

NETL-RUA 2013 SPRING MEETING: Growth Through Collaboration

National Energy Technology Laboratory – Regional University Alliance (NETL-RUA) members joined together at Waterfront Place Hotel in Morgantown, West Virginia on March 5, 2013 for the Alliance’s third annual spring meeting, which focused on the organization’s strategic plan going forward.

After a warm welcome from Mridul Gautam, Associate Vice President for Research at West Virginia University (WVU), NETL Deputy Director Scott Klara lauded the success of the NETL-RUA in its efforts to improve the stature and reputation of the Alliance, create a regional research and development (R&D) presence, and expand the funding pool for our researchers, but emphasized that there is still work to be done to achieve the pinnacle of these goals. “I envision a day where professors come to the table and ask to be a part of the RUA because its stature adds value to their research and proposal efforts,” remarked Klara, and he noted that “we are starting to approach that day.”



Dr. Mark Redfern, Vice Provost for Research at the University of Pittsburgh (Pitt), unveiled the Executive Committee’s strategic plan to move the NETL-RUA forward over the next few years by focusing on three areas: sustainable growth,

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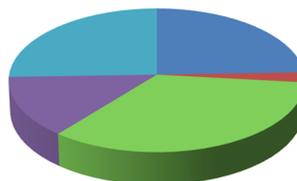
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NETL-RUA METRICS SNAPSHOT

PRODUCTS		
	FY2012	FY2013
Publications	195	34
Patents Issued	12	1
Licenses	4	0
Students Graduated	23 PhD	8 PhD
	19 MS	1 MS

Product data is updated quarterly.

RESEARCH PERSONNEL



Total = 584

- Graduate Students - 143
- Undergraduate Students - 13
- University Researchers - 199
- URS Researchers - 80
- NETL Researchers - 149

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>> **SPRING MEETING**, *Continued from Page 1*

the innovation engine, and the next-generation workforce. Efforts to grow and cultivate fossil energy research will focus on pursuing new initiatives, identifying new strategic growth areas, partnering with industry, and jointly pursuing solicitations as a group. Translating the Alliance's research into action and into society will be accomplished through a well-planned commercialization process that works well for all Alliance partners. Finally, the plan capitalizes on our research efforts as a platform for educating the next generations of scientists and engineers.

Cynthia Powell, NETL Director, Office of Research and Development, provided an overview of the NETL-RUA research portfolio which concentrates on reducing the

environmental impact of coal utilization and creating a science-based understanding of the impacts of developing the nation's unconventional resources, such as shale gas. Powell went on to share success stories of NETL-RUA members that display the importance of the Alliance partnership. These successes include an R&D 100 Award for the development of a Basic Immobilized Amine Sorbent (BIAS) process, the Carbon Capture Simulation Initiative (CCSI) pre-release of a first-generation toolset to industrial partners, the development of better-performing oxygen carriers in the chemical looping process, and catalyst development for converting carbon dioxide (CO₂) into fuels and chemicals.



The main emphasis of the spring meeting was the research being performed by the 13 research teams within NETL-RUA. After a brief five-minute presentation by each research team, meeting attendees voted for three of the teams to give expanded presentations. Congratulations to Dave Alman, Ale Hakala, and Kirk Gerdes whose team presentations for Innovative Process Technologies (IPT), Unconventional Resources, and Fuel Cells, respectively, were selected to provide a more in-depth look at the research progress, successes, and challenges faced by their multi-organizational teams.

The day's program also included the introduction of three new funding programs sponsored by URS, and available to NETL-RUA in the form of awards for new concepts and recognized outstanding existing research projects. Further, NETL launched an undergraduate intern program within NETL-RUA to begin this summer. Details of both programs can be found on Page Four.



Thanks to all who gave their time to make this year's NETL-RUA Spring Meeting a success. A webcast of the meeting as well as presentation materials and informative handouts are available on the NETL-RUA Members Only SharePoint Site (MOSS) at <https://portal.netl.doe.gov/sites/RUA/NETLRUA%20Spring%20Meeting%20%202013/Forms/AllItems.aspx> and on the NETL-RUA external website at <http://netl.doe.gov/publications/proceedings/13/rua/index.html>.



Upcoming Events

- **[12th Annual Conference on Carbon Capture & Sequestration](#)**

May 14-16, 2013

David L. Lawrence Convention Center, Pittsburgh, PA

- **[American Association of Petroleum Geologists \(AAPG\) Annual Convention & Exhibition](#)**

May 19-22, 2013

David L. Lawrence Convention Center, Pittsburgh, PA



Noteworthy Achievements

Of Our NETL-RUA Members

NETL-RUA Wins a Third Carnegie Science Award

Congratulations to Pitt professor and NETL-RUA principal investigator (PI), **Dr. Robert Enick**, who will be honored with the Carnegie Science Environmental Award for developing a unique method of capturing CO₂ from the stacks of coal-fired power plants. This work was part of a U.S. Department of Energy (DOE) Advanced Research Projects Agency-Energy (ARPA-E) project in which Dr. Enick worked with scientists at GE Global Research to develop a novel liquid spray that reacts with dilute concentrations of CO₂ to form solid particles that can be readily captured. The Environmental Award recognizes outstanding achievements in the fields of environmental protection and restoration that benefit the economy, health, and quality of life in our region. Dr. Enick's state-of-the-art technique is projected to have much lower energy costs than current technologies.

Dr. Enick is Bayer Professor and Vice Chair for Research in the Department of Chemical and Petroleum Engineering of Pitt's Swanson School of Engineering. His NETL-RUA research supports the Carbon Capture and Ultra-deepwater teams and focuses on experimental investigations of high pressure thermodynamic and transport measurements, and pre-combustion CO₂ capture.

Three Carnegie Science Awards, *Advanced Materials*, *Corporate Innovation*, and *Environmental*, will be presented to NETL-RUA recipients at Carnegie Music Hall in the Oakland neighborhood of Pittsburgh on May 3, 2013. Tickets to attend the ceremony are available at <http://www.carnegiesciencecenter.org/carnegie-science-awards/>.



Dr. Robert Enick

NETL-RUA Researcher Awarded Computational Hours on World's Fastest Supercomputer

One million computational hours, which is the equivalent of 114 computers running simultaneously and nonstop for one year, on the world's fastest supercomputer have been devoted to NETL-RUA PI **Dr. James P. Lewis**. Lewis and his research group at WVU have received a grant from DOE to use supercomputer Titan to design new materials which are key in developing solar power. Titan is currently listed as number one on the [TOP500](http://www.top500.org/) website of the world's fastest supercomputers and will allow Lewis and his group to test the possible effectiveness of new materials for photovoltaics without wasting money on development in the lab. Titan was created at DOE's Oak Ridge National Laboratory in Oak Ridge, Tennessee, to provide scientists with the most advanced computing power in the world.

Dr. Lewis is an associate professor in the Department of Physics at WVU. His NETL-RUA work supports the Industrial Carbon Management Initiative (ICMI) team and focuses on using state-of-the-art computational methods to determine the optical and electronic properties of photoactive catalysts and sorbents.



Dr. James P. Lewis

Your favorite issues of the NETL-RUA E NEWS are now available on the Members Only SharePoint Site (MOSS) and the NETL-RUA website (www.netl.doe.gov/rua)



Technology Spotlight

CO₂ Adsorption Advancement

A NETL-RUA research activity led by Professor Bingyun Li of WVU has studied the adsorption of CO₂ by amino acids supported in nanoporous microspheres. Such sorbents retained their highly porous structures after amino acid ionic liquid (AAIL) loading and exhibited fast kinetics as well as reasonably high sorption capacity and easy regeneration. These results have been published in a recent issue of *Journal of Materials Chemistry A*.

The process of amine capture of CO₂ involves a reaction in the presence of water. Aqueous amine scrubbing has been used to separate hydrogen sulfide and CO₂ from natural gas and hydrogen since 1930. It is a robust technology and is ready to be tested and used on a larger scale for CO₂ capture from coal-fired power plants. However, this technology has shown serious disadvantages such as the loss of volatile amines, which increases operational costs, and the need to release CO₂ by water evaporation, adding heating costs. This provides an opportunity to develop innovative, cost-efficient solutions for separating CO₂ from flue gas.

Biological systems exhibit amino groups of various types (amino acids, peptides, proteins, etc.) that invite systematic development as potential sorbents for CO₂ capture, including amino acids and AAILs. Preliminary experimental studies have shown that these amino acid-based materials are capable of better performance in CO₂ capture than monoethanolamine (MEA), the prototypical amine sorbent used in capture systems.

Bingyun Li is an Adjunct Assistant Professor of Chemical Engineering at WVU. Li's NETL-RUA research supports the Carbon Capture team and is aimed at accelerating the development of efficient, cost-effective technologies that drive towards the post-combustion programmatic goal of capturing 90 percent of the CO₂ produced by an existing coal-fired power plant with less than a 35 percent increase in the cost of electricity (COE).

Xianfeng Wang, Novruz G. Akhmedov, Yuhua Duan, David Luebke, Bingyun Li, "Immobilization of amino acid ionic liquids into nanoporous microspheres as robust sorbents for CO₂ capture", *Journal of Materials Chemistry A*, volume 1 issue 9, 2013, page 2978-2982.

NETL and URS Announce Programs to Support NETL-RUA Research

Energy Internship Program was announced on March 5, 2013 at the NETL-RUA spring meeting in Morgantown, WV. One of the primary objectives of this program is to encourage U.S. undergraduates in Science, Technology, Engineering, and Mathematics (STEM) majors to obtain advanced degrees and embark on careers in research. NETL Focus Area Leads (FALs), Technical Coordinators (TCs) and University Consortium Area Leads (CALs) will nominate research projects for funding. Criteria for selection will include progress and results of research, potential impact of research, and degree of collaboration between NETL and the university. University PIs will select the interns and serve as primary mentors. Selected interns will support existing NETL-RUA research projects but work at their home university; collaboration with NETL staff will be strongly encouraged. Interns will deliver a presentation/report summarizing their research at the conclusion of their internship. Additional program information is forthcoming and will be posted on the MOSS.

URS is pleased to announce the establishment of three new awards that will support the NETL-RUA strategic plan for sustainable growth, strong innovation, and the next generation workforce. The awards include the **URS Innovative NETL-RUA Research Award**, the **URS Outstanding NETL-RUA Research Award**, and the **URS Award for NETL-RUA Student Travel** for a total of \$110,000 in funding. These awards are designed to provide financial support to faculty and students to help advance the strategic objectives of NETL-RUA and will be open to ideas across the entire spectrum of R&D from fundamental concepts to near commercial-ready technologies. The Request for Proposal (RFP) for each award will be released on April 1, 2013 and will be available on the MOSS, as well as distributed to NETL-RUA CALs at each university. Proposals will be due on May 1, 2013 and award notifications will be made in early June. Please direct inquiries to Janet.Nelson@contr.netl.doe.gov.