



University of Pittsburgh

CENTER FOR ENERGY NEWS

A quarterly newsletter from the University of
Pittsburgh Center for Energy

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A Message From the Director

The Spring Term wrapped up with a group of 22 undergraduate students returning from a two-week program in Sweden and Denmark. The group studied renewable and alternative energy systems, and grid technology, to compare with systems and technology in the US. Also, PhD recipient Ansel Barchowsky spoke movingly at Commencement on behalf of the Swanson School of Engineering graduating class.

As our Class of 2017 graduates begin the next chapter of their journey, and the classrooms are quiet, the Center for Energy remains as busy and active as ever, as work

continues on our facilities and laboratories at the Energy Innovation Center. We look back at the first quarter of 2017, which included a series of four exciting lectures in the Center's speakers' series, while planning our activities for the rest of the year, including the 12th annual Electric Power Industry Conference and our fall speakers' series.

We welcome you to learn more about these and other activities in this quarter's newsletter, and as always, please feel free to contact us at the Center for Energy for additional information.



Dr. Gregory Reed
Director and Professor,
Center for Energy and the GRID Institute
Swanson School of Engineering



NSF Grant Provides Undergraduate Research Opportunities

The NSF awarded a [Research Experience for Undergraduates](#) (REU) grant to provide undergraduate students with research opportunities in Chemical and Petroleum Engineering. The three-year, \$425,000 grant

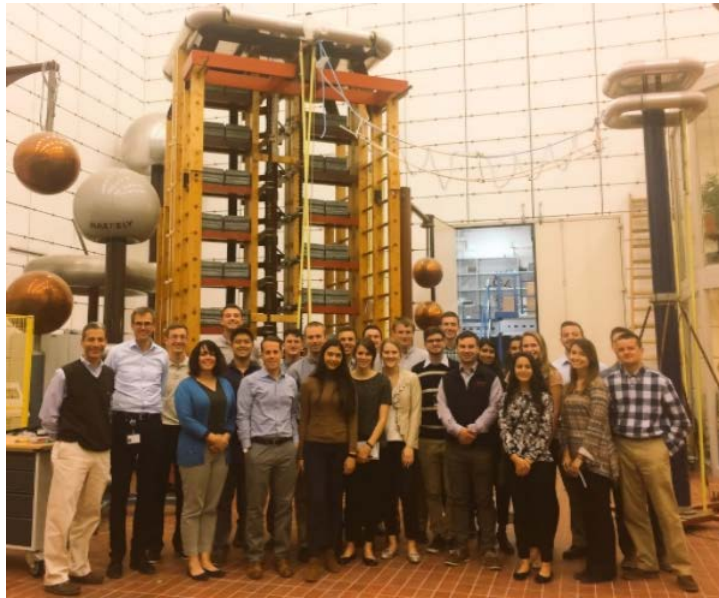
will fund a 10-week summer research program for students and provide them with a stipend and financial assistance for food, housing, and travel.

Three Chemical Engineering Faculty Members Receive Prestigious NSF CAREER Awards



Three researchers from one University of Pittsburgh department were recognized with the National Science Foundation's most significant award in support of junior faculty. John Keith, Giannis Mpourmpakis and Christopher Wilmer, all assistant professors of chemical and petroleum engineering at Pitt's Swanson School of Engineering received individual [NSF CAREER awards](#), which "recognize faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations." Each professor received \$500,000 in funding for the five-year awards.

Students Travel to Scandinavia to Study Renewable Energy and Advanced Grid Technologies



Dr. Gregory Reed and Michael Rooney, through the Center for Energy and the Electrical & Computer Engineering Department, traveled with 22 Swanson School undergraduate students on the [Clean Power Grid Engineering: Scandinavia](#) course, through Pitt's Study Abroad Program. The students explored comparative topics in renewable energy and electric power transmission & distribution grid technologies in Pittsburgh and Scandinavia. Locally, Duquesne Light Company and Pitt Ohio Express hosted pre-departure visits. While in Scandinavia, students visited ABB, Danish Oil & Natural Gas, the Middelgrunden Wind Farm, Denmark Technical University's high voltage power laboratory, and the Jaegerspris Thermal Solar and District Energy facility.

Read more from the students at the Center for Energy [website](#).

Recent & Upcoming Events



May 9: Delivering Economic Resilience in the New Energy Paradigm

The Harvard Business Review hosted a [seminar](#),

Delivering Economic Resilience in the New Energy Paradigm. The University, along with the City of Pittsburgh and Duquesne Light Company participated in the event, which was sponsored by Siemens. Participants explored challenges and opportunities facing Pittsburgh's resilient and sustainable energy future.



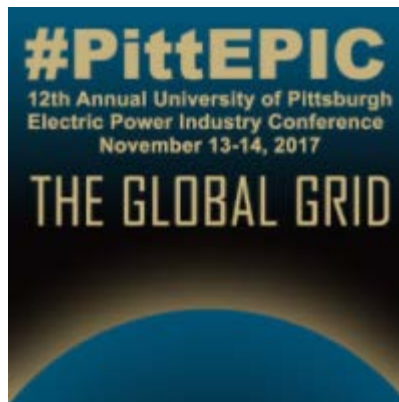
May 22: Experience America Ambassador Day

Ambassadors from more than 40 countries came to the University to discuss opportunities for partnership and development within the City of Pittsburgh. The Center was pleased to assist the US Department of State and the Chancellor's office in hosting a panel "Energy as a tool for development: depoliticizing the new energy paradigms". The panel focused on the multidimensional opportunities in the Pittsburgh region to truly deliver a resilient energy ecosystem within the tristate region. Panel participants included Vice-Chancellor Rebecca Bagley, Dr. Gregory Reed (Director, Center for Energy), Dr. Götz Vesper, (Pitt Chemical Engineering), David Ruppertsberger (President, Pittsburgh Regional Alliance) Tim Dugan (COO, Consol Energy) and Allegheny County Executive Rich Fitzgerald.



September 7: GBA to Host GRID Institute Tour

The Green Building Alliance will host a tour at the Energy Innovation Center, where participants will explore the Electric Power Technologies Lab, the Next Generation Energy Conversion and Storage Technologies Lab, and the High-Temperature Corrosion Testing Lab. In addition to tours and interactions with each lab's leader, we'll enjoy food, drinks, and networking. [Save the date!](#)



November 13-14: EPIC 2017: The Global Grid

The 12th Annual Pitt Electric Power Industry Conference will take place November 13-14, in Downtown Pittsburgh and at the Energy Innovation Center. Registration will be open soon.



Parker Named Outstanding Educator for 2017

Dean Holder presented Professor Dr. Robert S. Parker (Chem/Petroleum Engineering, Bioengineering) with the Swanson School's award for Outstanding Educator of the Year for 2017.



Chen Receives Carnegie Science Center Energy Innovation Award

In May, the Carnegie Science Center and Duquesne Light Company presented the [Innovation in Energy Award](#) to Dr. Kevin Chen. Dr. Chen is driving innovation with his research on fiber optical sensing technology. The innovations and technologies developed by Dr. Chen's team have critical applications to improve efficiency of energy production and safety of transportation infrastructures across all aspects of the energy industry.



ASCE Names Bunger 2016 Professor of the Year

The American Society of Civil Engineers (ASCE) has chosen Andrew Bunger, assistant professor of civil and environmental engineering at Pitt, as the 2016 [Professor of the Year](#). Bunger received the award at the Engineer's Week Banquet on February 18.

The Award Committee stated it selected Bunger for his continual excellence in teaching, contribution to professional guidance and the development of civil engineering students by reinvigorating the geotechnical engineering program at the University of Pittsburgh, among other criteria.



Harbert Speaks on Energy Security

Dr. William Harbert, Professor in the Department of Geology and Environmental Science, spoke in March to a group of technical experts visiting from Romania on *Strengthening Energy Research and Security*, as part of a series sponsored by the [International Visitor Leadership Program \(IVLP\)](#), the U.S. Department of State's premier professional exchange program.

Pitt Researchers Investigate Fuel Cell Membrane Technology

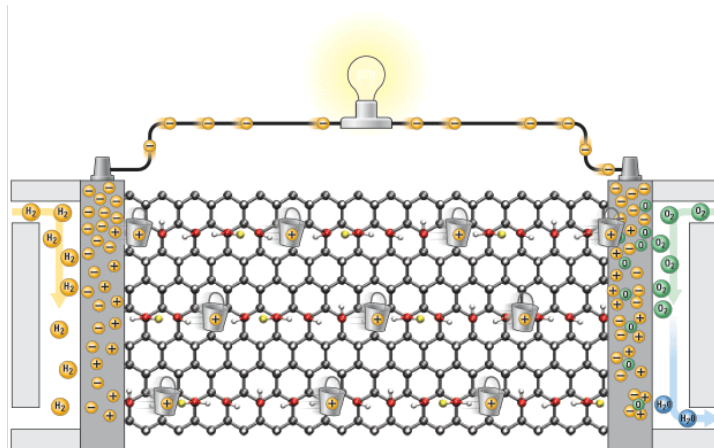


Image: A. Bagusetty/University of Pittsburgh; Rick Henkel

The [Johnson Research Group](#) has found that the unusual properties of [graphane](#) – a polymer of carbon and hydrogen – could potentially lead to the development of more efficient hydrogen fuel cells for vehicles and other energy systems.

Norway Research Council Funds Project Partnering Pitt with SINTEF and University of Calgary

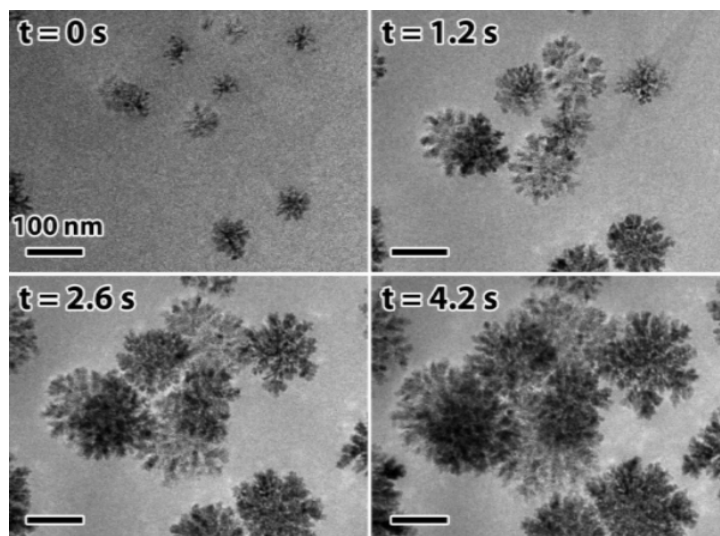


Forskningsrådet
The Research Council of Norway

The Research Council of Norway recently funded a project titled *Improved performance of CO₂ EOR and underground storage by mobility control of CO₂*. Participating organizations include SINTEF (The Foundation for Scientific and Industrial Research), The University of Calgary, and Pitt's Swanson School.

The project's goals include developing knowledge to enable large-scale CO₂ storage in North Sea oil reservoirs, strengthen cooperation between Norway and North America, and help the EU and Norway reach their goals for reduced CO₂ emissions.

New Capabilities for Nano-scale Materials Observation



The [Nanoscale Fabrication and Characterization Facility](#) (NFCF) recently acquired a liquid flow holder for the facility's environmental transmission electron microscope (ETEM). This will enable the observation of materials down to the nano-scale under liquid environments, expanding the array of stimuli and environments the ETEM can bring to bear upon challenging research questions. Interest in running experiments with the ETEM and its specialized holders can be directed to [Dr. Judith C. Yang](#).

Graduate Student Researcher: Casey Hansen



Casey Hansen is a graduate student in the Bioengineering Department under Dr. Prashant Kumta.

"I'm a Pennsylvania native, growing up just an hour north of Pittsburgh in Ellwood City. I even went to undergrad in Pennsylvania, majoring in Math and Physics at Washington & Jefferson College. Making the transition from Math and Physics to Bioengineering was difficult, but it's one of the best decisions I ever made. I found that I have a real passion for the field, working on research that aims to improve quality of health, and this passion is fueled by my advisor and my lab. I enjoy working under a professor who has appointments in both the Chemical Engineering and Bioengineering departments, as I am learning far more than I ever could in either of these departments alone. I'm gaining an incredible set of skills that I know will take me great places and allow me to continue working on such powerful projects. My lab is made up of incredibly diverse academic backgrounds, and almost demands thinking outside of the box, which really pushes me to my intellectual potential."

Ms. Hansen's research focus is on implants, specifically investigating implantable resorbable batteries to power transient medical implants – devices that perform a function then degrade in the body, with no need for secondary removal procedures. These devices have great potential for powering wound monitoring or drug delivery (such as chemotherapy drugs) systems, as eliminating the need for device removal reduces trauma to already volatile areas of the body. Casey told us, "One of the biggest challenges for these devices is finding a battery that not only provides sufficient power for the device, but does so with minimal negative effects to the patient. My present work involves studying a system with commercially obtained degradable metals, but future work will investigate the properties of different proprietary

alloys that will be used in the system. In the future, my work will also involve creating a computational model for such a battery, so that I can effectively test a wide range of materials to ascertain the optimal balance between power output, battery life, and biocompatibility. My plans are to publish the promising results obtained to date and continue the exciting scientific work towards completion of my doctoral degree in the near future."

When not engaged in research, Casey is working toward a black belt in taekwondo.

"The generosity of the RK Mellon Graduate Fellowship not only allows me to concentrate on my work, but it provides me the unique opportunity to be part of a project that merges energy and bioengineering research. I am lucky to be part of a project that has the potential to make a difference in people's lives, and I am grateful for the support of the RK Mellon Fellowship as I work toward this goal."

Faculty Spotlight: Dr. John A. Keith



Dr. John Keith is an R. K. Mellon Faculty Fellow in Energy, a tenure-track assistant professor at the University of Pittsburgh in the Department of Chemical & Petroleum Energy and is affiliated with Pitt's Center for Energy. He received his B.A. in chemistry from Wesleyan University and his Ph.D. in chemistry from Caltech. He was then an Alexander von Humboldt postdoctoral fellow at the University of Ulm (Germany) in the Institute for Electrochemistry and then an Associate Research Scholar at Princeton University in the Mechanical and Aerospace Engineering department before starting his independent position at Pitt in September 2013.

His research group uses computational modeling and

simulations based on quantum mechanics to study atomic scale chemical reaction mechanisms involving molecules and materials. Current research efforts in his group include elucidating biomimetic hydrogenation reaction pathways for solar fuels catalysts (funded by the American Chemical Society Petroleum Research Fund and the National Science Foundation), identifying materials that inhibit galvanic corrosion (funded by the U.S. Naval Research Laboratory), and accelerating the development of environmentally green chelating agents using machine learning methods (funded by a 2017 seed grant from the Mascaro Center for Sustainable Innovation).

In 2017 he received an NSF-CAREER award and was selected by the Journal of Materials Chemistry A as an emerging investigator. He also serves on the executive committee for the physical chemistry division of the American Chemical Society, and he is the chemical engineering department's recruiting coordinator for the Ph.D. program.

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