



OPUS COLLEGE OF ENGINEERING

Design Day

May 5, 2023



OPUS

College of Engineering

MARQUETTE UNIVERSITY

Dear Opus College of Engineering Community:



Welcome to our eighth 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

Marquette University Opus College of Engineering

College of Engineering Design Day

Schedule of Events: May 5, 2023

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

*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 posters from 16 design teams of new engineering students enrolled in BIEN 1110. This year's design project tasked students with identifying an improvement of or investment opportunity for a current medical device that would reduce the burden of transitioning to a high-volume production environment and maximizing cost effectiveness. These projects are sponsored by Plexus.

1:30 p.m. – 3:00 p.m.

Student-led Design and Course Projects Lower Level and Level 1

Student-led Projects

- Concrete Canoe (ASCE Student Chapter)
- Las Cruces Pachalip (EWB Student Chapter)
- Ground Source Heat Pump at MMSD

Course Projects

- Digital Signal Processing
- Big Data Discovery Through Integration
- Computer Security
- 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 16 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.

The Future of Machinery Design, Simulation, and Automation

Engineering Hall 136

Scott Felber, Siemens Digital Industries Software

NX Product Engineering Marketing Manager

SIEMENS

Abstract:

Machine builders have one common goal – to make a profit from their products. But within industry 4.0, consumer preferences are changing; in turn, machine builders are challenged to produce highly tailored machines that can satiate evolving customer requirements, all within short timeframes.

To create highly agile machines that meet customer expectations and simultaneously face these challenges, machine builders need a new way forward with digitalization.

See how today's machine builders can strategically position themselves within the market through three core differentiators:

- **Next generation machine design:** Integrate disciplines to rapidly deliver against changing customer requirements/industry regulations
- **Effective delivery of complex projects:** Empower workers to collaborate through high-visibility tools that support data reuse for one-off designs
- **The digital twin of machinery:** Simulate machine designs that promote greater energy efficiency, multi-disciplinary analysis, and superior performance, without the need for physical prototyping

Biomedical Engineering

Senior Design Projects

Engineering Hall 136

10:30 – 11:00

Chair for Paracheer Athletes

Clinical Advisor: T. Stumvoll, Marquette University

Faculty Advisor: F. Pintar

Team: S. Tuma, M. Slattery, A. Koehler, M. Riddler, G. Gramz

MIAD Partners: R. Bryant, Z. Scharrer, C. Schreurs, E. Travitz

11:00 – 11:30

Locking Ankle Foot Orthotic

Sponsor: T. Current, Hanger, Inc.

Faculty Advisor: P. Voglewede

Team: M. Peters, K. Meintz, A. Anderson, A. Vear, A. Grady

11:30 – 12:00

Workstation for Independent Learning

Sponsor and

Clinical Advisor: M. Houser, Menominee Falls School District

Faculty Advisor: B. Stemper

Team: M. Schiferl, N. Gumushian, J. Potempa, P. Hetlage

12:00 – 12:30

Modular Adaptive Gaming Controller for Client with Disabilities

Sponsor: C. Heges, eClusion

Faculty Advisor: J. Goldberg

Team: N. Bhattacharya, B. Sanden, A. Oudghiri, L. Fiebig, R. Mobley

1:30 – 2:00

Simulated Blood Glucometer with Remote Control Programming Functionality

Sponsors and

Clinical Advisors: A. Costello, A. Potter, T. Bullis, Marquette University College of Nursing

Faculty Advisor: S. Audi

Team: C. Kraft, J. Munding, M. Leighton, K. Lechowska, J. Lawrence

2:00 – 2:30

Improved Cranial Stabilization System for Use with Intraoperative MRI

Sponsor: M. Krucoff, Medical College of Wisconsin
Faculty Advisor: B. Schmit
Team: J. Lanzar, F. Kempa, J. Delacruz, C. Roberts

2:30 – 3:00

Brain Cart & Adjustable Display for Clinical EEG Research

Sponsor: H. Ray, Medical College of Wisconsin
Faculty Advisor: S. Beardsley
Team: R. Mitchell, F. Presta, N. Balthazor, F. Conforti, J. Feryance

3:00 – 3:30

Heart Kart III

Sponsor: C. Vogel, Anne and Robert H Lurie Children’s Hospital of Chicago
Faculty Advisor: T. Onushko
Team: A. Torri, P. Hynes, G. Schwarz
MIAD Partners: M. Hoffman, M. Lewellyn, F. Rico Sanchez, C. Sabroff



Confidential Projects

Project 1

Sponsor: S. Slavic, GE Healthcare
Faculty Advisor: T. Gilat-Schmidt
Team: E. Niebler, H. Schuler, S. McLaughlin, S. Hayden, A. Clark

Project 2

Sponsor: S. Slavic, GE Healthcare
Faculty Advisor: R. Cooper
Team: B. Wilichowski, G. Caringella, S. Kothari, E. Cahill, G. DeGroot

Project 3

Sponsor: V. Eisele, C. McCahery, I. O’Hara, Medtronic
Faculty Advisor: B. Tefft
Team: A. Waltz, K. Frank, N. Loy, E. Bartoletti, M. Schumar
MIAD Partners: L. Hackenbracht, D. Emeterio, L. Knight

Biomedical Engineering Senior Design Projects

Project 4

Sponsor: B. Beran, Medical College of Wisconsin
Faculty Advisor: J. Goldberg
Team: B. Fox, K. Plested, P. Sanders, D. McTigue
MIAD Partners: Z. Burkett, L. Druley, R. Pflum

Project 5

Sponsor: B. Erickson, Medical College of Wisconsin
Clinical Advisor: J. Corteville, Medical College of Wisconsin
Faculty Advisor: B. Yu
Team: L. Salazar, K. Colmone, M. Ducklow, A. Larson

Project 6

Sponsor: A. Min, Fresenius Kabi
Faculty Advisor: L. Olson
Team: H. Hovland, E. Egbers, M. Breunig, N. Monosov

Civil, Construction, and Environmental Engineering Senior Design Projects Engineering Hall 323

10:00-10:30 **Wastewater Treatment Plant Enhanced Primary Treatment (EPT) Upgrade**

Mentor Organization: Black & Veatch
Lead Mentor: D. Diehl
Associated Mentors: S. Arant, C. Hengel-Prom
Team: O. Greco, B. Kelly, B. Zielinski, K. Zingelman

10:30-11:00 **Couture MKE Team 2**

Mentor Organization: T. Tomasetti and Findorff
Mentors: T. Kalayil, E. Diels, B. Scott, D. Gallenberger
Team: R. Duffek, M. Flaherty, J. Kuchera, R. Mehail, A. Sahayda

11:00-11:30 **Couture MKE Team 1**

Mentor Organization: T. Tomasetti and Findorff
Mentors: T. Kalayil, E. Diels, B. Scott, D. Gallenberger
Team: N. Cheung, M. Niquette, M. Williams, A. Wyckoff

11:30-12:00 **Drexel Avenue Reconstruction**

Sponsor: Marquette University
Lead Mentor: D. Zitomer
Associated Mentors: M. McNamara
Team: M. Braschi, J. Kallal, C. Maimone, T. Roth, Z. Swanson

1:30-2:00 **The Marquette University Wellness and Recreation Center**

Sponsor: Findorff
Lead Mentor: M. Stern
Team: P. Cogan, M. McShane, C. Brinkmann, B. Bartels

Civil, Construction, and Environmental Engineering Senior Design Projects

2:00-2:30

Arthur Avenue Resurfacing

Mentor Organization: raSmith

Lead Mentor: A. Stasiukevicius

Associated Mentors: J. Bruggeman, A. Axt , A. Utic, J. Diekfuss (P4 Infrastructure)

Team: A. Arechiga, M. Byzewski, M. Hernandez, L. Tennity

2:30-3:00

16th Street Viaduct Multimodal Redesign

Sponsor: City of Milwaukee

Lead Mentor: M. Sizemore

Team: S. Leudo Carmona, K. Turczewski, D. Nevarez-Lopez, C. Marquez



Presented Earlier

Novel Pyrolysis of Municipal Wastewater Solids for Energy and Biochar

Mentor Organization: Marquette University and Milwaukee Metropolitan Sewerage District

Lead Mentors: D. Zitomer (Marquette University), K. Jankowski (Milwaukee Metropolitan Sewerage District)

Associated Mentors: P. McNamara (Marquette University), M. Magruder (Milwaukee Metropolitan Sewerage District)

Team: B. Gonzalez Sanchez, E. Lynch, J. Martinez, J. Pierce

Marquette University Lot S- Reconstruction with Green Infrastructure Integration

Mentor Organization: The Sigma Group

Lead Mentor: Z. Meyer

Associated mentors: C. Carr

Team: A. Compton, D. Connolly, I. O'Mahony, M. Schmidt

ARCO Design/Build Project Team 2

Mentor Organization: ARCO Design/Build

Lead Mentors: J. Stefan, T. Hefferon

Team: E. Carrera, Z. Felden, V. Rizzo, JT Yurek

ARCO Design/Build Project Team 1

Mentor Organization: ARCO Design/Build

Lead Mentor: J. Stefan, T. Hefferon

Team: E. Johnson, C. Reichenbach, D. Trainor, F. Ziccardi

Walkway from Haggerty to E-Hall Team 1

Mentor Organization: Marquette University

Lead Mentor: B. Wan

Team: J. Cheng, S. Jablonsky, G. Leary, L. Romero

Walkway from Haggerty to E-Hall Team 2

Mentor Organization: Marquette University

Lead Mentor: B. Wan

Team: E. Brindac, R. Carlson, G. Dominguez, G. Newcomb

Midwest Design Competition – Global Water Stewardship Project

Sponsor: MSA Professional Services, Inc.

Lead Mentor: M. Castillo

Team: M. Allen, M. Cerven, C. Connelly, C. Herbert, M. Ketelhohn

Computer and Electrical Engineering

Senior Design Projects

Engineering Hall 236

11:00-11:30

Evolution Simulator

Sponsor: D. Hudetz, Marquette University

Faculty Advisor: R. Povinelli

Team: D. Hudetz, E. Ludwig, M. Danquah, B. Varley

11:30-12:00

Web3 Payment Analytics Platform

Sponsor: T. Tscheppe, Marquette University

Faculty Advisor: R. Povinelli, R. Coutu

Team: D. Titzer, T. Tscheppe, J. Condit, R. Duffy, N. Diaz

12:00-12:30

Sulfur Hexafluoride (SF6) Gauge Monitoring System

Sponsor: T. Pink, Dynamic Ratings

Faculty Advisor: R. Coutu

Team: C. Constabileo, V. Di Castri, J. Herrera, T. O'Sullivan

1:30-2:00

Scattered Field Measurement System

Sponsor: J. Richie, Marquette University

Faculty Advisor: J. Richie

Team: P. Munyon, M. Van Gaal, M. Castro, H. Malik, E. Koenig

2:00-2:30

Integrated Solar and LED Technologies

Sponsor: P. Rose, Roman Electric Co, Inc.

Faculty Advisor: R. Coutu

Team: N. Bayer, A. Blum, J. Deighton, G. Johnson, L. Maag, J. Wall

Mechanical Engineering

Senior Design Projects

Engineering Hall 128

10:30-11:00 **Minimum Energy Device for Combustible Dusts**

Sponsor: Marquette University

Faculty Advisor: C. Allen

Team: I. Curran, R. French, L. Hupke, P. Sullivan

11:00-11:30 **Monkey Scarer**

Sponsor: Marquette University

Faculty Advisor: V. Cariapa

Team: K. Bopp, C. Burke, P. DuMais, N. Greene, N. Sanchez Soto

11:30-12:00 **Low-Cost Hearing Aid for Under-Privileged People**

Sponsor: Marquette University.

Faculty Advisor: V. Cariapa

Team: R. Betancourt, V. Chang, K. Cronin, M. Donato, D. Lambertsen,
J. Ream

12:00-12:30 **Device to Allow Independent Washing, Drying and Fixing of Hair**

Sponsor: Marquette University

Faculty Advisor: A. Murray

Team: C. Covarrubias, K. Ermentrout, P. Silva Nazario, H. Yue

1:30-2:00 **Marquette Aerospace and Robotics Systems (MARS)**

Sponsor: NASA, Wisconsin Space Grant Consortium

Faculty Advisor: P. Voglewede

Team: D. Chacon, S. Guel, A. Mancilla, B. Montellano, C. Schmeiser,
I. Stark, M. Wall, D. Whalen

Mechanical Engineering Senior Design Projects

2:00-2:30

Automated Four Mold Box Station

Sponsor: J. Tully, Pregis
Faculty Advisor: V. Cariapa
Team: T. Burns
N. Clingan, L. Fonseca, E. Kerkman, E. Porembski, J. Zydlo

2:30-3:00

Indian Elephant Scarer

Sponsor: Marquette University
Faculty Advisor: V. Cariapa
Team: C. Dougherty, E. Howard, M. Medina, R. Xavier

3:00-3:30

Low-Cost Water Purifier for Developing Countries

Sponsor: Marquette University
Faculty Advisor: V. Cariapa
Team: B. Brunner, O. Cannestra, M. Dornbos, E. Hoyerman,
E. Wiszniewski



Confidential Projects

Project 1

Sponsor: Marquette University
Faculty Advisor: A. Bowman
Team: A. Agin, J. Burrichter, S. Engelkens, S. Grant, M. Kenlay, D. Lettau

Project 2

Sponsor: M. Thill, Lupagen Inc.
Faculty Advisors: V. Cariapa, G. Garcia
Team: M. Kanakkanatt, E. Khaja, C. McDonald, A. McGill, J. Mika

Project 3

Sponsor: W. Baronti, Klein Tools
Faculty Advisor: J. Moore
Team: T. Day, J. Killian, M. Moreno, B. Ryan
MIAD Partners: K. Frank, A. Jenkins, G. Otte

Project 4

Sponsor: P. Masterson, C. Quinell, and N. Geldner, Husco International Inc.
Faculty Advisor: J. Schimmels
Team: C. Casey, J. Connolly, A. Fague, T. Florian, C. Herda, T. Lawder,
S. Partyka, W. Peters

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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