learn more
For more information about our graduate programs,
please contact:
Mechanical & Aerospace Engineering
maegradadmissions@osu.edu
614-292-7163
Nuclear Engineering
nuclear@osu.edu
614-292-8519

Mechanical Engineering
Nuclear Engineering
Aerospace Engineering

GRADUATE STUDIES

The Ohio State University

Department of Mechanical & Aerospace Engineering
201 W. 19th Avenue
Columbus, Ohio  43210
Phone  614.292.2289
mae.osu.edu
facebook.com/OhioStateMAE
youtube.com/OhioStateMAE

The Ohio State University
Beyond the qualifications associated with acceptance into a graduate studies program, we recognize that you are vitally interested in the student experience that awaits you – the breadth of research areas, the scholarly faculty, the quality of training and mentoring, and the exceptional resources available during your pursuit of a graduate degree. At Ohio State, it is our intent that this time of transition toward the launch of your professional career will significantly boost your intellectual growth, technical depth, and preparation for tomorrow’s technology.

Our graduate degree programs in Mechanical Engineering, Nuclear Engineering, and Aeronautical and Astronautical Engineering are designed to help you recognize where opportunity abounds. As technology evolves, traditional academic boundaries cross and our graduate students become engaged in learning experiences that help them acquire knowledge through direct connections to individuals in emerging areas of their own field of engineering, in interdisciplinary endeavors involving challenges at the intersection of established disciplines, and in research and technology organizations with highly skilled workforces.

Over the course of the past 25 years, our department’s engineering programs have collectively conferred about 2,500 graduate degrees to highly motivated students who chose to pursue their graduate education at Ohio State, and who have gone on to excel in industry, academia, and government. We invite you to apply to our prestigious MS and PhD programs and look forward to an exciting phase of your young life when you will continue to learn, discover, and strengthen your formation.

Ahmet Selamet
Chair, Department of Mechanical and Aerospace Engineering

As I began the graduate school search, I was looking for a biomechanics program that offered a wide variety of courses, provided great research opportunities, and had dedicated, encouraging professors. Ohio State’s mechanical engineering graduate program met all of these requirements and more!

I’ve not only learned a lot about biomechanics, but also how to ask good research questions, devise different ways to solve problems, and present results through oral presentations and papers in an effective and compelling manner. I currently work in the Neuromuscular Biomechanics Laboratory. The ultimate goal of my research is to understand muscle function in patients with osteoarthritis before and after total knee replacement to improve surgical outcomes. I’ve had the opportunity to collaborate with physical therapists, surgeons, and other biomechanists to gain a better understanding of the human body. Even if your passion is not biomechanics, Ohio State’s mechanical engineering graduate program offers classes and conducts exceptional research in a wide variety of specialties that are sure to expand your knowledge and experience in your field.

Elena Caruthers
Mechanical Engineering Graduate Studies

fast facts

about the Department of Mechanical and Aerospace Engineering

Average annual department enrollment: 350-370 Graduate Students
- 180-190 Masters students
- 170-180 Doctoral candidates

All of our graduate programs are ranked in the top 25 programs in their disciplines in the U.S.

The department is housed in the Peter L. and Clara M. Scott Laboratory, a $72.5 million building complex with high-tech research laboratories.

Internationally known research centers associated with our graduate programs include the Aeronatical and Astronautical Research Laboratories, the Center for Automotive Research, the Gear and Power Transmission Lab, the Smart Vehicle Concepts Center, the Nonequilibrium Thermodynamics Laboratory, the Nuclear Reactor Laboratory, and the Institute for Materials Research.

Ohio State is...

- a research powerhouse. Ohio State ranks second among all U.S. universities in industry-sponsored research with $117 million (National Science Foundation).
- among the top 12 destinations for corporations recruiting new employees.
- the only college in Ohio to make Princeton Review’s 100 Best Value Colleges.
- among the nation’s top 20 universities both for international student enrollment and the number of students who study abroad.
The Department of Mechanical and Aerospace Engineering is comprised of more than 60 faculty members whose excellence in teaching and research has been recognized by national and international organizations. Faculty members in the department hold more than 50 fellow-grade memberships in several engineering organizations and professional societies.

Department faculty members not only engage in their own award-winning research, they also support graduate students’ research efforts by serving as advisors and mentors. We also focus on multidisciplinary, collaborative research with faculty in other departments in the College of Engineering, the College of Arts and Sciences, and the College of Medicine.

In addition, the excellent record of publications and patents by faculty and students illustrates the broad scope of the program and wide range of faculty expertise. Always interested in new challenges, several assistant professors have been selected to attend the National Academy of Engineering’s Frontiers of Engineering Education symposium or have received grants from the National Science Foundation, agencies of the Department of Defense, and the National Institutes of Health.

Areas of Research

Department instructional and research activities are focused around four sub-disciplines that are common to all three disciplines within the department: Applied Mechanics, Dynamic Systems, Sensing and Controls; Design & Manufacturing; and Energy, Fluid and Thermal systems.

Research application areas are listed below, along with specific ongoing research projects:

**Advanced Aerospace Systems**
- computational approaches to high-speed flow phenomena; aerodynamic flow control, aeroacoustics; compressible turbulence; gas turbine engine aeromechanics and heat transfer; CFD for turbomachinery; plasma-assisted combustion; molecular gas lasers; high pressure plasmas; computational aerelasticity; laser-based flow diagnostics; gearbox technology for gas turbine engines

**Advanced Automotive Systems**
- advanced powertrains; hybrid electric vehicles; battery materials and storage research; engine acoustics and emissions; diesel engine modeling and control; automotive noise, vibration and harshness; gear and power transmission systems

**Bioengineering**
- injury and soft tissue biomechanics, musculoskeletal mechanics, design of medical devices and procedures, sport biomechanics, cell and tissue mechanics, legged locomotion; microfluidics, precision instrumentation for biological research

**Energy and Environmental Quality**
- turbulent combustion and laser diagnostics, materials for thermoelectric applications; microsystems for water desalination; microcombustors; modeling of fuel cells, catalytic converters, and gas-phase combustion

**Materials and Manufacturing**
- material characterization at high strain rates; modeling and characterization of smart materials (e.g. shape memory alloys, magnetostriictive materials) and their uses for actuation and sensing; ultrasonic additive manufacturing; precision forming; solid oxide fuel cell materials and manufacturing

**Micro and Nanotechnology**
- nanotribology and nanomechanics; biomimetics; micro/nano fluids; micro/nano systems for water desalination and chemical/biological separations; precision biomedical instrumentation; nanoscale thermal transport

**Nuclear Science and Engineering**
- probabilistic risk assessment; severe accident analysis; experimental and computational reactor physics; experimental and computational reactor heat transfer and thermal-hydraulics; experimental and computational studies of radiation effects; human factors, human and software reliability

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Master of Science Programs

While a variety of factors influence your decision to enter graduate school, we understand that the availability of both thesis and non-thesis MS tracks allows many students to better navigate the requirements of graduate study.

Master's Thesis and Non-Thesis Options

For the thesis option, students will complete a required set of coursework in addition to their research. The non-thesis option is primarily coursework, although a research project must be completed prior to the conclusion of the program. The option selected should be reported to the department's Graduate Advising Office by the end of the first semester of enrollment in the graduate program via the Notice of Graduate Advisor form.

Master's Program Requirements | Semester Schedule

**Thesis Option**

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<thead>
<tr>
<th></th>
<th>Mechanical Engineering</th>
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<tr>
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<tr>
<td>5000-Level and above Courses*</td>
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<tr>
<td>8999 Research</td>
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<td>Individual study</td>
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**Non-Thesis Option**

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<tbody>
<tr>
<td>Graduate Level Math</td>
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</tr>
<tr>
<td>5000-Level and above Courses*</td>
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<tr>
<td>Total Hours</td>
<td>30</td>
<td>30</td>
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</tbody>
</table>

Each degree program includes a mandatory attendance requirement for seminars.

Note: All program requirements are subject to change.

*The 5000-level and above course requirement for each program stipulates a minimum number of hours for graduate level courses. Exact hours required for each level will be provided upon enrollment.

Earning a PhD

We recognize that those students who, on average, carve out four to five years of their lives to earn a PhD are motivated by the opportunity for in-depth, original research and are encouraged by the prospect that their work has the potential for real social, economic, and environmental impact in the long term. Our Nuclear, Aerospace, and Mechanical Engineering Programs are designed to keep innovation, ideas, and technology at the forefront of the doctoral candidate’s day-to-day experience. Whether your path to PhD begins immediately after earning your Bachelor of Science or your Master of Science degree, or after a few years of on-the-job engineering experience, the time you will spend to study, write, research, publish, and perhaps teach will be guided by a responsive graduate advisory committee whose mission is to advance the course of your scholarly achievements and accomplishments.

PhD Program Requirements | Semester Schedule

**BS to PhD**

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<tbody>
<tr>
<td>Graduate Level Math</td>
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<tr>
<td>6000-Level and above Courses*</td>
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**MS to PhD**

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<tbody>
<tr>
<td>Graduate Level Math</td>
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<td>9</td>
</tr>
<tr>
<td>6000-Level and above Courses*</td>
<td>15</td>
<td>15</td>
<td>12**</td>
</tr>
<tr>
<td>8999 Research</td>
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<tr>
<td>Total Hours</td>
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<td>50</td>
<td>50</td>
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</table>

Each degree program includes a mandatory attendance requirement for seminars.

Note: All program requirements are subject to change.

*The 6000-level and above course requirement for each program stipulates a minimum number of hours for graduate level courses. Exact hours required for each level will be provided upon enrollment.

**Some core courses required for the NE master’s degree are at the 5000 level. These same courses are a required component of the NE PhD program in which the student bypasses the MS degree.

“Coming from a small liberal arts college, I wanted a program where I could work one-on-one with faculty, but still have access to the resources of a major university. The nuclear engineering graduate program at Ohio State was the perfect combination of a tight-knit, collaborative body within a much larger, well-supported organization. With access to the OSU research reactor, as well as colleagues and alumni at national labs, the research topics available to nuclear engineering graduate students are endless.

The ability to learn something every day is what I like best about working in nuclear engineering. The accumulation of laboratory experience is the most useful aspect of this program. While learning theory in the classroom is important, gaining hands-on lab experience from conducting experiments is invaluable. I am currently working on developing a solid-state neutron detector using the wide bandgap semiconductor gallium nitride, coated with gadolinium. Our goal is to create a detector with high neutron detection efficiency, capable of operating in high temperature, high radiation environments.”

Padhraic Mulligan
Nuclear Engineering Graduate Studies
student life & MEGA

The mechanical, aerospace, and nuclear engineering graduate student experience is enriched by participation in MEGA, the graduate students’ association. MEGA members plan and/or participate in a wide variety of social, professional development, and outreach activities, including potluck meals, coffee hours, fall tailgates, trivia nights, movie nights, happy hours, canned food and toy drives, seminars, and panel discussions. They also work closely with the departmental faculty, staff, and administration to provide a voice for the graduate student population. Opinions of graduate students are routinely sought in matters ranging from planning for curriculum enhancements to selecting seminar speakers.

Members of MEGA help organize an annual Research Day for current graduate students to present their research to their peers within the Department of Mechanical and Aerospace Engineering. It is a great opportunity to see the wide-ranging research being conducted in the department as well as a great chance to interact with other students.

A common destination for the department’s graduate students is the Graduate Student Lounge, located on the fifth floor of Scott Lab. Students frequently meet in the lounge to discuss various topics or to break away from their research for a short while. Kitchen conveniences are part of the lounge area, as are some great reference materials for those who want to browse some historical text while grabbing a quick cup of coffee or preparing snacks and meals. The facility is so popular that some of our graduate students created a Grad Student Lounge Facebook page to capture and communicate some of the fun moments that occur there!

facilities & libraries

Outstanding and well-designed modern facilities abound on campus, including Scott Lab (the sophisticated educational and research complex that’s home to mechanical, aerospace and nuclear engineering), the Physics Research Building, Knowlton School of Architecture, the nation’s largest collegiate Recreation and Physical Activity Center, and a spectacular new student union. In addition, the Association of Research Libraries ranked Ohio State’s extensive library collections 12th out of 122 research libraries in North America. Located directly across the street from Scott Lab is the 18th Avenue Library which houses an extensive science and engineering collection. Located very near the department’s graduate student population. Opinions of graduate students are routinely sought in matters ranging from planning for curriculum enhancements to selecting seminar speakers.

I was applying to graduate school while deployed to Iraq with the U.S. Army, so I didn’t really have the opportunity to visit any potential graduate programs. My wife completed her undergraduate degree at Ohio State and really enjoyed the overall experience in Columbus. I began looking into the mechanical engineering program and was impressed with the amount of research and opportunities available.

I think the most important and meaningful aspect of any graduate program is executing novel research. Applying the scientific method and embracing the challenge of doing things that have never been done before is a great learning experience. Research requires a lot of critical thinking, trial and error and determination. These are valuable skills regardless of whether your career ends up in industry, academic research or as an entrepreneur.

If you enjoy learning and thinking critically, I would seriously consider graduate school as a step towards an interesting career.

graduate student housing, transportation & commuting

Housing is available for single graduate and professional school students in two campus residence halls. Family housing is also available in the Buckeye Village community. Application forms are available online through University Residences and Dining Services. Due to its central location in the city of Columbus, many graduate students choose to live off-campus in neighborhoods located near Ohio State. Assistance with off-campus housing and commuting to and from campus can be found through the off-campus student center office. Students may also apply for campus parking permits through Ohio State’s Transportation & Parking Services web site.

columbus, ohio

The capital of Ohio and home to Ohio State, Columbus has a history of fostering innovation and entrepreneurship. In fact, Forbes recently named it the no. 1 up-and-coming tech city and The Daily Beast placed Columbus in its top 20 “smartest cities” list. It’s also considered a very affordable place to live; and Forbes named it one of the Best shopping cities in the U.S. ranking 4th. Columbus is a major metropolitan area with 1.8 million people in the region and is home to several national corporations, a vibrant arts community, professional sports franchises, distinctive neighborhoods with diverse housing options, and access to many recreational and cultural opportunities.

diverse community

There is no such thing as a typical Ohio State graduate student. More than 10,000 graduate students enroll at Ohio State each year from a wide variety of ethnic, racial, and cultural backgrounds, including approximately 2,500 students from more than 100 countries around the world.
competitive funding

Ohio State graduate fellowships and teaching and research associateships are the primary sources of financial assistance provided to graduate students. Fellowship appointments provide a monthly stipend and tuition and other benefits, including health care. Fellowships do not include a service requirement. Graduate research associates (GRAs) and graduate teaching associates (GTAs) are provided a monthly stipend, tuition, and other benefits, including health care, and have a service requirement related to teaching, research, or administrative responsibilities. Approximately 65 percent of Ohio State graduate students are awarded graduate fellowships or associateships. The majority of other graduate students are funded through research grants or through their employer’s continuing education programs. In recent years, total sponsored research expenditures for the Department of Mechanical and Aerospace Engineering have reached nearly $22 million annually.

Benefits for Funded Graduate Students

In addition to receiving a stipend and paid tuition, Ohio State graduate students with fellowships or graduate associateships are eligible for many associated benefits, including:
- Health insurance
- Health insurance subsidy for partners, spouses, and dependents
- Childcare
- Short-term absences and extended leaves of absence for personal and/or family illness, bereavement, childbirth, and adoption

Admission Criteria

Criteria for admission to Ohio State vary by individual graduate program. For detailed requirements and links to all of Ohio State’s graduate programs, visit gradadmissions.osu.edu.

Applying to Ohio State

Graduate applicants may apply online at gradadmissions.osu.edu. Eligible applicants are able to apply without paying the application fee through the CIC Free App program. (The CIC is the Committee on Institutional Cooperation, a consortium of the Big 10 universities and the University of Chicago.) CIC Free App eligibility criteria and online application can be found at www.cic.net/Home/Students/FreeApp. In addition, McNair Scholars and Summer Research Opportunities Scholars (SROP) are eligible for application fee waivers. Applicants who note their participation in those programs on their Ohio State application will be prompted to request a fee waiver.

All applicants are encouraged to complete the application process online at the Ohio State Graduate School web site.

Complete details about the Graduate School application process can be found at gradadmissions.osu.edu

Required Application Materials

- Application
- Statement of Intent
- Resume
- All official undergraduate transcripts
- All official graduate transcripts, if applicable
- Three letters of recommendation
- Official GRE scores
- Official English speaking score (TOEFL, IELTS, MELAB), if applicable
- Research area of interest form

Deadlines

The deadline for all students who wish to be eligible for funding consideration is November 30.

The general admission deadlines are the following for all students:
- Autumn Semester - March 1
- Spring Semester - October 1

Note: Students admitted by the general admission deadlines are typically not funded at the time of admission, but may be considered for GRA and GTA positions.

Please submit only the required application materials listed above. Extra materials will not be provided to or reviewed by the admissions office. Only the required application materials are used when making a decision on an application.

All application materials should be uploaded at the time you apply. Materials not uploaded can be submitted to: maegradadmissions@osu.edu.