MARYLAND AEROSPACE ENGINEERING | FALL 2024

AEROCONTACT

DEAR FRIENDS,

An anniversary provides an occasion to pause and reflect—to take a glance back at the road we've traveled before continuing our journey. In this issue of AeroContact, I invite you to join us as we mark 75 years of aerospace engineering at UMD, celebrating our department's many achievements while cultivating a vision of marvels to come.

Our story is a balance of change and continuity; we continue to build on our rich legacy in areas that include rotorcraft research, space systems engineering, flight dynamics and propulsion, while at the same time conducting pace-setting research in emerging areas of interest, such as artificial intelligence, autonomy and robotics, and hypersonics. The result is a rich array of research endeavors and educational opportunities.

In this issue, we highlight some of the proudest moments in our department's history—accomplishments that made international news headlines and, in one case, earned us a spot in the Guinness Book of World Records. We honor visionaries who have shaped the history of the department, including Glenn L, Martin, Alfred Gessow, and Darryll J. Pines. We also survey some of the unique centers and facilities that support the pioneering research being conducted here at UMD.

At the same time, this issue is about the future—for, even as we pause to celebrate, the world of aerospace continues to evolve at a rapid pace. We continue to evolve with it. Just this past fall, UMD launched a brand-new hub, based at the Department of Aerospace Engineering, that will bring together researchers from across the University of Maryland System to do exciting, collaborative work in the arena of space engineering. Our faculty and students at the Alfred Gessow Rotorcraft Center, meanwhile, are helping to tackle the critical engineering challenges involved with Vertical Takeoff and Landing. Engineers and pilots at our UMD UAS Research and Operations Center, based in Southern Maryland, are moving ahead with a bold initiative that will advance the safe, shared use of airspace by crewed and uncrewed aircraft. Back here on the College Park campus, researchers at a recently-launched lab are using haptics to augment pilot perception, potentially leading to improved flight safety in challenging environments.

In addition to showcasing past, present, and future research, this issue also reflects the vibrant student experience that our department provides. The highlights this year are many, including competition triumphs, scholarships, and awards. We also celebrate our alumni, many of whom continue to play an active role in the UMD Aerospace Engineering community. You'll read about NASA astronaut Jeanette Epps M.S. '94, Ph.D. '00, who recently completed a mission aboard the International Space Station. And about Andrew Garber '90, M.S. '96, who has helped equip military satellites with advanced technologies that protect warfighters.

A past to be proud of, a vibrant present, and a future of exciting possibilities—that's UMD Aerospace Engineering. We invite you to celebrate with us! If you can, please consider a $75 gift to your favorite department cause using the QR code below.

Best regards,

Alison Flatau

Alison Flatau
PROFESSOR AND CHAIR
DEPARTMENT OF AEROSPACE ENGINEERING

SPECIAL SECTION

AEROCONTACT

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

Flying High

Imagine the year 1949: a time of optimism but also mounting challenges.

America and its allies had defeated the Axis powers, but now faced a potent adversary in the form of the Soviet Union. During the ensuing Cold War, achieving technological superiority, including not only in aviation but in space exploration, would take on critical importance. The need for research expertise in these areas, as well as for a trained workforce, was becoming clear.

(CONT. ON PG 2)

The department's first chair, A. Wiley Sherwood, admires the newly completed wind tunnel in 1949.

(CONT. FROM PG 1)

Commercial aviation had begun to take off, generating immense excitement among the public. In 1949, Britain's de Havilland Aircraft Company flew a prototype of the first commercial airliner, known as the Comet. It featured a novel engine mounting design, soundproofing, and a spacious, comfortable cabin—but also a fatal design flaw that led to a series of mid-flight breakups, heralding the end of British dominance in aviation—and creating opportunities for an American company known as Boeing.

UMD Mechanical Engineering Department Chair John E. Younger, a pioneer in aircraft design, had for years been among a handful of faculty with an interest in aviation. Starting in the late 1930s, he began to make the case to administration for a new department. By the postwar era, what sounded like a novel idea had become a must.

In the fall of 1949, the department's aeronautical sciences option officially separated and became the UMD Department of Aeronautical Engineering, with A. Wiley Sherwood chosen as chair. Less than a decade later, after the Soviet Union's successful Sputnik launch set in motion the Cold War space race, the department name changed to Aerospace Engineering.

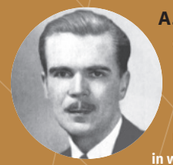
Seventy-five years since its founding, the department celebrates continuity with the past while marking significant transformations. Today, UMD Aerospace Engineering is a major center for rotorcraft research, with the Alfred Gessow Rotorcraft Center—one of three national Rotorcraft Centers for Excellence. UMD Aerospace continues to support space exploration, not only by designing space vehicles, but also by engineering habitats and even designing spacesuits. Meanwhile, the department has positioned itself at the leading edge of emerging technologies, notably AI and autonomy.

Along the way, historic milestones have been achieved, some even making it into the Guinness Book of World Records. That honor went to a student team that, in 2012, flew the Gamera II human-powered helicopter for 65.1 seconds, setting a new world record. Seven years later, a team of pilots and engineers from the department's UAS Test Site—now known as the UAS Research and Operations Center—etched a new entry into aviation history, successfully completing the first-ever drone delivery of a live organ for transplant.

Our students and alumni have been history makers, too—including doctoral graduate Jeanette Epps, who has taken her engineering skillset to new heights—literally—as a mission astronaut aboard the International Space Station.

Maryland Aerospace Engineering Pioneers

CONSIDERED ONE OF THE FATHERS OF AMERICAN AVIATION, GLENN L. MARTIN had moved his aircraft company to Maryland, and UMD was well-positioned to provide research and a skilled workforce. An investment of $2.5 million funded four new buildings on campus—including a wind tunnel—and a formal Department of Aerospace Engineering (AE) was designated in 1949. With new resources, a growing faculty, and a national desire for bigger, faster, more sophisticated aircraft, it began its evolution into what is now one of the most recognized programs in the country. It has endured a number of boom and bust periods in its lifetime, closely aligned with what was happening on the outskirts of College Park: wars, the space race, market trends, and military priorities often required strategic responses and out-of-the-box thinking. Each of the department chairs were instrumental in bringing change and growth in the face of societal, economic, and technological challenges.



A. WILEY SHERWOOD, the department's first chair, created the curriculum and, later, the expansion into astronautics. His company, AEROLAB, was the first spin-off company out of the university and still remains a global leader in wind tunnel design and manufacturing.

JOHN ANDERSON was appointed department chair in the 1970s during a period of profound uncertainty. Like many engineering programs across the nation, UMD had suffered a 70% drop in enrollment, and rumors of the elimination of the department circulated amongst the faculty. Anderson's reverse trajectory, which included substantial courting for research funding and a massive public relations campaign with university administration, resulted in a surge in aerodynamics and propulsion work, garnering national attention.

ALFRED GESSOW, a former NASA researcher and administrator with many years of federal service, leveraged his contacts in government to establish a rotorcraft curriculum and research center, along with programs in dynamics, flight mechanics, aerodynamics, and composite structures, all of which are thriving today.

WILLIAM FOURNEY served as the department chair for 11 years, beginning in 1994. During his impactful tenure, he oversaw a seismic boom in enrollment, research dollars, and faculty. He also spearheaded development of the Clark School's Keystone Program, geared towards experiential learning. With more than six decades at Maryland Engineering, Professor Emeritus Fourney has remained active in the department, teaching classes and conducting research that could help protect soldiers from brain injuries.

DARRYLL PINES Darryll J. Pines joined the department in 2003 and only six years later became Dean of the A. James Clark School of Engineering. A bold thinker with a love of student competitions and an eye for emerging technologies, Pines helped set in motion UMD's bid for the Sikorsky Prize and also catalyzed interest in micro air vehicles and autonomy. In 2020 he became UMD President.

ALISON B. FLATAU, chair since 2022, has worked to expand UMD Aerospace's scope by fostering research in areas such as AI, autonomy, modeling and simulations, and hypersonics, while continuing to build up the department's strengths in propulsion, rotorcraft, and space engineering. Flatau has recruited a new generation of faculty and worked to ensure a future for the department in which—as in space—anything is possible.

Did Someone Say "Impossible"?

THE GAMERA HUMAN-POWERED HELICOPTER PUT UMD AEROSPACE INTO THE GUINNESS BOOK OF WORLD RECORDS.

Few engineering competitions have offered such a rich incentive, and few have presented such difficulty. For more than three decades, the Sikorsky Prize was regarded as one of the most elusive goals in aviation.

Contenders for the $250,000 prize had to design, build, and fly a human-powered helicopter that could meet ambitious requirements for height and endurance, and then be able to land it within a tightly circumscribed space.

Interest in the endeavor had dropped off since the prize was first announced in 1980: multiple attempts had failed to get off the ground, often literally. By the turn of the 21st century, the general consensus was that the feat was impossible to achieve and not worth the time and effort.

Inderjit Chopra, director of the Alfred Gessow Rotorcraft Center (AGRC), recollects the state of affairs. "The quest for the Sikorsky was dead—everyone had given up."

But Darryll J. Pines, then dean of the A. James Clark School of Engineering, wasn't resigned to letting the Sikorsky go forever unclaimed. If any university was poised to win it, he reasoned,

UMD was. After all, UMD Aerospace Engineering was home to one of the nation's only rotorcraft centers for excellence—and some of the best minds in the field, not to mention highly-motivated and ambitious students.

Together, he and colleagues at the AGRC helped galvanize a student-led effort to fulfill the longstanding quest. Soon, the race for the Sikorsky was on again.

During a series of flights conducted in 2012-13, UMD's Gamera human-powered helicopter broke new ground in altitude and duration. Their flight highlights included:

- A flight that reached 10.8 feet (3.3 meters) in altitude, 48 seconds in duration
- A flight that reached 9.4 feet (2.85 meters) in altitude, 60 seconds in duration

The altitude of 10.8 feet marks the highest that the Gamera helicopter has ever flown.

The Gamera team powered the Clark School to a world record of 65.1 seconds in flight duration—and surpassed that achievement a year later, reaching 97 seconds.

Although a competing team edged out UMD for the Sikorsky Prize itself, the UMD team has the distinction of having proven the "impossible" possible—and earning a spot in the Guinness Book of World Records.

An Ingenious Concept Changes Space History

A TEAM OF UMD AEROSPACE ENGINEERING STUDENTS IN 2002 DREW UP EARLY DESIGNS FOR WHAT WOULD SOMEDAY BECOME THE MARS HELICOPTER.

When Ingenuity lifted off from the surface of Mars on April 19, 2022, it achieved something that had never been done before. It was the first-ever powered flight to take place on another planet.

In many ways, it was also the culmination of a story that had begun nearly two decades earlier at UMD.

Wind the clock back to the dawn of the millennium. In 2000, a team of UMD graduate students led by Anubhav Datta—now a professor at the university—drew up plans for a design they named the Martian Autonomous Rotary-wing Vehicle (MARV). It sounded like science-fiction at the time.

Their design, which featured two-bladed coaxial counter-rotating rotors mounted on a square symmetric fuselage, established the feasibility of a Mars helicopter, and provided a blueprint for its design. It won them first place in the American Helicopter Society's (now known as the Vertical Flight Society) international graduate design competition, which was sponsored by Sikorsky and NASA.

The students demonstrated that blade loading—a parameter crucial for rotary-wing flight—could be achieved satisfactorily on Mars, if certain guidelines for maximizing the blade Reynolds number were followed, and that a two-bladed coaxial counter-rotating system would be ideal. Their work was published in the AIAA Journal of Aircraft and then quickly forgotten. "There was no momentum to make it real," Datta said. "The scale of enterprise needed to put a helicopter on a Mars mission meant only NASA JPL could make it happen."

And happen it finally did. By 2015, not only were NASA, JPL, and engineering contractor AeroVironment working together to design a helicopter bound for the Red Planet, but it incorporated key aspects of the UMD students' work.

Indeed, the helicopter that lifted off from the surface of Mars in April 2022 bore a striking resemblance to MARV—notably, both designs featured two-bladed coaxial counter-rotating rotors on a square fuselage.

There were important differences, too. The actual helicopter was 1/3.7-scale smaller in dimensions and had a hinge-less hub to conform to certain control bandwidth requirements discovered by JPL. Advances in lightweight electric motors allowed two independent rotor drives and independent swashplates replacing the more complex inter-connecting linkages designed in MARV. There was no payload except for a camera.

A new generation of UMD graduate students, working under Datta's supervision, played a crucial role in the development of the craft that became Ingenuity, using the UMD-developed program known as X3D to design and test blades that are strong and durable, yet uncommonly thin. That hard-to-achieve combination is a prerequisite for flying in the very un-Earthlike conditions of Mars, with its lower gravity and thin, carbon dioxide-dominated atmosphere.

Those efforts continue today as NASA and its partners build on Ingenuity's achievement, designing larger helicopters that can carry more substantial payloads, stay in the air longer, and travel farther distances. As Datta notes, Ingenuity was just the beginning. Martian flight, he says, "is an emerging field of the future."

Jeanette Epps: From Engineer to Astronaut

A UMD AEROSPACE ENGINEERING ALUM SPENT MUCH OF 2024 AS A CREW MEMBER ABOARD THE INTERNATIONAL SPACE STATION.

By Annie Krakower

As the countdown reached zero and the Falcon 9 rocket lifted off amid billowing smoke and flame from the John F. Kennedy Space Center in March, a Terp was preparing to take up temporary residence in a new home circling over the globe.

Mission specialist Jeanette Epps (M.S. '94, Ph.D. '00), one of four astronauts on NASA's SpaceX Crew-8 mission, was beginning a six-month stint on the International Space Station (ISS), where served as a flight engineer. A NASA astronaut since 2009, she was venturing into space for the first time.

"I've learned a lot about myself over these years training for spaceflight," she said in an interview for UMD. "I've learned a lot about my limitations, how far I can go, what excites me, what I'm afraid of, how I overcome those things and move forward. It is a great journey of self-exploration as well."

The adventure started in elementary school, when Epps' older brother suggested that her stellar math and science grades could launch her to a space-focused career. After receiving her bachelor's in physics from LeMoyne College, she earned master's and doctoral degrees in aerospace engineering at the University of Maryland, where she built models, tested rotor blades and developed code.

After stints working in Ford Motor Company's Scientific Research Lab and then as a technical intelligence officer for the CIA, she used that experience to help pass a rigorous selection process at NASA.

During her time on the ISS, her responsibilities included maintaining equipment and systems while working with crewmates Matthew Dominick, Michael Barratt and Alexander Grebenkin to conduct around 200 experiments to advance space exploration and benefit life on Earth.

"All this hands-on work that I was able to do at the University of Maryland translates directly to what we do as astronauts," Epps said. "(It's) having that understanding of tools, how to use the tools, how to use them properly and effectively, and then understanding, 'Well, this isn't going to work, but I know a tool that will work.'"

Epps underwent a vigorous training ahead of her journey into space. She lived in a cave for five days and in an underwater habitat for nine, mastered Russian, and learned to fly a T-38 jet. Ultimately, all the hard work yielded the rare opportunity to view the Earth from 250 miles above the surface.

For Epps, the sense of responsibility is intensified as she becomes just the second Black woman to have joined the ISS. She hopes her work can inspire the next generation of scientists and researchers.

"We're developing new technologies. We're creating jobs, we're creating interest in science, we're creating more interest in STEM," she said. "All the social issues that we have on Earth seem to be dwarfed by the magnitude of the things that we're trying to accomplish."

This article originally appeared in Maryland Today.

A Waiting Patient, a Historic Transplant

IN A FIRST-EVER ADVANCEMENT IN HUMAN MEDICINE AND AVIATION TECHNOLOGY, A UMD UNCREWED AIRCRAFT DELIVERED A DONOR KIDNEY TO SURGEONS AT THE UNIVERSITY OF MARYLAND MEDICAL CENTER IN BALTIMORE FOR SUCCESSFUL TRANSPLANTATION INTO A PATIENT WITH KIDNEY FAILURE.

When the team at UMD Aerospace's UAS research and testing facility in Southern Maryland first got word of a daring new proposal—to fly a live kidney across Baltimore's skies for use in a transplant operation—they did not underestimate the risks.

Uncrewed aerial vehicles (UAV) don't typically have a great deal of redundancy built in to their systems. If any one component—motor, rotor, guidance system, power controls—should fail, the flight is over. And, lacking wings, a drone's descent isn't a graceful glide to terra firma; it's a catastrophic plunge to earth.

So when Dr. Joseph Scalea called about delivering a live human organ to a living human patient, the team at the UMD UAS Research and Operations Center (UROC)—then known as the UMD UAS Test Site—had their work cut out for them.

Scalea, a transplant surgeon, had been following news of the Test Site's experiments with medical supply deliveries across the Chesapeake Bay. He wondered if something similar could be done with a donated organ. Professor Normal Wereley, then chair of UMD Aerospace Engineering, found the notion intriguing. He encouraged Scalea to give the Test Site a call.

Current methods of organ delivery rely on a combination of conventional aircraft and ground vehicles, and are often fraught with delays. As a result, some transplant organs never get used; by the time they reach their destinations, they are no longer viable.

Drones have the potential to trim back on delivery times and avoid the snags that can lead to a wasted organ. And in April 2019, the Test Site team would demonstrate that the concept was feasible.

To create a machine worthy of the groundbreaking three-mile flight, a team of engineers worked over the course of two and a half years to design and build an automated vehicle and system for the task.

The Test Site team set about addressing as many of the conventional UAV single-point failures as possible. Among other redundant safety features, the final design of the 50-pound UAV boasted eight rotors (two could fail and the vehicle would still fly), a parachute, a backup battery, and a mesh network radio system able to automatically select the best communications connections at any point along the flight path.

"When Dr. Scalea said he had this wild, crazy idea to fly a human organ to a real person with a drone, and asked, can we do it? I said yes," said Matt Scassero, then director of the Test Site and now head of the A. James Clark School's MATRIX Lab. "Looking 10, 20, 30 years into the future—I can see it easily, in a heartbeat. Autonomous aircraft is the way we're going to transport organs for transplant someday."

THE FUTURE OF UAS: REALIZING THE PROMISE

Five years after UMD's history-making organ delivery, the UROC team continues to help advance the safe, reliable, and innovative use of drones. The Chesapeake UAS Route Network (CURN) aims to ease the integration of drones of all sizes into the National Airspace System over Maryland, opening the door for economic development opportunities and new kinds of public services. Meanwhile, UROC has also been selected to lead a federally-funded Maryland Department of Planning pilot program in which drones will be used to improve access to medical services in communities that face transportation barriers. These include Smith Island, which lacks bridges to the mainland.

Wind on Demand

ORIGINALLY BUILT TO TEST AIRCRAFT COMPONENTS, THE GLENN L, MARTIN WIND TUNNEL HAS ALSO BEEN USED BY OLYMPIC ATHLETES.

Aviation pioneer Glenn L. Martin could hardly have imagined the achievements made possible by the wind tunnel that bears his name. Built in 1949, it is one of only a dozen low-speed wind tunnels in the United States and the second-largest found at a university. For over 70 years, the tunnel has helped researchers advance aerodynamic design, fluid mechanics, and other structural integrity design challenges.

But its uses go well beyond aviation. The facility has served as the test site for almost all of the Ford Motor Company's scale-models and, more recently, uncrewed aircraft systems. In the 1990s, the tunnel was instrumental in helping to reduce NASCAR driver injuries from vehicles going airborne at high speeds. Tunnel researchers worked with Ford to create a roof spoiler that is now a NASCAR safety requirement.

It has also helped athletes train. in 2002, the U.S. bobsled team used it to help prepare for the Olympics. There have been interesting animal studies as well, like the feasibility of tracking devices on birds and research into the evolution of the flying squirrel.

With a test section 11 feet wide and almost 8 feet high, and powered by a 2,000 horsepower electric motor, the facility is large enough to test electric vehicles, helicopters, boats and even building structures and materials for their ability to weather hurricanes. In recent years, with interest rising in uncrewed aircraft and other autonomous systems, it has been used in tests involving drones.

"One of the reasons why I've been here so long is that we test so many different things," said wind tunnel Director and Associate Professor Emeritus Jewel Barlow, who has overseen the tunnel for 42 years. In 2024, the tunnel was designated a Vertical Flight Heritage Site by the Vertical Flight Society.

UMD Nearspace: A Pioneer in Hands-on Engineering Education

MARY BOWDEN AND HER STUDENTS HAVE CONDUCTED HUNDREDS OF LAUNCHES, INCLUDING A PAIR DURING THE APRIL 2024 SOLAR ECLIPSE.

Last April, many donned eclipse glasses and headed outside to watch the Moon's shadow block out the sun. Meanwhile, UMD students involved in the university's Balloon Payload Program successfully executed a feat they'd planned for all year: launching a pair of balloons intended to gather valuable data during the rare event.

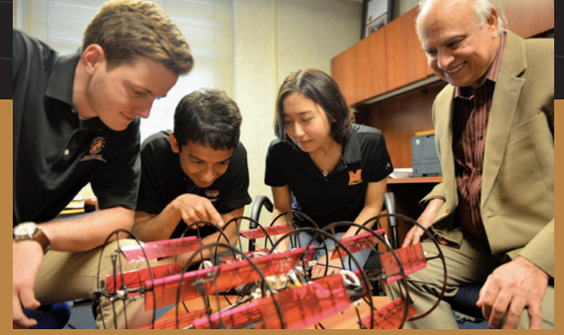
UMD's program, known as UMD Nearspace, was part of NASA's Nationwide Eclipse Ballooning Project (NEBP), in which students from 75 colleges and schools gathered at locations along the path of totality to attempt launches. As part of the endeavor, around 30 undergraduates, two graduate students, and two faculty members, as well as friends, family, and enthusiasts, traveled to a site near Fort Wayne, Indiana.

Exhilarating as the experience was, in some ways it was business as usual for UMD Nearspace, which conducts balloon launches several times a year—indeed, the organization recently celebrated its 100th launch, and in October 2023 had sent balloons into the path of an annular eclipse, also as part of the NEBP. Directed since its inception in 2003 by Dr. Mary Bowden, a doctoral graduate of the Massachusetts Institute of Technology, UMD Nearspace has made it its mission to provide students with a hands-on systems engineering experience—dubbed Design, Build, Fly—that replicates the processes used by NASA and private companies to plan and execute space flights. The Maryland Space Grant Consortium, a Congressionally-funded umbrella organization bringing together universities and other institutions from across the state, helps support the program's launches and other activities.

"Many of our students want to be space engineers, and so we're giving them an opportunity to go through an experience that's very similar to building payloads and launching them on rockets," Bowden said. " It's motivational, it's educational, and it's fun."

Alfred Gessow Rotorcraft Center: Preparing Future Engineers

THE UMD-BASED ROTORCRAFT CENTER OF EXCELLENCE HAS BEEN TRAINING INDUSTRY GAME-CHANGERS SINCE 1982. WITH THE EVTOL REVOLUTION IN PROGRESS, THE MOMENTUM IS SET TO CONTINUE.



When Alfred Gessow became chair of the UMD Department of Aerospace Engineering in 1980, he was determined to expand the department's research scope. A former senior executive at NASA and leading expert in helicopters, he was particularly interested in branching off traditional airplane work to include rotorcraft.

In 1982, the department established the Center for Rotorcraft Education and Research, an internationally recognized research center in rotorcraft science and technology, conducting research in acoustics, computational fluid dynamics, aerodynamics, dynamics, flight mechanics, and smart structures applications. Renamed the Alfred E. Gessow Rotorcraft Center for Education and Research (AGRC) in 1997, it is one of three university-based Vertical Lift Research Centers of Excellence, the others being at Georgia Tech and Penn State.

AGRC graduates have gone on to work for NASA, the Federal Aviation Administration, the U.S. Armed Forces, Boeing, Bell, and Sikorsky. Nine AGRC alumni have received the prestigious Vertical Flight Society (VFS) Bagnoud Vertical Flight Awards, 13 have become Technical Fellows of the VFS and 29 are now faculty members at leading institutions and invigorating rotorcraft education worldwide.

"We need to increase the number of trained rotorcraft helicopter engineers in this country," said Inderjit Chopra, who has directed the center since 1991. "If the United States is to retain leadership in the field, we must ensure that the pipeline is there. At UMD, we're doing our part."

Visit the AGRC's facilities on campus and you'll see students in action, creating scaled rotor models and then testing their performance characteristics on hover towers and in vacuum chambers. In the coming years, the existing facilities will be supplemented by new ones housed at the E.A. Fernandez IDEA Factory, the brand-new, state-of-the-art engineering building that opened its doors in 2022.

Faculty currently affiliated with the Center include Chopra, Langley Professor James Baeder, Associate Professor Anubhav Datta, Professor Roberto Celi, Igor Sikorsky Professor Olivier Bauchau, Minta Martin Professor Norman Wereley, Assistant Professor Umberto Saetti and Research Scientist V. T. Nagaraj. UMD President Darryll J. Pines, who began his career at UMD as an aerospace engineering professor with a focus on rotorcraft, is also on the AGRC faculty.

Defying Gravity: UMD's Neutral Buoyancy Research Facility

On the edge of UMD's engineering campus sits an unassuming brick building with only a handful of windows; trudge up two flights of metal stairs and you arrive at the edge of a 50-foot-wide, 367,000-gallon, cylinder-shaped tank, surrounded by robotic arms, equipment, and students at work. The Neutral Buoyancy Research Facility, home of the Space Systems Lab, is one of only two in the nation designed to mimic the zero-gravity environment of space, and the only one in the world on a college campus.

Built in 1990 under the careful eye of Professor David Akin as part of a grant from NASA, the tank has been the testing site of a number of robotic systems—many of which were developed at UMD's Advanced Robotics Lab—designed to make space exploration safer and more efficient.

It has developed and tested flight-ready systems like Ranger, a robotic system capable of intricate, precise work that is difficult for spacesuit-clad astronauts; cutting-edge spacesuit design; and in-space vehicle systems. It has even explored the potential for human-robot collaboration. The lab has helped test systems from a number of private, government-sponsored, and academic institutions, including NASA's Hubble Space Telescope repair unit, who conducted testing daily in the tank for six months. The lab is in a constant state of activity, with hundreds of undergraduates coming in and out of the lab working on their projects, from Gemstone teams and senior capstones to Ph.D. work.

"I love this job," says Akin. "It's the closest you can get to being an astronaut without having to live in Houston."

New Space Research Center Launched at UMD

ASTRA, LED BY ASSOCIATE PROFESSOR CHRISTINE HARTZELL, WILL BRING TOGETHER RESEARCHERS FROM ACROSS THE UNIVERSITY TO TACKLE A WIDE RANGE OF PROJECTS RELATED TO SPACE.

From protecting Earth against collisions with space objects to designing infrastructure for future Moon habitats, UMD has a rich track record of involvement in space engineering and research. A new center established at the Department of Aerospace Engineering will help consolidate those activities and open up new avenues for collaboration.

The center, named Advanced Space Science and Technology Research at UMD (ASTRA), is headed by Professor Christine Hartzell, director of the Planetary Surfaces and Spacecraft Laboratory and a UMD faculty member since 2014.

Hartzell has been involved in several U.S. and international spacecraft missions. From 2018 to 2020, she participated in NASA's OSIRIS-REx asteroid sample return mission and in 2020 she was tapped as a mission specialist for NASA's SIMPLEx-Janus mission. Currently, she is part of the science team on the Japan Aerospace Exploration Agency's Martian Moons eXplorer mission.

"The goal of ASTRA is to support existing research and provide new opportunities for research related to space science and engineering," Hartzell said. "We have a lot of folks on campus who are involved in collaborations with

organizations such as NASA-Goddard and the Johns Hopkins University Applied Physics Laboratory (APL), and who do space-related research. Until now, though, we haven't had an institutional structure to promote space exploration as a major research thrust at Maryland. ASTRA will change that."

UMD's location, just six miles down the road from NASA-Goddard and a short drive south from APL, provides advantages—as do unique UMD facilities such as the Neutral Buoyancy Research Facility (NBRF), the only such facility worldwide to be located on a college campus. Both APL and NASA-Goddard have designed, built, and operated major spacecraft missions that have explored the solar system, studied the Sun, and observed solar systems around other stars. "Strengthening our research ties with these two institutions will give students the unique opportunity to work alongside the day-to-day practitioners of spaceflight," says Hartzell.

The Space Systems Laboratory, led by Professor David Akin, has designed improved spacesuits for astronauts and engineered autonomous systems that can assist humans as they explore space.

Hartzell's Planetary Surfaces and Spacecraft Lab, among other activities, has experimented with novel methods for removing lunar dust from spacesuits and equipment, while also developing models and simulations that have helped uncover mysteries surrounding asteroid formation.

As the new center takes flight, Hartzell and her team will help to increase awareness in the space community—including prospective graduate students, academic peers, and funding agencies—aware of such efforts. "We want to increase visibility and promote Maryland as a place for space research," she said.

ASTRA will also help get the word out about the master's of engineering and certificate programs offered by the UMD aerospace engineering department in collaboration with Maryland Applied Graduate Engineering (MAGE). Both programs offer educational opportunities to working professionals with an interest in obtaining or enhancing space engineering credentials.

Unlocking the Potential of Composites

Composite materials, which can often be both robust and lightweight, are playing an increasingly important role both in aviation and in aerospace, yet much remains to be understood about their properties. The Composites Research Laboratory (CORE), headed by Minta Martin Professor Norman Wereley, is filling in those research gaps, exploring topics that include the effectiveness of different manufacturing techniques and how composites respond to vibrations. The team's work extends beyond aerospace as well; recent work has included studies of composite materials used in prosthetics.

Extending The Boundaries of Perception

NEW TECHNOLOGY BEING EXPLORED AT UMBERTO SAETTI'S EXTENDED REALITY FLIGHT SIMULATION AND CONTROL LAB COULD REDUCE THE RISKS OF PILOT DISORIENTATION—AND EVEN MAKE FLYING POSSIBLE FOR PILOTS WITH VISION-RELATED DISABILITIES.

At night or in nasty weather, what a pilot feels and what their instruments indicate can be wildly disparate.

This spatial disorientation has been at the root of numerous high-profile plane crashes, including one that killed John F. Kennedy Jr. and wife Caroline Kennedy in 1999. Now it's the subject of a UMD aerospace engineer's efforts to recreate those conditions with a flight simulator en route to a solution.

"What if we could use more senses in order to overcome these phenomena and increase the safety of flight?" said Assistant Professor Umberto Saetti.

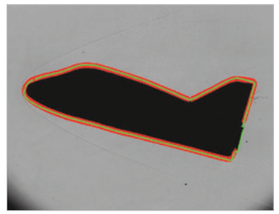
At Saetti's Extended Reality Flight Simulation and Control Lab, located at the E.A. Fernandez IDEA Factory, test pilots wear a full-body haptic suit, which uses electrical stimulation to help recreate sensations, or even to provide cues such as nudges, to negotiate low visibility and other challenges.

The system could even enable visually impaired pilots to rely on senses other than vision for navigation.

Adventures in Hypersonics

THREE NSF CAREER AWARD WINNERS ARE TACKLING TOUGH ENGINEERING PROBLEMS IN A FRONTIER AREA OF RESEARCH.

As engineers explore the potential of hypersonic flight, much remains to be understood about the complex flow physics that occur at such high speeds. UMD Aerospace has multiple labs and research facilities devoted to this key technological frontier, including the Cluster for Research on Complex Computations (CRoCCo) Laboratory, headed by Professor Pino Martin. Among other achievements, Martin and her team have developed numerical methods that can be used to support highly accurate computer simulations, thus laying the groundwork for increasingly accurate predictions of turbulent flows. The data from first principles are used to develop and calibrate new experimental flow diagnostics and to complement data from ground and flight experiments. This year, Martin has received support to lead a $4.5M Joint Hypersonics Transition Office Grand Challenge Award and characterize hypersonic flow jet interaction data across experiments and simulations.



Professor Stuart Laurence, meanwhile, directs a team of researchers at the department's High-Speed Aerodynamics and Propulsion Laboratory. With support from a $500,000 Defense Advanced Research Projects Agency Young Faculty Award, Laurence has pioneered a number of innovative approaches to measurement, analysis, and prediction. Taking a cue from the world of gaming, for instance, Laurence is harnessing a technique known as ray tracing to derive highly accurate aerodynamic measurements based on images taken of models flying freely through a hypersonic wind tunnel.

Also advancing the field of hypersonics research is Associate Professor Christoph Brehm, whose research activities include the first-ever simulations of transitional flow interacting with ablative surfaces at the hypersonic boundary layer, which is the region of airflow that is closest to the surface. Brehm, Laurence, and Martin have all received National Science Foundation (NSF) CAREER Awards in recognition of their innovative work in the field.

BE PART OF THE CELEBRATION!

In marking 75 years of UMD Aerospace Engineering, we invite you to join our **Strive for 75** initiative and **contribute $75 (or more!)** to featured funds in support of future Maryland aerospace engineers.
LEARN MORE AT **go.umd.edu/strive75**

Darryll J. Pines: A Fearless Visionary

The young professor who joined the UMD Aerospace Engineering faculty in 2003 soon impressed colleagues with his drive and dedication. Darryll J. Pines, a graduate of the Massachusetts Institute of Technology (MIT), came to the university as an expert on the structural dynamics of aircraft, but found himself drawn increasingly towards rotorcraft research.

Immersing himself in the subject, he investigated ways in which helicopter drive trains—notoriously subject to failure—could be improved. Within three to four years, he had gained international recognition as an authority on the subject. Pines' work, along with Alfred Gessow Rotorcraft Center Director Inderjit Chopra's, helped establish UMD as one of only a few universities where significant research was being done in this area.

In the years ahead, he would bring the same carpe diem mindset to a succession of roles: as a program manager at the Defense Advanced Projects Research Agency (DARPA), where he focused on micro and nano air vehicles, and then at UMD again, as aerospace engineering chair and subsequently as dean of the A. James Clark School of Engineering. In the latter role, Pines oversaw the expansion of its programs and facilities, and secured the largest philanthropic gift in Clark School history. In 2019, he received one of the highest professional honors bestowed on engineers: induction into the National Academy of Engineering.

Then, in 2020, Pines became the 34th President of the University of Maryland, succeeding Wallace D. Loh. He is the fifth engineer to lead UMD, after Nariman Farvardin, C.D. "Dan" Mote, John Slaughter, and Robert L. Gluckstern. He is also the university's first Black president.

Pines assumed leadership of the university during one of the most challenging times in its history. Early in 2020, only weeks after the University System of Maryland (USM) Board of Regents announced his appointment, the COVID-19 pandemic escalated and the United States went into lock-down. Universities abruptly found themselves facing a perfect storm of challenges, from transitioning students online to mapping out long-term plans to reboot campus life.

In May 2020, another inflection point occurred for the nation: the killing of George Floyd while in police custody. The incident prompted calls to examine and rectify the continued structural racism that pervades U.S. societal institutions, including higher education.

Leading a university during a volatile era requires decisiveness and a readiness to act, and Pines wasted no time after taking the helm, spearheading the university's plans for responding to COVID-19 and prioritizing the health and safety of the campus community.

Beyond the pandemic, Pines has also moved quickly to address lingering inequities and promote a more inclusive environment at the university. On his first day as president, he launched 12 new initiatives and recommendations—five of which aim to create a more inclusive environment. More specifically, Pines has sought to increase student, faculty, and staff diversity, providing unconscious-bias and anti-racism training, diversifying the curriculum, and examining community policing practices.

"Darryll has always been a proponent of tackling big challenges and going after firsts," says Professor and former Department of Aerospace Engineering Chair Norman M. Wereley, a fellow MIT graduate who shared an office with Pines during their student days. "It's something that really motivates him, and it's a perspective that fits well with aerospace engineering, with our long history of firsts, going back to the first flight."

"To me, he's been a great colleague for many, many years. We're very proud that someone who came into our department as an assistant professor has made such great strides in his career that he is now president of UMD," adds Wereley. "That's pretty amazing, and we're all very happy about that. It's takes a special skill set to be a president, and he has that skill set."

New Faculty

The UMD Department of Aerospace Engineering welcomes our two new faculty members, Assistant Professor John Martin and Assistant Professor Tam Nguyen. A Ph.D. graduate of the University of Colorado, Boulder, Martin conducts research in aerodynamics, scientific machine learning, reinforcement learning, and dynamical systems. Nguyen, meanwhile, earned her Ph.D. from the Massachusetts Institute of Technology; her research interests include remote sensing and architecture for space applications, including planetary science and exploration.

Assistant Professor John Martin

Assistant Professor Tam Nguyen

PROMOTIONS

We congratulate aerospace engineering faculty members Anubhav Datta and Stuart Laurence, both of whom have been promoted to full professor.

Anubhab Datta, Alfred Gessow Professor, UMD Department of Aerospace Engineering

Stuart Laurence, Professor, UMD Department of Aerospace Engineering

AEROSPACE ENGINEERING BOARD OF VISITORS

Jillian Alfred
Andreas (Andy) Bernhard
Steven Donaldson
Marcio Duffles (Chair)
Chris Huie
Matthew Hutchinson
Phil Joyce
Vivek Kuppusamy
Daniel Newman
Benjamin Parrington
Tanya Pemberton
Justin Richeson
Lael Rudd
Michael Ryschkewitsch
Daniel Scott
Emily Smallwood
Mary Snitch
Kerry Wisnosky

HONORS AND AWARDS

Hartzell Becomes AIAA Associate Fellow

Associate Professor and Minta Martin Professor Christine Hartzell has been named an associate fellow of the American Institute of Aeronautics and Astronautics (AIAA). Hartzell was selected for her contributions to the understanding of dust-plasma interactions on the moon and asteroids, and foundational work demonstrating the significance of plasma solitons for detecting small orbital debris.

Associate Professor and Minta Martin Professor Christine Hartzell

Baeder Named Igor Sikorsky Distinguished Professor in Rotorcraft

The UMD Department of Aerospace Engineering named Professor James D. Baeder the next Igor Sikorsky Distinguished Professor. Supported through an endowment from Sikorsky, a Lockheed Martin Company, the Sikorsky Distinguished Professorship serves to support enhanced research specialization in areas related to rotorcraft.

Professor James D. Baeder

Datta, Patil Honored by AIAA

Professor Anubhav Datta and Alfred Gessow Rotorcraft Center graduate Mrinalgouda Patil Ph.D. '22 were honored with a prestigious award by the American Institute of Aeronautics and Aeronautics (AIAA). Their paper, "Three-Dimensional Blade and Hub Stresses of Coaxial Rotors in High-Speed Forward Flight," was named the Structural Dynamics Technical Committee Best Paper from the 2023 AIAA SciTech Forum.

Anubhab Datta, Alfred Gessow Professor, UMD Department of Aerospace Engineering

Mrinalgouda Patil Ph.D. '22

Chopra, Saetti Receive 2024 DURIP Awards

Two UMD Department of Aerospace faculty members have received funding through the Defense University Research Instrumentation Program (DURIP). Distinguished University Professor and Alfred Gessow Rotorcraft Center Director Inderjit Chopra received an award for his project "Upgrading of Model Rotor Rig for Testing of Tip-Propeller-Driven Rotor in the Glenn L. Martin Wind Tunnel." Assistant Professor Umberto Saetti, meanwhile, received a DURIP for his project "Extended Reality Simulation and Control of Aerospace Vehicles with Brain Activity Monitoring." Saetti was also honored in 2024 with the Dave Ward Memorial Lecture Award, given by the Aerospace Control and Guidance Systems Committee.

Distinguished University Professor and Alfred Gessow Rotorcraft Center Director Inderjit Chopra

Assistant Professor Umberto Saetti

In just two years, the Terrapin Rocket Team has risen from 30th place to competition victor.

Terrapin Rockets Triumph at Spaceport America Cup

It's been a breathtaking ride to the top. In just two short years, the Terrapin Rocket Team has risen from 30th place to competition victor, receiving the 2024 Genesis Cup Trophy at the 2024 Spaceport America Cup, held June 17 to 22 in Las Cruces, New Mexico.

The team, which brings together students from across disciplines to design, build, and fly high-powered rockets for competition, also took first place in the 10K Student Researched and Developed (SRAD) category. This is only the fourth time Maryland competed for the Cup.

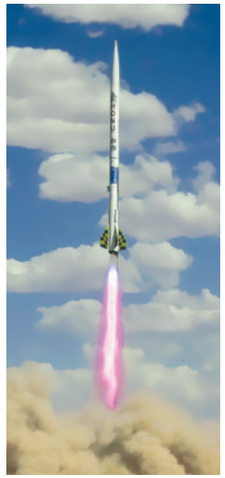
The Spaceport America Cup is the world's largest intercollegiate rocket engineering competition. This year, it drew 122 teams from around the world to test their rocketry and engineering skills, launching solid, liquid, and hybrid rockets to target altitudes of 10,000 and 30,000 feet.

In the months leading up to the event, the 75 Terrapin Rocket Team members worked tirelessly on their nearly 13-foot competition winning rocket, Honu. Meaning turtle in Hawaiian, Honu featured a carbon fiber fin can with Terps Rocket's signature fins, an airbrake, custom avionics, and payload.

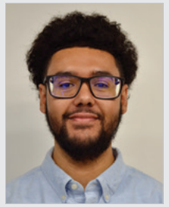
The team focused heavily on custom crafting as many of their rocket components as possible, says Sunjum Mehta, chief engineer and aerospace engineering junior, as well as focusing on slow, incremental improvements.

Mehta also credits the success of their recruiting and knowledge continuity efforts as contributing factors in the team's success. They welcomed nearly 60 new members this past year, and dozens received their L1 certifications after completing a skill based certification program designed to ensure safety in hobby rocketry.

"We had a very strong team with some brilliant team members, and lots of really cool sub-teams that had a lot of technical ability behind them," said Mehta. "We knew exactly what we needed to do, and we had help right there if we needed it. And that's a really important thing to have continuity on a rocketry team, especially when there's so much turnover every four years, three years."



The team's nearly 13-foot rocket has a number of distinctive features, including its fin design.



Clark, Johnson Win Spots in SAMPE University Research Symposium

Two UMD aerospace engineering undergraduates were selected for the 2024 Society for the Advancement of Material and Process Engineering (SAMPE) University Research Symposium Competition. Christopher Clark and Grace Johnson presented their research papers at SAMPE's 2024 Composites and Advanced Materials Expo (CAMX) in September.

Clark, who conducts research under the supervision of Professor Norman Wereley at the CORE Lab, was selected for his paper "Optimizing Specific Actuation Force of Soft Composite Pneumatic Artificial Muscles Using Additively Manufactured Components."

Johnson is also part of the CORE Lab, where she works closely with Ph.D. student Colleen Murray. She was selected for her research project, "Enhancing Energy Absorption of Additively Manufactured Tubular Honeycomb Structures."

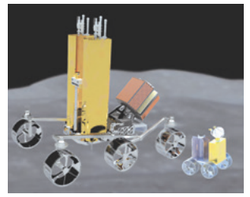
Uppoor Receives Best Paper Award at VFS 80th Annual Forum

UMD aerospace engineering Ph.D. student Vivek Uppoor was recognized with the best paper award from the Dynamics Committee technical session at the Vertical Flight Society's (VFS) 80th Annual Forum & Technology Display.

His paper, "Aeromechanics Investigation of a Dual-Wing Lift Compounded Slowed Mach Scale Rotor," investigated the effect of lift compounding on the aeromechanics of a rotorcraft, and more specifically, the Mach-scaled UMD compound rotor rig which was tested in the Glenn L. Martin Wind Tunnel in 2023.

UMD Students in Top Two at RASC-AL

From left to right: Professor David Akin and aerospace engineering seniors Kruti Bhingradiya, Robert Fink, Sneha Sunilkumar, and Matias Calderon.



A UMD team took second place overall and best in theme at the 2024 NASA Revolutionary Aerospace Systems Concepts–Academic Linkage (RASC-AL) Competition, which culminated in a competitive design review held in Cocoa Beach, Florida last June.

The challenge given students was to design a project around one of four themes: designing a long-range simulation of a Mars mission launched from the Moon; developing an architecture for evolving human presence on the Moon to expand available services and commodities; designing AI-powered self-replicating probes; and developing a large-scale lunar crater prospector.

The UMD team tackled the fourth of these with their Subsurface Ice and Terrain In-situ Surveyor (SITIS)–an uncrewed rover (pictured at right) designed for a one-year mission to explore permanently shadowed regions of the lunar south pole, where the average temperature is -250°C, and to characterize water ice resources and other volatiles.

Going beyond the basic aim of the challenge, to design a single rover, the team also incorporated a novel approach to communications that allowed their mission vehicle to remain in continuous contact with Earth.

"We designed our mission to have a small communication relay rover at the rim of our chosen location, the Sverdrup-Henson crater, which would directly align itself with Earth," explained Kruti Bhingradiya '24, team lead. "As Earth moves, this rover would move around the rim of the crater and find the best 'parking location' to have a direct line of sight to Earth."

The RASC-AL competition was the culmination of a year's work by students in the department's capstone courses ENAE 483/484, taught by Professor David Akin.

Quinteros Awarded Wings Club Foundation Scholarship

Rowan Quintero, an honors student in aerospace engineering, received a Wings Club Foundation Scholarship. This scholarship program supports outstanding students pursuing advanced education and future careers in aviation, aeronautics and astronautics.

Quintero is an aerospace engineering undergraduate student in the air track, and currently works with Associate Professor Stuart Laurence in the High-Speed Aerodynamics and Propulsion Laboratory.

Grammer, Kuznetsov Land AIAA Scholarships

UMD seniors Daniel Grammer and Jeremy Kuznetsov have been recognized with 2024 American Institute of Aeronautics and Astronautics (AIAA) scholarships. Grammar, who is also pursuing a minor in nuclear engineering, received the Thompson Space Technology Scholarship. Kuznetsov, a dual major who is also studying mathematics, received a Dr. James Rankin Digital Avionics Scholarship.

AMAV Team Advances in NIST UAS 5.0 Competition, Wins Three Best in Class Awards

UMD'S AUTONOMOUS MICRO AIR VEHICLE (AMAV) TEAM WON BEST IN CLASS AWARDS AND ADVANCED IN THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)'S UNCREWED AIRCRAFT SYSTEM (UAS) 5.0 COMPETITION.

The contest, dubbed the First Responder UAS 3D Mapping Challenge, is the latest installment of NIST's Public Safety Communications Research Division's Prize Challenges.

Part of a four-stage prize competition, this stage was aimed at leveraging innovators' ingenuity and UAS hardware/software skills to support the public safety community in improving situational awareness and saving lives during search and rescue operations taking place in a constrained indoor environment, such as limited lighting, compromised structural integrity, and lack of GPS availability.

AMAV team representatives at competition in Kansas: aerospace engineering Ph.D. students Wei Cui and Animesh Shastry (Team Lead), UROC Engineer Grant Williams, and computer science/math undergraduate student Alec Luterman.

The AMAV team took third place overall in the competition, and secured three Best in Class Awards with their UAS dubbed Intrigue: Map Data Acquisition Speed, Bill of Materials Total Cost, and Blue/Green UAS Capable.

SEVEN UMD STUDENTS RECEIVE VERTICAL FLIGHT FOUNDATION SCHOLARSHIPS

UMD students were well represented among the 2024 Vertical Flight Society's (VFS) annual scholarship recipients, announced on April 1.

VFS's philanthropic arm, the Vertical Flight Foundation, annually awards students who represent the world's most talented engineering students interested in vertical flight. This year, seven UMD aerospace engineering students were selected out of 29 total awards.

Bob Lynn Scholarship:
APURVA ANAND

M.A. "Tony" Paradiso Scholarship:
MATTHEW ARACE

Dr. Jing Yen VFF Scholarship for Cost Awareness:
BATIN BUGDAY

Dr. Friedrich Straub Scholarship:
MARGARET DONOVAN

Robert Head Scholarship:
GRACE JOHNSON

Hal Andrews Scholarship:
WILLIAM MAGELLAN OGLE

Professor Alfred Gessow Scholarship:
LOGAN TANNER SWAISGOOD

TO LEARN MORE ABOUT OUR 2024 VFS AWARD WINNERS AND THEIR PROJECTS, VISIT
go.umd.edu/2024VFS

UMD Student's Buoy Released into Arctic

UMD aerospace engineering undergraduate Nathan Roy escaped the summer heat this past August in a big way. An intern working with UMD Associate Professor Cy Keener (Department of Art) and the University of Washington Applied Physics Lab as part of the International Arctic Buoy Program, he had the opportunity to travel to Alaska in August for an aerial buoy drop, featuring buoys he himself had designed and built. During two flight days with the Air National Guard, Roy donned a harness and helmet, stood in an aircraft's open door, and filmed his buoys being released.

"My favorite part of the design process has always been the testing phase, and this time was no different," Roy said. "We were able to collect critical data for characterizing parachute opening loads, which lets us optimize the design for the next iteration."

"Getting to stick your head out of the plane and look out over the sea ice is an experience that's hard to beat. I'm very thankful to Professor Keener for giving me the opportunity to tag along," he said.

High altitudes are a recurring interest for Roy, who is also payload manager for UMD's Terrapin Rocket Team, helping to design and build a parafoil-like vehicle that uses a circular parachute to navigate to a landing point after being deployed. The team soared to victory at this year's Spaceport America Cup, earning the 2024 Genesis Cup Trophy and securing first place in the 10K Student Researched and Developed category.

Szyprowski Takes First in SAMPE Regional Poster Competition

Aerospace engineering sophomore Jack Szyprowski took first place at the Society for the Advancement of Material and Process Engineering (SAMPE) Regional Additive Manufacturing Symposium, held at Rowan University. His research poster, "Variable Stiffness 3D Printed Structured Fabrics Activated by a Pressure Field," explored particle jamming through the modification of an existing design of 3D printed structured fabric (similar in design to chainmail).

Robotics That Can Save Lives: UMD Shines at DARPA Triage Challenge

In mass casualty situations, time is of the essence. For the past year, the Defense Advanced Research Projects Agency (DARPA) has been conducting a multi-institutional competition aimed at harnessing the potential of autonomous vehicles (both ground and air) and advanced computing to help response teams gain an edge. UMD's RoboScout team, led by Professor Derek Paley, successfully completed the first phase of the DARPA Triage Challenge in October and will now move on to the second phase. RoboScout won first place among DARPA-funded university teams, second place among all funded teams, and third place overall.

From left: Srijal Poojari (doctoral student, electrical and computer engineering), Zach Bortoff (doctoral student, aerospace engineering), Atharv Marathe (Maryland Robotics Center software engineer), Grant Williams (UROC chief pilot), Chris Titus (UROC engineer), Alexandra Mangel (M.S. student, aerospace engineering), MRC Director and Willis H. Young Professor Derek Paley, and Josh Gaus (UROC Engineer).

ALUMNI SPOTLIGHT

Andrew Garber:
After Fruitful Career, UMD Alum Comes Full Circle

THE AEROSPACE ENGINEERING GRADUATE IS PAYING IT FORWARD IN A BIG WAY, GIFTING HIS ESTATE TO THE PROGRAM IN SUPPORT OF FUTURE STUDENTS. "IT'S THE RIGHT THING TO DO," GARBER SAYS.

When Andrew Garber ('90, M.S. '96,) studied aerospace engineering at UMD, his mentors gave him support and encouragement—and threw him the occasional, good-humored curveball.

"I had just finished my thesis defense and was waiting in the hallway," Garber recalls. "Then Professor Dave Akin came out. He told me that everything had gone well and that I'd nailed my defense, but that he just had one question: what was the significance of today's date in NASA history?"

Garber, caught off guard for a moment, hesitated as he searched for the answer. But then he realized he knew it. The date, February 20, was the anniversary of John Glenn's historic space flight around the Earth.

Garber, in fact, was well-steeped in NASA lore. Before returning to UMD to complete his master's degree, he'd worked at a NASA flight dynamics facility, where he monitored command and control of scientific satellites.

Akin provided some of the impetus for Garber's decision to pursue a master's. A recent UMD hire at the time, he had established a Space Systems Lab at the aerospace engineering department—and set up one of the only neutral buoyancy tanks to be housed on a college campus. The new resources at UMD were a draw for the young Garber. Although aircraft engines and propulsion had been his main focus as an undergraduate, he found himself gravitating towards space engineering, in part because of his time at NASA.

At UMD, Garber studied not only with Akin, but with another recent hire—future UMD President Darryll J. Pines. Trivia challenges aside, he says, both provided the kind of thorough, caring, and conscientious feedback that are critical to a graduate student's success.

Garber went on to build a professional career that's been both rewarding and varied. He landed a role as a lead attitude control systems hardware engineer at Orbital Sciences, assisting with multiple satellite launches. Later, the Department of Defense tapped his skills; among other projects, Garber helped engineer military satellites that assist frontline warfighters with communications, navigation, and situational awareness. He also developed an entire system level test program to verify and validate ground based command and control software for the overhead persistent infrared (OPIR) sensor package. The OPIR sensor, as integrated on numerous overhead assets, is a technology which provides battlefield commanders with intelligence on specific enemy threats.

And if all those pursuits weren't enough, Garber also manufactured flight hardware and components, working all the way down to chip level. He was, in addition, the lead test engineer on a project to develop next-generation onboard data storage units (DSUs) for use on DoD spacecraft. Variants of the unit he helped to develop are still in use today.

He credits UMD aerospace engineering with making such a career possible, and for that reason he's decided to gift his estate to the department—both as an expression of gratitude, and as a way to support future engineers. "It's the right thing to do," he said.

"The professors I studied with were not only distinguished in their academic fields, but often maintained contact with industry and were on top of emerging trends," Garber said. "Their expertise enabled them to answer just about any question an aspiring young engineer could throw at them."

"They piqued my interest to seek, to know, and to understand whatever the latest and greatest thing might be. They inspired me to always keep pushing forward in terms of acquiring new knowledge and skills," he said.

FIVE UMD ALUMNI RECEIVE VERTICAL FLIGHT SOCIETY HONORS

Five UMD Department of Aerospace Engineering alumni were recognized this year by the Vertical Flight Society (VFS) for their many contributions to the advancement of rotorcraft.

ANUBHAV DATTA, Ph.D. '04 was named a 2024 Technical Fellow for his research and academic leadership. Datta is now a professor in the department and co-director of UMD's Alfred Gessow Rotorcraft Center.

CARL OCKIER, M.S. '90, a senior expert on rotorcraft flight test engineering at Airbus Helicopters, was named a 2024 Technical Fellow.

BRAHMANANDA PANDA, Ph.D. '85 was selected for the 2024 Alexander A. Nikolsky Honorary Lectureship.

CLIFFORD SMITH, Ph.D. '95 was named a 2024 Honorary Fellow.

WILLIAM STARUK, M.S. '12, Ph.D. '17 received the annual François-Xavier Bagnoud Award.

TO LEARN MORE ABOUT OUR VFS HONOREES, VISIT go.umd.edu/VFS24

Van Wie is Greenaugh Award Recipient

Congratulations to David Van Wie (B.S. '80, M.S. '82, Ph.D. '86), Head of the Johns Hopkins University Applied Physics Laboratory (JHU/APL) Air and Missile Defense Sector and the inaugural recipient of the Kevin C. Greenaugh Award, established by Maryland Engineering's Dean Samuel Graham, Jr. in recognition of professional excellence at the intersection of strategic leadership, technical expertise, and impact on the prosperity of our nation or state.

LEARN MORE AT go.umd.edu/greenaugh24

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School of Engineering

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HAPPY BIRTHDAY, UMD AERO!

Testudo and Professor Emeritus William Fourney celebrate 75 years of UMD aerospace engineering at an alumni gala held on October 19. Marking decades of innovation, education and community, alumni, students, faculty, and staff gathered to reflect on the department's history, milestones, and future trajectory.

TO VIEW MORE PHOTOS AND READ ALUMNI STORIES, VISIT
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