Message from the Chair
Jim Gregory

The Department of Mechanical and Aerospace Engineering at The Ohio State University builds on its diversity of people and ideas to cultivate a range of advancements in mechanical, aerospace and nuclear engineering.

From gears to cancer research, our mechanical engineers are experts in an array of specialty areas. Our strengths in both aeronautical and astronautical engineering boost the impact of our aerospace engineers. And, with an on-site nuclear reactor—and high-achieving graduates throughout industry and government—our nuclear engineers value collaboration.

To best showcase the unique achievements of each of our programs, we have created separate research publications. In this Research Impact: Aerospace, you will see samples of our advancements in aerospace engineering over the past year.

We had a recent alum serve on a project that could help astronauts stay in space longer (page 5), launched a nuclear propulsion research collaboration focused on space flight (page 9), and turned the focus of our aerospace engineering program toward the future (page 11).

All of this was accomplished with our talented students, who continue to be our primary focus. They are involved in every facet of our research.

I invite you to read on to learn about our recent cutting-edge innovations.

Jim Gregory
Chair, Mechanical and Aerospace Engineering
Professor, Mechanical and Aerospace Engineering

Cover: The team of student researchers that set the world’s fastest drone, one of many accomplishments of MAE’s future-focused Aerospace Engineering Program. See more: Page 11

DEGREES CONFERRED
Academic Year 2019-2020

<table>
<thead>
<tr>
<th>Degree</th>
<th>BS</th>
<th>MS</th>
<th>PHD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>248</td>
<td>73</td>
<td>26</td>
</tr>
<tr>
<td>MECHANICAL</td>
<td>248</td>
<td>73</td>
<td>26</td>
</tr>
<tr>
<td>AEROSPACE</td>
<td>69</td>
<td>20</td>
<td>7</td>
</tr>
<tr>
<td>NUCLEAR</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

STUDENT ENROLLMENT
Autumn Semester 2019

<table>
<thead>
<tr>
<th>Degree</th>
<th>BS</th>
<th>MS</th>
<th>PHD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>608</td>
<td>107</td>
<td>147</td>
</tr>
<tr>
<td>ME MAJOR</td>
<td>608</td>
<td>107</td>
<td>147</td>
</tr>
<tr>
<td>ME PRE-MAJOR</td>
<td>561</td>
<td>21</td>
<td>38</td>
</tr>
<tr>
<td>AE MAJOR</td>
<td>164</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>AE PRE-MAJOR</td>
<td>286</td>
<td>3</td>
<td>22</td>
</tr>
</tbody>
</table>
Statement from the Chair: We must change.

The Ohio State University’s Department of Mechanical and Aerospace Engineering stands with all black people – faculty, staff, students, colleagues, friends, and members of our community. The injustice that we see has been painfully brought to light by the long chain of lives needlessly and shockingly lost due to unjust and flagrant abuses of power – George Floyd, Ahmaud Arbery, Breonna Taylor, Botham Jean, and many others stretching over decades and centuries of our history. Many of us are experiencing deep pain - we share that pain, and together we long for justice and a better future.

We stand with all black people in vocally exclaiming that things must change. We will labor together to pursue ever greater justice, to advance towards an equitable society, to warmly embrace diversity, and to thoughtfully create a respectful and inclusive environment.

But this isn’t just about what’s happening in the world around us: the problem is here with us. In fact, my eyes are being opened to the ways that many of us contribute to and are complicit with systemic injustice. Just a few days ago in an engineering community dialogue, I listened to the voices of young African American Engineering students who shared their experiences of racism – injustices that they have experienced in our presence and from us. Excluded from groups. Seen as a threat. Isolated. Othered.

I am confronted by this stark reality. This is not who we want to be! It is not a reflection of the values of compassion, community, respect, justice, equity, diversity, and inclusion to which we aspire.

So, we must change. Please join me in boldly confronting these failures to live up to our values – this is what we have the most direct agency to change. I invite you to process with me in assessing our own role. We’ll need to humbly and unflinchingly confront the ways that we contribute to injustice. Yes, there is racism among us. Yes, the injustice is systemic. And yes, we can do better.

I freely admit that I am not fully aware of the injustice and the problems, and that I need to learn. The effects of systemic injustice run deep and may be difficult to bring to light. But we must – for the good of all of us.

While I don’t have any answers today, I am committing our department to listening, to learning, and to change. These are a few initial steps that we will take:

- We will reflect on the history of our department and learn from it. Let’s examine the origins of our department and our role in society over the years - we’ll need clarity as we bring the systemic injustices to light.
- We will proactively listen to our own students, staff, and faculty – to hear their experiences; to ask careful questions; and to compassionately commit to change. We will respond with care and committed action when we learn of reports of racist or unjust behavior or attitudes.
- We will partner with the College of Engineering and the University on broader change where we can play a role.

We are deeply grieved by the injustice that we see in the world, injustice that has been with us for a long time. And, we acknowledge that there are many ways that each of us is a part of the systemic injustice in our world. Together, we will courageously move forward on a pathway of listening, learning, advocacy, and change. Thanks for your partnership with us as we pursue an equitable and just learning environment and broader society.

Jim Gregory
Chair, Mechanical and Aerospace Engineering
Professor, Mechanical and Aerospace Engineering
If you’re a Buckeyes fan, you know Wilson Flores. Or at least you’ve seen him. The recent engineering grad is the focus of The Ohio State University television commercial that airs during football and basketball games. And if you’ve watched the commercial, you will likely remember it has something to do with NASA.

In the Chihuahuan Desert of west Texas, Flores watched that something launch into space. An interdisciplinary Ohio State experiment funded by NASA to study muscle atrophy in space was among dozens of research and outreach payloads stowed aboard Blue Origin’s suborbital New Shepard rocket.

The experiment’s origins date back to 2015, when Assistant Professor of Surgery Peter Lee began recruiting a small team of students to author a grant to NASA’s Undergraduate Student Instrument Project. Members of that team included engineering, biology and pharmaceutical students. Lee ultimately received the grant for a study entitled “Microgravity sensing in tissue engineered muscle.”

Astronauts undergo significant muscle atrophy when in spaceflight for extended periods of time, but the mechanisms behind it are not well understood. The Ohio State experiment enabled miniaturized tissue-engineered skeletal muscle constructs to enter microgravity for at least two minutes on the rocket to determine how expression of key genes change when compared to controlled muscle constructs in the lab. The findings could ultimately help astronauts spend longer periods of time aboard spacecraft.

Flores was an aerospace engineering student who grew up dreaming of space. When he heard about Lee’s project, he leapt at the opportunity to contribute. He joined Lee’s team in 2016 and the project became the focus of his senior capstone. Since then, several groups of pre-med students and Buckeye engineers have honed the experiment to its final form. Since then, several groups of pre-med students and Buckeye engineers have honed the experiment to its final form.

“Working on a project that could help astronauts stay in space longer has been very exciting,” Flores said.

While Lee and the pre-med students handle the complex tissue engineering, Flores led the design, manufacturing and testing of the technology to capture real-time data in suborbital space. He describes the technology in three phases. A fluid injection system delivers a special solution to the muscle cells at the end of the microgravity period, which in essence genetically freezes the cells’ DNA for comparison to control cells in the lab. The team also has engineered a series of electrodes to stimulate the muscles—making them expand and contract—and a four-camera system to capture footage of the muscle cell aggregates throughout the flight.

“This concept of stimulating muscle cells in space has never been done before,” Flores added.

Currently employed with the U.S. Air Force and pursuing a graduate degree at the Air Force Institute of Technology in Dayton, Flores plans to author a research paper on the engineering technology he helped develop.

Named after Mercury astronaut Alan Shepard, the first American to go to space, New Shepard is Blue Origin’s reusable suborbital rocket system designed to take astronauts and research payloads past the Kármán line—the internationally recognized boundary of space. This was the 12th total test flight of the New Shepard launch system, and the 3rd such flight in 2019. Watch a replay of the launch and landing here.

Also on the vehicle are several student art experiments as part of a collaboration with the rock band OK Go, along with thousands of postcards from students around the world. According to Blue Origin, this mission will help inspire future generations of children to pursue careers in STEM and help visualize the future of space travel.

RECENT GRAD HELPS OHIO STATE FLEX SPACE RESEARCH MUSCLES
LADDCS GROUP WINS 2019 AIAA SENSOR SYSTEM AND INFORMATION FUSION BEST PAPER


Mrinal Kumar, director at Laboratory for Autonomy in Data-Driven and Complex Systems (LADDCS), Alex Soderlund, a researcher at LADDCS and senior Ph.D. candidate at Ohio State, and Chao Yang, a former post-doctoral researcher at LADDCS, presented the paper at SciTech Forum and Exposition in San Diego on Jan 7-11, 2019.

The paper is about estimating the spread of wildfires in real time. The overall objective of the research is to perform fusion of data from potentially conflicting sensors and forecasting agents to generate a meaningful representation of where the fire currently is and where it is going next.

The group reached their objectives by using a combination of forecasting, based on probabilistic environmental conditions, and sensing, using in-field temperature sensors and mobile aerial drones with vision and infra-red cameras, Soderlund said.

All of the work in the paper is simulation, but the group has recently begun a collaboration with Ohio State’s School of Environment and Natural Resources and have taken data during a recent prescribed burn in Marion, Ohio. They will practically test their research again for a prescribed burn in Coshocton, Ohio.

GRADUATE STUDENT AND ASSISTANT PROFESSOR RECEIVE FELLOWSHIP FROM AFRL/DAGSI

The team of mechanical engineering graduate student Mohamad Al Nashar and assistant professor Alok Sutradhar have received a fellowship award to support their research in materials and manufacturing.

"I’m looking forward to the experience and the skillset I’m going to accumulate during my fellowship," said Al Nashar. "I’m excited to work on this cutting-edge project that could impact not only academia, but also the industry."

The fellowship comes from the Air Force Research Laboratory Dayton Area Graduate Studies Institute (AFRL/DAGSI). Sutradhar and Al Nashar’s fellowship title is “Topology Optimization of Coupled Mechanical and Electromagnetic Designs.”

"In this project, we combine mechanical and electromagnetic topology optimization to design novel electromagnetic systems,” said Sutradhar.

The design proposed by the project will lead to new performance and integration opportunities. This includes systems that are lighter, more compact and affordable.

"New technologies that are adaptive, reconfigurable, provide spectrum flexibility with reduced cost, size, weight, and power, which leverage advanced micro-electronics and macro-electronics devices, components, and structures can be designed,” said Sutradhar.
OHIO STATE LAUNCHES NUCLEAR PROPULSION RESEARCH COLLABORATION FOCUSED ON SPACE FLIGHT

At the American Astronautical Society’s John H. Glenn Memorial Symposium in Cleveland, The Ohio State University College of Engineering and a subsidiary of BWXT Technologies, Inc. (BWXT) announced a joint interdisciplinary research effort to advance nuclear thermal propulsion for space flight missions.

Nuclear thermal propulsion (NTP) offers the potential to significantly reduce travel time for spacecraft, especially for deep-space destinations in the solar system at distances of Mars and beyond. Additionally, the significant power and specific impulse improvements will enable new and innovative flight trajectories, and eventually reduce the time astronauts are exposed to harmful cosmic radiation while transiting in deep space.

BWXT is a leading supplier of nuclear components and fuel to the U.S. government, and is currently working for NASA under contract to reduce risk for NTP development as well as conduct a mission study for a potential flight demonstration.

Ohio State’s world-class materials science capabilities, robust data analytics expertise and its own nuclear reactor laboratory complement BWXT’s applied science leadership in nuclear propulsion to help meet the nation’s future space flight needs.

“The Ohio State University is a leader in research partnerships with industry and performing critical research in the national interest,” said College of Engineering Dean David B. Williams. “We work closely with NASA’s two primary centers focused on nuclear applications on nuclear applications in Cleveland. We are excited to build this collaboration to help further space exploration and greatly reduce travel times to a range of key destinations in deep space.”

The College of Engineering’s Center for Design and Manufacturing Excellence soon will embark upon the construction of a working NTP scale-model rocket engine using non-nuclear power sources and significant advances in additive manufacturing.

“We are extremely pleased to work with The Ohio State University to advance nuclear thermal propulsion technology,” said BWXT President and Chief Executive Officer Rex Geveden. “Projects like this create an interesting intersection between student development and our business ambitions in this promising technology for the space market.”

Student involvement will be emphasized in Ohio State's support of BWXT’s NTP program, and will be enriched further through the university’s role as one of six members of the Department of Energy’s Idaho National Laboratory National University Consortium. This summer, Ohio State engineering graduate students are already interning at BWXT’s Lynchburg offices and at Marshall’s nuclear propulsion research laboratories, respectively. Several mechanical and aerospace engineering capstone projects focused on NTP in the past academic year, and more are planned for the future.

Later this year, Ohio State and BWXT also will host a dedicated research conference focused on the interdisciplinary aspects of nuclear thermal propulsion. Coordinated by the university’s Battelle Center for Science, Engineering, and Public Policy in the John Glenn College of Public Affairs, the conference will convene global technical, policy, and administrative leaders and help focus specific areas of research.

“Projects like this create an interesting intersection between student development and our business ambitions in this promising technology for the space market.”

by the College of Engineering

AIAA BEST PAPER AWARD

Ohio State researcher from the Turbine Aerothermodynamics Laboratory won the 2020 American Institute of Aeronautics and Astronautics (AIAA) Gas Turbine Engine Best Paper Award.

Mohammad Arif Hossain, a former graduate research assistant at the Aerospace Research Center (ARC), presented at the 2020 AIAA Aerospace Science Forum in January 2020. Hossain was advised by Dr. Jeffrey Bons.

The paper is about developing innovative cooling architectures for turbine engines. The objective of this research effort was to explore innovative cooling architectures enabled by additive manufacturing techniques for improved cooling performance and reduced coolant waste.

“The final vane design consists of sweeping jet film cooling holes on the suction surface, sweeping jet impingement holes at the leading edge and double-wall partial length triangular pin-fins with impinging jets at the trailing edge,” he said.

Hossain graduated with a PhD in Mechanical Engineering from OSU in May 2020 and started a new role as a Senior Research Specialist at the Core R & D of the Dow Chemical Company.

by the department of mechanical and aerospace engineering
I’m not every day that most people contemplate how to improve society through enhancing air transportation, but it’s an ever-present thought for James Gregory, departing director of The Ohio State University Aerospace Research Center.

“I am struck with gratitude that we get to work on things that make us strong and great at what we do.”

Gregory has quietly guided the multi-laboratory center’s growth from $2.8M in research expenditures in 2017 to $8M in 2020. The center connects core strengths across laboratories outfitted with cutting-edge experimental facilities test components for some of industry’s biggest names and scholars work to solve air transportation challenges. ARC, which has over 20 faculty and 50+ graduate and undergraduate student researchers, also serves as a unique resource for industry, academia, government labs and other organizations to collaborate on complex research challenges.

“She is the best, we’re at our best when we pull together.”

“I would say it’s our people that make ARC strong,” shared Gregory. “The collegiality, our cooperative approach to research, innovativeness, mentoring of graduate students and the vision to tackle the most challenging problems facing society. These are the things that make us strong and great at what we do,”

ARC (launched from the Department of Mechanical and Aerospace Engineering in 2013 under the purview of Professor Mo Samimy. When Samimy returned to a traditional faculty role in 2017, Gregory assumed the directorship after serving as the Associate Director of Unmanned Aerial Systems since 2015. Now, the center has grown to encompass research projects from across the university.

Strength in partnership

Located on the campus of the university’s executive airport, Don Scott Field, ARC’s unassuming brick building houses world-renowned research labs producing patents and solutions reaching nearly every facet of the aerospace and aviation industry. Here, laboratories outfitted with cutting-edge experimental facilities test components for some of industry’s biggest names and scholars work to solve air transportation challenges.

One such program aims to maximize the efficiency and safety of jet turbines through the Pratt & Whitney Center of Excellence in the Gas Turbine Laboratory. A series of projects being investigated by the Turbine Aerothermodynamics Laboratory addresses aircraft efficiency and safety while flying through very dusty skis. ARC is also a core member of the Federal Aviation Administration ASSURE Center of Excellence on Safe and Efficient Integration of Unmanned Aircraft Systems into the National Airspace System, a national consortium investigating the safe and efficient integration of drones into national airspace.

Although much of Gregory’s work has been done with an air towards subtlety, not all of his successes have been discreet. In 2017 he led a team of researchers to set the record for the world’s fastest drone, a technology demonstration that allowed the team to push limits while creating an inspirational project for younger students. He was also selected by The Great Courses and the Smithsonian Institution to produce a video series, The Science of Flight.

Future focus

Gregory’s passion for research extends beyond the lab. He counts some of his most enjoyable achievements as mentoring students and new faculty. “We are an educational institution and we are training graduate students to be the next generation of researchers and scholars and R&D developers,” he said. “It’s actually a multigenerational impact that we have, and that’s what makes it rewarding and lasting beyond any specific technology developments that an individual faculty member may do on their own.”

This outlook fits well with Gregory’s next challenge. June 1 he took the pilot seat of the university’s Department of Mechanical and Aerospace Engineering. With over 80 faculty members and over 2000 graduate and undergraduate students, Gregory looks forward to providing good organizational structure, as well as vision and empowerment to the faculty.

“Tm excited about the prospect of serving the faculty of our large, complex department. I look forward to tackling academic programs, as well as the research,” said Gregory, who will still maintain his UAS laboratory space at ARC.

Final thoughts

Gregory’s guiding principles form the base of his leadership approach.

“I think it’s important to recognize that each person has unique and wonderful gifts and strengths and that we can all build upon those strengths and work together to do great things. It’s just important to recognize that everybody has something to contribute. Everybody has incredible worth and significance as a person and we’re doing our best, we’re at our best when we pull together.”

Gregory joined the university after serving as a policy fellow at the National Academy of Engineering and completing a postdoctoral fellowship at the U.S. Air Force Academy. He earned his Bachelor of Aerospace Engineering from Georgia Tech, and received master’s and doctorate degrees in aeronautics and astronautics from Purdue University. He is a licensed private pilot with instrument rating and holds a UAS 107 license.

by Holly Henly, Ohio State University Airport
Professor Bharat Bhushan announces retirement

Since 1991, professor Bharat Bhushan has been an Ohio Eminent Scholar and the Howard D. Winhager Professor in the department of mechanical and aerospace engineering. His research interests include fundamental studies with a focus on scanning probe techniques in the interdisciplinary areas of bio/nanotribology, bio/nanomechanics and bio/nanomaterials characterization and applications to bio/nanotechnology and biomimetics.

During his time at Ohio State, Bhushan has been prolific in his publishing. He has published 10 scientific books, over 100 book chapters, and over 900 scientific papers. He has edited over 50 books and holds more than 25 U.S. and foreign patents. Professor Bhushan has become an internationally recognized researcher and is one of the top 1500 highly cited researchers in the world.

Prof. Bhushan has been recognized with numerous awards, most recently the ASME May Hershey Award, presented for lifetime contributions to the field of tribology. In addition to his technical work, professor Bhushan advised 28 PhD students and 43 masters students.

Professor Cheena Srinivasan announces retirement

Cheena Srinivasan has been a part of the Ohio State community for 40 years. For 12 years (2000–2012) he served as the Chair of the department of mechanical and aerospace engineering.

Professor Srinivasan’s key contributions to the department include leading capital campaign efforts that led to the building of Scott Laboratory. He oversaw the merger of mechanical and nuclear engineering with aerospace engineering in 2010. And he was able to establish and sustain extensive relationships with department alumni networks. Srinivasan also served as Associate Dean for Research in the College of Engineering (1998-2000), and as Program Director for the Manufacturing Research and Equipment Program at the National Science Foundation (1992-1994). He also helped advance MAE alumni relations as Faculty Director for Alumni Relations (2016-2018).

Many students and faculty in the department of mechanical and aerospace engineering have benefited from professor Srinivasan’s knowledge and experience. He will continue to engage in academic activities including teaching and researching as an Emeritus Faculty.

Renee Zhao receives 2 NSF awards in Spring 2020

Renee Zhao, an assistant professor of Mechanical and Aerospace Engineering, has received two awards from the National Science Foundation (NSF) in Spring 2020.

Earlier this year, Zhao received a five-year, $562,511 NSF Faculty Early Career Development (CAREER) Award for her research in the mechanics of soft intelligent materials. More recently, NSF announced she will be awarded $398,773 over three years for the project “Micromechanics of Interactions Between Hard Magnetic Particles and Soft Matrix on Magneto-Mechanical Actuation.”

The two grants will facilitate the investigation of the mechanical behavior of the magnetic soft materials,” Zhao said. “These materials are composed with hard-magnetic particles embedded in soft matrices. Upon the application of an external magnetic field, the composite could provide untethered, fast and reversible deformation with large shape changes. The magnetic soft materials have already demonstrated potentials in designing morphing structures and actuators for various engineering applications.

Visit go.osu.edu/ReneeZhao for more information.

Canova and Serrani Recognized with Lumley Interdisciplinary Research Award

Marcello Canova, associate professor in the Department of Mechanical and Aerospace Engineering, and Andrea Serrani, professor in the Department of Electrical and Computer Engineering were awarded the College of Engineering’s Lumley Interdisciplinary Research Award.

This award is presented annually to faculty and/ or research scientists within the College of Engineering who have demonstrated significant research collaboration that cuts across departmental or discipline boundaries.

“[This team] is well recognized nationally and internationally, and has made a significant contribution to the advancement of feedback control technology and its applications to advanced powertrain systems,” said Hesham El Gamal, professor and chair of the Department of Electrical and Computer Engineering.

Because of the interdisciplinary nature of their work and its balance between methodological depth and industrial relevance, Canova and Serrani have received significant research funding from the National Science Foundation (NSF) as well as Ford Motor Company.

Ryan Harne awarded the ASME Gary Anderson Early Achievement Award

Ohio State mechanical engineering professor Ryan Harne was awarded the ASME (American Society of Mechanical Engineers) Gary Anderson Early Achievement Award for his contributions to the field of Adaptive Structures and Materials.

More recently, the outcomes of Dr. Harne’s research efforts have led to one patent, multiple patents pending, one book, over 50 journal publications, over 50 conference proceedings, and numerous students mentored and guided through their academic programs.

Professor named International Society for Optics and Photonics fellow

Marcelo Dapino, professor of mechanical and aerospace engineering, was named a fellow of the International Society for Optics and Photonics (SPIE). Dapino was selected for outstanding technical contributions in the field of smart materials and structures and for extensive service over the past 20 years to the SPIE Smart Structures and Nondestructive Evaluation conference.

Prof. Dapino is widely recognized in the field of smart materials for the development of transitional
research programs that approach foundational research with an industrial focus. Along with his students and collaborators, Dapino has authored 250 technical articles and book chapters while serving as primary advisor on over 50 dissertations and theses.

**Professor Bharat Bhushan** receives ASME Mayo D. Hersey Award for lifetime achievement in Tribology Award

Professor Bharat Bhushan, Ohio Eminent Scholar and Howard D. Winbigler Professor and Director of Nanoprobe Lab for Bio- & Nanotechnology and Biomimetics has received the 2020 Mayo D. Hersey Award from the American Society of Mechanical Engineers (ASME).

The ASME Mayo D. Hersey Award was established in 1965. It is given in recognition of distinguished and continued contribution over a substantial period of time to the advancement of lubrication science and engineering, according to ASME. The award is regarded as the highest honor in the field given by ASME.

For more than four decades Dr. Bhushan has made outstanding contributions to the advancement of tribology as a prolific author and internationally recognized expert at the micro-to-nano scales. He has authored 10 scientific books, over 100 handbook chapters, and over 900 scientific papers. He also edited more than 50 books and holds more than 25 U.S. and Foreign Patents. He is a Highly Cited Researcher in materials science, biology, biochemistry, and cross-field category. His research was listed as one of the Top Ten Science Stories of 2015 and he has received two semi-honorary and three honorary doctorates. Bhushan is also recognized as a pioneer of the tribology of magnetic storage devices, whose influence has extended to the interdisciplinary areas of biological and materials science.

Jim Gregory to become chair of Mechanical and Aerospace Engineering

Professor James W Gregory will become the next chair of the Department of Mechanical and Aerospace Engineering (MAE) at The Ohio State University, effective June 1, 2020. He will succeed Professor Vish Subramaniam, who has served as chair since 2016.

Currently an MAE professor and Director of the Aerospace Research Center (ARC), Gregory came to Ohio State in 2008. Under his leadership, ARC has expanded interdisciplinary collaborations to include colleagues from industrial engineering, electrical engineering, mechanical engineering and medicine. The center’s research output also has grown substantially with a doubling of research expenditures over the past two years. In August 2017, Gregory led a team of researchers and students in setting official world records for speed and distance for an autonomous drone.

Gregory’s innovative teaching methods helped him earn numerous awards throughout his career, including the McCarthy Engineering Teaching Award, the Department of Aerospace Engineering Outstanding Professor Award, and SAE’s Ralph R. Teetor Educational Award. He has produced a video lecture series on the Science of Flight, in collaboration with the Great Courses and the Smithsonian Institution’s Air & Space Museum.

NEW FACULTY APPOINTMENTS

Chris Atkinson

Professor Atkinson joined the department of mechanical and aerospace engineering in June, and is the Director of Smart Mobility Program. Most recently, Atkinson was Director of ARPA-E in Washington, DC where he led a diverse portfolio of energy research funded by the agency.

Learn more about MAE professor Chris Atkinson: go.osu.edu/Atkinson

**Follow Us:**

@OhioStateMAE

@OhioStateMAE

Department of Mechanical and Aerospace Engineering at The Ohio State University
STUDENT RECOGNITION

Ming Yang selected as Ohio State Presidential Fellow

Ohio State mechanical engineering PhD student Ming Yang was selected as one of this year’s recipients of the Ohio State Presidential Fellowship.

Yang is advised by Dr. Soheil Soghrati and is a fourth year doctoral candidate who came to Ohio State from China.

The fellowship is given to students who “embody the highest standards of scholarship” in the graduate programs at the university going into the last stages of their dissertation research or terminal degree project. Recipients are given a monthly stipend for living expenses so they can focus solely on completing their research, as well as help with travel expenses to present at national conferences.

Yang’s research focuses on creating an efficient numerical framework, including microstructure reconstruction, mesh generation, finite element simulation, and deep learning algorithms, for the computational modeling of novel materials with complex microstructures. It will significantly reduce the time and labor cost associated with the modeling process.

Read more: go.osu.edu/MingYang

MAE PhD student selected to receive SMART fellowship

PhD student, Jordan Thayer has been awarded a SMART Fellowship by the United States Department of Defense (DOD). Thayer is advised by MAE professor Jack McNamara, and works in the Multiscale Interactions Research Group (MIRG) directed by McNamara.

The Science, Mathematics And Research for Transformation (SMART) Scholarship for Service Program is an opportunity for students pursuing an undergraduate or graduate degree in Science, Technology, Engineering, and Mathematics (STEM) disciplines to receive a full scholarship and be gainfully employed upon degree completion. This award provides full tuition, health insurance, living expenses, and employment at a DOD facility after graduation. Selection for an award is based on an essay, letters of reference, and educational/ work background information.

Thayer’s fellowship was awarded by The Air Force Research Laboratory Aerospace Systems Directorate (AFRL), at Arnold Air Force Base. His research will focus on fluid-structure interactions in high-speed, unsteady flow environments.

MAE PhD student selected to receive a NDSEG Fellowship Award

Ohio State mechanical engineering PhD student Rob Clark has been selected to receive a 2020 National Defense Science and Engineering Graduate (NDSEG) Fellowship Award.

Clark’s research was advised by Dr. Jeffrey Bons and focused on deposition of particulates in high temperature environments, notably gas turbine engines.

“The focus of the work is topology optimization of Coupled Mechanical and Electromagnetic Designs.”

“The project will focus on an essay, letters of reference, and educational/ work background information. Thayer’s fellowship was awarded by The Air Force Research Laboratory Aerospace Systems Directorate (AFRL), at Arnold Air Force Base. His research will focus on fluid-structure interactions in high-speed, unsteady flow environments.”

Graduate student and assistant professor receive fellowship from AFRL/DAGSI

The team of mechanical engineering graduate student Mohamad Al Nashar and assistant professor Alok Sutradhar have received a fellowship award to support their research in materials and manufacturing.

The fellowship comes from the Air Force Research Laboratory Dayton Area Graduate Studies Institute (AFRL/DA/OSGI). Sutradhar and Al Nashar’s fellowship title is “Topology Optimization of Coupled Mechanical and Electromagnetic Designs.”

“This project will focus on an essay, letters of reference, and educational/ work background information. Thayer’s fellowship was awarded by The Air Force Research Laboratory Aerospace Systems Directorate (AFRL), at Arnold Air Force Base. His research will focus on fluid-structure interactions in high-speed, unsteady flow environments.”

Ohio State student wins first prize at international student conference

Collin O’Neill, an Ohio Space Grant Consortium Fellow and a graduate student pursuing a master’s in aerospace engineering, won the first prize in the international student conference in the undergraduate category on Jan. 6 at the American Institute of Aeronautics and Astronautics (AIAA) SciTech Forum in Orlando, Florida.

O’Neill competed against six other regional-winning contestants from around the world with his research, presentation and paper. The competition was based on several categories like quality of the presentation and paper, impact on industry and how novel the work is.

The research focused on active flow control for offset diffusers for aircraft engines and how to reduce the required airflow for aircraft engines and are typically straight, but O’Neill’s research focused on using plasma actuators to solve the problems with flow that arise when aircraft uses a diffuser that is offset.

Ohio State engineering student wins National Design Competition first prize

Collin O’Neill, an Ohio Space Grant Consortium Fellow and a graduate student pursuing a master’s in aerospace engineering, won the first prize in the international student conference in the undergraduate category on Jan. 6 at the American Institute of Aeronautics and Astronautics (AIAA) SciTech Forum in Orlando, Florida.

O’Neill competed against six other regional-winning contestants from around the world with his research, presentation and paper. The competition was based on several categories like quality of the presentation and paper, impact on industry and how novel the work is.

The research focused on active flow control for offset diffusers for aircraft engines and how to reduce the required airflow for aircraft engines and are typically straight, but O’Neill’s research focused on using plasma actuators to solve the problems with flow that arise when aircraft uses a diffuser that is offset.

Wen Cai receives Ohio State Presidential Fellowship

Ohio State mechanical engineering PhD student Wen Cai was selected as one of this year’s recipients of the Ohio State Presidential Fellowship.

The fellowship is given to students who “embody the highest standards of scholarship” in the graduate programs at the university going into the last stages of their dissertation research or terminal degree project. Recipients are given a monthly stipend for living expenses so they can focus solely on completing their research, as well as help with travel expenses to present at national conferences.

Wen’s research focuses on the investigations on nonlinear energy harvesters in complex vibration environments for robust direct current power delivery. With the research she hopes to combine the advancements of mechanical and electrical sub-systems to ensure sustainable direct current power delivery in complex vibration environments. Her advisor was Ohio State mechanical engineering professor Ryan Harne.

Ohio State student wins first prize at international student conference

Collin O’Neill, an Ohio Space Grant Consortium Fellow and a graduate student pursuing a master’s in aerospace engineering, won the first prize in the international student conference in the undergraduate category on Jan. 6 at the American Institute of Aeronautics and Astronautics (AIAA) SciTech Forum in Orlando, Florida.

O’Neill competed against six other regional-winning contestants from around the world with his research, presentation and paper. The competition was based on several categories like quality of the presentation and paper, impact on industry and how novel the work is.

The research focused on active flow control for offset diffusers for aircraft engines and how to reduce the required airflow for aircraft engines and are typically straight, but O’Neill’s research focused on using plasma actuators to solve the problems with flow that arise when aircraft uses a diffuser that is offset.

Ohio State student wins first prize at international student conference

Collin O’Neill, an Ohio Space Grant Consortium Fellow and a graduate student pursuing a master’s in aerospace engineering, won the first prize in the international student conference in the undergraduate category on Jan. 6 at the American Institute of Aeronautics and Astronautics (AIAA) SciTech Forum in Orlando, Florida.

O’Neill competed against six other regional-winning contestants from around the world with his research, presentation and paper. The competition was based on several categories like quality of the presentation and paper, impact on industry and how novel the work is.

The research focused on active flow control for offset diffusers for aircraft engines and how to reduce the required airflow for aircraft engines and are typically straight, but O’Neill’s research focused on using plasma actuators to solve the problems with flow that arise when aircraft uses a diffuser that is offset.

Wen Cai receives Ohio State Presidential Fellowship

Ohio State mechanical engineering PhD student Wen Cai was selected as one of this year’s recipients of the Ohio State Presidential Fellowship.

The fellowship is given to students who “embody the highest standards of scholarship” in the graduate programs at the university going into the last stages of their dissertation research or terminal degree project. Recipients are given a monthly stipend for living expenses so they can focus solely on completing their research, as well as help with travel expenses to present at national conferences.

Wen’s research focuses on the investigations on nonlinear energy harvesters in complex vibration environments for robust direct current power delivery. With the research she hopes to combine the advancements of mechanical and electrical sub-systems to ensure sustainable direct current power delivery in complex vibration environments. Her advisor was Ohio State mechanical engineering professor Ryan Harne.

Ohio State student wins first prize at international student conference

Collin O’Neill, an Ohio Space Grant Consortium Fellow and a graduate student pursuing a master’s in aerospace engineering, won the first prize in the international student conference in the undergraduate category on Jan. 6 at the American Institute of Aeronautics and Astronautics (AIAA) SciTech Forum in Orlando, Florida.

O’Neill competed against six other regional-winning contestants from around the world with his research, presentation and paper. The competition was based on several categories like quality of the presentation and paper, impact on industry and how novel the work is.

The research focused on active flow control for offset diffusers for aircraft engines and how to reduce the required airflow for aircraft engines and are typically straight, but O’Neill’s research focused on using plasma actuators to solve the problems with flow that arise when aircraft uses a diffuser that is offset.
Researchers from the Laboratory for Autonomy in Data-Driven and Complex Systems won an award for their research on predicting wildfire spreading with drones. They tested their research at this controlled burn in Marion, OH. Learn more on page 7