NETL-RUA
Regional University Alliance

E NEWS

Shared Intellect • Shared Laboratories • Shared Resources

April 2012
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NETL-RUA 2012 SPRING MEETING:

Growth Through Collaboration

NETL-RUA members joined together at Waterfront Place Hotel in Morgantown, West Virginia on March 9 for the Alliance's second annual spring meeting. Over 200 members, including 31 by webcast, convened to greet friends and colleagues and hear about key progress and initiatives that will carry the NETL-RUA into the future.

NETL Director
Dr. Anthony Cugini

National Energy Technology Laboratory (NETL) Director Anthony Cugini acknowledged the Alliance's quick growth in just a few years, during which "we brought together five major universities, a very multifaceted government organization and a major company to channel efforts and focus on a singular goal of building a regional powerhouse that could do fantastic and cutting-edge research."

According to Dr. Cugini, the next step in the NETL-RUA's evolution is to focus on business outreach to bring funding in from regional industrial sources, many of which have shown tremendous interest in working with the Alliance.

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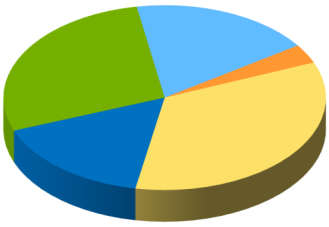
NETL-RUA
METRICS SNAPSHOT

PRODUCTS		
	FY2011	**FY2012**
Publications	194	43
Patents	11	2
Licenses	9	4
Students Graduated	20 PhD	9 PhD
	8 MS	6 MS

** Products data is updated quarterly

RESEARCH PERSONNEL



Total = 510

- Graduate Students
- Undergraduate Students
- University Researchers
- URS Researchers
- NETL Researchers

April 2012

E News is your monthly source for the latest information about NETL-RUA's research, activities and other important news. If you have information that you would like to feature in future newsletters, send that information to

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What's in This Issue

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After an inspirational welcome from the provost of West Virginia University (WVU), Michele Wheatly, Office of Research & Development (ORD) Director and NETL-RUA Executive Committee member Cindy Powell delivered the main address. "It's all about us coming together to jointly define what research should be done and how best we can approach it and what pieces we can collectively bring together," stated Powell.

Cindy Powell, Director of the NETL Office of Research & Development

Presentations by Andy Gellman of Carnegie Mellon University (CMU) and Geo Richards, George Guthrie, and Steve Zitney of NETL highlighted the successes and paths forward of three NETL-RUA research initiatives.

NETL-RUA Manager Juli Klara presented three pathways to grow the R&D portfolio, which include leveraging Core R&D, pursuing Strategic Growth Areas (SGAs) that are natural extensions of Fossil Energy research, and expanding into what she termed "Strategic Expansion Areas."

Juli Klara, NETL-RUA Manager

The plenary session concluded with updates for the three current SGAs presented by Ale Hakala (NETL), Greg Reed (University of Pittsburgh), and Roe-Hoan Yoon (Virginia Tech) for Shale Gas, Grid Technologies, and Rare Earths, respectively.

Following a networking lunch, the day ended with afternoon break-out sessions of the NETL-RUA Research Teams providing attendees the opportunity to learn more about the work being accomplished and to develop future plans for research and growth. The NETL-RUA Charter Committees held break-out sessions as well, taking advantage of the opportunity to meet with "long-distance" members already in Morgantown for the spring meeting. Updates of the Charter Committee meetings can be found on page 4 of this newsletter.

Thanks to all who gave their time to make this year's NETL-RUA Spring Meeting a success. A recording of the meeting webcast, presentation materials, and informative handouts are available on the NETL-RUA Members Only SharePoint Site (MOSS). From those in attendance, the NETL-RUA requests feedback via an electronic survey regarding your experience at the Spring Meeting and thoughts for the Fall Meeting.

NETL-RUA Team Working on Innovative Solvents for Pre-combustion Carbon Capture in IGCC Systems

Capture of carbon dioxide (CO_2) from large power generation facilities is a critical component of any practical strategy for stabilizing atmospheric concentrations of CO_2. Integrated gasification combined cycle (IGCC) power plants have substantial process efficiency advantages over more conventional pulverized coal combustion facilities and allow CO_2 to be captured more efficiently as well.

A 250 MW IGCC plant near Lakeland, Florida

A team of NETL-RUA researchers including Robert Enick from the University of Pittsburgh, Hunaid Nulwala from CMU, and Dave Luebke of NETL are working jointly on an innovative solvent based technology to selectively remove CO_2 from the IGCC process prior to combustion, when there would be more water (H_2O) in the gas stream. By identifying a selective solvent that does not absorb water or remove such useful gases as hydrogen (H_2), the overall efficiency of an IGCC plant can be increased by several percentage points and the cost of capturing CO_2 reduced.

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The most commonly proposed physical solvent for CO_2-H_2 separation is poly (ethylene glycol) dimethyl ether (PEGDME). Commercial examples of PEGDME-rich solvents include Selexol® and DEPG®. The NETL-RUA project team is identifying other commercially available polymeric liquids, and designing new ones, that are CO_2-philic, hydrophobic, and unlikely to absorb hydrogen.

The two most promising candidates identified to date include a silicone oil, poly(dimethyl siloxane) or PDMS, and poly(propylene glycol) dimethyl ether or PPGDME. Both of these solvents are capable of absorbing about as much CO_2 as PEGDME, and may pick up much less water.

The NETL-RUA team is evaluating these solvents by measuring their capacity to remove CO_2. The ideal candidate would be completely hydrophobic and absorb as much CO_2 and as little H_2 as Selexol. It should also be low cost, and have low viscosity, low vapor pressure, with high thermal stability, and no effect to health, safety, or the environment.

The initial tests include the determination of the solubility of CO_2, H_2 and H_2O in both solvents over a wide range of temperature and pressure, and the measurement of the viscosity of these solvents over a wide temperature range. If, as may be likely, the candidate solvents exhibit some but not all of the desirable properties, systems analysis will be required to determine the solvent's promise.

Given a positive outcome of the initial experiments, the NETL-RUA team will be looking to demonstrate performance of the solvents in a scaled up operating environment and will also be developing a process model based economic assessment of anticipated system benefit.

Students Star in U.S. DOE Science Bowls

Preparing the next generation of scientists, engineers, and entrepreneurs, and future leaders to perform innovative research and apply new technologies in the marketplace is an important goal of the NETL-RUA. Many of our members recently stepped up to show their support for this goal by volunteering their time at the 21st U.S. Department of Energy Science Bowls for Southwestern Pennsylvania and West Virginia.

Forty-one teams of high school students and 23 teams of middle school students from southwestern Pennsylvania as well as 18 teams of high school students from West Virginia gave us an encouraging glimpse into the future with their enthusiastic participation in these regional competitions. Hosted by NETL, the Science Bowls challenged these teams with questions about Biology, Chemistry, Earth and Space Science, Energy, Mathematics, and Physics at the high school level, and Life Science, Physical Science, Earth and Space Science, Energy, Mathematics, and General Science at the middle school level.

Morgantown High School demonstrated its academic prowess as it defeated 17 other teams on February 4 to capture first place at the West Virginia Science Bowl.

Morgantown High School team

On February 25, four high school teams emerged victorious from the first round of the fierce competition at the Southwestern Pennsylvania Science Bowl, and on March 3, four middle school teams claimed first-round victories. These eight teams from southwestern Pennsylvania went on to compete in the double-elimination finals matches on March 7 at NETL in Pittsburgh. North Allegheny edged out Mt. Lebanon in a close match to win the high school competition, while Ingomar took home first prize in the middle school competition.

North Allegheny High School team

The winning teams have each earned an expense-paid trip to the National Science Bowl® scheduled for April 26-30, 2012 in Washington, D.C.

Ingomar Middle School team

Congratulations to the talented young people who participated in this year's regional Science Bowls, as well as the three teams advancing to the National Science Bowl.

Special thanks to the volunteers who gave their time to support and encourage these students and to our member universities who provided recruitment materials to the high school participants.

AVESTAR Explored for Benchmarking Study

The Center for Effective Performance (CEP), a workforce performance consulting firm based in Atlanta, Georgia, recently included NETL's AVESTAR™ Center at WVU as part of a benchmarking study for a proposed world-class, virtual simulation-based training center. Representing Saudi Aramco, Saudi Arabia's national oil company, CEP is conducting the study as part of an effort to develop Aramco's downstream refining and petrochemicals workforce.

Steve Zitney of NETL and Debangsu Bhattacharyya of WVU provided CEP with an overview of the AVESTAR R&D, training, and education programs. AVESTAR's IGCC dynamic simulator and the recently launched 3D virtual immersive training system (ITS) were highlighted. CEP's representative also toured the AVESTAR facilities at WVU and was given a demonstration of the IGCC simulator.

AVESTAR was also highlighted in presentations at the Sixteenth Annual ARC World Industry Forum and 2012 Power Plant Simulation Conference (PowerPlantSim '12) in February.

Launched in May 2011, the world-class AVESTAR Center is the result of a successful collaboration between NETL, industry, and university partners.

Join Us Online

NETL-RUA Committee News

NETL-RUA Charter Committees are charged with supporting NETL-RUA's research and educational mission by collaboratively addressing critical initiatives and ongoing processes. This issue focuses on discussions held at the NETL-RUA Spring Meeting, March 8-9, 2012. Meeting notes, presentations, charters, and plans for all of the committees can be found on the NETL-RUA MOSS.

Joint Business Development and Research Committees

Discussions continued from the January Joint Meeting and focused on the need to operationalize business development functions, identify roles and responsibilities, and discuss New Initiatives and Solicitation response processes.

Roe-Hoan Yoon provided an update on the Critical Materials SGA which centered on the forthcoming Critical Materials Research Alliance (CMRA).

The group also identified operational and resource barriers that must be overcome to improve our success at pursuing large new initiatives like those of the SGAs.

Technology Transfer Committee

Focusing on the NETL-RUA agreement mechanisms, this meeting included a presentation by Carl Irwin, from WVU, on the first annual TransTech Energy Business Development Conference to be held in Morgantown, West Virginia November 15-16, 2012.

Jessica Sosenko presented the NETL Technology Transfer Process, and additional discussions were held on how to pull and leverage all of the Alliance members' patents into one portfolio for the benefit of the organization.

Joint Education and Communications Committees

Discussion revolved around communications processes and the need to develop a business development oriented brochure for the NETL-RUA.

A summer internship program geared toward undergraduates was discussed. It is hoped that this new NETL- sponsored internship program will be available in summer 2013.

Operations Committee Meeting

The Operations Committee met March 9 to discuss NETL-RUA solutions and strategies which would assist the universities in ongoing NETL-RUA contract work. Operational issues had been identified as a result of a data call that was sent to the partner universities in December 2011.

Highlighted issues included incremental funding, cost reporting and invoicing, property management, travel, communications, technical reporting, project development, and press releases.

UPCOMING EVENTS

NETL-RUA Fall Meeting

The NETL-RUA is planning a fall meeting to be held in Canonsburg, PA at the Southpointe Hilton Garden Inn, November 28 - 29, 2012. Titled "Energy and Innovation," the fall meeting will provide a forum to accelerate technology development and assist in commercializing new technologies and products by connecting manufacturers and university and federal laboratories. The date and venue are currently being finalized and will be announced in the next newsletter. Information gained from the Spring Meeting electronic survey is being used to develop the agenda. If you have ideas for the meeting, please contact Juli Klara or Jessica Sosenko.

NETL-RUA Executive Committee Meeting

May 2, 2012 at NETL Pittsburgh site