



ENGINEERING AT MARYLAND

Building
Tomorrow,
Together:
An Investment
for Maryland

What’s on the cover?

The impact and legacy of A. James Clark is represented by a mosaic composite of Clark School people, events, and buildings.



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An Investment for Maryland

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PHOTO: AL SANTOS

“Let’s follow Mr. Clark’s example and continue to build opportunities in the communities that we care about.”

Dear Friends of the Clark School,

With incredible elation, I want to pass along my excitement about the extraordinary, nearly \$220 million investment from the A. James & Alice B. Clark Foundation, announced October 4. This bold generosity will shape engineering at the University of Maryland for the next century by increasing college access and affordability for engineering students, inspiring the next generation of leaders, and sparking innovations that tackle today’s most daunting problems.

In our feature story, you’ll read about the continuing philanthropic legacy of our beloved engineering alumnus and eponym, A. James Clark, and the array of need-based scholarships, graduate fellowships, distinguished faculty chairs, and operational and capital projects that this investment—the largest in UMD history and among the largest to a public research institution in the 21st century—will fund.

This is a very special edition of *Engineering at Maryland*. Our masthead has changed, and our future is even brighter than before. Your contributions to our community of excellence laid the groundwork for this investment, but our work here isn’t done. Let’s follow Mr. Clark’s example and continue to build opportunities in the communities that we care about. For more information, please visit buildingtogether.umd.edu.

Best,

Darryll J. Pines
DEAN AND FARVARDIN PROFESSOR OF ENGINEERING

Engineering at Maryland is published twice a year for alumni and friends of the A. James Clark School of Engineering and the Glenn L. Martin Institute of Technology at the University of Maryland.

Letters to the editor and alumni notes are welcome. Please send them to *Engineering at Maryland* Editor, 3228 Kim Engineering Building, 8228 Paint Branch Drive, College Park, MD 20742-2831. Information can be sent by email to mandreyc@umd.edu.

Please note that *Engineering at Maryland* refers to the A. James Clark School of Engineering by that name in all cases, including stories that describe alumni who graduated before the name was established, in 1994, to honor Mr. Clark’s outstanding philanthropy.

ENGINEERING
AT MARYLAND

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Building Tomorrow, Together:

An Investment for Maryland

The late A. James “Jim” Clark (B.S. ’50, civil engineering) was a man who believed in building community. For more than 50 years, he helped build the University of Maryland, College Park (UMD) and the engineering school that now bears his name. His generous investments have furthered the education and careers of thousands of students in a mission to solve the most critical issues of our time.

This mission is about to shift into overdrive.

Announced October 4, the A. James & Alice B. Clark Foundation that carries on the legacy of Mr. Clark made a commitment of nearly \$220 million to transform UMD’s A. James Clark School of Engineering through investments in students, leadership, and infrastructure. This extraordinary generosity allows the university to reimagine the path to a better future for the state of Maryland.

“This investment is historic in scope and transformational in impact, and I do not say this lightly,” says University of Maryland President Wallace D. Loh. “Access to higher education is essential if we are to solve urgent national problems. Creating this path for the most promising students in engineering and other fields may well prove to be Mr. Clark’s greatest legacy.”

New scholarships and student support made possible by this donation build on the Foundation’s—and Mr. Clark’s—fundamental belief in connecting effort with opportunity, by helping those who demonstrate determination and perseverance. The investment earmarks funds to ensure post-secondary education is accessible and affordable to high-potential students from all backgrounds.

“Without question, my dad loved the University of Maryland,” says Courtney Clark Pastrick, chair of the A. James & Alice B. Clark Foundation. “College Park was instrumental in educating and equipping him as an engineer and successful businessman. However, his legacy is in his community engagement and generosity. Our family and the Foundation look forward to seeing the impact of this gift in the decades to come.”

New endowed faculty positions will attract the foremost experts in critical research areas. New leading-edge infrastructure will provide the necessary tools to take our teaching and research enterprise to the next level. Working together, these initiatives underpin the Clark School’s mission to surmount the most daunting

challenges facing society—from energy and the environment to security and human health—through engineering innovations.

“This investment will transform the university, and especially engineering,” says Clark School Dean and Farvardin Professor of Engineering Darryll J. Pines. “For today’s engineering students, this gift promises not only to open doors to a world-class engineering education, but also to inspire hearts and empower minds through the example set by Mr. Clark. By learning about the industry leader and philanthropist, students will feel driven to develop solutions to help people lead better lives.”

Game-Changing Gift Positions Clark School to Transform Problems into Possibilities

President of the National Academy of Engineering C. Daniel Mote, Jr.—who maintains an appointment with the Clark School as Regents Professor and Glenn L. Martin Institute Professor of Engineering—reflected on the counsel Mr. Clark provided him during his time as president of UMD.

“Jim Clark was a wise man with tremendous instincts. He could see what was going to work,” says Mote. “As society’s problem solvers, engineers have never been more in demand. The entire world is hungry for engineering talent. That’s why this support of the Clark School is so enormously important: it’s going to facilitate the creation and development of this talent.”

“Dad always said that education changes lives, and his education changed his life.”

COURTNEY CLARK PASTRICK
CHAIR, A. JAMES & ALICE B. CLARK FOUNDATION



Mr. Clark at work.

The Story of A. James Clark



Mr. Clark's UMD yearbook photo.

THE STUDENT

Before Mr. Clark, the philanthropist; before Mr. Clark, the builder and business leader; there was the young man and student. The late chairman and CEO of Clark Enterprises spent his life building an empire in the construction industry, but he never forgot his start as an engineering student at the University of Maryland.

Coming from a family of modest means, he hitchhiked his way each day from his family's home in Bethesda, Maryland, to College Park to pursue a degree in civil engineering. The year was 1946. His classes were held in Skinner Hall; he would have eaten lunch in what is today LaFrak Hall or on McKeldin Mall. Unable to afford to live on campus, he paid only for his textbooks and used library copies when he couldn't afford his own. His university education was made possible by a state scholarship, a fact he never forgot—and would pay forward time and again.

In his later years, Mr. Clark liked to share his hitchhiking story with the students he would meet whose scholarships he funded. “Mr. Clark spoke with students as if he were still a student,” says Clark School Dean and Farvardin Professor of Engineering Darryll J. Pines, “and they loved it.” He told students that a scholarship funded the education that set him on his career path, and he owed a lot in return. He gave back, and he hoped that the students he helped would follow his example and use their engineering training to benefit their communities.

Courtney Clark Pastrick, chair of the A. James & Alice B. Clark Foundation, recalls her father's view on education: “Dad always said that education changes lives, and his education changed *his* life.”

THE BUILDER

He didn't look or act like your typical construction magnate. “You could pass Mr. Clark in the hallway and not know it,” says Pines. “He wanted it that way. He wanted to be behind the scenes, to do good work, but not necessarily to be recognized for it.”

At the same time, he was absolutely driven to succeed. Shortly after graduating from UMD in 1950, he was hired as a field engineer by the Bethesda, Maryland-based George Hyman Construction Company. Over the next 60 years, Mr. Clark grew the company into one of the largest construction firms in the nation: Clark Construction. Of the construction industry, Mr. Clark said, “If you do it right, you will build structures that will be there for future generations.”

He did it right. The company he grew now claims a portfolio of more than 2,000 projects from coast to coast. Clark Construction has transformed the landscape of the nation's capital, from Nationals Park to L'Enfant Plaza, and, most recently, the National Museum of African American History & Culture. At UMD, the company has built or renovated 27 structures. More important than his portfolio, Mr. Clark developed an esteemed company on the core values that got him through college: hard work, integrity, and respect.

Melanie (Wong)
Turlington

UMD DEGREE: B.S. '11, Civil Engineering

CURRENTLY: Program Manager with
Google's Real Estate and Workplace
Services Global Data Integrity Team

A native of Clarksburg, Maryland, Melanie Turlington has always been passionate about the environment and protecting the world's resources. A member of her high school's environmental science organization, she began to view civil engineering as a way to work with the ecosystem while also pursuing a more technically rigorous degree program.


When applying to schools, some out of state, Turlington realized that college was going to be far more expensive than she or her family had expected. But when she found out that she had been awarded a host of scholarships to attend the University of Maryland—including an A. James Clark Scholarship—she discovered that she had found a way to make her goal of receiving a great engineering education a reality.

“Because I didn't have to worry about getting a part-time job to fund my education, I was able to focus on my studies, participate in extracurricular activities, and intern for real-world experience,” says Turlington.

While enrolled at UMD, Turlington interned at the U.S. Department of Energy, presenting shale gas research to federal agencies and the American Gas Association, increasing the visibility of federal energy jobs, and speaking to campus leaders, faculty, and students at UMD.

After graduating from UMD debt-free and receiving her master's degree from the Massachusetts Institute of Technology, Turlington embarked on a career path that combines her technical background in civil engineering with her passion for improving people's lives through technology. She remains a strong advocate for the A. James Clark School of Engineering, advising young students on the West Coast who are interested in engineering to consider UMD as the place to launch their own impactful careers.

STUDENT IMPACT



Nicholas J. Weadock

UMD DEGREE: B.S. '13, Materials Science and Engineering

CURRENTLY: Doctoral Candidate,
Department of Applied Physics and Materials Science,
California Institute of Technology

When Nick Weadock enrolled at the University of Maryland's A. James Clark School of Engineering, he focused his interest in renewable energy and sustainability on the Department of Materials Science and Engineering following a compelling presentation at an admitted student open house.

Weadock's A. James Clark Scholarship gave him the freedom to engage in in-depth summer research projects with faculty, such as with Clark School Associate Professor Liangbing Hu's research group on an environmentally friendly battery made from wood.

Weadock also played a key leadership role in designing and operating the university's winning entry in the U.S. Department of Energy's 2011 Solar Decathlon. This collegiate competition challenges student teams to design and build full-size, solar-powered houses. Weadock designed the heating, ventilating, and air

conditioning system for the UMD team's offering, called WaterShed, as well as ran the house during the intensive 10 days of competition on the National Mall.

"The WaterShed house is still standing at the Pepco facility in Rockville, Maryland," says Weadock. "I've been back to visit it a few times! it is so gratifying that it is still being used as a teaching tool; it is my biggest contribution to the engineering community to date."

As a Ph.D. candidate in the Department of Applied Physics and Materials Science at the California Institute of Technology, Weadock has continued his research interest in renewable energy. He currently is looking at how we can better use metal hydrides and carbonaceous materials for hydrogen storage, which has renewable energy implications in developing safe, energy-dense, rechargeable batteries and fuel cells for electric vehicles.

STUDENT IMPACT

THE PHILANTHROPIST

It speaks volumes about his generosity that student success, not structures, stands as Mr. Clark's legacy at UMD. A proud alumnus, he believed strongly in education and often quoted his mentor and friend Benjamin Rome: "Young people are our future. If we don't invest in their education, what kind of future will we have?"



George Dieter, left, with Mr. Clark.

In that spirit, Mr. Clark gave generously to his alma mater. Professor Emeritus George Dieter, dean of the engineering school at UMD in the early 1980s, recalls connecting with Mr. Clark shortly after he became head of his construction business—before there was much interaction between the university and industry. "Out of the blue, Mr. Clark gave our school the funds to establish a chair position in construction engineering," says Dieter. "Then, once a year, I'd go to Mr. Clark's office and talk with him. He was very interested in undergraduate engineering education; he wanted to know what—and how—our professors were teaching our students to be tomorrow's engineers."

As his business grew, so did his philanthropy. In 1994, Mr. Clark donated \$15 million in support of undergraduate engineering education at UMD, for scholarships and programs

such as career services, to create all-around successful graduates. In recognition of his generosity and his leadership in the field of civil engineering, the college was named the A. James Clark School of Engineering. Known for his humility, Mr. Clark said the naming was "the most meaningful honor I will ever receive."

In 2005, he established a \$30 million endowment to provide financial support for Clark School undergraduates. His investment strengthened the university's ability to attract the most talented students and helped address a national shortage of highly trained engineers.

Mr. Clark's support of students stemmed from his values, says Herb Rabin, who served as interim dean of the Clark School twice during the 1990s and 2000s. Mr. Clark's own scholarship to attend UMD influenced his giving back, says Rabin. "However, I believe his generosity was deeply embedded in his personal character."

THE LEADER

Mr. Clark's ongoing relationship with his alma mater brought honor and recognition to the Clark School. "Mr. Clark was an exceptional engineer and industry leader," says Rabin. "His relationship with the Clark School conveyed an extremely positive message to our students—and to entire communities in Maryland and beyond."

With an eye on the future of engineering, Mr. Clark invested in Maryland yet again in 2012 with a naming gift to support the design and construction of A. James Clark Hall, headquarters to the Fischell Department of Bioengineering and the Robert E. Fischell Institute for Biomedical Devices. The new home for human health and innovation, which opens for classes in 2018, is the first building on campus to bear the name of the legendary builder and leader: A. James Clark.

LEGEND TO LEGACY

The construction icon passed away on March 20, 2015. Dieter and other university leaders including University President Wallace D. Loh, along with many UMD faculty, staff, and students, took buses from campus to attend the funeral at Washington National Cathedral. Walking up the cathedral's long center aisle, what impressed Dieter wasn't the presence of Washington, D.C., business luminaries, but the other 1,000 men and women in attendance. "Most of the people there were Mr. Clark's construction workers," he says.

By living every day by the values he espoused—honesty, integrity, and dedication to quality—Mr. Clark had earned unwavering loyalty from all his employees. Clark Enterprises President Robert J. Flanagan recalls the National Cathedral service. Of the many Clark Construction employees who were

there paying their respects, he says, "If you asked them who they worked for, they would say, 'Jim'—not the company, not Clark Construction. They worked for Jim Clark."

Honoring Mr. Clark means more than remembering our alumnus and benefactor: it means following his mandate to give back to the communities where he built his success; it means ensuring the success of the next generation.

Today, the philanthropic A. James & Alice B. Clark Foundation, a private organization funded by the A. James Clark family and managed by its President and CEO Joe Del Guercio, carries on Mr. Clark's values through several charitable focuses: engineering scholarship, education and community investments across the D.C. metro area, and veterans support.

Strengthening Student Success



Mr. Clark, center right, with Dean Darryll Pines and students who benefited from his scholarships.

The century ahead poses daunting societal challenges, from feeding a growing world population to engineering new medicines to developing dependable sources of renewable energy. To tackle these challenges, we need great engineers.

In 2008, the National Academy of Engineering (NAE) identified 14 “Grand Challenges for Engineering in the 21st Century.” These goals—which include making solar energy economical, restoring and improving urban infrastructure, and securing cyberspace—support the NAE’s vision for a “more sustainable, safe, healthy, and joyful world.”

To achieve the NAE’s aspirational vision, Mr. Clark, an NAE member, knew that tomorrow’s engineers must receive the best education, today.

INVESTING IN THE BEST

The A. James Clark Scholars Program, a signature A. James & Alice B. Clark Foundation initiative, supports high-performing undergraduate engineering students with financial need. Clark Scholars participate in specialized academic programs along with leadership, business, and project management training. “Mr. Clark always thought that engineers, while being great problem solvers, also needed to understand how to run a business,” recalls Clark School Dean and Farvardin Professor of Engineering Darryll J. Pines.

At the Clark School, the Clark Scholars Program will bring together a cohort of 10 exceptional engineering

students annually. The scholarship is designed to ensure that these bold young innovators will be able to graduate debt-free, enabling them to fully engage with their studies, peers, and service activities.

The Foundation has funded A. James Clark Scholars programs at leading engineering schools across the country. A hallmark of the University of Maryland’s Clark Scholars program is that students additionally will commit to one of the NAE’s Grand Challenges and to becoming more knowledgeable about it during their studies.

STUDENT IMPACT

After working to pay his way through his associate degree in electrical engineering from Maryland’s Carroll Community College, Allen Corbin set about searching for a rigorous, well-respected, and affordable undergraduate program to help him take the next step.

The University of Maryland’s A. James Clark School of Engineering was a natural fit, and when Corbin found out he had been awarded an A. James Clark Opportunity Scholarship for Transfer Students, that sealed the deal.

“Because of this great scholarship, I no longer had to work 35–50 hours a week to make ends meet,” he says. “I was able to focus on my studies and my personal passions, which included walking onto the UMD football team as a cornerback. It’s a great honor to suit up for the Terps on Saturdays.”

Corbin also has interned twice at Mona Electric Group—both at their headquarters in Clinton, Maryland, and onsite at the Cannon House Office Building in Washington, D.C.—and at Joint Base Andrews.

Corbin graduates from UMD this fall, and he is excited to have already landed a position as a systems engineer for Leidos, a global leader in the integration and application of information technology, engineering, and science and a strategic corporate partner of UMD and the Clark School.

“I was lucky to have leadership and mentoring from a lot of great professors while I was at the Clark School,” says Corbin. “I hope to be able to inspire the next generation of engineers throughout my own career.”

Allen Corbin

UMD DEGREE: B.S. in Electrical Engineering
(Specialization in Power Electronics),
graduating Fall 2017



PHOTO: A. JAMES & ALICE B. CLARK FOUNDATION

Ian Stringer

UMD DEGREE: B.S. in Electrical Engineering, graduating Fall 2019

Every day after school, Ian Stringer would run home to watch the family's VHS tape of "Star Wars"—so often, in fact, that he eventually wore out the tape.

As a boy, he longed to become an astrophysicist and understand how those starships worked, but as an adult, he had to be practical. He began working after high school, and after more than 10 years with the global food distribution corporation Sysco, Stringer was downsized in 2015.

He took the opportunity to reflect on where he wanted his life to go, and he decided to follow his lifelong dream of working in the aerospace industry. Because of the high cost of higher education, Stringer started by completing his associate degree in electrical engineering at Maryland's Baltimore City Community College. Then, he began aiming for the best possible university at which to complete his bachelor's degree.

"I am endlessly grateful that I received the A. James Clark Opportunity Scholarship for Transfer Students and several other grants," says Stringer. "The financial support I was given was absolutely the difference between me being able to pursue my degree or not."

As an older student, Stringer's scholarship makes his education possible not just for him, but also for his four-year-old son and entrepreneur wife.

These days, Stringer's research interest in electric propulsion systems in the aerospace field has far-reaching applications, from making satellites more efficient and less costly to launch to—you guessed it—making interplanetary travel more realistic in the future.

ANSWERING THE DEMAND

Engineers are in high demand. UMD is answering the call for Maryland, the nation, and the world. Last year, the Clark School awarded more than 1,000 bachelor's degrees. Many of these graduates began their college education at a Maryland community college.

First-year scholarships often are the focus of university financial aid, but many transfer students also demonstrate significant financial need. With a previous investment from the A. James & Alice B. Clark Foundation, the pilot Clark Opportunity Transfer Scholarship Program has worked to support the transfer student population from Maryland community colleges. With additional support from the Foundation, the third class of 20 scholarship students took their next steps toward career—and life—success at the Clark School this fall.

The program provides students who are excelling at community colleges within the state of Maryland a generous scholarship to attend its public flagship engineering school. With funding for four semesters of study—along with the comprehensive (academic, career, and research) support offered to all Clark School scholarship students—this program serves a vital dual role by supporting student success and developing engineering talent, such as with Allen Corbin (see pages 8 and 9) and Ian Stringer (at left).



PHOTO: AL SANTOS

"These students will further Mr. Clark's legacy by rising to the challenge to not just encounter, but work to solve, society's problems."

DARRYLL J. PINES
DEAN, A. JAMES CLARK SCHOOL OF ENGINEERING

OPENING DOORS

Though Mr. Clark's focus of passion was engineering, he cared deeply about his alma mater and its students, especially students whose families—like his own when he was a young man—could not afford a UMD education without assistance. Mr. Clark never wavered in his commitment to pay it forward through scholarships at UMD.

He knew that strengthening the university depends on breaking down the economic and social barriers that prevent talented students from attending UMD. The Clark Challenge for the Maryland Promise embodies Mr. Clark's legacy at the university and his own experience as a student.

Still in its planning phase, a campus-wide matching program aims to use the Foundation's investment to catalyze an equal amount of support from alumni and friends—to ensure an education for students across campus with the greatest financial need.

If the goals of the Clark Challenge are met, the university's need-based funding will double, for an unprecedented achievement in support of student success at UMD. By opening the doors to higher education, the Clark Challenge promises truly transformational results—for students, families, and communities.



PHOTO: JOHN CONSOLI

Hermann Kaptui Sipowa, an aerospace engineering major and A. James Clark Opportunity Scholarship for Transfer Students recipient.

STUDENT IMPACT



Rose Weinstein

UMD DEGREE: B.S. '16, Aerospace Engineering

OCCUPATION: Graduate Research Assistant in UMD's Morpheus Laboratory, National Institute of Aerospace

PHOTO: DAVID C. BOWMAN/NASA

When Rose Weinstein was accepted to the A. James Clark School of Engineering, she was thrilled—and also a little intimidated. While she excelled in science and math, her high school hadn't offered the high-level courses such as physics and calculus that she knew other students would already have taken.

"It was daunting to feel like I'd be starting at a disadvantage," says Weinstein. "But the Clark School has so many academic resources for students, and I found that I was part of a very collaborative, helpful culture."

Weinstein also received notification that she had been awarded an A. James Clark Scholarship.

"Reducing the financial burden through this scholarship made my college dream more accessible," she says.

Weinstein found the support and encouragement she needed within the Department of Aerospace Engineering, and in turn she and several classmates founded the

University of Maryland's chapter of Women in Aeronautics and Astronautics (WIAA) to make even more students feel at home.

"Because of the gender disparity, engineering can be intimidating for a lot of women," says Weinstein. "The idea behind WIAA is to show everyone that there is a community that can help you to foster growth and help break down stereotypes in the industry."

These days, Weinstein is an intern at the NASA Langley Research Center and a National Science Foundation Graduate Research Fellowship recipient. She also is in the second year of her master's degree in aerospace engineering at UMD, taking courses remotely several times a week through the National Institute of Aerospace.

"I am so grateful for the Clark School and everything it has allowed me to accomplish," says Weinstein.

STUDENT IMPACT

Building a Legacy of Leadership

"I learned more about life from Jim Clark than from anyone else: you treat people fairly, you give back to your community, you work hard, and you take responsibility."

LAWRENCE C. NUSSDORF
CHAIRMAN & CEO, CLARK ENTERPRISES

Today's critical global challenges demand pioneering engineering leadership in areas such as bioengineering, disaster resilience, energy, security, and more. In turn, the Clark School must rise to the challenge by bringing the best minds in these fields to the University of Maryland.

DEFINING THE FIELDS

"The Clark School needed a mechanism to attract the brightest in research growth areas—individuals who not only excel in their fields, but define their fields," says Clark School Dean and Farvardin Professor of Engineering Darryll J. Pines. Understanding this, the A. James & Alice B. Clark Foundation will establish eight Clark Distinguished Chairs, faculty positions that directly address the most

critical research areas set forth by the 2020 Strategic Plan for the Clark School, including additive and advanced manufacturing, autonomy and robotics, and energy and sustainability.

These faculty leaders will open new frontiers, creating a community of collaboration and excellence that gains momentum with every achievement in research and innovation.

FOSTERING GROWTH

As is the case with world-class faculty, the most talented graduate students can provide a foundation for the Clark School's future as a center of leading-edge research and innovation. However, without a substantial increase in the number of graduate fellowships, the Clark School would not be able to compete with peer public institutions

and private engineering schools to recruit the most sought after doctoral candidates. "To get the best, we need to be competitive," Pines explains.

With the establishment of the Clark Doctoral Fellows program, the Foundation has answered this need with a solution: supporting 30 first-year doctoral fellowships per year as an impetus for the best research. The inaugural class of graduate fellows supported by the Foundation's investment consists of more than 20 doctoral students who will work in strategic and vital research areas. These scholars have the potential to become tomorrow's leaders and innovators, launching technology companies, spearheading lifesaving advances, and working to improve society.



Mr. Clark, right, with his wife Alice.

INVESTING IN INNOVATORS

Strengthening the entire campus means moving forward as an interdependent university community that invests in innovative leadership.

UMD is one of the few universities in the world with the potential to integrate expertise and computing capacity in diverse fields—such as engineering, computer science, criminology, information studies, public health, and more—into a single educational and research powerhouse. However, meeting this challenge requires new research and solid leadership to build programs vital to the knowledge-based economy of our 21st century.

As with all senior academic posts, endowments are critical to the recruitment and retention of stellar faculty leaders in vital, interdisciplinary areas. Funded by the Foundation, five

Clark Leadership Chairs with shared appointments in colleges across campus will conduct important cross-cutting research on emerging issues that are most pressing to the future of our global society: for instance, data analytics, neuroscience, and cybersecurity. These highly competitive endowed faculty posts promise to elevate the entire university through inspiration and leadership in critical fields of study.

“One of the most important contributions to the quality, stature, and impact of a major university is its faculty.

The Clark Leadership Chairs will make it possible to attract and retain the very best people in critically important fields such as neuroscience, virtual reality, cybersecurity, and big data—fields that are key to solving our greatest societal issues,” says Mary Ann Rankin, senior vice president and provost of UMD. “The A. James & Alice B. Clark Foundation’s investment in Clark Leadership Chairs will catapult the university forward in these critically important fields, while touching programs across the entire university.”

“The Clark Leadership Chairs will make it possible to attract and retain the very best ...”

MARY ANN RANKIN
SENIOR VICE PRESIDENT & PROVOST, UNIVERSITY OF MARYLAND

A Hub for Discovery

Like A. James Clark Hall, the most useful infrastructure and facilities help the University of Maryland’s best people adapt to the needs of engineering education and emerging research areas. Since engineering is inherently hands-on, it requires state-of-the-art spaces to help attract top undergraduate and graduate students, recruit and retain world-class faculty, and foster collaboration between disciplines and with institutional and business partners.

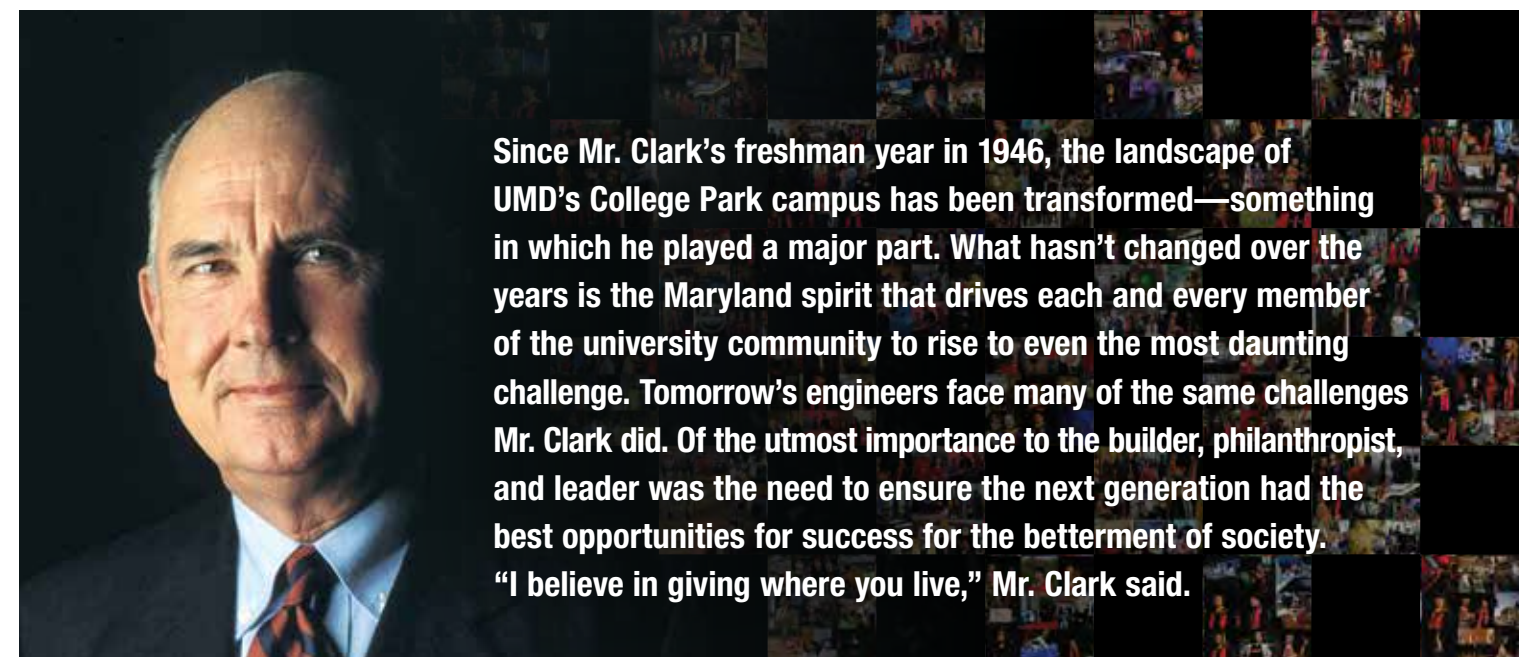
New facilities proposed and supported by the Foundation will support the Clark School as a hub for engineering leaders, furthering collaboration—and fostering discovery.



A. James Clark Hall

At 11 years old, the Jeong H. Kim Engineering Building is already a Clark School landmark and research and education center, where the very construction components serve as a working laboratory. Yet there still is room to expand this facility and further develop its value for the school.

One such example is the IDEA Factory, a new engineering facility proposed by the Foundation that would feature virtual design and state-of-the-art labs, immersive design environments, and more. The IDEA (Innovate, Design, and Engineer for America) Factory addition to the Kim Building promises to promote the next generation of engineering innovations—carrying ideas from concept to proposal to the marketplace, where they can positively impact humanity—just what Mr. Clark would have wanted.



Since Mr. Clark’s freshman year in 1946, the landscape of UMD’s College Park campus has been transformed—something in which he played a major part. What hasn’t changed over the years is the Maryland spirit that drives each and every member of the university community to rise to even the most daunting challenge. Tomorrow’s engineers face many of the same challenges Mr. Clark did. Of the utmost importance to the builder, philanthropist, and leader was the need to ensure the next generation had the best opportunities for success for the betterment of society. “I believe in giving where you live,” Mr. Clark said.

Looking Back & Moving Forward, Together

Mr. Clark did much more than give back. He, his family, and the Foundation have set a bold, generous example for the entire University of Maryland community. The hope is to inspire today’s students also to give back to those who come after them. More than buildings of bricks and mortar, Mr. Clark fostered a legacy that will forever inspire Maryland pride in those who learn of it.

UMD and the school that bears his name owe a great debt of gratitude to Mr. Clark and his family, a debt that is shared by all who have benefited from the growth of Maryland’s flagship university over the last half century.

As we approach the 125th anniversary of UMD’s engineering school in 2019, we are reminded of the strong foundation on which the Clark School stands. From modest beginnings, the school has risen to prominence—not only in reputation and reach, but in

the hearts of supporters like the late Mr. Clark, whose devotion to his alma mater endures. For the rest of the Clark School community—alumni, faculty, staff, donors, and students—it is incumbent that we do what we can to follow Mr. Clark’s example and build tomorrow, today.

Beyond the Clark School, this investment forms the foundation of *Fearless Ideas: The Campaign for Maryland*, the most ambitious and comprehensive fundraising effort in the university’s history, set to launch in Spring 2018. It will elevate and expand UMD’s mission of service, enhance its academic distinction, and bolster its research enterprise. The hope of Mr. Clark’s family and the leadership of the A. James & Alice B. Clark Foundation is that their investment will be catalytic, inspiring further investment from alumni, friends, and parents.

WHAT’S YOUR FEARLESS IDEA?

Become a part of this amazing effort. Together, we can build opportunities for Clark School students and faculty—along with the many lives they will touch—while we help the university achieve its historic goal. Join us.

BUILDING TOGETHER
AN INVESTMENT FOR MARYLAND

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Undergrads Develop Tools to Diagnose Alzheimer’s Disease



A prototype of the headset, designed by OpenBCI, that UMD students are using for Alzheimer’s research.

A team of seven Clark School undergraduates earned the top prize in this year’s National Institutes of Health Design by Biomedical Undergraduate Teams challenge for their efforts to develop low-cost tools to diagnose Alzheimer’s disease before patients show symptoms. Organized by the University of Maryland student chapter of the Biomedical Engineering Society, the team was awarded \$20,000 for developing a portable electroencephalogram (EEG) that uses a specially designed headset designed by OpenBCI and a new software analysis tool to detect Alzheimer’s disease before a patient displays clinical symptoms. The team, which recently filed for a company LLC in Maryland, believes their work could help make dementia diagnoses more quantitative, more systematic, and less costly—allowing doctors to use it at regular check-ups. “It can take up to two years after clinical symptoms arise for patients to receive a proper diagnosis, and by then, he or she may have already seen significant progression of the disease,” says Dhruv Patel, team captain and bioengineering major. “To address this, our technique allows us to characterize an Alzheimer’s patient’s brainwave using a variety of mathematical analytical tools and compare it with a healthy patient’s brainwave to create a machine-learning model that can then accurately predict the probability of the patient having the disease.”

>> LEARN MORE, VISIT go.umd.edu/synapto

UMD IN TOP SIX AT HYPERLOOP COMPETITION

In the second SpaceX Hyperloop Pod Competition held August 25–27, a team of University of Maryland undergraduate students was one of only six selected to complete an open air run (riding down the track without it being sealed) in the Hyperloop tube. The team, UMD Loop, competed against 24 international teams in this round of the competition, which aims to advance the “hyperloop” concept for a long-distance, high-speed transportation system that would send pods full of people or cargo through a near-vacuum tube. In the preliminary rounds, teams ran their pods on a test track. UMD Loop completed two of these runs before being selected to complete an open air run in the tube. UMD Loop and its second-generation pod Nemesis completed a successful open air run in the tube on the first day of competition, but was ultimately not one of the three teams selected to attempt a vacuum-pressure run on the final day of competition. The team’s top-six finish follows its successful run at the first Hyperloop competition in January 2017. At that event, the UMD pod Prometheus took top honors for Performance in Operations.

>> LEARN MORE, VISIT go.umd.edu/hyperloop-2

UMD Solar Decathlon Team Heads to Denver



UMD President Wallace Loh visits the Solar Decathlon construction site on campus.

The University of Maryland is defending its first place win from 2011—the last time it entered the U.S. Department of Energy Solar Decathlon—in the 2017 competition, held October 5–15 in Denver. Solar Decathlon challenges student teams to design and build full-size, solar-powered houses. For this year’s competition, the UMD team’s entry, reACT, emphasizes regenerative principles, sustainability, and technological self-reliance. The target markets for reACT, which stands for resilient adaptive climate technology, are Native Americans striving for an authentically indigenous lifestyle outside a reservation. The team blended traditional Native American knowledge with western scientific thinking to develop reACT’s climate technologies. These technologies include architectural responses to changing weather conditions controlled by open source SmartHouse software, an innovative HVAC system that uses air’s thermal nature, solar and water systems that achieve net zero waste, and living systems that restore native ecosystems. At the time of this magazine’s publication, the competition was still forthcoming.

>> LEARN MORE, VISIT eng.umd.edu

Ph.D. Candidate Wins Smithsonian Fellowship

Miriam “Mimi” Hiebert, a doctoral candidate in the Department of Materials Science and Engineering, was selected as a 2017 Big Ten Academic Alliance Smithsonian Institute Fellow. This fellowship is only available to current Ph.D. students of Big Ten Alliance schools. The other University of Maryland fellowship recipients this year are in the College of Arts & Humanities and College of Computer, Mathematical, and Natural Sciences.



Recipients receive funds in the amount of \$32,700 to be used for study, research, and related travel. However, “the real prize,” says Hiebert, “is that it gives me open access to Smithsonian lab equipment, resources, expertise, and even some of the objects in their collection.”

>> LEARN MORE, VISIT go.umd.edu/miriam

Senior Receives Fulbright English Teaching Assistantship

Department of Mechanical Engineering senior Soophia Ansari received a 2017–18 Fulbright English Teaching Assistantship to Malaysia. While there teaching, Ansari will collaborate with science teachers to engage students in projects that introduce them to using English in the context of science and technology. In addition, she will learn about Malaysian Islam by visiting local mosques and joining a Quran class. Ansari, who is also minoring in international development and conflict resolution, earned a citation from the College Park Scholars International Studies program, and, last year, was the first recipient of the Bell Helicopter Engineers on a Mission Scholarship.



>> LEARN MORE, VISIT go.umd.edu/ansari



UMD Loop at SpaceX headquarters in Hawthorne, Calif.

UMD Teams Place 1st in AHS Student Design Competition



The UMD graduate team at the Student Design Competition.

Two Clark School teams won top spots in the American Helicopter Society (AHS) International's 34th Annual Student Design Competition. This year's competition, sponsored by Sikorsky Aircraft Corporation, challenged each student team to design an original vertical lift aircraft that could hover for 24 hours over three stations, each 1 km apart, carrying a human-sized payload of 80 kg, or 176.4 lb. Making an impression, the University of Maryland teams took first place in both the graduate and undergraduate divisions, beating out teams from across the globe.

While each placing team receives a cash stipend, only the first place winners are invited to attend AHS International's 74th Annual Forum and Technology Display in Phoenix, Arizona, in May 2018, where they will present their designs.

>> LEARN MORE, VISIT go.umd.edu/two-wins

UMD Takes 1st in AHS Student Challenge



A University of Maryland undergraduate team took first place in the American Helicopter Society (AHS) International's 5th Annual Micro Air Vehicle (MAV) Student Challenge. Themed "Package Delivery in the Wild West," the event challenged teams to create a MAV—a miniature drone operated autonomously or by remote control—capable of traversing an obstacle course and delivering an envelope weighing 25 grams, about 0.06 of a pound, to a designated drop-off location. The MAV then had to acquire another envelope and deliver it back to the starting position. The entire task needed to be completed in under 10 minutes using an attached camera to steer the vehicle.

UMD's Terrapin Sheriffs was one of three international teams selected to participate. The competition took place at Fort Worth Convention Center, Ft. Worth, Texas at the 73rd AHS International Annual Forum and Technology Display, where teams battled for first place and awards totaling up to \$5,000.



The UMD team at the MAV Student Challenge.

>> LEARN MORE, VISIT go.umd.edu/mav



The UMD team at the NASA RASC-AL Competition.

UMD TAKES 2ND IN NASA COMPETITION

One of the biggest challenges of space exploration is learning how to live in outer space as humanity expands its reach into the solar system and beyond. New approaches to developing habitats for space are of great interest, and there is no better source of new perspectives than students.

At the 2017 Revolutionary Aerospace Systems Concepts-Academic Linkages (RASC-AL) Space Design Competition, the University of Maryland Department of Aerospace Engineering team competed in the development of these new concepts. The team took second place in the Undergraduate Division and second place overall.

Sponsored by NASA and managed by the National Institute of Aerospace, RASC-AL allows university-level students studying fields applicable to human space exploration to create aerospace designs that support life in outer space. Students compete in teams to construct human-scale architecture concepts based on themed NASA engineering challenges. In turn, NASA is offered access to new research and design projects by students.

>> LEARN MORE, VISIT go.umd.edu/rasc-al



The UMD team in action at the regional steel bridge competition.

Steel Bridge Team Builds Their Way to Nationals

Civil engineering students juggled speed and thoroughness earlier this year to construct the bridge that would secure them a spot at nationals in Oregon. The team placed second overall in the 2017 American Society of Civil Engineers Mid-Atlantic Regional Student Conference

steel bridge competition. It's the second time in three years that Terps have advanced to the National Student Steel Bridge Competition, where they competed with 42 other universities. The Mid-Atlantic Regional Student Conference also featured a business meeting, professional and technical presentations, display contests, and a concrete canoe and geowall competition.

>> LEARN MORE, VISIT go.umd.edu/regionalconference

CAPSTONE DESIGN COURSE ON ELECTRIC BIKES SPRINTS AHEAD

In Spring 2017, the Department of Electrical and Computer Engineering offered a unique capstone course led by Professor and Associate Chair for Undergraduate Studies Romel Gomez. Students designed safe, light, and utilitarian electric bicycles for personal transportation.



The urban bike designed by the course's students.

One team designed a bike (pictured) that can travel 50 miles in a single charge (roughly two round-trips from College Park, Maryland to the Washington Monument in Washington, D.C.) and can be charged to 80 percent capacity in less than two hours.

>> LEARN MORE, VISIT go.umd.edu/bikes

Student Team Wins IEEE IFEC Award

A student team led by Alireza Khaligh, associate professor of electrical and computer engineering with a joint appointment in the Institute for Systems Research, won the Best Presentation Award at the 2017 Institute of Electrical and Electronics Engineers (IEEE) International Future Energy Challenge (IFEC) in July at Virginia Tech in Blacksburg, Virginia.

IFEC is an international undergraduate competition for innovation, conservation, and effective use of electrical energy, open to college and university student teams from recognized engineering programs in any location. The 2017 challenge was to build a high-efficiency, high-density isolated electronic circuit. Twenty-three teams from around



The circuit built by the UMD team.

the world submitted proposals; of these, the University of Maryland and 14 others were selected to enter the second round competition. UMD was one of only 10 teams selected to enter the final competition.

>> LEARN MORE, VISIT go.umd.edu/ifec

QUEST Students Tackle Brisbane Ferry Challenge

Summer Legambi (B.S. '18, civil and environmental engineering) and Zachary Zweig (B.S. '17, mechanical engineering) teamed up with students at the University of Queensland in Spring 2017 to help increase ferry ridership in congested Brisbane, Australia.

Through the University of Maryland's Quality Enhancement System and Teams (QUEST) honors program and Global Classrooms Initiative, the duo traveled to Brisbane in May to present recommendations to the international engineering consultancy Arup.

Recommendations were based on the team's analysis of city Go Card records, along with qualitative data used to create profiles for each ferry terminal.



TF2 Consulting.

"The opportunity to analyze a city's public transportation data meant this was bigger than a project. We could make a real impact on Brisbane," says Legambi.

TF2 Consulting, as the student group was called, also provided Arup with a tool to help analyze future data sets.

"Being part of international work like this is something really special," says Zweig. "Learning and working with students from other cultures is incredibly valuable. What QUEST is doing with these projects is really important."

>> LEARN MORE, VISIT go.umd.edu/Brisbane

Student SPOTLIGHT



DOUBLE SCHOLARSHIP RECIPIENT UNDERTAKES GRAND CHALLENGES

KATHERINE MCKEE, A SENIOR MAJORING IN FIRE PROTECTION ENGINEERING, is the 2017 recipient of both the Sarah Bryan Scholarship and the Philip De Camara Jr. Memorial Award. She was selected not only for her high marks in the classroom, but also for her extensive list of extracurricular activities including mentoring incoming freshmen via the University of Maryland Ambassador Program, working as a teaching assistant, and collaborating with startup companies through the UMD Hinman CEOs Program.

In late July, McKee attended the Global Grand Challenges Summit, a conference geared towards all engineering specialties with the goal of addressing humanity's most pressing issues and how engineering can offer solutions. McKee rubbed elbows with Google Earth co-creator Brian McClendon and lastminute.com entrepreneur Martha Lane Fox. Speaking with McClendon made McKee realize that "while all of these speakers are outstanding individuals, they are still just normal people who decided to go after their dreams and really make an impact on the world. There is nothing stopping the rest of us from doing the exact same thing."

>> LEARN MORE, VISIT go.umd.edu/mckee

Alumna Wins Prestigious Lemelson-MIT Student Prize



Lisa Tostanoski (Ph.D. '17, bioengineering) won a \$15,000 Lemelson-MIT Student Prize following a highly competitive nationwide search for the most inventive college students. Tostanoski was selected for her efforts to develop two novel biomaterials-based strategies to combat multiple sclerosis and other autoimmune diseases.

The nine recipients of this year's collegiate competition were selected from a diverse applicant pool of undergraduate and graduate students from colleges and universities across the country. Tostanoski was one of two graduate students awarded this

year's prize for the "Cure it!" category, which recognizes students working on technology-based inventions that can improve health care.

"Lisa's work demonstrates the enormous potential for bioengineers to shape the future of human health innovation," says John Fisher, chair of the Fischell Department of Bioengineering and Fischell Family Distinguished Professor. "Even more, her dedication to the field extends beyond the lab, as she devotes much of her time to mentoring aspiring engineers. For these reasons, Lisa exemplifies what it means to receive the Lemelson-MIT Student Prize."

>> LEARN MORE, VISIT go.umd.edu/lisa

(CYBER)SECURING A PROFESSIONAL EDUCATION

Software engineer Aakash Moni (M.E. '15) has seen some major changes in his field since he started working for Logictree in 2010. One of the biggest? The role of cybersecurity.

"Cybersecurity changes daily," Moni says, "and we need to be updated on a daily basis." That quick-changing pace is one of the things he likes best about his job as a software developer—but he realized that he needed more than his undergraduate background to keep up with the growing demands of coding secure programs.

"My bachelor's degree was based mostly on theory," says Moni. "I gained some practical experience at work, but I still lacked some details for best practices and recent developments."

The Clark School's Professional Master of Engineering in cybersecurity had exactly what he needed, both to get current and to help him move up in his company. "The professors were updated on current developments. We had discussions about what happened today or last week. It was really detail-oriented, and the practical experience was really good.

"Also, most of the people in class had a few years' experience in the cybersecurity field, so we could learn from each other as well. I made a lot of important connections—we're still in touch."

As do a number of employers, Logictree paid Moni's tuition. The investment is already paying off, for them and for Moni. "I was promoted to a senior position as soon as I was done with my master's."



ADVANCE YOUR CAREER

Offered through the Clark School's Office of Advanced Engineering Education, the Professional Master of Engineering and the Graduate Certificate in Engineering programs assist engineers in the development of their professional careers and provide the technical expertise needed in business, government, and industry. The online programs were ranked 23rd in the nation by *U.S. News & World Report* for 2017.

>> LEARN MORE, VISIT go.umd.edu/oaee

>> EMAIL oaee@umd.edu

UMD Leads New Center for Engineering Complex Tissues

The University of Maryland is leading a newly established National Institutes of Health (NIH)-funded Biomedical Technology Resource Center aimed at advancing techniques to create complex tissues and parts for the body, such as for organs and bone. NIH awarded a \$6.25 million grant to the Center for Engineering Complex Tissues, for which Rice University and the Wake Forest Institute for Regenerative Medicine serve as key partners. The center will serve as a national hub for transforming current tissue engineering and 3-D printing technologies into new and improved platforms for everyday uses in regenerative medicine.



PHOTO: JOHN CONSOLI
The first 3-D bioprinted placenta model, created by Clark School bioengineers and partners.

>> LEARN MORE, VISIT go.umd.edu/cect

NEW CLEAN ENERGY INSTITUTE LAUNCHED AT UMD

“More than 100 University of Maryland faculty have been involved already in developing breakthrough technologies in the areas of solar, wind, energy efficiency, and battery and fuel cell technology.”

CHRIS VAN HOLLEN, U.S. SENATOR FOR MARYLAND



PHOTO: FELICITY HANCOCK

On August 14, state and university leaders gathered at the University of Maryland campus to officially launch the Maryland Energy Innovation Institute (MEI²), created by the state to turn research breakthroughs by Maryland academic institutions into commercial, clean energy solutions that meet the needs of the state and its people.

Maryland Governor Larry Hogan authorized \$7.5 million in state funding earlier this year for MEI², an initiative that is designed to catalyze clean energy research programs at academic institutions in the state and attract and develop private investment in clean energy innovation and commercialization. The institute will seek to bolster economic jobs in the clean energy industry sector in Maryland and promote the deployment of clean energy technology throughout the state.

MEI² is a partnership between the state’s Maryland Clean Energy Center and the University of Maryland Energy Research Center within UMD’s A. James Clark School of Engineering.

>> LEARN MORE, VISIT go.umd.edu/mei2

From left to right: UMD President Wallace Loh; U.S. Senator Chris Van Hollen; State Delegate Tawanna Gaines; State Senator Richard Madaleno; Clark School Dean Darryll Pines; MEI² Director Eric Wachsman; and Director of the Maryland Energy Administration Mary Beth Tung.

UMD Science, Engineering Experiments in Space

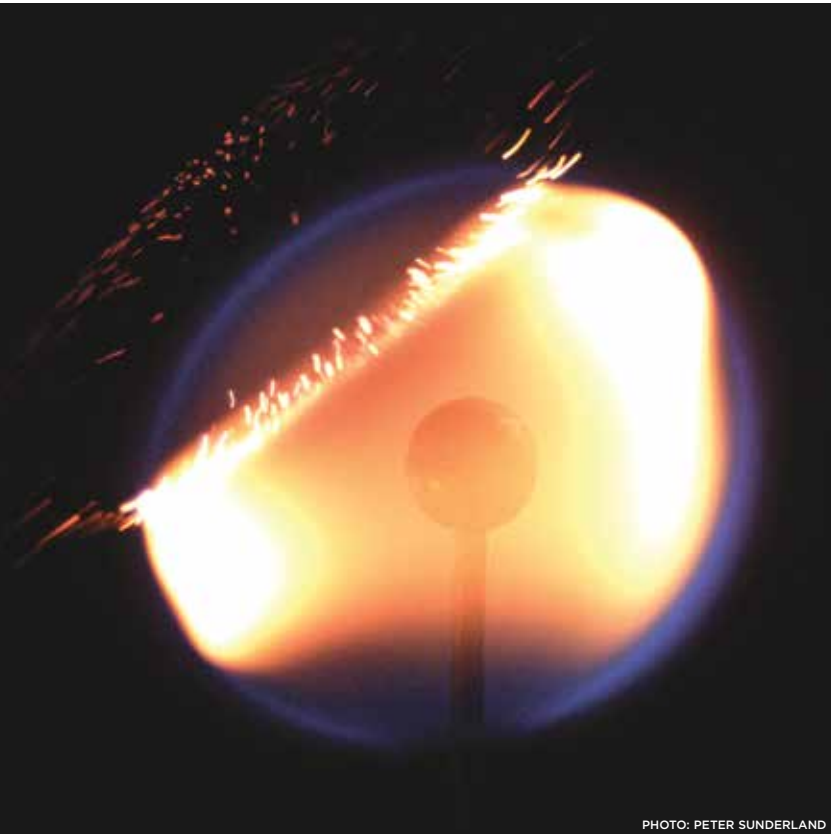


PHOTO: PETER SUNDERLAND
An experiment examining how flames create soot and pollution and other UMD projects blasted off to the International Space Station.

With research ranging from fire safety and prevention of harmful microbial growth in space to solving longstanding cosmological mysteries, the University of Maryland is expanding its scientific footprint on the International Space Station (ISS).

A SpaceX Dragon spacecraft launched from the Kennedy Space Center in Florida on August 14 carrying hardware for projects from faculty and student researchers in physics, fire protection engineering, bioengineering, and chemistry, among other ISS supplies. It represents an unprecedented number of UMD experiments in a single launch to the station, university officials say.

The Burning Rate Emulator experiment, led by Professor of Fire Protection Engineering Peter Sunderland, is designed to test the fire risk of various materials in orbital microgravity. An undergraduate project by bioengineering major Stacey Mannuel and physics, chemistry, and cell biology degree candidate Colton Treadway will test a common method to reduce biofilms on Earth and see if it transfers to space, where biofilms outperform their terrestrial relatives.

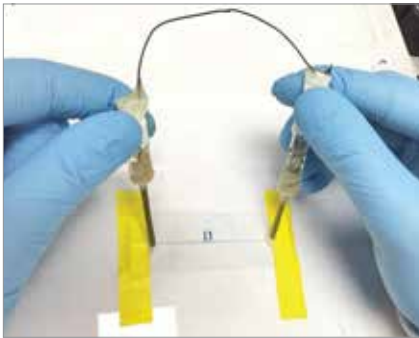
>> LEARN MORE, VISIT go.umd.edu/satellite-campus

UMD ENGINEERS INVENT THE FIRST BIOCOMPATIBLE BATTERY

Engineers at the Clark School have invented an entirely new kind of battery. It is biocompatible, because it produces the same kind of electrical energy that the body uses.

In an ordinary battery, ions move through the device, generating electrons: this creates the battery’s electrical energy, or current. In the University of Maryland research team’s reverse-design battery, electrons move through the device, generating ions as its current. This is how electricity is generated in the human body and all living things: through ion currents.

It is the first ionic current-generating battery. Potential applications might include the development of the next generation



A demonstration of the UMD team’s biocompatible battery.

of devices to micro-manipulate neuronal activities and interactions that can prevent or treat such medical problems as Alzheimer’s disease and depression.

>> LEARN MORE, VISIT go.umd.edu/bio-battery

Clark School Captures Totality

As the total solar eclipse traveled from coast to coast on August 21, several University of Maryland groups conducted experiments to see its effects.

Mary Bowden, visiting professor of aerospace engineering, and 25 students from UMD's Balloon Payload Program took a 10-hour car ride to Williamston, South Carolina—an area in the eclipse's path of totality—to launch a weather balloon with various experiments. The group focuses on research and development of high-altitude experiments that fly via helium weather balloons.

The eight-foot, helium-filled balloon rose 104,000 feet during its two-hour flight and traveled 33 miles carrying about eight experiments, with equipment including GoPro cameras and biological samples.

Two other teams from UMD's Unmanned Aircraft Systems Test Site, a research and operations facility, launched experiments from South Carolina and Wyoming—which had areas of totality—with one team member at each location. Each group used two drones recording 360-degree video from altitudes of 100 to 400 feet during the total solar eclipse, said Matt Scassero, director of the test site.

>> LEARN MORE, VISIT go.umd.edu/eclipse-2017

This is an excerpt of an article by Lindsey Feingold originally appearing in The Diamondback.



Students from UMD's Balloon Payload Program.

UMD Recognized for Cyclocopter Development

The Army Research Laboratory (ARL) has sought an efficient design for small unmanned aerial vehicles (UAVs) for U.S. Army reconnaissance use. ARL wants autonomous UAVs that are small enough to fit in a soldier's hand, but can maintain stability in wind turbulence and traverse crowded environments.

Under ARL, the Micro Autonomous Systems and Technology program's Collaborative Technology Alliance (MAST-CTA) was created to recruit research universities, including the University of Maryland, for this purpose.

UMD's research team All-Terrain Cyclocopter was highlighted in the American Helicopter Society International's *Vertiflite* magazine for its innovative cyclocopter design developed while working towards ARL's goal.

Thanks to the Alfred Gessow Rotorcraft Center, UMD has been at the forefront of cyclocopter development for years. Beginning in 2011, UMD researchers performed the first-ever stable flight of a cyclocopter micro air vehicle. In 2015, they had the successful hover of the first palm-sized cyclocopter. And in 2017, they created the first cyclocopter capable of aerial, terrestrial, and aquatic locomotion—the vehicle that would be the recent highlight in their work for ARL.



The UMD research team and their cyclocopter.

>> LEARN MORE, VISIT go.umd.edu/cyclocopter



From left to right: José Torero, Arnaud Trouvé, and Stanislav Stoliarov.

INFLUENCERS IN INTERNATIONAL FIRE RESEARCH COMMUNITY

Three faculty members within the Department of Fire Protection Engineering are lead organizers of a new effort endorsed by the International Association for Fire Safety Science: the Working Group on Measurement and Computation of Fire Phenomena (MaCFP). The goal of MaCFP is to establish a coordinated effort in the fire research community on a broad range of topics related to fire science. The general objective of the working group is to build a collaborative framework between computational and experimental researchers in the fire science community around the topic of the experimental validation of computational fluid dynamics-based fire models.

Professor Arnaud Trouvé, who has additional appointments in the Departments of Mechanical Engineering and Aerospace Engineering, and Professor José Torero, also director of the Center for Disaster Resilience, are organizing committee co-chairs of MaCFP. Associate Professor Stanislav Stoliarov, also co-director of Fire Testing and Evaluation Center, serves on the organizing committee of an MaCFP subgroup, further asserting the prominent role of the University of Maryland in the international fire research community.

>> LEARN MORE, VISIT go.umd.edu/fire

UMD, NOAA Explore UAS Uses

In an effort to determine whether unmanned aircraft systems (UAS) can be used to validate weather satellite data more efficiently, the National Oceanic and Atmospheric Administration (NOAA) has partnered with the University of Maryland UAS Test Site.

Flight tests in January confirmed that the Phoenix ACE XL and Talon 120E could orbit a precise point and collect sensor data at exact altitudes, two criteria vital to any validation effort. The team also successfully tested whether the systems could hover stably and maneuver in a straight line while maintaining altitude.



The research team in Red Lake, Ariz.

Test site pilot Ryan Henderson and engineer Jacob Moschler teamed up with NOAA researchers again in April to investigate effective flight paths and directly compare the quality of data collected with information gathered on foot in Arizona's Red Lake.

>> LEARN MORE, VISIT go.umd.edu/noaa

Fellows, Societies, Honors, & Awards

Associate Research Professor **LEIGH ABTS** (BIOE/College of Education) received the American Society for Engineering Education Lifetime Achievement Award from the K-12 and Pre-College Engineering Division. Abts was recognized for his leadership in developing pre-AP and AP engineering curricula for high school students.

Professor **THOMAS ANTONSEN** (ECE/IREAP/Physics) was named a Distinguished University Professor by the University of Maryland. This title is the highest academic honor bestowed by UMD and is conferred to a very limited number of its most acclaimed and preeminent faculty campus-wide. He is being recognized for his fundamental contributions to the related fields of plasma physics, charged particle beam research, and nonlinear dynamics.

Associate Research Scientist **VIKRANT AUTE** (ME/CEEE) received the 2017 American Society of Heating, Refrigerating, and Air-Conditioning Engineers Distinguished Service Award. This award recognizes members who have served faithfully and with distinction on committees or have otherwise given freely of their time and talent on behalf of the society.

Professor **JOHN BARAS** (ECE/ISR) received the American Automatic Control Council (AACC)'s 2017 Richard E. Bellman Control Heritage Award. The award is given for distinguished career contributions to the theory or application of automatic control. It is the highest AACC recognition of professional achievement for U.S. control systems engineers and scientists.

BARAS also received the 2017 Institute of Electrical and Electronics Engineers (IEEE) Simon Ramo Medal, given for exceptional achievement in systems engineering and systems science. This award is one of the major IEEE-wide medals and is the highest IEEE-wide recognition for exceptional achievement in systems engineering and systems science.

Professor **GREGORY BAECHER** (CEE) was appointed by the National Academies of Sciences, Engineering, and Medicine to a new committee that will make recommendations to the Federal Aviation Administration on risk assessment methods for streamlining the process of integrating unmanned aircraft systems into the national airspace.

Professor **ARISTOS CHRISTOU** (MSE) was honored with the rank of Life Fellow in the Institute of Electrical and Electronics Engineers. Candidates for this fellowship offer accomplishments that have contributed importantly to the advancement or application of engineering, science, and technology, bringing the realization of significant value to society, spanning 10+ years of professional experience in their field.

Professor **ALLEN DAVIS** (CEE) was recognized by the University of Delaware Department of Civil and Environmental Engineering for his sustained dedication, leadership, and service to the profession and society. Davis, who earned his B.S., M.S., and Ph.D. at the University of Delaware, is an international leader in urban stormwater management and treatment.

Assistant Professor **GREGG DUNCAN** (BIOE) was named one of 12 recipients of the 2017 Burroughs Wellcome Fund Career Award at the Scientific Interface. This prestigious award is intended to foster the early career development of researchers in the U.S. or Canada who have transitioned or are transitioning from collegiate work in the physical, mathematical, or computational sciences or engineering into postdoctoral work in the biological sciences.

Professor of Practice **MILLARD FIREBAUGH** (ME/CECD) was recognized by the American Society of Naval Engineers with the 2016 Harold E. Saunders Lifetime Achievement Award for significant contributions to naval engineering. The award honors an individual whose reputation in naval engineering spans a long career of notable achievement and influence.

Fischell Family Distinguished Professor and Department Chair **JOHN FISHER** (BIOE) was awarded the 2017 Tissue Engineering and Regenerative Medicine International Society – Americas Senior Scientist Award. The award recognizes outstanding contributors to the field whose body of work spans 10+ years and is well recognized by members of the tissue engineering and regenerative medicine community.

Research Professor **GERALD GALLOWAY** (CEE) was named co-chair of a new National Academies of Sciences, Engineering, and Medicine study committee charged with identifying effective ways to measure the resilience of a community to natural hazards and other disruptions.

Associate Professor **DIMITRIOS GOULIAS** (CEE) has been appointed head of the Civil Engineering Unit of the Athens Institute for Education and Research. Goulías will serve through 2020, promoting international and multidisciplinary cooperation in research, education, and conferences.

Associate Professor **LIANGBING HU** (MSE/MEI²) was selected as the winner of the 2017 Nano Letters Young Investigator Award. Hu was selected for his contributions to the fields of nanoscience and nanotechnology.

HU was also selected as the 2017 KINGFA Young Investigator Award winner. The annual award, administered by the American Chemical Society's Cellulose and Renewable Materials Division, recognizes outstanding contributions by young investigators to the science and chemical technology of cellulose and renewable materials.

Professor **PETER SANDBORN** (ME/Mtech) was awarded the American Society of Mechanical Engineers 2017 Kos Ishii-Toshiba Award. This award recognizes sustained meritorious contributions to the research to support design, manufacturing, and life cycle management decisions in product development.

Professor **ARNAUD TROUVÉ** (FPE/ME/AE) received the 2017 Sjölin Award, bestowed by the International FORUM of Fire Research Directors. The award recognizes an outstanding contribution to the science of fire safety or an advance in the state of the art in fire safety engineering practice of extraordinary significance.

Professor **ERIC WACHSMAN** (MSE/MEI²) was selected as the 2017 recipient of the Carl Wagner Memorial Award, an honor bestowed by the Electrochemical Society. The award recognizes mid-career achievement, excellence in research areas of interest to the society, and significant contributions in the teaching or guidance of students or colleagues in education, industry, or government.

WACHSMAN also was elected by the World Academy of Ceramics (MAC) to its 2017 class of Professional Members (Academicians). Professional Membership in WAC is limited, international, honorary, and merit-based. Candidates are nominated and rigorously evaluated before they are named. Professional Membership honors individuals who have made an international, significant contribution to the advancement of ceramics culture, science, and technology.

Professor **MIAO YU** (ME/ISR) was named an American Society of Mechanical Engineers (ASME) Fellow. The ASME Committee of Past Presidents confers Fellow-grade memberships on worthy candidates to recognize their outstanding engineering achievements. Nominated by ASME Members and Fellows, an ASME Member has to have 10 or more years of active practice and at least 10 years of active corporate membership in ASME.

KEY TO DEPARTMENTS, INSTITUTES & CENTERS

AE: Department of Aerospace Engineering	CHBE: Department of Chemical and Biomolecular Engineering	ISR: Institute for Systems Research
BIOE: Fischell Department of Bioengineering	ECE: Department of Electrical and Computer Engineering	ME: Department of Mechanical Engineering
CECD: Center for Engineering Concepts Development	FPE: Department of Fire Protection Engineering	MEI²: Maryland Energy Innovation Institute
CEE: Department of Civil and Environmental Engineering	IREAP: Institute for Research in Electronics and Applied Physics	MSE: Department of Materials Science and Engineering
CEEE: Center for Environmental Energy Engineering		Mtech: Maryland Technology Enterprise Institute

Yu Selected as Director of Maryland Robotics Center

Miao Yu, professor of mechanical engineering and affiliate of the Institute for Systems Research (ME/ISR), is the new director of the Maryland Robotics Center. She succeeds Associate Professor Sarah Bergbreiter (ME/ISR).

Yu directs the Clark School's Sensors and Actuators Laboratory, where technologies have been developed for fly ear-inspired sensors, bioinspired robotic homing and navigation systems,



system-on-a-chip multifunctional sensor platforms, and miniature optical manipulation systems. These areas of expertise are very useful in robotics applications.

The Maryland Robotics Center's mission is to advance robotic systems, underlying component technologies, and applications of robotics through research and educational programs that are interdisciplinary in nature and based on a systems approach.

Yu received her B.S. and M.S. degrees in engineering mechanics from Tsinghua University and her Ph.D. in mechanical engineering from the University of Maryland.

>> LEARN MORE, VISIT go.umd.edu/yu

Kofinas Named CHBE Chair

Professor Peter Kofinas is the new chair of the Department of Chemical and Biomolecular Engineering (CHBE). He succeeds Sheryl Ehrman, who recently became Don Beall Dean of the Davidson College of Engineering at San Jose State University.

Prior to this appointment, Kofinas was a professor in the Fischell Department of Bioengineering and held administrative appointments as the Clark School's equity officer and associate dean for faculty affairs and graduate programs. During his tenure at the University of Maryland, Kofinas received the Faculty Early Career Development (CAREER) Award from the National Science Foundation. He has also received several distinctions from the Clark School including the Outstanding Junior Faculty Teaching Award, the Engaged Faculty Award, the Senior Faculty Outstanding Research Award, and the Faculty Outstanding Service Award, and has been named a Keystone Professor.

Kofinas received his B.S. and M.S. degrees in chemical engineering and his Ph.D. in materials science and engineering, all from the Massachusetts Institute of Technology.

>> LEARN MORE, VISIT go.umd.edu/kofinas

REGLI NAMED SIXTH DIRECTOR OF ISR

Clark School Dean Darryll Pines recently named William Regli as the sixth director of the Institute for Systems Research (ISR). Regli will begin his appointment in January 2018. ISR's current director, Reza Ghodssi, will continue to serve ISR until Regli's arrival.

Regli, a faculty member at Drexel University, has been with the Defense Advanced Research Projects Agency (DARPA) since 2014 and presently serves in the role of Acting Director of the Defense Sciences Office. During his time at DARPA, he has pioneered advances in advanced robotics, design and manufacturing, social systems, machine learning, and human-machine teaming. His previous research spans a range of technical areas; most recently he has been focused on advancing the use of lightweight semantic models to solve problems in content-centric networking, metadata extraction and labeling, and supply chain interoperability.

Regli received his Ph.D. in computer science from the University of Maryland in 1995.

>> LEARN MORE, VISIT go.umd.edu/regli

UMD Engineers Respond to Record-Breaking Harvey

In August, Hurricane Harvey unloaded more than 50 inches of rain in parts of Texas—the greatest amount ever recorded in the lower 48 states from a single storm.

Richard Krupar III, a postdoctoral associate in the Department of Fire Protection Engineering and Center for Disaster Resilience, spearheaded a preliminary rapid damage assessment of the Texas coast in the wake of Harvey. Conducted with researchers from partner universities, the assessment identified damaged areas and captured initial data on how well single-family residences and other buildings withstood wind and storm surge hazards. A preliminary report has been shared with the engineering and scientific communities to inform current and future efforts to understand the impacts of Harvey.

National and local news outlets turned to the disaster expertise of engineers in the Clark School's Department of Civil and Environmental Engineering and Center for Disaster Resilience. The New York Times interviewed Senior Research Engineer Sandra Knight about the use of terms such as "500-year flood" and why they can be confusing to the public. The Washington Post interviewed Research Professor Gerald Galloway about how Houston's development may have contributed to the devastating flooding.

>> THESE AND OTHER STORIES IN CNBC, HUFFPOST, AND MORE AT go.umd.edu/harvey



PHOTO: RICHARD KRUPAR III
A UMD-led team collected critical data on Harvey's damage.



BOWDEN APPOINTED ACTING DIRECTOR OF WIE

"More than anything, the existence of this program is recognition that we want women in engineering and that there is no question they can do it."

MARY BOWDEN

As of July 24, Visiting Assistant Professor Mary Bowden became acting director of the Clark School's Women in Engineering (WIE) program, leading the program while WIE Director Paige Smith is on leave serving at the National Science Foundation as the director of the diversity program Broadening Participation in Engineering.

Fostering a sense of community and system of support, WIE's core purpose is to produce open-minded and globally-conscious engineers seeking to create positive change. To do so, WIE provides resources to increase the number of women enrolling in engineering and—most importantly—increase the number of female engineers who make it to commencement.

One of Bowden's major goals as acting director, in addition to remaining an effective educator while taking on the new position, is to increase the retention rate of female students returning to the engineering program after their first semesters.

>> LEARN MORE, VISIT go.umd.edu/bowden

The Alumnus Who Brought Stormwater Management to Silicon Valley



Ryan Janoch (M.S. '08, civil and environmental engineering) is a self-described stormwater junkie, so it's hardly a surprise that he has dedicated his career to it. But not even he expected the path to lead to Silicon Valley.

Janoch, along with his wife Allie (B.S. '09, computer science), is the founder of Mapistry, a Berkeley-based company that combines stormwater expertise with easy-to-use software to help industrial facilities navigate regulations and apply best practices.

"We make environmental regulations easier for manufacturing companies so they can expand the economy while protecting water quality," he says.

Eighty-three percent of the California facilities that have relied on Mapistry to reduce elevated levels of contaminants flowing from their sites have successfully dropped down to allowed concentrations. In contrast, approximately 50 percent of all similar facilities statewide saw dips in contaminant levels.

>> LEARN MORE, VISIT go.umd.edu/mapistry

PAUL GASKE

ENDURING INTELLECTUAL;
DEVOTED PHILANTHROPIST

PAUL GASKE (B.S. '76, ELECTRICAL ENGINEERING) came by his lifetime love of learning honestly and early, taking after his father—a man the family joked "never met a class he didn't want to take." After attending college in Pennsylvania briefly, he realized that he wanted to return to the bustle of the Washington, D.C. area.

Gaske settled into life at the University of Maryland, living on the third floor of Chestertown Hall and studying every night at the same table in Hornbake Library. He was so enthusiastic about learning—just as his father before him—that once he earned his summer spending money, he'd register for summer session classes at UMD, taking everything from biology to virology.

In between classes (his record total for a single semester was 21 credits), Gaske rarely missed a home Terps basketball game. He would show up to Cole Field House around 2:00 p.m.—attendance at the time was first-come, first-served—then do his homework outside while waiting in line until the game began at 7:00 p.m.

Gaske's connection to UMD runs deep; in fact, it was right in front of Hornbake where he met his future wife Ellen, an education student. After graduating from UMD, they both attended Johns Hopkins University, where Gaske earned a master's in computer science, and his wife received her Ph.D. in education.

Gaske began working at Hughes Network Systems, LLC in 1977, where today he is executive vice president and general manager for Hughes' North American Division.

Over the years, Gaske and his wife's mutual love of education would solidify into the Paul and Ellen Gaske Foundation, a philanthropic organization that allows them to help students better their lives and society in general through education. The Gaske Foundation supports the Clark School through a number of initiatives, including the Dean's Fund, the Electrical and Computer Engineering Undergraduate Laboratory, and Undergraduate Education Support.

"I really enjoyed every moment of being at the University of Maryland," says Gaske. "Through the Gaske Foundation, Ellen and I are able to help students find that same kind of joy, and to go on to be productive members of society and lead a good life."

And as for Gaske's favorite UMD memory? "Meeting my wife in 1976," he says without hesitation. ■



PHOTO: ALISON HARBAUGH

THANK YOU,
PAUL AND ELLEN GASKE,
AND ALL OF OUR DEAN'S CIRCLE DONORS!

The Dean's Circle recognizes and celebrates those individuals who have given \$100,000 or more during their lifetime to the A. James Clark School of Engineering.

To learn how you can make a charitable donation today and make a significant difference in the future of the Clark School, contact Leslie Borak, assistant dean for external relations.

EMAIL: lborak@umd.edu

PHONE: 301.405.0317

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SCHOOL OF ENGINEERING**
DEAN'S CIRCLE

UMD STARTUP ANNOUNCES \$3.1 MILLION IN PRIVATE FINANCING

gel-e Inc., a startup company launched by University of Maryland Fischell Department of Bioengineering alumnus Matthew Dowling (Ph.D. '10), recently announced that it has raised \$3.1 million in private financing, led by early-stage investment funds and life science investors.

gel-e specializes in developing a broad range of advanced hemostatic and wound treatment products, including bandages for the treatment of routine cuts and scrapes, foams, putties for traumatic and military injuries, and surgical gels and powders.

The announced financing will allow gel-e to expand its initial U.S. Food and Drug Administration regulatory clearance for the management of bleeding wounds to a broader hemostatic product line for the treatment of external wounds.

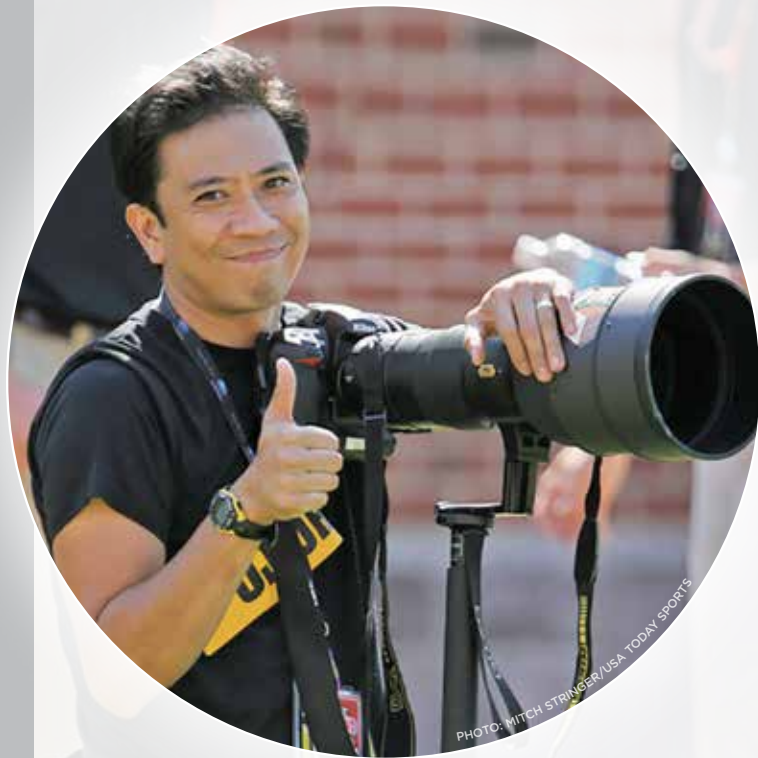
"gel-e exemplifies an ideal investment for us," says Jim Hughes, director of UM Ventures, a joint initiative of the University of Maryland, Baltimore and University of Maryland, College Park to commercialize technologies and expand industry collaboration. "By strategically deploying grants, gel-e has built an impressive corporate foundation, such as achieving its first regulatory clearance, securing an issued patent estate, and receiving recognition through numerous peer-reviewed publications. We are excited to be a part of this financing that supports the next phase in the company's growth."

>> LEARN MORE, VISIT go.umd.edu/gel-e



"gel-e
exemplifies
an ideal
investment
for us."

JIM HUGHES,
DIRECTOR, UM VENTURES



AWARD-WINNING STAFF

"People look forward to the weekends because they don't have to work, but I actually look forward to Mondays," says Alan "AI" Santos, director of student services in the Clark School's Department of Civil and Environmental Engineering.

Student advising at a school the size of the University of Maryland is no small task, but Santos makes it his life's work. Honored with numerous advising awards from both the University System of Maryland and the Clark School, he is a recognized star in his department and an important figure to his students.

Santos's advising is so effective because he not only puts himself in his students' positions, but he keeps a positive attitude, hoping that his students will learn from his example.

"A positive attitude goes a long way," he says. "Students are going to fail along the way to success, and that's okay. It makes us stronger and more resilient, and it helps us grow."

Involved on campus, Santos advises student groups, photographs countless UMD events (such as the ENES 100 end-of-semester showcase, discussed at right), and leads Terp Fit Crew, an exercise group of staff and students that meets every Monday, Wednesday, and Friday during the school year.

With more than two decades at UMD under his belt, Santos is not looking to change his position. "I've been here 21 years, and I still have a lot to learn. Every day is different!" he says. "But 10 years from now, this is exactly where I want to be."

>> LEARN MORE, VISIT go.umd.edu/santos

THE PLACES AND PROGRAMS THAT MAKE THE CLARK SCHOOL A CATALYST FOR HIGH-QUALITY RESEARCH, INNOVATION, AND LEARNING.

HONORING LEGACIES

This past May, Marie Sayre Cole stopped by the University of Maryland to see the ENES 100 Introduction to Engineering Design end-of-semester showcase. ENES 100 is a required course offered by the Clark School's Keystone Program for all first-year engineering students, aimed at building a strong academic foundation in a UMD engineering student's first year.

It's also one of the courses taught by Dr. Clifford L. Sayre Mechanical Engineering Teaching Fellows. The supporting fund, established by Cole in spring 2017, honors her father and longtime UMD Mechanical Engineering Professor Clifford L. Sayre, who passed away early last year.

Sayre was a UMD faculty member for more than 30 years. Throughout his career, Sayre advocated for increased diversity in engineering education and had significant involvement in creating a summer program for minority and women scholars in engineering. Because one of his primary focuses was on the importance of experiential learning, Sayre also aided in the development of the senior capstone design course.

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.

"I would hope that this scholarship will take the 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 emulate his passion for students and education."



Clifford L. Sayre



Marie Sayre Cole

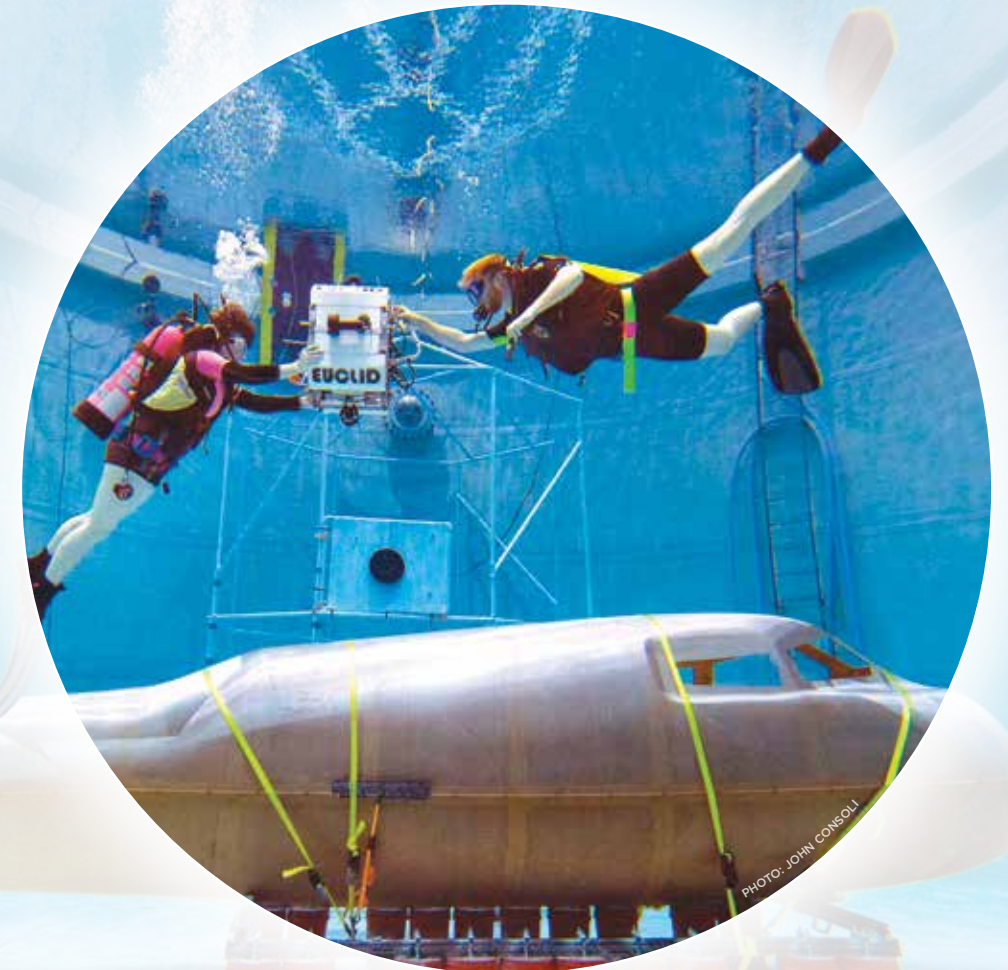
>> LEARN MORE, VISIT go.umd.edu/sayre

FIRST-CLASS FACILITIES

Hovering above a spacecraft fuselage, aerospace engineering students work with Euclid, a free-flying underwater robot, in the Clark School's Neutral Buoyancy Research Facility.

The Neutral Buoyancy Research Facility—which simulates the weightless conditions of space—is the only facility of its kind on a university campus and, along with NASA's, is one of only two operating neutral buoyancy tanks in the United States. It was originally built for orbital operations studies, but faculty and students today also use it to simulate robotic operations in lunar and Mars gravity.

>> LEARN MORE, VISIT go.umd.edu/ssl



SUPPORTING DIVERSITY & INCLUSION

The Louis Stokes Alliances for Minority Participation (LSAMP) program at the Clark School's Center for Minorities in Science and Engineering aims to increase substantially the quantity and quality of underrepresented minority students receiving baccalaureate degrees in science, technology, engineering, and mathematics (STEM).

The University System of Maryland (USM) LSAMP, funded through a National Science Foundation grant, has trained and supported thousands of students over the years, directly through financial support and indirectly through influencing institutional climates that foster and celebrate

diversity. Particular emphasis is placed on transforming undergraduate STEM education through innovative, evidence-based recruitment and retention strategies and relevant educational experiences in support of racial and ethnic groups historically underrepresented in STEM disciplines: African Americans, Hispanic Americans, American Indians, Alaska Natives, Native Hawaiians, and Native Pacific Islanders.

The USM LSAMP includes alliance partners at the University of Maryland, College Park; University of Maryland, Baltimore County; and University of Maryland, Eastern Shore.



USM LSAMP students at the 2017 LSAMP Bridging Conference in August.

>> LEARN MORE, VISIT go.umd.edu/usm-lsamp



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PHOTO: JOHN CONSOLI

WHAT'S IN THIS PHOTO? Travis Burch, a master's student in the Department of Aerospace Engineering, works in the Clark School's Collective Dynamics and Control Laboratory to understand the role of hydrodynamic sensing in fish behavior and to translate that understanding into the design of a closed-loop control system for an autonomous underwater vehicle. The idea is to create a bioinspired fish robot whose autonomous swimming behavior originates in the actual capabilities and behaviors of fish. This research is led by Derek Paley, Willis H. Young Jr. Professor of Aerospace Engineering Education. Paley holds a joint appointment in the Department of Aerospace Engineering and the Institute for Systems Research.

LEARN MORE, VISIT go.umd.edu/cdcl

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