

DESIGNING THE FUTURE

What is Mechanical Engineering Senior Design at Hopkins?

MORE THAN 1,200 STUDENTS have gone through the Department of Mechanical Engineering's capstone program since its founding in 1984. Each year, industry sponsors' cutting-edge projects motivate and excite our students to explore the challenges of design engineering in the real world.

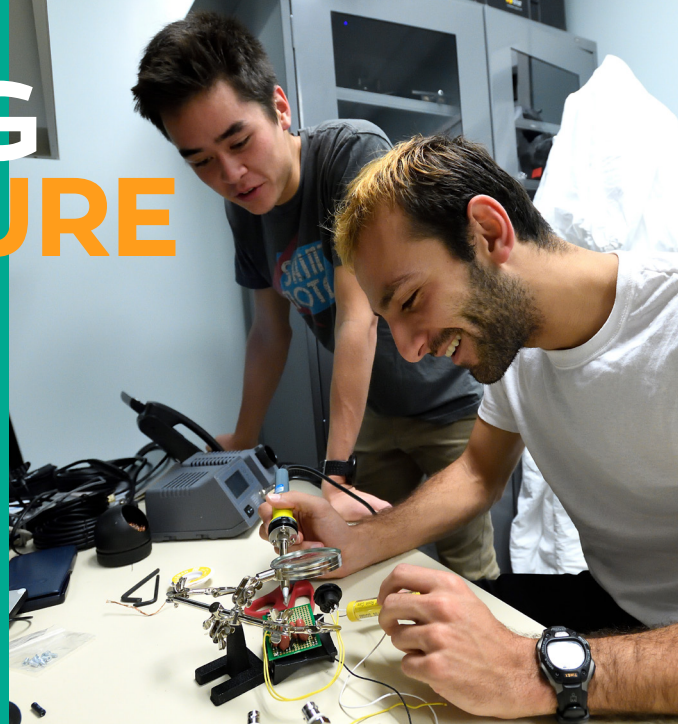
Our sponsors provide student teams with funds for materials, access to world-class resources, and technical contacts; and the students provide sponsors with functioning prototypes that have gone through the design loop several times and have been tested at the clients' facilities.

The Senior Design experience is much like an apprenticeship: students learn to work in teams, meet deadlines, manage project resources, and apply critical thinking to real problems that matter.

Why Sponsor?

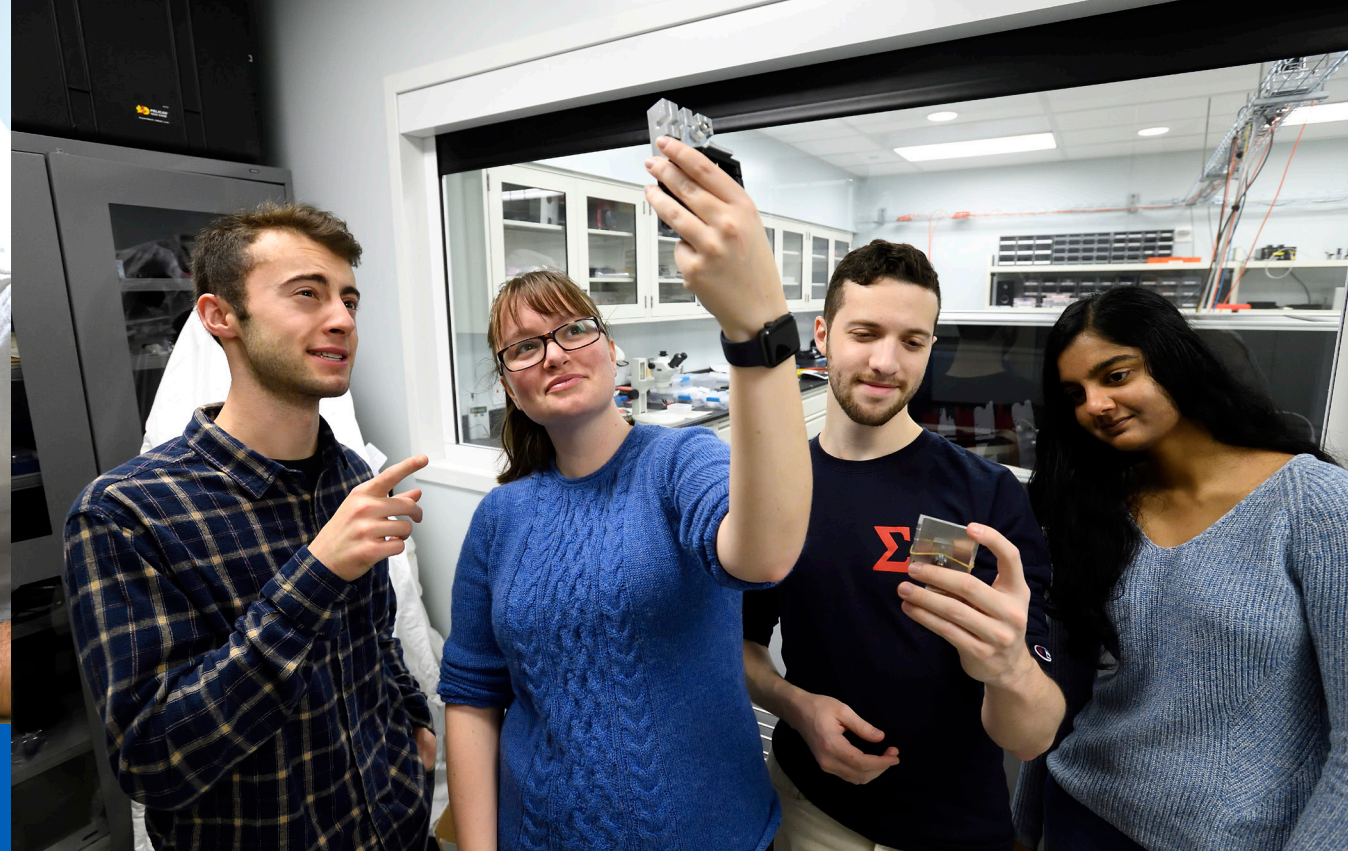
OUR SENIOR DESIGN PROGRAM has a strong history of collaboration with sponsors from a range of disciplines across industry, government, academia, and nonprofit. Sponsors provide an open-ended problem and our students take the project through the design process to deliver their client an inventive, tangible solution. Projects that sponsors may not have the time or resources to pursue become the top priority of a team of Hopkins engineers.

Sponsors are exposed to the fresh perspectives and creative thinking of the very best undergraduate engineers and Hopkins faculty members. They also get access to a pool of talented potential employees. The capstone Senior Design experience allows students to develop skills and apply concepts that are valued by employers. In return, sponsors get the opportunity to connect with the next generation of leaders in innovation and engineering design. It is a win-win for all involved.



“For a small cost, ARL gets the chance have engineering students work on a design challenge that is important to our mission and could provide great payback. As a sponsor, ARL helps young engineers coming out of college be much more productive when starting their careers. One major benefit for ARL is that we have hired some graduates and they were ready to jump right in.”

BRADFORD DAVIS
U.S. ARMY RESEARCH LABORATORY,
ADELPHI, MARYLAND



“Senior Design coursework is focused on theory; going through the process of Senior Design is the most effective way to experience the craft of mechanical engineering from design to production, as well as all the challenges engineers face along the way.”

NICK MORTON, SENIOR DESIGN ALUM '17
SOFTWARE AND MARKETING ENGINEER, COGNEX, NATICK, MASSACHUSETTS

“For my Senior Design team, I was chiefly responsible for FEAs, which I now do for my job. The technical presentation skills I gained in Senior Design, both in reports and in meetings, were invaluable and have definitely helped me excel in my current job where I am expected to communicate results to design teams and document my technical findings in a clear and thorough manner.”

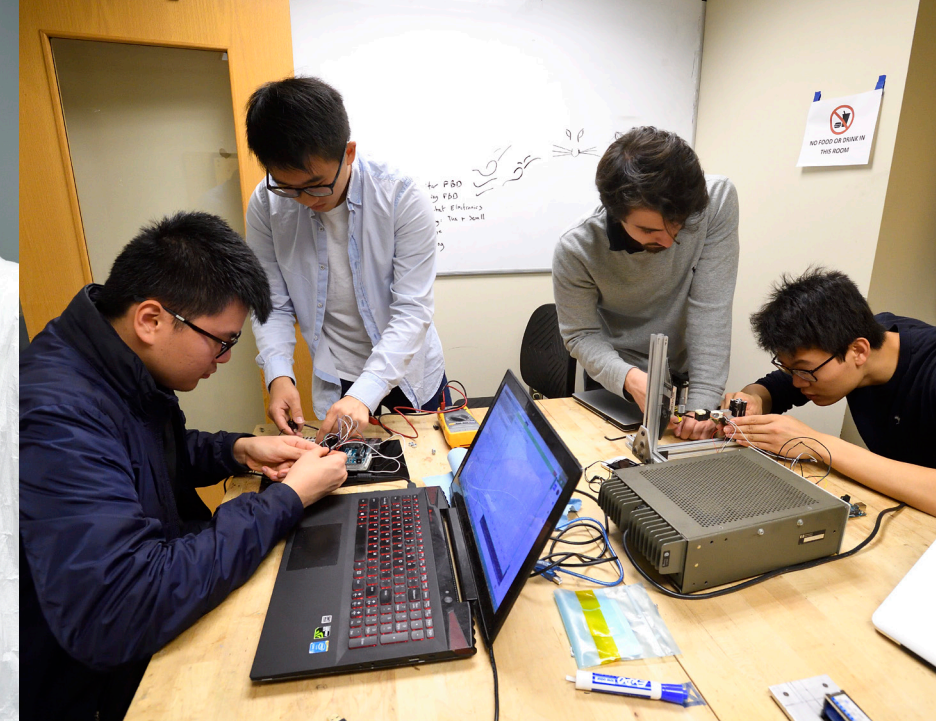
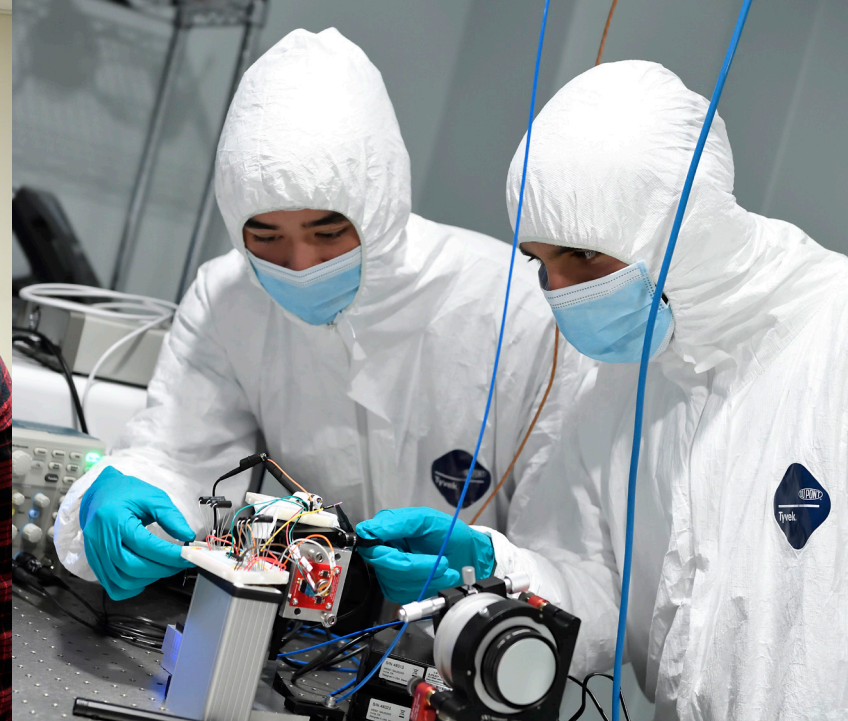
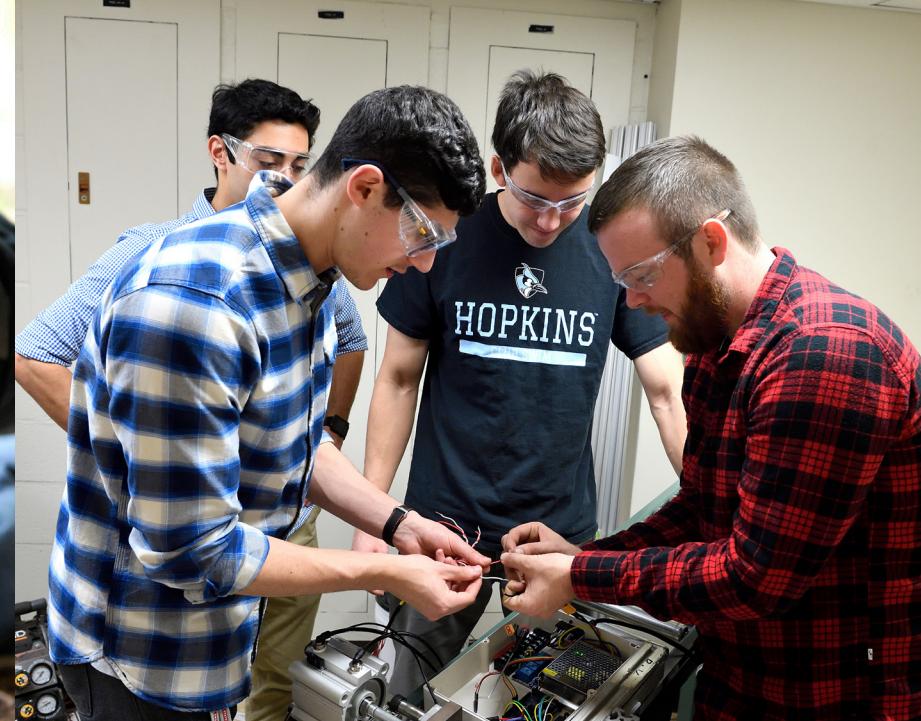
CAITLIN CLANCY, SENIOR DESIGN ALUM '17
MECHANICAL STRUCTURAL ANALYST, RAYTHEON, WALTHAM, MASSACHUSETTS

To sponsor a project or for more information, contact Nathan Scott (nscott@jhu.edu) or visit the Department of Mechanical Engineering at me.jhu.edu.



MECHANICAL ENGINEERING SENIOR DESIGN 2019

2019 JOHNS HOPKINS ENGINEERING DESIGN DAY / MAY 7



“In Senior Design, I was able to gain design experience for mass-produced parts that you simply can’t learn from a textbook. My own successes and failures during the program taught me in nine months what would have otherwise taken years. Senior Design really jump-started my career in product development at Stanley Black & Decker.”

NATE GREEN
MECHANICAL ENGINEER,
STANLEY BLACK & DECKER



One thing I hear repeatedly from our mechanical engineering students is how much they value the Senior Design experience, from the opportunity to work with sponsors to the guidance and mentoring they receive from the course’s dedicated teaching staff.

Most characterize it as “the most challenging and rewarding experience I have had during my time at Hopkins.” The capstone of their years of study of mechanical engineering, Senior Design is an opportunity for our students not only to demonstrate a knowledge of scientific concepts, but also to apply their deep understanding of engineering principles to real-world design projects presented by sponsors from industry, non-profits, and governmental organizations.

The results of these student projects are nothing short of remarkable—for both students and sponsors. Students get access to sponsors’ technical contacts and resources, and learn to work within budgets to create solutions to real problems. Sponsors come away with working prototypes complete with user manuals, specifications, and design histories, not to mention the opportunity to take an up-close-and-personal look at some extraordinarily talented potential employees. Both parties benefit immeasurably.

GRETAR TRYGGVASON
DEPARTMENT HEAD AND **CHARLES A. MILLER, JR.**
DISTINGUISHED PROFESSOR
DEPARTMENT OF MECHANICAL ENGINEERING

SENIOR DESIGN DAY // 5.7.19 current projects

- 1. ARL—ARMY RESEARCH LABORATORY**
*Members: Amy Chi, Maria Coleman, Sarah Rossman, John Cai**
Morphing airfoils in extreme launch environments
- 2. CMM—JHU SCHOOL OF MEDICINE AND THE PEABODY INSTITUTE**
Members: Chun Cheng Hsu, Can Kocabalkanli, Khanh Nguyen, Zhiyi Ren
Smart Guitar for training and therapy
- 3. DIX—DIXON VALVE**
*Members: John Donohue, Robert Little, Robert Raniszewski, Collin Meissner**
Next Generation EZLink™ coupler seal
- 4. ECD—EAST COAST LACROSSE**
Members: Eklavya Mehtani, Lucas Serlin, Seena Vafaee**
Commissioning and testing lacrosse stick test robot

- 5. HIOA—HOOPERS ISLAND OYSTER AQUACULTURE**
Members: Nicolas Covone, Damian Cross, Spencer Witte
Floating upweller system
- 6. KUB—JHU BIOMEDICAL ENGINEERING CDEPARTMENT**
Members: John Chu, Kevin Peters, Stefanie Shirley, Tanner Walker
Kubanda Cryotherapy, delivering maximum cooling power to cure breast cancer
- 7. MOW—JHU SCHOOL OF MEDICINE**
*Members: Rafael de la Tijera Obert, Tianyue Liang, Garrett Ung, Natalie Myers, Aloysius Teng**
Prevention of lawn mower injuries to children
- 8. PRS—PAUL REED SMITH GUITARS**
*Members: Chinmaya Kuduvali+, Alex Cohen+, Dave Samson+, Robbie Durham**
Automated fret press robot

- 9. ROCK—JHU APPLIED PHYSICS LAB**
*Members: Tej Jolly, Brian Prats, Erik Salazar, Daniel Zanko, Randall Elkind**
Suborbital mission to capture space dust
- 10. SBD—STANLEY BLACK& DECKER**
Members: Austin Dillow, Solomon Polansky, Andrew Shaughnessy, Dominic Yared
Chainsaw test stand
- 11. SHER—SHERWOOD AMUSEMENTS**
Members: Brandon Fielder+, Jan Hagemeister+
Automated confectionary device
- 12. SRT—SERVICE ROBOTICS & TECHNOLOGIES**
Members: Kevin Chang+, Andre Ruas+, Joey Chung+
Developing robot to map the inside of a building

- 13. STSCI-C—SPACE TELESCOPE SCIENCE INSTITUTE**
Members: Alexander Doran, Scott Pourshalchi, Lucy Reider
Autonomous control of HiCAT beam
- 14. STSCI-M—SPACE TELESCOPE SCIENCE INSTITUTE**
*Members: Miranda Grenville, Nicolas Lamaison, Sumita Rajpurohit, Thomas Tiberghien Alvarez, Gia Bao Nguyen Dam**
Deformable mirror prototypes to support advanced coronagraph (HiCAT)
- 15. THOR—THORLABS**
Members: Florian Pontani+, Raph Santore+
New control system for micrometer scale CNC machine

*denotes a student in the junior level Engineering Design Process (530.381)
+denotes a master’s student