



METRICS

MECHANICAL ENGINEERING AT MARYLAND

Fearless Futures

Transforming Mechanical
Engineering Education
at Maryland



Chair's Message



Dear Friends,

As the fall semester commences here in College Park, our students return to begin another year of classes. Throughout their time at the University of Maryland, they will learn skills and make memories that will last them long past their time on campus, like many of you reading this year's METRICS. With our 125th anniversary around the corner, we reflect on an interconnected fabric that connects all graduates of the department over the years: our educational values, curriculum, and research excellence.

Again, this year, we are pleased to share with you that we have been named a top 20 mechanical engineering program, in both the undergraduate and graduate rankings. No doubt, we are delighted with this recognition as it reflects our dedication to high quality research and instruction. This honor is in no small part due to the continuing commitment of our faculty and staff, who work to help our students reach their highest potential, and our extended research community of industry and academic partners.

In this year's issue, we introduce you to our new faculty members and the fascinating research they plan to pursue in the department. The field of mechanical engineering is constantly evolving and we take great pride in helping the field move forward and educating students in the latest technologies, while also staying true to the foundations of the profession. We spotlight innovative new courses in our curriculum and hear from students about how these courses have shaped their careers, both at Maryland and in their futures in a variety of industries.

Additionally, in this issue, we highlight some of our recent research publications, faculty awards and recognitions, and student achievements from the past year. Our sincere thanks to our alumni, friends, and corporate sponsors for their continued support of the department. Over almost 125 years, Mechanical Engineering at Maryland has created a legacy that builds upon fearless commitment to our students and the world at large. This history inspires our work to this day and paves the path for the future of the department.

B. Balachandran

Balakumar Balachandran
MINTA MARTIN PROFESSOR AND CHAIR
DEPARTMENT OF MECHANICAL ENGINEERING

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METRICS

MECHANICAL ENGINEERING AT MARYLAND

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Metrics is published annually for alumni and friends of the Department of Mechanical Engineering at the A. James Clark School of Engineering, University of Maryland.

Please send letters to the editor and alumni notes to umdme-comms@umd.edu

Fearless Futures

Transforming Mechanical Engineering Education at Maryland

With unprecedented new technologies and advances in engineering emerging almost daily, maintaining a premier program in Mechanical Engineering means constantly revitalizing and re-working the curriculum to help students move toward their future goals.

Over the past five years, the department has added ten faculty members with expertise in areas such as additive and advanced manufacturing, big data and design, computational mechanics, energy systems, virtual and augmented reality, and robotics.

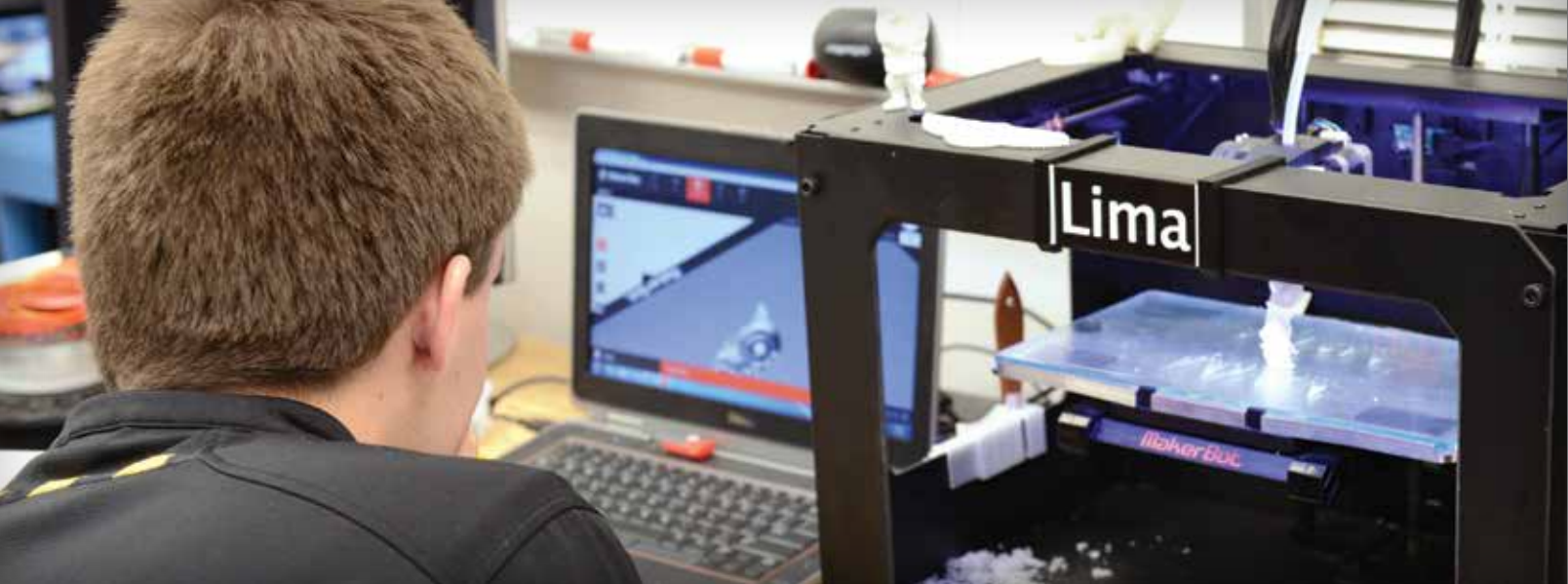
Mechanical engineering at Maryland is constantly reinventing itself in the eyes of its students and the world. Here's a window into the expertise and material that is keeping our graduates competitive.

CONTINUED ON PAGE 2



Assistant Professor Mark Fuge and undergraduate students hold projects created by additive manufacturing

PHOTO: MIKE MORGAN



Student uses 3D printer to manufacture project

ADDITIVE MANUFACTURING

Additive manufacturing is a key area of research for the department and the A. James Clark School of Engineering as a whole. The 2013 Presidential State of the Union highlighted the importance of additive manufacturing, and its role in shaping manufacturing in both today's world and the future. Engineers increasingly will have to know these skills to succeed in careers in industry, government, and academia.

This is why one of the newest additions to the department curriculum is Additive Manufacturing (ENME416/744), taught by Assistant Professor Ryan Sochol. This cross-listed undergraduate and graduate course was added last fall, and has hit its maximum enrollment of 50 students each time it has been offered. Through this course, students develop a comprehensive understanding of the fundamentals of additive manufacturing, while also being challenged to create their own products through the techniques taught in class.

Sochol has students complete three projects over the course of the semester, which each build upon the previous designs and skills learned that week. This style of teaching encourages students to refine their original models to respond to different challenges and situations. This assignment replicates real world situations, which translates outside the classroom in terms of both research and industry.

The final project is a UMD-themed ball, complete with moving parts. Students must build these balls in respect to three different additive manufacturing processes: Fused Deposition Modeling, Stereolithography, and Polyjet Modeling. Some examples of final projects included a Rubix cube-type ball that relies on other parts to move and a cut out ball with a smaller piece located inside.

"Learning these skills helped narrow down my

research focus," says Ruben Acevedo, a second year Ph.D. student in mechanical engineering working with robotics. "I'm able to directly apply what I learned in class to what I do in the lab."

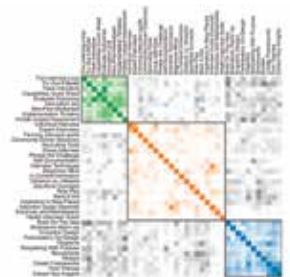
Acevedo says the college's focus on innovation in engineering is one of the reasons he chose to come to Maryland.

Graduate students were not the only ones who appreciated Sochol's emphasis on the different types of skills needed to be a good engineer. Connor Armstrong, now a graduate student in the department, took the class as an undergraduate. "[Sochol] gave us a great foundation in the hard, technical skills, but also encouraged the development of soft skills such as speaking and networking," he states. "The combination of these skills better prepared me for my future career paths, whether that be in a professional or academic environment."

MACHINE LEARNING

"Engineering is using the tools of science and math to solve real world problems," according to Assistant Professor Mark Fuge. "Only today, these concepts have evolved from the traditional models and our modern tools are computer science and statistics." This definition guides his goals for his Applied Machine Learning for Engineering and Design Class (ENME 440/808E), which was added to the department curriculum in the fall of 2015.

Machine learning is offered to students in their senior year, or as an elective for graduate students aiming to get more experience in the field. It is one of the most



Clustering Design Methods using Machine Learning

popular courses students take in their last year due to its appeal to different interests. Many want to work in a field that integrates machine learning, such as the development of self-driving cars. Others want to develop their skills in programming or get acquainted with the language of the field. No matter what brings them to the class, Fuge wants them to leave with the ability to do just that.

Fuge accomplishes these goals partly through his teaching style, which incorporates active learning to provide students with in-depth educational experiences. In the lecture notes he prepares for his class, Fuge includes codes that students can run during class, to speed up the process. He believes giving students a place to start allows them to create a connection between the idea and the real work of the algorithm.

According to students, it is working.

“I enjoyed being able to see how changing the values of different parameters affected the performance of the algorithm,” says graduate student Vaibhav Bhilare, who is working on his master’s degree in robotics here at Maryland. “Along with the IPython Notebooks, Dr. Fuge presented various relevant online demos that helped me understand the concepts more easily.”

Fuge wants to expand this idea of active learning to future iterations of the class. To do so, he has begun using real-world data sets, from organizations such as the US Navy, to help students better envision what models are appropriate for a given problem. He also plans to incorporate optional assignments that allow students to map out a class trajectory most suitable to their career goals. Fuge hopes through his course in machine learning, students will gain access to a new tool to solve modern problems in engineering.

ENGINEERING FOR SOCIAL CHANGE

Since its introduction into the curriculum in spring 2015, Engineering for Social Change (ENME 467) has provided students with the opportunity to consider how to apply their technical knowledge to issues at the intersection of engineering, philanthropy, and social change.

The course is given through the Center for Engineering Concepts Development (CECD) within the department. Course leaders Professor Emeritus and CECD Director Davinder Anand and Assistant Director Dylan Hazelwood designed the course to show students how engineering can work to solve growing social and environmental challenges. They invite faculty and industry speakers who share their career experiences and how to think about engineering in a social context. Assignments include creating a poster presentation and writing a scholarly paper on an unintended consequence of engineering, and how students would work to mitigate this consequence.

Undergraduate student Christine Bersabal, who took ENME 467 her senior year, says these assignments made her consider engineering through a different lens. She researched electronic waste, focusing on the ethics of cell phone disposal and how engineers can solve this problem.

The ultimate assignments work with the \$10,000 grant, provided by the Neilom Foundation, which is presented to an organization chosen by the class. Students are given a short list of topics on engineering social issues. From this list, they create a request for proposal that is sent out to local non-profits, who give presentations on their companies and goals.

Last year, this award went to Baltimore-based company V-LINC. V-LINC specializes in helping people with disabilities through the use of technology at school, in the workplace, at home, and in the community. Students



Mechanical engineering students Guru Prasad Pandian, Christine Bersabal, and Nehemiah Emaikwu (l-r)

conducted on-site and phone interviews of the finalist companies to determine the recipient.

This engagement with the companies had an impact. Graduate student Nehemiah Emaikwu says that knowing their decision would affect companies for the better put the class in a unique position and made the work more fulfilling.

“The skills I gained in this course have helped me in my other courses,” says Emaikwu. “They guided my approach to ENME 472, the mechanical engineering capstone design course (where students create a prototype aimed at solving a given problem). Throughout the process, I weighed my decisions by also considering the related intended and unintended consequences.”

BIO-INSPIRED ROBOTICS

With state-of-the-art research centers such as the Maryland Robotics Center, the University of Maryland is on the forefront of robotics and its systems. Mechanical Engineering researchers work with robotics to solve problems in fields such as medicine, automotive, and artificial intelligence.

The department also offers a class in Bio-Inspired Robotics (ENME 489L) once a year. Through this course, geared towards undergraduates in their senior year, the faculty teach students how to design a robot that reflects biological traits, specifically those of a selected animal.

Stephen Aaron, mechanical engineering senior, says he was drawn to the class because he thought making his own robot seemed interesting. However, as he learned more about the assignments, he found the theory to be equally compelling.

“[The class] was great because we would learn the material of how the robots worked, and then apply it as we built our own,” says Aaron.

Aaron worked on Hippobot, a robot that replicated a hippopotamus. Teams were encouraged to watch videos of their chosen animal in motion to learn their locomotive movements. From there, their goal was to replicate these motions on a small scale in their robots.

The undergraduates were not the only ones learning. Graduate student Ryan St. Pierre co-taught the class with Mechanical Engineering Professor Hugh Bruck as part of the Clark School’s Future Faculty Program. The program provides select Ph.D. students with a curriculum to prepare them for the academic world.

St. Pierre, who will graduate in 2018, plans on getting a postdoctoral research fellowship and continuing on to an academic career. He says the experience of teaching Bio-Inspired Robotics was exciting because the students liked the material.

“Every student wants to build a robot,” says St. Pierre. “Getting to teach a project-based class is exciting because of the tangibility; students see how and where to apply what they learn in lecture to their individual projects.”



PHOTO: LISA HELFERT

FABRICATION AND MACHINE TOOL PRACTICES FOR ENGINEERING

Majid Aroom is passionate about ensuring mechanical engineering students have manual equipment skills. He has managed the Product Innovation & Realization Laboratory Suite (PIRLS), which includes the Machine Shop, for seven years, providing a learning center for students to get “in and behind the machines,” he states. “These skills are not automatic, you cannot just pick them up from a book.”

These reasons are why the department introduced the Fabrication and Machine Tool Practices for Engineering (ENME 207) in 2016. This course is being developed by Mechanical Engineering lecturer Dr. Babak Eslami. He intends to demonstrate to students the capabilities and limitations of different fabrication techniques. It is offered in the winter and summer semesters to appeal to students who might not have the space on their schedule during the school year.

To Aroom, these skills are crucial to an engineering education. He believes students should have the chance to learn how to use these machines during their undergraduate careers to better prepare them for their outside careers, whether they be in industry or academics. Aroom was the first technical staff member hired by Chair Balakumar Balachandran, who is glad that we were able to attract him to the department.

As part of ENME 207, Eslami assists students in learning the different machine parts and functions through hands-on interactions with the equipment. Assignments include fabricating different machines

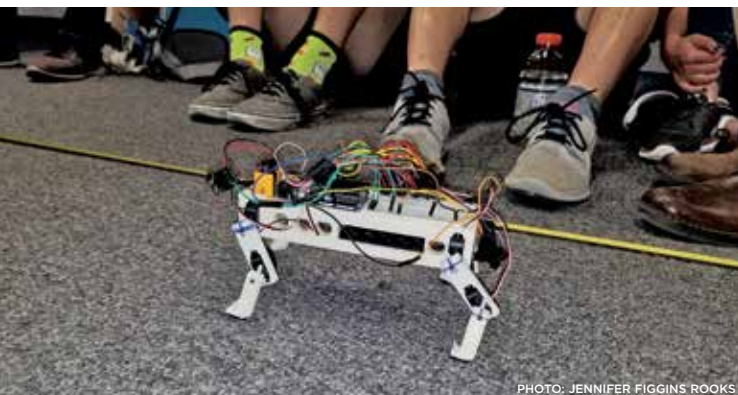
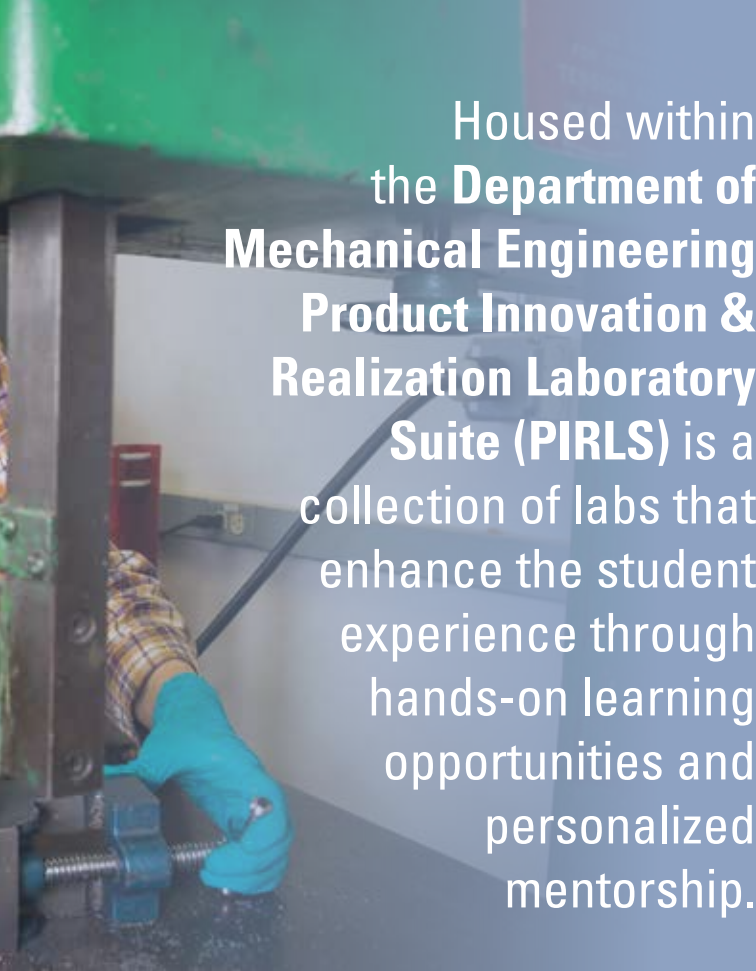


PHOTO: JENNIFER FIGGINS ROOKS

Cheetahbot, a student project from ENME 489L



Housed within the **Department of Mechanical Engineering Product Innovation & Realization Laboratory Suite (PIRLS)** is a collection of labs that enhance the student experience through hands-on learning opportunities and personalized mentorship.

and studying computer numerical control (CNC) systems that automate the design process. Students create prototypes, such as the engine shown on this page, for the final project, bringing together the various machines and techniques learned over the semester.

Eslami's goal is to expose students to the terminologies and practices so they are able to explain them to others after finishing the class.

"UMD is known for its innovative and leading design classes. By giving engineers the tools to both create the designs and communicate the build to those on the floor, we can create stronger graduates in all different fields," says Eslami.

True to its spirit, the machine shop is also used actively to meet 3D printing needs in courses, such as Bio-Inspired Robotics. In the future, both Aroom and Eslami envision the Machine Shop as continuing to be a place students come to design and work on a variety of projects. They want to remove limitations students face in their projects by giving them the equipment to solve whatever problems might arise. Through new courses such as ENME 207, they hope to continue implementing these tools as part of a comprehensive mechanical engineering curriculum at Maryland. ■

Established in 2006 and renovated over the last five years, the suite is a space where students can collaborate on projects from the classroom, in their research, or personal engineering projects they wish to pursue outside of their studies.

PIRLS also contains the Mechanical Engineering Machine Shop, which serves about 1800 students each semester. This space offers students different manual equipment and tools that aid in the construction of their projects. Students have the opportunity to learn how to correctly use equipment such as mills, saws, lathes, and drill presses; tools that are crucial in the manufacturing world.

Other PIRLS Facilities

DesignME | The Mechanical Engineering Design Lab is a workroom where students can have group meetings, brainstorming sessions, and make use of a wide selection of construction tools and materials. The lab contains workstations where students can collaborate and tools to facilitate design and construction. An electronics assembly area is included in this lab for projects that involve circuit manufacturing.

DesignME Computer Lab | The DesignME Computer Lab connects to DesignME and contains six workstations that provide students with high-speed internet, scanning and printing capabilities and a variety of software packages. In addition to the standard software found in the engineering computer labs, the DesignME Computer Lab is equipped with Minitab Quality Companion 2, CNC and plastic prototyping software, and cost analysis software.

ProtoME | The Mechanical Engineering Prototyping Lab houses equipment and machines that are used to bring designs to life. This lab contains plastic rapid prototyping, paper prototyping, and metal prototyping capabilities. The goal is to provide students the ability to create and experiment with designs to gain a deeper understanding of their projects and offer a sense of completion.

BuildME | The Mechanical Engineering Build Lab is geared towards providing space and tools for assembly and construction of student projects of all sizes. The lab houses one of the University-sponsored competition teams in the Human Powered Sub team and is also available for use by students in the ENME371 and ENME472 courses.

United Technologies and Carrier to Establish Center of Excellence at the University of Maryland



Representatives from UTC and Carrier meet with UMD faculty and researchers last fall.

Global giants United Technologies (UTC) Climate, Controls and Security, and HVAC manufacturer, Carrier, announced that they will establish a new research center of excellence at the University of Maryland that will lead to scientific advancements for safer, smarter and more sustainable buildings and climate controls systems design.

The collaboration will support research projects across two departments in UMD's A. James Clark School of Engineering—the Department of Mechanical Engineering and Fire Protection Engineering.

"Given the range of industry relevant research activities that we pursue in the department, we welcome the establishment of this new Center for Excellence supported by Carrier," said Balachandran Balakumar, Department of Mechanical Engineering Chair and Minta Martin Professor of Engineering. "The support received by this center will allow us to pursue interdisciplinary research activities across the college and provide unique opportunities for doctoral students in the thermal sciences and energy systems area."

One of those interdisciplinary research

projects will be led by Department of Fire Protection Engineering associate professor and principal investigator Stanislav Stoliarov to investigate the most cost-effective and efficient approach to lithium ion battery fire mitigation. Lithium ion batteries are considered to be one of the most promising technologies for effective electrical energy storage, but under some

conditions they may potentially fail, leading to large scale fires and property damage.

"We believe that this long term collaboration between UMD Fire Protection Engineering and UTC/Carrier will lead to significant advancements in these important areas of engineering," said Stoliarov. "And, we are excited to engage in research activities promoting safe and energy efficient infrastructure."

Looking ahead, Fire Protection Engineering Department Chair and

Professor James Milke added, "We are truly excited to be part of the United Technologies and Carrier to establish Center of Excellence. The activities of this center involving smart buildings and energy systems provide synergies with ongoing initiatives in our department."

The 'UTC/Carrier Center of Excellence' will begin its research work in fall 2017 at the University of Maryland's College Park campus.

The Center for Environmental Energy Engineering (CEEE) will be spearheading research for the Department of Mechanical Engineering. CEEE is a leader in research and education in environmentally responsible, economically feasible integrated energy conversion systems for buildings and transportation. Research focuses in particular on air-conditioning, refrigeration and heat pumping, and integrated cooling heating and power systems.

"...we are excited to engage in research activities promoting safe and energy efficient infrastructure."

STANISLAV STOLIAROV, FPE ASSOCIATE
PROFESSOR AND PRINCIPAL INVESTIGATOR

United Technologies is a global leader in the building systems industries, and is a leading provider of advanced commercial and technical solutions, for safer, smarter and more sustainable buildings. Carrier is the world leader in high-technology heating, air-conditioning and refrigeration solutions. With more than 100 years of proven innovation, they aim to solve problems on a global level, and drive new industries with innovation. ■

UPDATE: DOMINION FOUNDATION GRANT

In 2015, the Dominion Foundation presented department faculty with a \$50,000 educational grant, part of Dominion's Higher Educational Partnership to support Maryland's project for "Design of Efficient Solar Cooling System with High Coefficient of Performance." This story was featured in last year's Metrics.

The project, led by Research Professor and Associate Director for the Center of Environmental Energy Engineering (CEEE) Yunho Hwang, aimed to model, design, fabricate, and test a new solar cooling system that exceeds current efficiency standards. In their previous experiments, the team proved the concept of a solar thermal cooling system, and characterized the performance of the separate sensible and latent cooling systems but required more accurate system data. The team included Mechanical Engineering undergraduate students Jonathan Kagan and Joseph Baker (who has since become a graduate student) and graduate student Tao Cao.



THE TEAM PRESENTED THE FINAL REPORT OF THEIR FINDINGS THIS MAY.

Through the grant, they were able to design and establish a test facility to examine the performance of solar cooling technology to a degree of accuracy that CEEE has not been able achieve in previous experiments. Their experiment uses a solid, rotating desiccant wheel to dehumidify a process air stream, while the separate, regeneration air stream removes the moisture absorbed in the process air stream and carries it out of the system. This allows them to achieve constant dehumidification. In their concept, solar

thermal collectors supply the heat required for regeneration.

"Because we are able to measure air-flow very accurately, we are able to develop a model to describe the flow of air around the desiccant wheel. It has long been known that leakage occurs in solid desiccant systems, but there are no available models that quantify this phenomenon. We are in the process of the testing required to create a robust model of this airflow... We hope that this research will enable one to predict unwanted air leakage around a desiccant system and improve future solar cooling projects," said Hwang. ■

7



Maryland Robotics Center Receives NSF Funding for REU Site in Bioinspired Robotics

The Maryland Robotics Center (MRC) faculty, previously led by Mechanical Engineering Professors Hugh Bruck and Sarah Bergbreiter and now led by Professor Miao Yu, received funding from the National Science Foundation (NSF) to support 30 undergraduate researchers over the next three years as part of a Research Experience for Undergraduates (REU) Site in Bioinspired Robotics.

Bioinspired robots, defined as robots that are inspired by natural systems like insects, birds, mammals and reptiles, have the potential to significantly enable or enhance capabilities in manufacturing, health care, reconnaissance, exploration, food safety and search and rescue. Because of their unique design, bioinspired robotics offer a truly interdisciplinary systems research challenge that encompasses biology, materials, mechanical design, control, sensors and actuators, power, electronics, and computer science among other topics.

The REU program at Maryland was offered starting summer 2017. Selected students spend 10 weeks conducting research in bioinspired robotics that includes both application and fundamental research on topics involving, but not limited to, soft sensing, aerial vehicles, space robotics, miniature robotics and underwater robotics.

REU awards were made based on students' strong potential and motivation to perform bioinspired robotics research, academic preparation in their area of interest, letters of reference and interest in interacting with diverse mentors and peers in interdisciplinary research. ■

COULD STANDING ON A SCALE GIVE YOU BETTER INSIGHTS INTO YOUR CARDIOVASCULAR HEALTH?

Department of Mechanical Engineering Assistant Professor Jin-Oh Hahn and his team, which includes research associate Chang-Sei Kim and graduate student Stephanie Ober, have spent the past several years exploring ways to mathematically model some of the human body's cardiac functions to create algorithms and tools aimed at both improving current cardiovascular monitoring tools—like blood pressure cuffs—and creating unobtrusive ways to monitor patient vitals as well as health and disease.

Their latest findings published in *Scientific Reports*, “Ballistocardiogram: Mechanism and Potential for Unobtrusive Cardiovascular Health Monitoring,” offers a new mathematical model that could help establish a way to use an easy to measure vital sign known as cardiogenic body movements to improve cardiovascular health monitoring.

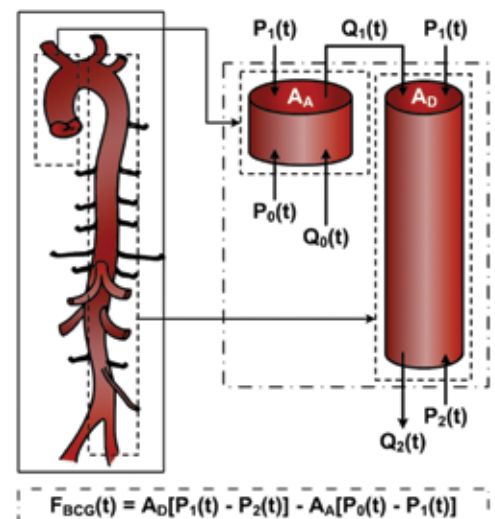
Cardiogenic body movements occur when the body pumps blood from the heart outward through the arterial system. As the blood travels outward, the body makes small recoiling movements to adjust for the displacement as it moves through the body. While we can't feel these subtle sensations, researchers have been able to easily measure these movements using specially modified weight scales that calculate these movements through installed sensors.

However, from when the Ballistocardiogram movement was first observed about 140 years ago until now, it was unclear what mechanism created these movements and how they could be used to evaluate cardiovascular health.

“We’ve succeeded in creating a mathematical model that unveils the relationship between these very small body movements and the flow of blood through the body,” explained Hahn. “By mathematically formalizing the equilibrium of forces exerted on the blood moving through the aorta, we were able to derive a model capable of predicting the waves as well as the physiological timings and amplitudes for the major waves.”

By understanding the mechanism of these easily measured waves and creating a way to correlate these measurements to other predictive factors of cardiovascular health, the team thinks there are possibilities in using these methods to achieve effective and unobtrusive ways to monitor and diagnose cardiovascular health and disease, such as simply standing on a scale, lying on a bed, or wearing a wrist band or ear phones.

Their research was based on work supported by the National Institutes of Health and the Heart and Stroke Foundation of Canada and was performed in partnership with colleagues at the University of Alberta, Edmonton, Georgia Institute of Technology, Atlanta and Michigan State University, East Lansing.



Mathematical model of the BCG waveform. The aorta is simplified as two tubes in cascade.

UMD Research Makes Back Cover *Soft Matter*

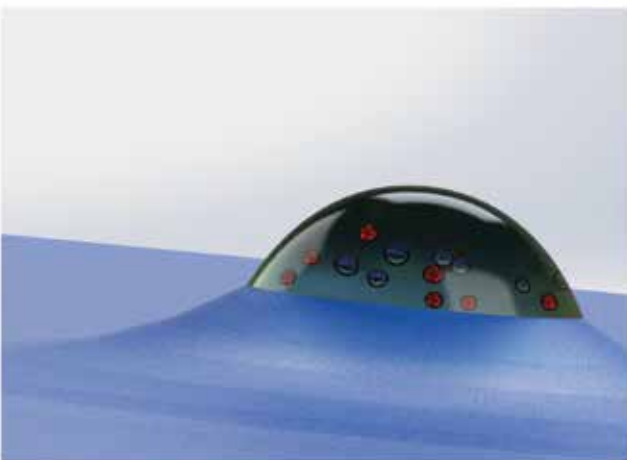
New research led by Mechanical Engineering Assistant Professor Siddhartha Das was featured on the back cover of the January 21, 2017 issue of the Royal Society of Chemistry's journal *Soft Matter*. Das and graduate students Haoyuan Jing and Shayandev Sinha shed new light on the behavior of liquid drops on soft and deformable surfaces. According to Das, understanding these behaviors is central to fabricating surfaces with desired properties that have applications in areas such as efficient heat conductors, water condensers, self-cleaning surfaces and manufacturing.

The technological applications of these studies could help in developing smart surfaces for triggering enhanced drop condensation, arresting coffee-ring formation, inducing controllable drop-drop interactions and more. Understanding drops on soft surfaces provide a window to better understanding cellular motion on compliant surfaces for tissue formation, explains Das, and potentially how to use of soft surfaces for arresting the spread of cancer cells.

The team paper, 'Elasto-electro-capillarity: drop equilibrium on a charged, elastic solid,' presents a theory that for the first time solves the equilibrium of the drop—such as the combined drop-solid shape—on a soft deformable solid for the asymmetric case of unequal solid-liquid and solid-vapor surface energies, and offers a fundamental step forward for a more realistic modeling of drop behavior on soft surfaces. Using their theory, they aim to unravel the effect of surface charge on soft solid on the drop equilibrium, which is another step towards providing a more realistic description of soft wetting phenomenon since most engineering and biological soft matter systems contain surface charges.

"Our results unraveled that this elasto-electro-capillarity effect makes a soft, elastic surface softer in context of liquid-drop induced deformations," explains Das. "We believe that this finding could massively impact the manner in which people will investigate and employ it in different target applications of soft wetting phenomenon."

Last year, Das' research on the attraction and repulsion of liquid drops resting on a soft solid was published in the Proceedings of the National Academy of Sciences and was featured in New York Times article 'Inverted Cheerios Effect' Returns Physics to the Breakfast Table. |




Highlighting research from the group of Dr Siddhartha Das of the Department of Mechanical Engineering, University of Maryland College Park.


Elasto-electro-capillarity: drop equilibrium on a charged, elastic solid

Elasto-electro-capillarity: new theory shows that the presence of surface charges makes a soft, elastic surface softer in context of liquid-drop-induced elastocapillary deformations.

As featured in:



See Siddhartha Das et al., *Soft Matter*, 2017, 13, 554.



rsc.li/soft-matter-journal

Registered charity number: 208899



“Miao is a highly talented member of our faculty, who has made a name for herself through her creativity and innovation.”

DR. BALACHANDRAN
CHAIR & MINTA MARTIN PROFESSOR

PHOTO: LISA HELFERT

Yu Awarded Professorship, Becomes Director of Maryland Robotics Center

Associate Professor Miao Yu was awarded rank of Professor by University of Maryland (UMD) President Dr. Wallace Loh and named the new Director of the Maryland Robotics Center. Her new positions were effective July 1, 2017.

Yu received her Ph.D. from UMD in 2002, and joined the department as a professor in 2005. During her time at Maryland, she has established and directed the Sensors and Actuators Laboratory, which has been used for both research and instructional efforts. Yu's research focuses on optical sensors, sensor mechanics and material behavior at special scales and micro/nano sensor systems. She has been published in the Nature family of journals, including Nature Communications and Scientific Reports, as well as highly regarded journals within her own domain including Applied Physics Letters and Optics Letters. Yu currently has six US patents, five of which have been licensed by industry.

She has received numerous awards and recognitions throughout her career. She won UMD's Invention of the Year Award in the Physicals Sciences Category in 2002. In 2007, she was awarded the National Science Foundation's (NSF) Faculty Early Career Development (CAREER) Award and the Air Force Office of Scientific Research's Young Investigator Research Program (YIP) Award. Yu also currently serves as an Associate Editor for the American Society of Mechanical Engineers (ASME) Journal of Vibration and Acoustics.

“Miao is a highly talented member of our faculty, who has made a name for herself through her creativity and innovation,” said Department Chair and Minta Martin Professor Balakumar Balachandran. “Her accomplishments have placed her on a path for continued international leadership in a number of areas, including optical sensing, acoustical sensing, and bio-inspired methodologies.”

FACULTY AWARDS AND RECOGNITION

Professor **SHAPOUR AZARM** won the 2016 American Society of Mechanical Engineers (ASME) Robert E. Abbott Award.



Professor **JEFFREY HERRMANN** was named a leader of a "Designing Innovations" research stream for UMD'S First-Year Innovation & Research (FIRE) Program.



Associate Professor **SARAH BERGBREITER** was featured on the front cover of *Advanced Materials Technologies* Advanced Robotics Manufacturing Institute.



Professor **PETER SANDBORN** received the ASME 2017 DFMLC Kos Ishii-Toshiba Award by the ASME Design Engineering Division. He also published the second edition of his book *Cost Analysis of Electronic Systems*.



Assistant Professor **SIDDHARTHA DAS** was named to the editorial board of Nature's *Scientific Reports* in the Fluids and Plasma Physics category.



Professor **LINDA SCHMIDT** was chosen as a UMD Undergraduate Studies Faculty Fellow for the 2016-2017 academic year.



Glenn L. Martin Institute Professor of Engineering and Professor of Practice **MILLARD S. FIREBAUGH** was recognized by the American Society of Naval Engineers (ASNE) with the 2016 Harold E. Saunders Lifetime Achievement Award for significant contributions to naval engineering.



Professor **JELENA SREBRIC** won the 2016 Inaugural Particle and Fibre Toxicology Prize Paper Award.



Distinguished University Professor **ASHWANI GUPTA** was named a 2016 Honorary Member by ASME. He was also named an American Association for the Advancement of Science (AAAS) Fellow. Gupta also won the 2017 American Institute of Aeronautics and Astronautics (AIAA) Pendray Aerospace Literature Award. Additionally, he was awarded the Golden Elephant Award by Thailand's Surindra Rajabhat University in recognition of his scientific achievements and collaboration with their university.



STAFF AWARD

Associate Director of Graduate Studies **KERRI POPPLER JAMES** received the 2016 Marilyn Berman Pollans Outstanding Staff Service Award.



Two new faculty members join the Department of Mechanical Engineering



Before joining the University of Maryland faculty, Assistant Professor Axel Krieger was the Assistant Research Professor and program lead for Smart Tools at the Sheikh Zayed Institute for Pediatric Surgical Innovation at Children's National. There, he led a group of scientists and engineers in the research and development of robotic tools and laparoscopic devices.

>> TO LEARN MORE VISIT:
go.umd.edu/Krieger-New-Faculty



Before becoming a faculty member at the University of Maryland, Assistant Professor Katrina Groth was Principal Member of Technical Staff at Sandia National Laboratories in Albuquerque, NM, where she worked from 2010. She is a department alumna and received her B.S., M.S., and Ph.D. from Maryland.

>> TO LEARN MORE VISIT:
go.umd.edu/Groth-New-Faculty

Undergraduates Win National Deloitte Consulting Case Competition

It started with a group text between four high school friends asking “what’s your major and GPA?” From there, the rest was history.

Sophomores Joshua Cocker (ME), Brooke Nesselt (ME), and Conor Casey (AERO) were not surprised when their former Poolesville High School and current University of Maryland (UMD) classmate Alex Tran (Finance and Information Systems) contacted them and signed them up for the National Deloitte Undergraduate Case Study Competition.

“Thankfully we all replied to his vague text, otherwise we wouldn’t be here now,” said Nesselt.

In March, the group of four competed in and won the national competition, which took place at Deloitte University in Westlake, Texas. The UMD team competed against 16 other universities from across the country to solve a case competition.

The competition took place over two days. On the first day, teams were given a business case—this year’s challenge involved an online retailer moving to a physical brick and mortar location. After receiving the case, teams had eight hours to develop a plan and submit a final pitch. They also prepared a fifteen minute presentation to give in front of Deloitte partners the following day.

Four top teams were chosen and gave a final speech in front of about one hundred Deloitte employees and other spectators. UMD placed first, beating out other finalists Vanderbilt, Cornell, and other Big Ten school Indiana University.

The sophomores won more than just bragging rights, too. Each student received \$1000 in prize money for being part of the winning team. |

UNDERGRADUATE AWARDS & HONORS

A. James Clark School of Engineering Leadership Award, **HAROULA TZAMARAS**

Academic Achievement Award (Junior 4.0), **ISAIAH THOMASON** and **MARIYA TYMOFIY**

Chairman’s Award: **DAVID ALCANTARA, KELSEY EARLE, NEHEMIAH EMAIKWU, AUSTIN KENDALL, GEDALIAH KNIZHNIK, CHASE MANNY, SAMUEL MAZZA, TRISHA PATEL, ALEXANDER PIQUÉ, AND LAURA SHUMATE**

Clark School Commencement Speaker, Fall 2016, **COREY ABRAMS**

Clark School Commencement Speaker, Spring 2017, **CONOR BRIGGI**

Deloitte Case Competition, First Place, **JOSHUA COCKER** and **BROOKE NESSELT**

Kim Borsavage and Pamela J. Stone Student Award for Outstanding Service, **JAIME BEREZ**

Maryland Technology Enterprise Institute (MTECH) ASPIRE Outstanding Student Research Award, **AAMAN MENGIS**

National Boren Scholarship, **HOANG NGUYEN**

Phillip Merrill Presidential Scholar, **CHRISTINA KRUEGER**

GRADUATE AWARDS & HONORS

ALL-S.T.A.R. Fellowship, **STEFAN BANGERTH**

American Control Conference Student Travel Award, **XIN JIN**

The American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) National Capital Chapter Endowed Fellowship, **STEFAN BANGERTH**

ASHRAE Travel Grant, **DARREN KEY**

American Society of Mechanical Engineers (ASME) Petroleum Division Scholarship, **VARUN KHEMANI**

ASME Dynamic Systems and Control Conference Student Travel Award, **ZHARA GHASEMI**

Dean’s Doctoral Research Award Competition, Second Place, **HANNES GREVE**

Department Best Dissertation Award, **ALEXI CHARALAMBIDES**

Department Best Teaching Assistant Award, **ZOHREH GHORBANI**



From left to right: Conor Casey, Joshua Cocker, Brooke Nesselt, and Alexander Tran.

FUTURE FACULTY



Faez Ahmed
ADVISOR, ASSISTANT PROFESSOR
MARK FUGE



Yan Ding
ADVISOR, ASSOCIATE PROFESSOR
STANISLAV STOLIAROV



Xiaotian Ma
ADVISOR, ASSOCIATE PROFESSOR
SARAH BERGBREITER



Jie Peng
ADVISOR, ASSOCIATE PROFESSOR
PETER CHUNG



Saurabh Saxena
ADVISOR, PROFESSOR
MICHAEL PECHT



Eliot Rudnick-Cohen
ADVISOR, PROFESSOR
SHAPOUR AZARM



Shayandeve Sinha
ADVISOR, ASSISTANT PROFESSOR
SIDDHARTHA DAS

Department Best Teaching Assistant Award, Runner-Up, **PAUL ANDERSON**

Department Best Thesis Award, **JOSEPH ANDREWS**

C. Raymond Knight Fellowship, **REUEL SMITH** and **TAOTAO ZHOU**

Center for Environmental Energy Engineering (CEEE) Best Consortium Meeting Presentation, Fall 2016, **YE TAO**

Center for Environmental Energy Engineering (CEEE) Best Consortium Meeting Presentation, Spring 2017, **DAVID HYMAS**

Clark School's Future Faculty Program: **FAEZ AHMED, YAN DING, XIAOTIAN MA, JIE PENG, ELIOT RUDNICK-COHEN, SAURABH SAXENA, AND SHAYANDEV SINHA**

GDF-Suez Fellowship, **DANIEL DALGO** and **YE TAO**

UMD's Graduate Dean's Dissertation Fellowship, **RAMIN BIGHAMIAN**

UMD's Graduate Student Summer Research Fellowship, **SIYAVASH TOOSI**

International Conference Student Support Award: **SRIRAM HARIHARAN, WEI TENG,** and **CONG ZHANG**

International Compressor Engineering Conference Best Student Paper, **YE TAO**

International Microelectronics Assembly and Packaging Society (IMAPS) Foundation's Steve Adamson Student Recognition Award, **NATHAN VALENTINE**

Institute of Electrical and Electronics Engineers (IEEE) ITherm Travel Grant, **DAVID DEISENROTH**

Jacob K. Golhaber Travel Grant, **STEFAN BANGERTH, GUANG CHEN, ZHIEWI HUANG, YE TAO** and **CONG ZHANG**

UMD Kulkarni Summer Research Fellowship, **VIPIN AGARWAL** and **FAEZ AHMED**

Machinery Failure Prevention Technology (MFPT) Conference Best Student, **NOEL JORDAN JAMESON**

Materials Research Society Travel Award Symposium Assistantship, **SHAYANDEV SINHA**

Maryland Science Olympiad Extraordinary Service Recognition to Regional K-12 Programs, **SHAYANDEV SINHA**

National Science Foundation (NSF) Smart and Connected Health PI Meeting Travel Support for Student Outreach Mentoring, **ZHARA GHASEMI**

Outstanding Graduate Assistant Award: **MARTIN ERININ, AKSHIT MARKAN, RYAN ST. PIERRE,** and **MANOHARAN SUBRAMANI**

Richard and Stefani Vogel Graduate Student Award, **RYAN ST. PIERRE**

Roving Comforter Design Competition, Second Place, **ZHIWEI HUANG**

UMD Graduate Research Interaction Day (GRID) Award, **MIED NIKFARJAM**

A Passion for Life and Learning

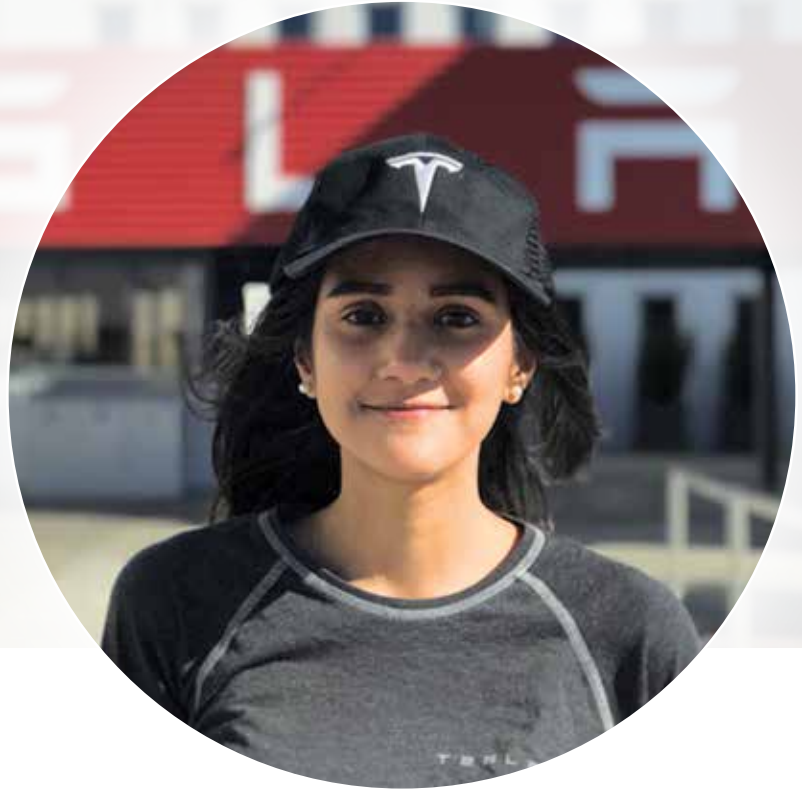
SOOPHIA ANSARI HAS MANY DIFFERENT INTERESTS. IF YOU TALK TO HER, THAT'S ONE OF THE FIRST THINGS YOU'LL FIGURE OUT.

She's currently finishing up a semester long co-op at Tesla working with crash test dummies. She studied abroad in Valencia, Spain her junior year. She is a Muslim and curious about different religions across the world. She loves languages (and speaks three). She's passionate about education and outreach in developing countries. And this fall before heading to Malaysia to complete a one year Fulbright teaching assistantship, she is going to graduate with her B.S. in Mechanical Engineering.

"Mechanical Engineering was the best route for my multifaceted interests due to the amount of diversity in the curriculum. You can shape the degree to whatever you want to do," Ansari says.

A first-generation Pakistani-American, Ansari moved to Baltimore, Md. during childhood with her family. She says that watching her father, who is also a mechanical engineer, build different machines cultivated her passion for math and science. As a young girl, she built paper-mâché rockets, competed in STEM competitions, and read books on quantum space travel. When time came to decide what she wanted to study at the University of Maryland, mechanical engineering was the obvious choice.

What wasn't so obvious was how she could explore her technical and non-technical passions while sticking to the curriculum. However, throughout her time at Maryland, she has been involved with various groups that illustrate the wide range of opportunities available within a career in engineering.



Ansari joined the UMD chapter of Engineers Without Borders, an international organization focused on the implementation of sustainable engineering projects, her freshman year. This group honed her skills in international development and illuminated a professional career path that combined her passions for engineering, different cultures, and sustainability. From there, she pursued her pedagogical interests through the Clark School Ambassador Program and serving as a Teaching Assistant for ENME 361 Vibrations, Control, and Optimization. Through these experiences, she was able to explore her own understanding of what it means to be an engineer.

In January 2018, Ansari moves to Malaysia to serve as a Fulbright English Teaching Assistant. There she'll teach students English in the context of science and technology. She plans on incorporating lessons on how planes work and have students create their own paper helicopters, planes, and parachutes. On the surface, these topics might seem dissimilar, but knowing Ansari, she'll be able to combine these different concepts into effective lessons for her students.

So what are her words of advice to students at Maryland?

"Try as many things as you can. Don't be afraid if there isn't a clear path, and don't settle. Always seek out your passions and stay hungry for those opportunities."

Ansari says when she arrived at college, she was not sure if she could pursue her various interests, but was proven wrong through the countless opportunities available to Terps. Her education in mechanical engineering sharpened her ability to problem solve and think critically. That's what engineering at Maryland means to her, and what makes her most excited about moving forward to the next chapter of her life. |

Scholarship Honors Clifford L. Sayre



Marie Cole, in red, with ENES 100 students and faculty members Balakumar Balachandran and William Fourney.

This past May, Marie Sayre Cole stopped by the College Park campus to see the ENES 100 Introduction to Engineering Design end of semester showcase. She planned to be in the area visiting family and friends, and was informed that this event was happening.



"It was really just luck that the two lined up. It was great to see the student showcase and the projects the teams had designed."

ENES 100 is a required course for all first-year engineering students at the University of Maryland. The project-based course requires students to work in teams to develop a prototype over sand vehicle (OSV) capable of autonomously navigating a course and completing one of several missions. It is one of the Keystone Program courses, aimed at building a strong academic foundation in an engineering student's first year at Maryland.

It also happens to be one of the courses that will be taught by Dr. Clifford L. Sayre Mechanical Engineering Teaching

Fellows, who are supported by the funds established by Cole this spring. This fund honors her father and longtime Maryland mechanical engineering professor Dr. Clifford L. Sayre, who passed away early last year.

Sayre was a member of the University of Maryland faculty for over 30 years. He joined the department as an assistant professor in 1955, and received his Ph.D. in Mechanical Engineering from Maryland in 1961. During this time, he served as both the Associate Dean of Engineering (1976-1979) and Acting Chairman in Mechanical Engineering (1979).

Throughout his career, Sayre championed many programs that helped shape the department's curriculum to this day. He advocated for increased diversity in engineering education, and had significant involvement in creating a summer program for minority scholars and women in engineering. Sayre also aided in the development of the senior capstone design course, as one of his primary focuses was the importance of experiential learning within engineering education. In fact, Cole remembers her father coming home from the capstone Design Day and talk-

ing about the different student projects he saw every semester.

Which is why, Cole says, supporting mechanical engineering teaching fellows within the Keystone Program is the perfect way to honor her father's legacy.

According to Cole, Sayre caught the teaching bug through his own time as a teaching assistant. After serving in the United States Navy, Sayre came to Maryland and taught undergraduates while getting his Ph.D. in Mechanical Engineering. These experiences led him on the path to his future career here at the Department.

Cole wanted to give back to Maryland because her father was pivotal in the development of the educational pillars the department still stands on today. She believes creating an endowment in his name will continue the legacy that started over 50 years ago when he began as a student at Maryland.

And her hopes for the students who receive the scholarship?



"I would hope that this scholarship will take the financial burden off some of these students and continue to energize engineering education at Maryland," says Cole. "And maybe a few will go on to teach like my father, and follow his passion for students and education."

>> TO LEARN MORE ABOUT THE DR. CLIFFORD L. SAYRE, JR. ENDOWMENT FUND, VISIT go.umd.edu/Sayre-Fund

MARIA KORSNICK ELECTED PRESIDENT AND CEO OF NEI

Alumna Maria Korsnick (B.S. Nuclear Engineering '86) was elected to the position of President and CEO of the Nuclear Energy Institute (NEI), which is the policy organization for the United States nuclear energy industry. She had previously served as their COO since May 2015. She began her tenure January 1, 2017, succeeding former NEI President Marvin Fertel.

This appointment follows years of experience in the industry. During her time at NEI, she has been responsible for government affairs, strategic planning and policy, suppliers and international programs and nuclear generation and communication divisions. Previous to this position, she was a senior VP of Exelon's Northeast operations and acting CEO and CNO of Constellation Energy.

Of her new position, Korsnick says "It's a challenging and exciting time for the nuclear industry right now. At NEI, we have four objectives: Preserve, Sustain, Innovate and Thrive. We are working to get our current fleet of reactors recognized for the value they bring—very reliable, emissions- and carbon-free, 'round-the-clock generation. Reduce regulatory burden to help sustain the fleet. Innovate and bring new reactors to the market—small modular and advanced designs... Lots to do—with real opportunity to make lasting change!"

Korsnick is also an active alum both here in the department and at the University of Maryland as a whole. She currently serves as a member of the Department of Mechanical Engineering Visiting Committee. She has been a member since 2015. Also, last year, she was featured in the University of Maryland Energy Research Center's (UMERC) Transforming Energy Lecture Series for her talk titled "Nuclear Energy's Vital Role in America's Diverse Electricity System."



ALUMNI APPOINTMENTS

MIAN LI (PH.D. '07) Associate Professor with tenure, Electrical and Computer Engineering, University of Michigan-Shanghai Jiao Tong University Joint Institute

KATRINA GROTH (PH.D. '09) Assistant Professor, Mechanical Engineering, University of Maryland

ZHIMIN XI (PH.D. '10) Assistant Professor, Industrial & Systems Engineering, University of Tennessee Knoxville

JAMES BORRELLI (PH.D. '11) Postdoctoral Fellow, Physical Therapy and Rehabilitation Science, University of Maryland School of Medicine

CHAO HU (PH.D. '11) Assistant Professor, Mechanical Engineering, Iowa State University

PAVAKUMAR TALLAPRAGADA (PH.D. '13) Assistant Professor, Electrical Engineering, Indian Institute of Science

JIANJUN XU (PH.D. '13) Assistant Professor, Mechanical Engineering, University of the District of Columbia

RAMIN BIGHAMIAN (PH.D. '17) Postdoctoral Fellow, Electrical Engineering, University of Southern California

Alumni on Campus: Career Paths

FALL

- **JACK COURSEY (B.S. '01, M.S. '03, PH.D. '07)**
Manager, Engineering at Canon Life Sciences
- **JAMES MORELAND (B.S. '88)**
OUSD AT&L/Tactical Warfare Systems Deputy Director, Naval Warfare at the Department of Defense
- **LEWIS ASKEW (B.S. '88)**
Managing Partner at Graves, Horton, Askew & Jenkins LLC
- **CARA MARTIN (B.S. '06)**
Chief Operating Officer, Optimized Thermal Systems
- **CHRIS STRAIGHT (B.S. '84)**
Director Product Development, K2M

SPRING

- **CHAD SCHNEIDER (B.S. '99)**
President, Root3 Labs
- **BARRY MCQUAY (B.S. '84)**
Mechanical/Electrical Manager, Whiting-Turner
- **PATRICK GEX (M.S. '84)**
VP Industry Solutions Executive at ABB Inc.
- **JOHN SPRUILL (B.S. '98)**
Director, Vehicle Engineering Test Group, Tesla
- **VEE RAMKALAWON (B.S. '95)**
Manager, Verizon



Alumnus George Gellrich (second from left) visits the Maryland University Training Reactor (MUTR)

OTHER SPEAKERS

- **LES BOOKOFF (B.S. '90)**
Partner, Bookoff McAndrews - Speaker for UMD Honors College
- **DAN DIEHL (B.S. '90)**
CEO, Aircuity, Inc - Brought Aircuity Founder Gordon Sharpe to speak at ASHRAE Lecture
- **GEORGE GELLRICH (B.S. '81)**
Site Vice President, Calvert Cliffs Nuclear Plant - Speaker for Nuclear Reactor Systems & Safety course
- **ALEX MEHR (PH.D. '03)**
Founder Zoosk, Entrepreneur, Startup Advisor/ Investor - Featured Panelist at UMD Digital Disruptors Event
- **TONIANN THOMAS (B.S. '82)**
Partner IBM Global Business Services - Speaker for FLEXUS Executive Leadership Series

Want to Share Your Story?

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Life in the Fast Lane: Alumnus on 2017 Winning Daytona 500 Team

ALUMNUS MIKE COOK (B.S. '08) IS NO STRANGER TO LIFE IN THE FAST LANE.

Just this past February, the former Terps Racing team leader was a member of the Daytona 500-winning No. 41 Kurt Busch team of Stewart-Haas Racing (SHR). But a career in NASCAR wasn't always on his horizon.

When Cook arrived at the University of Maryland in 2001, his intention was to pursue a degree in mathematics. However, after encountering Terps Racing, the school's Formula Society of Automotive Engineers (SAE) student competition team before his senior year, Cook opted to switch gears and transitioned from mathematics to mechanical engineering.

"Growing up, I always had an interest in cars and racing," explained Cook. "This program really sucked me down the rabbit hole. I switched my major to mechanical engineering, and that basically restarted my college career."

Over the next few years, Cook devoted his energy to Terps Racing, and in 2007 became the team leader. During that time, the team secured its best finish, 15th, in the Formula SAE Michigan competition.

After graduation, Cook took a job with the U.S. Army at Aberdeen Proving Grounds. However, in 2014, Cook received a call from Klausmeier with an opportunity to work as a race engineer at SHR. The allure of being back in the garage was too much to resist, and Cook relocated to Mooresville, North Carolina.

Fast-forward to Daytona this year, and the culmination of hard work and team efforts paid off.



"The Daytona 500, and speedway racing in general, is much more about all of the preparation at the shop than the actual car setup at the track," Cook explained. "Engineers have a different role at speedway races than all other tracks. Success comes down to horsepower, aerodynamic drag, luck, and car setup—in that order. To win the 500 is really a testament to the whole shop working together."

However, this particular Daytona win did come down to engineering ingenuity. While the team's speedway cars can typically average 47 laps on a tank of gas, and most cars pitted on lap 150 of the 200-lap race, Cook and the rest of Kurt Busch's team opted to stretch its fuel mileage and make its pit stop on lap 151.

The strategy paid off for the team as several of the lead cars ran out of fuel in the closing laps. Busch was able to maneuver into the lead while the other drivers were unable to organize quickly enough to try to catch up. Busch ultimately won the Daytona 500 having led just one lap—the final one—the fewest ever led by a Daytona 500 winner.

"There were 100,000 people cheering, but when I got out there, all of that went quiet. Kurt left the car running. It still had enough fuel to do a burnout and make it to victory lane, where it finally ran out. All I could hear was the idling of the car. It was surreal," Cook said. "On one hand, you're being broadcast across the world for millions to watch, and on the other, it seemed just like a bunch of car guys hanging out in our garage."

While the Daytona race was a huge achievement for the team, the race was just the start of the 2017 NASCAR season. While he loves his job, he credits the support of his wife, Meredith DeMoss Cook (M.S. '08), for enabling him to stay the course.

"We all sacrifice a lot to do this. My loving wife is really the foundation of our family, which lets me do this," Cook added. "There is still a long season ahead of us. However, I will never forget my biggest win, the 2017 Daytona 500."

>> FOR MORE INFORMATION ON MIKE, VISIT go.umd.edu/ME-Mike-Cook



A. JAMES CLARK SCHOOL OF ENGINEERING

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University of Maryland
College Park, MD 20742



DESIGN DAY JUDGES

FALL 2016

Andy Akers
Tim Arnold (B.S. '76)
Bruce Dale (B.S. '64, M.S. '67)
John Drager (B.S. '64)
Greg Herwig (B.S. '03)
Paul Hickey (B.S. '93)
Bill Leasure (B.S. '66)
Aris Mardirossian (B.S. '74, M.S. '75)
Jonathan Murray (B.S. '00)
Chris Straight (B.S. '84)
Todd Wallenstein (B.S. '00, MS '04)

SPRING 2017

Thomas Bassolino (B.S. '04)
Tom Carcaterra (B.S. '84)
Aris Cleanthous (B.S. '96)
Bruce Dale (B.S. '64, M.S. '67)
John Drager (B.S. '64)
Allen Ford (B.S. '64)
Paul Hickey (B.S. '93)
Tyler Knight (B.S. '14)
Bill Sangrey (B.S. '65)
Chris Straight (B.S. '84)
Todd Wallenstein (M.S. '04)
Nick Watkins (B.S. '11)
Russ Werneth (B.S. '64, M.S. '68)

PHOTO: JENNIFER FIGGINS ROOKS

SPRING 2017 DESIGN DAY WINNING TEAM, Journey on a Gurney, with their project "GIRL-V"—a wheel assembly that replaces the existing wheels on an ambulance gurney to reduce the vibrations transmitted to a patient.

Visit <http://www.enme.umd.edu/events/me-design-day>

STAY CONNECTED!

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