

NETL-RUA and Coronary Stent Team to Receive Carnegie Science Awards

On January 30, the Carnegie Science Center hosted a reception to announce the winners of the [2013 Carnegie Science Awards](#). NETL-Regional University Alliance (NETL-RUA) and three of its members were chosen as recipients of awards in two categories.

The **Corporate Innovation Award** was given to the NETL-RUA as an environment that promotes innovation in science or technology. The NETL-RUA was chosen based on an outstanding commitment to research



that protects human health and the environment, reduces the energy sector's carbon footprint, finds uses for mitigated carbon dioxide (CO₂), and ensures energy security. Specific technologies that captured the attention of the selection committee include NETL's Multiphase Flow with Interphase eXchanges (MFIX) software; Carbonaceous Chemistry for Computational Modeling (C3M) for coal gasification, gas clean-up, and carbon capture processes; the first-of-its-kind Advanced Virtual Energy Simulation Training and Research (AVESTAR™) Center to train advanced power plant operators; and improved methods for estimating our nation's permanent CO₂ storage potential

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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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Join Us Online

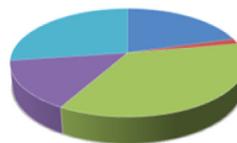


NETL-RUA METRICS SNAPSHOT

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



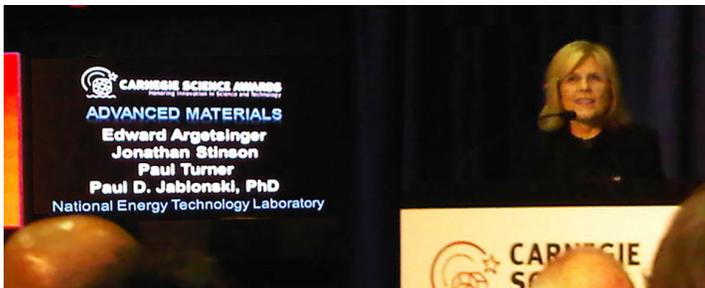
Total = 546

- Graduate Students - 112
- Undergraduate Students - 9
- University Researchers - 196
- URS Researchers - 80
- NETL Researchers - 149

>> **AWARD**, *Continued from Page 1*

for industrial carbon emissions. NETL-RUA's combined expertise and facilities and its ability to inspire the next generation of researchers to tackle national energy challenges also figured into the award. Criteria include an organization's level and quantity of scientific innovation, organizational commitment to innovation, the impact on the reputation of the region, and realized and potential economic or employment benefit.

Paul Turner and Paul Jablonski of NETL and Ed Argetsinger of URS can now add the Carnegie Science Center's **Advanced Materials Award** to a growing list of achievements, which includes a Secretary of Energy Achievement Award, an Excellence in Technology Transfer Award, and a prestigious **R&D 100 Award**. The Advanced Materials Award recognizes accomplishments in materials science that create new materials or properties leading to significant business, economic, or societal benefits for the region. The team will be honored for their work in formulating a unique platinum-chromium alloy used for new-generation coronary stents. Developed with Boston Scientific Corporation, Inc., the stents are superior to older models because the alloy makes them stronger, thinner, more flexible, and easier to see via x ray. Since their introduction in 2010, these stents have generated more than \$4 billion in sales worldwide, capturing a 45 percent U.S. and 33 percent global share of the coronary stent market. This new product line has created more than 300 new, high-paying jobs at Boston Scientific in Pennsylvania, along with more than 150 jobs in their worldwide supply chain and alloy supplier. Patients have benefitted with shortened recovery time and avoidance of follow-on procedures and more invasive surgery. Physicians demand the new alloy stents, as they are easier to place and optimize clinical outcomes, which improves patient care and reduces cardiac healthcare costs.



Carnegie Science Center established the Carnegie Science Awards program in 1997 to recognize and promote innovation in science and technology across western Pennsylvania. The 2013 awards will be presented at a ceremony to be held at the Carnegie Music Hall in the Oakland neighborhood of Pittsburgh on May 3, 2013. [Click here](http://www.carnegiesciencecenter.org/carnegie-science-awards/), or go to <http://www.carnegiesciencecenter.org/carnegie-science-awards/> for tickets.



For the NETL-RUA Spring Meeting

The NETL-RUA will hold its annual spring meeting on Tuesday, March 5, 2013, at the Waterfront Place Hotel in Morgantown, West Virginia.

This year's meeting will have a more technical focus than past meetings. Each research team will be providing a brief overview of the technical challenge being addressed by the team, the progress that has been made thus far, and any issues that have created hurdles in developing a solution. Other agenda topics planned include an overview of the Executive Committee's NETL-RUA Strategic Plan, a summary by the Office of Research & Development's (ORD) Director of the past year's R&D successes, and a presentation on the Simulation-Based Engineering User Center (SBEUC) and how to gain access.

Registration will be a nominal fee of \$18 dollars to cover lunch. You can register by URL online at <http://netldev.netl.doe.gov/events/2013-netl-rua-spring-meeting>, or at www.netl.doe.gov and clicking on the events calendar, or by calling **412-386-4763**. Hotel accommodation information and the program agenda are also available at this link. Travel authorization is required for URS and university members who plan to charge meeting expenses to a NETL-RUA project. Contact your URS Subcontract Technical Representative (STR) for guidance. Federal employees must request approval from their Division Director as there are a limited number of attendees permitted from ORD.

Upcoming Events

- **NETL-RUA Spring Meeting** (see details above)
Tuesday, March 5, 2013
Waterfront Place Hotel, Morgantown, WV
- **PITTCON™ Conference & Expo**
March 17–21, 2013
Pennsylvania Convention Center, Philadelphia, PA
- **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

Congratulations to NETL scientist **Michael Nowak** for his election to a three-year term as Director of the [Council for Chemical Research](#) (CCR), of which NETL has been a longstanding member. CCR's goal has been to improve trust and collaboration among academic, national laboratory, and industrial research communities. Nowak supports the NETL-RUA as part of the NETL Business Development and Outreach Group.



Michael Nowak

Dr. De Nyago Tafen of URS and an NETL-RUA member supporting the NETL ORD Advanced Combustion team was awarded 200,000 computing (processor) hours at the National Energy Research Scientific Computing Center (NERSC) for the year 2013. These hours complement 375,000 hours previously granted to him through an external peer-reviewed proposal process. NERSC, one of the premier computational centers in the world, is the primary scientific computing facility for the [Office of Science](#) in the U.S. Department of Energy, and is housed at the University of California in Oakland, California. NERSC is considered to be one of the premier computational centers in the world and provides some of the largest computing and storage systems available anywhere. Dr. Tafen's total award will provide approximately one year of computational resources needed to model the dynamics of electron transfer in cadmium selenide/titanium oxide (CdSe/TiO₂) nanoparticle heterostructures.

Dr. De Nyago Tafen



Larry Biegler

Lorenz T. (Larry) Biegler, Carnegie Mellon University (CMU) Professor of Chemical Engineering and NETL-RUA Principal Investigator supporting the Advanced Simulation and Carbon Capture Simulation Initiative (CCSI) teams, has been elected as member of the [National Academy of Engineering](#) (NAE) for his pioneering contributions in large-scale nonlinear optimization theory and algorithms for application to process optimization, design, and control. Election to the NAE is among the highest professional distinctions that can be awarded to an engineer.

In December 2012, three West Virginia University (WVU) and NETL-RUA graduate students were awarded degrees for their graduate work. **Job Kasule** received his Ph.D. in Chemical Engineering after successfully defending his dissertation, entitled "Mathematical Modeling and Simulation of a One-dimensional Transient Entrained-flow GEE-Texaco Coal Gasifier." Job will continue to support the NETL ORD Innovative Process Technologies team as a post-doctoral researcher. **Andrea Sack**, whose NETL-RUA work supported the NETL ORD Quantitative MVA, Carbon Storage, and Unconventional Resources teams, successfully defended her thesis entitled "Tracing Water and Carbon Sources in Complex Geochemical Settings of the Appalachians: An Isotopic Perspective" and was awarded a Masters degree in Geology. **D. Aaron Streets** received his Masters degree in Civil and Environmental Engineering with his thesis entitled "Assessing the surface water quality impacts of Marcellus shale development in Whiteday Creek watershed, West Virginia." Streets's NETL-RUA research supported the NETL ORD Unconventional Resources team.

Job Kasule

Andrea Sack

D. Aaron Streets



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Technology Spotlight

WVU's Gao Listens to Rocks, Fractures, and Fluids



Dengliang Gao

WVU Associate Professor and NETL-RUA Principal Investigator [Dengliang Gao](#) works in the application of emerging 3D seismic attribute technologies to detect faults and fractures in reservoirs to enable assessment of reservoir storage capacity and caprock integrity.

Geophysicists have long used seismic signals—echoed sound waves—to detect subsurface features including rock facies (sedimentary interfaces), fractures, and fluids. A recently developed frontier of this research is to analyze more subtle seismic signal characteristics to better visualize and make predictions concerning the features that affect their reflection.

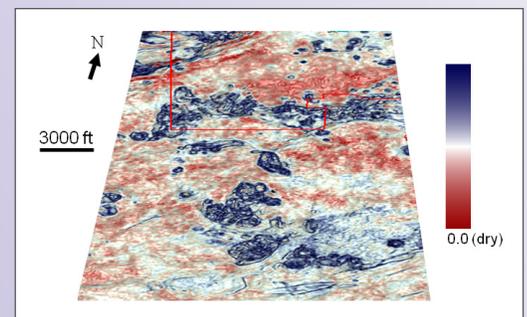
Gao has been working on 3D seismic attribute analysis for subsurface exploration since 1998. In 2009 he developed a new attribute technology which uses a waveform model as a calibrator to extract waveform similarity and similarity phase information that are critical to seismic facies and seismic structure analysis.

Unlike conventional attribute extractions, the new algorithm designs different waveform model schemes tailored to enhance the accuracy and resolution of imaged reservoirs and caprocks while significantly reducing the time required for analysis. The new technology helps to mine otherwise underutilized 3D seismic data, helping to better define reservoir structural geometry, caprock integrity, and plume migration potential for oil, gas, water, and CO₂ in the subsurface, and potentially helping to avoid drilling wasteful and risky wellbores, thereby having direct economic and environmental impact.

After receiving his Ph.D. from Duke University in 1997, Gao worked with ExxonMobil, Marathon, and Chevron. Since joining the faculty at WVU in 2009, Gao's research has focused on the application of 3D seismic waveform attribute technology to detect faults and fractures in unconventional reservoirs such as the tight sand at Teapot Dome (Wyoming) and Marcellus shale in the central Appalachian Basin.

Recently, Gao became interested in the application of seismic attribute technologies to CO₂ sequestration and storage, a major component of integrated research efforts in support of the Quantitative Monitoring, Verification and Accounting (QMVA) and Carbon Storage teams at NETL ORD. In the past two years, he completed two projects sponsored by the NETL-RUA related to the application of seismic attribute technology to fractured reservoirs, and has published four papers in the peer-reviewed international journal *Geophysics*, one of which was selected by the Society of Exploration Geophysicists (SEG) in 2012 as a BrightSpot paper, showcased in the SEG magazine. Of the graduate student papers and presentations arising from these projects, two posters received honorable mention at the American Association of Petroleum Geologists student career poster competition.

In 2013, Gao and his graduate team plan to focus on effectively incorporating seismic attribute information into fractured reservoir characterization and modeling with particular application to CO₂ storage risk assessment in support of the NETL ORD National Risk Assessment Partnership (NRAP) team. The effort will also lead to better understanding of the fracture networks in the central Appalachian Basin using proprietary 3D seismic data provided by energy companies including Energy Corporation of America (ECA) and CONSOL Energy.



The new seismic waveform attribute helps visualize fracture systems saturated with saline water (blue) that are deeply buried in the subsurface. The fracture facies can serve as effective CO₂ reservoirs with high storage capacity and retention permanency, thereby reducing leakage risk and environmental contamination in the subsurface.