

# DESIGNING THE FUTURE

## What is Mechanical Engineering Senior Design at Hopkins?

MORE THAN 1,200 STUDENTS have graduated from 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—a win-win for all involved.

**“The benefit of working with the Senior Design students is that it allows us to explore deep technical topics without the limitations of corporate bureaucracy. We can innovate and engineer without distractions and really dig deep into the technical issues we know we need to solve, but often don't have the resources to do so.”**

CHRIS IBRAHIM  
STANLEY BLACK & DECKER

**“While working with my Senior Design team, I was able to truly dive into the engineering process and gain experience I was not able to in any other class. From designing, rapid prototyping, manufacturing, testing to presenting, and communicating with sponsors—the amount of work that is directly applicable to industry is significant. I feel fully prepared to apply everything I have learned and continue to build upon this experience for the remainder of my career.”**

ELAYNA WILLIAMS, SENIOR DESIGN ALUM '22

**“For my Senior Design team, I was chiefly responsible for Finite Element Analysis (FEA), 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

To sponsor a project or for more information, contact Steve Belkoff (sbelkoff@jhmi.edu) or visit the Department of Mechanical Engineering at [me.jhu.edu](https://me.jhu.edu).



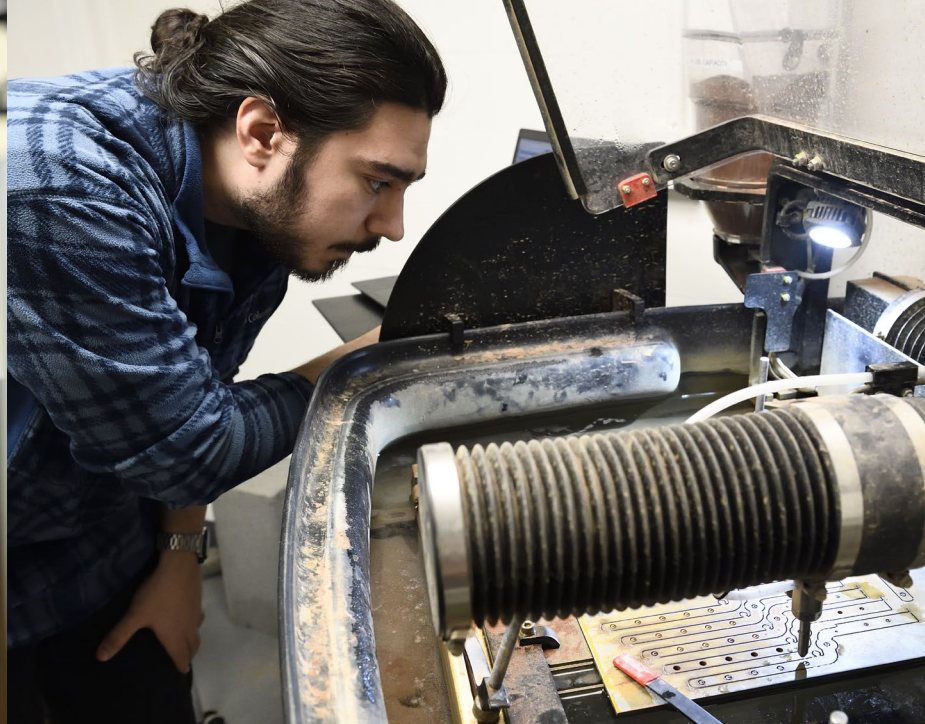
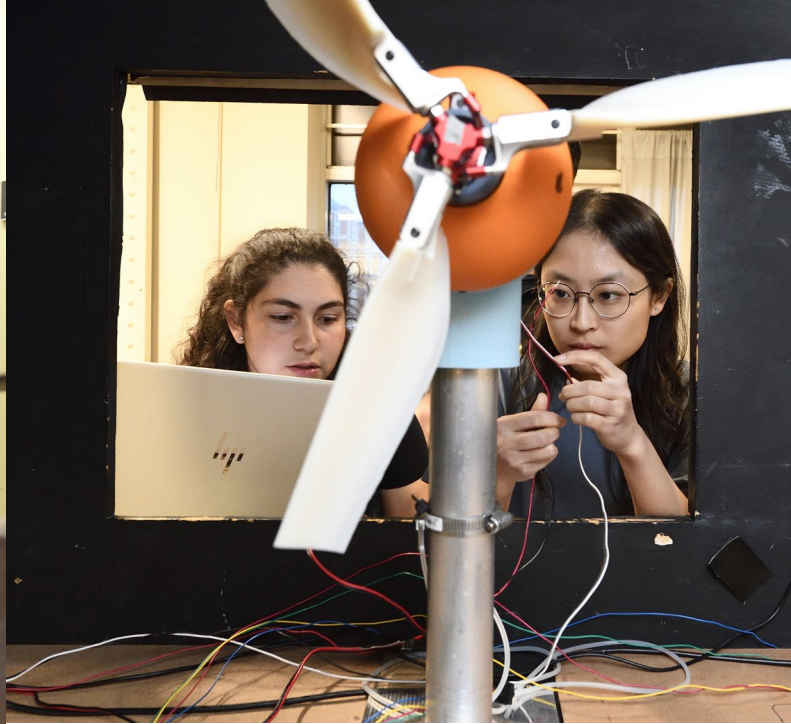
JOHNS HOPKINS  
WHITING SCHOOL  
of ENGINEERING

**MECHANICAL  
ENGINEERING  
SENIOR  
DESIGN  
2023**





# A MESSAGE FROM THE HEAD



“Working with our sponsors and clients at Blind Industries & Services of Maryland on assistive technology was so rewarding. Just knowing that someday our project would make a blind person feel empowered instead of limited in their disability is everything I hoped my mechanical engineering career would be.”

REGINALD ORIBH  
SENIOR DESIGN ALUM '21  
TECHNICAL ANALYST  
ACCENTURE FEDERAL SERVICES



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 // 2023 current projects

### STSCI-E23

#### Space Telescope Science Institute

HICAT enclosure to isolate environmental stimuli  
*Jack Anderson, Roberto Flores, Lance Phillips, Esteban Rivera*

### ASNE23

#### American Society of Naval Engineers

Build and race a manned electric boat  
*David DeScherer, Sara Pardee, John Wu, Eric Guo*

### BISM23

#### Blind Industries & Services of Maryland

Manufacture long white canes  
*Katie Bomhof, Justin Carder, Daniel Deng, Delphine Tan*

### SBD-MC23

#### Stanley Black & Decker

Design flexible conduit cutter  
*Danny Comer, Gavin Mackay, Ari Miller, Marcus Montisano*

### SBD-P23

#### Stanley Black & Decker

Plier jaw grip measurement and wear testing rig  
*Tessa Erickson, Sasha Khidekel, Kelsey Neff, Katharine Priu*

### SBD-S23

#### Stanley Black & Decker

Tree stump cutter  
*Lujia Liu, Frank Sun, Jim Wang, Xiao Yu*

### SBD-ID23

#### Stanley Black & Decker

Tamper-proof identification of high-speed Angle Grinder Disc  
*Jacob Hill*

### CWC23

#### Collegiate Wind Competition

Build an offshore wind turbine and compete nationally  
*Kathy Cao, Evan LaTourrette-Ghez, Isaac Lee, Justin Lee*

### STRENGTH23

#### Office of the Undersecretary of Defense

Novel methods for aircraft floorboard construction  
*Aditi Kishore, Chase Lahr, Melody Lei, Ryan Retino*

### APL23

#### JHU Applied Physics Lab

Persistent in-line load sensor for osseointegrated implants  
*Bridgette Kim*

### SANDIA23

#### Sandia Labs

Thermal conductivity measurement in porous insulating materials  
*Helen Hu, Alexander Karam-Shilts, Fayleon Lin, Jack Rao*