



DESIGN DAY

ENGINEERING HALL | MAY 3, 2019



OPUS

College of Engineering

MARQUETTE UNIVERSITY

MESSAGE FROM THE DEAN

Dear Opus College of Engineering Community:

Welcome to our fifth 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 deliver on that, too.

As you walk through Engineering Hall, you will see senior, freshman, student-led and 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'm 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

DESIGN DAY SCHEDULE and LOCATIONS | MAY 3, 2019

College of Engineering Design Day, May 3, 2019 Schedule of Events

Oral Presentations		Posters/Demos	
8:30 - 9:00	Continental Breakfast - Levels 1 and 2	Student-led Design Projects (Lower Level)	BIEN Poster Exhibit & Competition (Levels 1 and 2)
9:00 - 9:30			
9:30 - 10:00			
10:00 - 10:30	ELEN/COEN Senior Design		
10:30 - 11:00	BIEN Senior Design A		
11:00 - 11:30	MEEN Senior Design		
11:30 - 12:00	Keynote* Siemens		
12:00 - 12:30	Keynote* We Energies		
12:30 - 1:00	Keynote* Plexus		
1:00 - 1:30			
1:30 - 2:00	ELEN/COEN Senior Design	Course Design Projects (Level 3)	
2:00 - 2:30	BIEN Senior Design A		
2:30 - 3:00	Keynote* Siemens		
3:00 - 3:30	BIEN Senior Design B		
3:30 - 4:00			
4:00 - 4:30			
4:30 - 5:00			
		Course Design Projects (Levels 2 & 3)	GEEN Poster Exhibit & Competition (Levels 1 and 2)

*Lunch will be available at noon for attendees of keynote presentations.

- Rm. 128
- Rm. 136
- Rm. 236
- Rm. 323
- Rm. 336
- Lower Level, Levels 2 & 3
- Levels 1 & 2

ALL ROOMS ARE LOCATED IN ENGINEERING HALL.

**Posters and Demonstrations
LOWER LEVEL and LEVELS 1–3**

**9:00–10:30 AM
STUDENT-LED DESIGN PROJECTS**

LOWER LEVEL

- Baja Car (SAE Student Chapter)
- Concrete Canoe (ASCE Student Chapter)
- Wireless Phone Charger
- Lift Assist for an Aerial Bucket
- Human-Powered Water Sculpture
- AI-Ready Research Portal (SIIM Hackathon)
- Safety Jacket
- Smart Shower
- Biomedical Engineering Society (BMES) Student Chapter
- Society of Women Engineers (SWE) Student Chapter

LOWER LEVEL (VISUALIZATION LAB):

- Guatemala School Project (EWB Student Chapter)
- Water Project (EWB Student Chapter)
- Bridge Project (EWB Student Chapter)
- Immersive Virtual Environment Demonstrations

**9:00 AM–1:00 PM
COURSE DESIGN PROJECTS**

LEVEL 3

- Operating Systems (Room 336 – Oral presentations/demos)

**1:00–2:30 PM
COURSE DESIGN PROJECTS**

LEVELS 2 AND 3

- Dynamics
- Manufacturing Engineering
- Digital Control Systems
- Digital Signal Processing
- Advanced VHDL and FPGA Design
- Introduction to Algorithms
- Mechanics of Materials
- Design of Machine Elements

**Posters and Demonstrations
LOWER LEVEL and LEVELS 1–3**

**10:00 AM–12:00 PM
BIEN POSTER COMPETITION***

LEVELS 1 AND 2

This session includes posters and mock-ups/prototypes from 26 design teams of new engineering students enrolled in BIEN 1110. The Biomedical Engineering freshman class will be presenting their ideas that address needs within the senior health community impacting senior care and/or quality of life.

Sponsored by Direct Supply

**3:30–5:00 PM
GEEN POSTER COMPETITION***

LEVELS 1 AND 2

This session will include posters and mock-ups/prototypes from 20 design teams of new engineering students enrolled in GEEN 1210. The theme of the design projects is *Water and Energy Sustainability*.

*Prizes for this year's BIEN and GEEN poster competitions were donated by Milwaukee Tool.

SIEMENS

Ingenuity for life

Realizing Next – The Value of the Digital Twin

Scott Felber – Market Management Manager NX Designs, Siemens Product Lifecycle

Location: Room 128

Digitalization or the digital twin, are words we are talking about every day in engineering. The digital twin is a precise virtual model of a product or production or performance assets as they evolve through their lifecycle. In this presentation we will see how the digital twin influences the entire engineering process when we make even a small design change. We will step through examples showing how companies save time executing design changes by keeping everyone notified of the status and how by using an integrated approach eliminates the need to re-enter data.



Not your Grandfather's (or your Father's) Electric Company

Paul Gogan – Manager Electric Reliability, We Energies
Dave Nestler – Planning and Engineering Manager, We Energies

Location: Room 136

The electric industry is changing. The new electric company incorporates new technologies such as electric vehicles, renewable generation, energy storage, micro grids, data analytics, robots, drones, python geospatial programming, smart sensors, Smart Phone apps, and augmented reality. We will discuss how each of these technologies plays a vital part in shaping the New Electric Utility.

We Energies provides electrical service to areas of Wisconsin and Michigan's Upper Peninsula, and natural gas and steam energy to areas of Wisconsin.



The Product Realization Company

Tolerance Mistaken: Impacts of Not Properly Addressing Design for Manufacturability

Dale Lee – Senior Staff DFX Strategy Engineer, Plexus

Location: Room 236

Electronic assemblies today are smaller and lighter with increased functionality per unit area and/or volume. The rate of new technology adoption is increasing; however, design methods, industry standards, materials and manufacturing processes utilized during the product development and production process have not progressed to meet these new demands. Thus many of the tolerance margins that were considered insignificant and acceptable in the past are now critical to high yield, reliable products. This presentation will highlight issues with today's electronic designs and impacts when material limitations, industry standards and assembly tolerances are not adequately addressed during design, printed circuit board (PCB) fabrication, assembly and test.

Biomedical Engineering
Senior Design Project Oral Presentations
ROOMS 136 | 128

SESSION A: ROOM 136

9:00–9:30 AM

DEVICE TO PROVIDE CONTINUOUS REAL-TIME FEEDBACK OF HEART RATE PEAK FREQUENCY AND POWER

Sponsor: T. Chelimsky, Medical College of Wisconsin
 Faculty Advisor: S. Audi
 Team Members: L. Jimenez
 A. Heigl
 E. De Leon
 J. Hubler
 D. Newman

9:30–10:00 AM

CT AND MR PHANTOM FOR STUDY OF LIVER TISSUE

Sponsor: S. Slavic, GE Healthcare
 Faculty Advisor: T. Gilat-Schmidt
 Team Members: D. Ostrander
 K. Ramos
 K. Cardoza
 C. McColl
 D. Butler

10:00–10:30 AM

PORTABLE POSITIONING DEVICE FOR STANDARD CHAIRS*

Clinical Advisor: A. Pleva
 Faculty Advisor: S. Beardsley
 Team Members: T. Echols
 L. Moolayil
 W. Wilson
 S. Doddi
 I. Garcia-Casas Tron (Milwaukee Institute of Art and Design)
 A. Felix (Milwaukee Institute of Art and Design)

10:30–11:00 AM

Clinical Advisor:
 Faculty Advisor:
 Team Members:

COMMUNICATION ASSIST DEVICE*

M. Houser
 S. Beardsley
 H. Barakat
 A. Kehn
 O. Dau
 O. Ballatin
 J. Wiszniewski
 V. Heyer (Milwaukee Institute of Art and Design)
 E. Berndt (Milwaukee Institute of Art and Design)

11:00–11:30 AM

Clinical Advisor:
 Faculty Advisor:
 Team Members:

PEDIATRIC WALKER FOR G-TUBE EQUIPMENT*
 C. Schindler, Marquette University College of Nursing
 J. Goldberg
 L. Hawkins
 C. Curtin
 J. Amedio
 A. Ezzell
 E. Granados Centeno
 S. Hernandez (Milwaukee Institute of Art and Design)
 G. Dyke (Milwaukee Institute of Art and Design)
 A. Lundberg (Milwaukee Institute of Art and Design)

11:30 AM–12:00 PM

Sponsor / Faculty Advisor:
 Team Members:

RESCUE MANNEQUIN NECK TO SIMULATE SPINAL CORD INJURIES FOR FIRST RESPONDER TRAINING
 F. Pintar, Medical College of Wisconsin
 Z. Wilcox
 A. Beduhn
 K. Dolick
 M. Rose
 C. Gunderman

1:30–2:00 PM

Sponsor:
 Faculty Advisor:
 Team Members:

LARYNGEAL NERVE MONITORING IN INFANTS TO PREVENT VOCAL CORD PARALYSIS DURING SURGERY
 T. Robey, Medical College of Wisconsin
 G. Garcia
 N. Lundeen
 K. Nordmeyer
 L. Miller
 L. Chambers
 L. Arant

*Supported by R25 EB013070 from the National Institute of Biomedical Imaging and Bioengineering.

*Supported by R25 EB013070 from the National Institute of Biomedical Imaging and Bioengineering.

SESSION A: ROOM 136

2:00–2:30 PM

DEVICE TO ASSIST WITH TRANSFER FROM WHEELCHAIR TO CAR/VAN**

Clinical Advisor: A. Morgan, C. Schindler, Children's Hospital of Wisconsin
Faculty Advisor: J. Goldberg
Team Members: K. Dausman
B. Sylvester
A. Mangelsdorf
K. Hornberger
R. Serfas
B. Sanna (Milwaukee Institute of Art and Design)
D. Gabriel (Milwaukee Institute of Art and Design)

2:30–3:00 PM

TENSIOMYOGRAPHY DEVICE FOR ATHLETIC TRAINING AND REHABILITATION*

Sponsor/Advisor: D. Kant-Hull, Marquette University Athletics
Faculty Advisor: B. Stemper
Team Members: A. Amer
M. Assad
E. Blais
M. Bellinder
D.J. Seline

3:00–3:30 PM

GO BABY GO! JOYSTICK CONTROLLED CARS FOR YOUNG CHILDREN WITH DISABILITIES*

Sponsor: B. McHenry
Faculty Advisor: J. Rammer
Team Members: P. Lopez
K. Perez
B. Wrucke
M. Saleh
S. Hussain

3:30–4:00 PM

WHEELCHAIR TRANSFER ASSIST DEVICE**

Sponsor: L. Kahle
Faculty Advisor: J. Goldberg
Team Members: C. Fitzgerald
J. Schneider
T. McNutt
K. Beyers

SESSION B: ROOM 128

1:30–2:00 PM

ANKLE FOOT ORTHOSIS WITH IMPROVED INVERSION CONTROL*

Sponsor: B. Robertson-Dick, Medical College of Wisconsin
Faculty Advisor: T. Onushko
Team Members: M. Lindway
B. Pacilio
M. O'Connell
D. Rivera
M. Solis (Milwaukee Institute of Art and Design)
E. Grinwald (Milwaukee Institute of Art and Design)

2:00–2:30 PM

NON-INVASIVE TESTING FOR IRON DEFICIENCY

Sponsor: M. Sikulu-Lord, Spectroscopy and Data Consultants Pty Ltd.
Faculty Advisor: B. Yu
Team Members: A. Sanchez
J. Solito
R. Florido
W. Eng
T. Rittenhouse

*Supported by R25 EB013070 from the National Institute of Biomedical Imaging and Bioengineering.

**Supported by Marquette University Strategic Innovation Fund Grant.

*Supported by R25 EB013070 from the National Institute of Biomedical Imaging and Bioengineering.

**Supported by Marquette University Strategic Innovation Fund Grant.

SESSION B: ROOM 128

2:30–3:00 PM

HAND STRETCHING DEVICE

Sponsor: B. Robertson-Dick, Medical College of Wisconsin
Faculty Advisor: B. Schmit
Team Members: I. Burns
R. Henry
A. Williams
A. Cedillo

3:00–3:30 PM

HUMAN MOTION ANALYSIS MODEL VALIDATION TOOL

Sponsor: A. Graf, Shriner's Hospital, Chicago, IL
Faculty Advisor: J. Fritz
Team Members: J. Benandi
A. Lopez
R. Jaber
K. Wachholz
J. Weaver

3:30–4:00 PM

ASSISTIVE WALKING DEVICE TO CONTROL FOCAL SPASTICITY OF THE FOOT

Sponsor: S. Paterson, Resolution Medical, LLC
Faculty Advisor: J. Fritz
Team Members: J. Evanoff
E. Bobeck
D. Neubauer
J. Baltz
E. Russell

Civil, Construction and Environmental Engineering Senior Design Project Oral Presentations ROOM 323

9:30–10:00 AM

MIXED-USE, WATER-CENTRIC DEVELOPMENT AT MILWAUKEE'S REED STREET YARDS

Sponsors: C. Carr, P. Finn, P. Imig, K. Kasubowski, The Sigma Group
Faculty Advisors: M. Federle, D. Zitomer
Team Members: K. Brecht
J. Fink
T. Hombsch
O. Wycklendt

10:00–10:30 AM

MIXED-USE APARTMENT / COMMERCIAL BUILDING DEVELOPMENT

Sponsors: M. Stern, K. Loest, J.H. Findorff & Sons, Inc.
Faculty Advisors: M. Federle, D. Zitomer
Team Members: M. Yankee
C. McGovern
Z. Lukasik
D. Hammond

10:30–11:00 AM

WASTEWATER BIOLOGICAL TREATMENT AND INTERCEPTOR DESIGN

Sponsors: M. Castillo, K. Hermann, MSA Professional Services, Inc.
Faculty Advisors: M. Federle, D. Zitomer
Team Members: K. Harrison
K. O'Malley
M. Sizemore
K. Paul

11:00–11:30 AM

DREXEL AVENUE RECONSTRUCTION

Sponsors: T. Barbeau, J. Bruggeman, J. Schueler, R.A. Smith
Faculty Advisors: M. Federle, D. Zitomer
Team Members: A. Ball
N. Perez
P. Gallagher
R. Sanchez

11:30 AM–12:00 PM

MILWAUKEE BALLET BAUMGARTNER CENTER FOR DANCE

Sponsor: C. O'Donnell, HGA, Inc.
Faculty Advisors: M. Federle, D. Zitomer
Team Members: R. Cullen
A. Gesior
E. Lehman
C. Redman

1:30–2:00 PM

Sponsors:
Faculty Advisors:
Team Members:

MIXED-USE, WATER-CENTRIC DEVELOPMENT AT MILWAUKEE'S REED STREET YARDS

C. Carr, P. Finn, P. Imig and K. Kasubowski,
The Sigma Group
M. Federle, D. Zitomer
B. Groundwater
C. Skelton
M. Chrabaszc
N. Goldman

2:00–2:30 PM

Sponsors:
Faculty Advisors:
Team Members:

DREXEL AVENUE RECONSTRUCTION

T. Barbeau, J. Bruggeman and J. Schueler, R.A. Smith
M. Federle, D. Zitomer
J. Stasser
L. Cimaglia
C. Brauer
M. Tobin

2:30–3:00 PM

Sponsors:
Faculty Advisors:
Team Members:

MIXED-USE APARTMENT / COMMERCIAL BUILDING DEVELOPMENT

M. Stern and K. Loest, J.H. Findorff & Sons, Inc.
M. Federle, D. Zitomer
D. White
M. Goese
D. Jahi
M. McKeivitt

3:00–3:30 PM

Sponsor:
Faculty Advisors:
Team Members:

MILWAUKEE BALLET BAUMGARTNER CENTER FOR DANCE

C. O'Donnell, HGA, Inc.
M. Federle, D. Zitomer
E. Diamond
K. Mofatt
B. Neuman
M. Zinnecker

3:30–4:00 PM

Sponsors:
Faculty Advisors:
Team Members:

INDUSTRIAL WAREHOUSE DESIGN

J. Stefan, B. Panis, T. Hefferon, ARCO Design/Build
M. Federle, D. Zitomer
M. Kelly
L. Veon
T. Daguison
A. Byrne

**Electrical and Computer Engineering
Senior Design Project Oral Presentations
ROOM 236**

9:00–9:30 AM

Sponsor:
Faculty Advisor:
Team Members:

AUTOMOTIVE DATA LOGGER

Milwaukee Tool
S. Schneider
M. Hertel
S. Stewart
C. Conard
J. Rozewicz
E. Ciliske

9:30–10:00 AM

Sponsor:
Faculty Advisor:
Team Members:

SYSTEM FOR STRESS TESTING OF SECURE DIGITAL (SD) CARDS

Rockwell Automation
R. Povinelli
T. Bobeck
Q. Gerhartz
C. Hels
D. Zurawski

10:00–10:30 AM

Sponsor:
Faculty Advisor:
Team Members:

VIBRATION BRACELET FOR HEARING-IMPAIRED ELDERLY PEOPLE

C. Ababei
C. Ababei
A. Foyer
P. Hara
K. Conley
J. D'Souza
T. Janik
J. Reichard

10:30–11:00 AM

Sponsor:
Faculty Advisor:
Team Members:

SUPPLY CHAIN MANAGEMENT FOR AI-POWERED TOOLS IN MEDICAL IMAGING

T.M. Sippel Schmidt
T.M. Sippel Schmidt
K. Chang
A. Dums
P. Moras

11:00–11:30 AM

Sponsor:
Faculty Advisor:
Team Members:

ELECTRONIC DISPLAY FOR ECE OFFICE

C. Ababei
C. Ababei
C. Gilger
K. Etta
D. Maatman
T. Ren
L. Wedel

11:30 AM–12:00 PM

Sponsor:
Faculty Advisors:
Team Members:

ELECTRIC UTILITY AUGMENT REALITY INVESTIGATION

We Energies
C. Tamma and R. Marklin
A. Vonderhaar
C. Baltrusch
D. Koetting
J. Lee
G. Thalji

1:30–2:00 PM

Sponsor:
Faculty Advisor:
Team Members:

EXPLORE THE EXCHANGE, MANAGEMENT, DISTRIBUTION AND USE OF “COMMON DATA ELEMENTS” USING IHE STRUCTURED DATA CAPTURE FOR ONCOLOGY CLINICAL TRIALS

T.M. Sippel Schmidt
T.M. Sippel Schmidt
B. Miller
N. Olson
J. Funk

2:00–2:30 PM

Sponsor:
Faculty Advisor:
Team Members:

OPTIMIZATION OF VISION-BASED TRACKING ALGORITHMS

H. Medeiros
H. Medeiros
I. Bremseth
A. Shakal
M. Shreiner
N. Simon

2:30–3:00 PM

Sponsor:
Faculty Advisor:
Team Members:

INTELLIGENT EMBEDDED SYSTEM

M. Marischen
C. Tamma
N. Mussoline
M. Marischen
T. Parackal
M. Fiorini

Mechanical Engineering Senior Design Project Oral Presentations ROOM 128

9:30–10:00 AM

Sponsor:
Faculty Advisor:
Team Members:

NASA ROBOTIC MINING COMPETITION

NASA
P. Voglewede
M. Braccio
T. Campbell
N. Faust
K. Koumoutsos
E. LeBeau
Z. Nordgren
Z. Pederson

10:00–10:30 AM

Sponsor:
Faculty Advisor:
Team Members:

MOTORIZED PAINTBALL TRAINING SYSTEM

Marquette University
V. Cariapa
V. Difatta
B. Eagan
A. Gasperlin
P. Vasquez
G. Von Der Lippe

10:30–11:00 AM

Sponsor:
Faculty Advisor:
Team Members:

FASN INDUSTRIAL AUTOMATION DEMONSTRATION

Marquette University
J. Schimmels
J. Fuchs
J. McKenna
J. Obert
P. Parisi
R. Witt

11:00–11:30 AM

Sponsor:
Faculty Advisor:
Team Members:

ROBOTIC FORGING CELL AND SENSOR INSTRUMENTATION

J. Domblesky
J. Domblesky and A. Bowman
C. Byrne
J. Gladysz
L. Kirsch
H. Neumann
J. Steele

11:30 AM–12:00 PM

Sponsor:

Faculty Advisor:

Team Members:

SAE BAJA EAGLE 3 GEARBOX

Eagle Racing, Marquette University

J. Moore

M. Ahmad

C. Malliet

B. Ollhoff

M. Jensen

J. Fuller

COLLABORATE WITH US

One of the most valuable components of a Marquette engineering education is student interaction with industry partners. If you're interested in learning more about how you can collaborate with our students, our Office of Industry Relations is ready to discuss which opportunities best fit your needs.



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MARQUETTE UNIVERSITY

Contact Katherine Atkinson, interim director of industry relations, at (414) 288-7192, or katherine.atkinson@marquette.edu, for more information.

**Senior Design Projects | Student Organizations
Design Day | Job Fair
Professional Development
Summer Undergraduate Research Fellowships**



Energize your career

Energize your career in a progressive work environment through our intern, co-op and entry-level job opportunities that give you a chance to gain professional experience and jump-start your career. We offer competitive pay, benefits and meaningful work experience.

WEC Energy Group is one of the nation's largest electric generation and distribution and natural gas delivery companies, with the operational expertise and financial resources to serve the Midwest's energy needs safely, reliably and responsibly. Based in Milwaukee, it serves 4.5 million customers in Wisconsin, Illinois, Michigan and Minnesota.



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