

CAES director to take new INL role

By Kortny Rolston, CAES Communications

Center for Advanced Energy Studies director Harold Blackman is leaving the research partnership to lead a new organization for Idaho National Laboratory.

Blackman, a longtime INL employee, has been named the director of nuclear research for the lab's Materials and Fuels Complex (MFC). He will oversee all research performed at MFC, located 38 miles west of Idaho Falls.

Bill Rogers, INL's longtime Laboratory Associate Director for Energy and Environment, is taking over as CAES director.

"I have really enjoyed my time at CAES and working with the state of Idaho and the Idaho universities to build CAES into the strong research collaboration it is today," Blackman said. "Bill Rogers will do a great job in his new role and has the technical, academic, and scientific background to take the CAES partnership to the next level."

Blackman was appointed CAES director in 2006, a year after the partnership between Boise State University, INL, Idaho State University and University of Idaho was launched.

During Blackman's tenure, CAES exceeded expectations of all stakeholders: a 55,000-square-foot building was constructed in Idaho Falls; the center won



Harold Blackman

more than \$20 million in competitive research and other funding; CAES established strong relationships with industry, government agencies and academia; and gained a reputation for getting various groups to work together.

Bob Smith, a CAES associate director and University of Idaho's associate vice president and center executive officer



Bill Rogers

for its Idaho Falls campus, said Blackman has played a major role in the research partnership's success.

"(Blackman) arrived at CAES at a critical time in the partnership," Smith said. "He was able to pull together four institutions that didn't understand what it meant to work together. He forged a working relationship between the universities and national laboratory unlike anything I've seen in my 20-plus years in Idaho."

Rogers said Blackman has done a remarkable job leading CAES and that he plans to continue building the partnership.

"CAES has been very successful and has done some great work," he said. "It's become a model of how universities, national laboratories and industry can collaborate."

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We recently launched a Facebook page to help keep our friends and fans updated on what's happening at CAES. Check it out at www.facebook.com/CenterforAdvancedEnergyStudies and become our friend.



Researchers, industry exchange ideas at symposium

By Kortny Rolston, CAES Communications

Before attending the Idaho Research Symposium, Joe Bowen polled his M2M Communications co-workers about the Center for Advanced Energy Studies and its research collaborations.

Few – including Bowen - knew how CAES, a research partnership between Boise State University, Idaho National Laboratory, Idaho State University and University of Idaho, might benefit a private company like M2M Communications, which develops sensors to control and monitor electrical energy consumption. (M2M recently sold to EnerNOC for \$33.3 million.)

By the time the symposium ended, that was no longer the case.

"I feel like I have a much better understanding of what CAES is and the research capabilities of its partners," said Bowen, M2M's chief technology officer. "I have some ideas on how we might be able to work together."

That is the response CAES was hoping for when it organized the Idaho Research Symposium. (The event was sponsored by CAES, its partner institutions - Boise State University, Idaho National Laboratory, Idaho State University and University of Idaho - and the Idaho Technology Council.)

"We wanted to plant some seeds for research collaboration with industry and to understand what the private sector needs from Idaho's researchers," said CAES Director Harold Blackman.

More than 50 people from industry and the CAES partner institutions attended the symposium, which was held February 1-2 in Idaho Falls.

During the event, CAES scientists and engineers described the research capabilities of their respective institutions in geothermal, energy efficiency, nuclear energy and bioenergy and discussed potential areas of private-sector collaboration.

Industry representatives discussed how such work might benefit them and also how relationships with Idaho's research community would enhance their competitiveness.

One key issue that emerged is the different timeframes in which academic researchers and private industry work.

"We don't have time to wait for a proposal to be submitted or to write a grant. If we do, we'll lose business," said Doug Sayer, president of Premier Technology, a Blackfoot-based manufacturer.

However, both industry representatives and the CAES partners vowed to overcome this difference. They also agreed that forging partnerships is critical to speeding the transfer of technology from public institutions to entrepreneurs.

The Idaho Research Symposium, they said, represented a good start.

"Having discussions like this will help us bridge the valley of death that exists between a technology being developed at a university or lab and getting it to market," said Pamela Crowell, Idaho State University's vice president of research.

Ray Furstenau, deputy director of the U.S. Department of Energy's Idaho office, applauded CAES for organizing the symposium and explained his agency's push to developing "innovation ecosystems" that move government-developed technologies into the marketplace faster.

These ecosystems, he said, will help ensure the United States stays at the forefront of energy innovation and research.

"We're starting our own innovation ecosystem with this function today," he said.

Bowen agreed.

"Now we know what kind of research capability is out there," he said.

CAES research update

By Kortny Rolston, CAES Communications

CAES' research focuses nuclear science and engineering, advanced materials, carbon management/geosciences, bioenergy, energy policy, modeling and simulation and energy efficiency.

Here is the latest news from our research initiatives:

Nuclear Science and Engineering

- Shilo McCrory, an Idaho State University graduate student, won an award at the 2011 American Nuclear Society student conference in Atlanta. McCrory, who works with Dr. Mary Lou Duznik-Gougar, won best podium presentation in the environmental science, decontamination and decommissioning division. Several other ISU students also attended and presented at the conference. They were Connie Hill, Jesse Sundar (poster), Alan Nelson, Bradley Heath (podium presentation), John Holzmer, Brycen Wendt (podium presentation), David Kammerman (podium presentation), Katelyn Wachs (poster) and Tara Smith (podium presentation).

Advanced Materials

- CAES is sponsoring a course on atom probe tomography (APT) August 3-5 in Idaho Falls. This 20-hour course will

cover the theory, capabilities, and applications of the local electrode atom probe (LEAP), which is housed in the CAES Microscopy and Characterization Suite (MaCS). Sample preparation, including focused ion beam (FIB) milling also will be included. For more information, visit www.caesenergy.org.

Carbon Management/Geosciences

- CAES sponsored a geothermal energy workshop April 21-23 in Idaho Falls. The goal was to build competitive teams of scientists, engineers and students from its partner institutions - Idaho National Laboratory, Boise State University, Idaho State University and University of Idaho - to conduct research and development that will develop Idaho and the region's geothermal energy resources.

Bioenergy

- CAES bioenergy researchers and the Energy Policy Institute hosted a roundtable discussion in Twin Falls on some of the policy and regulation issues surrounding community anaerobic digesters.

Energy Policy

- A paper entitled "Analysis of Carbon Capture and Sequestration Pore

Space Legislation: A Review of Existing and Possible Regimes" by Dr. Elizabeth Lokey Aldrich, an assistant professor at Boise State University and a CAES researcher, was published in the April edition of the *Electricity Journal*.

- David Solan, director of the Energy Policy Institute, and Mike Louis, EPI's deputy director, facilitated sessions at the Western Governors' Association's Industrial Energy Efficiency Summit in Boise on March 16-17. The sessions focused on potential policy recommendations to spur more investment. Solan also facilitated the closing session to propose specific options for the association to review.

Modeling and Simulation

- CAES is sponsoring a summer course on immersive environments and visualization July 20-22 in Idaho Falls. CAES is home to a new Mechdyne Flex, a four-sided computer-assisted virtual environment (CAVETM), and smaller low-cost immersive environments known as IQ-stations. For more information, visit www.caesenergy.org.

My amazing future

By Kortny Rolston, CAES Communications

More than 70 female eighth-grade students from Twin Falls and Idaho Falls conducted experiments and learned about science and technology careers while at CAES during the "My Amazing Future" event on March 4. The annual event is organized by Idaho Women in Nuclear (IWIN.)



Ask Akira: UI professor interviewed about Japan nuclear power plant

By Kortny Rolston, CAES Communications

After a 9.0 earthquake shook Japan on March 11, 2011 and caused a massive tsunami to knock out backup power supplies at the country's Fukushima Daiichi nuclear power plant, local and national media called on experts for comment. One of those interviewed was Dr. Akira Tokuhiko, a nuclear engineering professor at University of Idaho and a CAES researcher.

Since March 11, he has been interviewed by several media outlets, including Slate, multiple Idaho newspapers and the New York Times.

Tokuhiko has a unique perspective about the incident because he was raised in Japan until age 6 and worked in Japan's nuclear industry for five years.

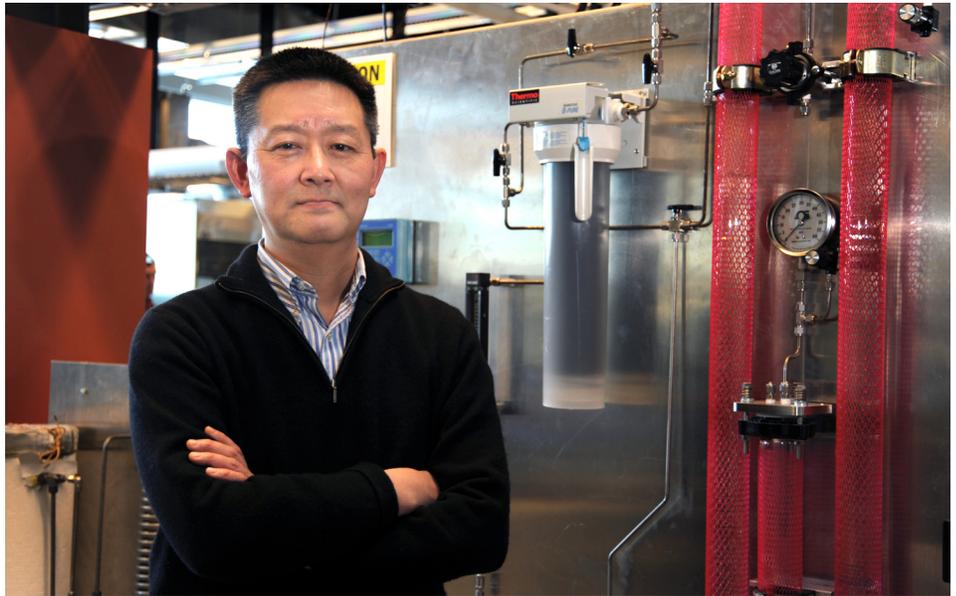
Here is what he has to say about his interviews and what happened at Fukushima:

What led to the power plant's failure and the release of radiation? The plants survived the quake and the tsunami but not without damage. There have also been after-quakes. So, although the reactors shutdown and backup power worked, after the tsunami there was a large mismatch of decay (residual) heat and the cooling capacity. This mismatch and the first response lead to many failures and release of radiation.

What do you tell people when they ask you if the same thing could happen here? I usually say that no two accidents are alike. Take for instance a car accident; no two accidents are exactly the same. And could it happen here? Yes, in terms of probability, there is a non-zero probability that it could happen here. However, we hope that the answer to the question "Could it happen?" will be a very small probability.

What has been the most common question asked by the media and public about the Fukushima accident? There have been a number of common questions. How dangerous is the radiation? Could it happen here?

How do you explain the impact of the radiation release to the public? Well, I usually explain that our ability to measure very minute levels of radiation is very good. Also, that we have lived on earth with natural background level of radiation. We also are exposed to radiation from X-rays and other man-made



technologies. The body can tolerate some lower levels of radiation; it is hard to tell how low this needs to be. Public release of radiation is not good news, but if it is released we need to ask if it is a dangerous level and whether we can manage it.

In your opinion, are U.S. nuclear power plants safe? I believe they are safe. We should use this incident to review the safety of older nuclear power plants and the practicality of not having a national spent fuel repository – mainly Yucca Mountain. If we have the U.S.-originated technology solution, why aren't we using it? We also need to remember that risk is relative and that we need to practice periodic review of safety of engineered systems.

What has prevented workers from bringing the plant back under control? The fact that both offsite power as well as backup power (diesel and battery) were lost has prevented quick resolution of the engineering issues. Also, the decay heat (residual heat) from more than one reactor meant multiple challenges. Further crisis management is somewhat culturally tied.

Can you expand on the role Japanese culture has played in the crisis management? How is it different than the United States? One fact I find interesting is that in the U.S. we have many more lawyers than in Japan. Perhaps because the U.S. is a 'melting pot' of people from so many nations, we have to have laws and regulations to maintain 'social order'.

Increasingly, American society is one that has prominent legal liability. This is both good and bad. So as I said, we (U.S.) tend to warn the public of the worst consequence of a situation.

On the other hand, Japan is known to be very homogeneous; there is social expectation and obligation to maintain social order. It relies less on legal liability. So, for the same post-accident situation in Japan, the Japanese viewpoint may be to provide the most hopeful information. I can understand this in order to avoid panic; in the U.S. we tend to panic quickly based on the messages of 'fear' that mass media broadcasts. There is a balance that is difficult to define between information and exaggeration.

Further, as a country with much history and social order, life is a bit more predictable in Japan. In Japan for example, you have to attend the best schools from early on to attend the next best school. A path through University of Tokyo maximizes one's chances of becoming a successful professional. Predictability is viewed as something positive. However, some events like disasters can upset this social order. After a disaster, one has to improvise and respond quickly. Perhaps in a predictable society like Japan, there is an inherent weakness in responding to quickly and strong leadership. On the other hand, the U.S. may have too many people who all want to respond quickly and be the leader. Obviously a balance is needed.

The CAES for geothermal energy

By Kortny Rolston, CAES Communications

The Center for Advanced Energy Studies is getting into hot water – the energy producing kind.

CAES has formed a geothermal energy research team to explore turning the hot water flowing beneath Idaho into an economical source of power.

The team, which is comprised of researchers from Boise State University, Idaho National Laboratory, Idaho State University and University of Idaho, is focusing on enhanced geothermal energy systems – a technology in which fluid is injected into hot dry rock that has been fractured in order to extract heat and harness it to generate power.

“We think geothermal energy is an area of untapped potential for the state and frankly, the region,” said Harold Blackman, CAES director. “Idaho doesn’t have the coal or natural gas reserves that surrounding states do so we need to use what we have and that is geothermal.”

Idaho is consistently ranked as one of the top states for its geothermal energy potential.

In 2006, a Western Governors’ Association taskforce estimated that Idaho has 855 megawatts of near-term economic potential resources and 1,670 megawatts of long-term potential. (One megawatt can power 1,000 homes.)

While Idahoans have long used geothermal energy to heat buildings and greenhouses and to raise warm water fish, the state only has one commercial geothermal plant. (U.S. Geothermal acquired the Raft River plant in 2002 and now sells electricity to Idaho Power.)

The CAES research team is hoping to change that.

They believe the time is ripe for geothermal, especially with the development of new technology and the push for reliable sources of renewable energy.

“Geothermal energy production allows us to tap the earth’s natural heat to help meet our needs for increased base-load energy without the burning of additional fossil fuels,” said Bob Smith, a CAES associate director and researcher from University of Idaho.

CAES recently hosted a geothermal energy workshop that drew more than 70 people from industry, academia, government agencies and conservation groups.

The goals were to identify geothermal expertise at the CAES partner institutions, understand industry needs, identify research funding opportunities and discuss the possibility of a shared geothermal curriculum among the university partners.

“We needed all the stakeholders at the table so we could refine our research focus and figure out the best ways to pool our resources,” said Robert Podgorney, an INL and CAES researcher who helped organize the event.

For Richard Austin, the timing of the workshop and the formation of the CAES geothermal research team couldn’t be better.

Austin, who is overseeing an exploratory drilling in Idaho for AMG, a company based in Colorado, is looking for students to recruit into the geothermal field – especially now that there is renewed interest in using hot water and steam to produce power.

“Geothermal is an industry that is blossoming and we are going to need workers who are trained in different aspects of the field,” he said. “It’s exciting that the Idaho universities are talking about developing a geothermal curriculum.”

Austin also believes that geothermal will become a key energy source for Idaho, the region and possibly the country.

“Idaho and the Northwest have long relied on hydropower, but that resource is maxed out,” Austin said. “We are using all the hydropower we have. We’ve got to develop new sources of clean, reliable energy and geothermal has great potential.”



Did you know?

The world’s first geothermal district heating system was developed in Boise in 1892. The city still uses geothermal energy to heat 55 buildings in its downtown area.

CAES brings materials road show to Idaho Falls

By Kortny Rolston, CAES Communications

Imagine owning a cell phone that you shake to charge, opens when it rings and has a display screen that doesn't crack if dropped.

Local students now can after participating in the Discovery Center of Idaho's "Matter Matters" road show on materials science. They learned how such features are possible through the use of piezo crystals, shape memory alloys and other advanced materials.

"It was amazing to learn how these materials I have never heard of can do so many cool things," said Max Webster, a third grader at A.H. Bush Elementary School in Idaho Falls.

Webster was one of 500-plus students from the Idaho Falls area to view the show, which was sponsored by Idaho National Laboratory and the Center for Advanced Energy Studies (CAES). The

45-minute show was presented at four local elementary schools – Bush, Iona, Mountain Valley and Longfellow – as well as at CAES on March 16-17.

They are part of a campaign by the Discovery Center, INL, CAES, Micron, Idaho Public Television and others to promote "Making Stuff," a four-part NOVA series on materials science. The series was created with the help of Amy Moll, a Boise State University materials science professor and CAES researcher.

INL and other also have hosted numerous events around the state, including Science Cafés for people to discuss the series and screenings of the "Making Stuff: Cleaner" segment, which focuses on energy-related materials research.

CAES wanted to bring the Discovery Center's "Matter Matters" show to Idaho Falls to educate students about the impact of

materials science and pique their interest in the growing field.

"Think about the Stone Age, Bronze Age or silicon and plastic. Those major advances in our civilization have occurred because of the creation of new materials," said Harold Blackman, CAES Director. "Materials science touches everything we do and the Discovery Center show is a good way to bring that home for students. They learn how new materials impact everyday items like cell phones."

Woody Sobey, the Discovery Center's education director and "Matter Matters" presenter, said the show is designed to not only teach students about materials, but how to think like scientists.

"One of the things materials scientists have to go through is to identify a problem and find the best material to solve that problem," he said during the March 17 show at A.H. Bush Elementary.

Webster is glad he and his classmates go to see the show and participate.

"I really liked it," he said. "It was interesting to learn how when molecules change, it changes the materials."



Did you know?

CAES played a part in the creation of the NOVA series "Making Stuff." The center contributed \$10,000 to help pay for Dr. Amy Moll, a Boise State University professor and CAES researcher, to work on the show.



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