

**NUCLEAR
ENGINEERING**

NEWSLETTER

FALL 2018



PURDUE
UNIVERSITY.



MESSAGE FROM THE HEAD

As the fall semester is in full swing and West Lafayette is slowly turning towards the autumn foliage, we publish this newsletter to reminisce on the School's activities over the last year.

As you turn the pages, you will find how our junior faculty members are making an impact in the nuclear engineering and science communities with their cutting-edge research and innovations. Early this fall, Dr. Yunlin Xu joined our School as an assistant professor. He brings highly-recognized, world-leading expertise on reactor physics which will further strengthen our legacy in Nuclear Power. It is exhilarating to continue to put forth another faculty search this year in continuation of our effort to invite top scholars to our School. The impact made by our faculty is also reflected by a recent philanthropic gift made by a former student of Dr. Tsoukalas, who wishes to remain anonymous but hopes to show his appreciation toward his teacher's mentorship, which he believes played a major role in his career success.

As our students are making us proud with outstanding recognitions, it is simply amazing to see how our alumni are making an impact on society as well. Among many impressive stories, we are featuring a story of one of our youngest alumni, who was selected as the Forbes 30 under 30 at the age of 25. Ian Hamilton established his own start-up company with the idea that he explored while pursuing a master's degree in our School.

In Fall 2019, we are set to launch an online Master of Nuclear Engineering degree program. This will provide us with a platform for digital education, which allows not only for life-long learning opportunities for those who cannot attend regular classes for higher degrees but for disseminating technical knowledge at scale. Moving toward a digital platform is also true for Indiana's only nuclear reactor, PUR-1, which is awaiting final license approval for a fully-digital instrumentation and control (I&C) system. When licensed, PUR-1 will be the Nation's first nuclear reactor with all-digital I&C and be able to expand its educational and research missions anywhere in the world.

As I close my message, I am happy to report that we have 31 incoming sophomores and 14 graduate students this fall, which accounts for nearly 35% and 32% of our total undergraduate and graduate students, respectively. Finally, as we celebrate Purdue's 150th Anniversary in 2019, we are proud to be a part of Purdue's vision of *Sustainable Planet, Artificial Intelligence, Space Exploration, and Health & Longevity* and striving towards a *Pinnacle of Excellence at Scale*.

We will be hosting an alumni & friends reception at the 2018 ANS Conference on November 12 in Orlando, FL. I hope to see you there!



Seungjin Kim
Capt. James F. McCarthy, Jr.
and Cheryl E. McCarthy Head
and Professor
School of Nuclear Engineering

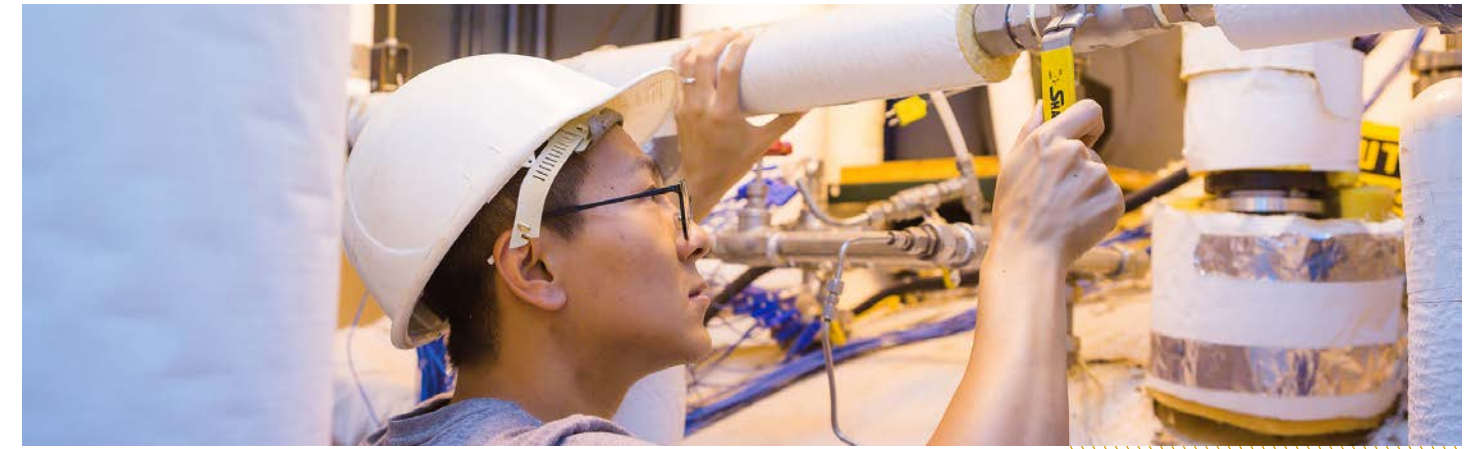


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ON THE COVER

Nuclear Engineering Assistant Professors (left to right), Janelle Wharry, Yunlin Xu, and Allen Garner.

Cover photo by Vincent Walters

SUCCESS WITH CHALLENGES, **PROF. JANELLE WHARRY** PERSEVERES WITH AN EXCEPTIONAL YEAR

When looking at the School of Nuclear Engineering's newsfeed, it's clear to see that Assistant Professor, Janelle Wharry had a wildly successful and impressive year. But, that's not to say that she did not have some stumbles along the way.

"In 2017, I had a lot of rejected grant proposals, so I changed my approach significantly for 2018," said Wharry. "That change seemed to pay off, and I think it made me tougher. The recognition means to me is the confidence that I am resilient and capable enough to weather the many storms of an academic job."

Wharry's research surrounds the micromechanical behavior of the materials under radiation. When examining the mechanical properties of a material (strength, ductility, and resistance to fracture) often times these items are



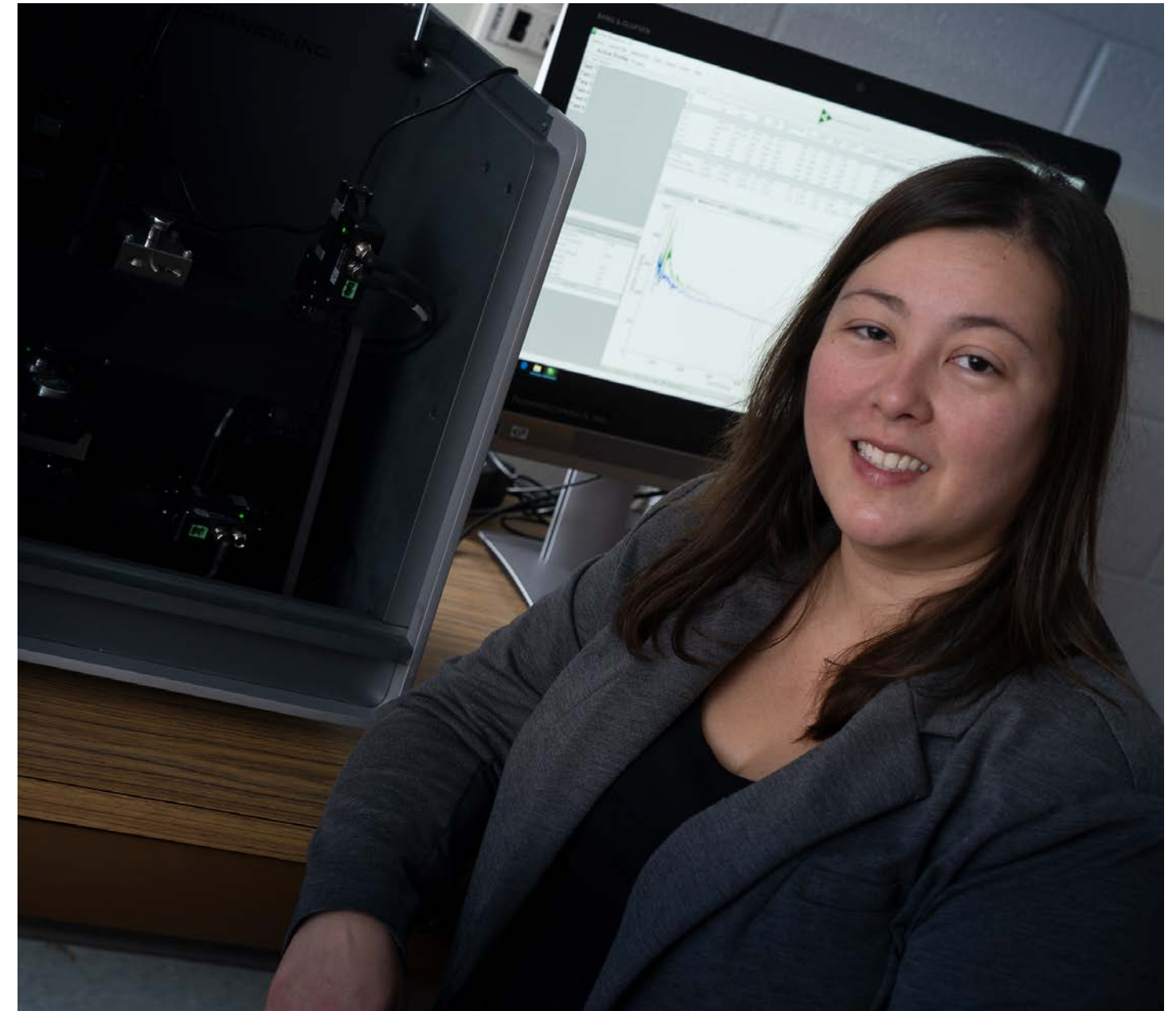
quantified and talked about on a large scale. But these "bulk" or macroscale behaviors are actually governed by atomic/microscopic level features in the materials. Building the connection between the atomic and macro scales is exactly what Wharry and her team are trying to figure out – and with an emphasis on how radiation can change those relationships.

In April 2018, The National Science Foundation (NSF) awarded Wharry a Faculty Early Career Development (CAREER) grant. The CAREER program offers the NSF's most prestigious awards supporting early-career faculty like Wharry, who have the potential to serve as academic leaders in research and education and to steer advances in their fields. Wharry is the first NSF CAREER recipient in the School of Nuclear Engineering at Purdue University.

The five-year \$560,000 award will support research on intergranular fracture, which is a specific failure mode common in structural materials throughout the automotive, aerospace, petrochemical, and nuclear industries.

A few months later, Wharry received nearly \$1.6 million for two projects thanks to the U.S. Department of Energy's Nuclear Energy University Programs (NEUP). NEUP provides top engineering faculty and their students a means to continue progressive nuclear research activities by providing large-scale grants.

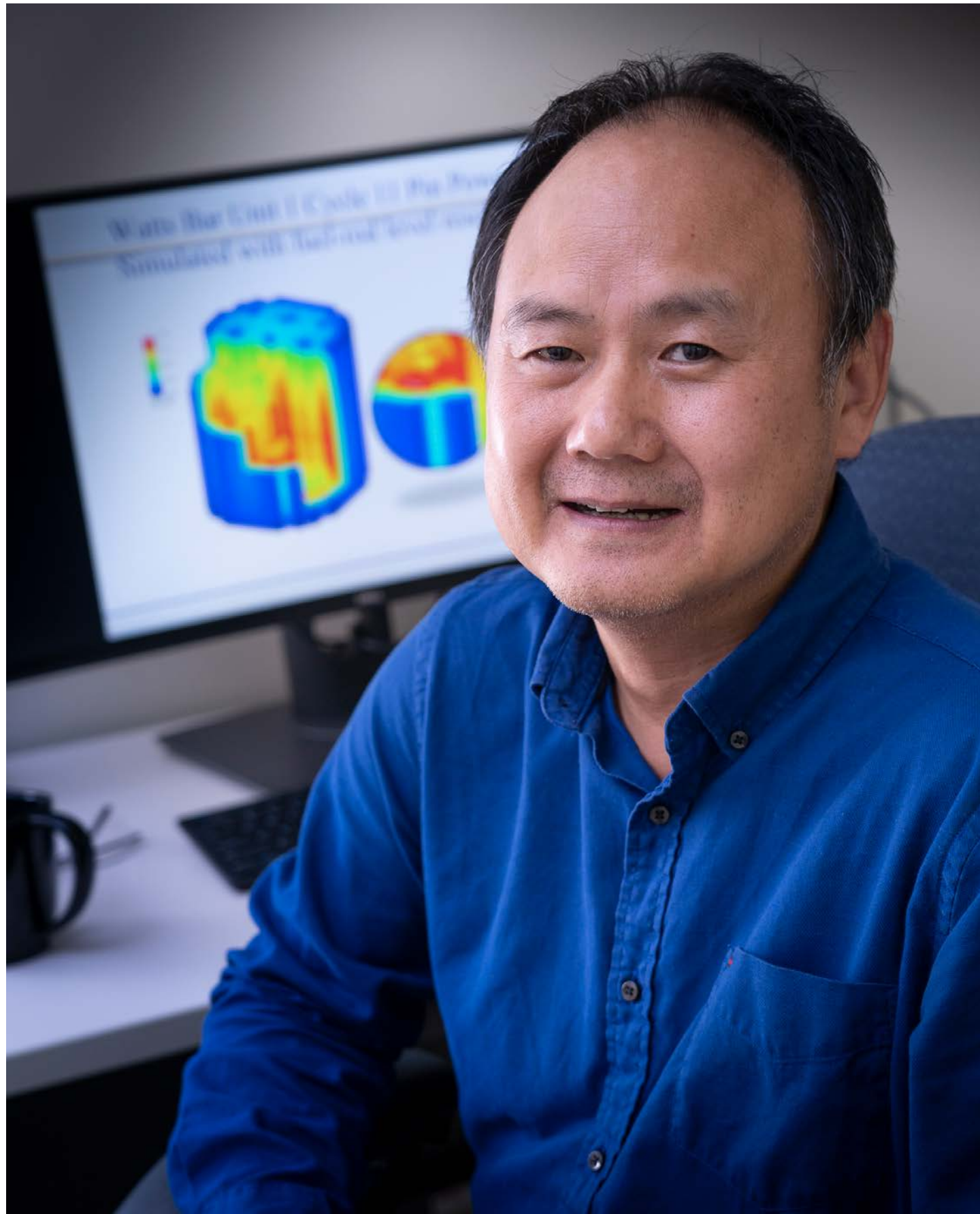
The first of Wharry's two projects is titled, "Microstructure-Based Benchmarking for Nano/Microscale Tension and



Ductility Testing of Irradiated Steels" and will receive \$800,000 in collaboration with Anter El-Azab (Purdue School of Materials Engineering) and researchers from Oak Ridge National Laboratory. The primary project outcome will be a set of recommended guidelines for nano/microscale mechanical testing, which utilize miniature specimens as compared to standard fracture testing specimens such as Charpy or compact tension geometries. If Wharry's team can show that these miniature specimens produce consistent results as the standard-sized specimens, the finding will lead

to unprecedented reductions in the time and cost for qualifying materials for in-reactor service and will ensure consistency of methods and validity of results.

Reflecting on her successes, Wharry is looking forward to the future and what it means for her and her students. "I would like my new students and new projects to get started on the right path. I'd like the students to gain confidence in their research skills by completing key milestones on the projects."



PURDUE ALUMNUS **PROF. YUNLIN XU** JOINS SCHOOL OF NUCLEAR ENGINEERING FACULTY

Returning to your alma mater is an act that many alumni practice on an annual basis, but for Dr. Yunlin Xu when he came back to Purdue University's campus in August 2018 it was not only as an alum but as an Assistant Professor in the School of Nuclear Engineering.

Xu joins the school after serving as an adjunct associate professor at the University of Michigan and principal research engineer at Argonne National Laboratory.

He received his bachelor's and master's degrees in nuclear engineering from Tsinghua University and his Ph.D. in nuclear engineering from Purdue in 2004. He also received a master's degree in computer science from Purdue in 2006.

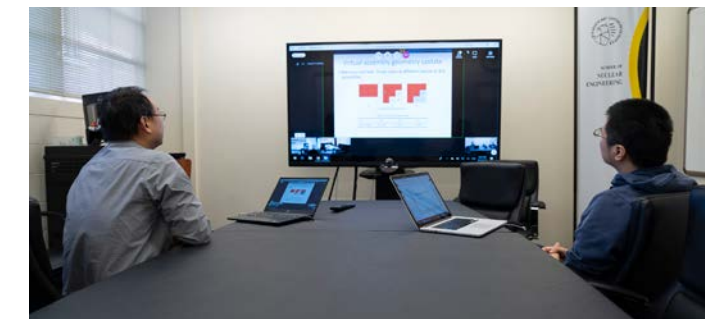
Xu's research is in the areas of reactor physics and computer science for a diverse set of applications including nuclear reactor design and safety analysis, advanced nuclear fuel cycles, numerical methods, and homeland security. In particular, Xu is highly recognized for his technical expertise in advanced neutronics codes, including PARCS, DeCart, MPACT, and Multi-physics coupled codes, such as TRACE, RELAP5.

Soon after joining the school, Xu was selected as a recipient of the Paul C. Zmola Scholar of Nuclear Engineering Award. This award was established by Paul C. Zmola (BSME '44, MSME '47, and Ph.D. '50) in 2007 to advance nuclear engineering research at Purdue and recognize

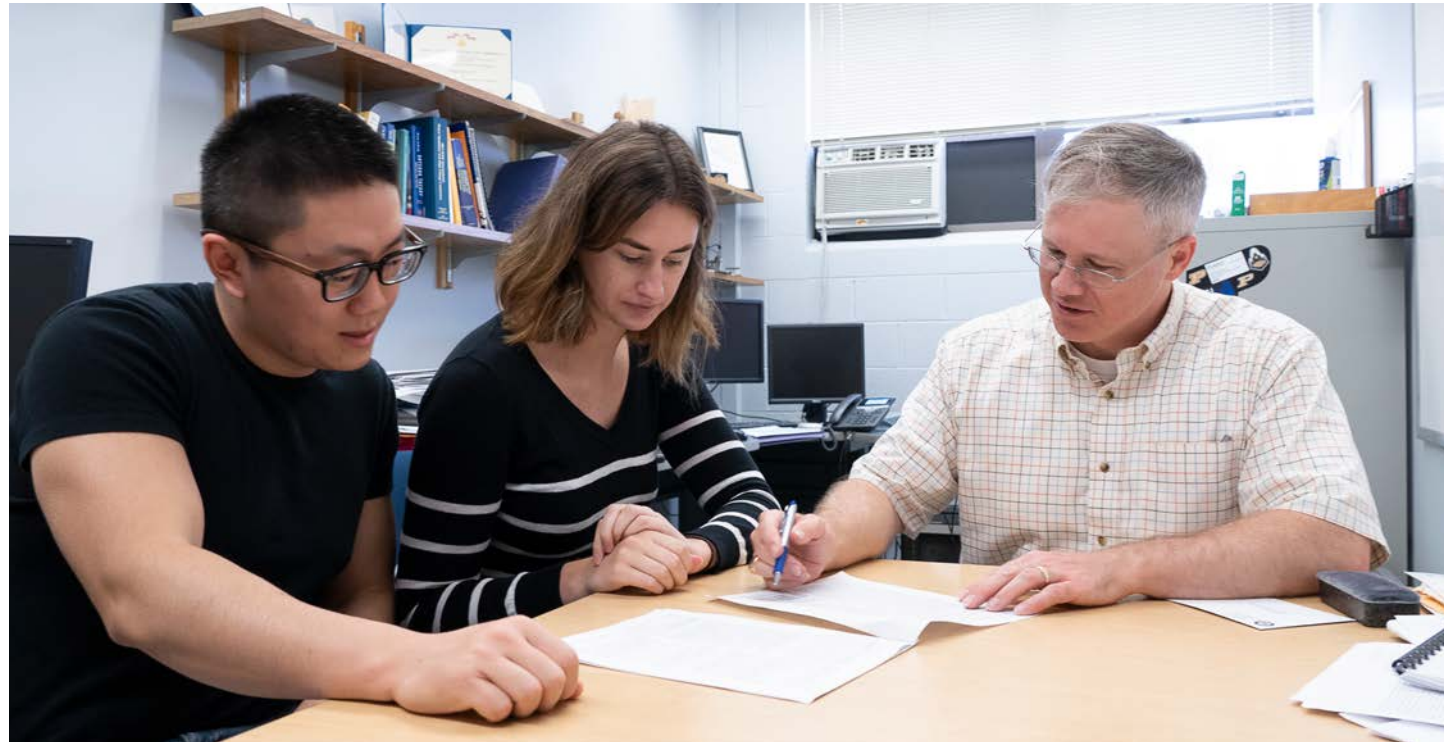
an outstanding newly-hired junior faculty member. The Paul C. Zmola Nuclear Engineering Scholar Award is for a five year period.

Xu's excitement to join the faculty was apparent from day one, but he was also anticipating the opportunity to give back to the nuclear engineering community at Purdue.

"It's a pleasure to provide help to students at Purdue University who are just like me 19 years ago," said Xu. "I am grateful for having the chance to demonstrate that an alumnus of Purdue University can be a good faculty member at a top university."



RECEIVING NOTABLE AWARDS, PROF ALLEN GARNER PROVIDES MULTI-DISCIPLINARY RESEARCH



Providing world-class education and research experiences is a passion that is clearly exemplified by Nuclear Engineering Assistant Professor, Allen Garner. Over the past year, he has received a notable collection of awards that will impact the exposure of him and his students to a variety of research initiatives.

“The biggest thrill is when other people across academia, government laboratories, and industry reach out to us to ask about, and apply our work,” said Garner. “We were approached by a professor from China at a conference, which resulted in a collaboration that led to a paper that was selected as a featured article and further research that could lead to additional high impact research.”

Garner and graduate student, Amanda Loveless made contributions to new research that shines light on the behavior of electrical breakdown for the smallest gap distances ever studied: a mere 5 to 10 microns. The two provided fundamental physics modeling and understanding to describe this breakdown in collaboration with Dr. Guodong Meng and colleagues from Xi’an Jiaotong University in China.

“Our study shows the transition between gas breakdown mechanisms, or the process by which the gas becomes conductive, and the discharge path length -- essentially how the electrons flow during their collisions with gas molecules, at very small scales,” said Garner.

From the microscale research to exploration that is out of this world, Garner, in collaboration with Eagle Harbor Technologies Inc., received funding from NASA to develop a precision eddy-current sensor for nondestructive evaluation of spacecraft structures.

While multiple methods currently exist - including ultrasound, radiography, and optical methods - there are often issues with expense, safety, and penetrate depth, respectively. Eagle Harbor is developing a simple and repeatable method of using electromagnetism to detect flaws, but challenges include penetration depth and sensitivity to crack orientation.

Dr. Garner’s group received funding to model the electromagnetic interaction with surface materials to assess the sensitivity of this technique to flaw location and orientation. This technique could be applied to other areas requiring nondestructive testing, such as pressure vessels nuclear reactors to extend their lifetime.

Over the span of a couple months in 2018, Garner received several additional grants including two awards from the Office of Naval Research. Totaling over \$1 million, the research projects include the development of mathematical models of nanoscale effects on gas breakdown and electron emission, and a project involving the study of high-power microwave system designs using nonlinear transmission lines.

As Garner and his research group continue to grow and explore different areas, the one thing that he continually emphasizes to students is the increasingly multidisciplinary and multi-sector nature of research. “A background in nuclear engineering gives a strong fundamental knowledge across multiple disciplines that students from other areas do not possess,” says Garner. “The cross-cutting problems that our group studies give the students the opportunity to apply this knowledge in practical manner.”



AS WE CONTINUE TO GROW OUR RESEARCH GROUP AND EXPLORE DIFFERENT AREAS, THE ONE THING THAT I EMPHASIZE TO STUDENTS IS THE INCREASINGLY MULTIDISCIPLINARY AND MULTISECTOR NATURE OF RESEARCH.



STUDENT AWARDS & RECOGNITION

DREW RYAN RECEIVES PRESTIGIOUS RICKOVER FELLOWSHIP

Drew Ryan, a graduate student in the School of Nuclear Engineering at Purdue University, was awarded a Rickover Fellowship from the Naval Reactors Division of the U.S. Department of Energy (DOE). This opportunity is considered as one of the most prestigious fellowships in the nation, awarded to top students pursuing a Ph.D. degree in nuclear engineering.

The four-year fellowship is intended to provide education on the maintenance and development of science and engineering technology pertaining to naval nuclear propulsion and advancing fission energy development.

During his fellowship, Ryan will conduct research on reactor thermal hydraulics and two-phase flow. He will spend two summers at one of the Naval Nuclear Laboratories and work at one of the labs for two years after obtaining his Ph.D. in nuclear engineering at Purdue.

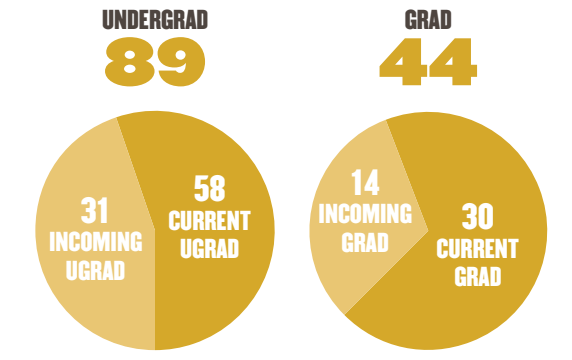
"I'm excited to have this opportunity for my graduate work," said Ryan. "The Naval Nuclear Labs are known for their high-quality work and their history of excellence, and I am grateful for the opportunity to work with them."

Ryan received his Bachelor of Science in Nuclear Engineering from Purdue University in May 2018. During his undergraduate career, he completed research with Dr. Robert Bean in a variety of fields and also completed work on an advanced reactor safety analysis software at Argonne National Lab.

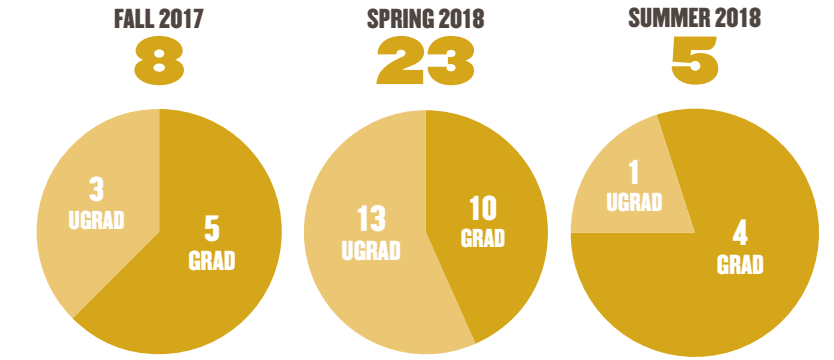


“ I’M STILL A LITTLE IN SHOCK THAT I WAS CHOSEN FOR THIS HONOR, BUT I THINK THAT I CAN DO SOME AMAZING WORK WITH THESE LABS. ”

2018-19 STUDENT NUMBERS



2017-18 GRADUATION NUMBERS



AMANDA LOVELESS RECEIVES 2018-2019 DIRECTED ENERGY PROFESSIONAL SOCIETY (DEPS) GRADUATE SCHOLARSHIP

Amanda Loveless, a nuclear engineering graduate student, received a 2018-2019 Directed Energy Professional Society (DEPS) graduate scholarship. She was among fifteen promising students from the total field of applicants who received a \$5,000-\$10,000 scholarship to continue studying or pursuing a career in directed energy (DE) technology areas.



Loveless received her BS and MS in Nuclear Engineering from Purdue University in 2015 and 2017. Her graduate research with Prof. Allen Garner focuses on developing theoretical models for gas breakdown in microscale gaps, which have applications in medicine and combustion. In particular, she has derived new analytic equations from first principles to describe the transition from traditional avalanche breakdown (Paschen’s law) to field emission at the microscale. She is currently studying the transition between electron emission mechanisms for various device sizes and gas pressures and working with experimentalists to apply simple mathematical models to gas breakdown for alternating current fields.

Since 2011, DEPS has provided more than \$855,000 in scholarships. The funds for these awards are provided by grants from the High Energy Laser Joint Technology Office, the Office of Naval Research and DEPS.

STUDENT CONTINUED



NUCLEAR ENGINEERING ALUMNA TRAVELS TO U.S. DOE AS A STUDENT DELEGATE

A recent School of Nuclear Engineering graduate was selected to participate in the Nuclear Engineering Student Delegation (NESD) that took place in Washington D.C. July 8–13, 2018.

Anna Biela was one of 16 students from the nation’s most prestigious nuclear engineering programs who were brought together to discuss a variety of topics involving nuclear energy, policy, and education with key policymakers.

After discussing nuclear policies, the group spent the first day developing a policy statement for this year’s delegation. Using this opportunity as a platform for change, they selected specific legislation that they believe advocacy efforts would be best focused on.

Through this, Biela said she “gained a lot of knowledge and insight into how politics, advocacy, and the federal government work and intersect with industry and academia.”



Nuclear Engineering Student Delegates stand with Commissioner of the U.S. Nuclear Regulatory (NRC), Stephen G. Burns (middle) during their visit.

STUDENT DELEGATE (CONT.)

The subsequent days involved meeting with governmental agencies and pro-nuclear energy groups, including the U.S. Department of Energy’s Office of Nuclear Energy where they met with Office of Nuclear Energy Senior Adviser Suzanne Jaworowski. They also visited the Nuclear Regulatory Commission where they met with three of the five commissioners (Annie Caputo, David A. Wright, and Stephen Burns).

The final days were spent meeting with representatives in the House and Senate.

“This experience showed me advocacy isn’t something we should expect other people to do for us,” said Biela, “but rather something we can, and more importantly, need to do for ourselves.”

The 2018 NESD developed three major policy priorities:

1. The Delegation recommends that Congress fund the IUP at or above FY 2018 levels to ensure robust American nuclear science and engineering expertise in the coming decades.
2. The Delegation recommends Senate passage of the Department of Energy Research and Innovation Act (S.2503/H.R.589) and Congressional passage of regulatory reform bills (S.512/H.R.1320) to support U.S. leadership in the development, commercialization, and licensing of advanced nuclear energy technologies.
3. The Delegation recommends Congressional passage of the Interim Consolidated Storage Act of 2017 (H.R.474) into law to provide a path forward for removing spent nuclear fuel from nuclear power plants.

Biela is the only Purdue University student who has been selected for the committee since 2014 and School of Nuclear Engineering alumna, Lenka Kollar, chaired the delegation in 2011. The American Nuclear Society and the Nuclear Energy Institute sponsored the delegation.

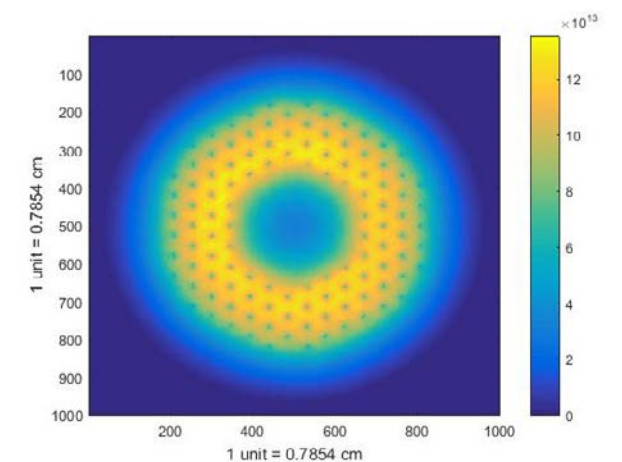
PURDUE NUCLEAR TEAM FINALISTS FOR ANS STUDENT DESIGN COMPETITION

A team composed of undergraduate students from the School of Nuclear Engineering has been announced as a finalist for the 2018 American Nuclear Society (ANS) Student Design Competition.

Competing against the University of Tennessee, the two teams will make their presentations at the ANS Winter Meeting in Orlando, Florida later this year.

The Purdue team will present on their project, the Hydrogen Production Electrolysis Reactor (HYPER). The reactor was designed to produce electricity and hydrogen for industrial applications. By exploring the possibility of refueling a reactor without shutting down, HYPER is capable not only of generating hydrogen and electricity with a 62 percent efficiency -- about twice that of modern power plants -- but also of preventing the release of 800,000 metric tons of carbon dioxide per year.

The team includes students Adam Darr, Antony Damico, Robby Kile, Christopher Copeland, Corey Ohneck, and Anna Biela. The faculty advisor for the team is Dr. Chan Choi.



The neutron flux as shown in the Hydrogen Production Electrolysis Reactor (HYPER).

ALUMNI AWARDS & RECOGNITION

NUCLEAR ENGINEERING ALUMNUS LANDS ON FORBES 30 UNDER 30

A former graduate student in the School of Nuclear Engineering at Purdue University was recently recognized in the energy sector of the Forbes 30 Under 30 list. At age 25, Ian Hamilton is the CEO of his own startup company, Atlas Energy Systems, where he's working to commercialize a long-lasting radioisotope battery, powered by spent nuclear fuel.

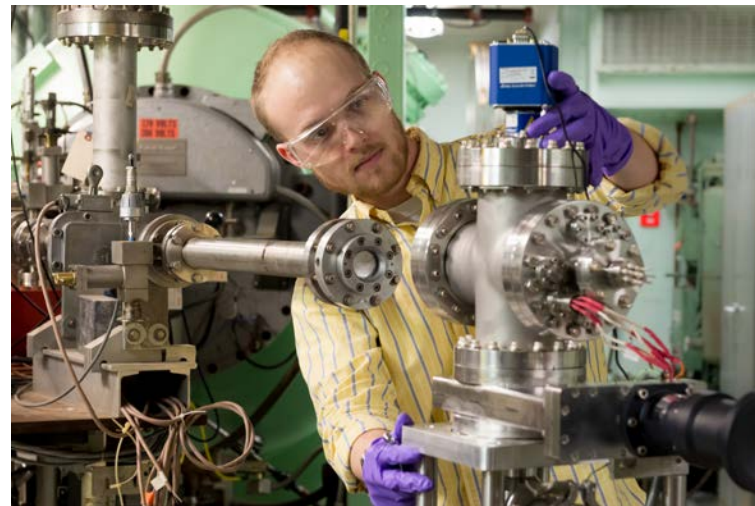
In its seventh installment, the energy sector of the Forbes 30 Under 30 list highlights an impressive collection of upstarts who are viewed as having the highest potential in the broad field of energy.

"It's an honor to be named to the Forbes 30 Under 30 list," said Hamilton. "It's great to get the validation for my ideas and my company, and a great way to get exposure out to potential investors and collaborators."

During his undergraduate years, Hamilton, along with three other Purdue alumni - Joshua Auger, Kyle Harris, and Kyle Pendergast - founded Atlas Energy Systems and developed the Atlas Power Cell. This device has the capability to utilize spent nuclear fuel, or nuclear waste, and convert the residual radiation energy into consumable electricity.

Hamilton envisioned this optimal power source during his undergraduate years in Materials Science at Purdue University, which then brought him to pursue a masters degree in Nuclear Engineering after realizing he needed the background to further develop this idea.

As for the future, Hamilton says his goals "are to continue with my company and grow it to a large distributed energy company and defense contractor." He also plans to expand to new types of direct energy conversion nuclear reactors as well as novel solar and wind devices.



“ I DON'T THINK I COULD BE DOING WHAT I AM OR BE AT ARGONNE NATIONAL LABS WITHOUT THE MASTERS PROGRAM IN NUCLEAR ENGINEERING AT PURDUE. ”

OUTSTANDING NUCLEAR ENGINEERS AWARD



PAUL L. WATTELET

**// CEO, EMERITUS, SARGENT & LUNDY, LLC
// PH.D. NUCLEAR ENGINEERING, PURDUE UNIVERSITY, 1967**

Dr. Wattelet is a CEO, Emeritus of Sargent & Lundy, a leading international power engineering consulting firm based in Chicago. After holding several executive management positions at Sargent & Lundy, Dr. Wattelet was appointed as CEO in 1996, where he served until retiring in 2005.

For his outstanding accomplishments, visionary leadership, and remarkable contributions to nuclear power engineering, The School of Nuclear Engineering is proud to present 2018 Outstanding Nuclear Engineers Award to Dr. Paul L. Wattelet.

2017-18 SEMINAR SPEAKERS INCLUDE ALUMNI FROM MEMBERS OF INDUSTRY, NATIONAL LABS, GOVERNMENT, AND ACADEMIA

During the 2017-18 academic year, 11 alumni of the School of Nuclear Engineering who have forged successful careers in the nuclear industry, national labs, government, and academia visited campus to talk with students during a weekly seminar series.

RICHARD LOOS
Bechtel Corporation (retired)
BSME - 1962, MSNE - 1971

PAUL L. WATTELET, PH.D.
CEO, Emeritus - Sargent & Lundy, LLC
Ph.D. - 1966

JOHN DEWES, PE.
Director - Global Security
National Security Directorate, Savannah River Laboratory
BSNE - 1982

COREY MCDANIEL, PH.D.
VP, Business Development & Commercial Ventures
Canadian Nuclear Laboratories
BSNE - 1993

TODD SMITH
Emergency Preparedness Specialist
Office of Nuclear Security and Incident Response, U.S. NRC
BSNE - 1996, MSNE - 1999, Ph.D. - 2002

YUNLIN XU, PH.D.
Argonne National Laboratory and University of Michigan
Ph.D. - 2004

CALEB BROOKS, PH.D.
Assistant Professor, Univ. of Illinois at Urbana-Champaign
BSNE - 2008, MSNE - 2012, Ph.D. - 2014

LENKA KOLLAR
Director, Strategy & External Relations - NuScale Power
BSNE - 2009, MSNE - 2012

IAN HAMILTON
CEO, Atlas Energy Systems, LLC
MSNE - 2017

ALEX HAGEN
Ph.D. - 2018

GREG SINCLAIR
Ph.D. - 2018

OUTREACH & OTHER HIGHLIGHTS



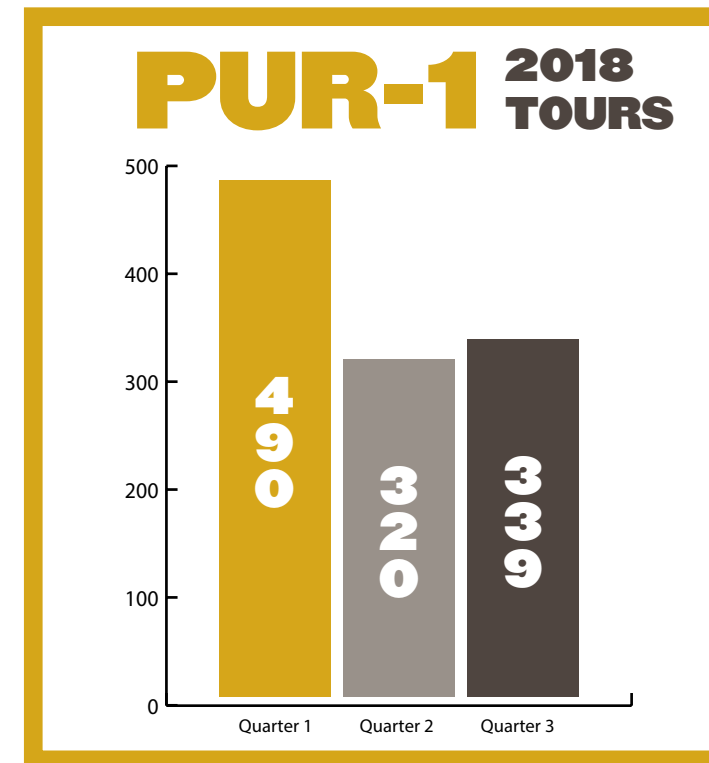
PUR-1 FOLLOWS LINEAGE OF "FIRSTS" WITH A FULLY-DIGITIZED I&C CREATING INNOVATIVE RESEARCH AND NEXT-GENERATION TEACHING CAPABILITIES

Purdue University is known for having many "firsts". From the first man on the moon to the first and only nuclear reactor operating in Indiana. Purdue's Reactor Number One (PUR-1), first installed in 1962, is still just as important and useful now as it was back then, but will now become more innovative with the implementation of a fully-digital instrumentation and control (I&C) system. A first with this type of instrumentation, the all-digital system will enable innovative research and next-generation teaching capabilities.

Schedule a tour: bit.ly/reactortour



The Purdue Women's Club tours the PUR-1.



Students from Rossville Jr./Sr. High School and Winamac Community High School perform a background radiation survey around campus as part of their tour of PUR-1 and learning about radiation principles.

HIGHLIGHTS CONTINUED

DR. SEUNGJIN KIM APPOINTED TO DOE NUCLEAR ENERGY ADVISORY COMMITTEE

Seungjin Kim, the Capt. James F. McCarthy, Jr. and Cheryl E. McCarthy Head of the School of Nuclear Engineering, has been appointed to the U.S. Department of Energy's (DOE) Nuclear Energy Advisory Committee (NEAC).

In this new role, Kim will meet biannually with the 25 other committee members to advise the Secretary and the Assistant Secretary for Nuclear Energy on a number of issues. Items discussed include matters of national policy and scientific aspects of nuclear issues of concern to DOE, periodic reviews of the various program elements within DOE's nuclear programs and recommendations based thereon, and the needs, views, and priorities of stakeholders of DOE's nuclear programs.



I AM HONORED TO BE INVITED TO ASSIST THE DOE IN SHAPING NATION'S NUCLEAR ENERGY PROGRAM. IT'S AN EXCITING TIME TO BE NUCLEAR ENGINEERS WITH NEW OPPORTUNITIES FOR BOTH EXISTING AND NEW NUCLEAR APPLICATIONS, AND I AM THRILLED TO BE PART OF DOE'S INITIATIVES AND BEING AT THE FOREFRONT IN ASSISTING THESE EFFORTS.

ANONYMOUS GIFT GIVEN TO HONOR DR. LEFERI TSOUKALAS

In reflection of his excellence in mentorship, a former student of Dr. Lefteri Tsoukalas has given an anonymous gift of \$500,000. The gift is directed towards the Applied Intelligent Systems Laboratory (AISL), a lab operated by Tsoukalas.



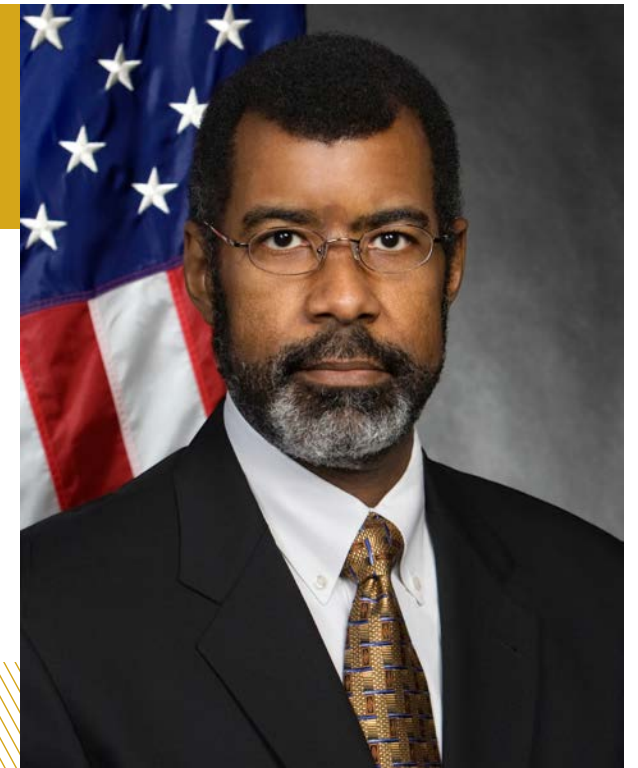
"This gift to the Applied Intelligent Systems Laboratory is a great and pleasant gesture," said Tsoukalas. "It feels terrific to be at the receiving end of this gesture, but it's not a surprise in a special University like Purdue, where gifting and philanthropy is part of the institution's culture and history."

He plans to use the funds to bring exceptional students into the School of Nuclear Engineering -- especially those who are interested in the innovative capacities of Artificial Intelligence.

The AISL is a research unit for theoretical and experimental research on intelligent systems and their applications on Nuclear Science and Technology. AISL's research also aims at promoting the various aspects of smart energy technologies including the "Energy Internet".

SCHOOL TO HOST WILLIAM D. MAGWOOD, IV, PURDUE ENGINEERING DISTINGUISHED LECTURER

The School of Nuclear Engineering is honored to host William D. Magwood, IV as part of the Purdue Engineering Distinguished Lecture Series. Mr. Magwood is currently the Director-General, OECD Nuclear Energy Agency (NEA) in Billancourt, France. The seminar will be on Thursday, December 6 at 1:30 pm in the Herman & Heddy Kurz Atrium in Armstrong Hall with a panel discussion to follow at 2:45 pm.



NE ADVISORY BOARD FORMED WITH DISTINGUISHED MEMBERS FROM NUCLEAR INDUSTRY, NATIONAL LABS, ACADEMIA AND GOVERNMENT



From left to right: Corey K. McDaniel, Hussein S. Khalil, Thomas A. Mehlhorn, Terry L. Grimm, Jack S. Brenizer (Chair), John S. Gilligan, Timothy K. Hanley, Said I. Abdel-Khalik, Jean-Marc Delhay, and Gerald S. Kulcinski (not shown).

Distinguished members from nuclear engineering industry, national laboratories, government, and academia recently met as selected members of the School of Nuclear Engineering Advisory Board. The board directly impacts the success of our educational and research programs and is one of the most important committees for the School.

HIGHLIGHTS CONTINUED

DIGITAL MOVES, SCHOOL'S FIRST ONLINE COURSE AND CREATION OF ONLINE MASTER OF NUCLEAR ENGINEERING PROGRAM

With the University's launch of Purdue Global and the growing trend in online offerings, the School of Nuclear Engineering has made giant leaps by establishing its first online nuclear engineering course, NUCL 501, as well as the creation of its online Master of Nuclear Engineering program.

The first online engineering course, NUCL 501 or Nuclear Engineering Principles is a primary course for graduate students desiring a nuclear engineering sequence and an elective for students in science or engineering. The course is structured in four parts:

- Nuclear structure and radiation, biological effects and medical applications of radiation.
- Basics of neutron and reactor physics, neutron diffusion, and reactor criticality.
- Nuclear materials and waste.
- Reactor systems and safety.

24 students from a variety of disciplines completed the inaugural online offering of the course being taught by NE Professor, Dr. Chan Choi.

The online masters program is conveniently designed for professional engineers looking to advance their skills without disrupting their careers. Courses will be offered in the topic areas of reactor physics, nuclear materials, fusion, thermalhydraulics and safety, and radiation and security. The program will offer a thesis and non-thesis option.

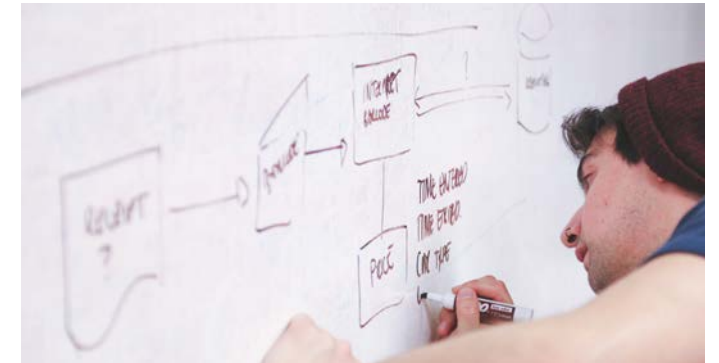
FACULTY OPPORTUNITY

The School of Nuclear Engineering at Purdue University invites applications for a tenured/tenure-track faculty position at all ranks. Purdue University seeks to attract exceptional candidates with interests and expertise in nuclear power, advanced reactor technology, nuclear materials, fuel cycle and non-proliferation; however, other areas will also be considered. Successful candidates must hold a Ph.D. degree in Nuclear Engineering or a related discipline and demonstrate excellent potential to build an independent research program at the forefront of their field, as well as potential to educate and mentor students. The successful candidate will conduct original research, advise graduate students, teach undergraduate and graduate level courses, and perform service both at the School and University levels.

For more information and to apply, visit bit.ly/nefacultyapp

NE OFFERS INAUGURAL INDUSTRY-SPONSORED SENIOR DESIGN PROJECTS

Obtaining real-world experience outside the classroom is just one factor as to what establishes a well-rounded education and this fall, seniors in the School of Nuclear Engineering will receive exactly that in the inaugural industry-sponsored senior design class. After months of planning, and over 21 different project proposals from a variety of industry leaders, 5 projects were selected.



PROJECT SPONSORS INCLUDE THE FOLLOWING:

Exelon - Project Title: Boiling Water Reactor Fuel Foreign Material Barrier

The goal of this project is to design a barrier that may be placed at the top of a fuel bundle to eliminate the possibility that foreign material could enter from the top of a bundle. This debris filter must not significantly impact the performance of the bundle.

Niowave, Inc. - Project Title: System Design of a 250 kW Subcritical Reactor for Medical Radioisotope Production

The goal of this project is to develop a neutronics model of the subcritical system, determine optimal fuel dimensions (enrichment, size, pitch, and cladding) for isotope production, and iterate results as needed to produce the final design.

RGA Labs, Inc. - Project Title: SMR - Electric Storage Hybrid (SMRE)

The objectives of the project would be to produce a suitable design concept that meets all of the basic requirements for a next-generation SMR electric generation unit (SMRE) that can be quickly and easily deployed both on established grids, as well as in remote, less developed, or degraded regions (e.g. Puerto Rico).

U.S. Nuclear Regulatory Commission - Project Title: The Impact of Weather on Radiological Dose Projections

The design team will evaluate the sensitivity of weather on the dose projections for an assumed small modular reactor source term using the current version of the NRC's Radiological Assessment System for Consequence Analysis (RASCAL) code. They will use RASCAL to quantify the impact that various weather conditions (e.g. - wind speed, atmospheric stability, precipitation, wind persistence) have on the dose projections over a 96-hour period from the time of release.

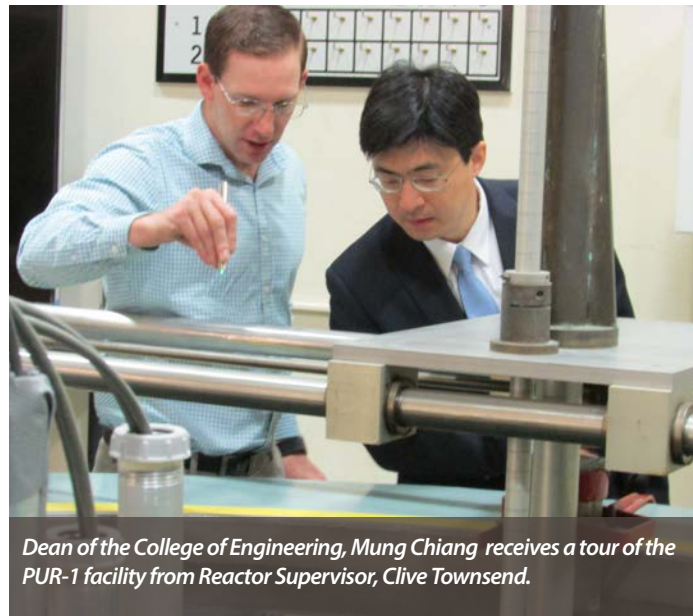
Westinghouse - Project Title: CFD analysis of heat exchanger rupture in a Lead Fast Reactor

The proposed team project will provide useful insights to be used in support of the design of the Westinghouse LFR. The student team will use a CFD code, such as STAR-CCM+ (preferred), CFX or Fluent, to analyze the dynamics and perform sensitivities for a hypothetical heat exchanger rupture occurring in an LFR. To this end, the student team will build a simplified domain representative of the plant's primary system, reproducing only the plant characteristics that are relevant for the problem under consideration.

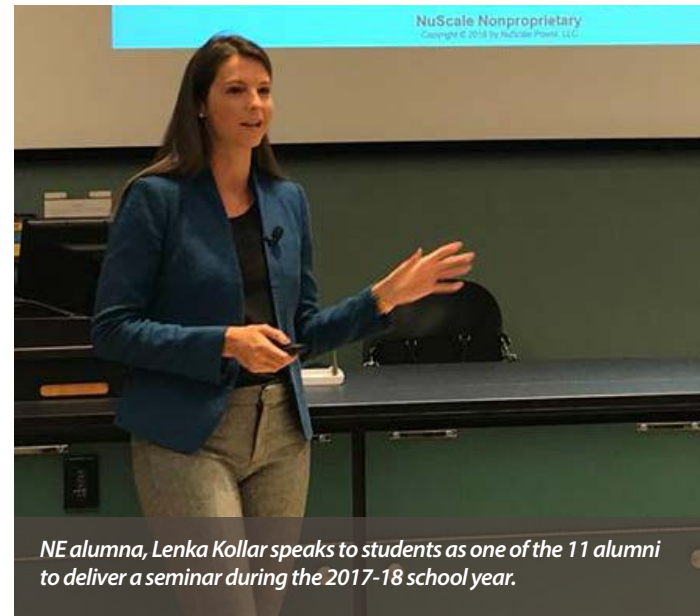
HIGHLIGHTS CONTINUED



NE grads and undergrads await the start of the Spring 2018 commencement ceremony. Ten graduate students and thirteen undergraduate students walked the stage of Elliott Hall of Music, marking the culmination of their time at Purdue.



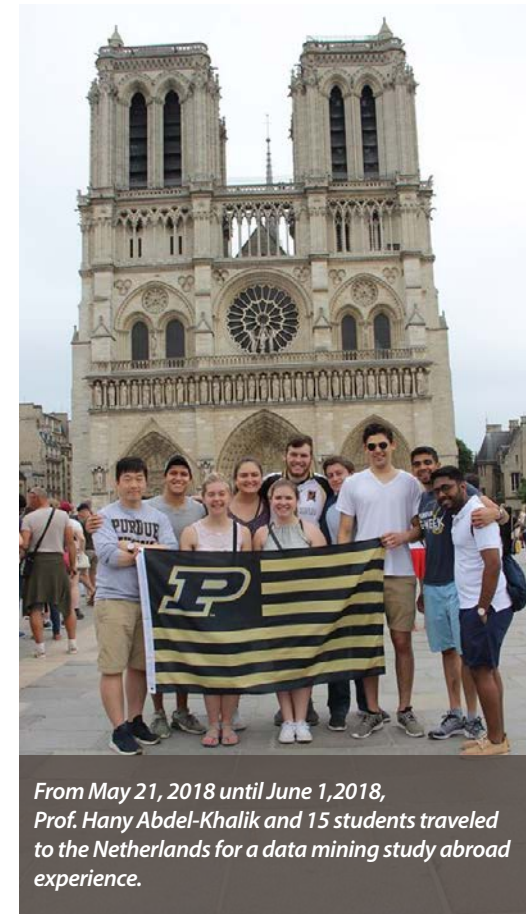
Dean of the College of Engineering, Mung Chiang receives a tour of the PUR-1 facility from Reactor Supervisor, Clive Townsend.



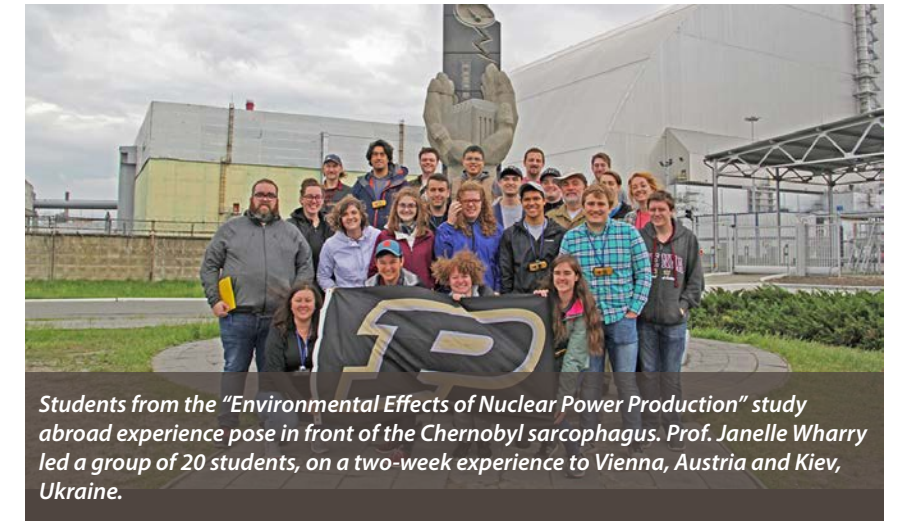
NE alumna, Lenka Kollar speaks to students as one of the 11 alumni to deliver a seminar during the 2017-18 school year.



Senior Advisor to the Office of Nuclear Energy in the U.S. DOE, Suzanne Jaworowski (middle-right), along with nuclear industry leaders from Exelon Nuclear, NuScale Power and Clearpath Foundation, engaged in discussion with students from the School of Nuclear Engineering during the Millennial Nuclear Caucus held in the Class of 1950 lecture hall.



From May 21, 2018 until June 1, 2018, Prof. Hany Abdel-Khalik and 15 students traveled to the Netherlands for a data mining study abroad experience.



Students from the "Environmental Effects of Nuclear Power Production" study abroad experience pose in front of the Chernobyl sarcophagus. Prof. Janelle Wharry led a group of 20 students, on a two-week experience to Vienna, Austria and Kiev, Ukraine.



NE faculty and staff members welcomed incoming engineering freshman during the College of Engineering picnic.

Nuclear Engineering

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ALUMNI & FRIENDS
RECEPTION
2018

MONDAY, NOVEMBER 12 / 6 PM - 8 PM
HILTON ORLANDO BONNET CREEK - ORLANDO, FL
Bonnet Creek VII

WE CORDIALLY INVITE YOU, YOUR FAMILY AND FRIENDS TO JOIN US IN CELEBRATING PURDUE'S LEGACY OF EXCELLENCE IN EDUCATION AND RESEARCH.

Photo from the 2018 Fall Welcome Picnic at Happy Hollow Park.

The poster features a large group photograph of diverse individuals, including men and women of various ages, standing on a grassy area with a dense forest in the background. The text is overlaid on the top left of the image. The word 'RECEPTION' is the largest and most prominent. The background of the image has a decorative pattern of diagonal yellow lines.

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