



OLD DOMINION UNIVERSITY

THE INAUGURAL
ISSUE

MECHANICAL & AEROSPACE ENGINEERING

SPRING 2024, HIGHLIGHTS



who we are



our mission

Old Dominion Mechanical & Aerospace Engineering is at the forefront of pioneering research and collaboration, shaping leaders who are revolutionizing the future of mechanical and aerospace engineering with innovative solutions.

our vision

We aspire to establish ourselves as one of the nation's foremost mechanical and aerospace program, dedicated to serving the greater good.

our values

Excellence through service-oriented leadership and synergistic collaboration. Fostering diversity, equity, and inclusion within research, teaching, and engagement initiatives.



our message

IN THIS INAUGURAL ISSUE of our quarterly newsletter, we provide a snapshot of our faculty and students' recent activities and accomplishments. From Willy Wriggers' designation as an ODU eminent scholar, the recent hiring of Logan Beaver and Cong Wei to enhance our faculty expertise in the area of autonomous systems, and an invitation extended to Krishna Kaipa to speak about robotics on Capitol Hill during the Senate Robotics Showcase & Demo Day. We have also included feature articles of two of our brightest students, Hailey and Jacob, who describe their experiences at ODU in their own words. We would love to hear your feedback; please contact us and let us know your impressions and what you would like to see in future issues.

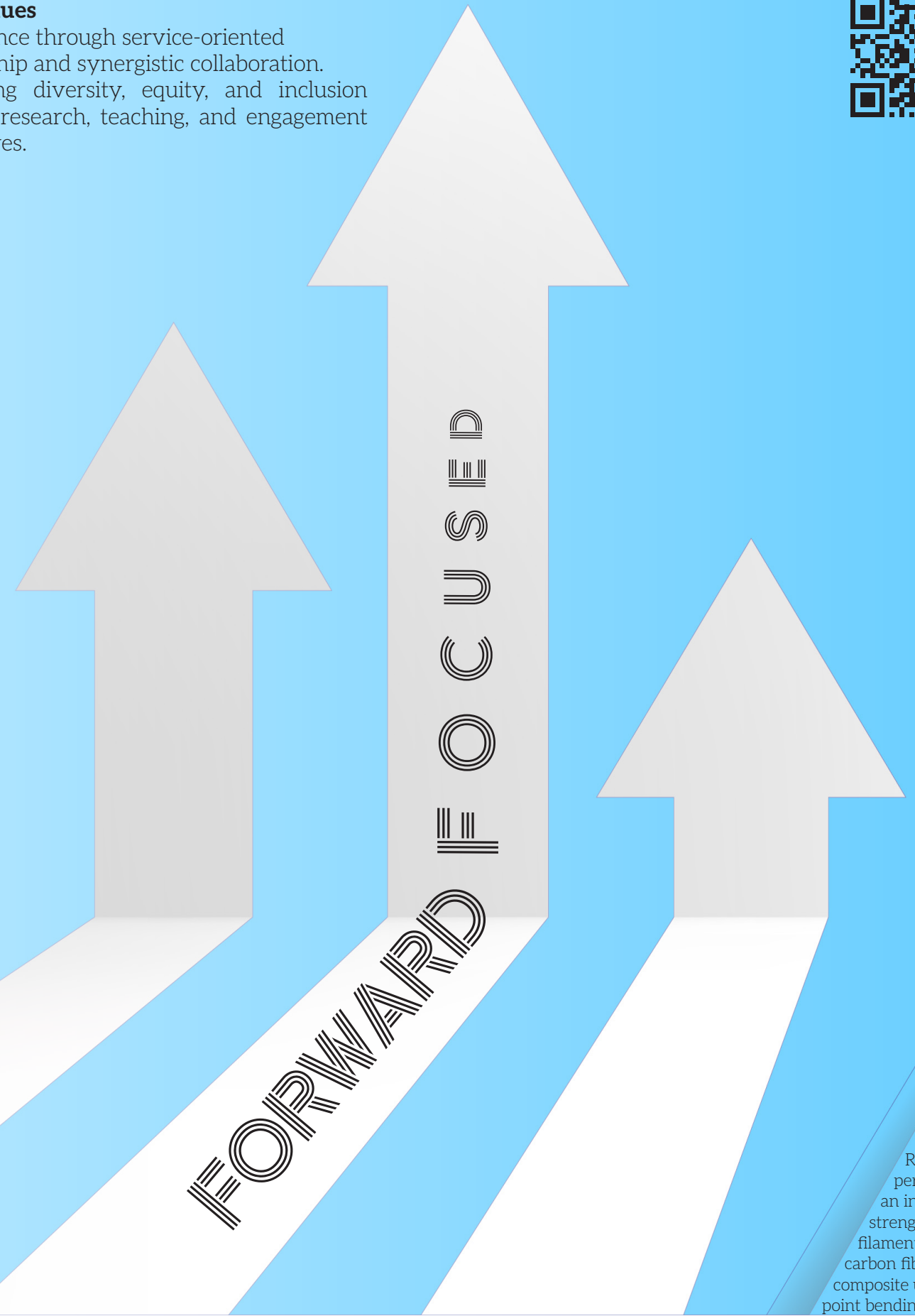
As we bring another year of academic excellence to a close, I wanted to take a moment to express my gratitude for the ongoing dedication of our amazing faculty and staff. Their contributions range from pioneering new insights in mechanical and aerospace engineering to nurturing the next wave of industry and academic leaders, and enhancing the learning journey for both undergraduate and graduate students. We are also thrilled to commemorate the accomplishments of our graduating class, whose endeavors collectively propel our department forward.

On a final note, as we navigate the dynamic landscape of the merger between ODU and Eastern Virginia Medical School (EVMS), it is essential to take a moment to reflect on our journey and the opportunities that lie ahead. Change is inevitable, and with change comes growth. It is during times of transition that we have the chance to harness our collective potential and propel ourselves toward even greater achievements.

I would like to personally thank you for your commitment and your support.

Miltos Kotinis, Ph.D.

Interim Department Chair of Mechanical and Aerospace Engineering,
Old Dominion University



Cover Photo: PhD student Ahmad Ravangard, performing an interlaminar strength test of filament wound carbon fiber composite using four-point bending fixture.

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I consider myself an entrepreneurial and enthusiastic researcher.



Photo Credit: Sherry DiBari



Willy Wriggers Named Eminent Scholar

The eminent scholar designation recognizes outstanding contributions and service to the university.

WILLY WRIGGERS, a first-generation college student, previously, worked at the private D. E. Shaw Research laboratory in New York City. There, he participated in the historic millisecond-length molecular dynamics simulation on the Anton special-purpose supercomputer, earning the 2010 Runner-Up of Science Magazine's Breakthrough of The Year. Before this, he held academic appointments as an Associate Professor of Biomedical Informatics at the University of Texas Health Science Center in Houston and as an Assistant Professor of Molecular Biology at The Scripps Research Institute in La Jolla, California.

Dr. Wriggers has been an MAE faculty member since 2014 and currently serves as the director of the Biomachina Lab. He was one of the pioneers of multi-scale modeling of biomolecular assemblies. In 1998, he developed the Situs package, the first software for integrating multi-scale structural data of large biomolecular assemblies derived from low-resolution x-ray crystallography, small-angle x-ray scattering (SAXS), electron microscopy, or tomography.

The lab software suite he developed is used by over 10,000 users worldwide and generates more than 200 citations annually; some of these tools have become de facto standards in the structural biology community.

Dr. Wriggers now joins Dr. Baysal as the second eminent scholar in the Mechanical and Aerospace Engineering department. He has consistently published his research in leading journals such as *Science*, *Structure*, *Cell*, *Proceedings of the National Academy of Sciences*, *PLOS Computational Biology*, and others. For four consecutive years,

Dr. Wriggers has been recognized in the Stanford University ranking of the world's top 2% scientists in Biomedical Research.

Throughout his academic journey, Dr. Wriggers has mentored countless PhD students, offering guidance and valuable insights from his extensive experience. Many of his former advisees have gone on to mentor PhD students themselves and facilitate their entry into academia.

Dr. Wriggers, a lifelong learner, continues to seek ways to expand his research. He is currently exploring opportunities in medical informatics and drug discovery. He envisions becoming the "bridge" between big data analytics and machine learning, applying these fields to basic biomedical research.

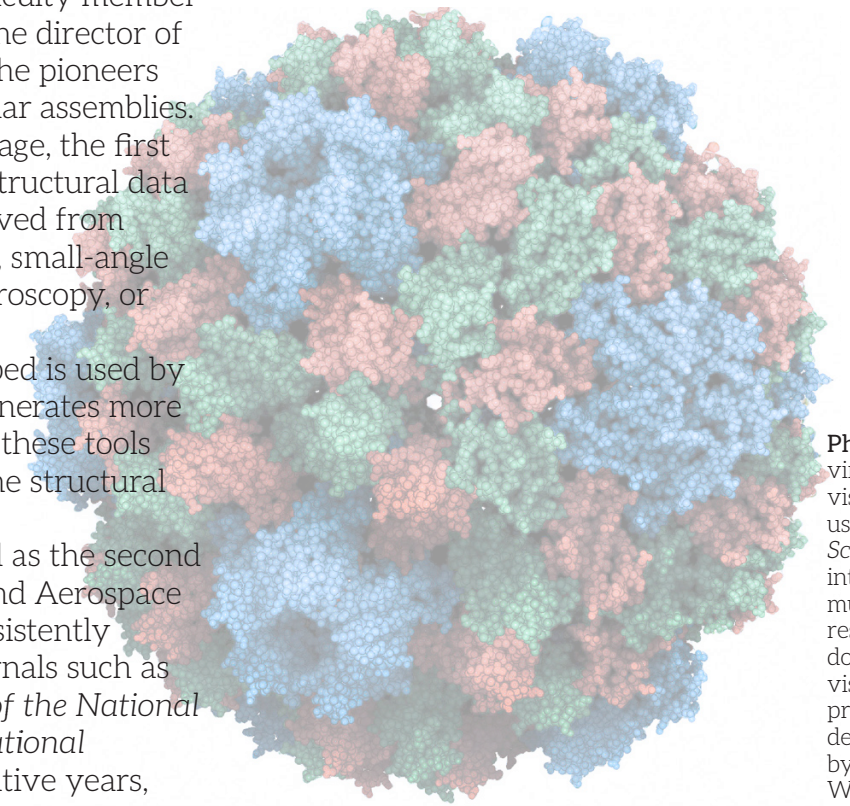


Photo: A virus capsid visualized using *Sculptor*, an interactive multi-resolution docking and visualization program developed by Dr. Wriggers.

IN FOCUS

HAILEY RIGGLEMAN, an MAE senior graduating this spring, is the definition of a non-traditional student. She started thinking about a career in engineering after attending the “Women in Engineering” event hosted by Lockheed Martin. She attended Germanna Community College from 2014 to 2016. After having her son, she returned to Germanna to finish her associate’s degree before transferring to Old Dominion University.

While balancing being a mom, a wife, and working full-time as a hiring manager and networking consultant, she began to work towards her degree. She recalls that her favorite course was Power Systems Theory and Design taught by Dr. Arthur Taylor. The material in the course proved to be challenging but she was able to improve her MATLAB skills significantly.

During her time at ODU, Hailey earned a spot on the Dean’s list every semester. She received the Newport News Shipbuilding and Huntington Ingalls Industries Scholars Program Endowment for 2023-2024. Hailey focused on excelling academically while also becoming an active chapter member in ODU’s Sorority for Engineering and Technical Studies (Phi Sigma Rho) and the Tau Sigma Honor Society.

During her senior year, Hailey was faced with the unplanned opportunity to work in the MAE Tutor Lab. Even though she was primarily providing support to fellow undergraduate students she found that the experience allowed her to deepen her understanding of engineering concepts and make valuable connections.

Hailey even went beyond assisting academically and used her personal experience in the workforce to help students fine tune their resumes and prepare for career fairs. Hailey



communicated that she had not expected to find the job to be so rewarding and she was reminded by the students that her effort, kindness, and guidance were making a difference.

The future is bright for Hailey. She plans to attend graduate school in the Fall here at Old Dominion where she will get her Masters in Aerospace Engineering. She has also recently accepted a full-time position as an engineering analyst with Kimley-Horn located in Virginia Beach.

“

I returned to school and found ODU to be supportive, understanding of my busy lifestyle, and helpful with resources.



THE PAST FOUR YEARS AT ODU have been an incredible journey of personal growth for MAE senior Jacob Lewis, as he discovered being an engineering major requires perseverance, resiliency, and dedication.

Alumni Profile

DR. BRIANNE WILLIAMS earned both a Masters and a PhD degree from the Old Dominion Mechanical and Aerospace department and joined Aerospace Corp in 2010. She is currently a Senior Project Leader in the Fluid Mechanics Department at The Aerospace Corporation.

Dr. Williams provides technical oversight to major wind tunnel test campaigns across NASA and DoD including launch vehicle programs like the Falcon 9, Falcon Heavy, Omega, and Vulcan. Her responsibilities include test planning, test article fabrication oversight and on-site test support, as well as post-test computational fluid dynamics (CFD) comparisons and uncertainty quantification.

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Student Spotlight

I feel very fortunate for all the incredible people I’ve met along the way, students and faculty alike.

During his senior year, Jacob took on the lead role for his capstone design project, managing a team of nine students. They were given a rather ambitious project but still managed to excel and even earn first place at ESPEX 2024 (see feature article in this newsletter).

Jacob is now enrolled in the master’s program in Aerospace Engineering to continue his studies at Old Dominion University. Through a VITA program sponsorship, he will be working at Jefferson Lab to perform research in the field of SRF linear accelerators. Jacob expressed that he is very excited and looks forward to the next set of challenging experiences that lie ahead.





MAE Robotics Travels to the Capitol Hill

THE COLLABORATIVE ROBOTICS & ADAPTIVE MACHINES (CRAM) LABORATORY led by Dr. Kaipa received an invitation to present several bio-inspired robots at the Senate Robotics Showcase & Demo Day; the event took place at the United States Senate in Washington D.C. on April 30th. The

purpose of the event was to provide a snapshot of current innovations in industry and academia that demonstrate the convergence of AI and robotics. Members of Congress along with their respective staff were given the opportunity to interact directly with robotics researchers, developers, and engineering students during the event, and to discuss the role of robotics in fostering productivity and economic development.

The booth overseen by Dr. Kaipa displayed an array of bio-inspired robotic crawlers that borrow inspiration from quadrupedal animals like frogs, elephants, and cats. Examples of applications for these crawling robots include emergency response at disaster sites, search & rescue operations in uneven terrain environments, and planetary exploration. These robots were designed and built from scratch by MAE undergraduate students who took the bio-inspired robotics course taught by Dr. Kaipa.

Among the visitors at Dr. Kaipa's booth were Erica Wissolik (IEEE-USA) and Dr. Sethuraman Panchanathan, the director of the National Science Foundation. Dr. Kaipa, while visiting booths from various universities, had a chance to network with congressional leaders, policymakers, faculty, and students.

The event also provided Dr. Kaipa the opportunity to interact with robotics companies that expressed interest in future collaborations and discussed potentially offering summer internship positions to MAE undergraduate students.



Above: Dr. Kaipa describing to members of Congress and to Erica Wissolik (IEEE-USA, left) applications of bio-inspired robots. **Below:** The booth overseen by Dr. Kaipa displayed an array of bio-inspired robotic crawlers.



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LOGAN BEAVER began his academic journey at the Milwaukee School of Engineering, where he earned his degree in mechanical engineering. He then pursued a master's degree at Marquette University, focusing on energy systems and robotics. After completing an internship at the Army Research Lab in Maryland and driven by a desire to explore the East Coast, he obtained his PhD from the University of Delaware.

In his search for career opportunities, he looked for universities with strong research programs and expanding robotics initiatives. Since joining ODU in the summer of 2023, Logan has been actively involved in kickstarting the Institute of Autonomous and Connected Systems (IACS) at ODU, and has become the faculty advisor for the autonomous driving student team..

This year, Dr. Beaver will be teaching Dynamics for the second time, and his autonomous driving student team hopes to participate in a competition in Toronto, Canada. His intelligent systems lab continues to focus on creating high-functioning aerial and ground robots with AI integration. After work, Logan is busy planning his upcoming summer wedding and playing video games.



CONG WEI earned his bachelor's degree in marine engineering from Ningbo University in China and his master's degree in ocean engineering from Harbin Engineering University. He continued his studies in the United States, obtaining a PhD in mechanical engineering from the University of Delaware in 2021. Following this, he worked as a postdoctoral associate at the Maryland Robotics Center at the University of Maryland.

Dr. Wei joined the MAE department at Old Dominion University in the summer of 2023, drawn by the institution's advancements in autonomous systems research. His passion and background in marine engineering led him to the Hampton Roads area, known for its vibrant marine culture. His current research focuses on multi-agent control of robots in the marine environment, integrating various domains such as control theory and oceanography. Cong has also played an active role in launching the Institute of Autonomous and Connected Systems (IACS) at ODU.

In Fall 2024, Dr. Wei will offer Applied Marine Robotics, where students will have the opportunity to view and operate marine robots while exploring the underwater world. In his spare time, Cong enjoys swimming, playing the piano, cooking, reading, and singing.

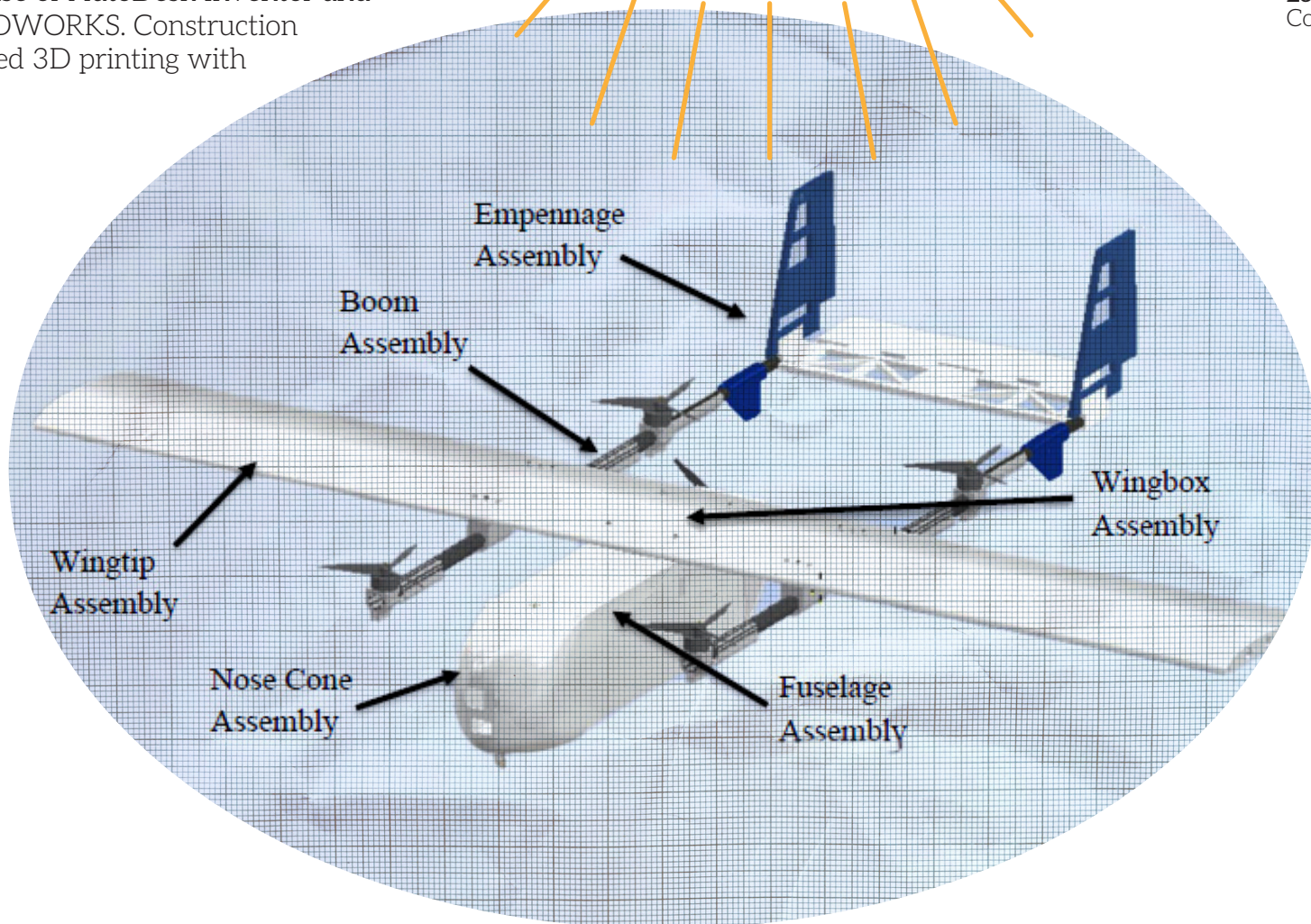
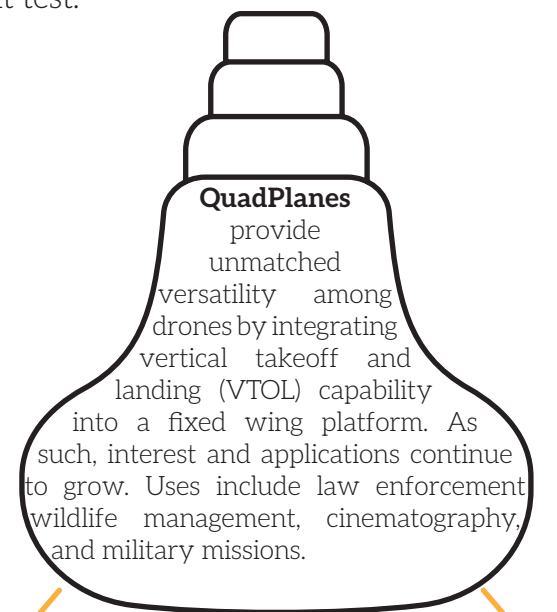
MAE Senior Design Group Secures 1st Place

divided into two phases: initially, a VTOL system was integrated into a pre-built fixed-wing model, which then formed the basis for the complete development of a second QuadPlane.

Design work for the aircraft included aerodynamic analysis in XFLR5, performance estimations in eCalc, and use of AutoDesk Inventor and SOLIDWORKS. Construction methods included 3D printing with

FRIDAY, APRIL 19TH. The senior design group advised by Dr. Drew Landman, with support from UAS expert and TA Rob Stuart, won first place at the 2024 Engineering Student Project Expo (ESPEX) with the design of their QuadPlane. The development of the UAV was

lightweight-PLA, PETG, and carbon fiber PETG, as well as laser-cutting with balsa and birch plywood. Promising results during the flight testing and performance analysis of the pre-built model indicated the ability to achieve the project's goals. The second QuadPlane was also designed for increased structural performance and modularity and is currently in flight test.



Left-to-Right: BCET Dean Ken Fridley, Daniel Mercier, Cade Black, Zoe Powell, Ethan Martinez, Jacob Lewis (team leader), Collin Hartman, Merene Victor, Hanna Theverapperuma, Branton Jones, and BCET Associate Dean Jeff LaCombe.

AIAA ODU Chapter Visits West Virginia

THE AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS (AIAA) chapter at ODU had a chance to present their research, exchange findings and ideas, and discuss ongoing aerospace-related matters while attending the 2024 Region I Student Conference hosted by West Virginia University in Morgantown, WV.

Dave Morgan (pictured), is an MAE sophomore who attended the event. His presentation focused on the ongoing partnership between NASA Langley and ODU. Dave is currently earning his minor in history and will intern at the Smithsonian National Air and Space Museum this summer.



Congratulations, Spring 2024 Graduates!

Bachelor of Science

Ara-Is, Neive Adrienne
 Barber, Rodney
 Black, Cade
 Brzezowski, David
 Carter, Phillip
 Chappell, Thomas
 Crostic, Andrew
 Durant, Thomas
 Dyar, Jacob
 Fredricks, Curtiss
 Grassl, Marc
 Hardin, Luke
 Hartman, Collin
 Highland, Logan
 Hill, Corbyn
 Icban, Karl Nathen
 Jones, Branton
 Keener, Logan
 Laporte, Drew
 Leithauser, Landon
 Lemma, Mintesnot
 Leppert, Kyle
 Lewis, Jacob
 Lively, Raio
 Martinez, Ethan
 Marx, Colin
 Mcintosh, Demarius
 Mercier, Daniel
 Miles, Aubrey
 Nichols, Kimberly
 Nouchet, Jonas
 Ochoa, Miguel

Perry, Jada
 Porter, Adam
 Riehl, Alex
 Riggleman, Hailey
 Robinson, Brent
 Theng, Austin
 Theverapperuma, Hanna
 Thornton, Scott
 Tran, Ai
 Tutt, Ethan
 Walsh, Gavin
 Ward, Braden
 Wilson, Charles

Master of Engineering

Ide, Jeremy
 Johnson, Brian
 Merriman, Joshua
 Smiley, Brett

Master of Science

Abedrabbo, Jeries
 Simmons, Lauren

Doctor of Philosophy

Newhart, Troy

Welcome to our ODU MAE YouTube Channel

Join us as we showcase the projects, research, and innovations happening right here at Old Dominion MAE. Get an inside look at the exciting work being done by our talented students, professors, and researchers. If you record exciting projects that your class or clubs are working on, please send the video to sold@odu.edu so that we can promote the amazing things that ODU mechanical and aerospace engineers are accomplishing.



youtube.com/@odumae



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