

OPUS COLLEGE OF ENGINEERING

Design Day

May 3, 2024



OPUS

College of Engineering

MARQUETTE UNIVERSITY

Dear Opus College of Engineering Community:



Welcome to our ninth annual Design Day, a celebration of the design and innovation that goes on throughout the Opus College of Engineering. I look forward to this event each year and the excitement it brings to our building.

Design Day is not only about recognizing the hard work our students have put into their projects over the past year, but it is just as much about celebrating how they have grown as innovators. I believe that with the right mindset and the curiosity to learn, we can all lead innovative projects that will create real, new value and solve some of the world's most pressing problems.

Each year I am proud to see that at the heart of all our student design projects, is a desire to deliver meaningful change. This year's projects continue to deliver on that. As you walk through Engineering Hall, you will see senior, first year, and other course-related design projects on display. I hope you will take a moment to talk with our students and hear more about their work. I am confident that you, too, will be inspired by what you learn.

On behalf of our students, I would like to thank our many generous event and senior design project sponsors, as well as our college faculty and staff. Without you, this day would not be possible.

Thank you for joining us to celebrate another great year of hard work, innovation, and the students who are already setting our world on fire.

Sincerely,

Kristina Ropella, Ph.D.

Opus Dean – Opus College of Engineering
Marquette University

Oral Presentations				Posters/Demos	
	Rm. 128	Rm. 136	Rm. 236	Rm. 323	Lower Level, Levels 1 & 2
8:00-8:30				CCEE Senior Design	
8:30-9:00					
9:00-9:30					
9:30-10:00					
10:00-10:30					
10:30-11:00					
11:00-11:30	MEEN Senior Design	ELEN/COEN Senior Design	BIEN Senior Design A	CCEE Senior Design	BIEN Poster Exhibit & Competition (Levels 1 and 2)
11:30-12:00					
12:00-12:30					
12:30-1:00		Keynote* Milwaukee Tool			
1:00-1:30					
1:30-2:00	ELEN/COEN	BIEN Senior Design B	BIEN Senior Design A	CCEE Senior Design	Student-led Design & Course Design Projects (Lower Level, Levels 1 & 2)
2:00-2:30					
2:30-3:00					
3:00-3:30					
3:30-4:00					GEEN Poster Exhibit & Competition (Levels 1 and 2)
4:00-4:30					
4:30-5:00					

*12:30-1:30pm: Lunch will be available for keynote attendees

Design Projects

Poster Exhibitions and Competition

11:00 a.m. – 12:30 p.m.

Biomedical Engineering (BIEN) Poster Competition Levels 1 and 2

This session will include 13 posters from engineering students enrolled in BIEN 1110. This year's design project tasked students with designing and constructing a user-friendly assistive device to empower individuals with limited hand dexterity to enhance their ability to perform daily tasks and improve their quality of life.

1:30 p.m. – 3:00 p.m.

Student-Led Design and Course Projects Lower Level, Levels 1 and 2

Student-Led Projects

- Marquette Service Engineers Water Project – Tzitzil Water Distribution System

Course Projects

- Introduction to Programming
- Software Methodologies
- Design of Machine Elements

3:30 p.m. – 5:00 p.m.

General Engineering (GEEN) Poster Competition Levels 1 and 2

This session will include posters and mock-ups/prototypes from 14 design teams of new engineering students enrolled in GEEN 1210. The theme of these projects is Water and Energy Sustainability.

Keynote Presentation

12:30 to 1:30 p.m.

Designing for the End-User

Engineering Hall 136

John Dey, Milwaukee Tool

Senior Manager – Electrical Engineering



Abstract

How do you keep innovating and growing in an increasingly competitive landscape? By being extremely focused on core end users and designing for their needs. We will delve into how Milwaukee Tool maintains its edge in the competitive market by prioritizing the needs and challenges of its core trades users. By concentrating on the specific needs of professionals in fields such as mechanical, electrical, plumbing, and more, Milwaukee Tool not only meets but exceeds expectations, leading to disruptive innovations that redefine industry standards and enhance user satisfaction. Discover the strategic thinking and practical implications of focusing intensely on end users, and how this approach helps in crafting solutions that are not just functional but truly transformative for the tradespeople who rely on them every day.

Biomedical Engineering Senior Design Projects

Session A: Engineering Hall 236

10:00-10:30 **Making Shopping with a Disabled Child Easier**
Sponsor: Department of Biomedical Engineering, Marquette University
Faculty Advisor: F. Pintar
Clinical Advisors: A. Morgan and C. Schindler, Children's Wisconsin
Team Members: M. Fonseca, J. Atkins, G. Pfeiffer, T. Leonard, S. Schinke
MIAD Partner: S. Mazzolari

10:30-11:00 **Improved Design of a Wheelchair Swing**
Sponsor: Department of Biomedical Engineering, Marquette University
Faculty Advisor: J. Goldberg
Clinical Advisor: K. Jane Lee, Medical College of Wisconsin
Team Members: G. Kowal, M. Mayer, C. Strauss, W. Kolasny, J. Towe

11:00-11:30 **Cost Effective Neonatal Respirator**
Sponsor: L. Olson
Faculty Advisor: L. Olson
Team Members: E. Hasanaj, N. Banda, M. Maslowski, E. Kobal, K. Brockman

11:30-12:00 **Improved Cranial Stabilization System**
Sponsor: M. Krucoff, Medical College of Wisconsin
Faculty Advisor: B. Schmit
Team Members: G. Tumacder, J. Dosemagen, J. Bartel, O. Kalata, H. Johnson

12:00-12:30 **Device to Prevent Injury During Crawling**
Sponsor: J. Koser, VA Labs
Faculty Advisor: F. Pintar
Team Members: M. Gordon, L. Gallagher, L. Holscher, M. Guerrero, K. Jimenez

1:30-2:00**All Terrain Walker for Improved Access**

Sponsor: Department of Biomedical Engineering, Marquette University

Faculty Advisor: S. Beardsley

Clinical Advisors: A. Morgan and C. Schindler, Children's Wisconsin

Team Members: J. Hodges, C. Milas, W. Shanahan, E. Skoglund, J. Whelan

2:00-2:30**Safer Sleeping Environment for Child with Disabilities**

Sponsor: Department of Biomedical Engineering, Marquette University

Faculty Advisor: J. Goldberg

Clinical Advisors: A. Morgan and C. Schindler, Children's Wisconsin

Team Members: F. Tavera, J. Conrad, S. Andriacchi, S. Kroening, T. Steck

MIAD Partners: D. Kenny, J. Slagle

2:30-3:00**Device to Allow Use of Two Hands During Endoscopy**

Sponsor: M. Harris, Medical College of Wisconsin

Faculty Advisor: J. Goldberg

Team Members: C. Condon, M. Theraniyil, Z. Smith, S. Mayer, M. Helminski

3:00-3:30**Game Board to Evaluate Children's Motor Function**

Sponsor: S. Nemanich, Marquette University

Faculty Advisor: R. Scheidt

Team Members: G. Ganje, M. Troff, J. Davis, F. Perez Espinosa, E. Yang

MIAD Partners: D. Saddler, A. Schaus

Continued on next page

Biomedical Engineering Senior Design Projects

Continued

Session B: Engineering Hall 136

1:30-2:00

Heart Kart IV

Sponsor: C. Vogel, Anne and Robert Lurie Children's Hospital of Chicago

Faculty Advisor: T. Onushko

Team Members: A. Lettner, Z. Jensen, A. Molenda

MIAD Partners: H. Klemz, M. Martin

2:00-2:30

Device for Human Research on Obstructive Sleep Apnea

Sponsor: G. Garcia, Medical College of Wisconsin

Faculty Advisor: G. Garcia

Team Members: D. Vander Heiden, B. Huennekens, J. Phillips, Z. Anderson, L. Read

2:30-3:00

Adapted Utensil to Allow for Independent Feeding

Sponsor: R. Tilton, Marquette University

Faculty Advisor: S. Audi

Clinical Advisor: R. Tilton

Team Members: Z. Cotter, B. Rodriguez, A. Rivera, J. Nudelman

3:00-3:30

Terrain Simulator for Treadmill Testing

Sponsor: Integrative Neural Engineering and Rehabilitation Laboratory

Faculty Advisor: B. Schmit

Team Members: E. Skarzynski, J. Pantaleon, K. Ayala, M. Hernandez, S. DeAsis

Confidential Projects

Project 1

Sponsor: A. Monk, Visionary League

Faculty Advisor: B. Tefft

Team Members: C. Zanon, N. Zintchenko, K. Knizner, A. Giblin, M. Long

Project 2

Sponsor: C. Melnick, Tecomet

Faculty Advisor: B. Stemper

Team Members: M. Helm, J. Greene, M. McKenna, L. Marciniak, M. Cimaszewski

Civil, Construction, and Environmental Engineering Senior Design Projects

Engineering Hall 323

8:00–8:30 ARCO Design/Build Project

Sponsor: ARCO Design/Build
Lead Mentors: J. Stefan, I. O'Mahoney
Team Members: L. Genecco, A. Gorrill, C. Nitsch, J. Pickett

8:30–9:00 ARCO Design/Build Project

Sponsor: ARCO Design/Build
Lead Mentors: J. Stefan, I. O'Mahoney
Team Members: K. Hamlin, A. Kennedy, N. Moo, B. Ramirez, O. Valadez

9:00–9:30 Novel Pyrolysis of Municipal Wastewater Solids for Energy and Biochar

Mentor: D. Zitomer
Team Members: J. Calteux, Z. Molczyk, K. Morgan, D. Zeller

9:30–10:00 16th Street Viaduct Multimodal Redesign

Mentor: M. McNamara
Team Members: H. Dean, G. Delrose, J. Donahue, J. Koboski, D.J. Lenius

10:00-11:00 BREAK

11:00-11:30 New Construction on Existing Conditions TT and Findorff Group 1

Sponsors: Findorff, T. Tomasetti
Lead Mentors: E. Diels, C. Baures
Associated Mentor: J. A. Torres Jimenez
Team Members: R. Christiansen, L. D'Agostino, C. Deinhammer, A. Hagen,
C. Ortman

Continued on next page

Civil, Construction, and Environmental Engineering Senior Design Projects

Continued

11:30-12:00 New Construction on Existing Conditions TT and Findorff Group 2

Sponsors: Findorff, T. Tomasetti
Lead Mentors: E. Diels, C. Baures
Associated Mentor: J. A. Torres Jimenez
Members: M. Connell, L. Karlen, K. Ludzia, A. Noon, S. Schoenfelder

12:00-12:30 Arthur Avenue Resurfacing

Mentor Organization: R. A. Smith
Lead Mentor: A. Stasiukevicius, P.E.
Associated Mentors: J. Bruggeman, P.E., A. Utic, P.E., C. White, P.E., J. Diekfuss, PhD,
P.E. (P4 Infrastructure)
Team Members: A. Acevedo, I. Batorowicz, A. Hiestand, M. Salov

1:30-2:00 The Hub

Sponsor: HGA
Mentors: M. Zak, L. Knapp, G. Corbett, D. Foren
Team Members: L. Alfaro, M. Denten, J. Gatsos, A. Ibanez-Baldor, E. Simms

2:00-2:30 Walkway from Haggerty to EHall Group 1

Sponsors: GRAEF and Marquette University
Lead Mentors: M. Vogel, A. Sen
Team Members: S. Heaps, J. Kruse, B. Peters, C. Ross, K. Wilkinson

2:30-3:00 Global Water Stewardship; Horquetas

Sponsor: MSA (WI)
Lead Mentor: M. Castillo
Team Members: M. Adelgren, V. Bevan, G. Camarda, B. Craighead, A. Tan

Presented Earlier

Walkway from Haggerty to EHall Group 2

Sponsors: GRAEF and Marquette University

Lead Mentors: M. Vogel, A. Sen

Team Members: L. Holub, S. Ramirez-Arriaga, S. Sakoulas, J. Schmidt

Sherman Phoenix

Sponsor: HGA

Mentors: M. Zak, L. Knapp, G. Corbett, D. Foren

Team Members: B. Epperson, K. Fidziukiewicz, J. Gardiner, J. Hendricks,
J. Mueller



Computer and Electrical Engineering Senior Design Projects

Engineering Hall 136

10:00-10:30 **System for Detection of Forgotten Children in Cars**
Sponsor: C. Ababei, Marquette University
Faculty Advisor: C. Ababei
Team Members: V. Garcia, B. Minick, D. Okerlund, J. Roesler, M. Rouse

10:30-11:00 **Epigenetics Teaching Software**
Sponsor: P. Deshpande, Marquette University
Faculty Advisor: P. Deshpande
Team Members: S. McDonough, C. Randolph, B. Singer

11:00-11:30 **Novel, Low-cost, Moisture Sensing for Home and Remote Area Use**
Sponsor: R. Coutu, Marquette University
Faculty Advisor: R. Coutu
Team Members: S. Bel, M. Bell, A. Kleinsasser, P. McKeever, E. Zielke

11:30-12:00 **GE Healthcare Robotic Testing**
Sponsor: F. Frigo, Marquette University
Faculty Advisor: F. Frigo
Team Members: J. Beningi, L. Bonetti, R. Lukas, B. Scufsa

12:00-12:30 **Secure Connections to the US Power Grid**
Sponsor: T. Pink, Dynamic Ratings
Faculty Advisor: R. Coutu
Team Members: J. Rovira, M. Simutis, T. Gonzalez, R. Solvenson

Engineering Hall 128

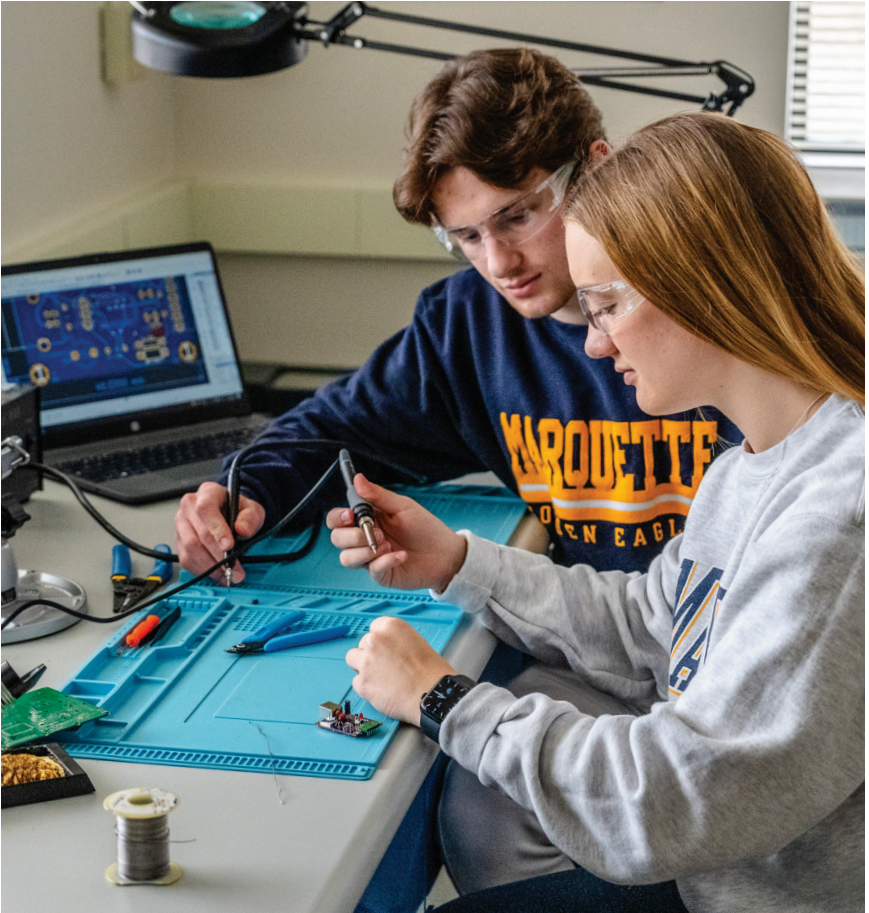
1:30-2:00

Using AI to Thwart Terrorist Activities and Protect the US Power Grid

Sponsor: T. Pink, Dynamic Ratings

Faculty Advisor: R. Coutu

Team Members: C. Taylor, J. Garcia, A. Sifuentes, E. Dalhoe, A. Pal Singh, B. Kurtovic



Mechanical Engineering Senior Design Projects

Engineering Hall 128

11:00-11:30

NASA Mars Lunabotics 2024

Sponsors: NASA, Wisconsin Space Grant Consortium

Faculty Advisors: P. Voglewede, S. Cash (Vitech Corp)

Team Members: G. Accardi, M. Chaidez, A. Kubik, V. Medrano, C. O'Brien, M. Pauly,
W. Pawlowski, N. Schilder, N. Timmins

11:30-12:00

Remote Weather Station for Boating

Sponsor: Marquette University

Faculty Advisors: A. Bowman, C. Ababei

Team Members: J. Doell, B. Doyle, M. Hankee, A. LeRoy, J. McCardle

12:00-12:30

FASN Mass Customization Demonstration

Sponsor: Marquette University

Faculty Advisor: J. Schimmels

Team Members: D. Butz, K. Carrasquilla, M. Kelly, C. Purney, T. Shilati, G. Voight



Confidential Projects

Project 1

Sponsor: J. Kwacz, Kohler Corp.
Faculty Advisor: P. Voglewede
Team Members: J. Drechsler, W. Garni, J. Ginter, V. Ricciardi, E. Szydlo

Project 2

Sponsor: T. Hunter, WolfStar Technologies
Faculty Advisor: V. Cariapa
Team Members: N. Dimitriou, M. Duffy, K. Olson, C. Romano, K. Schaefer-Flynn,
C. Toennies

Project 3

Sponsor: Marquette University
Faculty Advisor: S. Roy
Team Members: M. Ceranski, G. Chun, G. Lambesis, D. Olatunji, W. Schantz

Project 4

Sponsors: Marquette University and Sentry Equipment Corp.
(D. Nowak, H. Balisteri)
Faculty Advisor: A. Bowman
Team Members: S. Asselin, G. Bosley, H. Bridgeman, A. Giovanelli, C. Lamps,
E. Wagner

Project 5

Sponsor: Marquette University
Faculty Advisors: V. Cariapa, S. Keating, C. Koenig
Team Members: J. Basurto-Gutierrez, M. Hughes, J. Ledesma, E. Lijewski,
D. Oglesby, A. Segura, P. Sutherland

Project 6

Sponsor: Marquette University
Faculty Advisor: A. Bowman
Team Members: A. Anderson, B. Beck, M. Czyzewski, J. J. Klamm, J. LeClaire,
W. Ritchie

Dear Graduating Seniors,

Congratulations on your upcoming graduation!

We in the Opus College of Engineering have watched you transform from freshman engineering students into dedicated, ethical, and mission-driven engineers with a desire to serve others.

Allow this mission to guide you and remain open to continued growth and transformation. You are the difference; go forth and set the world on fire.

We know that your career will benefit from the same commitment and effort that you devoted to your academic work. We wish you the best!

Warmest Regards,
Opus College of Engineering Faculty and Staff



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**WE WOULD LIKE TO THANK
KEEN AND ENGINEERING UNLEASHED
FOR THEIR SUPPORT OF DESIGN DAY 2024.**

