ENGINEERING DESIGN NIGHT

WELCOME!

Join us in celebrating 35 capstone designs developed by teams of Electrical, Biomedical, and Mechanical Engineering seniors.

Thursday, April 28

5:00 - 7:00 p.m.

Davis Center, Grand Maple Ballroom

More information:
uvm.edu/cems/seed

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Wylo Biosciences

Engineering Design Night
Senior Capstone Poster Presentations

Thursday, April 28, 2022

UVM Dudley H. Davis Center
Grand Maple Ballroom

Presentations of Student Project and Posters from
**Departments of Mechanical Engineering and Electrical and
Biomedical Engineering
(ME 185-186, BME 187-188, EE187-188)
Professor Dustin Rand
Professor Kenneth Burkman
Graduate Teaching Assistant Anthony Julian
*And Presentation of the Engineering***
Honors Awards

Project 1 (Table B): Lyme Disease and Tick Testing Device- Wylo Biosciences
  Portable and low-cost device to collect and prepare tick samples for assay to assess whether ticks carry Lyme Disease pathogens.

Student Team: Josh Arvin, Hunter Duger, Joshua Miller, Calvin Pease, Anna Jane Brown
Mentor: Prof. Frederic Sansoz

Project 2 (Table U): Powered Mobility Platform- University of Vermont CESS
  Creation of a powered platform to accommodate a pediatric manual wheelchair, that would allow independent mobility for the user.

Student Team: Porter Awad, Max Farrington, Sirui Li, Zach Munson, Cameron Steele
Mentor: GTA Samantha Fox

Project 3 (Table J): Portable Interrogation System for FDR Sensors- University of Vermont CEMS
  Design a wireless sensor interrogation system that transmits a signal at one frequency (e.g., 900 MHz) and receives and records the power at double that frequency (e.g., 1.8 GHz). The system would be mounted on a train and used to monitor underground sensors along railbed to determine soil conditions during train operation.
Student Team: Carl Fung, Aidan Hamilton, Daniel Morton, Nolan Rogers
Mentor: Prof. Jeff Frolik

Project 4 (Table D): VANITAS- STK DESIGNS LLC
  Build upon and improve an existing technical model (robot) of nature that offers and receives balls to an interactive audience.

Student Team: Jipeng Chen, Cody Fisher, Luke Marcoon, Claire Smith, Thea Steeves-Boey
Mentor: Prof. Dustin Rand

Project 6 (Table K): Lake Champlain Water Quality Mapping with UAV- University of Vermont – CEMS

Use a UAV, Lora network and sensors for remote monitoring and mapping Lake Champlain water quality.

Student Team: Chandler Habig, Oliver Larsen, Zach Popke, Clayton Schroeder
Mentor: Prof. Tian Xia

Project 7 (Table M): ER Smokehouse- University of Vermont LCOM

Design a way for patients to smoke while in the emergency department or hospital without second-hand smoke compromising the health of others.

Student Team: Dakota Allen, Sean Applegate, Lily Audy, Isaac Downs, Trevor Ruzzo
Mentor: Prof. Yves Dubief

Project 8 (Table B): ACL Recovery Knee Brace- University of Vermont CEMS

Develop an ACL rehabilitation knee brace that can incorporate sensors to track the patient's recovery progress.

Student Team: Andrew Dubreuil, Haley Kuralt, Alex West, Kylie Willis, Yuying Zheng
Mentor: Prof. Ryan McGinnis

Project 9 (Table G): Paraplegia Mobility Platform- University of Vermont – Student Lead Project – Dustin Pereslete

Design an electro-mechanical wheelchair that can fully recline into a bed which can raise or lower to any reasonable level to allow a patient access to beds, chairs, tables and other structures completely autonomously, as well as enable them to rotate into a vertical position to attain normal eye level access with their fully enabled peers.

Student Team: Brendan Curry, Nolan Hogan, David Ma, Dustin Pereslete
Mentor: Prof. Mike Rosen

Project 10 (Table M): Digital Sketchpad- University of Vermont CEMS

Convert the raised line drawings created on the E.A.S.Y InTact sketch pad into a digital format for easy manipulation and sharing on a standard computer.

Student Team: Ran Bi, Owen Brandriss, Hannah Gonzalez, James Sheehan
Mentor: Prof. Mike Rosen

Project 11 (Table L): Lift Assist- Healthy Design Ltd.

Create a device for ICU patients to help them move their upper extremities to promote rehabilitation.

Student Team: Brendan Curran, Kai Hotelling-O'connor, Sara Kalb, Mark O'Connor, Tyler Ricchiuto
Mentor: Prof. Nic Fiorentino

Project 12 (Table N): Pressure-Regulated Urinary Catheter- Healthy Design Ltd.

Develop an indwelling urinary catheter system that allows the bladder to fill and drain at normal pressure levels, unlike current Foley catheters that continually drain the bladder rendering it always empty.

Student Team: Lydia Axelrod, Kirsten Homeny, Joseph Konvit, Ryan Murphy, Brigid Rose
Mentor: Prof. Rachael Floreani

Project 14 (Table L): Hemodialysis Filter Rotator- University of Vermont LCOM

Retrofit a home dialysis unit with a rotating filter to allow patients without blood thinners to perform dialysis at home.

Student Team: Nick Bowman, Nik Cobb, Aliza George, Steven O'Driscoll, Katie Thomas
Mentor: Prof. Yves Dubief

Project 15 (Table V): Gyromotion- Stimson Biokinematics

Redesign of the existing GyroCoach product so that the joint range of motion seen by observing the motion of the laser lines can be electronically measured and displayed.
Student Team: Ahmad Ilu, Hannah Sherriff, Keagan Thomas, Anna Ursiny, Shelbie Gebert
Mentor: Prof. James Kay

Project 16 (Table Q): Zen and the Art of Glitter Deposition- Integrity Industrial Inkjet Integration

Glitter depositing and removing module for use in digital inkjet 3D printing applications.

Student Team: Emma Marston, Jake Varakian, Anthony Vieriu, Helen Wang
Mentor: Prof. Jeff Marshall

Project 17 (Table P): WSU Insert Molded Joints- Hayward Tyler
Develop an optimized insert mold for wet wound motors for wye and straight joints required for the jointing of XLP wound stators.

Student Team: Beck Griswold, Eric Kuhn, Eric Roy, Nick Wilder
Mentor: Prof. Dustin Rand

Project 18 (Table R): Lung Sealant Burst Pressure Testing and Modeling- University of Vermont LCOM
Create a burst-pressure testing head that allows testing of several bio-patch to wound size ratios and develop a model that can predict the optimal patch size for sealing a given wound.

Student Team: Kailey Bell, Emily Day, Olivia O'Brien, Brad Young
Mentor: Prof. Dan Weiss

Project 19 (Table C): Airflow Effects on a Turreted Gun System- GD-OTS
Create a CFD cookbook to understand and optimize the airflow-induced loading on a turreted gun system to facilitate the development of a parametric model.
Student Team: Carson Barbour, Gordon Johnson, Scott Stanley, Jack Zwierzchowski, Lars Enstrom
Mentor: Prof. Jeff Marshall

Project 20 (Table E): Contact Temperature Sensor Mechanism- Hazelett
Design a mechanism that can measure the temperature (500-600 degree C) of a moving surface (7-9 meters per minute) with a contact temperature sensor.
Student Team: Sam Battles, Logan Griswold, Mason Rogers, Thomas Tousignant
Mentor: Prof. Douglas Fletcher

Project 21 (Table T): Drivetrain Optimization of Electric Rollerblades- Lightning Blades

Optimization of drive system for an electric rollerblade.

Student Team: Jeff Davis, Harris LaRock, Tyler Skroski, Aidan Keilty
Mentor: Prof. Zach Ballard

Project 22 (Table O): Product Integration of a TEC-Based Thermal Management System for a Laser Bank Module- 89 North

Optimize and integrate a thermal management system for a laser bank module which uses a thermoelectric heating/cooling element, heat sink, and fans to modulate the temperature of the system, into an existing product.

Student Team: Kyle Clays, Kaylan Hathaway, Sonam Sherpa, Jack Woodruff
Mentor: Prof. Eva Cosoroaba

Project 23 (Table O): Oil Remediation Probe Redesign- Bowles Corp

Redesign oil pump remediation probe to be quickly field replaceable and allow for sub-assembly troubleshooting that facilitates testing and repair.

Student Team: Thomas Giordano, Shannon Murphy, Eli Ogilvie, Abby Rathbun
Mentor: Prof. Jeff Frolik

Project 24 (Table F): AERODynamics – AERO

Design an improved aerodynamic nose cone for the AERO car based on CFD wind tunnel test data.

Student Team: Ricky Caron, Jack DeLorenzo, Patrick Man, Jack Nathan
Mentor: Prof. William Louisos

Project 25 (Table S): Biomass Compactor- DR Power Equipment

Create a device to compress yard waste (grass clippings, leaves, chipper/shredder output) into a smaller volume for eases of handling and disposal by modifying an existing log splitter.

Student Team: Kai Boyd, Alex Grimes, Matt Trycieckyj, Jason Veroff, Ryan Lloyd
Mentor: Prof. Jason Meyers

Project 26 (Table J): Active Sitting Measurement- QOR360.com
  Create an app that uses the accelerometers in a smart phone to measure
  how many calories are burned while sitting on QOR360 chairs.

Student Team: Claire Davis, Maggie Mayhew, Machlan Pettersen, Jade
Rigout
Mentor: Prof. Dryver Huston

Project 27 (Table I): BioFET Sensor Test Platform- GlobalFoundries
  Develop a test platform and procedure to enable GF to do fluid-testing
  of our BioFET sensors.

Student Team: Luc Capaldi, Wade Landrum, Bryce Rausch, Artur
Smiechowski
Mentor: GTA Anthony Julian

Project 28 (Table A): Vapor Deposition Tool Hoist- GlobalFoundries
  Design a hoist to lift a 60 lb lid on our physical vapor deposition tools
  such that it passes the safety requirements for the company, is able to
  be used in a clean room environment and can be duplicated across the
  fleet.
Student Team: Jack Kehoe, Mackenzie Beck, Emily Friedman, Aaron
Rucker, Jonathan Watzka
Mentor: GTA Anthony Julian

Project 29 (Table I): Die Size Polishing Jig- GlobalFoundries
  Develop a polishing fixture for semiconductor chips that will improve
  current manual processes.

Student Team: Megan Enman, Christophe Gessman, Adrien Plouffe,
Clifford Ransom
Mentor: Prof. Dryver Huston

**Project 30 (Table N): Handheld Tool for Cleaving Si Wafers-
GlobalFoundries**
  Design a handheld mechanical cleaving tool to generate a scribe line
  on the edge of a silicon wafer under an optical stereoscope with
  sufficient magnification for accurate alignment to target devices
  >20um.
Student Team: David Demasi, Will Jeffries, Chad Eddy, Jon Kerivan

Mentor: Prof. Ken Burkman

Project 31 (Table K): High Frequency High Voltage Device for RF Cellphone Applications- GlobalFoundries
  Design, Fabrication, and Measurement of High Voltage, High Frequency Device for an RF Cellphone Technology.

Student Team: Ethan Brueckner, Annie Cunningham, Lasana Drame
Mentor: Prof. Matthew Gallagher

Project 32 (Table W): Radial Expansion Testing Machine- m2
  Design and produce a "Radial Expansion Testing Machine' to apply accurate, repeatable and cyclic radial forces to a Ratcheting Medical Tourniquet (RMT) that will provide critical information in the development of future generations of RMT's.
Student Team: Jarod Fountain, Jon Lagoy, Patrick O'Connor, Jeffrey Steinman
Mentor: Prof. Dylan Burns

Project 33 (Table H): Cellular SecurShade Speed Control- SecurShade Inc.
  Design a system to control the speed and downward force of an emergency closure of a cellular window shade in a predictable and reliable manner.
Student Team: Beatrice Bellingham, Aaron Hogan, Alannah Kemple, Gary Mercy
Mentor: Prof. Dustin Rand

Project 34 (Table R): 3D Printing Filasticks Extruder- Filabot
  Modify an existing 3D printer that uses traditional filament to work with injection molded sticks (FilaSticks) of recycled plastic.

Student Team: Evan Demuynck, Cody Engel, Sam Fromowitz, Alex Hart, George Philbrick
Mentor: Prof. Dylan Burns

Project 36 (Table P): Dynamic Thrust Stand for Micropropulsion Measurements- Benchmark Space Systems
  Design a new dynamic thrust stand for measuring minimum impulse bit for small satellite thrusters.

Student Team: Avery Clotfelter, Jeff Goldman, Gabe Mailhot, Logan Park, Matt Zapata
Mentor: Prof. William Louisos

Project 37 (Table Q): Conveyor System for Tailings Dewatering Facility- Omya Inc.

Design a solution to achieve an automated, low maintenance and safe conveyance method to move flotation tailings from existing dewatering facility to a new onsite management area.

Student Team: Ben Ogden, Dan Wells, Ethan Cohen
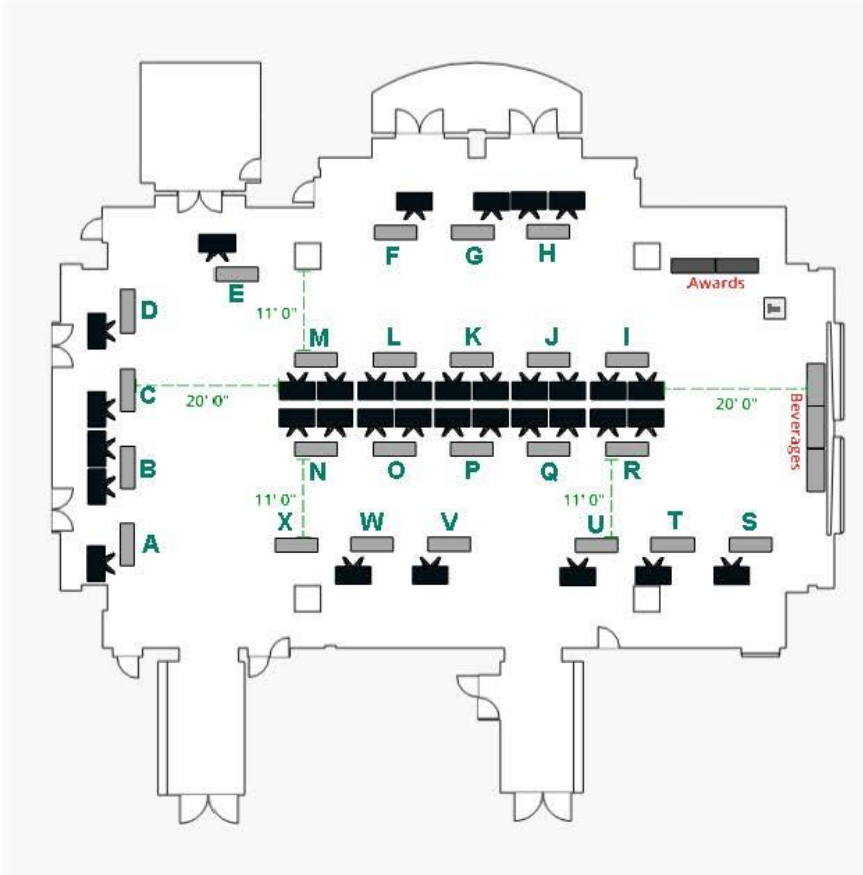**Mentor:** Prof. Jon Lens

Project 39 (Table V): Circumferential Insulation Elongation Tester- Harbour Industries LLC

Design a device to automate the elongation testing for multiple samples and sizes of PTFE wire insulation.

Student Team: Jack Boynton, Isaiah Foss, William Harvey, Oscar Lonaeus
Mentor: Prof. Dryver Huston

Table Layout

Heartfelt thanks to …

All who contributed to the success of the many projects including graduate students, faculty, and staff.

Graham Sherriff, University Engineering Librarian
Susanmarie Harrington, WID
Deb Fraser, The Vermont Space Grant
Lee Diamond, Risk Management & Safety,
Floyd Vilmont and Keith Saunders, The Machine Shop,
Jen Karson and the Fab Lab Team
Jen Main, The Dean's Office
Lauren Forcier, Department Administrator for Mechanical Engineering

Practicing professionals who have generously contributed their time and talents to supporting our teams throughout the year and our hardworking Work-study students!

Engineering Honors Awards- 2022

Civil & Environmental Engineering

Senior (Fay) Award- Clare A. Nelson (CE) and Jamie N. Keel (EENV)
Douglas P. Fay Award
Established in 1973 in honor of the former faculty member, this award is given to the student "who has made the greatest contribution to civil or environmental engineering during the past year."

Senior (Phelps) Award- Wyatt J. Matyas (EENV) and Peyton Lienhart (EENV)
Edward H. Phelps (Senior) Prize
The Edward Haight Phelps Award was established in 1884 by his father, the Honorable E.J. Phelps of Burlington. It was awarded by the faculty of Civil and Environmental Engineering to a student in the program "who shall have exhibited conspicuous merit in professional studies, and high and noble traits of character, if such can be found."

American Society of Civil Engineers Award- Matthew Nemeth
For meritorious work in the student chapter of ASCE.

Junior Award- Jacob Ladue (CE) and Courteney Hales (EENV)
For outstanding scholarship and commitment to civil/environmental engineering during junior year

Sophomore (Millbank) Award- Daniel Callahan (CE) and Josephine H. Alling-Graney (EENV)
Reginald Milbank (Sophomore) Award
In honor of Professor Reginald V. Milbank, who served the program for 23 years, this award was established in 1970 and is awarded annually to the "outstanding sophomore enrolled in Civil and Environmental Engineering and the University of Vermont."

Student Scholastic Achievement Award- Michael Newton (EENV) and Mia Grasso (EENV)
In recognition of outstanding academic success and placement on the Dean's list throughout the college career

Electrical and Biomedical Engineering

Senior EE Award- Carl Fung and Maggie Mayhew
Atwater-Kent (Senior) Award
For an undergraduate student who has demonstrated extraordinary qualities of integrity and commitment to others through outstanding service to faculty, staff, and students at the College of Engineering and Mathematical Sciences

Senior BME Award- Claire Davis
For excellence in performance and greatest promise of success.

Junior BME Award- Julianne Boughton and Claire Leahy
For excellence in performance and greatest promise of success.

Junior EE Award- Ian Barnaby and Noah Logan
For excellence in performance and greatest promise of success in electrical engineering.

IEEE Award- Ben Jackson
For fostering technological innovation and excellence for the benefit of humanity.

BME Program Award- Kylin (Kylie) Willis
For fostering inclusion, excellence, and awareness of all aspects of Biomedical Engineering.

BME Graduate Award- Brooke Bednarke
For research excellence and greatest promise of success.

Veinott Graduate Award- Yudan Liu
Cyril G. Veinott (Graduate) Award
For excellence in performance and greatest promise of success.

Mechanical Engineering

AAIA Award- Avery Clotfelter and David Demasi

For meritorious work in the student chapter of the American Institute of Aeronautics and Astronautics.

ME Grad Teaching & Outreach Award- Brandon Gamble
For excellence in performance and greatest promise of success.

ME Graduate Research Award- Josh Girard
For excellence in performance and greatest promise of success.

Senior Award- Kai Boyd and Tyler Skroski
Edmund F. Little (Senior) Award
For meritorious work in the mechanical arts.

Junior (Fahey) Award- Analiese Parsons
Sean O'Flaherty Fahey Commemorative (Junior) Award
For a junior mechanical engineering student who reflects the engineering achievements and spirit of Sean O'Flaherty Fahey.

Sophomore Award- Bjorn Westervelt and Elizabeth Zheng
For outstanding scholarship and commitment to mechanical engineering.

ME Undergraduate Research Award- Logan Griswold
For excellence in performance and greatest promise of success.

ME Undergraduate Service Award- William Jeffries
For excellence in performance and greatest promise of success.

Dean's Office Awards:

Engineers Without Borders Award- Olivia Mead
For the greatest contribution to the activities and objectives of the student chapter of EWB.

Society of Women Engineers Award- Sara Kalb
For the greatest contribution to the activities and objectives of the student chapter of SWE.

EMGT Senior Award- Ahmad Ilu

In recognition of academic excellence in the field of engineering management.

June Veinott Award- Maurah Gorney
June Veinott (Women in Engineering)
To the female student who, at the end of her first year of study, shows the greatest promise of being successful in the engineering profession.

Tau Beta Pi Outwater Prize- Kylin (Kylie) Willis
Tau Beta Pi John O Outwater Prize
To the outgoing president of Tau Beta Pi who, by virtue of the office, has demonstrated skill, tact and initiative.

Dean's Recognition/Gorky Award- William Jeffries
Brett Vincent Gorky- Dean's Recognition Award
For an undergraduate student who has demonstrated extraordinary qualities of integrity and commitment to others through outstanding service to faculty, staff and students of the College of Engineering and Mathematical Sciences.

Student Engineer of the Year: Luc Capaldi (ME)
Nominees
- Kennedy Brown (CE)
- Anna Grunes (EENV)
- Kailey Bell (BME)
- Maggie Mayhew (EE)
- Luc Capaldi (ME)