



Fall 2014

AEROCONTACT

AEROSPACE ENGINEERING
A. JAMES CLARK SCHOOL *of* ENGINEERING
www.aero.umd.edu

UMD LAUNCHES UNMANNED AIRCRAFT SYSTEMS TEST SITE

INSIDE:

- NEW ORBITAL DEBRIS RESEARCH CENTER
- STUDENT SERVICE STARS
- 6 STUDENTS WIN NSF FELLOWSHIPS



CHAIRMAN'S CORNER



Norman M. Wereley

Research at the University of Maryland has always been big, but this year, it just got a little bigger. With Maryland joining the Big Ten Conference and the Committee on Institutional Cooperation, Maryland has even greater access to research partnerships and collaborations—adding to the already robust resources available to our faculty and students.

In addition, U.S. News and World Report has ranked the University of Maryland Department of Aerospace Engineering among the top 10 undergraduate programs in the nation. This achievement underscores the commitment of our faculty, staff and students to education, innovation, creativity and excellence!

From new research and testing facilities to the achievements of our students and faculty, this issue of AeroContact celebrates the successes and achievements in the department.

This summer, the Clark School of Engineering along with support from the University System of Maryland, has launched the Unmanned Aircraft Systems (UAS) Test Site in Southern Maryland. This test site will bring together individuals and resources from across academia, industry and government to accelerate UAS research and position Maryland as a leader in UAS development, testing and education. The University has had a rich history in UAS research—from wind tunnel testing of the Freewing Aircraft in our Glenn L. Martin Wind Tunnel to design, fabrication and testing of prototype zero of NAVMAR's Mako UAS in the early 00's, to current collaborations with Aurora Flight Sciences, Lockheed-Martin, BAE Systems, and UAV Solutions Inc., to substantial basic and applied research in morphing unmanned air vehicle (UAV) and micro-air vehicle (MAV) work under US DoD and NASA support — and this facility will provide additional resources for our faculty and students to continue pushing the envelope of what is possible.

Our students and alumni not only strive for excellence in the classroom and beyond, but as you will see in this issue, they are contributing to building better communities both at home and abroad—from building homes for Habitat for Humanity to building better opportunities for women in rural Africa through aviation and engineering training. Aerospace students are passionate about what they do, and many of our students participate in

STEM outreach activities in local schools and at regional events such as the National Air and Space Museum's African American Pioneers in Aviation: Family Day Series.

Aerospace Engineering's faculty continue to strive for success and demonstrate some of the best resources the department has to offer. Alfred Gessow Professor Inderjit Chopra was promoted to the rank of Distinguished University Professor, the highest scholarly rank a faculty member can achieve, while Professor Ray Sedwick was made senior member of the Institute of Electrical and Electronics Engineers (IEEE) and helped launch the Center for Orbital Debris Education and Research, the first academically led research effort focused on all areas of orbital debris research. In the April 2014 issue of American Society for Engineering Education's (ASEE) *PRISM* magazine, Clark School Dean and Farvardin Professor of Aerospace Engineering Darryll Pines published an article calling for the addition of an Advanced Placement (AP) engineering course to AP courses currently available to high school students, who currently have little to no exposure to engineering prior to college.

Generous contributions and support from corporate partners and sponsors are helping to expand our programs and drive innovation. This year, Sikorsky and United Technologies pledged \$1 million to the Clark School in support of our rotorcraft education and curriculum. As part of the donation, the Igor Sikorsky Distinguished Professorship in Rotorcraft was created to enhance rotorcraft research specialization in areas such as autonomous flight operations, flight control and system identification, aeromechanics and composite structures. This endowment is part of an ongoing effort between Sikorsky and the Clark School to enhance our robust rotorcraft program and provide continued support for developing not only cutting-edge technology for future helicopters, but also, the next generation of rotorcraft engineers.

We welcome hearing from you, so don't forget to send us your news! You can keep in touch and up to date by connecting with us on Facebook and Twitter, and alumni can find us on LinkedIn.

Enjoy reading this issue of AeroContact.

Norman M. Wereley
Minta Martin Professor and Chair
Department of Aerospace Engineering
wereley@umd.edu



Dr. Wereley, faculty and students at the eleventh annual convocation for the Aerospace Engineering Honors program. This event is held to recognize the department's 2014 honors graduates for their achievements in the program.



Graduate students Jarred Young and James Lankford at the National Air and Space Museum's African American Pioneers in Aviation: Family Day Series event.

AEROCONTACT IS A NEWSLETTER PUBLISHED FOR ALUMNI AND FRIENDS OF THE DEPARTMENT OF AEROSPACE ENGINEERING AT THE A. JAMES CLARK SCHOOL OF ENGINEERING, UNIVERSITY OF MARYLAND.

Your alumni news and comments are welcome. Please send them to:
Tom Hurst
 Department of Aerospace Engineering
 3179 Martin Hall
 College Park, MD 20742
 thurst@umd.edu
 Visit our web site at: www.aero.umd.edu

Chair: Dr. Norman Wereley
Editor: Jennifer Figgins Rooks
Assistant Editor: Nicole Sakin
Contributing Writers: Jennifer Figgins Rooks, Aileen Hentz, Erika Aparakakananage and Tom Hurst
Graphic Designer: Jason Quick
Photography: Al Santos, Erika Aparakakananage and Jennifer Figgins Rooks



FALL 2014
 ON THE COVER

CONTENTS

- 2 UMD Launches UAV Test Site
- 6 Aerospace Engineers and Service
- 8 Aerospace Students Win NSF Fellowships
- 14 Student Spotlights
- 16 Faculty News
- 18 Faculty Spotlight
- 19 Philanthropy
- 20 Alumni Spotlight

ON THE WEB AT **AERO.UMD.EDU**

DEPARTMENT NEWS,
 RESEARCH UPDATES,
 ALUMNI INFO, MORE





2

UMD LAUNCHES UNMANNED AIRCRAFT SYSTEMS TEST SITE

Unmanned aerial vehicles (UAVs) have been making media headlines—from Amazon’s next delivery service to policing poachers in Africa—and the University of Maryland (UMD) is poised to contribute to the next generation of UAV research and innovation.

Graduate student Elena Shrestha, Post-doctoral Research Associate Derrick Yeo and Assistant Research Scientist Vikram Hrishikeshavan demonstrate their cyclocopter at the UAS Test Site Ribbon Cutting event.

UMD's A. James Clark School of Engineering has launched a new Unmanned Aircraft Systems (UAS) Test Site in Southern Maryland. With support from the University System of Maryland, the site will bring together leaders in academia, industry and government to accelerate UAS research.

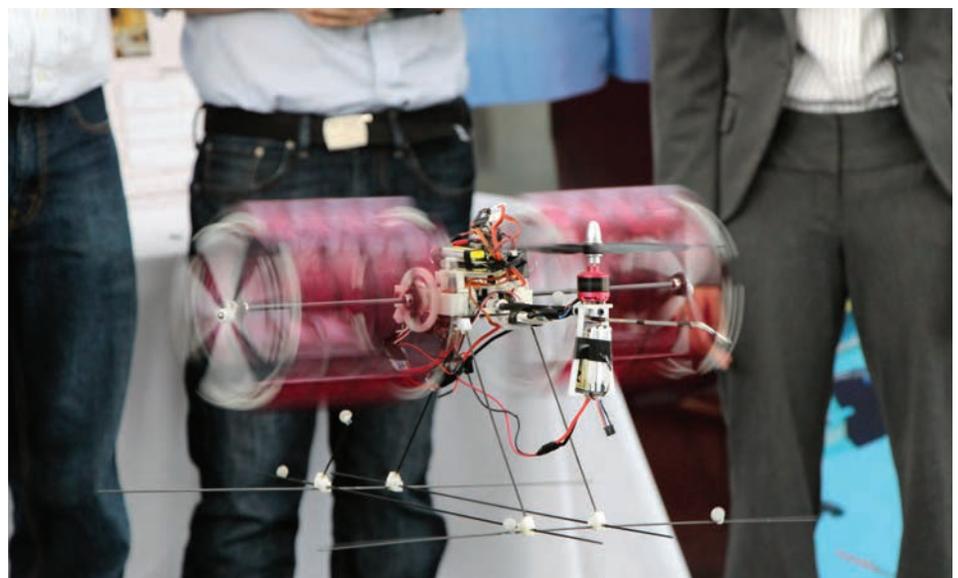
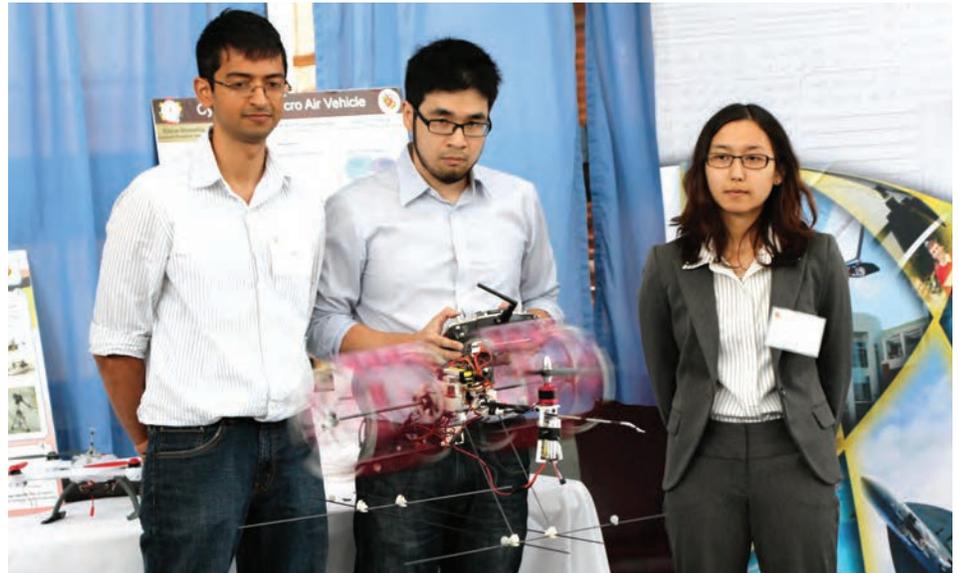
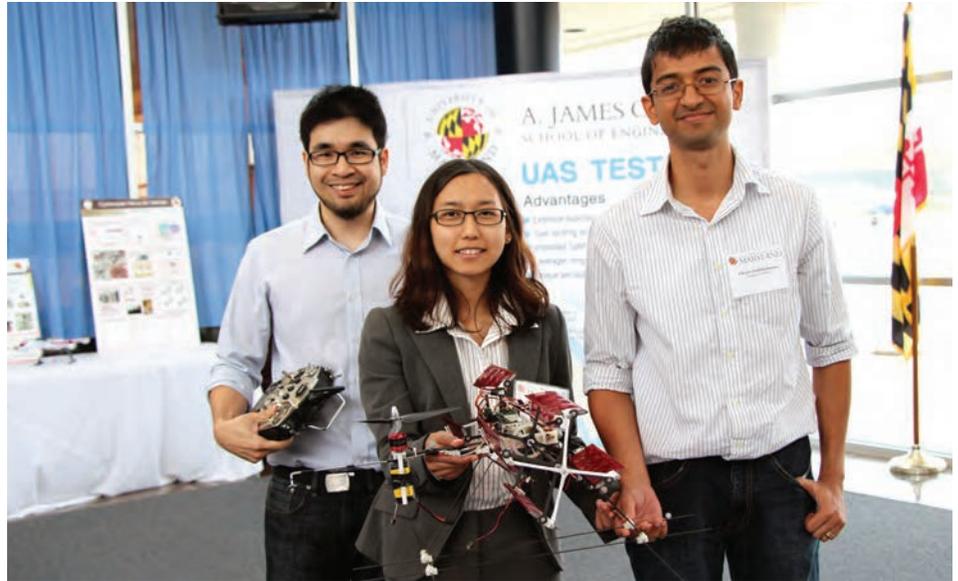
"With Patuxent River Naval Air Station serving as a premier facility for research, development, testing and evaluation, our region is already a hub for aviation innovation, and today's launch of the UAS Test Site will put Southern Maryland at the forefront of integrating unmanned autonomous systems into our national airspace," said Congressman Steny Hoyer, who represents the district in which UMD and the UAS Test Site are located. "With federal facilities like Pax River and a robust university system partnering together, Maryland will continue to lead the way in a critical field and benefit from diversification of our regional economy. I thank Chancellor Kirwan and his team at the University System of Maryland for their work to make this test site possible."

The UMD UAS Test Site, based in St. Mary's County, just a few miles from Naval Air Warfare Center Aviation Division (NAWCAD) at Naval Air Station Patuxent River, Naval Air Systems Command (NAVAIR) headquarters, and NAWCAD Webster Field Annex, will be a catalyst for research and development.

"Our expertise in autonomous vehicles research, aerospace engineering, and rotorcraft technology has positioned the University of Maryland as a pioneer and strong partner in the advancement of UAS research," said Mary Ann Rankin, senior vice president and provost of UMD.

Managed by the Clark School of Engineering, the UMD UAS Test Site will create and deliver products and programs in support of workforce development and higher education goals.

"I am pleased that the University of Maryland, College Park will manage the site, and that its educational value extends





Regional UAV manufacturers such as UAV Solutions, Aurora Flight Sciences and AAI Unmanned Aircraft Systems were on hand at the event with unmanned aerial vehicle displays.

4

to all University System of Maryland faculty, staff and students, as well as K-12 students throughout the state,” said Chancellor William “Brit” Kirwan of the University System of Maryland.

The test site will serve as a hub to focus the capabilities of the people and infrastructure in Southern Maryland, the University System of Maryland, government, and industry to address issues related to UAS

technology and policy, and will provide new opportunities for those in the region.

“This new addition to the St. Mary’s County Technology Corridor is the first step toward a larger autonomous research initiative in the region,” said Maryland Delegate John Bohanan, who advocated for the establishment of the UMD UAS Test Site since the idea was conceived. “The test site represents the next big transformation of our Southern Maryland economy, and will offer up new job opportunities for Maryland residents.”

“Our existing relationship with the University of Maryland serves as the foundation of this new test site,” said Vice Admiral David Dunaway, commander of NAVAIR. “The sharing of human capital and expertise from the university, government, and industry will be a conduit for technology transfer, and the overall betterment of national security.”

The UMD UAS Test Site is part of the Mid-Atlantic Aviation Partnership, in consort with Virginia and New Jersey, under the Federal Aviation Administration (FAA) UAS Test Site program, and will help the FAA integrate UAS into the national airspace.

Matt Scassero, a former Navy captain who helped lead the Naval Air Warfare Center Aircraft Division, is Director of the new UMD UAS Test Site.

To learn more about the UMD UAS Test Site, visit <http://uas-test.umd.edu>.

UMD’s Autonomous Vehicle Laboratory Featured in *The Accelerator*



The Autonomous Vehicles Laboratory (AVL) was featured in the March issue of *The Accelerator*, a monthly e-newsletter and blog published by the American Society for Engineering Education.

“Spotlight: The Benefits of Biomimicry” highlighted current research in the area of biologically inspired engineering. Taking cues from nature’s creatures, like bees and termites, researchers are developing solutions to complex engineering challenges.

Researchers at AVL are currently working on a number of projects to improve flight for autonomous flying vehicles. As part of the project MURI – AIRFOILS: Animal-Inspired Robust Flight with

Outer and Inner Loop Strategies, researchers at the lab are observing bee behavior—in particular, how bees fly in windy conditions—to improve vehicles’ ability to handle changing environmental conditions such as wind gusts and turbulence. The team’s goal is to build micro and nanoscale vehicles that could be used in disaster site exploration or observation and reconnaissance applications.

Techno-Sciences Professor of Aerospace Engineering Innovation J. Sean Humbert is the director of AVL, which is located in a facility in UMD’s Department of Aerospace Engineering.

Learn more about AVL’s biologically inspired autonomous vehicle research.



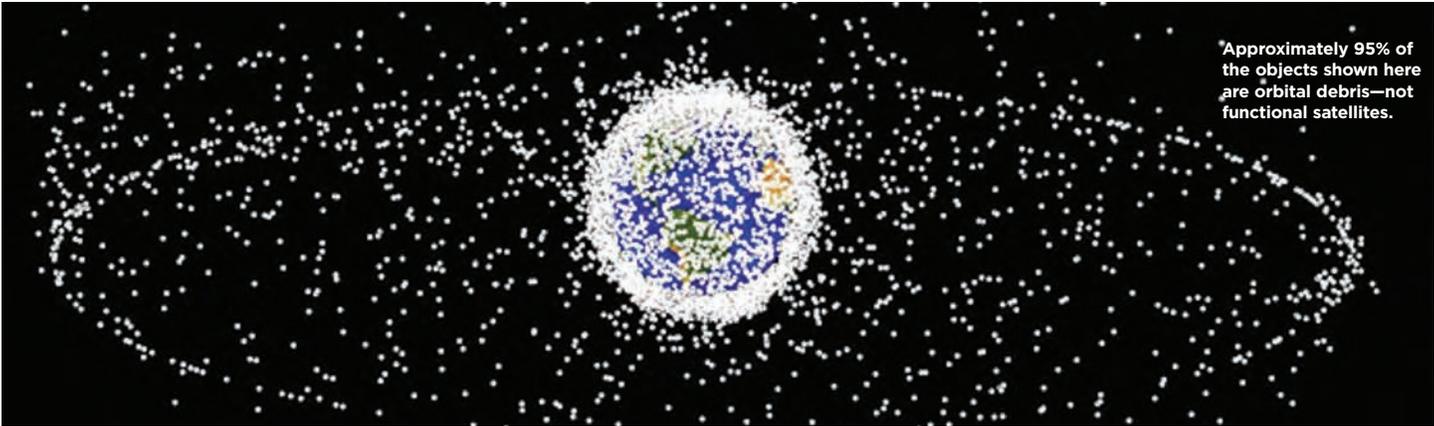


Image courtesy of NASA

UMD Establishes Orbital Debris Research Center

The University of Maryland (UMD) established the Center for Orbital Debris Education and Research (CODER) to address critical issues in orbiting space debris and serve as a hub for academic, industry and government research collaboration.

“CODER is the first academically led center established to address the full range of issues surrounding the orbital debris problem,” said founding faculty member and Associate Professor of Aerospace Engineering Raymond Sedwick. “Most existing organizations focus on just one aspect of the problem—tracking, modeling, remediation, mitigation, policy, etc.—but CODER will serve as a research collective to provide expertise in all of these areas.”

Orbital debris is a global issue. The increasing volume of orbiting space debris could significantly hinder future economy and national security as the world’s reliance on satellites for communications, research and defense grows. Orbiting debris can travel faster than three times the speed of a bullet and poses a threat to space-based communications, weather forecasting, commerce, scientific exploration, Earth observation and future space activities.

The past 50 years of space exploration and use have created an orbiting junkyard of debris. Over 22,000 pieces of space ‘junk’—10 centimeters or larger—are currently being tracked in Earth’s orbit. However, there is a much larger junkyard of smaller debris, with pieces numbering in the hundreds of thousands to millions that are beyond the scope of current tracking capabilities and are just as capable of causing significant damage.

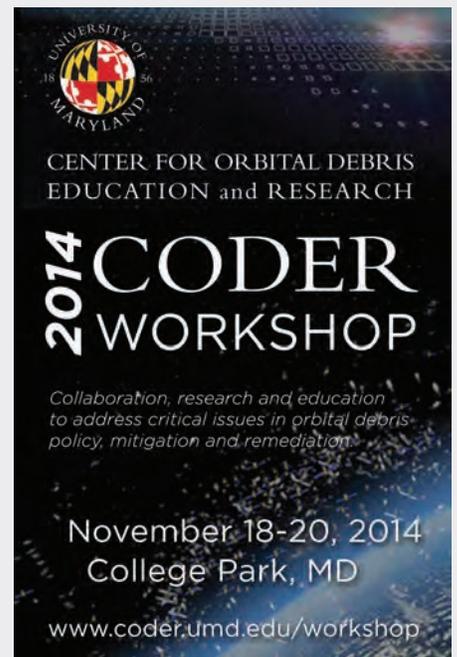
Sedwick sees CODER as a nexus for bringing together resources and ideas from across government, industry and academic communities to advance research aimed at addressing the orbital debris issue. There are several existing government, industry and academic organizations in the U.S. that already support critical functions for the orbital debris enterprise, but they are limited by their authority, capacity and budgets.

“The goal of the center is to raise awareness and financial support, help to coordinate, conduct and establish collaborative research and ultimately to provide new funding streams to accelerate these efforts,” said Sedwick, who is also Director of UMD’s Space Power and Propulsion Laboratory. “The University of Maryland is well-positioned to take the lead in creating a multi-disciplinary, multi-organizational, collaborative research center that will pursue orbital debris solutions through research in new technologies, policies and economic solutions.”

CODER will include a core interdisciplinary team at UMD to conduct and coordinate orbital debris research activities in science and technology as well as policy and economics. The center will spearhead research in each area of orbital debris, including modeling, tracking, mitigation and remediation, assist in developing international policies regarding orbital debris, and serve as a clearinghouse for orbital debris knowledge and findings.

The space community has worked hard to mitigate excessive proliferation of debris by establishing voluntary rules for spacecraft manufacturers and operators that help minimize the creation of new debris. However, there is no system or program in place to remove or clean up near-Earth orbit and there is no program addressing the long-term environmental control of space. Any cleanup program will take years to implement and possibly decades to carry out, but the future and efficacy of orbital operations lies in tackling this critical issue.

www.coder.umd.edu



2014 Workshop on Orbital Debris Education and Research

This inaugural workshop will address a wide spectrum of topics:

- Historical Aspects of Debris Creation
- Mitigation Efforts
- Technology Issues
- The Science of Orbital Debris
- National Policy Issues
- Remediation Architectures
- Systems for Debris Removal
- Long-Term Natural Effects
- International Space Laws and Treaties
- Economic Impacts
- Debris Impact on National Security
- Innovative Approaches to the Debris Problem
- Special Issues in and Near Geostationary Orbit
- Important Research Projects

Aerospace Engineers and Service



Peter Oas

One of the objectives of the department, and of the University of Maryland, is to help graduates become better and more productive citizens. Two alumni, Cory Frontin (B.S. '14) and Peter Oas (B.S. '14), exemplify the ideals set out by the university; after graduating, the two applied their engineering backgrounds in a service-oriented position with the non-profit organization Habitat for Humanity.

Oas was inspired to join Habitat for Humanity as a full-time volunteer after service trips he took while a student at UMD. "From NYC to Nicaragua, I got to experience new places and meet new people, all while working hard to bring help where it was needed. It never got old," Oas said. He joined Tau Beta Pi, an engineering honor society that also focuses on service. During the winter of 2013, Oas went to New Orleans to assist with a Habitat for Humanity project. While working on the projects and interacting with the volunteers who were similar to him in age, he realized that service was something he wanted to pursue post-graduation.

Frontin also worked as a part-time volunteer with Habitat for Humanity for the past nine years. Initially, the decision to commit to yearlong, full-time position as an assistant site supervisor felt like a risk, but Frontin maintains that the experience was enormously rewarding. "Doing year-long volunteer work gives me an opportunity to make a huge difference in people's lives. It will also help me remember in my professional life that I have been given opportunities—from family support to educational resources, scholarships and jobs—that have allowed me to succeed. Without everything... I would not be a graduate of the University of Maryland. Others do not have these opportunities, but that in no way makes me more important than those I'll serve, nor does it take away from their infinite human value. I'm excited to have a chance to remind them and remind myself of that."

As graduates of the Aerospace Engineering honors program, both Oas and Frontin had the opportunity to get involved in research and multiple team-based projects. "The hours of staying up late working on projects, problem solving, and working together on teams, are good preparation for the leadership and teamwork necessary for Habitat," Oas said. Frontin also agreed that he "didn't want to just finish assignments, rather finish them well and learn how to approach similar problems in the future. Because we worked in groups sharing this mentality, we would always learn to communicate how and why a system worked. I think this will translate well to the worksite, where the ability to learn and teach in rapid succession will be as useful with nail guns and caulk as it was with controller design and compressible aerodynamics."

After his yearlong volunteer position is completed, Oas plans to return to UMD to pursue his graduate degree in Aerospace Engineering. Frontin has also considered attending graduate school but is undecided at the moment. Regardless of where they plan to pursue their professional interests, it is evident that they will continue to incorporate a service-mentality in their roles as Aerospace Engineers.



Cory Frontin



Erika Aparakankanange with Parkland Aerospace Magnet Middle School's magnet coordinator Donna Blaney, Principal Benjamin OuYang, and Clark School Student Ambassadors, Kari Parkland and Stephanie Bilyk (B.S. '13). Every year Clark School students and staff, particularly from Aerospace, support STEM night which is designed to teach student participants about scientific research and prepare them to discuss their findings.



Gladys Palacio represents the Aerospace Department at Maryland Day 2014. Per tradition, students take the lead in running the department table. Students provide guests with information about the program, specifically their experiences as an aerospace student, and kids enjoy talking to "real engineers."



Every year students from the Alfred Gessow Rotorcraft Center give back to the community by showing kids how cool aerospace engineering can be. 2014's event was held at the National Building Museum in Washington D.C.



This past May, Andrew Lind served as a science fair judge at the Ludlow-Taylor Elementary School in Washington D.C. Here he is pictured talking to students about their project, "Investigating Flight."

Six Aerospace Engineering Students Win NSF Fellowships

Six students were awarded National Science Foundation (NSF) Research Fellowships. The University of Maryland's aerospace engineering recipients represent a quarter of all NSF Research Fellowships granted to students in the area of aeronautical and aerospace engineering nationwide, more than any other aerospace department in the country. They also represent half of the Clark School of Engineering's total number of recipients for 2014 NSF Graduate Research Fellowships.

The NSF Graduate Research Fellowship is the most prestigious national fellowship awarded by the National Science Foundation, and recognizes the outstanding abilities, leadership, and accomplishments of students, as well as their potential to contribute to strengthening the vitality of the American science and engineering enterprise.

Undergraduate NSF Research Fellowship recipients:



SYLVIE DELAHUNT was in the departmental Honors Program and the University Honors Program. She studied abroad in Toulouse, France for her International Engineering minor, and as an undergraduate research assistant, she coordinated pilot selection and testing for UMD's Human-Powered Helicopter Team. She received a Maryland Summer Scholarship to develop a drop test stand to conduct impact testing in the

Composites Research Laboratory with Dr. Norman Wereley. She is a member Omicron Delta Kappa and Tau Beta Pi, plays intramural soccer and is actively involved in the Honors College. She now attends UMD for her graduate work.



CODY KARCHER worked at NASA's Armstrong (formerly Dryden) Flight Research Center, contributed to the success of Team Gamera under Dr. Inderjit Chopra, and worked in the Collective Dynamics and Control Lab with Dr. Derek Paley. His research has included bio-inspired drag reduction, composite structures, stability and control, and underwater vehicle construction. He was previously recognized as a Hertz

Finalist, a National Defense Science and Engineering Graduate award-ee, an American Helicopter Society Vertical Flight Foundation Scholar, and a NASA Aeronautics Scholar. The NSF fellowship has enabled Cody to attend the Massachusetts Institute of Technology this fall to pursue a Ph.D. in aircraft design and performance optimization.



NELSON YANES was a member of both the Aerospace and University Honors Programs. He was awarded the NASA Aeronautics Scholarship, named a 2013 Philip Merrill Scholar and selected as a Senior Marshal for the May 2014 Commencement program and received a medallion for his achievements. His undergraduate research focus was on subsonic propulsion systems, and he developed a robust acoustic model for broadband noise for turbofan engines during his research at the NASA Glenn Research Center. He performed research under his mentor, Dr. Christopher Cadou, completing numerous projects on the acoustics

and thermodynamic performance of miniature two stroke internal-combustion engines and presented his work at AIAA Student Paper Conferences. Nelson will attend the California Institute of Technology, where he will pursue a Ph.D. in Aeronautics.

and thermodynamic performance of miniature two stroke internal-combustion engines and presented his work at AIAA Student Paper Conferences. Nelson will attend the California Institute of Technology, where he will pursue a Ph.D. in Aeronautics.

Graduate NSF Research Fellowship recipients:



ELAINE PETRO returned to graduate school at the University of Maryland in 2013, following three years of post-baccalaureate work at NASA's Goddard Space Flight Center. She is currently pursuing an M.S./Ph.D. with a focus on space propulsion and aims to design systems that will enable the next wave of deep space exploration. The NSF Fellowship will enable her to investigate fundamental problems related

to space propulsion systems. In addition, she is excited about the emphasis that the National Science Foundation places on international collaboration and science and engineering outreach.



ROBERT FIEVISOHN received his B.S. from Clarkson University in 2008 and commissioned as a 2nd Lieutenant in the U.S. Air Force. He went on to the Air Force Institute of Technology to complete his masters followed by work at the Air Force Research Labs in the Aerospace Systems Directorate. In 2013, he separated from the Air Force as a Captain and came to the University of Maryland to pursue a Ph.D. He is currently

conducting theoretical research into the fundamental physics that occur in Rotating Detonation Engines (RDEs).



TOM PILLSBURY is a Ph.D. student whose research in the UMD Smart Structures Lab focuses on robotic manipulation employing lightweight, soft Pneumatic Artificial Muscles for actuation. He received his B.S. in Aerospace Engineering from the University of Maryland in 2012. His current research interests include robotics, soft actuation, and biologically inspired design. Winning this NSF Fellowship will allow him

additional freedom to pursue his research interests in soft actuation for robotics.

THE NSF FELLOWSHIP will allow me to pursue my two passions: scientific research and teaching. With its support, I can work on projects that interest me the most, without worrying about funding. I am more confident than ever that I will become the academic scholar I have always sought after. - **NELSON YANES**

Weinstein Named Langley Aerospace Research Student Scholar



Rose Weinstein

Undergraduate Rose Weinstein was selected as a Langley Aerospace Research Student Scholar (LARSS). The LARSS Program is one of NASA's most prestigious and successful student research programs.

The highly competitive program also offers student the opportunity to work one-on-one with a recognized research mentor on cutting-edge problems.

Weinstein is a rising junior Aerospace Engineering student and an ambassador for the Clark School of Engineering. During her sophomore year, she worked for Professor Alison Flatau in the Aerosmart Flow Control Lab testing synthetic jet actuators as a method of active flow control and presented her research at the annual American Institute of Aeronautics and Astronautics (AIAA) Region 1 Student Paper Conference. This summer, Weinstein will participate in the NASA LARSS Program and pursue research on morphing unmanned aerial vehicles (UAVs) in Professor James Hubbard's Morpheus Laboratory. In her spare time, she enjoys flying Cessnas, shooting, and watching football.

Aerospace Engineering Announces 2014 AEROS Scholars

The Department of Aerospace Engineering has named seven students as 2014 Aerospace Engineering Research Opportunity Scholars (AEROS). The AEROS program provides funding support for motivated undergraduate students interested in spending the summer between their junior and senior year working closely with faculty on scholarly research projects.

The 2014 AEROS awardees are **Wiam Attar, Brian Free, Mateusz Gabryszuk, Aaron Lash, Eltzafan Mark, Andrew Mills** and **Lauren Trollinger**.

The AEROS program expands the mission of the John Anderson Scholarship, engages students in research and scholarship and facilitates student and faculty interaction. As part of the program, students and research advisors are invited to participate in events designed to foster a support network as the scholars engage in their research projects.

Weiner Wins 2014 Amelia Earhart Fellowship



Elizabeth Weiner

Graduate student Elizabeth Weiner was awarded the 2014 Amelia Earhart Fellowship from Zonta International, a global organization of executives and professionals working to advance the status of women worldwide through service and advocacy.

The organization awards only 35 fellowships worldwide annually.

As a student, Weiner has been extremely active in the department. As a member of Team Gamera—the human-powered helicopter project—she performed research, supported test flights and mentored younger team members. In 2014, she led the department's Student Design Team and helped win first place in the graduate division of the American Helicopter Society International's 30th Annual Student Design Competition. The team's HeliX rotorcraft design featured variable diameter tiltrotor and outboard wing extensions (OWEs).

Weiner is currently focusing on research to improve speed capabilities in rotorcraft as a means to improve flight time for emergency medical and trauma flights. According to Weiner, rotorcraft are extremely well suited to medical transport tasks due to their vertical take-off and landing capabilities (VTOL)—making rotorcraft speed one of the key factors in saving a life.

In particular, she is evaluating advances in materials engineering—such as composite tailoring—that could lead to dramatic innovations in highly loaded aerospace structures, such as rotorcraft blades in high-speed flight. She is also looking into the little explored area of shape-shifting rotors. Shape-shifting rotors are capable of changing their geometric characteristics, such as twist or chord length, mid-flight, could increase rotor efficiencies, and in turn allow for faster, more efficient vehicles. Faster aircraft that are more efficient could make a huge impact on the number of lives saved by VTOL vehicles.

After graduation, Weiner aims to join the helicopter industry and use her research in the development of future VTOL aircraft. She also wants to continue acting as a mentor to young women looking to pursue careers and education in STEM fields. Weiner said that the most rewarding part of her involvement with Team Gamera was the work she

was able to do with young engineers, exciting them to pursue a degree in an engineering field and encouraging them to question and innovate.

Cannon Named ARCS Scholar



From left to right: Dean Darryll Pines, Department of Aerospace Engineering Chair Norman Wereley, honoree Wanda M. Austin, Bernadette Cannon and Aerospace Engineering Professor and President of the American Institute of Aeronautics and Astronautics Mark Lewis.

Undergraduate Bernadette Cannon was selected to receive the Achievement Rewards for College Scientists Foundation (ARCS) 2014-2015 Wanda M. Austin Undergraduate Scholar.

Cannon is a junior currently working under the advisement of Associate Professor Raymond Sedwick. She is interested in spacecraft propulsion and orbital debris, and she is studying how to deorbit space debris using laser ablation techniques that could create a desired trajectory. She aims to work in the spaceflight industry furthering technology, knowledge and exploration.

This undergraduate award is a \$5,000 scholarship named in honor of Wanda M. Austin, the President and Chief Executive Officer of The Aerospace Corporation, a leading architect for the nation's national security space programs. She is recognized internationally for her work in satellite and payload system acquisition, systems engineering, and system simulation, and is committed to inspiring the next generation to study the STEM disciplines and to make science and engineering preferred career choices.

Cannon was awarded during ARCS May 7th Rooftop Reception to honor Austin held in Washington, D.C.

Students Win at the AIAA Student Paper Conference

Students Gino Perrotta and Brooks Muller placed at the American Institute of Aeronautics and Astronautics (AIAA) Region 1 Student Paper Conference held in Ithaca, N.Y. April 25-26. During the two-day conference, over 70 papers were presented, and almost half of the papers were by University of Maryland students.

Perrotta's paper, "Characterization of Rotor Wake in Ground Effect," won first place in the graduate paper division and described



Brooks Muller

the measuring of helicopter wake in ground effect using particle-imaging velocimetry for a small-scale rotor.

Perrotta, a recently qualified Ph.D. candidate in aerospace engineering, received his B.S. in aerospace engineering in 2012. He is currently completing his M.S. and works in the Jones Low Reynolds Number Aerodynamics Lab researching helicopter brownout. He has completed

research in wind turbine aerodynamics, and before graduate school, worked at the U.S. Air Force Hypersonic Wind Tunnel 9 developing temperature sensitive paint and at the Smithsonian National Air and Space Museum.

"The conference was a great experience," said Perrotta. "The award is exactly the kind of positive feedback (and confidence boost) that helps pull a thesis together."

Muller's paper, "Development of 135 gram Cyclocopter at Micro Air Vehicle Scale," placed third in the undergraduate paper division. His research described the design, development and testing of a highly adaptable and maneuverable cycloidal-rotor aircraft (Cyclocopter) at micro air vehicle (MAV) scale that used a combination of independent RPM control of all motors, thrust vectoring of the cycloidal rotors and an effective control strategy that provided decoupled roll, pitch and yaw.

Muller, a senior, is a member of the AIAA professional society and the Sigma Gamma Tau National Honors Society in Aerospace Engineering. Muller's areas of interests include space systems and propulsion technology. Over the last year, he has been working in the Alfred Gessow Rotorcraft Center with Research Scientist Moble Benedict and Alfred Gessow Professor in Aerospace Engineering Inderjit Chopra to design and build a lightweight cyclocopter.

Shrestha and DeVries Win 2014 Graduate Student Research Awards Competition

Students Elena Shrestha and Levi DeVries are the winners of the Department of Aerospace Engineering's 2014 Graduate Student Research Awards Competition. Shrestha and DeVries won the M.S. and Ph.D. categories respectively and were selected out of the field of nine competitors. Both Shrestha and DeVries proceeded to the college-level competition held Saturday, May 17.

ELENA SHRESTHA

Advisor: Inderjit Chopra

Paper: "Development of a 100-gram Micro-Cyclocopter Capable of Autonomous Hover"

Summary: Research focus is on the design, development and hover testing of a cycloidal-rotor aircraft.

LEVI DEVRIES

Advisor: Derek Paley

Paper: "Observability-based Optimization for Flow Sensing and Control of an Underwater Vehicle in a Uniform Flowfield"

Summary: Research focus is on how an underwater vehicle can control its motion by sensing the surrounding flowfield and use sensor measurements in a dynamic feedback controller.

The graduate research winners were announced at the Alfred R. Gessow Memorial Lecture held April 30. Alfred Gessow Professor Inderjit Chopra and Department Chair and Minta Martin Professor of Aerospace Engineering Norman Wereley, along with and guest lecturer Dr. William D. Lewis, Director for Aviation Development at the U.S. Army Aviation and Missile Research, Development and Engineering Center in Redstone Arsenal, Ala., presented awards.

Shrestha Wins 2014 Dean's Masters Student Research Award Competition



Elena Shrestha

Aerospace Engineering graduate student Elena Shrestha takes first place in the Clark School's 2014 Dean's Masters Student Research Award Competition.

Shrestha presented to the awards judges' panel her contributions to the field of micro air vehicles (MAVs) from design and

implementation of the first cyclocopter MAV to successfully achieve stable hover.

Additional work included the development of control strategies and wind tunnel testing that enabled the first successful forward flight of a cyclocopter. The awards panel recognized the value of this technology in accessing environments hostile to humans for both military and civilian applications.

"Their research accomplishments are a testament to the level of scholarship produced by Clark School students and faculty," said Clark School Dean and Farvardin Professor of Aerospace Engineering Darryll Pines.

As part of the award, her name will be added to plaques in both Martin Hall and the Kim Building.

Sullivan Receives Clark School of Engineering Dean's Award



Dan Sullivan

Recent graduate, Dan Sullivan received the Clark School of Engineering Dean's Award. Sullivan was recognized at the Clark School Honors and Awards Ceremony held April 10, 2014.

Sullivan was a member of both the University and Aerospace Honors programs, and he minored in Engineering Leadership Development. He was an active member and former president of the local chapter of Theta Tau, the nation's oldest professional engineering fraternity. Sullivan was a member of Team Gamera and completed an internship with Sikorsky Aircraft. He enjoys traveling, and he has studied abroad in Australia, the United Arab Emirates and Qatar. Sullivan also served as a Clark School ambassador and a teaching fellow for Introduction to Engineering.

Clark School of Engineering Dean's Award recipients are selected based on demonstrated scholastic excellence and outstanding service to the Clark School of Engineering through participation in activities that impact students in all engineering majors.

Three UMD Students Awarded Vertical Flight Foundation Scholarships

The Vertical Flight Foundation (VFF) has recognized three Department of Aerospace Engineering students with scholarships for the 2014-2015 school year. Established in 1977, VFF scholarships encourage the efforts of promising undergraduate and graduate

students planning to pursue careers in vertical flight, and with the hope that recipients will conduct work that will move vertical technology flight forward.

The three winners were:

- **William Staruk** – Ph.D. category, recipient of the Elaine Gessow scholarship (\$3100)
- **Chin Gian Hooi** – M.S. category, recipient of the Alfred Gessow scholarship (\$2300)
- **Andrew Mills** – B.S. category, recipient of the Hal Andrews scholarship (\$1700)

VFF award winners were honored at the American Helicopter Society's (AHS) Forum Awards Banquet during the 70th Annual Forum and Technology Display held May 21, 2014 at the Palais des congrès de Montreal in Montreal, Quebec.

UMD Students Place Second in 2014 RASC-AL Competition



PHOTO COURTESY OF RASC-AL

From left to right: UMD students Brooks Muller, Kyle Zittle, Rajarshi Chattopadhyay, Irene Borillo Llorca, Oliver Ortiz, Ben Mellman, Mike Schaffer and Aerospace Engineering Professor David Akin.

University of Maryland undergraduate students won second place overall and first place in the Habitat Design technical theme in the 2014 Revolutionary Aerospace Systems Concepts-Academic Linkages (RASC-AL) competition. Sponsored by the National Institute of Aerospace and NASA, the RASC-AL competitions are university design challenges that address NASA's new approach for future human space exploration.

UMD's project, "Variable Gravity Habitat for Space Operations, Exploration, and Research," was the work of undergraduate students in the Department of Aerospace Engineering's spring ENAE 484 class, Space Systems Design, taught by Associate Professor David Akin and Professor Mary Bowden.

This year's RASC-AL competition challenged students to come up with a system design that leveraged existing or planned space habitat/logistics carrier structures and configure a small crew-tended outpost in cis-lunar space that could augment the Orion to stay at the cis-lunar destination for at least

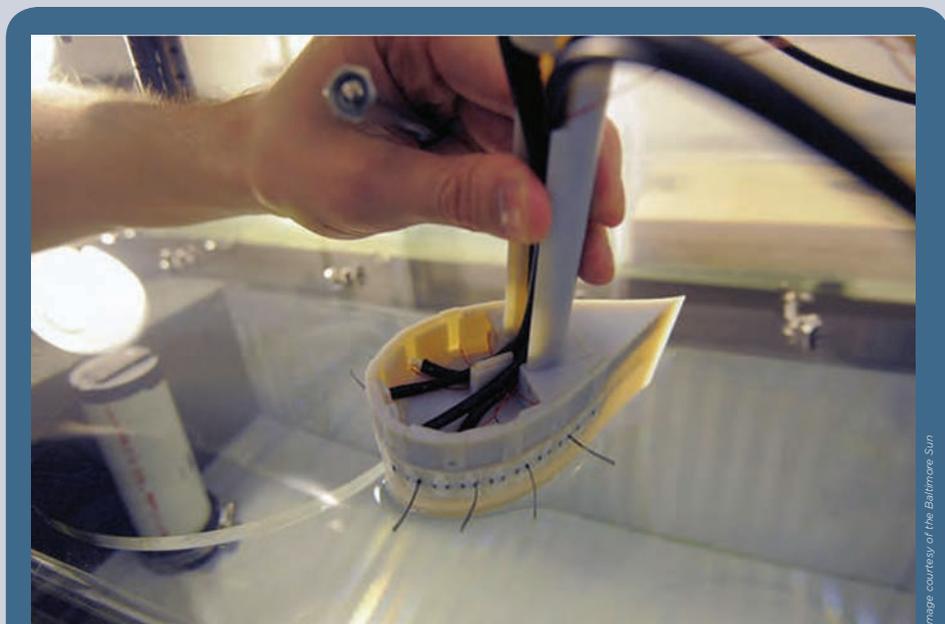


Image courtesy of the Baltimore Sun

Robotic Fish Research Profiled in Baltimore Sun

The April 4, 2014 edition of the *Baltimore Sun* featured the robotic fish work of Clark School faculty, graduate students and alumni.

Associate Professor Derek Paley (AE/Institute for Systems Research); Associate Professor Sean Humbert (AE); alumnus and Michigan State University Associate Professor Xiaobo Tan (Electrical Engineering, Ph.D. '02) and Professor Sheryl Coombs of Bowling Green State University have been working on bio-inspired flow-sensing and control for autonomous underwater vehicles through a 2012 Office of Naval Research grant.

The goal of the project is to create an autonomous underwater vehicle that can find stationary objects by changes in water flow, and can also work in groups.

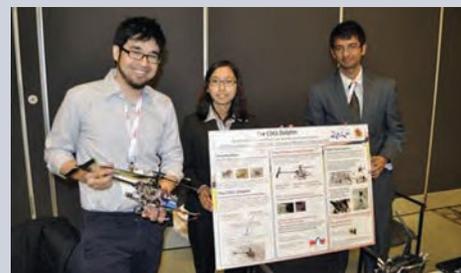
ter.ps/AEinbaltosun

30 days while also providing an airlock based extravehicular capability. Student teams then choose one of the challenge's themes—such as habitat design and human assisted sample return—to decide what mission the facility will enable Orion to complete.

To participate in the competition, student teams are selected based on their abstract submissions. Once chosen, the selected teams develop a 15-page technical report and must present both a poster and oral presentation before a panel of NASA and industry experts during the RASC-AL Forum.

As part of the team's second place win, they will receive a cash award to present their work at the American Institute of Aeronautics and Astronautics (AIAA) Space 2014 Conference, August 4-7, 2014 in San Diego, Calif.

UMD Team Wins AHS MAV Competition



The "CDCL Dolphin" team was led by Derrick Yeo (Left) with team-mates Cody Karcher (not pictured) and Elena Shrestha (center). Vikram Hrishikeshavan (right) provided onsite support competition day.

A student team won American Helicopter Society's (AHS) 2nd Annual Micro Air Vehicle (MAV) Student Challenge. Research Associate Derrick Yeo led the UMD team—dubbed CDLC Dolphin—that included Aerospace Engineering graduate student Elena Shrestha,

undergraduate Cody Karcher and Assistant Research Scientist Vikram Hrishikeshavan (Ph.D., '11), who provided onsite support the day of the competition. They were the only team that completed all tasks in the competition to an awardable level of satisfaction and the sole winner of the manually/remotely executed challenge.

The AHS MAV competition challenges students to design and build an electric-powered, vertical take-off and landing (VTOL) MAV that demonstrates the best flight and autonomy capabilities while executing a hover, target search and acquisition task.

The UMD team's MAV included a host of custom features to meet the challenges of the competition. 'The Dolphin' carried a custom built airspeed probe- which was part of the team's efforts to develop flow-sensing capabilities for small unmanned vehicles- used a pusher propeller for improved cruise performance, onboard gyros for stability and an onboard camera that allowed the MAV to be piloted remotely.

Only five finalists competed in the Final Competition held during the AHS Annual Forum May 19-22, 2014, in Montreal. Teams were selected through a rigorous selection process that includes a paper submission, video demonstration of MAV capabilities and evaluation by a panel of judges.

Mittra Named University Innovation Fellow



Atin Mittra

The National Center for Engineering Pathways to Innovation (Epicenter) named recent graduate Atin Mittra a University Innovation Fellow. Sixty-six university students were selected from 45

higher education institutions across the U.S.

Mittra, as an undergraduate, was named a finalist for the Tavis Smiley Social Innovation Challenge. Mittra is the founder of MADE Microfinance, a nonprofit focused on providing financial services to people who do not qualify at banks.

The University Innovation Fellows program offers undergraduate students in engineering and other fields training and support to become leaders who catalyze change on their home campuses. To showcase their enthusiasm for innovation and entrepreneurship, Mittra, and fellow University Innovation Fellow Meenu Singh (Civil and Environmental

Engineering) put together a YouTube video highlighting initiatives around the University of Maryland campus.

Watch their video at <http://ter.ps/UIFmittra>.

UMD Pilot Mentoring Program Featured in U.S. Air Force News



Colin Vandercreek, a University of Maryland student, works in the Arnold Engineering Development Complex White Oak Student Lab developing non-intrusive diagnostics for use in the Hypervelocity Wind Tunnel 9. (Coutesy photo)

The University of Maryland (UMD) teamed up with the Air Force Office of Scientific Research (AFOSR) and the Department of Defense's (DOD) Test Resource Management Center (TRMC) to provide funding, instruction and testing for young engineers as part of a pilot mentoring program at Arnold Engineering Development Complex's (AEDC) Hypervelocity Wind Tunnel in White Oak, Md.

The program, the Hypersonic Center of Testing Excellence (HCoTE), was featured in an Arnold Air Force Base's news story, "Pilot mentoring program propels the future of hypersonics and young engineers." Beginning in 2011, it is the first program of its kind aimed at preparing future engineers to work in the area of hypersonic testing and evaluation. Students in the program also conduct basic and applied research for the U.S. Air Force, DOD and the hypersonic test and evaluation communities.

According to the story, "six Tunnel 9 personnel are currently mentoring nine graduate students and nine undergraduate students in the program from UMD. Students are involved in research activities related to unsteady shocks, turbulence characterization, simulation, modeling and validation. The students' work in diagnostics include temperature sensitive paint and focused and background-oriented Schlieren."

Department of Aerospace Engineering Professor Mark Lewis, who is also the Science and Technology Policy Institute director, was one of the HCoTE programs co-founders. Currently, Department of Aerospace Engineering Associate Professor Ken Yu and Department of Mechanical Engineering Distinguished University Professor Ashwani Gupta run UMD's arm of the program.

Aerospace Engineering Welcomes Chynna Obana as New Undergraduate Programs Specialist



Chynna Obana

Aerospace Engineering welcomes Chynna Obana! She joined the department in August, 2014 as a graduate assistant, and she will serve in the role of Undergraduate Programs Specialist.

Prior to Maryland, she was an undergraduate advisor at the University of California San Diego in the Electrical and Computer Engineering Department. Obana has an interest in STEM disparities, specifically the recruitment and persistence of women and underrepresented students. She is excited to start working with various student organizations and programs within the Department of Aerospace Engineering and Clark School of Engineering.

Obana completed her B.A. at the University of California, Los Angeles and is currently pursuing her master's degree in Higher Education here at the University of Maryland.

Congratulations to Our 2014 Graduates!



Lauren Trollinger



Growing up in southern Maryland about twenty minutes from the Patuxent River Naval Air Station, senior Lauren Trollinger remembers getting excited to attend the airshows at the Navy Base. Although she attributes these early experiences as the first to get her interested in aviation, she was ultimately inspired to pursue a degree in Aerospace Engineering after completing a high school mentorship program at the Naval Air Warfare Center, Aircraft Division. During this experience, she got her first taste of rotorcraft dynamics, and she was hooked. “It was different; it was something I had never seen before,” said Trollinger. “Helicopters, and the challenges involved in their design, intrigued me.” To further her interests during high school, she also attended a weeklong engineering camp at

the University of Maryland which put both engineering and UMD on her radar screen.

Lauren has made the most of her college experience by pursuing opportunities and forming connections and networks with faculty and students both inside and outside the classroom. Within her first month of attending UMD, she joined the Human Powered Helicopter Team, Gamera, and while she initially had “no hands-on experience and very little knowledge of anything aerospace, within a month I was working with the team to manufacture microtruss structures out of carbon fiber.” At the start of her second year, Lauren got involved in additional research in the Aerosmart Flow Control Lab with her advisor, Associate Dean of Research and Professor Alison Flatau. “My experiments with piezoelectric synthetic jet actuators were

Lauren Trollinger is a senior Aerospace Engineering Honors student with a minor in Project Management. As President of AIAA and an active member of the engineering sorority Alpha Omega Epsilon, she is very involved in the Clark School. Lauren will be working with Dr. Flatau in the Flow Visualization Laboratory, researching the drag-reducing effects of synthetic jet actuators. She hopes to apply her research to rotorcraft aerodynamics and the reduction of drag on a helicopter main rotor pylon.

first my Aerospace honors project, then continued into my Research Instruction Service Entrepreneurship Leadership Academy (RISE) research, and then expanded to become my AEROS summer scholars project. Right now, I am trying to reduce the pressure drag on a symmetric body using piezo synthetic jet actuators—each actuator creates a small jet of air that can re-energize the boundary layer on a surface and keep flow around the body attached, reducing the pressure draft associated with separate flow. I believe this could have applications in reducing the draft caused by traditional helicopter rotor pylons.”

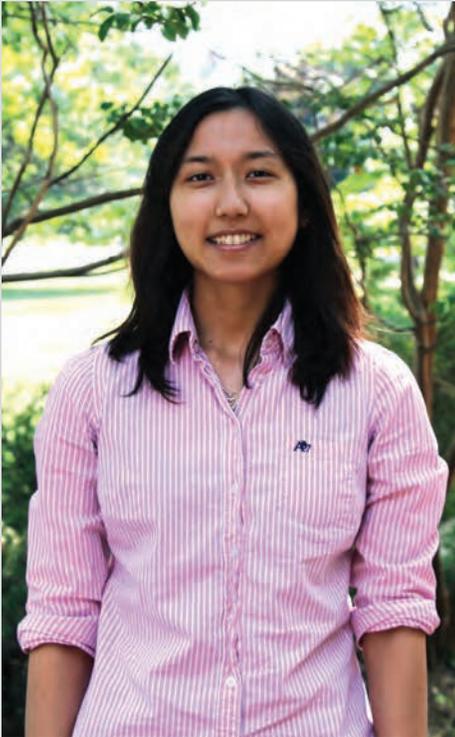
In addition to her research, Lauren is also the AIAA student branch President and Vice President of the engineering sorority, Alpha Omega Epsilon. “I could never surround myself with only school, class and research and be perfectly content. I came to Maryland partially because of the millions of clubs and activities on campus,” she said. With this mentality, Lauren decided to join the women’s club volleyball team and participate in an Engineering Alternative Break service trip to Mississippi. While making the most of her time as an undergraduate student, Lauren is also thinking about her future. She knows that graduate school is in her future, but before settling on more school, she first plans to strap on her camera and an oversized backpack and head out on a European adventure. Because as Lauren puts it, “there’s still a lot more for me to learn out there.”

SHOW YOUR SUPPORT

Students like Trollinger benefit through programs like AEROS and the John Anderson Scholarship.

To learn more about how you can support these programs, visit www.aero.umd.edu/giving.

Elena Shrestha



Elena Shrestha joined the Department of Aerospace Engineering at the University of Maryland in the fall of 2008 as an undergraduate student. She was enthusiastic about getting involved in research early on in her undergraduate studies. After being introduced to the Alfred Gessow Rotorcraft Center's Micro Air Vehicle (MAV) lab through ENAE100, she decided to join the Alfred Gessow Rotorcraft Center (AGRC) in her sophomore year.

Her research experience as an undergraduate student ultimately led to a journal publication, three professional conference publications and First Place at the 2012 AIAA region I-MA student conference in the undergraduate category. She was recognized by the rotorcraft community with the Vertical Flight Foundation Undergraduate Scholarship in 2011. Shrestha's academic coursework, supplemented by her research experience and a summer internship at Sikorsky Aircraft Corporation, steered her towards pursuing higher education and research in the field of rotorcraft. In the fall of 2012, she began her graduate studies at UMD in pursuit of a Master of Science degree in aerospace engineering under the guidance of Inderjit

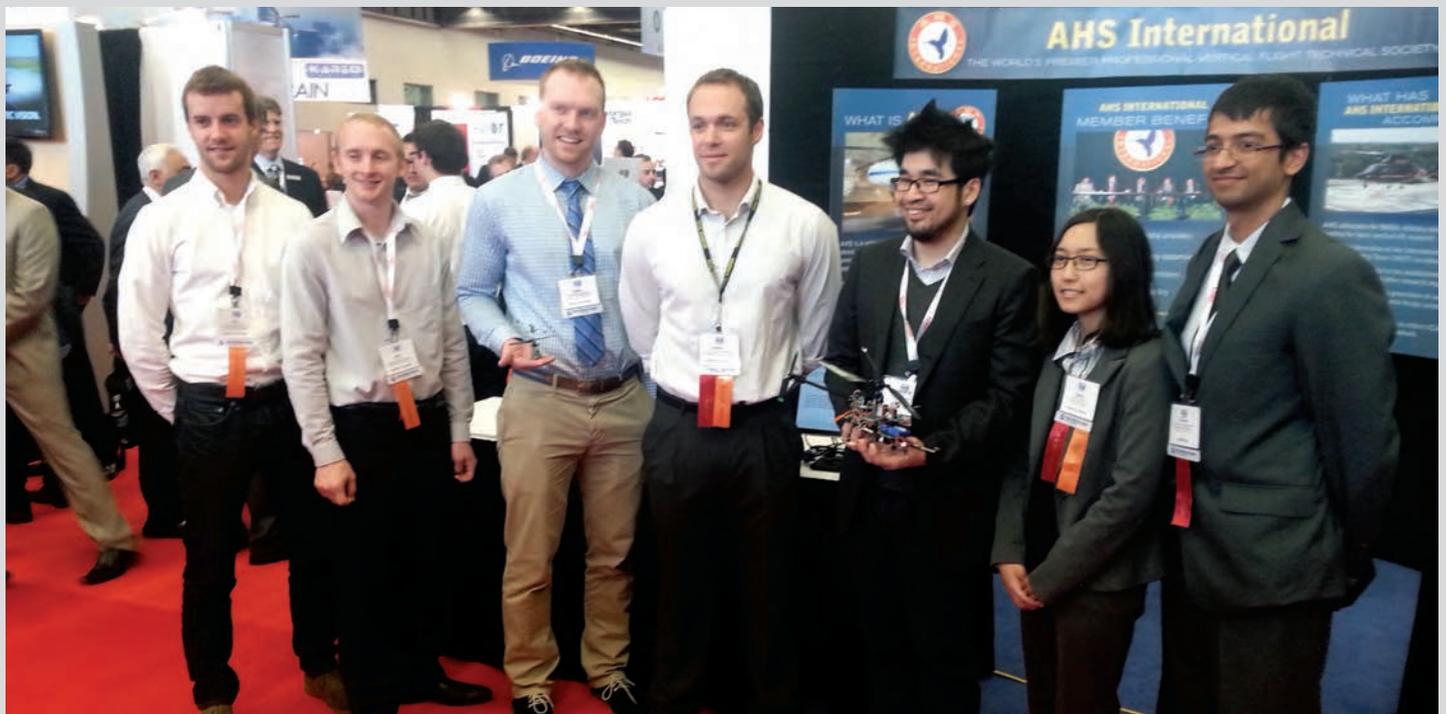
Chopra, professor and director of AGRC, and Moble Benedict.

Since 2010, Shrestha has been working on developing the Cyclocopter, a revolutionary cycloidal rotor MAV. Using a circular array of blades that rotate around a vertical axis, the Cyclocopter has performance and efficiency advantages over conventional rotorcraft at MAV scales. The rotor configuration allows the resulting thrust to be instantaneously vectored, affording improved maneuverability over conventional rotors. Although the concept existed since the early 20th century, the cyclocopter MAV was the first cycloidal rotor vehicle to achieve stable hover and forward flight as a result of her research efforts. When asked about her success, she said that "the project wouldn't have gotten this far without the tremendous amount of mentoring that Moble has provided me and support from my family." She was recently awarded the Dean's Master's Student Research Award for her Cyclocopter research.

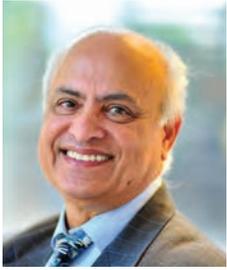
So what's next after earning her Master's?

"I'm definitely considering continuing with the Ph.D. program and my research because I truly believe the Cyclocopter concept has a great deal of potential."

Above: Graduate student Elena Shrestha.
Below: UMD CDCL Dolphin Team member Post-doctoral Research Associate Derrick Yeo (third from right), Elena Shrestha (second from right) and Assistant Research Scientist Vikram Hrishikeshavan with the Pennsylvania State University team at the 2014 AHS Micro-Air Vehicle Student Design Competition.



Chopra Promoted to Rank of Distinguished University Professor and Published New Book



Inderjit Chopra

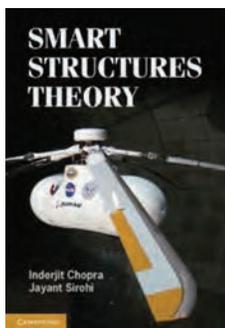
Alfred Gessow Professor Inderjit Chopra has been promoted to the rank of Distinguished University Professor at the University of Maryland. This is the highest scholarly rank attainable by a faculty member, and only 48 active faculty hold this position at UMD.

Chopra is the Alfred Gessow Professor of Rotorcraft Engineering, and has been the director of the Alfred Gessow Rotorcraft Center for over 30 years. He was the inaugural recipient of the Alfred Gessow Chair in Rotorcraft Engineering, and he oversaw the growth of the rotorcraft center so that it is now a premier center of excellence in rotorcraft in the nation, and the world.

Chopra is internationally recognized as the leading scholar in helicopter rotor dynamics and active rotors. His long and sustained publication record includes landmark papers in the most prestigious journals in fields of aerospace engineering and vertical or direct lift aircraft. He has published over 190 journal articles, over 350 articles in conference proceedings and has given over 50 invited lectures all over the world. He has secured, as principle investigator, six major research grants representing 65 years of funding of a million dollars or more. He has won numerous lifetime achievement awards and awards from the American Institute of Aeronautics and Astronautics (AIAA), the American Helicopter Society (AHS) and the American Society of Mechanical Engineers (ASME) for his outstanding scholarly contributions, public service, mentorship of colleagues and students and teaching.

Chopra has also published a new book, "Smart Structures Theory," as part of the Cambridge University Press Aerospace Series.

According to the publisher's description "the twenty-first century could be called the 'Multifunctional Materials Age.' The inspiration for multifunctional materials comes from nature, and therefore these are often referred to as



bio-inspired materials. Bio-inspired materials encompass smart materials and structures, multifunctional materials and nano-structured materials. This is a dawn of revolutionary materials that may provide a 'quantum jump' in performance and multi-capability."

The book, co-authored by Dr. Jayant Sirohi, focuses on smart materials and structures and systems, referred to as intelligent, adaptive, active, sensory and metamorphic. The purpose of these materials for smart systems is their ability to minimize life-cycle cost and/or expand the performance envelope. The ultimate goal is to develop biologically inspired multifunctional materials capable of adapting their structural characteristics (stiffness, damping, viscosity, etc.) as required, monitor their health condition, perform self-diagnosis and self-repair, morph their shape and undergo significant controlled motion over a wide range of operating conditions.

Dean Pines, Abts Featured in ASEE PRISM Magazine for Leadership in Exploring New AP Course in Engineering



Darryll Pines

Clark School Dean and Farvardin Professor of Aerospace Engineering Darryll Pines and Research Associate Research Professor Leigh Abts (Bioengineering/ College of Education) were featured in the April 2014 issue of American Society for Engineering Education's (ASEE) *PRISM* magazine for their leadership in exploring opportunities to expand the next generation of engineers.

The article, titled "Higher Reach," focuses on a recent push by engineering deans and faculty across the country to add a new Advanced Placement (AP) engineering course to the suite of 10 science, technology and math AP courses currently available to high school students.

"The big issue now is on a better educated and prepared pipeline, the K-12 STEM (Science, Technology, Engineering and Mathematics) pipeline," Pines said in the article.

As chair of the ASEE Engineering Deans Council's committee on K-12 STEM education, Pines has played a major leadership role in the AP Engineering review process. "Kids come in and don't know anything about engineering," Pines explained in the article, and

that can lead to challenges with retention and graduation rates. Advanced Placement, however, could offer a way to "brand engineering at the high school level" and capture the attention of students who might otherwise pursue math or science in college.

Wereley Elected SPIE Fellow



Norman Wereley

Department of Aerospace Engineering Chair and Minta Martin Professor of Aerospace Engineering Norman Wereley has been elected International Society for Optical Engineering (SPIE) Fellow.

SPIE Fellows are selected and recognized for their significant scientific and technical contributions in the multidisciplinary fields of optics, photonics and imagery. Wereley was selected for his contributions to the advancement of smart structures and materials.

Wereley has pioneered a new technology area for aerospace systems - the use of magnetorheological fluids to enhance stability and to mitigate vibration and shock. He has actively transitioned technologies from his laboratory to industry and led the development of numerous applications: semi-active magnetorheological seat systems for protection against whole body vibration and shock loads resulting from crash or blast events; magnetorheological fluid elastomeric dampers for helicopter rotor stability augmentation and magnetorheological landing gear systems for helicopters. His research has been recognized by several awards and honors, such as SPIE's 2013 Smart Structures and Materials Lifetime Achievement Award and he currently holds 17 patents with several patents pending.

Most recently he was the lead editor and contributing author for a new book *Magnetorheology: Advances and Applications* published by the Royal Society of Chemistry as part of their series on smart materials.

Wereley is a lifetime member of SPIE and actively volunteers at SPIE events as a conference chair and co-chair, session chair, and plenary lecturer. He has published over 55 papers in Proceedings of SPIE and has taught a short course at an SPIE conference. In addition, he received a lifetime achievement award and a product implementation award in 2013.

Sedwick Made Senior Member of IEEE



Raymond Sedwick

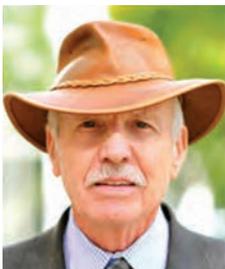
Department of Aerospace Engineering Associate Professor Raymond Sedwick has been elevated to the grade of senior member of the Institute of Electrical and Electronics Engineers (IEEE). IEEE Senior

membership is an honor bestowed only to those who have made significant contributions to the profession.

Sedwick is the Director of the Space Power and Propulsion Laboratory at the University of Maryland where he has been since fall 2007. He is a Keystone Professor within the A. James Clark School of Engineering and is the Director of the Aerospace Engineering Honors Program. Recently, Sedwick became the Director and a founding faculty member of the University of Maryland's Center for Orbital Debris Education and Research (CODER), the first academically led center established to address the full range of issues surrounding the problem of orbital debris.

Sedwick's current research includes orbital debris remediation, RF plasma generation for space propulsion, plasma assisted combustion and catalyzed decomposition, ion plume material impact damage and novel fusion confinement for space and terrestrial power applications.

Fourney Selected as Faculty Advisor of the Year



William Fourney

The University of Maryland Office of Undergraduate Studies has selected Associate Dean and Keystone Professor William Fourney as the Faculty Advisor of the Year. Fourney was selected for his incredible dedication

to student success and his commitment to providing high quality advising and student support. He will be recognized during the 19th Annual Undergraduate Studies Advising Conference.

Leishman Retires from Department

Professor J. Gordon Leishman retired from the Department of Aerospace Engineering after almost 30 years of service. Leishman joined the University of Maryland in 1986 after working three years as an Aerodynamicist at Westland Helicopters in England. Since he joined the department, he has made a sub-stantial impact.

Over the course of his career at UMD, Leishman authored over 250 papers on rotorcraft aerodynamics and fluid mechanics, as well as authoring two books, including *Principles of Helicopter Aerodynamics*, which was widely adopted as a key textbook at universities around the world. Promoted to full professor in 2000, Leishman also served as a Minta Martin Professor of Engineering from 2004-2014. Along the way, Leishman produced students who have become leaders in the rotorcraft field, including Dr. Ashish Bagai, who helped design the Sikorsky X-2 rotorcraft that won the coveted Collier Trophy in 2011 and is now at DARPA.

"Professor Leishman has been one of our most creative, productive and illustrious scholars for the past 25 years in the field of rotorcraft aerodynamics," said Department Chair Norman Wereley. "He literally wrote the book on 'Principles of Helicopter Aerodynamics,' which is used around the world in the helicopter industry and academia alike."

Leishman helped make the Alfred Gessow Rotorcraft Center one of the premier rotorcraft research centers, and his research on rotorcraft aerodynamics had a broad impact in the community of rotorcraft research.

Leishman's research impact is perhaps best demonstrated by his work in helicopter brownout phenomena. The Air Force sought to create a center to study the phenomenon of helicopter brownout, and Leishman became the Principle Investigator for the resulting Air Force-funded research center. Funded by a Multidisciplinary University Research Initiative (MURI) through the Department of Defense (DOD) in 2008, this 6-year research endeavor studied brownout phenomenon (intense, blinding dust clouds stirred up by the helicopter rotor downwash during near-ground flight) which causes accidents during helicopter landing and take-off operations in arid desert terrain.

"His extensive research into the causes and mitigation of brown-out phenomena for helicopters operating in desert climates has won the highest praise!" says Wereley. "Leishman is a Fellow of the American Helicopter Society for the many outstanding contributions that he has made to his field."

Next fall Leishman will be a Distinguished Professor at Embry-Riddle University in Daytona Beach. The department wishes him well in his new position and home and thanks him for his many years of distinguished service.



Hubbard Shares Life Story with STEM Students



NASA/David C. Bowman

Hubbard presenting to 9th-grade Engineering Explorations students during a Profiles in STEM lecture at NASA Langley's Reid Center.

Aerospace Engineering Samuel P. Langley Distinguished Professor James Hubbard Jr. shared his life story with 9th-grade Engineering Explorations students from the Heritage High School Governor's STEM Academy during a Profiles in STEM lecture at NASA Langley's Reid Center on February 19, 2014.

Hubbard discussed the challenges he experienced during his life, from his segregated hometown in Virginia to the tough Philadelphia and Baltimore neighborhoods he lived in as a youth. Hubbard shared his story of perseverance through the segregation of his youth, the turbulence of the sixties, and the detours and difficulties that led to MIT and a successful career in both industry and academe.

"The students were totally engaged and many employees remarked to me that Dr. Hubbard had made a lasting impression on them," said Equal Opportunity Director of the NASA Langley Research Center Janet Sellars.

Hubbard is the Director of both the University of Maryland's Morpheus Laboratory and the National Institute of Aerospace's Alex Brown Center for Adaptive Aerospace Research. He received his Bachelor of Mechanical Engineering (1977), Master of Mechanical Engineering (1979) and Doctor of Philosophy (1982) from the Massachusetts Institute of Technology (MIT).

"After more than 30 years in Engineering I'm still amazed at how much I love my work, how satisfying my interactions are with students, and how close my friendships with colleagues have become. I am blessed indeed."



Hubbard's engineering career began long before attending MIT. After high school, he enlisted as an officer in the U.S. Merchant Marines and attended the Calhoun Marine Engineers' Beneficial Association (MEBA) Marine Engineering School where he became the youngest service member to receive the unlimited horsepower, steam and diesel engine Marine Engineering license. During his service as a Merchant Marine, Hubbard served aboard vessels bound for Vietnam in support of U.S. war efforts.

While at MIT, Hubbard performed research on parametric wind tunnel tests to investigate blade/vortex interactions on helicopter rotor blades. Invited to join MIT's faculty, Hubbard went on to conduct research in the area of active vibration control of structures. Hubbard performed research in sensors and system concepts, optoelectronics and photonics, and his work resulted in what many consider the first example of an "adaptive" structure, or a structure that can change in response to its environment. He has patented "Smart Skin" technology that is a large-area, blanket-like sensor that could be used in a number of applications.

Hubbard's 30-plus year career has spanned both industrial and academic settings, and he has received several awards for his work, including the 2009 Smart Structures Innovation Award from the International Society for Optical Engineering and the 2002 Black Engineer of the President's Award from *U.S. Black Engineer & Information Technology* magazine. His work has resulted in 2 dozen patents, and he has served as a member of the Air Force Studies Board,

the Naval Research Advisory Committee, and the Committee on Space Defense Technology.

During his talk, Hubbard engaged students with hands-on interactive demonstrations of projects he and his graduate students are currently working on and hosted the students with a lunch and learn session where they could ask in depth questions.



From left to right: VP of University Relations Peter Weiler, Sikorsky VP of Research & Engineering Mark Miller, and Clark School Dean Darryll Pines

Sikorsky and United Technologies Pledge \$1 Million to UMD's Clark School of Engineering

The University of Maryland (UMD) today announced that Sikorsky Aircraft Corp., along with its parent company, United Technologies Corp., have pledged one million dollars to endow a fund to create the Igor Sikorsky Distinguished Professorship in Rotorcraft at UMD's A. James Clark School of Engineering. Sikorsky Aircraft (NYSE: UTX), is a world leader in helicopter design, manufacture and service, headquartered in Connecticut, and is a subsidiary of United Technologies.

The Igor Sikorsky Distinguished Professorship in Rotorcraft will reside in UMD's Department of Aerospace Engineering and is intended to support enhanced research specialization in areas related to rotorcraft such as: autonomous flight operations, flight control and system identification, aeromechanics, composite structures and computer aided manufacturing.

Sikorsky's donation is aimed at expanding UMD's rotorcraft education and curriculum, research programs and intellectual capital to be a continuous source for the best rotorcraft engineers in the world. The endowment is part of an ongoing

effort between Sikorsky and the Clark School to enhance UMD's robust rotorcraft program, and provides for continued support for developing not only cutting-edge technology for future helicopters, but also the next generation of innovative rotorcraft engineers.

"We are very grateful to Sikorsky and UTC for this generous investment in the Alfred Gessow Rotorcraft Center and our aerospace engineering program," said Clark School of Engineering Dean and Farvardin Professor of Aerospace Engineering, Dr. Darryll Pines. "Our partnership with Sikorsky has been a tremendously successful one, advancing innovation in rotorcraft education, research and technology development through our shared commitment to excellence."

Sikorsky is a committed Corporate Partner of UMD's Clark School of Engineering. Since 2011, the company has donated nearly \$400,000 to support programs for Clark School students, such as scholarships, fellowships and the Sikorsky Aircraft Colloquium Series in Aerospace Engineering. To date, 42 Sikorsky awards have been made to UMD students.

"Sikorsky has seen a direct benefit from many of the best and brightest alumni of the University of Maryland who now are exceptional engineers and senior leaders at our company. As Sikorsky continues its leading role in redefining the future of vertical flight, what better way to extend the legacy of our founder than by supporting this professorship so that future innovators may join the broader mission of rotorcraft engineering," said Mark Miller, Sikorsky Vice President of Research & Engineering.

The Clark School is home to one of the world's leading programs in helicopter engineering. In 2013, Clark School students continued to set U.S. and world records for flight duration of a human-powered helicopter and have won the American Helicopter Society's graduate student design competition for the 12th time in 15 years.

A new senior faculty member will be hired to fill the Igor Sikorsky Distinguished Professorship in Rotorcraft. More information about the opportunity will be announced at jobs.umd.edu.



Shelton and colleague Patricia at WAASPS Flight Training, (top) on the tractor getting ready to go mow the perimeter.

ing Lake Volta, the largest reservoir by surface area in the world, can be hard to access by truck, so airdrops by plane are more efficient to deliver educational pamphlets for community health and basic sanitation practices. “This program is right up my alley because it perfectly blends my two passions: helping people and aviation,” says Shelton. Although she was excited to embark on a new adventure in a foreign country, she felt her prior military training and college experience would prepare her for any challenges that were ahead.

Once she arrived in Ghana, she quickly discovered that she would have to take a crash course in learning about Ghana and Ghanaian culture. As Shelton explained, “the more I think about the culture here, the more confused I get. I thought since I was able to grasp, internalize and put into practice advanced maintenance and engineering concepts that it would be a cinch to apply the same thought process to foreign cultures. Not so. The more I search for reasons behind cultural differences, the more frustrated I become, and the more I admire the patience of Patricia and Captain Yaw for what they are trying to bring to the Ghanaian women here. They are trying to help on the culture’s terms, which I am quickly learning are dark waters to navigate.”

Captain Yaw and Patricia have welcomed Shelton with open arms and have helped her adjust to her new environment; however, there have been several locals that took bets on how long they thought she would last. As Shelton says, “the people who know me best already know how I will respond to that.” Based on Shelton’s determination, courage, and passion, she will not only last, but also make a tremendous impact while in Ghana and in the rest of her future as a truly talented aerospace engineer.

Read more about Catherine’s adventures at catinkpong.wordpress.com.

Catherine Shelton

Catherine Shelton sets her goals high, and she has never been afraid of a challenge. As a military veteran, and recent 2014 graduate, she has worked hard to develop a work ethic and mindset that gives her the grit and moxie she needs to take on any task head-on. When the opportunity arose to apply her aerospace engineering background in a challenging, yet rewarding way, she jumped at the chance. She accepted a summer volunteer position with WAASPS Flight Training and Aircraft Engineering in the Republic of Ghana. WAASPS is the leader in light aviation in West Africa. WAASPS founder Jonathon Porter, affectionately known as Captain Yaw, created the organization to help address the challenges of reaching the rural parts of Ghana in a safe and efficient manner. Captain Yaw and his wife Patricia run the organization from Kpong Airfield in the eastern region of Ghana.

At WAASPS, Shelton is mentoring young West African women training to build and fly ultra-light planes. Remote villages surround-

UMD Alumnus Wins Top Spot in Infiniti's Performance Engineering Academy



Photo courtesy of Infiniti Red Bull Racing

LaRoche (left) with fellow winners Jason Zide and William Priest.

Alumnus Eric LaRoche (B.S., '14) won a place in Infiniti's Performance Engineering Academy and secured the opportunity of a lifetime—a 12-month work placement with Infiniti Red Bull racing. The position includes accommodation in the U.K., an Infiniti company car and full salary.

LaRoche, who studied both aerospace and mechanical engineering with a minor in international engineering, was one of only a dozen finalists selected from 1500 international applicants to compete in Infiniti's Performance Engineering Academy challenge.

He secured his top spot after competing against fellow finalists during an intense three-day event held in the U.K. at Infiniti's European Technical Center at Cranfield and Infiniti Red Bull Racing's factory in Milton Keynes. The

event included series of intensive interviews, practical tests and technical challenges, assessed closely by leading technical figures from Infiniti and Infiniti Red Bull Racing.

According to an Infiniti Red Bull Racing press release, LaRoche said, "This process has been overwhelming, exciting, nerve-wracking and humbling. The other 11 candidates were extremely strong so it is an honor to have made the final three. Hopefully I'll be able to build on this experience when I take on the huge challenge of working in Formula One, and I look forward to being pushed, to learning more and hopefully having some fun along the way."

LaRoche was a project team leader and lead aerodynamicist with UMD's Terps Racing Formula SAE team and worked as an intern with both Chrysler Street and Racing Technology and Boeing.

At Infiniti, LaRoche will work not only with the Red Bull Racing team at their Formula One factory, but he will also work with Infiniti's road car engineers at their nearby technical center.

Alumna Epps Resurfaces from NASA Undersea Expedition

Alumna Jeanette Epps (M.S. '94, Ph.D. '00) recently participated in NASA's Extreme Environment Mission Operations (NEEMO) project. The expedition took Epps and three other astronauts to the Aquarius Reef Base research station, a pressurized habitat 19



meters beneath the Atlantic Ocean near Key Largo, Florida. Aquanauts participating in NEEMO conduct activities on the ocean floor that inform International Space Station and future exploration activities.

LinkedIn

Join Your Fellow Aerospace Engineering Alumni on LinkedIn

The Department of Aerospace recently created an alumni group on LinkedIn to help our graduates keep in touch and network with each other. To join, simply search "University of Maryland Department of Aerospace Engineering" and click "Join."

Alumnus Zurkowski Awarded Distinguished Flying Cross

Alumnus Lt. Col. Paul C. Zurkowski (B.S. '85), received the Distinguished Flying Cross with Valor for providing air support that saved the lives of 90 American troops during an engagement in Afghanistan. The award is given to those serving in the Air Corps of the Army who distinguishes themselves with heroism or extraordinary achievement while participating in an aerial flight.

"I saw tracer fire and I knew I was getting shot at but I went right back into supporting the ground troops. I turned away from the ground fire and got right back into providing fire support," said Zurkowski who was piloting one of several A-10C Thunderbolt IIs sent in to cover troops that were in contact on the ground with the enemy. "I landed at Bagram and had maintenance look the plane over for battle damage. That is when they found the two bullet holes in the airplane...I knew I had been shot at, but I didn't know I had been hit until then," said Zurkowski.

Zurkowski was a co-op with the Edgewood Aerodynamics Group at Edgewood Arsenal at Aberdeen while he attended the University of Maryland. After graduating with his aerospace engineering degree, he worked with the Edgewood group full-time for several years in the 1980s. During that time, he took pilot training with the United States Air Force. He joined the Maryland Army National Guard flying A-10s after serving on active duty, and he has completed several tours in



Air National Guard photo by TSgt. David Speicher/RELEASED

Maj. Chris Cisneros (Left), 104th Fighter Squadron Instructor Pilot, and Lt. Col. Paul C. Zurkowski (Second from left), 104th Fighter Squadron commander.

Bosnia, Iraq and Afghanistan deployed from the 104th Expeditionary Fighter Squadron.

"For an A-10 pilot there is no greater satisfaction then to meet the guys you helped that day and hear them say - 'You are the reason I am alive today,'" said Zurkowski. Zurkowski was honored with fellow pilot Major Christopher D. Cisneros during a ceremony at Warfield Air National Guard base on December 8, 2013.



A. JAMES CLARK SCHOOL OF ENGINEERING

The Department of Aerospace Engineering
3179 Glenn L. Martin Hall
University of Maryland
College Park, MD 20742-2111

Presort Standard
U.S. PAID
SOMD
Permit No. 1169

Show Your Support

You can contribute to the department and support our mission to transform lives through exceptional educational and research opportunities.

Your contributions can support aerospace engineering initiatives such as graduate fellowships, undergraduate scholarships and named professorships. Please visit www.aero.umd.edu/giving to learn more.

Gifts may be made by check to "University of Maryland College Park Foundation (UMCPF)." Please designate "The Department of Aerospace Engineering" in the memo line, and mail to:

Dr. Norman M. Wereley, Chair
Department of Aerospace Engineering
3179 Martin Hall
University of Maryland
College Park, MD 20742

You can help make a difference with a gift of any amount!

Connect with us on Facebook and Twitter!

www.facebook.com/umdaero

twitter.com/Aero_at_UMCP

