



CAES Has Record Funding Year

By Kortny Rolston, CAES Communications

For Center for Advanced Energy Studies, FY 2011 was a record year.

CAES researchers won \$18.2 million in competitive research, infrastructure and other funding – a new single-year record for the partnership. Their winnings push the center’s cumulative total to \$41.9 million.

“It was a great year for the CAES partnership,” said CAES Director Bill Rogers. “The collaborations we have built between the CAES partner institutions and with industry are starting to flourish and result in new research grants and other funding.”

During FY 2011, CAES researchers won more than 25 grants and competitive awards.

Projects include: a center that will train engineering students to assess the

energy efficiency of manufacturing facilities; researching methods to recover uranium from seawater; a software tool to help developers identify preferred locations for solar energy farms; and developing sensors to monitor conditions inside a nuclear waste container.

Idaho Gov. C.L. “Butch” Otter touted the center’s accomplishments in a recent news release and said that it provided taxpayers with an 11 to 1 return on their investment. (The state has contributed \$1.6 million a year over the past three years to help support university researchers’ involvement in the CAES partnership.)

“CAES is a great example of what the Idaho universities and Idaho National Laboratory can accomplish by working

together,” said Otter. “The CAES partnership has proven to be a great investment for taxpayers.”

Did you know?

CAES had a significant economic impact on the state of Idaho in FY 2011. A University of Idaho economist estimates that in FY 2011, CAES generated \$26.8 million in regional sales, 366 jobs and \$620,000 in tax revenue.

A Minute With Jason Harris

By Kortny Rolston, CAES Communications



Jason Harris is a health physics researcher and professor at Idaho State University.

He recently was named the CAES associate director for ISU and also leads the center's nuclear science and engineering research initiative.

How long have you worked at/with CAES?

I started working at CAES in October 2008.

Which research projects are you involved with at CAES?

I am involved in a variety of research areas related to radiation detection and measurement, nuclear instrumentation development, and radioanalysis. Some of the current areas involved with CAES include development of in-core instrumentation for Idaho National Labora-

tory's Advanced Test Reactor, supporting environmental safety and health activities at the building, and working on various other projects that require low-level radioanalysis (i.e., quantifying radioactive material deposition in the CAES Microscopy and Characterization Suite (MaCS). I am also Idaho State University's principal investigator for a new industrial assessment center being established by the CAES Energy Efficiency Research Institute (CEERI).

What do you like best about working at/with CAES?

I love being surrounded by researchers and students working on a variety of projects in very diverse energy research areas. CAES is all about collaboration and working together to solve real problems. To work alongside people who are so dedicated and in an environment that encompasses several different organizations is truly special.

Has CAES led to any new research projects?

There are several projects and initiatives that are on the horizon as a result of being part of CAES. For example, we are

developing radiochemical capabilities that will support operations, research, and education at Idaho National Laboratory and the Idaho research universities, all of which are partners in CAES. We also are looking to develop a nuclear safety, security, and safeguards institute to expand research and education in these areas not only in Idaho, but throughout the country as well.

What do you do in your free time?

Free time, what free time? Actually when I am free, I love to travel, stay fit by doing triathlons (in the warmer months) and skiing (in the colder months), and scuba dive (I'm a master instructor).

What is your favorite movie?

Shawshank Redemption

Favorite book?

Too numerous to pick just one. I, admittedly, did enjoy the Harry Potter series and the last book I finished was "Unbroken" by Laura Hillenbrand.

If you were a superhero, what would your superpower be?

Reading people's minds.



Researcher Receives International Award

A Center for Advanced Energy Studies engineering scientist recently was awarded an international engineering group's top award for his leadership and research contributions.

Dr. Donald M. McEligot, a distinguished visiting professor in mechanical engineering at University of Idaho, received the International Network of Engineering Education

and Research (iNEER)'s Leadership Award during a conference in Belfast, Northern Ireland.

According to the organization, McEligot was selected for his "visionary leadership in innovative research, consistent scholarship through international collaborations and pioneering contributions to engineering."

The International Network for Engineering Education and Research (iNEER) is a global professional organization formed by the world engineering community to promote mutual progress in teaching and learning through international cooperation.

iNEER is composed of educators and researchers from 98 countries.

McEligot, a thermal scientist based at CAES, is also a nuclear science (divisional) fellow at Idaho National Laboratory and a professor emeritus at the University of Arizona. Currently, his UI research emphasizes fundamental fluid physics studies for energy efficiency and sustainability as part of an international partnership between Boise State University, INL, the University of Limerick, KTH Royal Institute of Technology in Stockholm and others.

For INL, he is collaborating with ISU to study flow resistance and heat transfer in the "bypass flow" through vertical gaps between prismatic blocks of gas-cooled nuclear reactors.

Four honored as CAES Outstanding Contributors

CAES Communications

The Center for Advanced Energy Studies recently honored employees from its partner institutions for their contributions to CAES and its mission.

Jason Harris of Idaho State University, David Koehler of Boise State University, Supathorn Phongikaroon of University of Idaho, and Kortny Rolston of Idaho National Laboratory were named outstanding CAES contributors for 2011.

"All of our honorees were instrumental in furthering the CAES partnership and helping build on its success," said CAES Director Bill Rogers. "They exemplify that people are key to the success of CAES."

This is the second year CAES has given out the awards.

- **Jason Harris**, an Idaho State University health physics professor, has worked as a CAES researcher since 2008. He has contributed regularly to the partnership and recently was appointed to be the CAES associate director from ISU.

In addition to teaching courses and conducting research, Harris also leads the CAES nuclear science and engineering research initiative and is the Analytical Instrumentation Laboratory lead.

"(Harris) has been a strong supporter of CAES and has contributed to its mission," said George Imel, a former CAES associate director from ISU. "He stepped up this year strategically and operationally."

- **David Koehler** is the assistant director of the CAES Energy Policy Institute at Boise State University.

During the past year, he led teams that created nine proposals, four of which were funded at more than \$3 million. Koehler also is leading the formation of a new energy-water nexus policy and modeling group that includes 20 faculty and researchers. He has promoted CAES on

several fronts by attending numerous energy conferences and workshops.

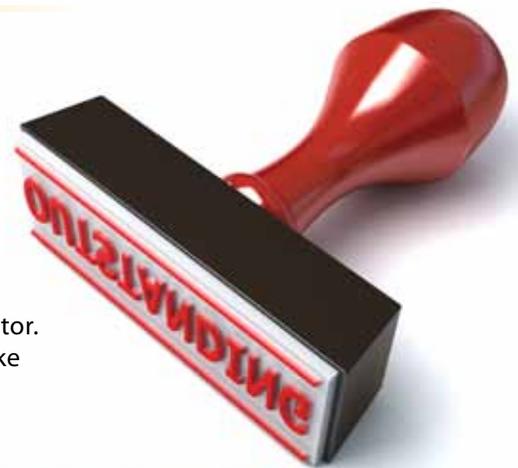
"(Koehler) was one of the key reasons why EPI was so successful during 2011," said David Solan, EPI director. "He has worked very hard to make it a success."

- **Supathorn Phongikaroon (aka Supy)** is a chemical engineering professor at University of Idaho and a CAES researcher. Besides teaching courses for UI and working with graduate students, Phongikaroon writes proposals and conducts research. He also is the lead for the CAES radiochemistry laboratory, one of four labs at CAES equipped to handle radiological materials.

Phongikaroon not only was instrumental in getting the CAES radiochemistry up and running, but also in getting others to embrace the center's operational standards.

"He has done a stellar job getting the radiochemistry lab operational," said Bob Smith, a CAES associate director from UI. "It was a difficult project because of the constraints and issues associated with accepting radiological samples, and (Supy) rose to the challenge."

- **Kortny Rolston** is the INL communications specialist for CAES. She began working at CAES in 2009 and leads the communications efforts for the center, which include producing the newsletter, overseeing



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the center's website and Facebook page, participating in outreach activities and tours and developing promotional materials.

Rolston also works with CAES researchers, students and staff at all of the institutions to promote the partnership and support their activities.

"She has established valuable relationships with people at every level and at every geographical location to bring a true meaning and purpose to CAES communications," said Bill Rogers, CAES director.

Past, Present and Future

Want to know more about CAES' accomplishments in FY 2011 and where it is headed? Visit www.caesenergy.org. The FY 2011 CAES Annual Report and the CAES Strategic Plan are now online.

A Different Kind of Student

By Kortny Rolston, CAES Communications



Like most University of Idaho graduate students, Clemente Parga divides his time between taking courses and conducting research under the tutelage of a professor.

But unlike his peers, Parga rarely sets foot on campus, never attends a lecture and sees his adviser, Akira Tokuhiro, in person about once a year.

That's because the nuclear engineering doctoral student lives in France and works for the French Commissariat à l'énergie atomique (CEA) in Cadarache – one of that country's major research centers.

"It's different than what most students do, but it's been worth it," Parga said.

By using technology, Parga, Dr. Christophe Journeau, his mentor in France, and Tokuhiro have overcome the 9,800-mile distance (by air) and eight-hour time difference. Parga takes online courses through University of Idaho and he talks with Tokuhiro via Skype monthly. They also meet at least once a year in Idaho or France.

"We have found ways to make it work," Tokuhiro said.

This is the first student Tokuhiro, who is based at the Center for Advanced

Energy Studies (CAES), has mentored who works at CEA.

He credits the arrangement with being a "series of rare things that strung together and worked."

It started in 2006 when Tokuhiro met Journeau at the International Youth in Nuclear Congress in Stockholm, Sweden. Both conduct research on severe nuclear accidents.

In 2007, Tokuhiro worked at Argonne National Laboratory for the summer where he met Parga, a materials science student who was interning there. Then in 2009, Journeau advertised that there was a European Union doctoral fellowship opportunity for a student with a background in materials and nuclear engineering – a hard position to fill because of the dual requirements.

When Tokuhiro saw it, he thought of Parga, who had just finished his master's degree in materials science at University of Texas – El Paso, and planned to pursue a Ph.D. in nuclear engineering.

He encouraged Parga to apply for the position.

"It's very unusual for an American student to get a position like this," Tokuhiro said. "Usually, it would go to a French student or maybe another European student. It is a real honor for Clemente."

Despite the obstacles involved – moving to a new country where he didn't speak the language – Parga jumped at the chance to work in France and conduct nuclear-related research in a country that gets 80 percent of its electricity from nuclear energy.

Parga's research is focused on how a nuclear reactor core melts during severe accidents. The research is very timely with respect to the likely meltdown of several reactor cores at Fukushima.

"It's been a challenge on the academic side because my professor is thousands of miles away and it's also been challenging learning the French culture and language," he said. "I would definitely recommend it though. Your perspective changes. It's not easy but is certainly worth it."

Journeau and Tokuhiro agree.

Both believe Parga will be a stronger researcher because of his international experience. Parga has connections to researchers that might have taken him years to build.

They also believe it has benefited him personally.

"Not everyone can move to a new country, take high-level courses, conduct research and learn a new language," Tokuhiro said.

Parga recently reached a major milestone. He surprised his colleagues in Cadarache by giving a technical presentation in French.

"Many people can learn to have a conversation in French," Journeau said. "It's much more difficult to give a technical presentation." We were very surprised – and proud."

Engineering students to tackle energy efficiency

By Kortny Rolston, CAES Communications

Most engineering students learn early on why it's important to design industrial systems that function well and operate efficiently.

Starting this spring, Idaho engineering students will apply those concepts through a statewide program run by the CAES Energy Efficiency Research Institute (CEERI). Known as the CEERI Industrial Assessment Center, the program hires student interns to study industrial systems at regional companies and recommend ways to improve energy efficiency and operations.

"The goal is to train the next generation of engineers on industrial energy efficiency and give them some real-world experience on working with these systems before they graduate," said John Gardner, a Boise State University/CAES researcher who leads CEERI. "It's an energy efficiency program, but primarily a workforce development program."

All three Idaho research universities (BSU, Idaho State University and University of Idaho) are participating in the project and will have regional teams in place for the spring semester.

Gardner expects the teams to conduct 20 to 30 assessments a year for various companies. Several food processors and others have already agreed to participate and allow the intern teams to tour their plants, study their operations and interview personnel as part of the assessments.

"This really is a win-win for everyone," Gardner said. "The students are gaining a new perspective on energy efficiency and the companies get detailed information about how they can save energy and money."

The CEERI Industrial Assessment Center is being funded by a five-year, \$1.5 million grant from the U.S. Department of Energy. It is one of 24 such DOE-supported centers across the nation and the only



one in Idaho, Montana, Wyoming, Utah, Nevada and Washington.

Though the CEERI will be based in Idaho, Gardner plans to work with companies in all of those states plus parts of Oregon.

"Our center will be able to cover a large geographic region and hit all of those states because of the way we are structured," he said.

Students, Fun and International Food

University of Idaho-Idaho Falls held its annual graduate fair and international food fair at CAES on November 4. More than 30 people attended the event to learn about the graduate and undergraduate degrees and courses available at University Place, research going on at CAES and to sample food prepared by UI graduate students who hail from around the world.



CAES Team Aims to Improve INL Bus Fuel Efficiency

By Kortny Rolston, CAES Communications

Same bus. Same route. Same fuel.

So why does one Idaho National Laboratory bus driver get up to 30 percent better gas mileage than another? That's what a Center for Advanced Energy Studies research team is studying in an effort to improve the fuel efficiency of INL's bus fleet.

"We want to understand what these drivers are doing to get such good gas mileage and use that information to build a tool that will help all drivers improve efficiency," said David Gertman, an INL researcher helping to lead the CAES team.

To do that, the team, which is composed of researchers from INL, University of Idaho, and 5D Robotics, is interviewing drivers and studying data generated by sensors located on INL's buses. The sensors gather real-time data – every second or so – and store it on a laptop, laptop. Mechanics can access and send the data to the CAES research team.

With that information plus data from the bus GPS systems, researchers are able to analyze entire routes, determine which is getting the best mileage and understand what that driver is doing at different points to be fuel efficient.

"It's really about driver behavior," said Milos Manic, a University of Idaho professor and CAES researcher. "What we know is that all drivers are good at different parts of the route. We want to understand what they are doing at a particular section to be so efficient and replicate that. How



fast are they going when they climb a hill? How fast are they going when they approach a turn?"

Manic and his graduate students have constructed a Virtual Bus simulator based on INL bus specs that mimics the controls, pedals and road conditions to help understand behavior data. The Virtual Bus simulator is using various computational intelligence techniques to mine the decision-making process of drivers and suggest the optimal set of actions.

The ultimate goal is to create an Intelligent Driver System, a tool that gives drivers real-time feedback about what they could do to improve mileage.

"Instead of telling drivers how they did after they finish a route, this tool would let them know what is coming up, whether they should slow down or speed up and what else they can do to improve efficiency," he said.

Researchers believe that what sets the CAES-funded project apart is that they are focused on drivers and helping them get the best mileage along specified routes.

"The INL bus system is a really good test bed for us," Gertman said. "They take the same routes several times a day so we can study it in detail. We think we can eventually use this model to help trucking com-

panies, government agencies and others that are in similar situations."

Scott Wold, who oversees INL's bus fleet, said improving efficiency is one of the lab's major goals, which is why his department agreed to participate in the project.

INL has undertaken several measures to reduce the amount of gas its buses consume on the dozens of trips they make each day to and from the Idaho desert, where many of the lab's research facilities are located.

Among them is introducing a park-and-ride system to reduce the number of stops and the amount of bus engine idling time.

But if the lab is to save even more, Wold said, it must look at driver behavior or other factors.

"We already know that some of our drivers get up to two or three miles per gallon better mileage than others," he said. "If we can help everyone, even our most efficient drivers, improve, it would save us a lot of money."

The INL bus fleet consumes 500,000 to 600,000 gallons of fuel per year, so improving efficiency by even 10 percent has the potential to save hundreds of thousands of dollars each year.

"It would be a substantial savings for us," Wold said.

Did you know?

INL's bus fleet is consistently recognized for its efforts to improve efficiency. The lab's Integrated Transportation Department has undertaken measures to reduce bus idling time and has streamlined routes to maximize fuel efficiency.

To submit story ideas or other information for upcoming CAES newsletters, please send an e-mail to Kortny.Rolston@inl.gov.