

RICHARD J. FASENMYER

# ENGINEERING DESIGN CONFERENCE

SATURDAY, APRIL 27, 2024



**PARKER LORD**  
OUTSTANDING CAPSTONE  
PROJECT SPONSOR



## SCHEDULE OF EVENTS

### 7:30 a.m.

Registration. Second Floor,  
Burke Center

### 7:30–11:30 a.m.

Refreshments. 112 Burke

### 8:00–11:30 a.m.

Senior Presentations (half-hour  
sessions including Q and A).

### 11:45 a.m.–12:15 p.m.

Keynote Speaker: Greg Simon.  
180 Burke

### 12:15–12:30 p.m.

Student and Sponsor Award  
Presentations. 180 Burke

### Class Pictures

Photos to be taken after awards in  
following order: ME, CSSE, IBE, PLET,  
MET, IE, ECE, ECET. Assemble in  
hallway outside 180 Burke.

### Reception

After the awards, join us in Clark Café  
for an ice cream celebration!

## KEYNOTE SPEAKER



### Greg Simon '95, '97

VP of Engineering, Google

Greg Simon was born and raised in the San Francisco Bay Area in the 1980s, surrounded by individuals and companies making pioneering engineering and product achievements. After graduating with a bachelor's in Electrical Engineering from Penn State Behrend in 1995 and a master's in Electrical Engineering from University Park in 1997, he joined the ranks of those innovators.

He created the web browser for the Apple Newton while still in graduate school, and he returned to Silicon Valley during the dot-com boom, helping to design and launch BMW's iPod interface—a pioneering example of seamless integration between automobiles and consumer electronics. That achievement set the stage for an entire industry trend of deeply integrated consumer devices.

Simon later joined Palm, becoming the software technical lead for webOS—with groundbreaking features like simultaneous running applications, a UI designed using web technology, and early use of wireless charging—and launching the iconic Palm Pre in 2009. At Palm, he worked on software and hardware innovations that were groundbreaking at the time, and that have been adopted as mainstays on popular devices of today.

In 2011, Simon joined Google, starting on the Chrome team and currently serving as VP of Engineering, focusing on core operating systems.



**PennState**  
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# RICHARD J. FASENMYER ENGINEERING DESIGN CONFERENCE

## SENIOR PROJECTS

### Computer Science and Software Engineering

**8:00 a.m. | 103 Burke**

#### ***Voice Automation and AI Learning Assistant***

Learn Osteology, sponsor  
Yaniel Gonzalez Rodriguez, Chibuike Odibeli,  
Rashad Weathers, Manasi Patil  
Teck Meng Liaw, faculty adviser

**8:00 a.m. | 206 Burke**

#### ***Mobile App for Presque Isle Events + Navigation***

Presque Isle Partnership, sponsor  
Maximus Smith, Collin Myers, Quincy Nguyen, Eric Petika  
Dr. Meng Su, faculty adviser

**8:30 a.m. | 102 Burke**

#### ***Virtual Reality Space Game***

NASA Psyche Mission-ASU, sponsor  
Jack Brand, Peyton O'Boyle, Noah Pfeffer, Cameron Schmidt  
Dr. Ziyun Huang, faculty adviser

**8:30 a.m. | 103 Burke**

#### ***Human Bone Identification Phone App***

Learn Osteology, sponsor  
Dustin Knowlton, Laura Wilson, Mason Willman, Cameron Hoss  
Dr. Shahid Hussain, faculty adviser

**9:00 a.m. | 207 Burke**

#### ***Redesign of CORv3 Phase 2***

Penn State Behrend Psychology Department, sponsor  
Tong Wu, Christopher Brennen, Amy Dong, Nate Rondinelli  
Teck Meng Liaw, faculty adviser

**9:00 a.m. | 102 Burke**

#### ***Web-Based Games for Psyche***

NASA Psyche Mission-ASU, sponsor  
Jace Sidorchuk, Garrett Macomber, Jenna Tomko, Han Dang  
Dr. Meng Su, faculty adviser

**9:30 a.m. | 206 Burke**

#### ***Machine Learning Engine in Ada***

AdaCore, sponsor  
Stefan Milinkovic, Owen Wienczkowski, Samuel Leonetti,  
Garrett Glowacki  
Dr. Shahid Hussain, faculty adviser

**9:30 a.m. | 102 Burke**

#### ***Virtual Reality Space Game***

NASA Psyche Mission-ASU, sponsor  
Aiden Emerling, Jonathan Morse, Devin Schiffer,  
Cooper Thomas  
Dr. Ziyun Huang, faculty adviser

**10:00 a.m. | 206 Burke**

#### ***MCU Bootloader in Ada/SPARK***

AdaCore, sponsor  
Michael Mankie, Joseph Smith, Alan Everett, Xavier Zhang  
Dr. Chen Cao, faculty adviser

**10:00 a.m. | 204 Burke**

#### ***North Shore Seafood App***

C.A. Curtze Co., sponsor  
David Witt III, Shawn Lelewski, Haydon Wolfe,  
Victoria Humberger  
Russell Martin, faculty adviser

**10:00 a.m. | 104 Burke**

#### ***Scavenger Hunt App***

Penn State Behrend, sponsor  
Donald Albert III, Nathan Todd, Sebastian Darrah,  
Nathan Cantwell  
Dr. Jie Zhao, faculty adviser

**10:30 a.m. | 204 Burke**

#### ***Financial Wellness Education***

Larson Texts, sponsor  
Jacob Williams, Ethan Bartley, Om Patel, Tyler St. Amand  
Russell Martin, faculty adviser

**10:30 a.m. | 207 Burke**

#### ***Measuring Student Engagement Using Machine Learning***

Omar Ashour, Ph.D., Penn State Behrend Industrial  
Engineering, sponsor  
Neha Pandit, Yuying Jin, Jack Hilson, Carlo Munizza  
Melanie Ford, faculty adviser

## Electrical and Computer Engineering

**8:00 a.m. | 205 Burke**

### **Integrated 2D Motion Analysis System**

Penn State Behrend, sponsor  
Amy Patterson, Christine Patterson, Joshua Conklin,  
Jeremy Novakowski  
Dr. Kyeiwaa Asare-Yeboah, faculty adviser

**8:30 a.m. | 206 Burke**

### **Alternative Power Solution: Presque Isle Lights Event**

Presque Isle Partnership, sponsor  
Dominic Yeso, Anthony Roberto, Owen Flisnik  
Dr. Sudarshan Nelatury, faculty adviser

**8:30 a.m. | 205 Burke**

### **LoRa Wireless Integration**

Poseidon Systems LLC, sponsor  
Steven Lin, Jervis Lynch, Austin Vodenichar  
Dr. Issah Ibrahim, faculty adviser

**9:00 a.m. | 205 Burke**

### **Battery Management System (BMS) HW Simulator**

Wabtec, sponsor  
Alexander Kerr, Leo Gregory, Zachary Thompson,  
Jarrett Mosco  
Dr. Mohammad Rasouli, faculty adviser

**9:00 a.m. | 208 Burke**

### **Real-time Temperature Control System**

Northrop Grumman, sponsor  
Isaac Heim, Dominick Button, Nolan Reinsel  
Dr. Abdallah Abdallah, faculty adviser

**10:00 a.m. | 002 Burke**

### **On-Board Vehicle Diagnostic Data Capture and Analysis**

Penn State Applied Research Lab, sponsor  
Jacob Heffner, Steven Cardenas, James Pierce  
Dr. Abdallah Abdallah, faculty adviser

**10:00 a.m. | 207 Burke**

### **Soccer Training Assistant: Robot Goalkeeper**

Penn State Behrend Athletics, sponsor  
Jeremy Tucciarelli, Cole Askey, Nathan Green  
Dr. Ahmed Elnakib, faculty adviser

## Electrical and Computer Engineering Technology

**8:00 a.m. | 208 Burke**

### **Sensor for Measurement of Temperature in the Field**

Lake Erie Regional Grape Research and Extension  
Center, sponsor  
Juliana Bruno, David Motkowski, Laurence Vorous  
Dr. Zhengran He, faculty adviser

**8:00 a.m. | 105 Burke**

### **Thongophone Instrument Modifications**

Penn State Behrend School of Humanities and  
Social Sciences, sponsor  
Andrew Cornetto, Tyler Jones, Tecumseh Thundercloud  
David Loker, faculty adviser

**8:30 a.m. | 105 Burke**

### **Pipe Cutter**

Rooftop Equipment Inc., sponsor  
Elijah Abraham, Robert Baldwin, Evan Harris, Brandon Parry  
David Loker, faculty adviser

## Industrial Engineering

**8:30 a.m. | 208 Burke**

### **Material Closed Loop Process on Production Line**

Berry Global, sponsor  
Gracie Chwatek, Zachary Koch, Devin Muscarella,  
Michael Ulizzi  
Dr. Jing Zhao, faculty adviser

**9:00 a.m. | 105 Burke**

### **Green Steel Recycling**

SKF USA, sponsor  
Brock Wolff, Cody Ray, Dmytri Rakovan  
Dr. Hsin-Li Chan, faculty adviser



## Industrial Engineering (continued)

9:30 a.m. | 208 Burke

### **Development of a Patient Central Intake Process**

Sarah Reed Children's Center, sponsor  
Mackenzie Dominick, Katherine Kinney, John Ziobro  
Dr. Omar Ashour, faculty adviser

9:30 a.m. | 105 Burke

### **Energy and Water Reduction Project**

Technip FMC, sponsor  
Ahmed Abobaker, Titus Fuller, Olivia Getty, Aaron Kovatch  
Dr. Hsin-Li Chan, faculty adviser

9:30 a.m. | 103 Burke

### **Robotic Pad Printing Cell**

Superior Tire & Rubber Corp., sponsor  
Naoki Iwata, Evan Snyder, Keith Von Volkenburg  
Dr. Yohannes Haile, faculty adviser

## Interdisciplinary Business with Engineering Studies

8:00 a.m. | 001 Burke

### **Flexible Wall System**

DBC Remodeling & Construction, sponsor  
Chelsea Gruzca, William Jamison, Michael Mathis,  
Natalia Santilli  
Carol Putman and Dr. Jeff Vaitekunas, faculty advisers

8:30 a.m. | 001 Burke

### **Data Rack Cable Management**

Great Lakes Data Racks & Cabinets, sponsor  
Colby Alauzen, Matthew King, Jeffrey Zick  
Carol Putman and Dr. Jeff Vaitekunas, faculty advisers

9:00 a.m. | 001 Burke

### **Remote Monitoring**

Penn State Applied Research Lab, sponsor  
Daniel Boehme, Alec Kliem, Samuel York  
Carol Putman and Dr. Jeff Vaitekunas, faculty advisers

9:30 a.m. | 001 Burke

### **Nonprofit Diabetes Grant Funding Website**

Matt MacBeth/Wave 3, sponsor  
Aidan Domencic, Reagan James, Daniel Sprumont  
Carol Putman and Dr. Jeff Vaitekunas, faculty advisers

10:00 a.m. | 001 Burke

### **Free Spirit Compass**

Karrah Kightlinger, sponsor  
Jared Schrecengost, Britney Shaw, Mia Welsh  
Carol Putman and Dr. Jeff Vaitekunas, faculty advisers

10:30 a.m. | 001 Burke

### **Erie Insurance: Mobile App Prototype**

Erie Insurance, sponsor  
Justin Gavio, Nikolai Osborne, Ian Smith  
Carol Putman and Dr. Jeff Vaitekunas, faculty advisers

11:00 a.m. | 001 Burke

### **Parade Street Farm Stand**

Parade Street Farm Stand, sponsor  
Mike Boyle, Collin Faulkner, Joshua McGee  
Carol Putman and Dr. Jeff Vaitekunas, faculty advisers

## Mechanical Engineering

8:00 a.m. | 104 Burke

### **Demonstration of Natural Gas and Other Energy Facets for K-12**

Penn State Behrend, sponsor  
Brandon Hutchinson, Taewan Ku, Vincent Nava  
Dr. Barukyah Shaparenko, faculty adviser

8:00 a.m. | 207 Burke

### **Design and Prototyping of Modular External Fixator**

Aseman LLC, sponsor  
Andrew Cassano, Isabella Mercurio, Morgan Rockwell,  
Anthony Slate  
Dr. Jun Zhou, faculty adviser

8:00 a.m. | 107 Burke

**Improve Manufacturing of the 11-inch HVF Spring Assembly**

Eriez Manufacturing Co., sponsor  
Joseph Alberta, Cash Balocik, Megan Swantner, David Taylor  
Brian Lani, faculty adviser

8:00 a.m. | 102 Burke

**Robotic Explorer for Hypothesized Surfaces**

NASA Psyche Mission-ASU, sponsor  
Theodore Boehm, Aidan Domencic, Carl Pietrzyk,  
Isabella Pilyih  
Dr. Xiawa Wu, faculty adviser

8:30 a.m. | 207 Burke

**Design of a Continuous Fiber Composite 3D Printer**

Aseman LLC, sponsor  
William Gustafson, Michael Kohl, Mitchel Magraw,  
Joseph Wargo  
Dr. Mark Rubeo, faculty adviser

8:30 a.m. | 104 Burke

**In-Space Manufacturing Perovskite Solar Cells**

Penn State Behrend, sponsor  
Mark Barton, Nicholas Lockhart, Dylan Norris, Jeremy Wilfong  
Dr. David Beevers, faculty adviser

8:30 a.m. | 107 Burke

**SE Magnet Impact Plate Weld Joint Review**

Eriez Manufacturing Co., sponsor  
Joshua Elegeer, Hunter Kitchen, Lucas Wolf  
Dr. Chetan Nikhare, faculty adviser

9:00 a.m. | 104 Burke

**Design and Manufacturing of a Cast Steel Halligan Bar**

Penn State Behrend, sponsor  
Christopher Annear, Jacob Bailey, Julia Sank, Dan Tanaskovic  
Brian Lani, faculty adviser

9:00 a.m. | 103 Burke

**Instrumented Adhesion Testing Machine**

Superior Tire & Rubber Corp., sponsor  
Christopher Frenn, Nicholas Hood, Vincent Pettinato,  
Jonathan Wonderling  
Dr. Charlotte de Vries, faculty adviser

9:00 a.m. | 206 Burke

**Light Display: Presque Isle Lights Event**

Presque Isle Partnership, sponsor  
Joseph Cyrilla, Cole Roberto, Connor Rossey, Mark Sedlak  
Dr. Baiou Shi, faculty adviser

9:30 a.m. | 002 Burke

**Air Droppable Fuel Bladders**

Penn State Applied Research Lab, sponsor  
Paul Hess, Joseph Hodges, Trenton Pace, Taras Vterkovskyy  
Dr. Barukyah Shaparenko, faculty adviser

9:30 a.m. | 205 Burke

**Algae Reduction in Findley Lake, New York**

Findley Lake Watershed Foundation, sponsor  
Richard Cooper, William Frost, Devon Schmitt,  
Saishashank Survi  
Dr. Jiawei Gong, faculty adviser

9:30 a.m. | 107 Burke

**High Frequency Test Equipment**

Parker Lord, sponsor  
Benjamin Coler, Jacob Savko, Larry Schwenk, Tyler Shearer  
Dr. Xiawa Wu, faculty adviser

9:30 a.m. | 104 Burke

**Tooth Morphology and Mechanical Stresses**

Penn State Behrend, sponsor  
Madeline Fadale, Angelina Hofrichter, Hannah Olanrewaju,  
Olivia Wright  
Dean Lewis, faculty adviser

10:00 a.m. | 105 Burke

**Door Check Jig Design**

Toyota, sponsor  
Hannah Brewer, Sarah Cole, Kayla Lindberg, Carter Thompson  
Dean Lewis, faculty adviser

10:00 a.m. | 107 Burke

**Next Gen Fluid Mount Design**

Parker Lord, sponsor  
James Caldwell, Timothy Fair, Alexander Jackson,  
Luke Wyvratt  
Dr. Adam Hollinger, faculty adviser

10:30 a.m. | 105 Burke

**Forge Furnace Cable Replacement**

McInnes Rolled Rings, sponsor  
Michael Koroly, John O'Toole, Ian Post, James Rotunda  
Dean Lewis, faculty adviser

10:30 a.m. | 002 Burke

**Unmanned Maritime Logistics Delivery**

Penn State Applied Research Lab, sponsor  
Alex Bauer, Dominic Lengwin, Kyle Yarger, Steven Zacharatos  
Dr. David Beevers, faculty adviser

## Mechanical Engineering Technology

**8:00 a.m. | 204 Burke**

### **Sphere Brake Piston Retraction Challenge**

Sphere Brake Defense Inc., sponsor  
Nolan Cumberland, Jacob Maley, Payden Ordos  
Dr. Nancy Study, faculty adviser

**8:30 a.m. | 204 Burke**

### **Tamper-Resistant Floor Drain Strainer**

Zurn, sponsor  
Rachel Diefenderfer, Nate Kalkowski, Cody Nikolai,  
Chad Vanderwiel  
Dr. Liyong Sun, faculty adviser

**9:00 a.m. | 107 Burke**

### **Extend Size of Full-Coverage Lift Magnet Line**

Eriez Manufacturing Co., sponsor  
Jason French, Corey Smith, Ryan Weidner  
Dr. Feng Qian, faculty adviser

**9:00 a.m. | 204 Burke**

### **Switch-Adapted Power for Manual Wheelchair Users**

Barber National Institute–Elizabeth Lee Black School, sponsor  
Mason Presler, Wyatt Sasek, Daniel Sernik, Jack Walbridge  
Dr. Ihab Ragai, faculty adviser

**9:30 a.m. | 207 Burke**

### **Mat Sanitization Project**

Penn State Behrend Wrestling, sponsor  
Alex Breindel, Kullen Crosby, Amanda Hunter  
Dr. Steven Nozaki, faculty adviser

**9:30 a.m. | 204 Burke**

### **ROC Stack Handler**

Rehrig Pacific Co., sponsor  
Cody Andres, Nicholas Fedorowich, Richard Trenn  
Ed Evans, faculty adviser

## Plastics Engineering Technology

**8:00 a.m. | 106 Burke**

### **Eagle Secondary Operation Prototype**

Eagle Manufacturing, sponsor  
Matthew Behary, Ryan Flanigan, Jordan Loy  
Nick Vitelli, faculty adviser

**8:30 a.m. | 106 Burke**

### **Rotomolder Design and Development for Shot Put Shell**

Penn State Behrend, sponsor  
Gabriel Smithbauer  
Brad Johnson, faculty adviser

**9:00 a.m. | 106 Burke**

### **Injection Molded Shot Put Shell Design and Development**

Penn State Behrend, sponsor  
Matthew Ferko  
Brad Johnson, faculty adviser

**9:30 a.m. | 106 Burke**

### **Plastics Lab Sustainable Recycling Program Development**

Penn State Behrend, sponsor  
Joe Greene, Colin Ryan  
Dr. Gamini Mendis, faculty adviser

**10:00 a.m. | 106 Burke**

### **GreenLabs Recycling RPP**

GreenLabs Recycling, sponsor  
Hailey Desatoff, Tyler Wilson  
Dr. Greg Dillon, faculty adviser

**10:30 a.m. | 106 Burke**

### **AmeriChem Healthcare Chemical Resistance Study**

AmeriChem, sponsor  
Nicholas Chandler, Emi Curcio, Elizabeth Whiteford  
Brian Young, faculty adviser

**10:30 a.m. | 107 Burke**

### **Effects of D3 Parameter on Injection Molding Simulation**

The Madison Group, sponsor  
Emelia Graham  
Jason Williams, faculty adviser

**11:00 a.m. | 106 Burke**

### **High Calcium Limestone Compounding Feasibility**

Allegheny Mineral, sponsor  
Zachary Potter, Laekynn Proctor, Greg Simon  
Jason Williams, faculty adviser

# 2024 CAPSTONE PROJECT SPONSORS

Thank you to all our sponsors for their help with this year's senior design capstone projects! If your company is interested in sponsoring a senior project, or if you would like more information about industry partnerships, visit [behrend.psu.edu/capstone](http://behrend.psu.edu/capstone).

- AdaCore
- Allegheny Mineral
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- Omar Ashour, Ph.D., Penn State Behrend Industrial Engineering
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- Findley Lake Watershed Foundation
- Great Lakes Data Racks & Cabinets
- Green Steel Recycling
- GreenLabs Recycling
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- Larson Texts
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- Penn State Behrend School of Humanities and Social Sciences
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### Parker Lord

For almost 100 years, Parker Lord has worked in collaboration with customers to provide innovative oil and gas, aerospace, defense, automotive, and industrial solutions. Parker Lord is part of Parker Hannifin, a Fortune 250 global leader in motion and control technologies. The Erie facility, with more than 575 employees, houses design, production, testing, material development, and many other specialties.

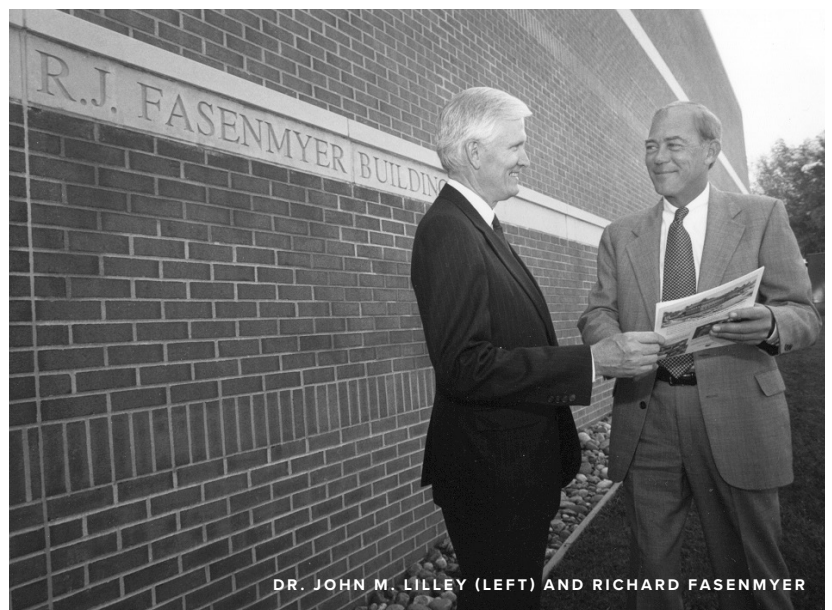
# A BRIEF HISTORY OF THE RICHARD J. FASENMYER ENGINEERING DESIGN CONFERENCE

The Richard J. Fasenmyer Conference showcases the results of yearlong engineering senior capstone projects supervised and managed by students and guided by their faculty and industry advisers. In many cases, the projects address applied problems posed by industrial sponsors.

The first public presentation of senior design projects at Behrend took place on April 22, 1995, in Hammermill and Fasenmyer buildings on the west end of campus. Seventy-nine students participated, presenting thirty-one projects.

Since then, the annual presentation has grown: To date, nearly 6,000 students have presented more than 1,500 projects. Today, more than 225 students are presenting.

In 2005, the conference was named to honor the legacy of Richard J. Fasenmyer '69, a longtime supporter of Penn State Behrend's School of Engineering. An Alumni Fellow and Distinguished Alumnus of the University, Dick Fasenmyer was the first Penn State Behrend graduate to donate \$1 million to the college.



DR. JOHN M. LILLEY (LEFT) AND RICHARD FASENMYER

# HONORING THE MEMORY OF DR. DIPO ONIPEDE



For more than 20 years, Dr. Dipo Onipede was an integral part of the Behrend School of Engineering—as an instructor in mechanical engineering, an adviser, and a mentor. Though Dr. Dipo, as he was known to students, passed away January 9, 2024, his memory lives on at Penn State Behrend.

The School of Engineering is working to establish an endowed scholarship fund in his name, to continue his legacy of supporting students. To contribute to the scholarship fund, please go online to [raise.psu.edu/DipoMemorial](https://raise.psu.edu/DipoMemorial) or use your smartphone to scan the QR code above.



## SPONSOR A SENIOR DESIGN PROJECT!



Looking to solve a problem at your company? We can help! Through our senior design projects, our students can help your company find creative solutions and fresh ideas. As a project sponsor, you'll not only gain access to the world-class resources of Penn State—you'll also interact with bright and creative young engineers (who might just be your future employees!).

### Choose from focus areas:

- Electrical/computer
- Industrial
- Mechanical
- Plastics
- Software/computer science

### Questions? Ideas?

Contact Dean Lewis, senior project coordinator,  
at [BDSEniorDesign@psu.edu](mailto:BDSEniorDesign@psu.edu)

Deadline for 2024-25 project sponsorships is  
August 15



This publication is available in alternative media on request.

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