Herrick Labs Newsletter

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SPRING/SUMMER 2019

RAY W. HERRICK LABORATORIES

CHPB CENTER FOR HIGH PERFORMANCE BUILDINGS AT PURDUE

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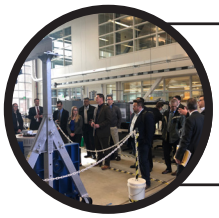

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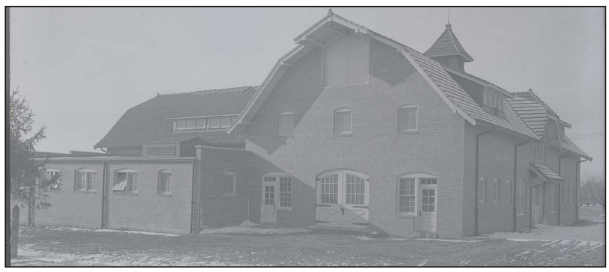


Herrick Laboratories Building, 1912**
From the J.C.. Allen Collection, courtesy of Purdue University Libraries, Archives & Special Collections

New Ray W. Herrick Laboratories Building, opened November 2013

Eckhard Groll Appointed Head of School of Mechanical Engineering

The Purdue College of Engineering has selected a seasoned leader to be its new head of the School of Mechanical Engineering.

On July 1, Eckhard A. Groll will become the William E. and Florence E. Perry Head of Mechanical Engineering. Currently, Groll serves as associate dean for undergraduate and graduate education for the College of Engineering and the Reilly Professor of Mechanical Engineering. His successor as associate dean will be announced at a later date, said Mung Chiang, the John A. Edwardson Dean of the College of Engineering.

Eckhard came to Purdue in 1994 as an assistant professor, moving to associate professor in 2000 and full professor in 2005. He was named a Reilly Professor in 2013. He holds a Pre-Diploma of Engineering and Diploma of Engineering, both in mechanical engineering from Ruhr-University of Bochum, Germany. He earned his Doctor of Engineering degree in mechanical engineering from the University of Hanover, Germany.

“I consider it the right time to reinvent the School of Mechanical Engineering as an interdisciplinary, unique entity that provides exceptional cross-disciplinary and transformational learning, discovery, and engagement activities for our students, faculty and staff,” Groll said. “I am deeply honored and excited about the opportunity to lead our school.”

His research interests include fundamental thermal sciences as applied to advanced energy conversion systems, components, and their working fluids. Select recognitions include the Ritter von Rittinger International Heat Pump Award, Institute of Refrigeration International Gold Medal in Refrigeration, ACE (American Council on Education) Fellow, ASHRAE Distinguished Lecturer and a Purdue Book of Great Teachers inductee.

Eckhard also worked on creating two living lab research homes: the ReNEWW House, sponsored by Whirlpool and retrofitted with renewable technologies to be net-zero energy, water and waste; and the DC Nano-Grid House, sponsored by the Center for High Performance Buildings, which focused on converting an AC-powered home to DC power. Both research homes are 1920s-style residential buildings in West Lafayette.

Eckhard succeeds Anil K. Bajaj, who has been the head of mechanical engineering since 2011. After a one-year sabbatical, he will return to the ME faculty.

“Eckhard is a stellar researcher who has been recognized by his field’s top awards and an outstanding teacher who received five teaching/mentoring awards and transformed Purdue’s treasured co-op program,” Chiang said. “He also has a strong track record of administrative experience and success. Building upon the proud heritage developed over the decades, including over the past years by Anil, whose many accomplishments we celebrated last month, Eckhard will lead Purdue ME to the Pinnacle of Excellence at Scale.”

A nine-person committee, led by Ali Shakouri, the Mary Jo and Robert L. Kirk Director of Purdue’s Birck Nanotechnology Center and a professor of electrical and computer engineering, conducted the nationwide search. “We appreciate the dedication of the search committee and all the input provided by faculty, students, staff and alumni,” Chiang said.

Adapted From: Purdue News Room

CHPB Spring Members Meeting May 16-17, 2019

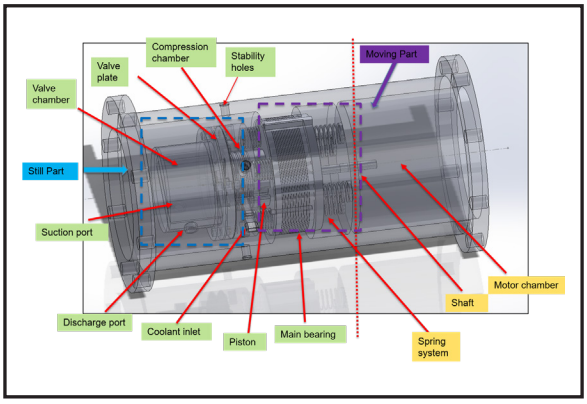
This past May, industry members of the Center for High Performance Buildings (CHPB) visited Herrick Labs to receive updates on on-going research activities, discuss industry trends and present new project concepts. Sixteen companies were represented at the meeting. General presentations included Systems to Enable Smart Connected Energy Aware Communities, DC House and Future Developments, New Insights on Office Air Quality and State-of-the-Art of Conventional and Disruptive HVAC&R Equipment. A dinner function at Bistro 501 provided a laid back setting for attendees to network and mingle for the evening.

The Center for High Performance Buildings is dedicated to partnering with industry in the development, demonstration, evaluation, and deployment of new technologies and analysis tools for high performance buildings. The sixteen members are Belimo, Carrier, Duke Energy, Emerson Climate Technologies, Goodman, GMCC, Gree, Honeywell, Ingersoll Rand, Trane, Johnson Controls, Kulthorn Kirby, Lennox, LG Electronics, Regal Beloit, Southern California Edison, and Whirlpool.

The next CHPB Members Meeting will take place this October, prior to the annual Ray W. Herrick Industrial Advisory Committee meeting. For more information visit **engineering.purdue.edu/CHPB**

Highlighted project from the CHPB Annual Review:

CHPB-04-2018 Development of General Purpose Simulation Tools for Positive Displacement Compressors
PI: Dr. Davide Ziviani, Prof. Eckhard A. Groll, Prof. James E. Braun; **RA:** Xinye Zhang



Detailed and comprehensive simulation models of positive displacement compressors (usually referred to as mechanistic or deterministic models) are extremely useful in accurately predicting compressor performance and identifying improved compressor designs. However, these simulation models are typically developed for a specific type of machine and are not suitable to be easily modified to simulate a completely different compressor. For these reasons, a generic simulation platform (PDSim) has been developed as part of CHPB-04-2016 and CHPB-04-2017. Within the third year of this project, PDSim has been extended to include the simulation model of linear compressor technology in order to have a better understanding of the dynamic behavior characteristics as well as to identify the major source of losses. The major objective of the project was to prototype a semi-hermetic linear compressor with internal cooling path to investigate the feasibility of achieving isothermal compression. The core elements of the compressor have been 3D printed by the Advanced Manufac-

Article written by Tom Coyne. Photos by Jared Pike.

Purdue Energetic Materials Summit

May 21-24, 2019,

Leaders in the defense, security, intelligence and academic communities gathered at Purdue University to discuss key challenges and potential technical solutions involving energetics materials.

The second Purdue Energetics Materials Summit was held May 21-24 on campus to convene thought leaders and decision makers to discuss the challenges of explosives, pyrotechnic compositions, propellants and other energetic materials often used in defense and security. In contrast to some other gatherings, the summit at Purdue brings together a mix of people from the defense industry, government and academia.

“We bring together people working on all sides of the energetics material challenge,” said Jeffrey Rhoads, a professor in the School of Mechanical Engineering and associate director of the Purdue Energetics Research Center. “Some involved in the defense industry work in such large organizations that they may find it difficult to communicate with one another. We serve as a common meeting ground for people to talk with each other.”

Representatives of industries attending the summit included researchers trying to find better ways to keep people from smuggling a bomb on an airplane, researchers involved in detecting improvised explosives and researchers involved in trying to find a more efficient high-performance rocket propellant.

“What makes this summit unique is that it brings offense and defense together,” said Steven Son, a professor of mechanical engineering. “We bring key people together from different points of view and mix them up, and something interesting usually results.”

The event, held for the first time in 2017, is part of the Purdue Energetics Research Center’s efforts to situate itself as a thought leader in energetic materials.

“Part of our role as academics is to bring people together and help them discuss the problems that they are facing and to help set priorities,” said Stephen Beaudoin, the center’s director and a professor in the Davidson School of Chemical Engineering. “We try to find commonalities in problems, where different people might be working on different problems but have the same issues. It can lead to some interesting outcomes.”

The summit, in bringing a variety of energetics-related companies to campus, also can lead to potential job opportunities for Purdue graduates.

The work aligns with Purdue’s Giant Leaps celebration, celebrating the global advancements in sustainability as part of Purdue’s 150th anniversary. It is one of the four themes of the yearlong celebration’s Ideas Festival, designed to showcase Purdue as an intellectual center solving real-world issues.

PERC: Purdue Energetics Research Center

Faculty and staff at Purdue University have joined efforts to form an interdisciplinary team with an overriding focus on Energetic Materials. Approved as a formal Purdue Center on September 8, 2017, The Purdue Energetics Research Center (PERC)'s research addresses existing and emerging explosives-based threats to civilian and military infrastructure, commerce, and aviation. It also targets the U.S. military's need for more stable, more effective, less sensitive, and more easily processed energetic materials for use as propellants, pyrotechnics and in ordinance. The center is led by Director Steve Beaudoin, Professor of Chemical Engineering and Center Associate Director Jeff Rhoads, Professor of Mechanical Engineering.

The Center's research focuses on three areas: Synthesis & Fabrication, Diagnostics & Characterization, and Detection & Defeat. **Synthesis and Fabrication** activities of the pre-eminent team are aimed at creating tailored energetic materials. **Diagnostic and Characterization** efforts are primarily aimed at improving our ability to study energetic materials during dynamic events. **Detection and Defeat** activities of the pre-eminent team are focused generally on interdiction of terrorists and improvised explosive devices. For more information on PERC, visit **engineering.purdue.edu/Energetics**.

'19 PEMS
PURDUE ENERGETIC MATERIALS SUMMIT

2019 Purdue Energetic Materials Summit


PERC Director Steve Beaudoin


Keynote Speaker Ashley Johnson


Prof. Jeff Rhoads Addresses the Audience


Purdue President Mitch Daniels

Extra Terrestrial Habitat Simulator to be Built at Herrick Labs - Dr. Shirley Dyke

Although the human race has made tremendous strides to explore the broad range of extreme environments on the Earth, a new project at Herrick Labs is about to launch human exploration very much beyond the Earth. This award is funded by the Space Technology Mission Directorate of NASA.

The ideas that made this proposal a success were based on a foundation of research over the past 2 years funded by the Provost Office, which provided the funding to initiate this effort through the New Horizons program. That original team included: Antonio Bobet (Civil Engineering), Shirley Dyke (Mechanical Engineering), Julio Ramirez (Civil Engineering), Jay Melosh (Earth, Atmospheric and Planetary Science), and Dan Dumbacher (Aeronautical and Astronautical Engineering). For 2 years we have been pursuing our goal to build both research and education effort in resilient habitats working with other colleagues from across Purdue, postdocs, graduate and undergraduate students.

There are, of course, risks in reaching beyond the friendly confines of Earth. We need to learn from the many efforts to build resilience in our terrestrial communities, and draw on that knowledge to succeed in this task. The vision for the RETH Institute is to develop the knowhow to establish smart autonomous habitats that will adapt, absorb and rapidly recover from expected and unexpected disruptions to deep space habitat systems, without fundamental changes in function or sacrifices in safety. Our team looks forward to tackling some of these challenges as we build the RETH (Resilient Extraterrestrial Habitat) Institute.

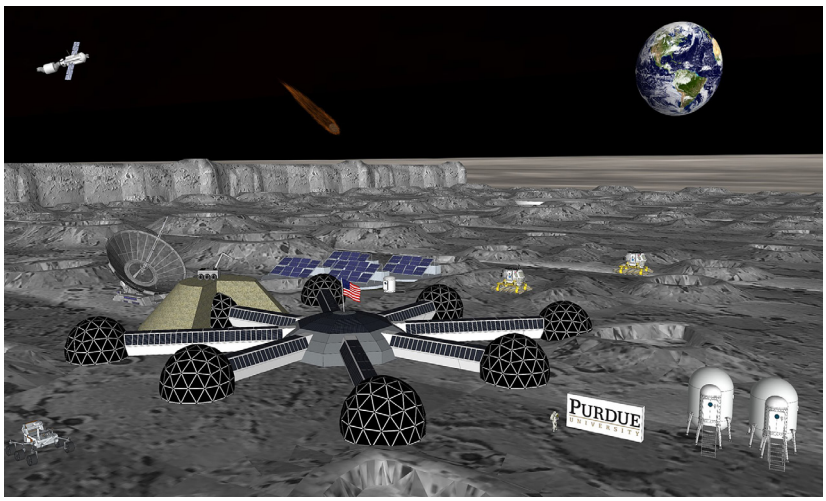
SmartHabs will need to have appropriate defenses that combat both the hazards, deterioration, and common faults that may occur, while specifically incorporating principles of resilience. The smart habitat will have to be designed with its resilience “toolkit” onboard, which will need the know-how to monitor the condition of the overall habitat and detect changes or problems, and interventions and resources it will need to respond to unforeseen hazards. Throughout RETHi’s efforts, consideration will be given to the interactions between humans and robots, recognizing that they are the ones that will both produce and defend against such situations.

At Herrick Labs these parallel efforts will converge in the establishment of a Cyber-physical Testbed that integrates physical models with computational (virtual) models to develop and validate the principles of resilience and autonomous capabilities. The support from Purdue University has been instrumental in achieving this award.

RETHi will leverage world-class expertise in developing civil infrastructure responsive to catastrophic natural hazards and merge it with leaders in the fields of autonomous robotics platforms, smart buildings, cyber-physical hybrid simulation, complex systems, transformable architecture, and diagnostics and prognostics for intelligent health management. Through this multi-disciplinary research effort, we will bring together those actively researching deep space habitats with those new to this application to achieve our vision.

The RETH Institute (RETH-i) will be headquartered at Purdue, but will also include partner institutions including the University of Connecticut, Harvard University, and the University of Texas San Antonio. The Leadership Team includes: Karen Marais (Purdue- Aero, Thrust 1), Jim Braun (Purdue-ME, Thrust 2), Justin Werfel (Harvard, Thrust 3) and Ramesh Malla (University of Connecticut, Industrial Partnerships Leader).

Participating Universities include: Purdue University, the University of Connecticut, Harvard University, and the University of Texas San Antonio. In addition to Shirley, Karen, James, Justin, and Ramesh, the multidisciplinary research team includes: Ilias Bilionis (PU), Antonio Bobet (PU), David Cappelleri (PU), George Chiu (PU), Ashwin Dani (UC), Elena Glassman (HU), Song Han (UC), Mohammad Jahanshahi (PU), Amin Maghareh (PU), Arturo Montoya (UTSA), Krishna Pattipati (UC), Julio Ramirez (PU), Jiong Tan (UC), Dawn Whitaker (PU). Industrial partners include: UTC Collins Aerospace and ILC Dover.



The work aligns with Purdue's Giant Leaps celebration, acknowledging the university's global advancements made in space and sustainability as part of Purdue's 150th anniversary. These are two of the four themes of the yearlong celebration's Ideas Festival, designed to showcase Purdue as an intellectual center solving real-world issues.

In honor of this special occasion, College of Engineering hosted a reception at Herrick Labs on Thursday, April 25. Remarks were given by President Mitch Daniels, Dean Mung Chiang, Dr. Shirley Dyke, and Dr. Bill Gerstenmaier, NASA's Associate Administrator of Human Exploration and Operations. Below are a few pictures from the celebration.


Shirley Dyke and President Mitch Daniels enjoying the celebration


Shirley Dyke talking with Bill Gerstenmaier of NASA

Announcement given by Dean Mung Chiang


Some of the members of RETHi Leadership Team

Alumni Reflections

Bryce Shaffer, Ph.D. 2012

I started Graduate School at Purdue in 2008 with the intent of only being in West Lafayette for two years to get my Masters. My goal was to work at Herrick to gain experience in modeling and testing of scroll compressors. After a semester working for Professor Eckhard Groll, he convinced me that it would be worth it to stick around longer to do a direct to Ph.D.. It turned out to be one of the best decisions of my career.

Bryce Shaffer

Anyone who's spent time at Herrick knows it's more than just a lab to us graduate students. With all the time you spend in the building it's more like a second residence. Being a morning person I would usually get in around 9 am, take periodic breaks for lunch and classes throughout the day and not leave until 10 or 11 at night. You spend more time at your desk, then your own bed and your office mates are more like roommates.

Our office was in the north wing of the old Herrick building. We had 6 desks crammed into our tiny room with a window to keep the internal clock calibrated. One year, to the disapproval of my fellow office mates I decided to create a coffee cup pyramid out of the expensed cups from the coffee shop across the street. The pyramid represented the number of days dedicated to writing my thesis, which would inevitably surpass the capacity of the pyramid. When the pyramid finally fell, months before I finished my thesis, we had to quarantine the office due to the smell of rancid cream. I'm lucky that my office mates still talk to me.

It's been 8 years since the fall of the infamous coffee pyramid and since then I've moved to Denver Colorado, and oversee all of the development and product engineering activity at a scroll compressor manufacturer called Air Squared. While today I function primarily as a manager with a good portion of the analytical knowledge from my days in grad school lost to memory, it's the writing and time/project management that has helped me the most in my career. Government grant and SBIRs now make up a majority of our R&D revenue. Writing these proposals wouldn't have been possible without the months of thesis and journal paper writing while at Herrick. Going into Herrick I was a typical engineer with little appreciation or confidence in writing, now I've learned to love it.

Balancing classes, research, and thesis writing at Herrick teach you time and project management. Before Herrick I was a perfectionist; at some point, every Graduate student realizes that if they focus too much on perfection, and not enough on completion, they'll never graduate. This lesson has carried on with me at Air Squared where every development project is executed to an aggressive schedule.

While having a Ph.D. next to your name is nice, it's the intangibles that live with you the most. I'm grateful that Professor Groll convinced me to stick around longer.

Bryce and Monica on their wedding day - July 1, 2017 in downtown Denver in front of the Colorado capital building

Alumni Reflections

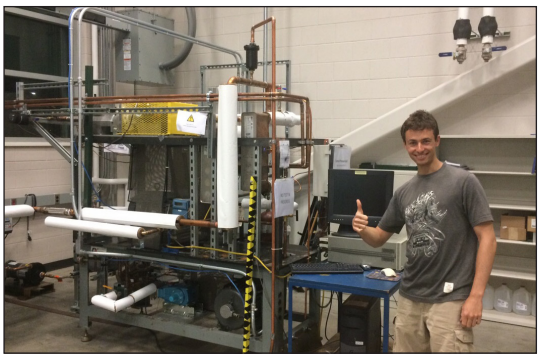
Felipe Accorsi, MSME 2016

Felipe Airoldi Accorsi

I studied for my bachelor's in mechanical engineering at UFRGS, a university in my hometown (Porto Alegre, Brazil). There, I acquired a taste for the challenges in the thermal sciences field. Then, in 2014, when I started my master's in ME at Purdue, though I was about 5000 miles away from my hometown, I was very happy to start an experimental research project on Organic Rankine Cycles (ORC) with my advisors Professors Eckhard Groll, Travis Horton and James Braun at Herrick Labs.

Engineering experimental research is always an exciting experience - even with good planning, unpredictable demands can rise. During these two years of my master's studies, I faced some challenges with my ORC test-bench (pump, piping and expander leaks; excessive vibration; hot source instability…); these slowed down my research. At that time, I felt a bit down because of the setbacks, however, today, when I look back, I can see how rich this experience was. The knowledge I gained from the hard work that I had to do to overcome these experimental challenges greatly complemented all that I learned in my mechanical engineering classes. The sum of these two activities (research & classes), gave me more confidence in executing activities at work.

As an application engineer for a supermarket refrigeration control's company called Full Gauge Controls, I give training and technical support to engineers, technicians and sellers. Also, I work together with electrical engineers developing new digital controllers and new functionalities to existing controllers. I am also teaching refrigeration four nights per week in a technical institute called SENAI. In both activities the mentor-learner relationship is present, and I feel very lucky to have had such wonderful professors at Purdue, whom I take as role models for myself.



Felipe standing next to his ORC test-stand at Herrick Labs

Felipe (center) enjoying an ASHRAE Conference with his former colleagues

Besides the strong technical background learned from the professors, my time at Herrick Labs helped me to grow as a person. From the questions that the professors asked me during the research, I learned from their expertise, improving my skills in areas such as logical thinking, problem solving and project management. We used to have weekly meetings to update our colleagues and other professors about my research. These were good discussions where I heard many different points of view expressed on the problems being addressed. Due to this experience, now I find myself more comfortable when presenting findings and sharing ideas with groups of people from diverse backgrounds.

Reliving all these experiences in my mind, reminds me of great memories. I used to have a desk in room 3057, a place where I have spent many nights and weekends studying and where I cultivated good friendships that last until today. The outstanding team at Herrick Labs, composed of engaged students, professors dedicated to current relevant research, and nice staff that were always willing to assist me, made Herrick Labs an environment with an incredible atmosphere. I arrived in West Lafayette knowing no one and I left this city with many friends and professional role models.

I hope that you will enjoy your time at Herrick Labs as much as I did. Doing a Master's or a Ph.D. program is a long journey and it is not a unidimensional activity. As tough as your research can be, remember that this experience is more than the research, it is an opportunity for you to develop your technical and personal skills, interact with amazing people, make friends and create good memories. **Enjoy it!**

2020 Purdue Conferences

Compressor Engineering | Refrigeration and Air Conditioning | High Performance Buildings

JULY 12-16, 2020 • PURDUE UNIVERSITY, WEST LAFAYETTE, IN, USA

KEY TOPICS COVERED

- Positive Displacement & Dynamic Compressors
- HVAC&R System Components
- Alternative Refrigerants
- Advanced Controls for Building Systems & Equipment
- Heat Pumping Systems
- Intelligent Building Operations
- Indoor Environmental Quality
- NetZero Buildings
- Building Simulation and Energy Modeling
- Waste Heat Recovery
- Advanced Heat and Mass Transfer Technologies of HVAC&R
- Oil Management for HVAC&R Equipment
- Interaction of Buildings and Occupants
- Impacts of Building and Refrigeration Technologies on Global Warming
- Multi Physics Modeling
- Machine Learning

SHORT COURSES OFFERED JULY 12, 2020

- Compressor Modeling Short Course
- USNC/IIR Refrigeration Short Course
- Intelligent Building Operation (IBO) Workshop

CONFERENCE DEADLINES

December 16, 2019
Abstract Submission Deadline

January 27, 2020
Abstract Acceptance Notification

April 6, 2020
Manuscript Submission Deadline

May 4, 2020
Manuscript Acceptance Notification

May 25, 2020
Pre-Registration ends;
Final Papers must be uploaded to Conftool

Visit **www.conftool.com/Purdue2020** to learn more about the submission process and requirements.

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ENGINEERING.PURDUE.EDU/HERRICKCONF

CONFERENCES: JULY 13-16, 2020 SHORT COURSES OFFERED JULY 12, 2020

Obituary: PG Vaidya

Tribute to Former Herrick Labs Post-Doc

I have crossed paths with P.G. Vaidya several times during my lifetime.

The year was 1975. I was a graduate student at Herrick Laboratories, a research facility at Purdue University with a recognized program in acoustics. It was there that I first met P.G. Vaidya, a postdoctoral fellow studying helical modes of sound in jet engines. Understanding helical modes was an important first step in reducing the jet engine noise that plagued communities in the flight paths of major airports. It was a very complicated topic for which P.G. was well equipped, as he had just received a Ph.D. from the Institute of Sound and Vibration Research (ISVR), a world-renowned research laboratory at the University of Southampton, in England.

I remember that P.G. was congenial, always going out of his way to help other students and faculty with their research. In addition to that, he was tall, dark, handsome, and he spoke English with a slight Indian/British accent, so he caught the eye of numerous female students at Purdue. However, he had only one female student on his mind, and her name was Beverly! So it wasn't long before P.G. and Beverly began to show up together at many of the social functions at Herrick Laboratories. I lost track of him after graduation, but I later learned that he and Beverly had been married.

Now jump forward to 1994. I had accepted a faculty position at the University of Idaho (UI) in Moscow, Idaho. There I met Mike Anderson, also a member of the UI faculty, and learned his major professor had been none other than P.G. Vaidya, then a faculty member at Washington State University (WSU), just 10 miles away. Mike, P.G., and I participated together in a local professional organization. My wife and I also interacted socially with P.G. and Beverly, trading several dinners with them, which gave us the opportunity to meet their children.

Then in 2012, several years after P.G. had left WSU, I needed to study higher acoustic modes in waveguides for a research project. And in doing that, I discovered that P.G., together with Phillip Doak, then the professor of acoustics of ISVR, had published several landmark articles on that topic years earlier, and edited the Journal of Sound & Vibration.

It goes without saying that the world is now a better place because of P.G.'s scientific contributions and because of his gentle way of helping students learn difficult topics. He is missed by the professional community, but more than that, I know he is sorely missed by Beverly, the love of his life, and his children.

We all loved you P.G.

David Egolf
Herrick Labs, Ph.D. 1976

June 22, 2019

Purdue Alumni Seminar Series

The Herrick Student Representative Committee is comprised of student leaders within the different research areas in the Herrick Labs: Daniel McArthur, Domenique Lumpkin, John Hollkamp, Austin Nash, Riley Barta, Tony Xue, Mrunal Joshi, Leon Brendel, and Kaushal Jain. In Spring 2017, they launched the Purdue Alumni Seminar Series at Herrick Labs. The Series is part of an overall effort to connect the Herrick students, alumni, staff, faculty and IAC for networking, mentoring, and career opportunities.

On February 21, Dr. Ziqiang Hu (Ph.D.1992), Senior Vice President and Chief Technical Officer for Midea Group, gave a presentation titled "Tips for Interviewing and Early Career Success in Industry". He talked about his international industry experiences, with a focus on advice for new graduates. He shared his experiences from working for GE's Global Research Center, GE Appliances, Samsung, and on to his current position with the Midea Group.

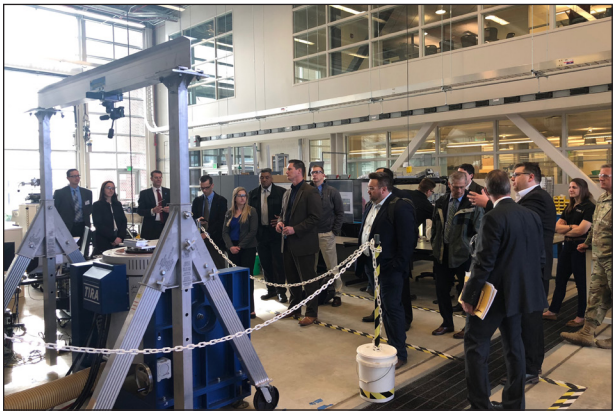
Midea Group is a Chinese electrical appliance manufacturer, headquartered in Beijiao, Shunde, Foshan, Guangdong, China.

Ziqiang was recently named as one of the 2019 Distinguished Engineering Alumni. After receiving his BSME and MSME degrees at Shanghai Science and Technology University, he came to Purdue and was awarded his Ph.D. in 1992 in Mechanical Engineering with Stuart Bolton as his advisor. To read more about Ziqiang and his career highlights, go to: **https://engineering.purdue.edu/Engr/People/Awards/Institutional/DEA/DEA_2**

The Army Research Laboratory (ARL) visit to Herrick Labs

A team from the Army Research Laboratory (ARL) led by Director Perconti visited Herrick Laboratories on April 2, 2019. The visit stemmed from recent success in additive manufacturing (AM) led by Herrick Faculty Jeff Rhoads, Steve Son (Purdue University, Zucrow Laboratories), and Emre Gunduz (Naval Postgraduate School). The meeting sparked several conversations about the gap in standard AM technologies to print highly viscous materials, such as propellants. Purdue University has developed a vibrating nozzle that, by reducing friction on the walls, allows highly viscous material to flow easily through the nozzle, enabling very fine features to be printed without heating the propellant, making holes or using large amounts of solvent. The ability to 3-D print propellants could lead to large advances in the environmental impact of propellant processing and overall Army readiness.

Jeff Rhoads (right) with the ARL visitors



Jeff Rhoads discussing research with the ARL visitors

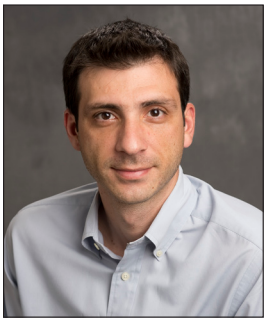
People News

Faculty Honors & News

Eckhard Groll was inducted into Purdue's Cooperative Education Hall of Fame in September 2018. Eckhard is the Reilly Professor Mechanical Engineering and the William E. and Florence E. Perry Head of Mechanical Engineering. He served as the Director of the Office of Professional Practice from 2007 to 2018.

Fabio Semperlotti was promoted to Associate Professor. Fabio's research interests are: Acoustics and Noise Control; Mechanics and Vibrations; Solid Mechanics; Computational Engineering with focus on the development of novel technologies for Structural Health Monitoring and Smart Structures.

Jeff Rhoads received Mechanical Engineering's 2019 Harry L. Solberg Best Teacher Award, which is chosen by the student body.



Thanos Tzempelikos was promoted to Full Professor. Thanos is a Professor of Civil Engineering with courtesy appointment in Mechanical Engineering. He specializes in Architectural Engineering with focus on Building Science and design/operation of energy-efficient buildings.

Brandon Boor, Assistant Professor in the Lyles School of Civil Engineering received a CAREER Award from the National Science Foundation (NSF) for his research into the formation, growth, and phase state of organic nanoaerosols in indoor environments. The continuing grant of $500,000 will help fund his research through 2024.

Student Honors & Awards

Kumar Akash, a current Ph.D. student advised by Prof. Neera Jain, received the Bilsland Dissertation Fellowship Award for 2019-2020, which starts in Fall 2019. This Fellowship, which is awarded by the Dean of the Graduate School, provides support to outstanding Ph.D. candidates in the final year of doctoral degree completion.

Rajakumar Ganne (MSME student advised by Prof. Peter Meckl) and **Kaushal Jain** (Ph.D. student advised by Prof. Peter Meckl) were recipients of the 2019 Estus H. and Vashti L. Magoon Award for Excellence in Teaching by the College of Engineering.

The honor recognizes outstanding teaching assistants and instructors and the selection is made by both faculty and students to recognize those students who were exemplary in their work as teaching assistants or instructors.

People News

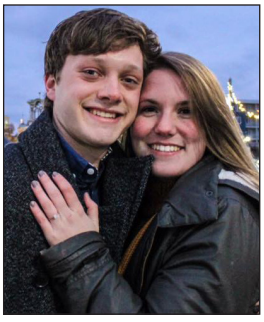
Weddings

Professor Yangfan Liu and **Jie Ma** (current Ph.D. student) were married on January 4th, 2019 at the Four Seasons Resort in Hawaii.

Yutong (Tony) Xue (current Ph.D. student) and **April Shao** were married on January 5th, 2019 in Urumqi, Xinjiang, China. April is currently doing her Master's of Fine Arts at the School of the Art Institute of Chicago (SAIC).

BongGil Jeon (Ph.D. 2016) and **JeongMin Park** were married on May 25, 2019 in Seoul, Korea. BongGil works for LG Electronics in Seoul.

Engagements



John Foster (current MSME student) and **Morgan Caudill** got engaged in December 2018 and are planning a December 28th, 2019 wedding. Morgan graduated from Purdue's School of Health Sciences in May 2018 and will start Physician Assistant school at Kettering College.

Births

Professors **Panagiota Karava** and **Thanos Tzempelikos** are the proud parents a baby boy born on April 11, 2019. George (Giorgos in Greek) weighed 7 lbs. 8 oz. and was 21 inches long at birth. Mom and baby are doing well!

Daniel McArthur (Ph.D. student) and his wife Sondra welcomed their 4th daughter named Lacey Mae on May 6. She weighed 7 lbs. 5 oz. and is 20" tall. Lacey is also welcomed by her 3 older sisters: Madilyn (7), Emma (5), and Kate (3).

Thomas Moesch (former Visiting Scholar) and fiancee Amelia Mills welcomed a baby girl named Leonie Patricia on January 7th, 2019. She weighed 7.5 lbs and measured 19.5 inches long at birth.

Graduations

Allen, Cody (Ph.D. 2019) Advancing Diesel Engines Via cylinder Deactivation. Cody is working for Boeing in St. Louis, MO.

Caskey, Stephen (Ph.D. 2018) Analysis of Thermally Connected Residential Appliances. Stephen is working for Air Squared in Denver, CO.

People News

Ibitayo, Ifeoluwa (MSME 2019) Enhanced Class 8 Truck Platooning Via Simultaneous Shifting and Model Predictive Control. Ife is currently exploring employment opportunities.

James, Nelson (Ph.D. 2018) Investigation of Chemical Looping for High Efficiency Heat Pumping. Nelson took a position with the Dept. of Energy in Washington DC.

Karthikeyan, Ganesh Ram Ramanujam (MSME 2018) Software In-the-Loop Simulation for Custom Aerial Vehicles. Ganesh took a position with Cummins, Inc. in Stoughton, WI

Rohleder, Cai (MSME 2019) Experimental Analysis of Positive Displacement Compressors for Domestic Refrigerator Freezer and Air Conditioning Application. Cai is working for ThermalTech Engineering in Cincinnati, OH.

Shi, Tongyang (Ph.D. 2019) Sound Field Reconstruction for an Under-Determined System and Its Applications. Tongyang is working for 3M in Minneapolis, MN.

Shin, Hyunjun (Ph.D. 2019) Weight Minimization of Sound Packages by Balancing Absorption and Transmission Performance. Hyunjun took a position with 3M in Minneapolis, MN.

Sun, Mingyu (MSME 2018) Artificial Neural Networks Control Strategy of a Parallel Through-the-Road Plug-In Hybrid Vehicle. Mingyu's employment is unknown at this time.

Vos, Kalen (Ph.D. 2019) Utilizing Valve Train Flexibility to Influence Gas Exchange and Reduce Reliance on Exhaust Manifold Pressure Control for Efficient Diesel Engine Operation. Kalen is working at Sandia National Labs, Albuquerque, NM.

Wang, Xuchen (MSME 2019) Active Noise Control. Xuchen is continuing his studies at The Chinese University of Hong Kong.

Xu, Xueyang (MSME 2019) Performance Evaluation of Scroll Expanders in Organic Rankine Cycles. Xueyang took a position with Cummins, Inc. in Columbus, IN.

Yedla, Abhilash (MSME 2018) Supervisory Control Implementation of a Plug-In Hybrid Electric Vehicle. Yedla is working for Cummins, Inc. in Columbus, IN.

Retirements

Donna Cackley retired from Herrick Labs in June after spending over 20 years at Purdue. Her retirement plans include spending more time with her family and grandchildren as well as traveling. Friends, family and former colleagues gathered at Herrick Labs on June 28 to wish Donna a fond farewell. She will be greatly missed at Herrick.

Donate to Herrick Labs

Donations to the Labs are always welcomed and appreciated. If you're interested in making a donation, below is some helpful information for you. For all of you who have contributed in the past: my sincere thanks. Your gifts help to create groundbreaking research and set a wonderful path to the future. Thank you for coming on board!

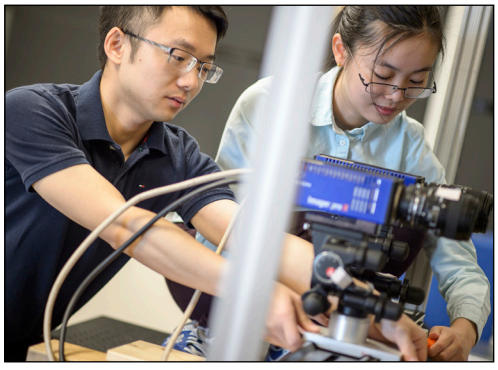
Be sure you specify your gift is for Herrick Labs. You are also welcome to support a specific professor's research, or support a few established funds:

- Herrick Laboratories Building Fund
- Ray Cohen Excellence in Thermal Systems Fund
- Herrick Laboratories General Operations
- William E. Fontaine Student Fellowship Fund

Giving by mail? Send your check to the address on back page of this newsletter, payable to the Purdue Research Foundation, with "Herrick Labs" and any additional designation on the memo line. Want to make an online gift? You can find details at the website:

https://engineering.purdue.edu/ME/Giving/GivingGuide.

Specific questions about giving? (stock options, estate planning, deferred gifts, etc.) Purdue has philanthropy experts solely assigned to Mechanical Engineering who can help you! Contact the Director of Development, Scott Banfield at (765) 494-5629 or visit Mechanical Engineering's website at: **https://engineering.purdue.edu/ME/Giving/index_html.**



Ever True Campaign

Ever True: The Campaign for Purdue University is officially the largest fundraising initiative in the university's history.

The campaign, launched in 2012 and publicly announced in 2015, generated $2.529 billion as of June 30, 2019, some 25% over its $2.019 billion goal. The record effort ends as Purdue celebrates its sesquicentennial — "150 Years of Giant Leaps" — and the 50th anniversary of alumnus Neil Armstrong's walk on the moon.

Ever True inspired more than 1 million gifts from 209,551 donors across 113 countries, all 50 states and all 92 Indiana counties. Of those gifts, 387 were of $1 million or more, and more than 740,000 were $100 or less. First-time donors accounted for half of all contributors.

Together, donors more than tripled Purdue's annual giving for student support from $32 million at the outset of the campaign to $102.1 million; a campaign goal was to double annual student support.

The campaign's $2.019 billion goal — surpassed by $510 million in dollars raised — included:

- $400 million - $500 million for student support, which includes scholarships and graduate and professional student support.
- $400 million - $500 million to increase the number of endowed professorships, headships and deanships
- $400 million - $500 million for programs and research.
- $300 million - $400 million to improve and better utilize Purdue's physical infrastructure.
- $300 million - $400 million for special initiatives and innovations.

The campaign finale celebration will be held on Oct. 11 at the France A. Córdova Recreational Sports Center as part of the President's Council Annual Weekend. To learn more about this campaign, visit: **giving.purdue.edu**

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News about You and Address Changes

We are always interested in hearing your news, like weddings, births, and job promotions, and we want to be kept up-to-date on current addresses. Please send notes to Cindy Cory or to the e-mail address below. Don't hesitate to let us know of other alums that have moved or changed jobs. Photos are always welcomed and encouraged.

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