breakfast - Grand Station III**

## Wednesday, July 10, 2013 - Grand Station I & II

### Post-Combustion Membrane-Based Capture

Moderator – *José Figueroa*, U.S. Department of Energy, National Energy Technology Laboratory

8:00 a.m. **Combined Pressure, Temperature Contrast, and Surface-Enhanced Separation of $CO_2$ for Post-Combustion Carbon Capture**
*Michael Wong,* Rice University

8:25 a.m. **Novel Inorganic/Polymer Composite Membranes for $CO_2$ Capture**
*Winston Ho,* The Ohio State University

8:50 a.m. **Low-Pressure Membrane Contactors for $CO_2$ Capture**
*Richard Baker,* Membrane Technology & Research, Inc.

9:15 a.m. **Composite Hollow Fiber Membranes for $CO_2$ Capture**
*Dhaval Bhandari,* GE Global Research

9:40 a.m. **BREAK - Grand Station III**

Moderator – *José Figueroa*, U.S. Department of Energy, National Energy Technology Laboratory

10:00 a.m. **Slipstream Testing of a Membrane $CO_2$ Capture Process**
*Tim Merkel,* Membrane Technology & Research, Inc.

10:25 a.m. **Electrochemical Membranes for $CO_2$ Capture and Power Generation**
*Hossein Ghezel-Ayagh,* FuelCell Energy, Inc.

10:50 a.m. **Membrane Absorption Process for Post-Combustion $CO_2$ Capture**
*S. James Zhou,* Gas Technology Institute

11:15 a.m. **Mixed Matrix Membranes for Post-Combustion Capture**
*Erik Albenze,* URS

11:40 a.m. **LUNCH - Admiral Room**

### Pre-Combustion Capture Projects

Moderator – *Elaine Everitt*, U.S. Department of Energy, National Energy Technology Laboratory

1:10 p.m. **National Carbon Capture Center: Pre-Combustion $CO_2$ Capture**
*Tony Wu,* Southern Company Services, Inc.

1:35 p.m. **Hydrogen-Selective Exfoliated Zeolite Membranes**
*Aparna Iyer,* University of Minnesota

2:00 p.m. **Designing and Validating Ternary Pd Alloys for Optimum Sulfur/Carbon Resistance in Hydrogen Separation and Carbon Capture Membrane Systems Using High-Throughput Combinatorial Methods**
*Hongbin Zhao,* Pall Corporation

2:25 p.m. **High-Temperature Polymer-Based Membrane Systems for Pre-Combustion $CO_2$ Capture**
*Kathryn Berchtold,* Los Alamos National Laboratory

2:50 p.m. **BREAK - Grand Station III**

Moderator – *Elaine Everitt*, U.S. Department of Energy, National Energy Technology Laboratory

## Wednesday, July 10, 2013 - Grand Station I & II

3:10 p.m. **Pre-Combustion Carbon Dioxide Capture by a New Dual-Phase Ceramic Carbonate Membrane Reactor**
*Tyler Norton,* Arizona State University

3:35 p.m. **$CO_2$ Capture From IGCC Gas Streams Using the AC-ABC Process**
*Gopala Krishnan,* SRI International

4:00 p.m. **Evaluation of Dry Sorbent Technology for Pre-Combustion $CO_2$ Capture**
*Carl Richardson,* URS Corporation

4:25 p.m. **ADJOURN**

## Thursday, July 11, 2013 - Grand Station I & II

7:00 a.m. **Registration - Grand Station Foyer**
**Continental Breakfast - Grand Station III**

### ARPA-E Capture Projects

Moderator – *Ramon Gonzalez*, U.S. Department of Energy, ARPA-E

8:00 a.m. **ARPA-E Overview**
*Ramon Gonzalez,* U.S. Department of Energy, ARPA-E

8:25 a.m. **Gelled Ionic Liquid-Based Membranes**
*Rajinder Singh,* Los Alamos National Laboratory

8:50 a.m. **Phase Change Ionic Liquids for Post-Combustion $CO_2$ Capture**
*Joan Brennecke,* University of Notre Dame

9:15 a.m. **Catalytic Improvement of Carbon Capture Systems**
*Roger Aines,* Lawrence Livermore National Laboratory

9:40 a.m. **Cryogenic Carbon Capture**
*Kyler Stitt,* Sustainable Energy Solutions, LLC

10:05 a.m. **BREAK - Grand Station III**

### System Studies and Modeling

Moderator – *Mike Mosser*, U.S. Department of Energy, National Energy Technology Laboratory

10:25 a.m. **Future of CCS Technology Adoption at Existing PC Plants**
*Donald Hanson,* Argonne National Laboratory

10:50 a.m. **Guidance For NETL's Carbon Capture R&D Programs**
*Dale Keairns,* Booz Allen Hamilton

11:15 a.m. **Economic Feasibility of $CO_2$ Capture Retrofits for the U.S. Coal Fleet: Impacts of R&D and $CO_2$ EOR Revenue**
*Michael Matuszewski,* U.S. Department of Energy, National Energy Technology Laboratory

11:40 a.m. **LUNCH - Admiral Room**

### Oxy-Combustion and Chemical Looping

Moderator – *Bruce Lani*, U.S. Department of Energy, National Energy Technology Laboratory

## Thursday, July 11, 2013 - Grand Station I & II

1:10 p.m. **Recovery Act: Oxy-Combustion: Oxygen Transport Membrane Development**
*Wladimir Sarmiento-Darkin,* Praxair, Inc.

1:35 p.m. **Recovery Act: Oxy-Combustion Technology Development for Industrial-Scale Boiler Applications**
*Armand Levassuer,* ALSTOM Power, Inc.

2:00 p.m. **Characterization of Oxy-Combustion Impacts in Existing Coal-Fired Boilers**
*Bradley Adams,* Reaction Engineering International

2:25 p.m. **Coal Direct Chemical Looping Retrofit to Pulverized Coal Power Plants for In-Situ $CO_2$ Capture**
*Samuel Bayham,* Ohio State University Research Foundation

2:50 p.m. **Future Combustion Technologies**
*George Richards,* U.S. Department of Energy, National Energy Technology Laboratory

3:15 p.m. **ADJOURN**