VIRTUAL DESIGN DAY
MAY 7, 2021

OPUS
College of Engineering
MARQUETTE UNIVERSITY
SENIOR DESIGN PRESENTATIONS

LEVELS 2-8

BIOMEDICAL ENGINEERING SENIOR DESIGN PRESENTATIONS
Level 2 | Session A: 9:00 a.m. – 1:00 p.m.
Level 3 | Session B: 9:00 a.m. – 11:00 a.m., 11:30 a.m. – 1:00 p.m.

CIVIL, CONSTRUCTION & ENVIRONMENTAL ENGINEERING SENIOR DESIGN PRESENTATIONS
Level 4 | Session A: 9:00 a.m. – 11:00 a.m., 11:30 a.m. – 1:00 p.m.
Session B: Presentations continuing through Microsoft Teams from 1:00 p.m. – 4:00 p.m.

COMPUTER & ELECTRICAL ENGINEERING SENIOR DESIGN PRESENTATIONS
Level 5 | Session A: 9:00 a.m. – 11:00 a.m., 11:30 a.m. – 1:00 p.m.
Level 6 | Session B: 11:30 a.m. – 1:00 p.m.

MECHANICAL ENGINEERING SENIOR DESIGN PRESENTATIONS
Level 7 | Session A: 9:00 a.m. – 11:00 a.m., 11:30 a.m. – 1:00 p.m.
Level 8 | Session B: 11:30 a.m. – 1:00 p.m.

POSTER PRESENTATIONS

LEVELS 9-11

9:00 – 10:30 AM | COURSE DESIGN PROJECTS
Software Methodologies (Posters E1-E8)
Introduction to Algorithms (Posters E9-E19)
Design of Machine Elements (Posters E20-E38)

LEVEL 12

10:00 – 11:30 AM | BIOMEDICAL ENGINEERING (POSTERS F1-F17)
This session will include posters and mock-ups/prototypes from 17 design teams of new engineering students enrolled in BIEN 1110. The theme of the design projects (sponsored by Ahmed Obeidat, MD – Medical College of Wisconsin) is rehabilitation needs for people with multiple sclerosis that impact care and/or quality of life.

LEVEL 13

11:30 AM – 12:00 PM | GENERAL ENGINEERING (POSTERS G1-G15)
This session will include posters and mock-ups/prototypes from 15 design teams of new engineering students enrolled in GEEN 1210. The theme of the design projects is Water and Energy Sustainability.

KEYNOTE PRESENTATION 11:00 – 11:30 AM

LEVEL 4

Building & Beyond
Mike Stern – Project Manager, J. H. Findorff & Son, Inc.

For over 131 years, Findorff has innovated and evolved to meet the needs of their clients. Completing over $800M of work annually, Findorff is proud to be considered as one of the largest construction firms in the Midwest. In addition, Findorff is excited to announce their new slogan, Building & Beyond, which represents the energy, innovative services, and expertise Findorff is synonymous with.

Having successfully completed The Commons residence hall in 2018, Findorff is honored and excited to continue their partnership with Marquette University as they embark on the construction of the University’s new College of Business Administration project. To help showcase that excitement is today’s keynote speaker, Mike Stern, a 2010 College of Engineering graduate who will be discussing Findorff’s partnership with Marquette, innovative happenings as well as the future College of Business building.
MESSAGE FROM THE DEAN

Dear Opus College of Engineering Community:

Welcome to our sixth 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 navigate through today’s virtual Design Day event, you will see senior, first-year, 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

SPECIAL THANKS TO OUR GENEROUS SPONSORS

PREMIUM & KEYNOTE SPONSORS

We Energies Foundation

Findorff
BUILDERS SINCE 1890

GOLD SPONSORS

Milwaukee

X-ES
Extreme Engineering Solutions
BIOMEDICAL ENGINEERING  
SESSION A  
Senior Design Project Oral Presentations

LEVEL 2

9:00 – 9:30 AM  
**BALANCE AND CONCUSSION EVALUATIONS IN PARA-ICE HOCKEY ATHLETES**  
Sponsor: M. Uihlein, US Para Ice Hockey Team  
Faculty Advisor: B. Schmit  
Team Members: T. Fairwood, C. Smeets, J. Castiglioni, M. Pineda, M. Jones, C. Sannito (Milwaukee Institute of Art and Design), E. Moratti (Milwaukee Institute of Art and Design)

9:30 – 10:00 AM  
**DEVICE TO PREVENT INJURIES DUE TO VISUAL IMPAIRMENT***  
Clinical Advisor: K. Jackson, Children's Hospital of Wisconsin  
Faculty Advisor: D. Cook  
Team Members: N. Waltz, S. Schabel, A. Winans, M. Offe, P. Myroth

10:00 – 10:30 AM  
**ASSISTIVE FISHING DEVICE***  
Sponsor: J. Gilmore  
Faculty Advisor: D. Cook  

10:30 – 11:00 AM  
**HEART KART II***  
Sponsor: C. Vogel, Ann and Robert Lurie Children's Hospital of Chicago  
Faculty Advisor: T. Onushko  
Team Members: C. Dyra, G. Serrano, K. Knopp, A. Rising, Z. Marmitt

11:00 – 11:30 AM  
**POWER ASSIST DEVICE FOR HANDBICYCLES AND RECUMBENT TRICYCLES***  
Sponsor: J. Casey, Milwaukee VA Spinal Cord Injury Unit  
Faculty Advisor: J. Goldberg  
Team Members: S. Herson, G. Sikora, R. Fischer, A. Dmello, D. DeStefano, S. Cullinan, B. Lee (Milwaukee Institute of Art and Design), J. Homesombath (Milwaukee Institute of Art and Design), J. Liang (Milwaukee Institute of Art and Design)

11:30 AM – 12:00 PM  
**SEATING SUPPORT SYSTEM FOR INCREASED INDEPENDENCE***  
Sponsor: L. McCarthy  
Faculty Advisor: F. Pintar  
Team Members: C. Higgins, M. Schunk, M. Marquez, A. Broekert, P. Streblow (Milwaukee Institute of Art and Design), D. Soller (Milwaukee Institute of Art and Design), C. Redmond (Milwaukee Institute of Art and Design)

*Supported by R25 EB013070 from the National Institute of Biomedical Imaging and Bioengineering.
12:00 – 12:30 PM  
**REducing Medication Errors in the Operating Room**  
Sponsor: K. Lauer, Medical College of Wisconsin  
Faculty Advisor: J. LaDisa  
Team Members: G. Grad, I. Comia, Z. Relias, C. Gonzalez, A. Wilczynski

12:30 – 1:00 PM  
**Neuromuscular Re-Education to Treat Thumb Instability*  
Sponsor: N. Hoover, Milwaukee VA Hospital  
Faculty Advisor: B. Tefft  
Team Members: J. Heim, M. Strobel, K. Burke, H. Meyer, T. Salinas

9:00 – 9:30 AM  
**Spinal Implant Test Fixture**  
Sponsor: Z. Dooley, SeaSpine  
Faculty Advisor: B. Stemper  
Team Members: C. Melendez, N. Georgiou, D. Boss, J. Schweizer, N. Bruns

9:30 – 10:00 AM  
**Improvements in Laparoscopic Camera Visibility*  
Clinical Advisor: R. Higgins, Froedtert Hospital  
Faculty Advisor: J. Goldberg  

10:00 – 10:30 AM  
**Auditory Biofeedback Device for Leg*  
Clinical Advisor: M. Dygulski, Marquette University  
Faculty Advisor: S. Beardsley  
Team Members: D. Plata, J. Cava, J. Gerhardson, K. Moore, M. Kaczmarczyk

10:30 – 11:00 AM  
**Design of a Novel Dental Instrument for Root Canal Procedures*  
Sponsor: L. Boryc, Marquette University School of Dentistry  
Faculty Advisor: B. Wang  
Team Members: W. Louis-Charles, M. Hughes, N. Brennan, R. Garcia, S. Samara

11:00 – 11:30 AM  
**Break**

*Supported by R25 EB013070 from the National Institute of Biomedical Imaging and Bioengineering.
<table>
<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
<th>Sponsor</th>
<th>Faculty Advisor</th>
<th>Team Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:30 AM – 12:00 PM</td>
<td>PRECISE TESTING OF SMELL LOSS IN COVID-19 PATIENTS</td>
<td>A. Greenberg</td>
<td>A. Greenberg</td>
<td>M. Karris, T. Krahn, J. Wilder, Z. Brown, M. Schoonover</td>
</tr>
<tr>
<td>12:00 – 12:30 PM</td>
<td>DETECTING HEART SOUNDS DURING TELEMEDICINE VISITS*</td>
<td>G. Garcia</td>
<td>L. Ambray, B. Brennan, H. Hartmann, T. Connors, T. Vukosavljevic, B. Kamyk (Milwaukee Institute of Art and Design), S. Salamon (Milwaukee Institute of Art and Design)</td>
<td></td>
</tr>
<tr>
<td>12:30 – 1:00 PM</td>
<td>INDIRECT OPHTHALMOSCOPY USING SMARTPHONES</td>
<td>A. Baseer, Medical College of Wisconsin</td>
<td>R. Cooper, A. Santilli, A. Bielek, J. Harnois, N. Vega, A. Evans (Milwaukee Institute of Art and Design), L. Wettengel (Milwaukee Institute of Art and Design), J. Jackson (Milwaukee Institute of Art and Design)</td>
<td></td>
</tr>
</tbody>
</table>

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

CIVIL, CONSTRUCTION AND ENVIRONMENTAL ENGINEERING
SESSION A
Senior Design Project Oral Presentations

LEVEL 4

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
<th>Sponsor</th>
<th>Faculty Advisor</th>
<th>Team Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 – 9:30 AM</td>
<td>OFFICE BUILDING AT CHICAGO 78 SITE</td>
<td>F. Weiss, The Related Companies Midwest</td>
<td>M. Paddock</td>
<td>J. Brooks, J. Cary, L. Flaherty, J. Martin</td>
</tr>
<tr>
<td>10:30 – 11:00 AM</td>
<td>WASTEWATER TREATMENT PLANT UPGRADE FOR PHOSPHORUS REMOVAL</td>
<td>J. Kemp, Black &amp; Veatch</td>
<td>M. Paddock</td>
<td>J. Lindsay, B. Jensen, C. Papineau, J. Smith, M. Stafford</td>
</tr>
<tr>
<td>11:00 – 11:30 AM</td>
<td>J. H. FINDORFF &amp; SON, INC. KEYNOTE PRESENTATION</td>
<td>J. H. Findorff &amp; Son, Inc.</td>
<td>M. Paddock</td>
<td></td>
</tr>
</tbody>
</table>
11:30 AM – 12:00 PM  NEW OFFICE BUILDING AND PARKING GARAGE DESIGN  
Faculty Advisor: M. Paddock  
Team Members: H. Hinke  
D. Kannin  
M. Oechsner  
O. Westmoreland

12:00 – 12:30 PM  BRAUN RD CULVERT REPLACEMENT AND ROADWAY RECONSTRUCTION  
Sponsor: K. Matson, HNTB  
Faculty Advisor: M. Paddock  
Team Members: J. Bradley  
K. Gwiazdowski  
M. Margas  
J. O’Brien  
B. Packenham

12:30 – 1:00 PM  MARQUETTE MI RENEWABLE ENERGY & BIOSOLIDS HANDLING PROJECT  
Sponsor: A. Williams, Donohue & Associates  
Faculty Advisor: M. Paddock  
Team Members: D. Foren  
N. Ladewig  
J. Lavin  
J. Stroesser

1:00 – 1:30 PM  MENOMONEE RIVER LEVEE IMPROVEMENTS WITH RECREATIONAL TRAIL AND BRIDGE  
Sponsor: M. Mittag, MMSD  
Faculty Advisor: M. Paddock  
Team Members: D. Del Conte  
J. Lynch  
A. Locascio  
B. O’Connor

1:30 – 2:00 PM  DREXEL AVENUE RECONSTRUCTION  
Sponsor: A. Stasiukevicius, R.A. Smith  
Faculty Advisor: M. Paddock  
Team Members: J. Drolen  
C. Kruse  
T. Martin

2:00 – 2:30 PM  JEFFERSON ST. INTERCHANGE RECONSTRUCTION / INTERSTATE 10  
Sponsor: A. Lewis, Michael Baker  
Faculty Advisor: M. Paddock  
Team Members: J. Amoruso  
L. Chancellor  
E. Hernandez  
D. Lammers

2:30 – 3:00 PM  KATHY’S HOUSE: A GUEST HOUSE AT THE MEDICAL COLLEGE OF WISCONSIN  
Sponsors: C. O’Donnell and M. Hansen, HGA  
Faculty Advisor: M. Paddock  
Team Members: W. Brown  
J. Palacios  
K. Simpson

3:00 – 3:30 PM  SAMARA DISTRICT COSTA RICA CENTRALIZED SANITARY WASTEWATER SOLUTION AND COLLECTION SYSTEM  
Sponsor: M. Castillo, MSA Professional Services  
Faculty Advisor: M. Paddock  
Team Members: M. Ballman  
M. Frank  
A. Quiles  
G. Leverentz

3:30 – 4:00 PM  BRAUN RD CULVERT REPLACEMENT AND ROADWAY RECONSTRUCTION  
Sponsor: K. Matson, HNTB  
Faculty Advisor: M. Paddock  
Team Members: N. Meisner  
C. Randall  
A. Saravanapandian
## COMPUTER AND ELECTRICAL ENGINEERING
### Session A
### Senior Design Project Oral Presentations

### LEVEL 5

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Sponsor</th>
<th>Faculty Advisor</th>
<th>Team Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 – 9:30 AM</td>
<td>SHONAQUIP TRANSPORT PROJECT</td>
<td>B. Sammut and Opus College of Engineering</td>
<td>C. Tamma</td>
<td>B. Sammut, G. Afre</td>
</tr>
<tr>
<td>9:30 – 10:00 AM</td>
<td>THE MARQUETTE IRENAEUS PROJECT (MIP)</td>
<td>C. Krall, Department of Theology</td>
<td>R. Povinelli</td>
<td>M. Callahan, M. Diaquino, C. Martin, Z. Nelson, R. Joseph</td>
</tr>
<tr>
<td>10:00 – 10:30 AM</td>
<td>SOLAR DISTRICT CUP 2021</td>
<td>Department of Energy</td>
<td>C. Tamma</td>
<td>C. Copoulos, A. Pink, N. Funteas, E. Helm, K. Barndt, S. Cameli</td>
</tr>
<tr>
<td>10:30 – 11:00 AM</td>
<td>DISEASE ADVISOR COMPANION APP</td>
<td>A. Lord, Disease Advisor Pty. Ltd. (Australia)</td>
<td>C. Tamma</td>
<td>T. Hill, C. Lee, S. Bhalla, M. Zech, B. Cruz</td>
</tr>
<tr>
<td>11:00 – 11:30 AM</td>
<td>BREAK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:30 AM – 12:00 PM</td>
<td>SMART CHAIR</td>
<td>C. Ababei</td>
<td>C. Ababei</td>
<td>C. Gorski, M. Lang, S. McCarthy, J. Moens, A. Porter</td>
</tr>
<tr>
<td>12:30 – 1:00 PM</td>
<td>NASA LUNABOTICS RMC</td>
<td>NASA and Opus College of Engineering</td>
<td>P. Voglewede</td>
<td>E. DeFaut, J. Edwards, A. Fernandez, W. Hansen, J. Hanley, J. Johnson, J. Murray, T. Wiza</td>
</tr>
</tbody>
</table>
### LEVEL 6

**Session B**  
**Senior Design Project Oral Presentations**

#### LEVEL 6

<table>
<thead>
<tr>
<th>Time</th>
<th>Project Description</th>
<th>Sponsor</th>
<th>Faculty Advisor</th>
<th>Team Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:30 AM – 12:00 PM</td>
<td>MAGNETIC NEAR FIELD 3D SCANNER</td>
<td>J. Richie and C. Ababei</td>
<td>J. Richie and C. Ababei</td>
<td>A. Betancourt, T. Killion, M. Lechowicz</td>
</tr>
<tr>
<td>12:00 – 12:30 PM</td>
<td>“ARDUINO KILLER” COMPONENT LIBRARY - PHASE 1</td>
<td>S. Schneider</td>
<td>S. Schneider</td>
<td>C. Seda, V. Dominic, R. Latinovich, C. Lim, T. Reyes</td>
</tr>
<tr>
<td>12:30 – 1:00 PM</td>
<td>MEDICAL GAMING SYSTEM</td>
<td>T. Sinclair, 9 degrees of Human</td>
<td>D. Ye</td>
<td>B. Andersen, A. Berkhout, E. Gainer, M. Ward</td>
</tr>
</tbody>
</table>

### LEVEL 7

**Session A**  
**Senior Design Project Oral Presentations**

#### LEVEL 7

<table>
<thead>
<tr>
<th>Time</th>
<th>Project Description</th>
<th>Sponsor</th>
<th>Faculty Advisor</th>
<th>Team Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.00 – 9:30 AM</td>
<td>LOW-COST GENERATOR</td>
<td>Marquette University</td>
<td>A. Dempsey</td>
<td>F. Batiz, D. Castiblanco, J. Garcia, M. Orndoff, T. Schultz</td>
</tr>
<tr>
<td>9.30 – 10:30 AM</td>
<td>REBUILD OF MARQUETTE UNIVERSITY LABORATORY FORGING PRESS</td>
<td>Marquette University</td>
<td>J. Domblesky</td>
<td>H. Hidrogo, B. Lucarelli, B. Nowak, R. Sessions</td>
</tr>
<tr>
<td>10:00 – 10:30 AM</td>
<td>MAKING THE UNDERSTANDING OF MOMENT OF INERTIA MORE FUN</td>
<td>Marquette University</td>
<td>V. Cariapa</td>
<td>A. Fairbank, N. Lindroth, N. Moehn, H. Quijano, A. Voeller</td>
</tr>
<tr>
<td>10:30 – 11:00 AM</td>
<td>LOW-COST MANUAL PUMP FOR DEVELOPING COUNTRIES</td>
<td>Marquette University</td>
<td>A. Bowman</td>
<td>C. Jemison, J. Keys, J. Radewahn, B. Starsky</td>
</tr>
</tbody>
</table>
11:00 – 11:30 AM  
BREAK

11:30 AM – 12:00 PM  
MAKING THE UNDERSTANDING OF FORCES MORE FUN
Sponsor: Marquette University  
Faculty Advisor: V. Cariapa  
Team Members: W. Gately, A. Michels, N. Organ, S. Sinopole

LEVEL 8

11:30 AM – 12:00 PM  
MARQUETTE UNIVERSITY BAJA CAR SHOCK ABSORBERS
Sponsor: SAE  
Faculty Advisor: J. Moore  

12:00 – 12:30 PM  
LOW-COST WATER PURIFIER FOR DEVELOPING COUNTRIES
Sponsor: Marquette University  
Faculty Advisor: V. Cariapa  
Team Members: M. Aiello, L. Figueroa, V. Marchese, P. McSorley, D. Orsi, J. Vinck

12:30 – 1:00 PM  
REDESIGN OF A LOW-COST STETHOSCOPE FOR DEVELOPING COUNTRIES
Sponsor: Marquette University  
Faculty Advisor: V. Cariapa  
Team Members: S. Cano, H. Gong, C. Hubbard, B. Negassí, D. Stolar, J. Tran

12:00 – 12:30 PM  
AQUAPONICS FOR THE POOR
Sponsor: Marquette University  
Faculty Advisor: V. Cariapa  
Team Members: J. Carpenter, J. Reeg, D. Sobski, M. Vander Heiden, N. Woida

12:30 – 1:00 PM  
MAKING THE UNDERSTANDING OF PROJECTILE MOTION MORE FUN
Sponsor: Marquette University  
Faculty Advisor: R. Crowley  
Team Members: Y. Ladeinde, C. Repking, E. Schmidt, C. Tate, N. Wagner
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.

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

OPUS
College of Engineering
MARQUETTE UNIVERSITY

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

DESIGN DAY 2021