

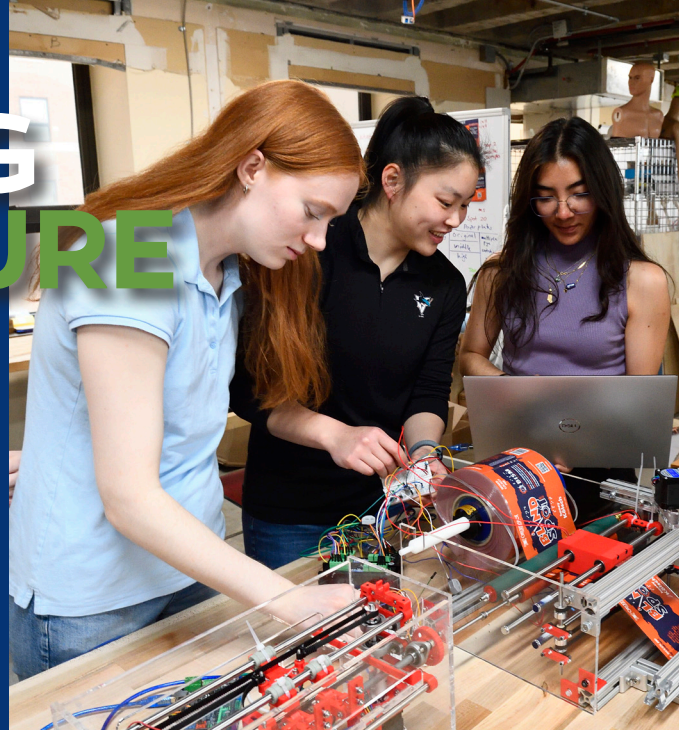
DESIGNING THE FUTURE

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.

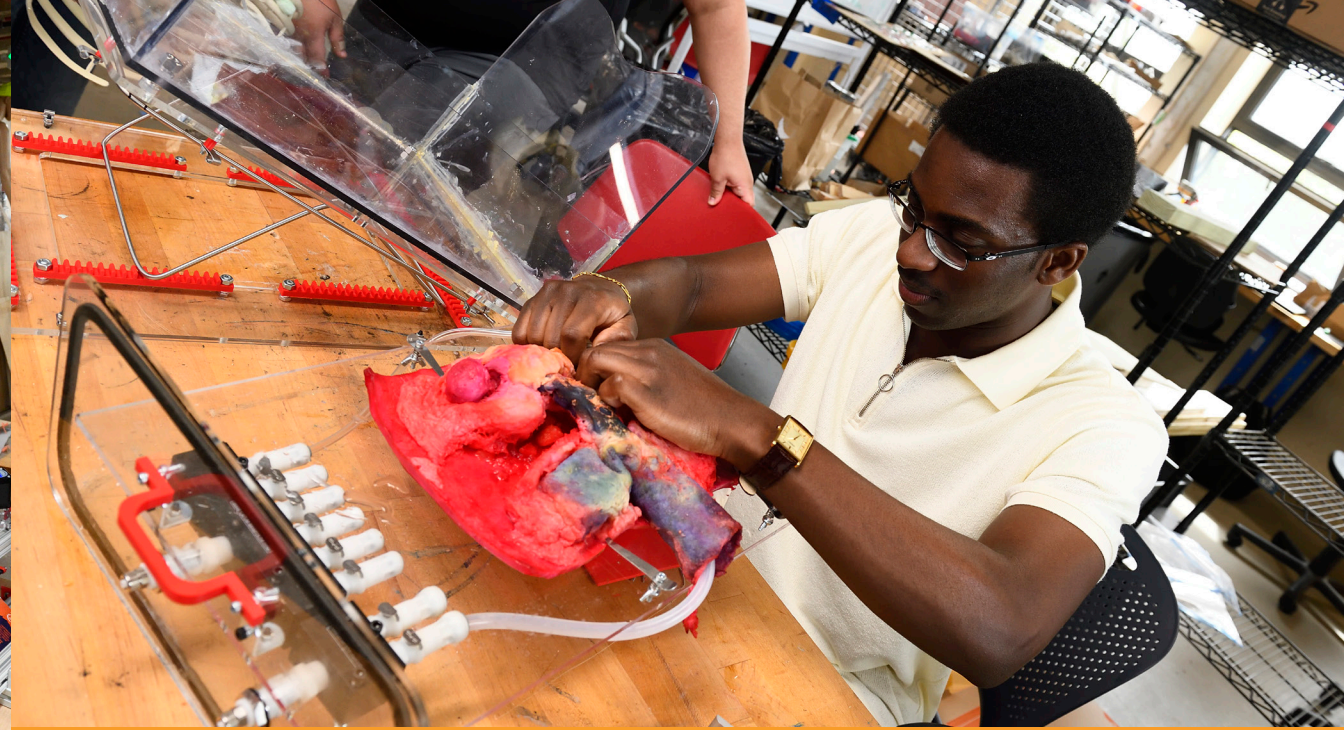
Why Sponsor?

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.



“Our experience working with the SMART25 team was outstanding. The students impressed us with their intelligence, diligence, and determination to succeed. They enthusiastically embraced a challenging project and demonstrated expertise across multiple disciplines, leading directly to its success. It was a great experience to work with such a driven and inspirational group of students.”

ADAM GOSIK-WOLFE, DIRECTOR OF ENGINEERING
AND PRODUCT DEVELOPMENT, SHUKLA MEDICAL



“Working with the KARMAN25 team this year has been as rewarding as my own senior design project. They took a complex aerospace design problem and broke it down into a set of clear and measurable requirements, controlling the entire process from ideation to a full-scale operational design and test campaign. I have thoroughly enjoyed watching them learn about the aerospace industry and mechanical engineering design as a whole, and Karman+ is excited to utilize their work for future asteroid mining missions.”

JESSE MILLER, SENIOR DESIGN ALUM '18
STRUCTURAL ENGINEER, KARMAN+ (2025 SPONSOR)

“Senior design has been the greatest opportunity I have had at JHU to hone my engineering ideation, design, manufacturing, analysis, and communication skills to new levels. I have been able to work with an excellent team and receive impactful mentorship while simultaneously owning my own work. I will always remember the memories and lessons from this project.”

AABHAS JAIN, SENIOR DESIGN ALUM '25, TEAM SMART25

To sponsor a project or for more information, contact Rich Bauernschub (rbauern1@jhu.edu) or visit the Department of Mechanical Engineering at me.jhu.edu.

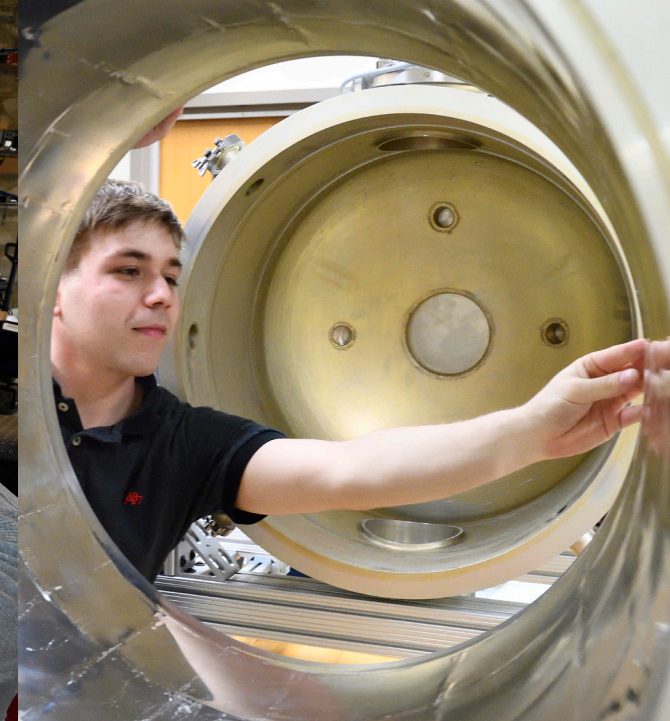


JOHNS HOPKINS
WHITING SCHOOL
of ENGINEERING

MECHANICAL
ENGINEERING
SENIOR
DESIGN
2025



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



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

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

SENIOR DESIGN DAY // 2025 current projects

BISM25

Sponsor: Blind Industries & Services of Maryland

Small-batch Braille printer
Gabriella Hu, Sophia Gomez, Krystal Lan, Catherine Pollard

FUTURE25

Sponsor: FutureMakers

STEM line assembly equipment
Matt Dierking, Andrew Lott, Jack Pangaro, Cole Peters

TIGON25

Sponsor: Tigon Medical

More reliable suture passing system
Lautaro Alvarez, Justin Lee, Manning MacAvoy, Emi Pinto

INJ25

Sponsor: Dr. Florin Selaru, Johns Hopkins School of Medicine

Radially expanding therapeutic agent injection device
Milla Ivanova, Jordyn Rodriguez, Kaity Shaughnessy, Valeria Vasquez-Barros

SURGSIM25

Sponsor: Dr. Ahmed Ghazi, Johns Hopkins School of Medicine

Torso simulator for surgical training
Kyle Dalrymple, Nico Fioranelli, Noah Graber, Jared Moser

SMART25

Sponsor: Shukla Medical

Smart surgical driver for orthopedic screw extraction
Aabhas Jain, Zuriel Erikson Joven, Jennifer Taylor, Dylan Zhu

STSCI25

Sponsor: Space Telescope Science Institute

Precise camera system that can operate in a vacuum tank
Mohamed Badwi, Bryant Bailey, Daniel Byrnes, Chris Hwang

KARMAN25

Sponsor: Karman+

Autonomous asteroid grinder
Jacob Hammond, Grace Nockolds, Zahari Stoimenov, Jonik Surprenant

LUNAR25

Sponsor: Johns Hopkins Applied Physics Laboratory

Lunar soil testing system
Aidan Green, Matthew Konkol, Xander O'Malley, Alexander Pivovarov

CARGO25

Sponsor: Naval Air Station – Patuxent River

New process to certify equipment
Andrew Ahn, Dilan Ferreira, Nicholas Watson, Deryck Yin

OCEAN25

Sponsor: Oceaneering

System that prevents an autonomous forklift from tipping
Sam Cohen, Rachel Fox, David Hindman, Charlie Margulies

IQT25

Sponsor: InQTel Labs

Cost-efficient underwater glider
Luke Moon, Zatara Nepomuceno, Tyler Stanley, Aaron Ziegler