DEPARTMENT OF
Engineering Physics
UNIVERSITY OF WISCONSIN–MADISON

SPRING 2016
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UW-Madison at forefront of INNOVATION in nuclear energy

For countries to sharply reduce carbon emissions while also meeting the increasing demand for electrical energy, it's widely recognized that nuclear power needs to be part of the solution.

Next-generation advanced nuclear reactors promise to compete economically with natural gas. These advanced reactor technologies are safer and more efficient than the conventional light water reactors operating today.

However, for advanced nuclear reactors to make an impact on cutting carbon emissions fast enough to stem climate change, the advanced nuclear sector and government need to work together to develop and deploy the next generation of reactors at a more rapid pace, according to Assistant Professor Raluca Scarlat. "We need plans quickly for new reactors—and quickly is not a word that's been used in nuclear," she says. "In order to change that, we need a lot of bright minds coming into this field. We need a lot of innovation."

To help accelerate innovation in advanced nuclear and highlight nuclear's role in addressing climate change, the think tank Third Way and Idaho National Laboratory partnered with Argonne National Lab and Oak Ridge National Laboratory to host a first-of-its-kind advanced nuclear summit and showcase in Washington, D.C., on Jan. 27, 2016.

During the showcase portion of the event, Scarlat, along with research collaborators from the University of California-Berkeley and MIT, gave a presentation on the innovative fluoride-salt-cooled high-temperature reactor (FHR) concept that they're working on developing. FHR is an advanced reactor design that uses a solid fuel and molten (liquid) salt as a coolant.

Several startup companies also presented their novel reactor concepts in the showcase, and Scarlat says it was very exciting to see the progress being made by nuclear entrepreneurs in this area.

Scarlat says companies like TerraPower (founded by Bill Gates) are helping drive innovation in advanced nuclear technology. TerraPower, which is working on developing a molten chloride salt reactor, is part of a public-private partnership that was recently awarded up to $40 million from the U.S. Department of Energy to develop the technology.

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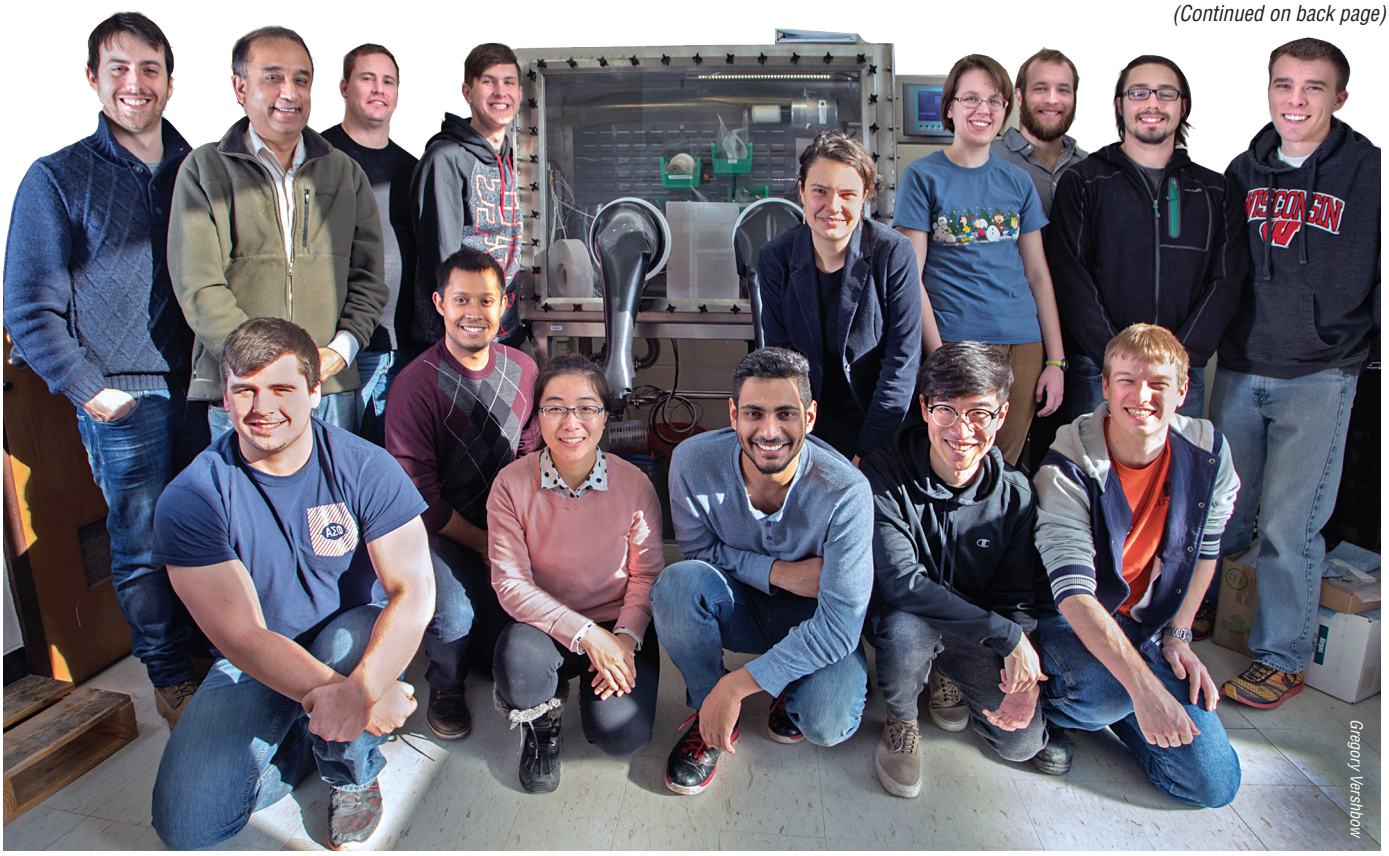

Gregory Vershbow

Assistant Professor Raluca Scarlat (center) with faculty, graduate and undergraduate students who conduct fluoride salt experimental research at UW-Madison.

Douglass Henderson

Greetings! We've just concluded another successful academic year, and as you will read in this publication, we have much good news to share with you.

I am happy to announce that Professor **Paul Wilson** has been awarded the Grainger Professorship in Nuclear Engineering for the next five years. This award was previously held by Professor Emeritus **Jerry Kulcinski**. The professorship recognizes Paul's many achievements and is a very well-deserved honor.

A number of longtime faculty members are retiring, including Professor **Michael Plesha**, Research Professor **Mohamed Sawan**, Distinguished Research Professor **Laila A. El-Guebaly** and Adjunct Professor **Fred Elder**. While we will miss our valued colleagues, these retirements give us an excellent opportunity to assess how we can grow in key areas and make strategic hires to build on our department's strengths.

UW-Madison is in the midst of a fund-raising campaign to increase private support across campus. I'd like you to consider participating in the campaign by making a gift to the Department of Engineering Physics. We are consistently ranked in the top four departments nationally and it will take additional financial resources to continue this trend. Giving to our annual fund is a great way to support the department. Your contributions will enable us to provide students with enhanced educational opportunities that are not covered by tuition and state dollars.

If you are interested in giving to the department, please contact our development director, Aaron Mullins, at aaron.mullins@supportuw.org. Aaron will be happy to share with you all the ways you can help the department. Or, you can simply make a gift online at **allwaysforward.org/giveto/ep**.

Thank you for your continued support of our department.

ON, WISCONSIN!

Douglass Henderson

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As Jim Meister (BSNE '78) looks back over his distinguished career in the nuclear industry, he says there's no doubt that his UW-Madison engineering education put him on a path for success. To show his appreciation, he has been an active supporter of the Department of Engineering Physics for years.

A recent gift-matching opportunity inspired Meister and his wife, Connie, who is also a UW-Madison graduate, to increase their support.

The Meisters, of St. Charles, Illinois, recently made a gift to the department to establish the Jim and Connie Meister Graduate Fellowship for the nuclear engineering program. The gift was matched by UW-Madison alumni Ab and Nancy Nicholas, who announced a $50 million gift-matching opportunity in June 2015.

"The Nicholas match certainly influenced us," Meister says. "The opportunity to double the money for your gift is unique, and to the level that we could participate, we wanted to make sure that some of the Nicholas money went into engineering."

Supporting the next generation of nuclear engineers

Jim and Connie Meister

Meister is vice president of operations support at Exelon Nuclear, the operator of the largest nuclear reactor fleet in the United States, including 23 operating reactors at 14 stations spread across six states. He has been involved with many facets of Exelon's operation, including engineering, maintenance, security and emergency preparedness, and he served as co-chair of the Electric Power Research Institute Low Level Waste and Radiation Management Area Planning Committee. From 2002 through 2008, he was a member of the industrial advisory board for the Department of Engineering Physics, and since 2007 he has served as a member of the College of Engineering Industrial Advisory Board.

Meister says he established the graduate fellowship as a way to help move nuclear energy forward and launch the careers of the next generation of UW-Madison's nuclear engineers. "Financial support allows the department to continue with research activities that will find solutions to the challenges that my business, nuclear power, faces," Meister says. "If Connie and I can contribute to that by supporting graduate students, who are tremendously gifted thinkers, I think it will help make a difference in the long run for a business that I've been in for the last 38 years."

Meister and his family have strong ties to UW-Madison. He met Connie Robertson in their first class at UW-Madison and the two married in 1978. Two of their children, Carrie and John, are UW-Madison graduates and are married to UW-Madison graduates. Their third child, Craig, graduated from UW-Madison in spring 2016.

"We've been extremely lucky in the opportunities we've had, and I don't think those opportunities would've been possible without the skills we learned and developed through our time at UW-Madison," Connie says.

As the Meisters were inspired by the Nicholas match, they hope their gift will help encourage others to give to UW-Madison. "The quality of the engineering education and research at UW-Madison is in line with the best universities in the country, and for it to stay that way is not only a challenge for the state of Wisconsin," Meister says. "As alumni, we need to recognize the many excellent opportunities we had based on the quality of the university, and we should do what we can to ensure UW-Madison remains a world-class university and that those opportunities are there into the future."

UW-Madison hosts successful ANS student conference

In spring 2016, hundreds of students from universities across the United States flocked to UW-Madison for the American Nuclear Society (ANS) student conference.

At the conference, held March 31 through April 3, students connected with their peers and industry professionals and discussed a variety of topics in the nuclear industry. Undergraduate and graduate students participated in technical sessions, workshops, panel discussions, an innovation competition and a career fair.

For the students in the UW-Madison ANS student section who organized the conference, the four-day event that drew 569 attendees was the culmination of hundreds of hours of work over three years. In the highly competitive selection process, ANS student sections spend at least one year creating a proposal to host the conference. While the UW-Madison students didn't receive the conference with their first proposal, they spent a second year writing a new proposal, which was successful. The students then spent a third year planning the conference.

From left: Student conference co-chairs AJ Gross, Kalin Kiesling and Matt Jasica.

"It's definitely an honor to be chosen, and we were very excited to host the conference," says Kalin Kiesling, conference co-chair and a nuclear engineering and engineering physics PhD student.

While the conference sessions were held at the Madison Concourse Hotel in downtown Madison, the students organized tours that showcased UW-Madison research facilities and labs, including the nuclear reactor and the fusion research experiments on campus.

"Hosting this conference is great advertising for the College of Engineering and UW-Madison," Kiesling says. "It's an excellent opportunity to boost interest in our program, show off our research and facilities and get people talking about us, whether it's students or the professionals in the nuclear community."

Because the conference is entirely organized and run by students, with some guidance from ANS, planning it is a big project for the student volunteers to take on in addition to their engineering coursework, Kiesling says.

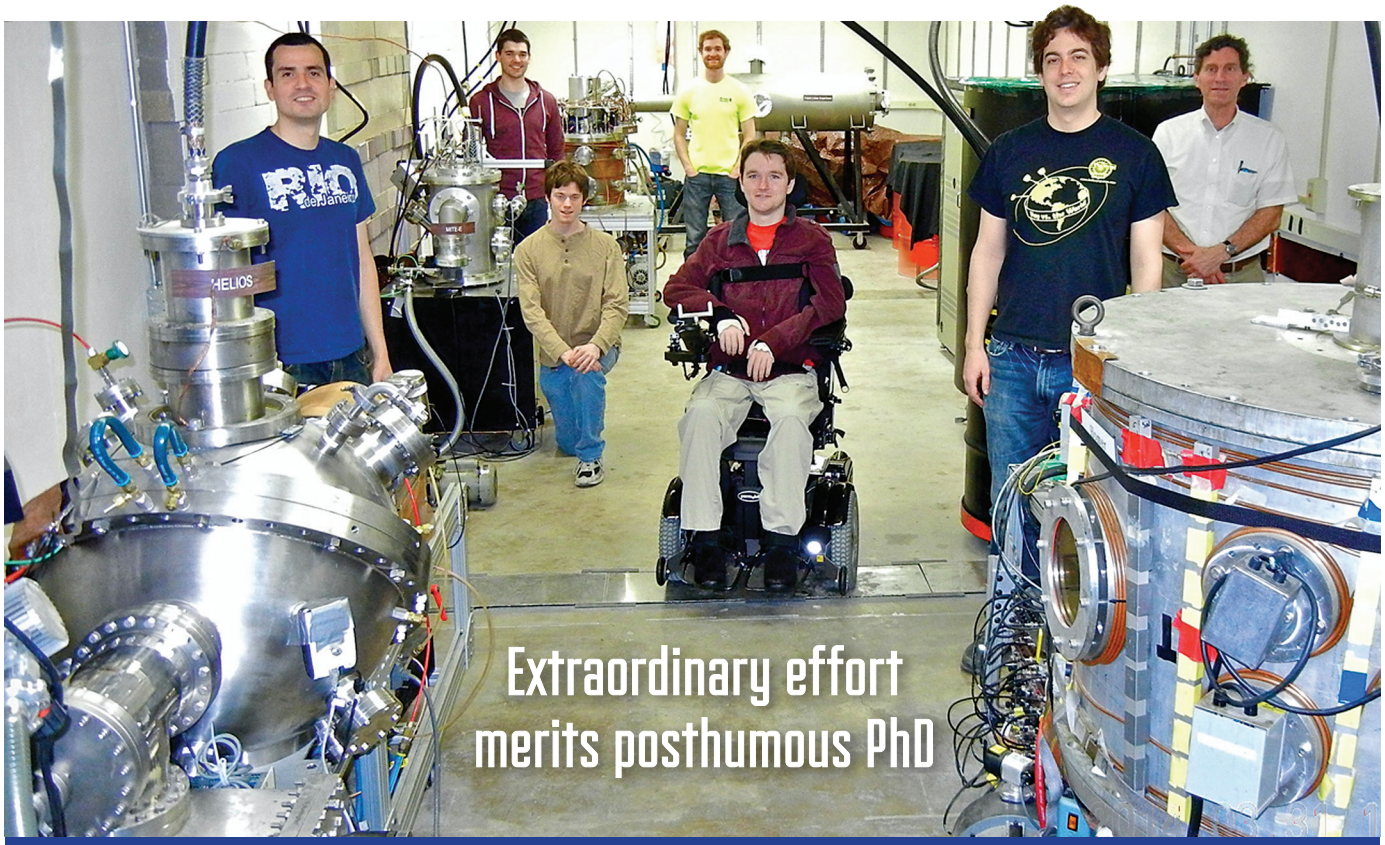
One of the most important aspects of planning the conference is securing enough financial support from sponsors to run the event. "The money to put on the conference doesn't just fall into our laps," says Matt Jasica, conference co-chair and a nuclear engineering and engineering physics PhD student. "We have to contact potential sponsors in industry and offer them a conference that's worth participating in. The vast majority of our conference was funded by sponsors and that allowed us to keep student registration fees fairly low."

Many industry sponsors were interested in participating in the career fair, including Exelon Generation, which was the top sponsor of the conference. "Sponsoring the conference was a great opportunity for us to get our name out there and recruit the best students," says Jim Meister (BSNE '78), vice president of operations support at Exelon Nuclear, a division of Exelon Generation.

Exelon also provided experts to participate in various sessions and technical workshops, and Meister delivered a keynote speech. Meister says the UW-Madison students did a truly outstanding job putting on the conference. "I was tremendously impressed with the conference," Meister says. "Although it's organized by young undergraduate and graduate students who are also busy with their education, they put on a conference that was comparable to many that I've attended that are run by professional agencies. It was really impressive."

Kiesling says nearly 50 volunteers, in addition to the 15 students on the organizing committee, helped the conference run smoothly. The students say the Department of Engineering Physics was instrumental in the conference's success. The department provided significant funding for the event, and many faculty members participated in sessions.

The student organizers say it's highly rewarding to see all their hard work result in a successful conference. "It was very well received," Kiesling says. "People enjoyed the speakers, and I only heard good feedback."



Extraordinary effort merits posthumous PhD

Engineering grad student Craig Schuff overcame a devastating injury to continue research

A tragic swimming accident in 2011 left UW-Madison graduate student Craig Schuff paralyzed from the neck down, but his ever-curious mind refused to get the memo.

Schuff came to the UW-Madison in 2008 to study nuclear engineering. He was well on his way toward his master's degree when, while swimming with friends on a warm May day, he dove off a pier in Lake Monona and hit his head on the bottom of the lake.

Schuff died in October from complications of his paralysis. He was only months away from wrapping up his PhD dissertation. To honor Schuff's scholarly work, which he pulled off while dealing with his new and profoundly limiting physical disability, UW-Madison awarded him a posthumous PhD in electrical and computer engineering. Schuff's parents, Mary and Rick, were presented with the degree during the May 2016 commencement ceremony. The posthumous award is a rare one: Schuff is only the second such recipient in the university's 168-year history.

"He was a very energetic young man and a very hard worker," says Jerry Kulcinski, professor emeritus of engineering physics and Schuff's research advisor. "He had a genuine drive to do things, and he was always generating new ideas."

One of those new ideas led to his master's thesis: Schuff developed a method of using a pulsed neutron source to detect nuclear materials through thick metal walls. The new method could be used to counter the threat of nefarious smuggling of nuclear materials in thick-walled suitcases or shipping containers. "He was very diligent about putting that proposal together and presenting his work," says Kulcinski. All of this was before the 2011 swimming accident.

"That was very tragic. When the accident occurred, of course nobody knew what was going to happen," Kulcinski says. At that point, Schuff had been on campus for nearly three years and had finished most of his coursework and started on his master's thesis. Kulcinski says everything was briefly up in the air as everyone waited to find out just how severe Schuff's injuries were. His parents came from Tennessee, and Schuff's mother—a teacher—took a semester off and lived with him in Madison until he was able to live relatively independently. Still, until his death, Schuff's parents and grandparents were a regular presence.

"Once he partway recovered from that initial damage we started to talk about where we were going to go next, and he said he wanted to finish his thesis," Kulcinski says.

So with the help of a generous anonymous donor, the department remodeled Schuff's lab space to be accessible for his new motorized scooter. Many other donors helped fund a special—and expensive—piece of lab equipment Schuff needed to run his experiments. The university and another donor helped fund Schuff as well. An undergraduate to be Schuff's "hands" in the lab was hired as Schuff was now paralyzed from his neck down. Between Schuff's ideas and supervision and the work of his undergraduate assistant, they were able to make progress on his thesis, and Schuff received his master's degree in 2012.

Living in an apartment near the College of Engineering campus, Schuff was able to motor over to his lab in the Engineering Research Building independently most mornings when the weather allowed, Kulcinski says. His work ethic and inquisitive nature led to steady progress toward his PhD, even as Schuff navigated his disability and

other health problems related to his injury. In 2013 he passed his qualifying exams and went through the prelim proposal process in 2014.

"Then he was on his way to actually running experiments with the help of an undergraduate," Kulcinski says. "He designed the experiment, he did the calculations, he plotted the graphs, he published his master's thesis and his prelim, which is pretty technical with equations, graphs, and CAD (computer-aided design) diagrams. If you didn't know that he had this disability, you'd assume he was any other student, which to me is quite remarkable."

Also remarkable, Kulcinski notes, is Schuff's attitude as he dealt with his new physical limitations. "He never let it slow him down," Kucinski says. "He had a lot of trouble with his immune system after the accident; he would be very subject to infections and all kinds of things that we would be able to handle, but his body couldn't. So sometimes he would come in and it would look like a real chore. But he came in. Quite frankly, I think that's what kept him going—he'd come in and work. The day before he died he was here, and we had a meeting. He looked good, and I remarked to one of my other colleagues, I said, 'Gee, Craig's looking good.'"

That was on October 23, 2015. On October 24, Schuff died unexpectedly, likely as a result of several factors related to his paralysis. Kulcinski says he'll remember Schuff for his perseverance, but also for his attitude. "He had a great sense of humor," Kulcinski says. "He was always cracking jokes with the group, and he was a team player. He volunteered if we had something in the lab to do; he wasn't reticent to do anything."

Schuff was also an avid football fan, and attended most home Badger football games, motoring the short distance to Camp Randall Stadium from his apartment.

After Schuff's death, the college swiftly advocated for a posthumous PhD. Within a month of beginning the process, which needed approvals by his thesis advisors, his PhD committee, the engineering physics and electrical and computer engineering department chairs, the college, and UW-Madison Chancellor Rebecca Blank, Kulcinski says he received word that the request had been approved. "That all happened reasonably quickly—almost at light speed considering the university process," Kulcinski says.

It was the final rally to recognize a student who had studied and conducted novel research while facing enormous obstacles.

UW-Madison spinoff receives construction permit for medical isotope plant in Janesville

SHINE Medical Technologies has received approval from the Nuclear Regulatory Commission (NRC) to begin constructing a plant in Janesville to make a medical isotope needed in about 20 million procedures annually in the United States.

On March 10, 2016, SHINE held a celebratory event in Janesville that was attended by local officials, UW-Madison College of Engineering faculty, UW-Madison Chancellor Rebecca Blank and U.S. Rep. Paul Ryan.

The construction permit is the latest sign of success in a 20-year quest to make molybdenum-99, an isotope that quickly decays into a form of technetium-99 that is used in SPECT scans, which can detect cancer and assess blood supply to the heart.

The UW-Madison spinoff's Janesville plant is slated to employ around 150 people when it opens in about three years.

SHINE CEO Greg Piefer pioneered the technology that the facility will use while getting a PhD from UW-Madison's nuclear engineering program. SHINE expects that more than 1 billion patients will benefit from its technology.

"This kind of progress is a perfect example of why this university is such an economic engine for the state," Blank says. "SHINE's discoveries and inventions will have a substantial impact on human health, and the plant will be a substantial asset to Janesville and Rock County. I can't say it enough: These are discoveries that can only take place at a world-class research university like UW-Madison."

The NRC's construction permit represents the first time since 1961 that the federal government has issued a permit for a facility to make these medical isotopes, says Piefer. "We've developed a greener, safer and cheaper way to produce these life-saving isotopes on a global scale," Piefer says. "We want to ensure that there will be a reliable supply of medical isotopes long into the future for the millions of patients that rely on them. Safety and environmental responsibility are top priorities at SHINE and reaching this milestone validates our dedication to those values."

Before the plant goes into operation, SHINE will require an operating permit from the NRC.

John Beckord, president of the economic development organization Forward Janesville, says SHINE's Janesville plant is a great example of the Wisconsin Idea in action. "This is an example of brainpower, ideas and entrepreneurship coming from the university and finding its way into a community outside of Dane County," Beckord says.

From left to right: Janesville City Manager Mark Freitag, U.S. Rep. Paul Ryan, SHINE CEO Greg Piefer and UW-Madison College of Engineering Executive Associate Dean James Blanchard at SHINE's Janesville event.

ADRIEN COUET:
Building nuclear reactors to withstand changing environments

For Adrien Couet, one of the most important long-term questions in nuclear engineering is how we can design materials for nuclear reactors and power plants that will be able to withstand the demanding pressures of an aggressive environment.

Couet, who recently joined the department as an assistant professor, studies how materials, their environment, and the stresses with which they come into contact, tend to couple in ways that are less than fortuitous for the maintenance and safety of a nuclear power plant.

The U.S. Department of Energy invests in this type of research, since engineers like Couet ultimately are trying to extend the lifetime of reactors, and to develop the reactors of the future, which aim to be even more reliable, safe and economically competitive.

A large part of his research focuses on a corrosion model he has been developing for more than six years, called C4 (coupled current charged composition). The model is predictive in nature, and allows engineers to screen and diagnose certain materials based on their strengths. He works specifically with fuel cladding, the first barrier that stands between uranium fuel and its environment within a nuclear reactor. C4 helps gauge which materials would work best for fuel cladding, as an alternative to a trial-and-error process, which is more costly and less efficient.

"It's usable within the industry, understandable, and it helps engineers build new types of materials," he says. "That's important because most of the current models in research are very fundamental, and there's a missing link between what the models accomplish and what engineers can use. Thanks to the model that I've developed, there's a link."

Couet has partnered with Westinghouse Nuclear, a major company in the nuclear industry, as well as EPRI, the Electrical Power Research Institute, in efforts to refine the model.

In his lab, he will be experimenting with stainless steels as well as zirconium, an element that is transparent to neutrons and therefore commonly used in nuclear reactors. Couet will be making ongoing measurements to more effectively profile the changing effects of the environment on these materials.

Some nuclear researchers expose materials to certain harsh environments, and then observe them after the exposure, measuring the effects of the environment on the materials. But this is problematic, since materials can have widely different and non-monotonic responses across the time they're subjected to in-reactor like conditions."You're looking at something and trying to recreate the history of that material when it was in a closed box," Couet says. "It's like looking at the teeth of a Cro-Magnon skeleton and trying to see what he has eaten for his whole life."

Instead of relying on today's evidence for yesterday's reactions, Couet uses specific tools to measure reactions as they are happening. By building a precise history of a material's response, he can better understanding the related phenomena, and validate his model.

Couet's interest in nuclear engineering began early, during his high school-equivalent education in France. He attended a preparatory school in Paris, where he studied physics, mathematics and chemistry, after which he began his master of science degree in nuclear engineering at Penn State University, in partnership with École Centrale de Lyon, in France, from which he received a master of engineering degree. In 2014, he received his PhD in nuclear engineering from Penn State. His PhD research centered around the subject of hydrogen pickup behavior in zirconium alloys.

After his PhD, Couet worked for more than a year as a research engineer at EDF, a French nuclear electric power generation company and one of the largest providers of electricity in the world. It wasn't long before he moved to Madison to resume work in academia. While working in industry, he realized that he missed the educational side of research in engineering—the ability to have a real impact—as well as the nuance of science itself.

"In industry, the answers are very binary, it's always either 0 or 1, it works or it doesn't," he says. "The question 'why' is never really what matters. And I always wanted to know why."

When UW-Madison offered him a position, it was too good of an opportunity to miss, he says. "It's a great program, a great education, great students, and the university is very well-known," Couet says. "And then you have the city of Madison."

Couet, 29, enjoys the bicycle-friendly nature of the city, as well as the good food, even after having lived in Paris. He is currently a member of UW's Badminton Club, a sport that he has been playing for more than 20 years.

Aaron Olson

Mehrdad Arjmand

Student startup NovoMoto wins Clean Energy Trust Challenge

On April 12, 2016, NovoMoto—an innovative startup co-founded by two UW–Madison engineering graduate students—won $90,000 in the Clean Energy Trust Challenge, a startup contest billed as the "largest single-day clean energy pitch competition in the nation."

Aaron Olson and Mehrdad Arjmand, NovoMoto co-founders and PhD students in engineering mechanics, competed against three other student teams and 14 teams overall to win a chunk of the $1 million in prize money. They will use the funds to bring a reliable source of electricity to the residents of Mboka Paul, a small village in the Democratic Republic of Congo (DRC) located one hour east of the country's capital Kinshasa. Olson, who was born in the DRC and moved to the United States with his parents at an early age, knows the village of Mboka Paul quite well as his aunt lives there and his family has farmland nearby.

Currently, 68 million DRC citizens (roughly 90 percent of the country's population) lack a reliable source of electricity. To power up, they often buy kerosene to burn in lamps for lighting and pay for local diesel generators to charge their phones. Arjmand and Olson say the current energy scenario is not only expensive—some residents spend up to one-third of their income on these services—but also inefficient and poses significant environmental and health risks.

Though a high-voltage power line runs above the village of Mboka Paul, none of the residents have access to the electricity it carries. For a reasonable cost, Olson and Arjmand plan to provide the villagers with rechargeable batteries that can store enough energy to charge a cellphone, power a small TV, radio, or fan, and provide up to six hours of light via three 3-watt LED bulbs. Customers can then bring their depleted batteries to a NovoMoto control station, powered by six 285-watt solar panels, and exchange them for fully charged units.

NovoMoto hopes to help DRC villagers light their homes with battery-powered LED bulbs rather than kerosene lamps, which provide dim lighting and can contribute to respiratory illness.

"What's useful is that we don't have to set up a distribution line to deliver energy to customers," says Olson. "They carry it around with them, come to our location where we have the panels set up with energy storage, then just take that power home home in a portable battery."

Getting the NovoMoto project off the ground will be simplified by the fact that Olson's aunt and cousins live in the neighborhood. Having local connections means being able to use existing distribution chains, including entrepreneurs who are already selling phone cards, water, medicine and anything else villagers might need.

"Instead of coming in as a foreign entity to sell a service that members of the community aren't familiar with, we're recruiting these local business people to join the NovoMoto team," says Olson.

Arjmand, who is a member of the Computational Materials Group in the Department of Materials Science and Engineering, says these connections will be key to the project's success.

"Having the funds and guidance to start the pilot phase is critical," says Arjmand. "Now we'll be able to interact with customers to offer them what we think is a good solution, and receive feedback to make the product better."

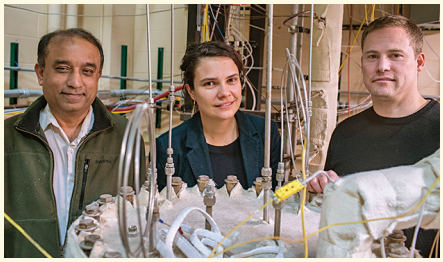
In summer 2016, with seed money in hand to complete a prototype, Olson and Arjmand will return to Mboka Paul to assemble the first NovoMoto solar power kiosk. Having received video testimonials from villagers about the product's potential, they're optimistic.

"The feedback so far is that it's a no-brainer," says Olson. "The villagers are basically saying, 'who wouldn't want this service?'"

While Olson and Arjmand fully intend to complete their graduate degrees, they are simultaneously committed to—and very excited about—getting NovoMoto off the ground. "At some point it may be appropriate to step down and let someone else continue the business," says Olson, "but we'll make that decision after it's successful."

INNOVATION

(Continued from front page)



Gregory Vershbow

From left: Sridharan, Scarlat and Research Professor Mark Anderson, who research molten salts, standing next to a storage container for high-temperature salt.

And when these growing companies want to recruit top talent, they look to UW-Madison. For example, Brian Kelleher, who earned his PhD at UW-Madison working on the FHR project under Distinguished Research Professor Kumar Sridharan, is now working at TerraPower. "This recruiting shows we're effectively training our students at UW-Madison to work on these advanced nuclear technologies, and that is feeding this new resurgence of innovation in nuclear," Scarlat says.

To enhance students' educational experience, Scarlat reached out to a number of molten salt reactor companies to see if they would be interested in serving as advisors for student design teams in NEEP 412: *Nuclear Reactor Design.* Scarlat says the response from the companies was tremendous, with six agreeing to serve as team advisors.

"By building connections with these companies, we're also reinforcing the fact that we're training students in this area and companies can recruit talented engineering grads from us," she says.

In addition to the innovative FHR research and training students, Scarlat says UW-Madison's unique capabilities for handling and studying molten salts containing beryllium make the university a leader in advanced nuclear.

Because beryllium is highly toxic, it's difficult to build facilities that can handle these kinds of high-temperature salts. UW-Madison is the only university in the country with the safety procedures in place to handle and purify beryllium fluoride salts and with faculty members who have experimental expertise with these molten salts.

"Our experimental facilities are quite unique at UW-Madison, and we can assist nuclear companies by doing measurements that are specific to their reactor designs," Scarlat says.

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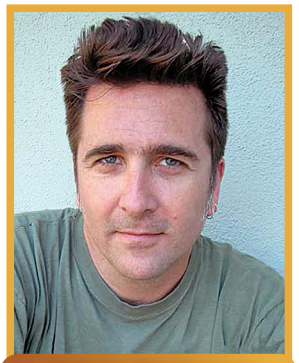
EP alum Adam Steltzner earns nation's top engineering honor



Adam Steltzner

An engineering mechanics alumnus who gained international notoriety for his role in developing a Mars rover landing system is among 80 U.S. and 22 foreign members elected to the National Academy of Engineering (NAE) in 2016.

Election to the academy is an honor reserved for those who have made outstanding contributions to engineering research, practice or education. The NAE recognized Adam Steltzner's major accomplishment in developing the Mars *Curiosity* 2011 entry, descent and landing system and for contributions to control of parachute dynamics.

Steltzner earned his PhD in engineering mechanics in 1999 under Professor Dan Kammer. He is an engineer at the NASA Jet Propulsion Laboratory and, in addition to his work on *Curiosity*, also was the lead engineer of the Mars Science Laboratory, and worked on projects that include the unmanned crafts *Galileo* and *Cassini*, the Mars *Pathfinder* and the Mars Exploration Rovers *Spirit* and *Opportunity*.

With his "rock-and-roll engineer" image, he has been the subject of numerous human interest stories and has been highlighted in several TV documentaries. Steltzner also holds a bachelor's degree in mechanical engineering from the University of California at Davis and a master's degree in applied mechanics from the California Institute of Technology.