



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

2019

EXCHANGE

ALUMNI NEWS Department of Mechanical and Aerospace Engineering



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Building Strength Through Diversity

The Department of Mechanical and Aerospace Engineering at The Ohio State University builds on its diversity of people and ideas to cultivate a range of advancements in mechanical, aerospace and nuclear engineering.

From gears to cancer research, our **mechanical engineers** are experts in an array of specialty areas. Our strengths in both aeronautical and astronautical engineering boost the impact of our **aerospace engineers**. And, with an onsite nuclear reactor—and high-achieving graduates throughout industry and government—our **nuclear engineers** value collaboration.

Our expertise in materials has lead to the discovery of new and simplified ways for engineers to create electronic devices (page 8) and expanded use of our patented electroceutical dressing (page 15)

We are seeing enhanced diversity through increasing numbers of female students entering our undergraduate mechanical engineering program (page 3).

Researchers in our Aerospace program have been selected by the Air Force Research Laboratory Aerospace Systems Directorate to lead a collaborative center for aeronautical sciences (page 18).

All of this was accomplished with our talented students, who continue to be our primary focus. They are involved in every facet of our research and we foster a spirit of collegiality among faculty, staff researchers and students.

I invite you to read on to learn about our recent cutting-edge innovations.

Vish Subramaniam

Professor and Chair
Department of Mechanical and Aerospace Engineering
The Ohio State University



Inaugural Reception for Women hosted by the department

The Department of Mechanical and Aerospace Engineering held its first Reception for Women during autumn semester 2018.

Attended by faculty, staff, graduate students and undergraduate students, the event included networking and the opportunity for students to meet department leadership.

Welcoming the group, Department Chair Vish Subramaniam expressed his commitment to supporting women in mechanical, aerospace and nuclear engineering.

“Enhancing diversity and improving inclusion in engineering is paramount for addressing the issues facing today’s society,” he said later.

“The department aims to support women in their academic and professional endeavors to make the world a better place, whether that’s through advancing nuclear safety, designing components for spacecraft or discovering new ways of treating cancer.”

“We want women to not only leave here with a degree, but enable them to achieve excellence and graduate ready to be future leaders in their fields by breaking barriers that prevent their full participation.”

It was announced at the event that 20 percent of incoming undergraduate students in the mechanical engineering major are women, according to the Undergraduate Advising Office.

“This is the first time our mechanical engineering major has reached such a high rate of enrollment by women,” said Blaine Lilly, associate chair for undergraduate education. “It’s certainly an achievement and we hope to continue making the department a welcoming place for not only women, but all students.”

After this successful inaugural gathering, future events were planned.

For more information on involvement, contact **Kesley Morales-Crispin** (morales-crispin.1@osu.edu)



Faculty, staff, graduate students and undergraduate students were among attendees at the department's first Reception for Women.

“Enhancing diversity and improving inclusion in engineering is paramount for addressing the issues facing today’s society.”

- VISH SUBRAMANIAM
Chair, Department of Mechanical and Aerospace Engineering



Sesquicentennial Scholars and Future Engineers

Five department students join the ranks of prestigious leadership program in celebration of Ohio State’s 150-year anniversary

To honor The Ohio State University’s historic 150-year milestone, the Sesquicentennial Student Scholar Leadership Program has been established to develop current students into future leaders. Five exceptional students from the Department of Mechanical and Aerospace Engineering are among the 150 from across the university system who have been selected to participate in this distinguished program.

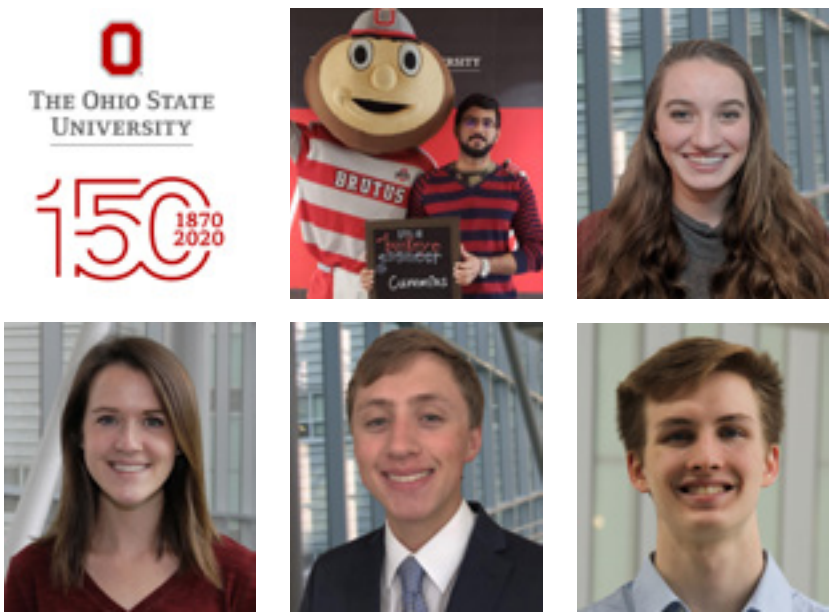
Vijay Sankar, Terra Forsythe, Rebekah Koehn, Richie Wainio and Maxwell Weber will build the skills and fortitude essential to becoming engaged citizens through leadership development and ambassador opportunities.

Scholars receive \$2,500 for the first year of the program, and the scholarships are renewable for up to six additional semesters or completion of their current degree program, whichever comes first.

“Being a Sesquicentennial Scholar to me means being able to represent all the aspects of The Ohio State University that have made it such a great place of learning for 150 years,” commented Maxwell Weber, an undergraduate mechanical engineering student.

Graduate student and mechanical engineering major Anil Sankar agrees. “[The program] connects me with fellow Buckeyes from diverse educational and cultural backgrounds, endowing me with broader perspectives on leadership, compassion and engagement, all of which contribute to a holistic educational experience.”

According to the university’s news release, beyond financial support, sesquicentennial scholars will receive



Top Row (Left to Right): Vijay Sankar, Terra Forsythe;
Bottom Row (Left to Right): Rebekah Koehn, Richie Wainio, Maxwell Weber

“ Being a Sesquicentennial Scholar to me means being able to represent all the aspects of The Ohio State University that have made it such a great place of learning for 150 years”

MAXWELL WEBER
Sesquicentennial Scholar

place: Buckeyes support each other,” she said. “I knew that I wanted to be a part of a community like that, and I am so excited and honored to be able to support and celebrate this community through the Sesquicentennial Scholars program.”

Weber recognizes “all of the opportunities and benefits Ohio State provides its students, faculty, alumni and the community,” and he hopes to “apply these lessons to my own career goals, so that I may become an engineer that makes a difference in the world.”

These Buckeye Engineers join a diverse group of students ready to enhance the university’s communities. They come from five continents, nine countries, 22 states in the U.S. and 42 counties across Ohio and represent every campus and college in the university.

leadership training and professional development support, and serve as sesquicentennial ambassadors at programs and events.

“I am very grateful to be able to represent Ohio State and serve as an ambassador for this great school,” commented undergraduate mechanical engineering student Richie Wainio

Graduate Fellow Rebekah Koehn is grateful for the opportunity to give back to a community that she has benefited from so much.

“The support I received even as a prospective student showed me that there was something different about this

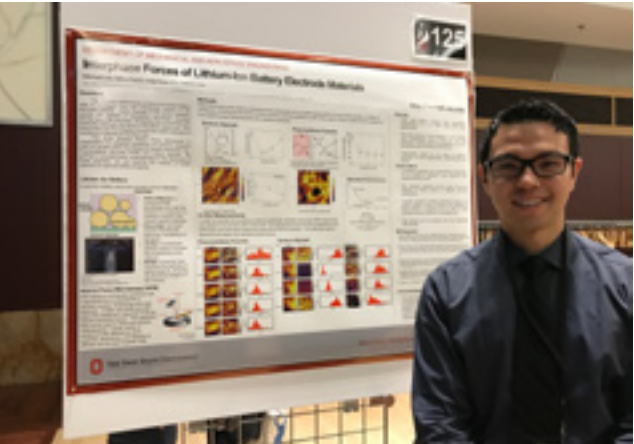
Department undergrads honored at Denman Research Forum

Buckeye engineers were celebrated as undergraduate researchers for their outstanding presentations at the 23rd annual Denman Undergraduate Research Forum. As one of the largest events of its kind in the country, the Denman Forum gives undergraduate students the opportunity to showcase their research, scholarship and creative activities to the Ohio State community and beyond.

In 2018, nearly 800 students from across the university presented their projects on a wide range of disciplines. Fourteen engineering students received honors in their categories, including four students from the Department of Mechanical and Aerospace Engineering.

Michael Lee, a mechanical engineering major advised by Hanna Cho, won first place in the materials engineering category for his work, “In-situ characterization of lithium-ion electrode polymers via atomic force microscopy.”

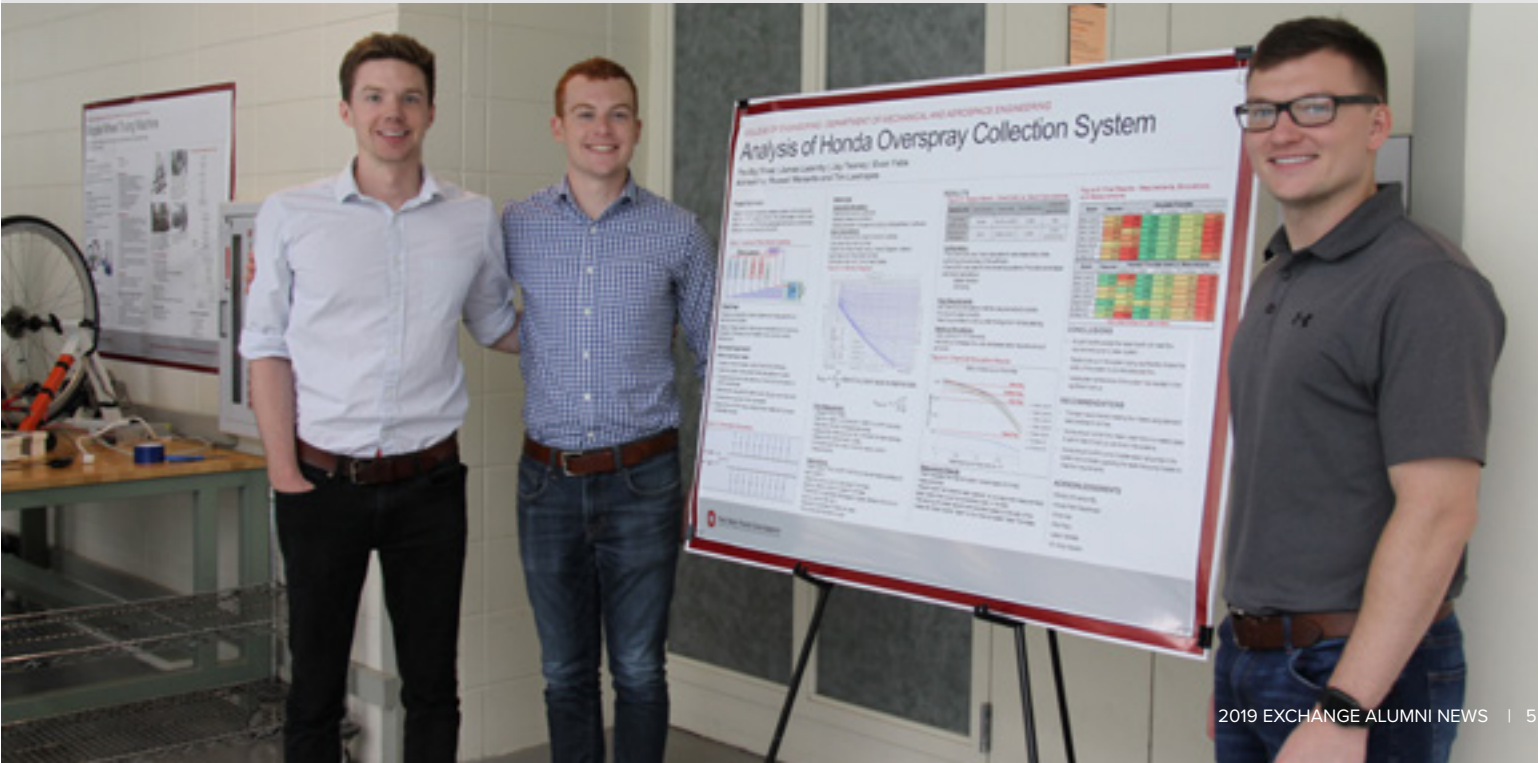
First place in the mechanical and aerospace engineering category went to aeronautical and astronautical engineering major Ian Chamberlain, advised by Kiran D’Souza, for his project, “Simulating UAV ingestion by a turbofan engine using LS-DYNA.” Mechanical engineering students Gene Li, also advised by Cho, and Peter Vuyk, advised by Ryan Harne, took home second and third place prizes, respectively.



Research & Design Day

April 17, 2020

Join us for an afternoon celebrating student research and design. Scott Laboratory hallways will be buzzing with excitement as undergraduate mechanical and aerospace engineering students showcase group projects from a variety of courses. Interactive demonstrations are a highlight of the annual event, which features collaborations with various industry and community partners. Contact: Assistant Professor Annie Abell, abell.9@osu.edu.



STUDENT SUCCESS

RESNA selects Einstein as winner of student scientific paper competition

Graduate student **Noah Einstein** aims to innovate with a purpose toward accessibility. The mechanical engineering graduate student’s scientific paper on wheelchair propulsion data was selected as one of four winning student submissions for the RESNA (Rehabilitation Engineering and Assistive Technology Society of North America) 2019 Annual Conference.

Entitled “SmartHub: Manual Wheelchair Data Extraction and Processing Device”, Einstein’s research focuses on extracting propulsion data from manual wheelchair users. Utilizing such data results in opportunities to reduce upper body injuries and allows users and clinicians to have a broader understanding of wheelchair utilization outside of the clinic. He is advised by Sandra Metzler.

The recognition earned the master’s student the opportunity to present his paper in a conference platform section. Additionally, he received free conference registration and accommodation, a one-year RESNA student membership and the publication of his paper on the RESNA website.



Einstein (Middle Left) at the 2019 RESNA conference..

Excerpt reprinted with permission from The Ohio State University’s College of Engineering.

Tseelmaa Byambaakhuu awarded Best Paper and Best Presentation at ANS Student Conference

Nuclear engineering PhD student **Tseelmaa Byambaakhuu** received two awards at the 2019 American Nuclear Society (ANS) Student Conference. She received best paper and best presentation awards for her article “Comparison of IpCMFD with Other CMFD Based Acceleration Schemes.”

Byambaakhuu’s research centers on stabilizing neutron transport utilizing coarse mesh finite difference acceleration. Her paper and accompanying presentation compared popular application methods of this approach with a new approach developed at Ohio State.

“This was an incredible opportunity to present Ohio State research to industry and research institutions, at the same time learning about the variety of research taking place across the discipline of nuclear engineering,” she commented.

The conference was held during April 2019 at Virginia Commonwealth University. Representatives from American and international institutions were in attendance.



TSEELMAA BYAMBAAKHUU
Nuclear Engineering

“This was an incredible opportunity to present Ohio State research to industry and research institutions”



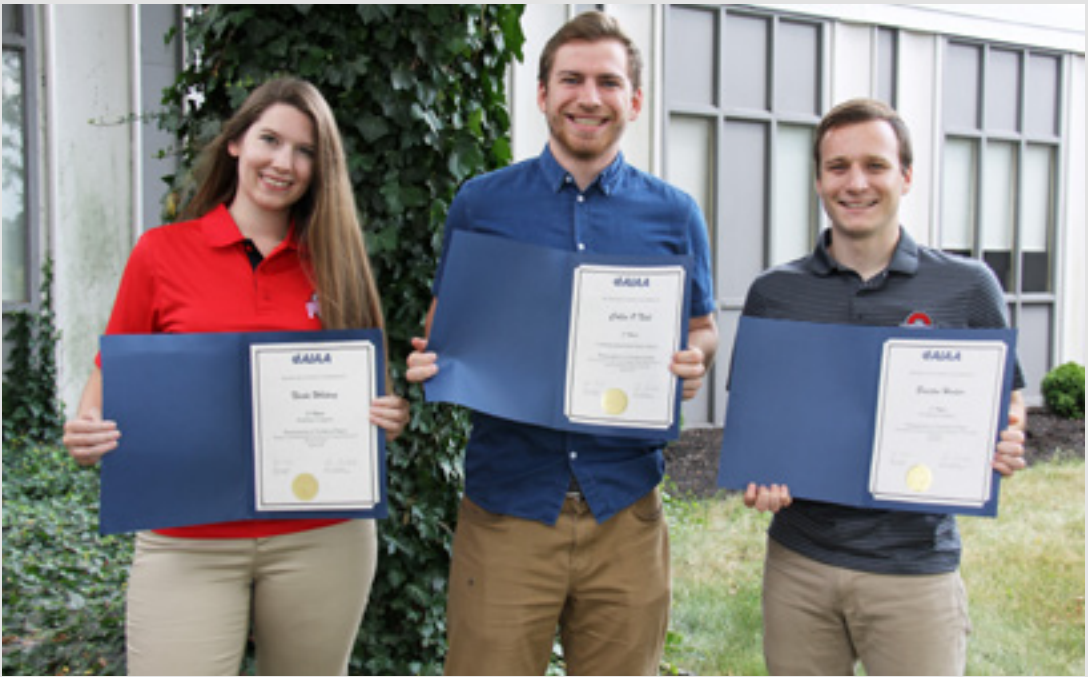
Aerospace students shine at AIAA student conference

Department aerospace students went three-for-three taking home top honors at the 2019 American Institute of Aeronautics and Astronautics (AIAA) Region III Student Conference.

Winning first place in the undergraduate category was **Collin O’Neill** (advisor: Mo Samimy) with his presentation “Active Flow Control in a Compact High-Speed Inlet/ Diffuser Model.” Graduate student **Braxton Harter** (advisor: James Gregory) won first place in the master’s category with his presentation “Lagrangian Coherent Structures in Optimal Vortex Ring Formation.” Second place in the master’s category went to **Nicole Whiting** (advisor: Mo Samimy) for her presentation “Design of an Experimental Facility for Characterization of Dynamic Stall.”

As first place winners, Harter and O’Neill have also earned a trip to the AIAA SciTech Forum in January 2020 to compete at the national level with other regional winners.

According to its website, the conference encourages students in aerospace-related fields to discuss research, exchange knowledge and generate interest in the field of aerospace engineering. This year’s event was held at Cleveland State University and was represented by schools across the Midwest.



Whiting, O’Neill, and Harter (Left to Right).

Whiting won second place in the master’s category.

O’Neill won first place in the undergraduate category

Harter won first place in the master’s category



Department undergraduate programs rank among top 20 in U.S.

In U.S. News & World Report’s 2019 Best Colleges rankings, several departments within The Ohio State University College of Engineering placed among the top programs in the nation. Overall, Ohio State’s undergraduate engineering program ranks 16th among public universities nationwide and first in Ohio. Other top 20 engineering undergraduate programs at Ohio State include the Department of Food, Agricultural and Biological Engineering’s undergraduate program (7), industrial/manufacturing engineering (14), materials engineering (14) and computer engineering (16). Electrical engineering and chemical engineering programs also received enough nominations to appear in this year’s rankings, at 23rd and 27th, respectively.

Researchers discover new material to help power electronics

Electronics rule our world, but electrons rule our electronics.

A research team at The Ohio State University has discovered a way to simplify how electronic devices use those electrons—using a material that can serve dual roles in electronics, where historically multiple materials have been necessary.

“We have essentially found a dual-personality material,” said **Joseph Heremans**, co-author of the study, professor of mechanical and aerospace engineering and Ohio Eminent Scholar in Nanotechnology at Ohio State. “It is a concept that did not exist before.”

Their findings could mean a revamp of the way engineers create all different kinds of electronic devices. This includes everything from solar cells, to the light-emitting diodes in your television, to the transistors in your laptop, and to the light sensors in your smartphone camera.

Those devices are the building blocks of electricity: Each electron has a negative charge and can radiate or absorb energy depending on how it is manipulated. Holes—essentially, the absence of an electron—have a positive charge. Electronic devices work by moving electrons and holes—essentially conducting electricity.

But historically, each part of the electronic device could only act as electron-holder or a hole-holder, not both. That meant that electronics needed multiple layers—and multiple materials—to perform.

But the Ohio State researchers found a material—NaSn2As2, a crystal that can be both electron-holder and hole-holder—potentially eliminating the need for multiple layers.

The finding could simplify our electronics, perhaps creating more efficient systems that operate more quickly and break down less often.

Think of it like a Rube Goldberg machine, or the 1960s board game Mouse Trap: the more pieces at play and the more moving parts, the less efficiently energy travels throughout the system—and the more likely something is to fail.

The researchers named this dual-ability phenomenon “goniopolarity.” They believe the material functions this way because of its unique electronic structure, and say it is probable that other layered materials could exhibit this property.

The researchers made the discovery almost by accident. A graduate student researcher in Heremans’ lab, **Bin He**, was measuring the properties of the crystal when he noticed that the material behaved sometimes like an electron-holder and sometimes like a hole-holder—something that, at that point, science thought was impossible. He thought perhaps he had made an error, ran the experiment again and again, and got the same result.



This work was funded by the National Science Foundation, the Air Force Office of Scientific Research and the Camille and Henry Dreyfus Foundation.

Pelotonia grant to investigate breast cancer metastasis

\$200,000 will support Jonathan Song’s lab over two years

Breast cancer metastasis to the brain is known to be a significant clinical problem. Despite this, it’s a surprisingly understudied issue. Mechanical engineering Assistant Professor **Jonathan Song**, along with radiation oncology Assistant Professor **Gina Sizemore**, will contribute to the topic’s knowledge base.

The researchers have recently been awarded a two-year, \$200,000 Pelotonia-funded grant from The Ohio State University Comprehensive Cancer Center to investigate the role of blood vessels in brain metastases. They aim for their fundamental work to inform future drug development. Their proposal—“Probing the Mechanisms of Vessel Co-option and Resistance to Anti-angiogenesis Therapy with Engineered Microvessels”—was submitted through the CCC’s Spring 2019 Intramural Research Program.

“Our study will examine four breast cancer cell lines that model triple negative breast cancer and HER2 amplified breast cancer, the subtypes most commonly associated with brain metastasis,” said Song.

Specifically, the study intends to identify potential pathways and mechanisms of blood vessel co-option that may enable certain cancers to maintain adequate blood supply and thereby undergo resistance to anti-angiogenic drugs.

Song has expertise in blood vessel structure and function, while Sizemore has focused work on breast cancer metastasis to the brain. During the study the investigators will establish a model, characterize it, then perform in vitro testing.

While current research indicates that anti-angiogenesis resistance in some tumors is due to blood vessel co-option, there are limited available tools for studying the co-option process to identify pathways that could be disrupted. This novel model, if validated, would provide an in vitro analysis of vessel co-option facilitating detailed studies that are difficult, if not impossible, in vivo.

“In short,” said Song, “results of the project would allow testing of drug targets to address identified mechanisms that allow tumors to avoid anti-angiogenic treatment.”



Assistant Prof. Song

Nuclear Technology R&D Award Winners

Three Ohio State Students take home Innovations awards

Three students at Ohio State University have won awards in the 2019 Innovations in Nuclear Technology R&D Awards, sponsored by the U.S. Department of Energy, Office of Nuclear Technology R&D.

Kelly McCary, a Ph.D. student in Nuclear Engineering, has been awarded a First Place prize in the Open Competition in the category of Advanced Fuels. Her award-winning research paper, “Response of Distributed Fiber Optic Temperature Sensors to High-Temperature Step Transients,” was published in IEEE Sensors Journal in November 2018.

Keoni Sanny, an Undergraduate student in Civil Engineering and Nuclear Engineering, has been awarded a Second Place prize in the Open Competition in the category of Energy Policy. His award-winning research paper, “Dynamic Probabilistic Risk Assessment with PyCATSHOO: The Case of the Emergency Power Supply of a Nuclear Power Plant,” was presented at the International Topical Meeting on Probabilistic Safety Assessment and Analysis in May 2019.

Neil Taylor, a Ph.D. student in Nuclear Engineering, has been awarded a Second Place prize in the Open Competition in the category of Material Protection, Control, and Accountancy. His award-winning research paper, “Isotopic Concentration of Uranium from Alpha Spectrum of Electrodeposited Source on 4H-SiC Detector at 500° C,” was published in the Journal of Radioanalytical and Nuclear Chemistry in May 2019.



McCary (Top Right), Sanny (Bottom Left), and Taylor (Bottom Right)

for more on Innovations in Nuclear Technology R&D Awards program visit: NuclearTechInnovations.org

Honors and Awards Ceremony celebrates exceptional alumni and students

The annual Honors and Awards Ceremony in the Department of Mechanical and Aerospace Engineering took place April 11, 2019. Thirty-seven students and alumni were honored from the nuclear, aerospace and mechanical engineering programs.

Stillman Robinson
Lifetime Achievement Award
honoring lifetime career distinction



Willard “Norm” Shade (BS ME ‘70, MS ME ‘70)
was presented with the **Stillman Robinson Lifetime Achievement Award**.

This award is presented to retired or emeritus alumni who have distinguished themselves over their lifetimes by contributing to the advancement of their chosen profession. Robinson joined Ohio State in 1878, and was the founding chairperson of the Department of Mechanical Engineering. He was also one of the founders of the American Society of Mechanical Engineers, and received an Honorary Doctorate of Science degree from Ohio State in 1896.

Since graduating from Ohio State in 1970 with bachelor’s and master’s degrees in mechanical engineering, Norm has distinguished himself with numerous contributions in his field of engineering and to the community.

Norm is known in the gas machinery industry for his development of breakthrough technology and processes. His long and distinguished list of accomplishments also includes revitalizing and growing established and startup businesses. Highlights from his most notable cases include growing a business from \$2.3M to nearly \$25M over eight years and increasing another from \$17M to \$46M in three years. He was a longtime employee of Cooper Cameron Corporation, where he served multiple divisions, starting as research scientist and ending at vice president over a 32-year career.

Marion Smith Service Award
recognizing service to community, university and/or society



The Marion Smith Service Award is presented to alumni who have distinguished themselves by providing a level of service to the community, the university, and/or society above and beyond what is expected in their position as they made significant career contributions. Smith received his master’s degree in mechanical engineering in 1947 from Ohio State. He served for more than 37 years as a faculty member and associate dean of the College of Engineering, giving generously of his time to students and alumni.

This year **Douglas Ball (BS AAE ‘74, MS AAE ‘75)** was awarded the **Marion Smith Service Award**.

Doug has been a lifelong advocate for the Department of Mechanical and Aerospace Engineering. Since his time here as a student, he has shown sincere dedication to the department’s success.

Doug’s positive impact reaches many levels of the department. As the chair of the Aerospace External Advisory Board since 2014 and a member at large since 2005, Doug significantly influences big-picture decisions and the direction of the aerospace program. Yet he is perennially involved in everyday student success by serving as a judge for the university’s Denman Undergraduate Research Forum, as well as for engineering capstone design showcases. His reach extends to the Design/Build/Fly student team, of which he is a proud supporter, and to sharing career management wisdom with students through “fireside chats.”

E.G. Bailey
Entrepreneurship Award
celebrating successful inventions



Bruce Lavash (BS ME ‘77, MS ME ‘78) received the **E.G. Bailey Entrepreneurship Award**.

This award is presented to alumni who have demonstrated exceptional entrepreneurship as they invented new products, processes, or procedures that have been successfully manufactured, adapted, or utilized. This award honors E.G. Bailey, a 1903 graduate of Ohio State, and inventor of the Bailey meter. Bailey left an engineering job to develop and manufacture his meter which dramatically improved boiler efficiency and has been used world-wide.

Bruce is a research fellow at Proctor & Gamble. There, he is also a member of the prestigious Victor Mills Society, which recognizes the corporation’s most innovative technologists.

Bruce joined Procter & Gamble after receiving his bachelor’s and master’s degrees from The Ohio State University in 1977 and 1978, respectively. During his career, he has developed more than 30 U.S. patents for paper-related consumer products 2019 Honors & Awards Ceremony 9 that are today used and recognized globally. His successful inventions have resulted in many new products, such as tissue paper products, disposable bibs, absorbent undergarments and pet litter box systems.

Rudolph Edse Award
in Space Engineering
honoring excellence



Timothy Priser (BS AAE ‘87) was presented the **Rudolph Edse Award in Space Engineering**.

The Edse Award is presented to Aerospace Engineering Program alumni who have made significant contributions to successful engineering and/or scientific advances in space related products or programs. Edse moved to Ohio State in 1950, becoming the director of the Rocket Research Laboratory. His research developed several possible propellant combinations, and determined their combustion characteristics and combustion stability limits. He was also one of the first to study cryogenic rocket propellants.

Tim is currently the Military Space Programs Mission Assurance Director at Lockheed Martin.

Tim’s career there has spanned over 30 years, beginning in 1987 when he joined Martin Marietta, which later merged to become Lockheed Martin. Significant contributions to the field include placing three orbiters around Mars and two landers successfully on the Martian surface. Tim innovated the first successful direct injection, powered descent, soft landing on Mars. He is also credited with architecting the first image of a Mars entry vehicle to be taken by a Mars orbiting asset.

Alan Gregory Loofbourrow
Business Achievement Award
recognizing career success



The **Alan Gregory Loofbourrow Business Achievement Award** was presented to **Jacqueline DiMarco (BS ME ‘95, MS ME ‘96)**.

This award is presented to alumni who have been recognized for their significant contributions in guiding a successful product or service business, major industrial organization, or government entity.

Jackie has worked at Ford Motor Company since she started in its College Graduate in Training Program. She is now Executive Product Line Manager of North American Truck.

A successful career has allowed Jackie to significantly impact signature Ford products. She has a skill for understanding the customer base and interpreting feedback to make improved products while maintaining classic characteristics. As chief engineer she was the first woman to oversee launch of the all-new F-150 EcoBoost V6 engine, and she also led the Ford Mustang project as the program manager for five years.

In her current role, Jackie is leading the progression of Ford’s first autonomous vehicle program. This position has enormous challenges, including technological invention, AV regulatory maturity, a changing business environment, recruiting top talent and engaging non-traditional suppliers and partners.

**Thomas French
Achievement Award**
celebrating educators



The Thomas French Achievement Award is presented to alumni who have distinguished themselves as scholars and educators. French, a 1895 graduate of Ohio State, served as a professor of engineering drawing at his Alma Mater, introduced new teaching methods, and authored a popular textbook. He was awarded the Lamme Medal in 1943 for his achievements.

Ahmet Kahraman (PHD ME '92) received the 2019 **Thomas French Achievement Award**

Garvin L. Von Eschen Award
*honoring leadership in aerospace
engineering*



The **Garvin L. Von Eschen Award** was presented to **Robert "Joe" Shaw (BS AAE '70, MS AAE '70, PHD AAE '79)**.

This award is presented to Aerospace Engineering Program alumni who have demonstrated technical and administrative excellence in leading successful aerospace projects and organizations. Von Eschen joined Ohio State in 1946 as the first chairman of the newly established Department of Aeronautical Engineering. During the next three decades, he provided vision and guidance to the growing department as it established highly rated undergraduate and graduate programs, as well as laboratories for aerodynamic and rocket research.

**Ralph Boyer
Young Achiever Award**
recognizing professional success



Onome Scott-Emuakpor (BS ME '04, MS ME '07) received the **Ralph Boyer Young Achiever Award** in honor of his influential leadership, significant product development and important manufacturing contributions to the engineering industry.

The Ralph Boyer Young Achiever Award is presented to alumni who have risen rapidly in their chosen profession, and made significant contributions to engineering products and/or programs before the age of 40. Boyer, a 1930 graduate of Ohio State, achieved chief engineer status, and contributed significantly to his company while still a young man.

**Ada Irene
Pressman Award**
overcoming significant challenges



Margaret Mkhosi (MS NE '03, PHD NE '07) was presented the **Ada Irene Pressman Award**.

The Ada Irene Pressman Award is presented to alumni who have made noteworthy contributions to their chosen professions while overcoming significant obstacles or barriers to the completion of their education and/or obstacles in their careers. Pressman was a 1950 graduate of the department. During a long career with the Bechtel Power Corporation, she provided technical direction and management for numerous projects involving the control of nuclear and fossil fuel power generating plants, as well as contributing significantly to the management and growth of the Society for Women Engineers. This was previously known as the Bertha Lamme Feicht Award.

Student Awards

Outstanding Research Award: James Lazenby, Evan Crowe, Dustin Goetz, Noah Darwiche, Matthew Little, Thomas Malkus

Top Academic Awards

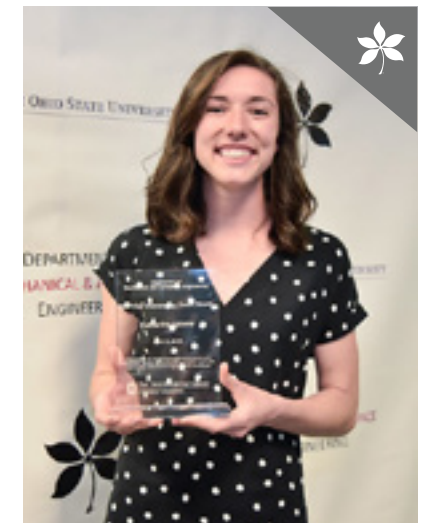
Mechanical Engineering Recipients

- Sophomore: **Nick Carcione, Andrew Grassi, Brigid Hayes, Matthew Hozdic, Megan McMahon, Jacob Paugh and Andrew Yates**
- Junior: **Richard Wainio and Christina Yang**
- Senior: **Michael Lloyd**

Aerospace Engineering Recipients

- Sophomore: **Thomas Bozzi**
- Junior: **Jacob Beardslee**
- Senior: **Madhav Shah**

Outstanding Senior in Aeronautical and Astronautical Engineering Award: Collin O'Neill



The **Rob Wolf Outstanding Senior Award** is presented to a mechanical engineering student in memory of Rob Wolf, a 1997 graduate. The award recognizes students who excel academically while actively participating in department, college, university and community organizations. Finalists were **Morgan Nash, Angella Volchko, and Catherine Adams**. This year's award was presented to **Catherine Adams**.



SUBMIT A NOMINATION!



Know an outstanding graduate in mechanical engineering, aerospace engineering, nuclear engineering or engineering mechanics?

Consider nominating an alumnus for an award! Nominations for 2019 will be accepted through February.



VISIT
go.osu.edu/MAEalumni

CLASS NOTES

1990s



Vince Jarrett ('98 BS) is a partner in the Columbus office of RMF Engineering.

Greg Murphy ('99 BS) is senior vice president for the states and municipalities sector of TranSystems Corporation.

2000s



Janelle Glick Kolisch ('06 BS) was named Young Engineer of the Year by the Professional Engineers of Oregon. She works for Heery International in Portland.

Adam Pilchak ('08 MS, '08 PhD) received the Presidential Early Career Award for Scientists and Engineers. Pilchak is a researcher at the Air Force Research Laboratory at Wright-Patterson Air Force Base in Dayton.

Craig A. Ziolkowski ('09 MS) was one of a four-person test crew that completed the first flight the G500 airplane for Gulfstream Aerospace Flight.

2010s

Kate Scherer Dominguez ('12 BS) received Harris Corporation's inaugural "10 Under 10" award. The award honors emerging engineers for their success and demonstrated leadership in their communities and profession within 10 years of obtaining their undergraduate degrees.

Julia Cline Armstrong ('14 BS) received Harris Corporation's inaugural "10 Under 10" award. The award honors emerging engineers for their success and demonstrated leadership in their communities and profession within 10 years of obtaining their undergraduate degrees.

To submit your exciting alumni news for inclusion in next year's *Alumni Exchange*, please visit osu.edu/alumni/news/alumnews/.

Novel electroceutical gives furry friend a leg up in healing

It's not science fiction: bandages that direct electric stimulation to tissue are being used to speed wound healing in pets and people.

A new, patented bandage technology developed by researchers in The Ohio State University Department of Mechanical and Aerospace Engineering has already proved beneficial for Daisy, a four-year-old canine companion that suffered from a chronic wound. Today, Daisy has a new lease on life thanks to a collaboration between Ohio State's College of Engineering and College of Veterinary Medicine.

Late in 2017, after having had a number of treatments on her right front leg, Daisy suffered from a large, infected non-healing wound. Existing treatment methods and antibiotics used to eliminate infection and promote wound healing hadn't helped for over a year. Then, her veterinarian, Kathleen Ham, DVM, formerly at the College of Veterinary Medicine, had the idea of reaching out to the Department of Mechanical and Aerospace Engineering.

Soon, Ham, along with Daisy's owners, agreed to trial the novel device.

Within one week of using the bandage, two centimeters of Daisy's fourcentimeter-long wound had healed. After 11 days of continued use, infection from the wound resolved. The bandage was removed and the wound was treated with standard wound care. A check-in at 67 days post-treatment revealed the wound had healed completely.

The antimicrobial bandage is designed to enhance the healing of chronic and non-healing wounds that are resistant to antibiotic treatment. The device co-inventor, Associate Professor **Shaurya Prakash**, along with **Vish Subramaniam**, chair of the Department of Mechanical and Aerospace Engineering, and an interdisciplinary team of Ohio State investigators, recently co-authored an article published in Scientific Reports that details the device's capabilities.

The dressing disrupts biofilm, a distinct antibiotic-resistant and bacteria-containing layer that can form over wounds, often rendering them chronic or non-healing.

According to the team, bacterial infections contribute to chronic and non-healing wounds. Electrochemical stimulations from the electronic bandage disrupt the communication of these bacteria and break their adhesion to the wound's surface. The resulting removal of bacteria allows the wound to continue to heal properly.



Device co-inventors Shaurya Prakash and Vish Subramaniam.



Composed of a silver-based ink printed on silk fabric and connected to a battery, printed electroceutical dressing works by generating electric stimulations across the wounddressing interface in order to aid healing. The electrochemical stimulation has shown nearly no adverse impact on underlying tissue.

In addition to eradicating bacteria, the electronicallyenhanced dressing potentially utilizes skin's natural electric currents to further promote wound healing.

The College of Veterinary Medicine encounters chronic and non-healing wounds frequently and provided the perfect proving ground for the new technology.

Now that the mechanical engineering team has demonstrated design, prototype development and proof-of-concept operation for the device, it's ready to move into the next phase of development.

Future work will target in vitro testing. Researchers will aim to optimize the device's design and operational characteristics, while establishing an understanding of its underlying mechanisms. The fundamental studies will be in collaboration with Ohio State's Department of Microbiology.

The research was funded by Ohio State's Center for Clinical and Translational Science L-Pilot Program, which is funded by a multiyear Clinical and Translational Science Award (CTSA) from the National Institutes of Health. The research has also received support from Ohio State's Infectious Disease Institute.

Manufacturing Ties to the Automotive Industry

Lori Herman is one of some 430 Ohio State alumni working at Ford Motor Co. She can recite that number off the top of her head because that's the way her mind works—and because she has made it her mission to welcome recruits who share her alma mater

Establishing and nurturing ties between Ford and Ohio State is in her job description as well. That means cultivating relationships among alumni, most of whom are based at the company's headquarters campus in Dearborn, Michigan. She joined Ford immediately after graduation and excelled in both manufacturing and design engineering positions, while also earning two master's degrees from the University of Michigan.

Since 2014, Herman has managed the Ford-Ohio State Alliance, a role she describes as "professional matchmaker."

"If a researcher at Ford has a need, a large part of my job is identifying if there's a counterpart at Ohio State who can help," she said. "And I promote what Ohio State is offering that Ford may be interested in. I invite faculty members to give seminars at Ford to spark interest in working with them."

Today, Herman keeps an eye out for potential interns and recruits who share that mindset and enthusiasm.

"If you were a success at Ohio State, you have the opportunity to be a success at Ford. You have to be self-motivated at Ohio State, and Ford is very much the same way. I tell our interns and new hires that if you want to learn things, people here are more than receptive."



Lori Herman (BS '00)

College Honors Exceptional Alumni

22nd annual awards celebration

The Ohio State University College of Engineering honored high-achieving alumni with awards and recognitions. Among those awardees were graduates of the Department of Mechanical and Aerospace Engineering.

Lamme Meritorious Achievement Medal

Vijay Kumar (MS ME '85, PhD ME '87)



Vijay Kumar is arguably the world's foremost expert on robotics. His research group, as part of the renowned General Robotics, Automation, Sensing & Perception (GRASP) Lab at the University of Pennsylvania, has produced some of the most seminal works in multi-robot systems and micro-aerial vehicles.

Beyond academic achievements, his academic and national leadership have fundamentally influenced the next generation of robotics research and policy. Of the 39 PhD students to graduate from his group, 20 are in academic positions across the world, demonstrating his excellence in the mentorship of the next generation of academic researchers. At the national level, he was previously the Assistant Director of Robotics and Cyber Physical Systems in the Office of Science and Technology Policy at the Executive Office of the President of the United States (2012 –2014), demonstrating his national impact on robotics policy and his ability to translate research findings to those outside of academia.

Meritorious Service Citation

Gary Kinzel (BS ME '68, MS ME '69)



Professor Emeritus **Gary Kinzel** has served the Department of Mechanical and Aerospace Engineering since 1978 and is still serving today. Starting as an assistant professor, his accomplishments led him to achieve increasingly higher positions, including associate chair.

An expert consultant in areas ranging from accident investigation to laboratory design, Kinzel has produced numerous publications, including four books and proceedings. He is credited with one patent and has advised over 120 graduate students. His teaching encompassed 15 different classes throughout his robust career.

Distinguished Alumni Award for Career Achievement

John Smucker (BS ME '67)

John Smucker is known as an excellent businessman and investment banker. His successful dual-impact career has led him to be a significant leader in both sectors.



He currently serves as the Chief Executive Officer, President and Chairman at MCE Technologies, Inc. Previous experience includes presiding as Chief Executive Officer of Aeroflex Microelectronic Solutions, Inc. and also serving as its President.

Distinguished Alumni Award for Entrepreneurship and Innovation

William Rudolph (BS ME '83, MS BA '86)



A perennial innovator with a knack for entrepreneurship, **William Rudolph** excels at growing and adapting businesses. Most notably, after Rudolph became a leader in his family's traditional construction business, Rudolph/Libbe Companies, Inc., he had the foresight to create a company division in the solar power industry

long before it was popular. This diversification has allowed Rudolph's company to succeed, making him a pioneer in solar power installation. Interestingly, Rudolph has led his company in the same direction as Ohio State is now moving with the Discovery Themes and the new Solar Applications and Innovations Lab (Ardeshir Contractor).

Distinguished Alumni Award for Academic Excellence

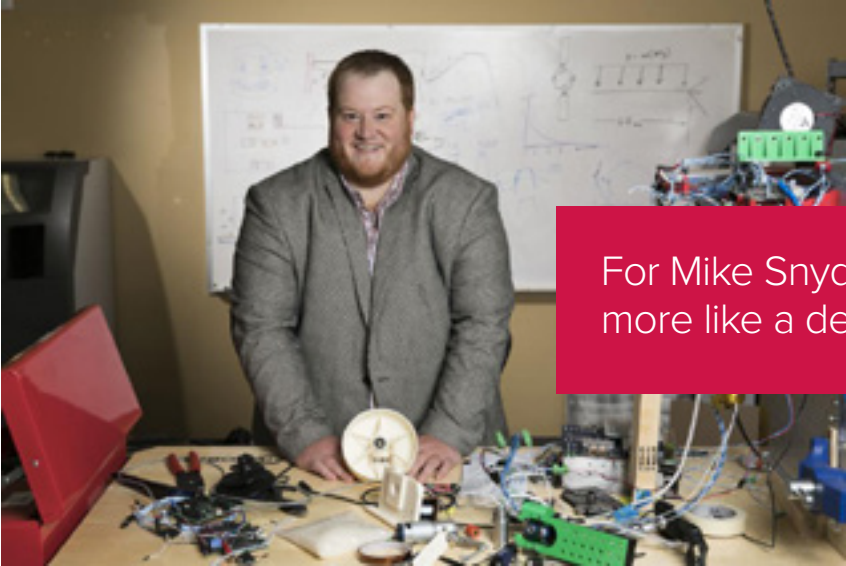
Teik Lim (PhD ME '89)



Teik Lim is recognized as an experienced leader, accomplished scholar and innovator. Since June 2017 he has served as provost at the University of Texas at Arlington. Previously, Lim served as the dean of the College of Engineering and Applied Science at the University of Cincinnati, where his many accomplishments

include overseeing significant growth in enrollment, reputation, faculty size, corporate partnerships, research funding and endowments. Lim established a unique UC Simulation Center funded by P&G that now supports 75 research students from five colleges at the University of Cincinnati, championing increased diversity among students and faculty.

ALUMNI SPOTLIGHT



For Mike Snyder, the sky's never been the limit. It's more like a destination.

Building a Future in Space

For Mike Snyder, the sky's never been the limit. It's more like a destination.

Snyder is co-founder, chief engineer and managing director of Made in Space, a California-based company that lives up to its name.

“Our primary goal is to live and work in space eventually,” said Snyder, who earned his bachelor’s and master’s degrees in aeronautical and astronautical engineering from Ohio State in 2009 and 2011, respectively. “We want to colonize space.”

It's a big goal, for sure, but Snyder talks about it in definitive terms. To him, people living and working in space is just a matter of time. And Made in Space is helping to lay the groundwork.

While still a student at Ohio State, Snyder met the company's three other founders through a Silicon Valley technology accelerator and they formed Made in Space in 2010. Their first mission was to develop a 3D printer that could work in space. They perfected their invention by experimenting with it on multiple parabolic flights, in which an airplane flies nearly straight up and noses down over and over to create periods of weightlessness.

In 2012, NASA awarded Made in Space a grant to place the 3D printer on the International Space Station. Now, Snyder's team uses it to make everything from parts for NASA to an artist's 3D representation of the sound of laughter. They also print tools for the space station, projects from college design students and experimental items for commercial customers.

The next masterpiece for Made in Space is Archinaut, a satellite-3D printer-robot creation designed to build big structures in space. NASA gave the company \$20 million to develop the system capable of not only printing out panels, beams and other parts, but putting them together to make things that serve a function in space.

He says Archinaut could be constructing projects in space within three years. Beyond that, Snyder predicts, the possibilities are limitless.

READ MORE: go.osu.edu/uisnyder

by Bob Beasley for Ohio State Alumni Association

Air Force Research Lab to Establish \$3M Collaborative Center for Aeronautical Sciences at Ohio State

Center initially funded at \$3M, with two subsequent two-year optional extensions

The Air Force Research Laboratory Aerospace Systems Directorate (AFRL/RQ) has selected a team of researchers led by The Ohio State University to establish a Collaborative Center for Aeronautical Sciences. The goal of the CCAS is to establish a flourishing, comprehensive, versatile and synergistic partnership with AFRL/RQ. Project partners include the University of Minnesota and Virginia Tech.

The cooperative agreement will proactively build strategic, high-fidelity computational aerodynamics capabilities for the United States Air Force. A special emphasis will be placed on evolutionary and disruptive research in high-speed aerophysics, fine-scale turbulence and control, non-linear fluid-structural interactions and high-fidelity computational technologies.

Principal investigator of the virtual center is Professor **Datta Gaitonde**, who directs the High Fidelity Computational Multiphysics Lab in Ohio State's Department of Mechanical and Aerospace Engineering.

The CCAS will begin with an initial five-year effort funded at \$3M, with two subsequent two-year optional extensions for a total funding amount of \$5.4M.

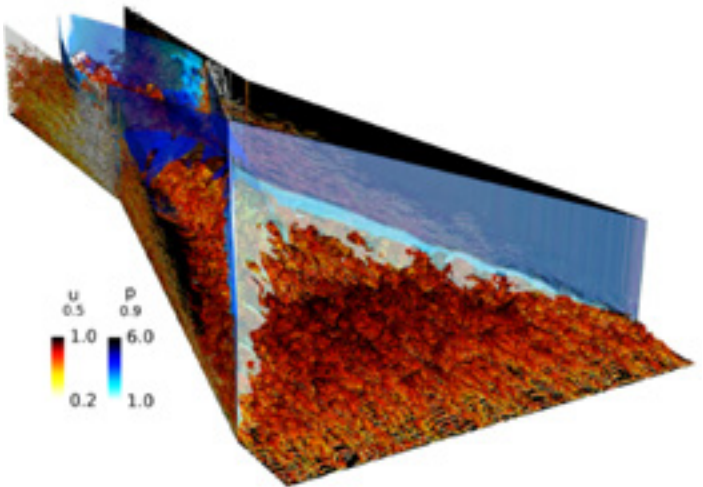
Through close collaboration with AFRL/RQ, advanced mathematical techniques will be developed and incorporated into massively-parallelized software and subsequently transitioned for use by AFRL and its broad user base. The CCAS will deploy these tools for physics-based analyses to address emerging challenges in the highly unconventional aerospace vehicle design environment, where multiple non-traditional factors must be considered.

CCAS activity will help reduce the prohibitive expense, and acquisition costs, associated with ground and flight-testing. A particularly crucial objective of the CCAS is to nurture and develop the next generation of aerospace research professionals with proven scholarly accomplishments and possessing the advanced multi-disciplinary skills required for the future aerospace workforce. Students funded by CCAS will be provided internship opportunities at AFRL to foster deep and lasting direct relationships with engineers performing basic and applied research.

This project builds on Gaitonde's expertise. He served as the principal investigator of a previous collaborative center, which developed and applied pioneering computational technologies for the design of United States Air Force systems.



“ The Air Force Research Laboratory Aerospace Systems Directorate has selected a team of researchers led by The Ohio State University to establish a Collaborative Center for Aeronautical Sciences.”



Buckeyes for life: Over 22 alumni and their grandchildren participated in the College of Engineering's second annual Grandparents Day! in August. Groups visiting the Robert O. Webster Machine Shop tried their skill at making paperweights.

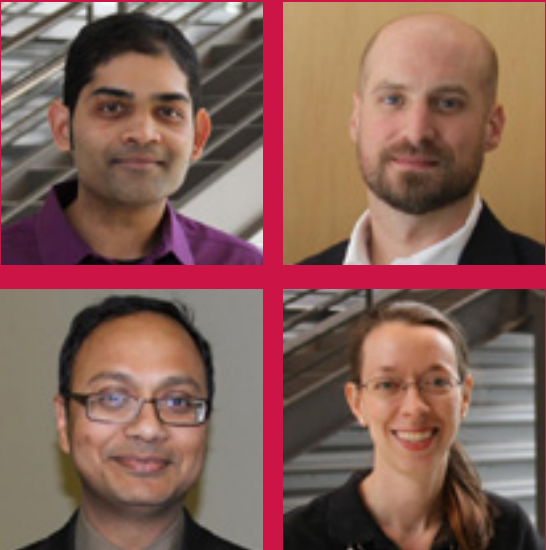
Faculty recognized for outstanding teaching, graduate student support and service

Four exemplary faculty and staff recently received recognition from the Department of Mechanical and Aerospace Engineering's External Advisory Board. During the board's spring meeting on April 12 and the faculty and staff meeting on May 24, **Satya Seetharaman**, **Cliff Whitfield**, **Sandip Mazumder** and **Ann Sanders** were honored for their teaching, support of graduate students and service to the department.

Seetharaman recieved the Michael J. Moran Excellence in Teaching Mechanical Engineering Award. Whitfield was awarded the inaugural Gerald M. Gregorek Excellence in Teaching Aerospace Engineering Award. Mazumder recieved the Distinguished Graduate Faculty Award. And Sanders was the recipient of the Service to Mechanical and Aerospace Engineering Award.

"When I conduct my annual reviews of faculty performance, these three names —Satya, Cliff and Sandip—always come up," said Department Chair **Vish Subramaniam**. "They are consistently our best teachers and mentors, and these intangible qualities inculcate the very best values in our students and we're very grateful for that."

"The staff in this department do a great deal for us and they are invaluable partners in our executing our mission," he continued. "They are a critical part of the operation—they really keep things going. That's why we wanted to present this year's service award to a staff member."



Top (Left to Right): Seetharaman, Whitfield
Bottom (Left to Right): Mazumder, Sanders

Commercializing research: Ohio State-developed software aims to support industry

Team completes I-Corps@Ohio program

Associate Professor **Mrinal Kumar** and his team are one step closer to possibly commercializing research they developed at The Ohio State University. Team “Point Prognostics” is designing software to optimize maintenance schedules for industrial equipment. The team successfully completed the 2019 I-Corps@Ohio program, an eight-week program aimed at helping selected faculty and student teams determine if their intellectual property could be the basis of a startup company. In all, 13 teams from Ohio research universities and organizations participated in this year’s competitive program. They shared their final business concept videos and presentations on July 11.



Kumar, Downing and Aggarwal

“The software is designed to optimize maintenance schedules for equipment, which is intended to reduce costs”

MRINAL KUMAR
Associate Professor

The I-Corps@Ohio process helps researchers get out of their “academic bubble,” said Kumar. He and doctoral student **Rachit Aggarwal** are creating a closed-loop forecasting framework for system prognostics and decision support. They are advised by industry mentor **Mike Downing**. “The software is designed to optimize maintenance schedules for equipment, which is intended to reduce costs by preventing unexpected shutdowns and premature repair,” said Kumar. The solution is built upon a robust, scalable computational platform capable of delivering trustworthy forecasts of key performance indicators as established by the client. “As researchers, we are often too focused on solving problems at the ‘fundamental level’ and do not necessarily look at the other side—whether this might actually be

something that people or companies can use,” Kumar said. The team’s software platform offers controllable accuracy, according to Kumar. This translates to confident decision making, as well as optimization of system performance, maintenance schedules and failure avoidance. The intended results? Savings in time and cost. As part of the I-Corps@Ohio program, the team conducted a customer discovery process. They identified thirteen potential segments to which their product offers a value proposition. “One of the top segments to emerge lies within the pharmaceutical sector,” commented Kumar. “There, the controllable accuracy offered by our simulation platform can speed up the process of new drug discovery.

“Another segment of high impact concerns the prediction of the failure of critical, access-restricted components in the oil and gas sector. Promise has also been shown for application in the aerospace industry, where our tools can bring about a paradigm shift in the way aircraft engine failure prediction is performed.” Most of the teams that finished I-Corps@Ohio will continue the process they began in the program before deciding whether to create a startup company or otherwise license their products. Five Ohio State teams participated in the 2019 cohort. I-Corps@Ohio, an initiative of the Ohio Department of Higher Education, is a statewide program that helps Ohio faculty and graduate students determine the market potential of their technologies and assists with the launch of startup companies.



College of Engineering Faculty Awards Ceremony

The College of Engineering annually honors faculty members for outstanding teaching and research. The 2019 awardees were recognized on April 25 at the 22nd annual Distinguished Faculty Awards. Four faculty from the Department of Mechanical and Aerospace Engineering were recognized.

Dean’s Award for Outstanding Teaching by a Lecturer



Satyanarayana Seetharaman was recognized for his consistently exemplary record as an instructor in the Department of Mechanical and Aerospace Engineering since 2011.

David C. McCarthy Engineering Teaching Award



Annie Abell recieved this award in recognition of innovative active learning, modern technologies and cross-disciplinary teaching approaches, which promote student engagement and success in the MAE product design curriculum.



Lumley Interdisciplinary Research Award - Joseph Heremans

Named for John H. Lumley (’27, ceramic engineering), this team award recognizes interdisciplinary research accomplishments of the college’s faculty and research staff.



Lumley Research Award - David Hoelzle

The Lumley Engineering Research Awards are presented to a select group of outstanding researchers in the College of Engineering who have shown exceptional activity and success in pursuing new knowledge of a fundamental or applied nature.



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REUNION/ HOMECOMING WEEKEND

Stay tuned for the 2020 Reunion/Homecoming Weekend dates.

VISIT
homecoming.osu.edu

Sparking interest: An early-career alumnus shares insights on professional success

Q&A with nuclear engineer Diego Mandelli

High-achieving alumni are making great impacts on their fields in research, industry and academia. One such alumnus is **Diego Mandelli (PhD NE '11, MS NE '08, advised by Tunc Aldemir)**, a nuclear engineer who works as an R&D Scientist for one of the nation's leaders in nuclear research at Idaho National Laboratory.

Diego specializes in employing new system modelling and data analysis methods for safety analysis and management of nuclear power plants; he has developed artificial intelligence and data-mining-based methods to help him analyze and assess the safety measures of multiple kinds of nuclear reactors.

With eight years of professional experience, Diego provides some insight on being a nuclear engineer and how students can best prepare themselves to pursue such a career.

Q: How did you become interested in nuclear engineering? What drew you to work for Idaho National Laboratory?

I started to study nuclear engineering back when I was an undergraduate student in Italy at Politecnico di Milano; I really liked a study program that heavily focuses on mathematics and physics. At that beginning, I was in fact considering a mathematics or an engineering degree. Looking back, I think I made a good choice; for me was ideal to develop analytical skills and apply them to safety and reliability problems.

When I arrived at Ohio State in June 2005, I became involved in several projects in collaboration with NRC (Nuclear Regulatory Commission) and INL. After several interactions with INL, I really admired the research activities under development, and this pushed me to apply at INL when I graduated.

Q: Are there other backgrounds or disciplines that work well with a nuclear engineering career?

From my eight years' experience at INL in the field of safety/risk/reliability, I have been working not only with nuclear engineers but also with people with a computer science and statistics background. Analysis of complex systems requires heterogeneous teams that can bring fresh ideas to the table.

Q: What skills and abilities are required to be successful in your role?

I think that strong analytical skills are going to be very important in the future in my field. In particular, strong mathematics and statistics skills (e.g., machine learning and data mining) are going to be very essential. In addition, I have seen that good programming skills (e.g., Python, Java or C++) are often



required for people working in the projects I have been involved with here at INL.

Q: What do you find most rewarding about your work? Most challenging?

Regarding my work challenges, this is the typical engineering challenge:

there is a problem to solve. Sometime I have the solution (often with limited resources). Sometimes I don't have a clear path. In the first case I just get the most out of what I have. In the second case, I just try to do my homework, understand and explore directions and solutions, ask and involve people with knowledge, skills and passion.

Q: What advice do you have for students who want to work in your field?

My main advice for the students that are now interested in the nuclear engineering field is to find an area that makes them really excited. Working for something that you really enjoy can open a lot of doors in a person career. Another suggestion I'd like to give is to don't be afraid to make hard choices or change path in your career: good things come out of these moments.



Placing students first

Putting scholars on a clear (and affordable) path to success

Each year, the best and brightest students from across the nation come to The Ohio State University to study with our faculty experts in the Department of Mechanical and Aerospace Engineering. Those students, in turn, conduct groundbreaking research, lead prominent student organizations and develop creative solutions to better our society.

It is our aim to provide MAE students with a clear and affordable path to the American Dream. As President **Michael V. Drake** stated, "affordable excellence is fundamental to who we are as a land-grant university." We invite you to join us in placing students first by investing in one of the department's priority funds listed below:

- **MAE Scholarship** supports scholarships within the department (310208)
- **MAE Priority** provides funding for emerging key areas within the department (302655)
- **MAE Curriculum** supports the department chair's curriculum reform project (313090)
- **Nuclear Priority** provides funding for Nuclear areas within the department (306406)

“The philanthropy of our alumni in support of our priorities allows us to create new opportunities for students and researchers, while funds directed toward scholarships help ease the financial burdens of high-achieving, deserving students. Our doors on campus are open for you to meet the students you support, to see first-hand some of our initiatives sustained by your generosity.”

VISH SUBRAMANIAM
Professor and Department Chair

In Memoriam



Gerald "Jerry" Gregorek earned three degrees from Ohio State in aeronautical and astronautical engineering (**BS '58, MS '59, PhD '67**). He then went on to serve as the chair of the Department of Aeronautical and Astronautical Engineering (1991-1999) and director of the Aeronautical and

Astronautical Research Laboratory (Aerodynamic Laboratory). With his recent passing on October 3, 2019, we celebrate his impactful accomplishments.

Gregorek's life passion was aviation research and he was known internationally as a leader in applied aerodynamics. His most notable projects include designing a transonic laminar flow airfoil for the Piaggio Avanti, an Italian executive aircraft.

"Jerry kept aviation alive at Ohio State," recalled Airport Director Douglas Hammon. "He initiated the practical application of flight testing and opened students' understanding of its importance."



The Department of Mechanical and Aerospace Engineering celebrates the life and contributions of **Professor Emeritus, John Lee**.

A kind-hearted leader and exceptional researcher, Lee is remembered by colleagues for his enduring passion for aerospace education and research. He passed away in April 2019.

Born in Canada, Lee became a fighter pilot in WWII for the Royal Canadian Air Force at age 18 and afterward completed his studies at the University of Toronto. At the conclusion of his service, he followed his interests and joined the faculty of The Ohio State University in 1952 as an assistant professor in the Department of Aeronautical Engineering. He excelled, holding the positions of associate professor, professor and professor emeritus during his career.

"We remember Professor Lee's generous spirit, his kind heart and his love for aerospace," said Professor Jim Gregory, director of the Aerospace Research Center, AARL's successor.



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