

**WHEN:**  
**FRIDAY APRIL 26, 2019**  
**5:00 - 7:00 PM**

**WHERE:**  
**SILVER MAPLE BALLROOM**  
**DAVIS CENTER**

# DESIGN NIGHT



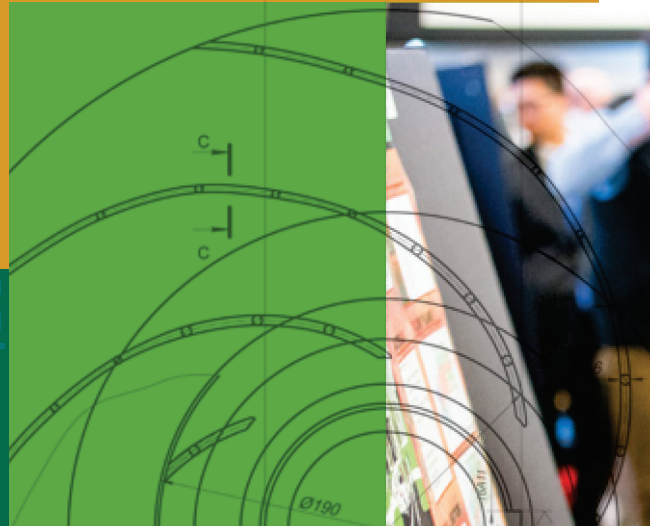
The University of Vermont  
COLLEGE OF ENGINEERING  
& MATHEMATICAL SCIENCES

**COLLEGE OF ENGINEERING AND MATHEMATICAL SCIENCES**

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## SPONSORS

- AERO Club
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- Intrepid Athletics
- Make My Life Easier
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- Stratton Mtn. School
- SUSOIX
- Town of Dorset, Vermont
- Town of White River Junction, Vermont
- University of Vermont
- University of Vermont - CEMS
- UVM - LCOM
- Vermont Energy Control Systems LLC
- Victoria Hand
- Village of Derby, Vermont
- Village of Essex Junction Bike/Walk Committee



Welcome to our celebration of the engineering profession and over 40 capstone designs developed by teams of Civil, Electrical, Environmental, Biomedical and Mechanical Engineering seniors!

**Engineering Design Night**  
**Senior Capstone Poster Presentations**

**Friday, April 26, 2019**  
**UVM Dudley H. Davis Center**

*Presentations of Student Project Posters from*  
**Departments of Mechanical Engineering and Electrical and  
Biomedical Engineering  
Capstone Design Project  
(ME 185-186, EE 187-188)  
Professor Dustin Rand  
and  
Department of Civil and Environmental Engineering  
Senior Design Project  
(CE 185-186)  
Professor John Lens**

*And Presentation of The Engineering*  
**Honors Awards**

**Student Engineer of the Year – Evan Fennelly (EE)**  
***University of Vermont Student Engineer of the Year Award***

For outstanding scholastic achievement and participation in University-related activities

*Presented at the Vermont Society of Professional Engineers annual banquet held on February 22, 2019.*

**Student Engineer of the Year:**

**Nominees:**

**Holly Dahlgren (BME)**  
**Anuarbek Onayev (CE)**  
**Sienna Roberge (EnvE)**  
**Emma Garvey (ME)**

**Dean's Recognition/Gorky Award – Sienna Roberge**  
***The Brett Vincent Gorky – Dean's Recognition Award***

For the undergraduate student who has demonstrated extraordinary qualities of integrity and commitment to others through outstanding service to the faculty, staff and students of the College of Engineering and Mathematical Sciences

*Established by Paul Gorky and Donna Young-Gorky in memory of their son, Brett Vincent Gorky*

**Undergraduate Service Award – Katie Stokes**

For excellence in performance and greatest promise of success

**Honorary & Professional Society Awards**

**AIAA Award – Duncan Hacker**

***American Institute of Aeronautics and Astronautics (AIAA) Award***

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

**ASME Award – Brandon Voll and Jonathan Burton**

***American Society of Mechanical Engineers (ASME) Award***

For meritorious work in the student chapter of the American Society of Mechanical Engineers

**SWE Award – Holly Dahlgren**

***Society of Women Engineers Award***

For the greatest contribution to the activities and objectives of the student chapter of SWE

**Tau Beta Pi Outwater Prize – Jessica Sheridan**

***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

**June Veinott Award – Beatrice Bellingham and Jillian Rathman**

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

**Engineers Without Borders Award – Sienna Roberge**

For the highest quality contribution to the Engineers without Borders student chapter and embodying the humanitarian ideals of EWB

**Department of Mechanical Engineering and the  
Department of Electrical and Biomedical  
Engineering:**

**Faculty Mentor: Dustin Rand, P.E.**

**Project 1: 'ExerGames' Video game therapy for intubated patients -  
Healthy Design Ltd.**

Develop a method for ICU restrained patients to play video games and communicate easily and safely.

Student Team: Evan Mckenzie, Elliott Read, Matt Jacobs

**Project 3: Cable Auto Tie in - Harbour Industries LLC**

Automated system that ties two strands of cable with minimal operator input during production at Harbour Industries manufacturing facility.

Student Team: Sawyer Woodland, Huaxing Liu, Nathaniel Froehlich, Nicholas Fitzsimmons

**Project 4: Breath Biofeedback Game for Patients with Paralysis –  
UVM - LCOM**

Produce a system using wireless sensors to record patient breathing data during breathing exercises instructed by a game.

Student Team: Matt Beecher, Alice Murphy, Emma Garvey, Luis Garcia

**Project 5: Collapsible Step Stool - Make My Life Easier**

Develop a stowable ladder or stool that will fit inside market shelves which can be accessed readily by grocery store staff.

Student Team: Sam Brown, Ward Gao, Logan Drexler, Harry Clinton

**Project 6: CubeSat Attitude and Control Testbed - University of  
Vermont - CEMS**

Produce a test bed that utilizes compressed air to generate lift of a CubeSat allowing the client to rotate it with at least one degree of freedom and measure data simultaneously.

Student Team: Rex Calabrese, Cliff Witte, Andrew Strauss, Duncan Hacker, Zach Harrington

**Project 8: System for Preventing Falls in Persons with Multiple Sclerosis - UVM - CEMS**

Create and implement a phone app that can receive real time data stream from accelerometers and use mHealth's proprietary software to determine and alert patients with multiple sclerosis if they are at a risk of falling.

Student Team: Chris Erkson, Sierra McConnell, Melissa Seib, Joe Nuzzolo

**Project 9: Self-Propelled Stump Grinder Electric Hub Motor - Country Home Products**

Add motors and a set of batteries that will allow the user to automatically propel the stump grinder from one location to another.

Student Team: Matt Chipman, Charlie Lucier, Zach Beebe, Brandt Vermillion, Eric Roback

**Project 10: Safe Stove India Project - Helping Hands Center**

Develop a new inexpensive stove for rural communities in India that will prevent women and children from potentially getting burned during cooking.

Student Team: Joe Doyle, Kaela Malaki, Sydney Whipple, Tarun Manthena

**Project 11: Semi-autonomous remote sense and control module - Vermont Energy Control Systems LLC**

Develop a remote-control system that is able to communicate with the client's system wirelessly and reduce the amount of wiring required (and thus cost) for the client's current system

Student Team: David Casper, Ming Qin, Justin Govindu, Atreyu Spencer

**Project 12: Stratton Mtn. School Air Awareness Ramp - Stratton Mtn. School**

Design an adjustable indoor ski and snowboard ramp that can create multiple trajectories for the different type of student athletes.

Student Team: Andrew Bock, Alex Haughton, Jon Burton, Drew Gallant, Derek Eidem

**Project 13: SUSOIX SpikeBoard Disc Brake with Self Arrest - SUSOIX**

Design a breaking mechanism for the Spikeboard to decelerate and stop riders descending hills.

Student Team: Aidan Laracy, Read Frost, Tara Nenninger, David Bryant, Aakash Vachhani

**Electrical and Biomedical Engineering**

**Junior Award (BME) – Alicia Tanneberger and Jon Ferri**

For excellence in performance and greatest promise of success in Biomedical Engineering

**Junior Award (EE) – Abdoulaye Ira**

For excellence in performance and greatest promise of success in Electrical Engineering

**Senior Award – Evan Fennelly**

***Atwater-Kent (Senior) Award***

For excellence of judgment and understanding of the principals of Electrical Engineering

**Senior Award (BME) – Jordyn Scism and Luis Garcia**

For excellence in performance and greatest promise of success

**Cyril G. Veinott (Graduate) Award – Marcia Golmohamadi**

For excellence in performance and greatest promise of success.

**Mechanical Engineering**

**Sophomore Award – Sadie Kass, Josh Gerrard and Ayden Henson**

For outstanding scholarship and commitment to mechanical engineering

**Junior (Fahey) Award – Eve-Audrey Picard**

***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

**Senior Award – Emma Garvey and Becca Osborn**

***Edmund F. Little (Senior) Award***

For meritorious work in the mechanic arts

**Graduate Teaching and Outreach Award – Samuel Whitmore**

For excellence in performance and greatest promise of success

**Graduate Research Award – Xiangxiao (Selina) Yao and Lukas Adamowicz**

For excellence in performance and greatest promise of success

**Undergraduate Research Award – Collin Freiheit**

For excellence in performance and greatest promise of success

## Engineering Honor's Awards – 2019

### Civil & Environmental Engineering

#### **Sophomore (Millbank) Award – Linh Nguyen (CE) and Isabelle Augustin (EnvE)**

##### ***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”

#### **Junior Award – Gregory Thivierge (CE) and Eliza Jobin-Davis (EnvE)**

Given each year by the Faculty of the Civil and Environmental Engineering Program to a junior who “best displays outstanding scholarship and commitment to civil engineering”

#### **Senior (Fay) Award – Heidi Thorne (CE) and Sienna Roberge (EnvE)**

##### ***Douglas P. Fay Award***

The Douglas P. Fay award was established in 1973 in honor of a faculty member who long served the program and is made to that student “who has made the greatest contribution to the Program of Civil and Environmental Engineering during the past year”

#### **Senior (Phelps) Award – Joshua Wasilewski (CE) and Jessica Sheridan (EnvE)**

##### ***Edward P. Phelps (Senior) Prize***

The Edward Haight Phelps Award was established in 1884 by his father, the Honorable E.J. Phelps of Burlington. It is 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”

#### **Student Scholastic Achievement Award – Dunia Karzai**

In recognition of outstanding academic success and placement on the Dean's list throughout college career

#### **Project 14: TAC - Track Assisted Carts - Built by Newport**

An autonomous moving cart that can transport materials from one end of a furniture assembly line to another with minimal user input.

Student Team: Zack He, Sam Andris, Wils Ezequelle, Edward Ling, Paul Lowe

#### **Project 15: Vehicle Data Collection System – UVM – AERO Club**

Develop a vehicle data acquisition system that will be able to give real time feedback of the vehicle's dynamics to assist future AERO team members with adjustments to improve vehicle performance.

Student Team: Ryan Chevalier, Peter Ferland, Cullen Jemison, Jack Zimmerman

#### **Project 16: Vocal Synthesizer – Vocal Synthesizer – Student Team**

A cool electronic mixing device that will take in real time user voice input and output auto-tuned voice signals with the desired user chords.

Student Team: Margot Criscitiello, Ben Crystal, Haley Greenyer, Elias Levinson

#### **Project 17: Analyzing and Building a more efficient Snow-gun - UVM - CEMS**

A suite of sensors that can detect the local weather conditions and that of snowmaking fluid to optimize the conditions of a snow gun and make snow production more efficient.

Student Team: Maeia Reagle, Scott Tanch, Ben Walsh, Taylor Roth

#### **Project 18: Hydrodynamic Bearing Wear Detection - Hayward Tyler**

Create a non-contact sensing mechanism that can detect differences in bearing wear of critical pumping systems. The sensor operates in high temperature and pressure environment and informs staff when the bearings require maintenance.

Student Team: Wesley L'Italien, Evan Fennelly, Tim Laracy, Carter Beeman

#### **Project 19: Additive Manufacturing for a Weapons System. General Dynamics**

Investigate the feasibility of using additive manufacturing for components of a development weapon system. This study will help determine what material properties exist, how designs need to be altered and how the costs compare to existing machining operations.

Student Team: Zach Moyse, Jack Fletcher, Michael Calascibetta, Matthew Bouvier, Kevin Capone

**Project 20: SecurShade Remote - SecurShade Inc.**

A remote controller that can automatically shut classroom shades during an active shooter situation. The remote will also be able to change shade height during non-emergency situations.

Student Team: Rex Patrick Fiske, Mateo Gray, Alex Allardi

**Project 21: Application Specific Prosthetic Attachment - Victoria Hand**

Create prosthetic attachments for Victoria hand's already existing prosthetic arm that will allow users to ride bicycles as well as utilize eating utensils.

Student Team: Binyameen Ghafoor, Alex Troche, Josh Goodrich, Katie Stokes

**Project 22: Greenhouse Gas (GHG) Drone Sensor System - UVM - CEMS**

A lightweight and inexpensive gas sensor system that can be attached onto a drone to collect greenhouse gas data during the drone's flight.

Student Team: Chris Barry, Antonio Jackson, Sam Zeltner, Ayomikun Adekunle-Fatokun

**Project 23: Low-Flow Lead (Pb) Snout - Hazelett**

A new lead snout that will improve lead flow conditions to improve the casting of continuous lead slabs.

Student Team Brandon Voll, Matthew Argraves, Samuel Ligon, Haihang Chen

**Project 24: Prosthetic Versa Foot to Snowboard Step on Binding Adaptor - Burton**

Adapt Versa Foot's to Burtons bindings to allow para-snowboarders to regain the full dexterity of a typical snowboarder

Student Team: Maggie Leon, Isabel Silveira, Arnar Hansson, Bijan Motia

**Project 25: Ice Cream Giveaway Control - Ben & Jerry's**

Analysis of the fluid flow conditions during ice-cream production that will elucidate the parameters that need to be controlled to reduce the amount of ice-cream give away during large scale production at Ben and Jerry's.

Student Team: Philip Nicolescu, Michaela Alonzo, Becca Osborn, Sophia Hodson

*Heartfelt thanks to ...*

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

Kerry Swift, Corine Farewell, Office of Technology Commercialization

Graham Sheriff, University Instructional Design Librarian

Lee Diamond, Francis Churchill, Office of Safety

Joshua Brown, Office of Communications

Floyd Vilmont, College of Engineering and Mathematical Sciences  
Prototype Facility

Administrative Assistants - Karen Bernard, Department of Mechanical Engineering; Katarina Khosravi, Department of Electrical and Biomedical Engineering; Pattie McNatt, Department of Civil and Environmental Engineering; and Debra Frasier, Project Coordinator, Vermont Space Grant Consortium

Course Teaching Assistants: Andrea Elhadj, CE and EnvE; and Eduardo Valdez, ME and EBE

Susan Munkres and Tom Wilson, Office of Community-University Partnerships and Service Learning (UVM CUPS)

Practicing professionals who have generously contributed their time and talents to supporting our teams throughout the year.

Faculty Mentors, Clients and Community Partners.

**Project 45: White River Multi-modal Transportation Improvements-Downtown Core Mobility Project – Town of Hartford, Vermont**

Design of improvements to parking and streetscapes to enhance pedestrian, cycling, and vehicle circulation and accessibility to downtown amenities.

Student Team: Kory J. Dotson, Michael O. Poulin, Nina A. Truslow

**Project 46: White River Village Multi-modal Transportation Improvements-External-to-Downtown Corridor – Town of Hartford, Vermont**

Design of improvements for traffic circulation directed to the downtown core in conjunction with the companion team concentrating on the downtown core.

Student Team: Joseph A. Casper, Samuel P. Gaillard, Tom K. Wiggins

**Project 47: DOE Race-to-Zero Competition – UVM CEE Capstone**

Design of building envelope and other reduced energy-use features for a new multi-unit residential building.

Student Team: Dunia Karzai, Justin LaRoche, Heidi R. Thorne

**Project 48: Votey Lot Transportation and Environmental Improvements – University of Vermont**

Design of parking lot reconstruction to reduce and mitigate untreated stormwater runoff and provide a sustainable parking lot design.

Student Team: Jaime I. Jacobs, Doris Jenkins, Ryan C. Morse, Aidan G. Ryan

**Project 49: Harvey Lake Dam Removal Remediation Engineering and Design – Lake Harvey Association**

Design of a weir dam at the outlet of Harvey Lake to accompany removal of a downstream dam on Peacham Brook.

Student Team: Bobby J. Lanzilotta, Lindsey C. Menard, Jess C. Sheridan, Sean Wines

**Project 50: Aquatic Center Conceptual Design – Intrepid Athletics**

Design of a brownfield site reuse for a community-based aquatic center and recreational facility, including structural and site design.

Student Team: Keven J. Borges, Shannon E. Geary, Violet I. Rosenberg, Joshua R. Wasilewski

**Project 51: Brookside Drive Flooding Remediation – Town of Dorset, Vermont**

Design to mitigate recurring flooding over a residential neighborhood access road.

Student Team: Shawn M. Cochran, Dakota D. DelSignore, Jake D. LaFontaine; Rebecca A. Shedd

**Project 26: Low Cost Ice Cream Lid Dispensing - Ben & Jerry's**

An autonomous ice cream lid dispenser that will take ice cream lids and sort and feed them into the production line with minimal to no user input.

Student Team: Vince Yannelli, Connie Ou, Nicholas Hermary, Andrew Vanacore III, Elliot Buckley

**Project 27: Device to measure the torque-rotation response of the knee joint – UVM – LCOM / CEMS**

Knee Device that can securely fasten a patient's leg and allow doctors to accurately measure the resistance to torque that the patient's knee joint is able to produce.

Student Team: Kiki Cunningham, Jordan Moskowitz, Jordyn Scism, Katlyn Hall

**Project 28: Human Simulation for Medical Procedures – UVM - LCOM**

A bio-simulated abdomen that will recreate conditions during the biopsy of a human liver. The device will simulate patient breathing as well as the presence of abscesses.

Student Team: Sharvari Athalye, Holly Dahlgren, Omolola Smith, Meredith Kelly

**Project 30: Greenhouse Gas Auto-Chamber – UVM - CEMS**

A chamber that will automatically close every hour to allow the sensors to capture greenhouse data in the field.

Student Team: Jon Hart, Owen McElhinney, Emily Kornfein, Robert Butler, Alexis Ziegler

**Project 31: DOE Race-to-Zero 2018/19 – UVM - CEE Capstone**

Design the mechanical, electrical and plumbing for a residential apartment building in collaboration with Civil/Environmental Capstone and DOE Race-to-Zero competition. Design a solar shade that will reduce the amount of light coming into people's homes during summer.

Student Team: Ryan Szczerbinski, Evan Smith, Jacob Corey

**Project 32: Optical Emission Fiber Probe for High Enthalpy Plasmas - UVM - CEMS**

A test probe that that can be into plasma that will measure light to detect the plasma conditions. The probe will be able to resist temperatures over 7,000 kelvin.

Student Team: Collin Freiheit, Jeffrey Schindler, Andrew Morin, Alex Harrington



**Project 34: Bio-patch Testing Device - UVM - LCOM**

A device that will allow the users to control and automate the pressure changes injected into a Bio-patch simulating the lung. to test the mechanical properties of said patch.

Student Team: Lynn Wood, Yale Young, Isaiah Crews, Nichol D'Aquila

**Department of Civil and Environmental Engineering:**

Faculty Mentor: John E. Lens, P.E.

**Project 35: Burlington Combined Sewer Overflow Mitigation Central Team – City of Burlington Department of Public Works**

Design of an underground storage tank and odor control system for temporary storage for flow equalization of combined sewer overflows reaching the Burlington main wastewater treatment facility.

Student Team: Meghan E. Close, Scott M. Ganz, Clay R. Gattey, Eric T. Romero

**Project 36: Burlington Combined Sewer Overflow Mitigation South Team – City of Burlington Department of Public Works**

Design of the pumps, pipelines, and sludge cleaning system for an overflow temporary storage tank to hold and flow-equalize combined sewer overflows reaching the Burlington main wastewater treatment facility.

Student Team: Quinn Ledak, Jordin J. Lemire, Cheng Zhu

**Project 37: Burlington Combined Sewer Overflow Mitigation North Team –Reducing Overflows Using Green Stormwater Infrastructure – City of Burlington Department of Public Works**

Design of stormwater runoff reduction using blue-roofs and pervious pavement to reduce and delay the combined sewer flows reaching the Burlington main wastewater treatment facility.

Student Team: Zelda J. Dively, Merrick V. Gillies, Xiao Lin

**Project 38: Pine Street and Lakeside Drive Street Flooding Mitigation – City of Burlington Department of Public Works**

Design of stormwater runoff reduction, delay and conveyance measures to lessen the flooding at this intersection during rainfalls and snowmelt.

Student Team: David Clemmer, Lizzy R. Duffy, Elyssa C. Gould, Tom S. Rioux

**Project 39: Drinking Water Treatment System Improvements – Village of Derby Center, Vermont**

Design of improvements to improve efficiency and reliability of the slow-sand drinking water treatment plant.

Student Team: Alex Adamski, Christian N. Boisvert, Mikah M. Inkawhich, Sienna L. Roberge

**Project 40: Roy Street Wastewater Disposal Remediation – Village of Derby Center, Vermont**

Design of remedial measures for a residential neighborhood with failing individual home septic systems.

Student Team: Melanie R. Drummond, Brett A. McCreary, Troy A. Rosenberg, Ryan S. Weinstein

**Project 41: Shattuck Hill Wastewater Disposal Remediation – Village of Derby Center, Vermont**

Design of remedial measures for a residential neighborhood with failing individual and cluster septic systems.

Student Team: Jenna E. Bragdon, Andrew J. Carter, Liam J. Donovan, Shengqing Lin

**Project 42: East Village Traffic Mitigation and Streetscape Redesign – Village of Essex Junction Bike and Walk Advisory Committee**

Design to mitigate traffic shortcutting through a residential neighborhood and improve the associated streetscapes for cycling and walking safety.

Student Team: Shuai Cao, Luke P. Chamberlin, Casey T. Holleran, Audrey L. Mann

**Project 43: West Village Traffic Mitigation and Streetscape Redesign – Village of Essex Junction Bike and Walk Advisory Committee**

Design to mitigate traffic shortcutting through a residential neighborhood and improve the associated streetscapes for cycling and walking safety.

Student Team: Ian Maerki, Josh E. Taylor, Schuyler W. van Pelt

**Project 44: Central Village Traffic Mitigation and Streetscape Redesign – Village of Essex Junction Bike and Walk Advisory Committee**

Design to mitigate traffic shortcutting through a residential neighborhood and improve the associated streetscapes for cycling and walking safety.

Student Team: John T. Buckley, Austin J. Burke, Annaliese Keimel, Anuarbek Onayev,