Barrett Honors

Program information

College: The Polytechnic School
Academic Unit: Engineering (EGR)
Campus: Polytechnic

About

In addition to the requirements specified by the Barrett Honors College, the Engineering and Manufacturing Engineering programs at The Polytechnic School in the Ira A. Fulton Schools of Engineering offer honors students several opportunities for honors credit and thesis research. The engineering program in the Polytechnic School is where project-based courses are the norm and innovation and an entrepreneurial focus is crucial to success. Our diverse faculty at poly study topics ranging from Systems Engineering, Automotive Systems, Mechanical Systems, Electrical Systems, Engineering Education, Global Design, Manufacturing, and Robotics, to name a few.

Lead FHA
Daniel Aukes
480-727-5851
dañukes@asu.edu
http://idealab.asu.edu

Honors Academic Coordinator
Brady Hamilton
Academic Center
480-727-5539
Brady.Hamilton@asu.edu
http://barrettpoly.asu.edu
Barrett Honors

What qualifies?

Most courses in EGR are offered for honors credit through the honors enrichment contract. Students wishing to receive honors credit should confer with the course instructor at the beginning of the semester in order to develop a mutually acceptable plan for the honors contract activity. Most honors contracts involve either a project that extends the ideas and techniques covered in the course or outside research on topics relevant to the course work. Students have the responsibility to apply for the honors contract through the Barrett Honors College. The Honors College contacts the instructor to approve the contract only after the student has initiated the process. Some courses have honors sections. Honors credit should be conducted in conjunction with an active faculty member, and the faculty member should be qualified to evaluate your performance in your selected project.

Examples:

• Lab-based research, literature reviews, or survey papers related to topics in your course, or well-aligned with your instructor’s research interests.
• Design, development, and implementation of an independent project, especially those resulting in a scholarly work.
• Human studies or social research conducted under the appropriate guidance of the appropriate faculty members.

Academic Preparation

Depending on the topic, students may be expected to have completed upper-level courses in the topic as guided by their Thesis Director. This is often an organic process, as good thesis topics typically arise from these classes. For example, after taking an honors EGR494 class, or a junior-level design project course, a student may wish to expand on their in-class project by studying their design more in-depth.

Recommended Timeline

Typically students reach out to professors in the Spring before graduation and submit their prospectus over the summer.


Other Honors Opportunities

Honors contracts are created on a case-by-case basis; you should reach out to a faculty member you are interested in working with more to develop a plan for your contract. Some successful examples include:
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- Creating a new assignment that can be used by younger students when learning a difficult concept
- Developing and sharing a new tutorial that can help others to learn a new skill in class or in the lab.
- Creating an app or script that helps research or teaching go faster, better, or easier.
- Shadowing a graduate student and learning a new research, computer, design, or prototyping skill.
- Helping out in a public-facing outreach event to teach a skill to others.

Recent Honors Theses Topics:
- A Supernumerary Wearable Soft Robotic Arm for Task Execution Assistance
- Parent Roles in Young Making: Informing Implications for Making in Museums
- Phantom Forces Haunting Free Body Diagrams: Misconceptions in Statics & Dynamics
- Jaipur Prosthetic Foot Fatigue Machine
- Leadership Characteristics within the Making Community
- Measuring Air Quality Using Wireless Self-Powered Devices

Faculty & Research Interests

Students looking for engineering and manufacturing engineering program faculty members to supervise their honors theses can review the following list.

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Topics</th>
</tr>
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<tbody>
<tr>
<td>Dan Aukes</td>
<td>Robotics, Design, Manufacturing and Simulation, Origami-inspired folding devices, Compliant systems, and Dynamics</td>
</tr>
<tr>
<td>Bruno Azeredo</td>
<td>Advanced Manufacturing</td>
</tr>
<tr>
<td>Jennifer Bekki</td>
<td>modeling/analysis of manufacturing systems, discrete event simulation, engineering student persistence, educational data mining/learner analytics, online learners</td>
</tr>
<tr>
<td>Dhruv Bhate</td>
<td>additive manufacturing, lattice materials, predictive modeling, biomimetic design</td>
</tr>
<tr>
<td>Samantha Brunhaver</td>
<td>career decision-making and identity formation of engineering students and engineers, engineering pedagogy (especially in design and mechanics)</td>
</tr>
<tr>
<td>Adam Carberry</td>
<td>impact of student characteristics and pedagogical approaches on student beliefs and learning in engineering education</td>
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<tr>
<td>Yan Chen</td>
<td>design, modeling, control of mechatronic systems; energy optimization, estimation, control of (electric/hybrid) vehicle systems; over-actuated</td>
</tr>
<tr>
<td>Name</td>
<td>Research Areas</td>
</tr>
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<tr>
<td>Brooke Coley</td>
<td>mechanical/electrical systems engineering education, mental health and social justice, virtual reality as a tool for developing empathetic and inclusive mindsets, hidden populations in engineering education, innovation for more inclusive pedagogies</td>
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<tr>
<td>James Contes</td>
<td>reducing aerodynamic and rolling resistance forces, improving fuel economy and vehicle efficiency</td>
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<tr>
<td>Scott Danielson</td>
<td>engineering mechanics, engineering education, manufacturing</td>
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<tr>
<td>Jerry Gintz</td>
<td>programmable automation control systems, distributed control systems, advanced motion control, advanced manufacturing techniques</td>
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<tr>
<td>Laura Hosman</td>
<td>information &amp; communications technology, international development, innovation and entrepreneurship, quality of life, public policy, natural resources / environment, renewable energy/solar energy</td>
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<tr>
<td>Kiril Hristovski</td>
<td>nanomaterial synthesis &amp; environmental applications and implications, development/ engineering/management of environmental systems for developing countries</td>
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<tr>
<td>Nathan Johnson</td>
<td>alternative energy, micro-grids, building energy control, designing for sustainability, techno-economic modeling, global development</td>
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<tr>
<td>Shawn Jordan</td>
<td>context in design, virtual teams, human-centered design, cross-disciplinarity, creativity, innovation, informal engineering education, K-12, STEM/STEAM</td>
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<tr>
<td>AM Kannan</td>
<td>PEMFC, DMFC &amp; AFC fuel cells, SLA &amp; Li-ion batteries, DSSC &amp; CSP, Solar</td>
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<tr>
<td>Darshan Karwat</td>
<td>climate, energy, social justice</td>
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<tr>
<td>Nadia Kellam</td>
<td>engineering education research, narrative research, emotions in student learning, stories, systems thinking, design thinking, arts in engineering, STEAM</td>
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<tr>
<td>Chen-Yuan Kuo</td>
<td>control, system dynamics &amp; computer simulations</td>
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<tr>
<td>Sharon Lewis</td>
<td>simulation, operations research, manufacturing</td>
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<tr>
<td>Abdel Mayyas</td>
<td>advanced automotive power train systems integration and control, hybrid electric vehicle thermal management design, light weight vehicle design</td>
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<td>Pavlos Mikellides</td>
<td>space vehicle propulsion systems</td>
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<tr>
<td>Thad Miller</td>
<td>environmental ethics, science and technology, science policy, socioecology, transdisciplinary research, sustainability education</td>
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<tr>
<td>Darryl</td>
<td>engineering pedagogy, engineering program development, stochastic</td>
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Guidelines for a Successful Honors Theses

The following provides general guidelines. Please check with the Barrett Honors College guidelines for updated information.

- Meet with the Honors Academic Coordinator Brady Hamilton, for your mandatory junior advising to go over the thesis process.
- The student is responsible for formulating the thesis topic, for requesting faculty to serve on the committee, to submit the necessary forms to the Honors College, and to inform the chair of the committee of all Honors College requirements and deadlines.
- Thoroughly review the Thesis/Creative project handbook and reference it throughout your project. Be aware of the deadlines and expectations of the project.
- Brainstorm ideas for your topic. Think of topics that you have a passion for and that may assist you with future goals. The students can start thinking of thesis topics as early as their freshman and sophomore years. The students should definitely have a clear plan of the thesis topics or research by their junior year.
- Investigate the research areas of the faculty in your department or in a related field and Create a list of questions and topic ideas to discuss with a potential thesis director.
- Set up a meeting with a potential thesis director. Refer to the Faculty Honors Advisor in your department, if you need additional assistance.
- Once you have a confirmed thesis director, register for the appropriate thesis course(s) (XXX492 and/or XXX493) through your director’s department.
- Select the second reader in collaboration with your thesis director.

Morrell | decision theory
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Changho Nam | development of nonlinear reduced order aerodynamic/aeroelastic models using a new RMI/ERA
John Rajadas | fluids, thermal sciences
Sangram Redkar | nonlinear dynamics & control, interial navigation & tracking
Bradley Rogers | engineering in developing world, conventional & alternative energy conversion systems, biofuel systems, heat transfer, thermodynamics, fluid mechanics
Kenan Song | materials analysis, materials development, mechanics of composite materials, nanotechnology, thin film materials
Thomas Sugar | wearable robotic systems: prostheses, orthoses, exoskeletons, walking & running gait
Wenlong Zhang | body sensor network and gait analysis, wearable assistive robots, human-robot interactions, networked and multi-agent systems
• Write your prospectus, have it reviewed and signed by your director and second reader.
• Submit your prospectus to the Barrett Advising office by the appropriate deadline.
• Meet regularly with your thesis director and second reader on the progress of your thesis/creative project.
• Schedule your thesis defense.
• Complete and file (if appropriate) the thesis reimbursement application.
• Finalize your manuscript with the guidance of your committee, and prepare for your defense.
• Plan to give your committee members a hard copy of your manuscript at least two weeks prior to the defense.
• Present at your oral defense and have your Signature page correctly formatted and signed by your committee.
• Submit your final unbound manuscript to the Barrett Advising office with correctly formatted Signature page containing original signatures (not photocopied) of all committee members, as well as an electronic copy of your thesis. See Final Copy Submission/Formatting section for campus specific emails.
• Confirm that your thesis/creative project director submitted a grade for the completed project and changed the Z grade if one was submitted in a prior semester (for 492).
• Remember to submit the Barrett Graduation form online through MyASU during your final semester. This form is used to RSVP for