### Project sponsors include...

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<td>Vestigo Ventures</td>
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Once a year, WPI students take time out from their studies to present to their faculty advisors and sponsors the results of their Major Qualifying Projects, or MQPs (one of two significant academic projects all WPI students complete). The MQP is a professional-level design or research experience generally completed in teams and often sponsored by corporations or other external organizations. The projects mirror the kinds of professional work students will tackle in their careers.

The project experience prepares students to lead team efforts, to communicate professionally, to meet deadlines and exceed expectations, to deal with ambiguity and unexpected difficulties, and to consider not just the technical, but the ethical and social dimensions of their work. The projects must be thoroughly documented in written reports, and virtually all teams make oral presentations of their results. These are the presentations you will see today.

Often MQPs lead to publications in peer-reviewed journals, presentations at regional and national conferences, and patents. Some become the foundations for entrepreneurial ventures. Others become useful innovations and products for their corporate sponsors. But no matter what becomes of an MQP, the chances are it has already served as an effective capstone to a WPI education and a profound steppingstone to a successful and rewarding career and life.

**Presentations by Department**

3 Aerospace Engineering  
4 Bioinformatics and Computational Biology  
4 Biology and Biotechnology  
5 Biomedical Engineering  
8 Business  
9 Chemical Engineering  
11 Chemistry and Biochemistry  
13 Civil, Environmental, and Architectural Engineering  
15 Computer Science  
18 Data Science  
19 Electrical and Computer Engineering  
20 Humanities and Arts  
21 Interactive Media & Game Development  
22 Mathematical Sciences  
23 Mechanical Engineering  
25 Physics  
27 Professional Writing  
28 Robotics Engineering  
30 Social Science and Policy Studies
Presentations by Department

Aerospace Engineering

Higgins Labs, Room 116

8:30am
Long Range Precision Aerial Delivery System
Benjamin English, Anthony Gosselin, Johnathan Lazo, Trevor Shrady
Advisor: Raghvendra Cowlagi, Gregory Noetscher (Army Lab)

8:50am
Low-Cost Quadrotor Micro-Aerial Vehicle
Akul Agarwal, Antonio Calcagni, Martin Runquist, Nicolas Hesel
Advisor: Raghvendra Cowlagi

9:10am
Estimation of a Plume with a UTV
John McCarthy, Vincent Mitala, David Ibrahimi
Advisor: Michael Demetriou

9:30am
Design and Testing of Lattice Structures for Noise Reduction
Jake Franklin, Alexander Hodge, John Spencer Kerwin, Bethany Ramsbottom
Advisor: Nikhil Karanjigaokar

10:00am
Micro-Aircraft Design for SAE Competition
Samuel Pitkowsky, David Van Sickle, David Tomer, Connor Miholovich, Christian Chadwick, Justin Schoepke
Advisor: Prof. Olinger

10:20am
Aircraft Design for AIAA Design Build Fly Competition
Bridget Wirtz, Joshua Martin, Christopher Davenport, Jordan Jonas, Samuel Vinson, Harrison Mazur
Advisor: Zhangxian Yuan

10:40am
Design, Analysis, and Test of a High-Powered Model Rocket
Kirsten Bowers, Abigail Collins, Alex Harrigan, Tyler Hunt, Theresa Larson, Daniel Mattison, Troy Otter, Connor Walsh
Advisor: John Blandino

11:00pm
Design, Implementation, and Testing of Apparatus to Investigate Combustion Phenomena Relevant to High-Altitude Relight
Ethan Davis, Meenakshi Kodali, John Sirois, Jonathan Stern
Advisor: Jagannath Jayachandran

11:20am
Redesign and Testing of a Surface UnderSea Kite Model
Olivia Chiasson, Adrienne Curtis, Thomas Rau, Zachary Sotland, Andrew Ventura Molina
Advos: David Olinger, Nancy Burnham (PH)

11:50am
Design of a NanoSat for an Ionospheric Mission
Phillip Durgin, Veronika Karshina, Samuel Waring
Advisor: Zachary Taillefer

12:10pm
Design of a 6U CubeSat for an Ionospheric Science Mission
Jeremy Gagnon, Drake Tierney, Christopher Ritter
Advisor: Michael Demetriou

12:30pm
Design of a 6U CubeSat for an Ionospheric Science Mission
Tyler Lizotte and Harrison Smith
Advisor: Nikolaos Gatsonis
Design and Analysis of SmallSat Mission to Venus
Leila Card, Dakota Cross, Paul Golias, Yuvraj Pathania, Daniel Santamaria-Hopkins, Sidney Williams
Advisor: Zachary Taillefer

Bioinformatics and Computational Biology

POSTER SESSION, 9:30 am to 11:30 am
Rubin Campus Center, Odeum

Multi-cell RNA-Seq (mcRNA-Seq): A computational approach to bridge the precision of single-cell and coverage of bulk RNA-Seq
Jules Cazaubiel, Nicholas Tourtillott
Advisor: Dmitry Korkin

Direct RNA Sequencing and Transcriptomic Analysis of the Soil Organism Pseudomonas putida
Maia Grant, Stokley Voltmer
Advisors: Natalie Farny (BBT), Eric Young

Using Proximity Labeling to Characterize Protein Neighborhoods of the Moss Exocyst Complex
Samantha Mora, Emily Musser, Julia Tatone
Advisors: Elizabeth Ryder, Luis Vidali, NIH

Predicting Becker and Duchenne Muscular Dystrophy Progression through the neuroMuscular Observational Datahub
Justin Moy
Advisor: Elizabeth Ryder

A Prototype Biovisualization of Gene Expression Changes in the Mycobacterium tuberculosis Metabolic Pathways
Adrian Orszulak
Advisors: Lane Harrison, Scarlet Shell

From Bumblebees to Butterflies: Expanding the Beecology Citizen Science Project Webapp and Database
Aidan Pecorale, Jared Poulos
Advisors: Carolina Ruiz, Elizabeth Ryder, NSF

Biology and Biotechnology

POSTER SESSION, 9:30am to 11:30am
Rubin Campus Center, Odeum

The Effects of Phytoestrogens on Osteoblast Differentiation
Brigid Griffin, Emma Hartzel, Marine Herman, Kelly Makechnie
Advisors: Michael Buckholt, Jill Rulfs

The Effects of mRNA Abundance on mRNA Degradation Rate
Van Le, Adrian Orszulak
Advisor: Scarlet Shell

Microbial Community Models for Measuring Survival and Persistence of SynBio Microbes in Soil
Alexis Rock
Advisor: Natalie Farny

Visualizing PtdIns(4,5)P2 in Tip Growing Cells of Physcomitrium patens
Eric Bormann
Advisors: Elizabeth Ryder, Luis Vidali

A Rhetorical Inquiry: Molecular Characterization of the Histone Methyltransferase Suv420 as a Grant Proposal
Cristian Nunez
Advisors: Ryan Madan (Professional Writing), Amity Manning

Analyzing Microbial Interactions in the Gut Microbiome
Emily Cimino, Dawn Frederick
Advisor: Reeta Rao

Purification of moss CLoG1 through HaloTagging and Elution by PreScission Protease
Emily Deberadinis, Elizabeth West
Advisor: Lou Roberts

Sheltering & Foraging Behavior in Relation to Mating Season in the Crayfish F. virilis
Sydney Atkinson, Erin Bryan, Jack Kruse, Nathan Sarachick
Advisors: Mike Buckholt, Lauren Mathews

PERK Up! Resveratrol-Induced Stress Granules Involve PERK Pathway Activation
Megi Kola, Julia Milks, Meghan Staples, Alexandra Wall
Advisors: Natalie Farny, Lou Roberts
Metaphase Chromosome Alignment Is Sensitive to Dynein-Dependent Forces at the Cell Cortex
Kylie Belanger
Advisor: Amity Manning

Exploring the Limits of F1 Phage Hosts
Marissa Lima, Rianna Ray
Advisor: JoAnn Whitefleet-Smith

The Effect of Proximity to Urbanization on Piping Plover Nest Productivity
Megan Brady, Hannah Dobson, Tess Flaherty
Advisor: Marja Bakermans

Examining the Effects of Resveratrol on Stress Granules
Michaela Sorrento
Advisor: Natalie Farny

Analyzing the Effect and Trends of Rodenticides on Birds of Prey
Sabine Garcia, Amanda Schnapp
Advisor: Marja Bakermans

Structure/Function Studies of EGFR Family and Kek1
Sarah Doherty
Advisor: Joseph Duffy

Investigating the Composition of Resveratrol-Induced Stress Granules
Sarah Jones, Kathryn Kenney, Abigail O’Connor
Advisors: Natalie Farny, Lou Roberts

Applying Microfluidics to Study Cell Growth in the Moss Physcomitrium patens
Sam Marcil, Kailana Wang
Advisor: Luis Vidali

Antibiotic Resistance in Worcester, MA
Emily Baker, Rachel McBrine
Advisors: Michael Buckholt, Elizabeth Ryder

Exploring the limits of F1 Phage Hosts
Marissa Lima, Rianna Ray
Advisor: JoAnn Whitefleet-Smith

Ginkgo Biloba Treatment Ameliorates Chemosensory Deficiencies in Caenorhabditis elegans Models of Alzheimer’s Disease
Rebecca Whittier
Advisor: Jagan Srinivasan

The impact of Ribosome Binding Sites on Translation in Mycobacteria
Catherine Masiello
Advisor: Scarlet Shell

The Effects of Phytoestrogens on Osteoblast Differentiation
Brigid Griffin, Emma Hartzel, Marine Herman, Kelly Makechnie
Advisor: Marja Bakermans

Variable Impact of Soil Nematodes on Above-Ground Herbivores of Apocynum Cannabinum and Asclepias Syriaca
Zane Molins
Advisor: Marja Bakermans

Population Structure and Phylogeography of Macrobrachium Species on the Hawaiian Archipelago
Kathleen Duffy, Tracy Rhode
Advisor: Lauren Mathews

Biomedical Engineering

SESSION 1
Salisbury Labs, Room 115 (Kinnicutt Hall)

9:05am
Augmented Reality for Ultrasound Imaging
Mary Barsoum, Sarah Lombardi, Ian Scott
Advisor: Yihao Zheng

9:25am
Mirror-Integrated Encapsulation Device for Ultrasound-guided PCNL Access
Srikar Nekkanti, Jieping Zhao
Advisor: Haichong Zhang

9:45am
Perfused Tumor Model for Invasion Analysis
Ben Hanemann, Samuel Losh, Alex Nieto,
Tim Santos-Heiman
Advisors: Catherine Whittington, Robert Daniello (ME)

10:05am
Custom Manufacturing of Bio-Realistic Organs for a Surgical Phantom
Emma Burkhardt, Lauren Hardy,
Eliana Palumbo, Mazen Yatim
Advisors: Thomas Cataldo (Beth Israel Deaconess Hospital), George Pins, John Sullivan (ME)
10:30am
Feeding Device for Premature Infants in Low Middle-Income Countries
Hannah Borges, Alexis Nichols, Shreya Puttagunta, Meghan Slaney, Chris Son
Advisors: Dirk Albrecht, Solomon Mensah

10:50am
Baseball Injury Prevention and Pitching Biomechanics
Michael Fraser, Martin McCormack, Jeffrey Mei
Advisors: Edward Clancy (ECE), Karen Troy

11:10am
Blast Microchamber to Study the Neural Effects of Overpressure Injury
Elizabeth Brousseau, Henry Buda, Ryan Singer
Advisor: Dirk Albrecht

11:30am
Coupling System Optimization for Medical Laser Surgical Applications
Hannah Brooks, Zhuofan Lu, Karina Mirochnik, Olivia Petropolus
Advisors: Loris Fichera (RBE), Yuxiang Liu (ME)

Session II - Salisbury Labs, Room 104

9:05am
Oxygenation of Mammalian Cell Culture by Photosynthesis
Lily Cordner, Mathiew Daniels-Diehl, Kirsten Stevens, Blake Wofford
Advisors: Sakthikumar Ambady, Tanja Dominko (BBT)

9:25am
Mirror Angled Configuration for Ultrasound Recording
Anthony Algieri, Layal Hamze, Kevin Piskorowski, Camren Smith
Advisor: Haichong Zhang

9:45am
Increasing Accessible Gynecological Care for Women with Cerebral Palsy: A Redesigned Speculum
Julianna Cognetta, Mia Velletri
Advisor: Karen Troy

10:05am
BATS: Development of a Biosignal Analysis Toolkit and Pipeline for Polytrauma Research
Nathan Draudt, Claire Nicholas, Carlos Velasquez, Lauren Wasserman
Advisors: Mark Claypool (CS), Adam Lammert

10:25am
Developing a Multi-Lead Wireless ECG
Emma Fountain, Nisha Goel, Ben Guerriero, Josh Reeder, Logan Young
Advisors: Edward Clancy (ECE), Songbai Ji

10:50am
Injectable Chondroitin Sulfate-Based Hydrogel Drug Delivery System
Camila Carvalho, Brianna McCuaig, Nicole Racca, Corrine Saucier
Advisor: Jeannine Coburn

11:10am
Fluid Flow Stimulation of Engineered Heart Valve Tissue
Sydney Hertel, Issac Petruzziello, Miranda Pitta, Emily Sansoucy
Advisor: Kristen Billiar

11:30am
Click: A Manual Pressure-Sensing Toothbrush
Emma Bailey, Matthew Casserly, Katelin Rudnik, Allison Smith
Advisors: Funmi Ayobami, Raymond Page

11:50am
Microneedle Pipette Attachment for Delivery of Cells to Decellularized Tissue
Katrina Garrow, Dana Maloy, Isabella Troop, Juan Villamizar
Advisor: Sakthikumar Ambady

Session III – Salisbury Labs, Room 105

9:05am
Bioreactor Design for Bacterial Cellulose Production
Isabelle Claude, Sawyer Fenlon, Edward Hay, Catherine Williams
Advisor: Jeannine Coburn
9:25am
Assistive Chair for Improved Sit-to-Stand Transitions
Sarah MacDonald, Brianna Mullay, Monika Nowak, Kaitlyn Pothier, David Rodriguez
Advisors: Sakthikumar Ambady, Ahmet Can Sabuncu (ME)

9:45am
Smart Continuum Robot for the Endoscopic Ablation of Malignancies (SCREAM) in the Larynx
Hoang Do, Emily Minch, Rositsa Mihaleva, Ryan Tougas
Advisors: Loris Fichera (RBE/BME), Shawn Liu (ME), William Michalson, (RBE/ECE)

10:05am
Replicating a Process for Fluorochrome Staining of Fatigue Induced Damage in Bone
Emily Adams, Victoria Carreiro, Samuel Hopkins, Sierra Raskevitz, Rose Romanos
Advisors: Funmi Ayobami, Karen Troy

10:30am
Recommended Improvements to Ventriculoperitoneal Shunts Using Biomedical and Mechanical Techniques
Jennifer Brownell, Winona Daw, Morgan Jones, Daniel Marsh, Katherine O’Leary
Advisor: Zoe Reidinger

10:50am
A Parallel Plate Flow Chamber to Investigate Endothelial Glycocalyx Remodeling After Pneumonectomy
Natasha Cruz-Calderon, Lydia Masse, Gillian Miller, Taylor Paradis, Samantha Raskind
Advisors: Kristen Billiar, Solomon Mensah, Aaron Waxam (Brigham & Women's Hospital)

11:10am
Transdisciplinary Design of a Blood Pressure Monitor for Pregnant Women in Ghana at High Risk of Developing Preeclampsia
Rayna Basma, Andrew Brooks, Meredith Eddy, Kajia Gisolfi-Mccready, Hailey Hurrell, Nathan Hyde, Nicholas Weiland
Advisors: Kristen Billiar, Elizabeth Lingo (SOB)

11:30am
Spring-loaded Needle Delivery System of Cells into Decellularized Scaffold
Alexandria Baker, Cosette Domkofski, Minh Anh Kieu, Siri Sundaraneedi
Advisor: Sakthikumar Ambady

Session IV – Salisbury Labs, Room 305

9:05am
Developing and Validating a Non-Invasive Diagnostic Test for Endometriosis
Alexandria Gannon, Lonna Neiding, Kiran Trembay
Advisor: Zoe Reidinger

9:25am
Intelligent Sit-to-Stand Aid (STS)
Colton Chung, Steven Chelak, Brittney Pham, Sophia Puch, Miriam Sayegh
Advisors: Sakthikumar Ambady, Ahmet Can Sabuncu

9:45am
3D Engineered Microenvironment for In Vitro Fibrosis Modeling
Ashley Baldwin, Lynsa Chau, Marisa Maltais, Adrienne Whitney
Advisor: Catherine Whittington

10:05am
The Design of an Implantable Reparative Device for Ulnar Collateral Ligament Tears in Overhead Throwing Athletes
Maria Decelles, Evan Hallberg, Brooklyn Paris
Advisors: David Magit (Beth Israel Deaconess Medical Center), George Pins, Karen Troy

10:30am
Needle Insertion Mechanism for Ultrasound-guided Percutaneous Nephrolithotomy Access
Desiree Diaz, Amber Poulin
Advisor: Haichong Zhang

10:50am
Microneedle Reservoir System for Delivery of Cells to Thick Tissue Scaffolds
Marissa Langille, Keri McLaughlin, Jessica Netto, Julia Ormerod
Advisor: Sakthikumar Ambady
11:10am

Engineered Tumor Models
Bishoy Abdelmalek, Cecilia Berniac, Brian Brooks, Michael Reilly
Advisors: Sakthikumar Ambady, Raymond Dunn
(UMass Medical School)

11:30am

Autonomous Exoskeleton for Paraplegic Assistance
Zachary Chapins, Ricard Ferrua Elmudesi, Dina Habboosh, Alek Hersum, Jack Waterman
Advisors: Mehul Bhatia (ME), Loris Fischer (RBE)

Business

POSTER SESSION, 9:30am to Noon
Unity Hall 500

A Business Intelligence Solution for Clark University’s Office of Enrollment and Admissions
Shauna Sullivan
Advisor: Nima Kordzadeh
Sponsor: Clark University

a.NASA Lunabotics 2021-2022
Jesulona Akinyele, Manjusha Chava, Peyton Grant, Corinne Hartman, Karen Hou, Nikita Jagdish, Tyreese James, Sarah McCarthy, Nathan Ng, Jacob Parker, Michael Rossetti, Julia Sheats, Thomas Sterrett, Jacob Yurcak
Advisors: Walter Towner, Joshua Cuneo (CS), Yarkin Doroz (ECE), Therese Smith (CS), Kenneth Stafford (IGS),
Sponsors: WPI Tinkerbox Program, PBC Linear, SendCutSend, Worcester Sand & Gravel, Cyvl.ai, Guertin Graphics.

Analysis of U.S. Job Market and Reddit Sentiment
Luke Gebler, Zhifei Ma, Andrew Nicklas
Advisors: Robert Sarnie, Marcel Blais (MA), Wilson Wong (CS)
Sponsor: Angelo-Gordon

Applying Analytics to Operational Decision Making
Anne Davis, Lauren Dishong, Grace Gately, Zoe Januszewski
Advisor: Sharon Johnson
Sponsor: Connecticut Children’s

Applying Industrial Engineering Principles to Student Workspaces at Worcester Polytechnic Institute
Ethan Bae, William DiCroce, Nickalas Dinatale, Erin Gonzalez, Kaelyn Hicks
Advisor: Walter Towner

Creating and Updating Effective Internal UIs for a Large Financial Company
Ido Katz, Caitlin Kuzma, Christopher Lobo, Callan Moriarty
Advisors: Robert Sarnie, Renata Konrad, Wilson Wong (CS)

Developing a Donation Analytics System for Big Brothers Big Sisters of Central Mass & Metrowest
Ahmed Alhejailli, Augustine Asumadu, Angel Beltre, Cady Diehl
Advisor: Nima Kordzadeh
Sponsor: Big Brothers Big Sisters of Central Mass & Metrowest

Developing an Online Community for Veterans for Clear Path New England
Zachary Harris, Alexander Young
Advisors: Diane Strong, James Ryan
Sponsor: Clear Path for Veterans New England

Development of a Cloud-Based Enterprise Resource Planning System for Gompei’s Goat Cheese
Christopher Guerrette, Natalie Mohn
Advisors: James Ryan, Therese Smith (CS)

Exploring Calming Activities for Intellectually and Developmentally Disabled Adults
Anish Nakahara, Malvina Piziak, Rachelle Wailes
Advisors: Adrienne Hall-Phillips, James Doyle (SSPS), Jeanine Skorinko (SSPS)

Fidelity Procurement Categorization of the Current Spend Trends
Luke Deratzou, Neville Ingram, Olivia Reneson, Ziqian Zeng
Advisors: Robert Sarnie, Marcel Blais (MA), Wilson Wong (CS)
Sponsor: Fidelity Investments

FT Project B21-Citizens-Cloud-based FinTech API Integration
Austin Franklin, Jenna Galli, Baian Ou
Advisors: Renata Konrad, Robert Sarnie, Wilson Wong (CS)
Sponsor: Citizens Bank
Impact of Heat-Treatment on Carbon Steel Alloys
Wenlan Fan, Samuel Furman, Dawson Scheid, Daniel Tengdin
Advisors: Walter Towner, Stephen Bitar (ECE), Jianyu Liang (MTE), Brajendra Mishra (MTE)

Improving Director Preferences and Creating a User Interface for the Global Opportunities Allocation Tool
Olajumoke Jackson, Kate Sincaglia, Marissa Thomas, Nicole Whipkey
Advisors: Andrew Trapp, Lane Harrison (CS)
Sponsor: Global Experience Office

Improving Goddard Riverside Options Center Access Program Intake Process
Adam Ferrarotti, McKenna Finken, Reagan Hajjar, Mason Watts-Rich
Advisors: Renata Konrad, Andrew Trapp
Sponsor: Goddard Riverside Options Center

Improving Major Qualifying Project Formation in The Worcester Polytechnic Institute Business School
Enzo Borges, Michael Levene, Allison Spratt
Advisors: Andrew Trapp, Renata Konrad

Innovation, Excellence, and Engagement in Online Graduate Business Education
Jessica Evans, Lucas Fernandez, Mackenzie Goldschlager, Eli Ruffa
Advisor: Diane Strong

Operational Improvements of Gompei’s Gears
Christopher Boyce, Frank D’Alessio, Jon Merchan
Advisor: Joe Zhu

Pallyt: Location and Delivery of Construction Materials
Joshua Alasso, Eva Bruklich, David Hinckley, Vignesh Kadarabad, Nathaniel Klingensmith, Robear Mankaryous, Ryan Menard, Margaret Reiter, Zachary Wong
Advisors: Walter Towner, Jessica Rosewitz (CEAE), Robert Sarnie, Wilson Wong (CS)

Post-Production Workday Opportunities: Operational and Communication Strategies
Bridgette Paredes
Advisors: Sharon Johnson, Esther Boucher-Yip (HUA)
Sponsor: Veronica Brandstrader, Change Management & Training Manager, WPI IT Department

Process Improvement in Construction Management
Noah Craft
Advisors: Walter Towner, Jessica Rosewitz (CEAE)

Scoreboard Message Standardization
Denver Blake, Tyler Jones, Spencer McLellan, Theodore Solomonides
Advisors: Robert Sarnie, Renata Konrad, Wilson Wong (CS)
Sponsor: Worcester Red Sox

Studying Managerial Foresight in Sports Analytics
Jacob Bissonnette, Chris Francis
Advisors: Kenny Ching, Randy Paffenroth (MA)
Sponsor: IG International

Transdisciplinary Design of a Blood Pressure Monitor for Pregnant Women in Ghana at High Risk of Developing Preeclampsia
Ranya Basma, Andrew Brooks, Meredith Eddy, Kaija Gistolli-McCreasy, Hailey Hurrell, Nathan Hyde, Nicholas Weiland
Advisors: Elizabeth Lingo, Kris Billiar (BME), Robert Krueger (SSPS)

When the Goals Change, the Process Must Too
Nada Abojaradeh
Advisors: Sharon Johnson, Robert Krueger (SSPS)

WPI Dining Services Delivery Plan
Clarissa Casilla Luzardo, Hannah Gelman, Alejandro Gerov Armas, Abigail Perlee
Advisor: Sara Saberi
Sponsor: Chartwells: WPI Dining Services

Chemical Engineering
POSTER SESSION, 8am to Noon
Salisbury Labs, Room 402

Biopsychosocial Validation of 3D Food Printing
Leslie Mateo, Emily Toala
Advisors: Danielle Cote, Angela Rodriguez
Sponsor: U.S. Army Combat Capabilities Development Command Soldier Center

Discovering Solar Materials
Julia Bryant, Ashli Silvera, Hunter Wieckowski
Advisor: Aaron Deskins
Computational and Experimental Analysis of Heavy Metal Cation Adsorption to Hydrothermal Char
Achilles Gatsonis
Advisor: Michael Timko

Celllobiose Group
Hailey Hanscom, Kim Mori, Emma Paxton
Advisor: Michael Timko

Identifying Reactive Intermediates Formed During Catalytic Upgrading of Bio-Crude
Abigail Goyette, Samuel Presutti, Bruno Schardong
Advisor: Michael Timko

Waste to Energy: Optimizing Bio-fuel Production Conditions
Michael Biando, Patrick Flaherty, Osasumwen Frederik-Ilekhuoba, John Laukaitis
Advisors: Alex Maag, Michael Timko, Geoffrey Tomsett

Cellular Encapsulation in Edible Bioreactors
Gabriella Cerbo, Liam Cox, Jillian Doyle, Luca Ialongo
Advisor: Eric Young
Sponsor: Incredible Foods (Chril Hango and Marty Kolewe)

Enabling β-Carotene Production in Saccharomyces Cerevisiae through Genetic Engineering
Gaby Mazzoni, Marina Petrillo, Kat Tarantino
Advisor: Eric Young

Oxidative Stress Reduction by Yeast Transporters
Kavim Bhatnagar, Chris LaFortune
Advisor: Eric Young

Bacterial Transport: The Migration of P. Putida Through Fungal Highways
Elia Petros
Advisors: Elizabeth Stewart, Eric Young

Metabolic Engineering of Taxane Biosynthesis
Jay Gandhi, Alexandra Horton, Sean Horton, Lauren Revene
Advisor: Susan Roberts

Soil Remediation Through Electrical Resistance Heating
Emma Mungovan, Rylee Pinsonneault
Advisors: Kristin Boudreau (HUA), David DiBiasio

Making Use of Mother Nature: Converting Fog into Drinkable Water
Jason Chen, Matthew Willis
Advisors: Kristin Boudreau (HUA), David DiBiasio

Machine vs. Nature: Carbon Capture
Makayla Carmichael, Isabella Piccione
Advisors: Kristin Boudreau (HUA), David DiBiasio

POSTER SESSION, 8am to Noon
Salisbury Labs, Room 411

Contamination of Sediment Along the AZHUREV Feed Channel
Maxwell Lepage, Caran Kate Manalo
Advisor: Stephen Kmiotek
Sponsor: Ecole Nationale Superieure des Industries Chimiques (ENSIC)

Optimizing the Creation of a Protein Beer
Ryan Bettencourt, Andrew Dupuis, Jeremy Rhines, Adam Strohm
Advisor: Stephen Kmiotek
Sponsor: Purgatory Brewing Company

Beer Optimization
Robert Blythe, Grace Richards, Jared Santerre
Advisor: Stephen Kmiotek
Sponsor: Purgatory Beer

Options for Water Reuse in Optical Fiber Production
Isabelle Chi, Gabriela Chong, Hossam Elaskalani, Olivia Gedgaudas, Kimberly Hazeltine
Advisor: Stephen Kmiotek
Sponsor: OFS Optics

Bioelectrochemical Regeneration of Enzymatic Cofactor Coupled to Co2 Reduction in a Redox Flow Cell
Katherine Doucette, Katarina Himmelberger
Advisor: Stephen Kmiotek

Developing a Continuous Fermentation Reactor for Mead
Brendan Olexa, Taylor Petell, Alex Poll, Meghan Sailor
Advisors: Stephen Kmiotek, Elizabeth Stewart
Optimizing Process for Depositing Niobium Oxide on Silicon Substrate
Antonio Ramirez
Advisors: Ronald Grimm (CBC), Stephen Kmiotek

Utilizing Biofiltration to Control Air Emissions for Sustainable Cannabis Production
Evy Case, Ceana Fuller, Emily Gonzales
Advisors: John Bergendahl (CEE), Stephen Kmiotek

Developing an Analytical Technique for PFAS on Paper Food Packaging Using SLE and NMR
Sophie Chase, Thomas Dziechciarz, Jillian Shimansky, Colin Wandell
Advisors: John Bergendahl (CEE), Stephen Kmiotek

Biofouling in Nuclear Power Plants: A Preliminary Exploration
Andrew Panneton, Danielle Upton
Advisors: Nouceiba Adouani, Stephen Kmiotek
Sponsors: Ecole Nationale Superieure des Industries Chimiques (ENSIC), Laboratoire Reactions et Genie des Procedes (LRGP)

Oxygen Dependence of Direct Aluminum Air Batteries
Pedro Cintron, Charles Pottow
Advisor: Andrew Teixeira
Sponsor: AlumaPower Corporation

Diffusional Limitations During Solid Phase Peptide Synthesis
Sydney Gagne, Meng Lian, Alyssa Whitley
Advisor: Andrew Teixeira
Sponsor: Mytide Therapeutics

An Inquiry into the Effect of Freezing Methods on the Performance of a Crosslinked Alginate Membrane
eshawn George, Timothy Kendall, H La Vallee, Karla Navarro
Advisor: Andrew Teixeira

Microphotocatalytic Packed Bed
Kimberly Frary, James Marlow, Andrew Yatsuhashi
Advisor: Andrew Teixeira

Promoting Batch to Continuous Processing for Pharmaceutical Manufacturing and Education
Patrick Roche, Ciara Young
Advisor: Andrew Teixeira

Dynamically Pulsed Catalysis for Selective Ammonia Synthesis
Avery Cirincione-Lynch, Eileen Piombino
Advisor: Andrew Teixeira

Not Presenting
WPI – Gallo MQP ’22
Julia Awad, Alex Kelleher, Julia Visconti
Advisor(s): David DiBiasio, Nikolaos Kazantzis
Sponsor: E&J Gallo Wineries

EHD Vapor Compression Cycle
Brian Desjardins, Grace Olaya, Ben Verdesi
Advisors: Aswin Gnanaskandan, Jamal Yagoobi
*Presenting in Mechanical Engineering

Photoredox C-H Acetoxylation through HAT and its Application in Flow
Michael Berwanger
Advisor: Stephen Kmiotek, Patricia Mussachio (Chemistry)
*Presenting in Chemistry

Chemistry and Biochemistry
POSTER SESSION, 9:30 to 11:30am
Rubin Campus Center, Odeum

Photoredox Catalyzed C-H Acetoxylation Through Formal Hydride Abstraction
Michael Berwanger
Advisors: Stephen Kmiotek, Patricia Musacchio

A Novel Approach: Unique Reactions of Sulfoxonium Ylides
Marissa Allegrezza
Advisor: Anita Mattson

The Effects of Monoamine Oxidase Inhibitors (Selegiline and Phenelzine) on the Egg Laying Behavior and Lipid Composition of Caenorhabditis Elegans
Jordan Wynn
Advisors: Arne Gericke, Jagan Srinivasan

Burn Box Case Study
Margaret Gunville, Christopher Martenson, Kathryn Rodriguez
Advisors: Mustapha Fofana, Robert Krueger, Anita Mattson, Hermine Vedogbeton
Purification of the exocyst complex from Physcomitrium patens
Rachel Maurice
Advisors: Mary Munson, Luis Vidali

Auto MSLA
Jacob Arciszewski, Jean-Luc Pierre-Louis, Matthew Plympton, Benjamin Tetreault
Advisors: Mehul A. Bhatia, Shawn Burdette, Joshua M. Cueno, Maqsood Ali Mughal
Sponsor: Tinkerbox

A Novel C-H Cyanation Strategy in Organic Chemistry
Hana Tabit
Advisor: Patricia Musacchio

How to Grow or Pattern a New 1-D Semiconductor for Sensors
Michelle Frasch
Advisors: Ronald L. Grimm, Pratap M. Rao

Cell Size Regulation for S. pombe
Lauren Guerrero Negron
Advisors: Destin Heilman, Nick Rhind
Sponsor: University of Massachusetts Medical School

Copper Bis(oxazoline)-Catalyzed Enantioselective Alkynylation of Quinolones
Sean Burns, Margaret Richins
Advisor: Anita Mattson
Sponsor: National Institutes of Health

Synthesis of Zinc Photocaged Thioester Molecules and their Adjacent Applications
Marina Spenciner
Advisor: Shawn Burdette

Physical Chemistry of Synthetic Melanin and Melanin Films
MacKenzie Sullivan
Advisor: Christopher R. Lambert

The Impact of Bacterial Metabolism on the Response to High Glucose Diets in C. elegans
Connor Norton
Advisor: Carissa Olsen
Sponsor: National Institutes of Health

Assessment of Nucleotide Labeling to Determine Organization of DNA Replication
Silvana Reid
Advisors: Destin Heilman, Nicholas Rhind
Sponsor: University of Massachusetts Medical School

Exploring Methods for Capping Metal Organic Framework 5
Isabella Lamar Ferrari Carrubba
Advisors: Ronald Grimm, Shawn Burdette

Examining phospholipids after oxidative stress in the membrane of a C. elegans Alzheimer’s model
Liza Hote
Advisor: Carissa Olsen

Understanding How Mechanical Stress Affects Calcium Release in Co-Cultured Neuronal and Smooth Muscle Cells
Jacqueline Novak
Advisor: Suzanne Scarlata

Exploration of Amidyl Radical Reagents and Their Impact in Hydrogen-Atom Abstraction Events
Ariadna Rivas-Soucchet
Advisor: Patricia Z. Musacchio

The Purification of Phospholipase Cbeta and Argonaute 2
Sara Stillings
Advisor: Suzanne Scarlata

Printing semiconductors by orthogonal separation of reactive precursors
Angel D Fernandez Sorondo
Advisors: Ronald Grimm, Pratap Rao

Development of an activity-based probe for SARM1, an NAD hydrolase involved in neuronal degeneration
Sebastian Tommasi
Advisors: Anita Mattson, Paul Thompson
Sponsor: University of Massachusetts Medical School

Contaminant Mobilization Due to Fire Events
Lisa Cristiano, Drew Grenier, Rayna Harter, Logan O’Donnell, Nihal Patel, Matthew Penkala, Isabelle Rhodes, Alexandra Sciarti, Avery Vreeland
Advisors: John Bergendahl, James Dittami, Jagan Jayachandran, Raymond Ranelone, Ali Rangwala

Developing and Validating a Non-Invasive Diagnostic Test for Endometriosis
Burnon Chen, Ali Gannon, Lonna Neidig, Kiran Tremblay
Advisors: Destin Heilman, Zoe Reidinger
Water Purification Using Synthetic Melanin
Ahmed Alhejaili
Advisor: Christopher Lambert

Studying the Localization of PCV1 VP3 Towards Understanding its Usefulness in Developing New Oncological Treatments
Sean Amberger, Meredith Gauthier
Advisor: Destin Heilman

Civil, Environmental, and Architectural Engineering

POSTER SESSIONS, 12:30pm to 3:00pm
Kaven Hall, 1st Floor Hallway

16. Extracting Nanocellulose
Madison Rutherford (CEAE)
Advisor: Harold Walker

17. Impacts of Climate Change on Drinking Water
Natalie Bennett (CEAE)
Caroline Dalton (CEAE)
Kaelyn Foss (CEAE)
Advisor: Jeanine Dudle

18. Lead and Copper Corrosion in Drinking Water Systems
Benjamin Beliveau (CEAE)
Lillian Taylor (CEAE)
Delaney Tedtsen (CEAE)
Advisor: Jeanine Dudle

19. Improving Stormwater Management for the Salisbury Pond Area
Jeffrey Desjardins (CEAE)
Morgan Emery (CEAE)
Fernand Gay (CEAE)
Edie Hudson (CEAE)
Meghan McCudden (CEAE)
Advisor: Paul Mathisen

20. Water Contamination from Fire Events
Lisa Cristiano (CEAE)
Drew Grenier (CEAE)
Rayna Harter (Chemical Engineering)
Logan O’Donnell (CEAE)
Nihal Patel (FPE)
Matthew Penkala (CEAE)
Isabelle Rhodes (Chemistry)
Alexandra Scariati (CEAE)
Avery Vreeland (CEAE)
Advisors: John Bergendahl, Ali Rangwala (FPE) & Jagannath Jayachandran (Aero)

21. Water Desalination in the UAE
Zoe Mahoney (CEAE)
Kiersten Potts (CEAE)
Advisors: John Bergendahl & Joseph Doiron (DIGS)

22. Contamination of Sediment Along the ASHUREV Feed Channel
Maxwell LePage (CEAE)
Caran Kate Manalo (CEAE)
Advisors: Stephen Kmiotek (Chem Eng)
Sponsor: Ecole Nationale Superieure des Industries Chimiques
Dr. Marie-Noelle Pons

23. Chelsea Living Shorelines
Evan Andrzejewski (CEAE)
Peter Conroy (CEAE)
Julie Pham (CEAE)
Jonathan Scribner (CEAE)
Advisors: Leonard Albano & Paul Mathisen
Sponsor: City of Chelsea, MA

24. Stantec: Bridgewater Wastewater Treatment Plant Design Upgrades
Maia Gifford (CEAE)
Evelyn Mortimer (CEAE)
Marshall Watts (CEAE)
Rachael Zmich (CEAE) Advisors: Leonard Albano & Suzanne LePage
Sponsor: Stantec – Boston Project Center

Content reflects information as of April 15, 12pm.
Extracting Water from the Martian Environment
Lydia Tonani (MME & CEAE)
Advisors: John Bergendahl, Carrick Eggleston & John Sullivan (MME)

POSTER SESSIONS, 12:30pm to 3:00pm
Kaven Hall, 2nd Floor Hallway

1. Developing a Spatial Decision Support Tool for Planning Tsunami Evacuation Shelter Location
   Rose Noggle (CEAE)
   Advisor: Leonard Albano & Steven Van Dessel

2. Design Robot-Enabling Architectural Elements for Roof and Façade Retrofits
   Kimberly Coudrey (CEAE)
   William Crist (CEAE)
   Hannah Hirsch (CEAE)
   Advisors: Shichao Liu, Markus Nimitz (Robotics), Carlo Pinciroli (Robotics), Nima Rahbar & Steven Van Dessel

3. HoloARCH: Design a Commercial Building by Incorporating Collaborative Augmented Reality
   Kathleen Morrison (CEAE)
   Joseph Sorrenti (CEAE)
   Advisor: Soroush Farzin & Shichao Liu

4. Modular Homes for Artsakh Refugees
   Katherine Bishop (AREN)
   James Valentine (AREN)
   Lara Varjabedian (AREN)
   Advisors: Leonard Albano & Soroush Farzin

5. Develop a WPI Living LEED Lab to Promote Sustainability
   Darius Luo (CEAE)
   Erin Venard (CEAE)
   Hannah Whitney (CEAE)
   Advisors: Leonard Albano, Soroush Farzin & Shichao Liu

6. Bus Envelope Optimization
   Gabriel Kafka-Gibbons (CEAE)
   Advisor: Aaron Sakulich

7. Building Redevelopment for Repurpose
   Daniel Divecchia (CEAE)
   Madison Di Vico (CEAE)
   Justin Hines (CEAE)
   Ethan Schock (CEAE)
   Advisor: Leonard Albano

8. Design of Auxetic Steel/Cement Composites
   Charles Considine (CEAE)
   Advisor: Nima Rahbar

9. Communal Housing Design
   Kade Woolverton (CEAE)
   Advisor: Suzanne LePage

10. CPM Analysis of the Kaven Hall Renovation
    Igor Reis (CEAE)
    Joe-Yee Yip (CEAE)
    Advisor: Jessica Rosewitz

11. Cross-Laminated Timber and Structural Resilience
    Stephanie Bishop (CEAE)
    Peyton Graham (CEAE)
    Isabelle Mellor (CEAE)
    Advisor: Leonard Albano
    Sponsor: Dr. Michael J. Richard

12. Improving the Framingham, MA Commuter Rail Train Station
    Braden Ballard (CEAE)
    Joseph Coutcher (CEAE)
    John Parenteau (CEAE)
    Tarang Shah (CEAE)
    Maximilian Storch (CEAE)
    Advisor: Suzanne LePage
13. MonteVerde Environmental Technology Park
   Colby Jensen (CEAE)
   Rhys Christian Kalama (CEAE)
   Skylah Mahon-Dixey (CEAE)
   Advisors: Suzanne LePage & Mingjiang Tao

14. Structural Design of a Vertical Axis Wind Turbine
   Bryan Davidson (CEAE)
   Joseph MacDonald (CEAE)
   Andrew Salvatori (CEAE)
   Ian Weston (CEAE)
   Advisors: Nima Rahbar & Ahmet Can Sabuncu (MME)
   Sponsor: Emil Jacob, Founder WindRays Energy

15. Sustainable WPI Residence Hall
   Tyler Cierpich (CEAE)
   Heather Lohrey (CEAE)
   Ava Schlesinger (CEAE)
   Madelyn Uryase (CEAE)
   Advisor: Leonard Albano

Computer Science

POSTER SESSION, 10:00am to Noon
Innovation Studio Second Floor, Rooms 203 and 205

Building a Customizable GAN Package Tool in Python
   Ryan Astor, Kyle Costello, Joshua DeOliveira, Alek Lewis
   Advisor: Elke Rundensteiner

Pallyt: Location & Delivery of Construction Materials-Team 2
   Eva Bruklich, Nathan Klingensmith, Robear Mankaryous, Adraesteia Wong
   Advisors: Robert Sarnie (MGE), Wilson Wong

Automatizing Inspection and Defect Detection for Metal Additive Manufacturing Using Deep Learning Techniques
   Collin Broderick, Adrianna Staszewska
   Advisors: Diana Lados (ME), Rodica Neamtu

VisQuiz
   Ryan Birchfield, Maddison Caten, Errica Cheng, Madyson Kelly, Truman Larson, Hoang Phan Pham
   Advisor: Lane T. Harrison

eTextile Interface for Generative Design Software
   Jenna Charron, Kyle Mikolajczyk, Noelle Morgan
   Advisors: Shamsnaz Bhada (ECE), Gillian Smith

Modular Package for Autonomous Driving Version 2 (MPAD v2)
   Bryan Lima, Anthony LoPresti, Thomas Riviere, Lindberg Simpson, and William Yang
   Advisors: Kaveh Pahlavan, Pradeep Radhakrishnan (ME)

Towards Inclusive Learning and Research with Sign Language Surveys
   Isabelle Cordova, Brittany Henriques
   Advisor: Erin Solovey
   Sponsor: ASL Education Center

Ultrafork and Focused KSM: Tools for Memory Optimization in Duplicate Containers
   William Cross, Adrian Curless, Alexander Simoneau
   Advisor: Craig Shue

Security in Isolated Environments: Determining Intuitive Features for Standard Computer Users
   Nicole Conill, Shannon Truong
   Advisor: Craig Shue

Deep Learning for Mental Health Screening
   Lily Garfinkel, Madeline Halley, Nicholas Jurovich, Mairéad O’Neill, Brian Philips, Jyalu Wu
   Advisor: Elks Rundensteiner (DS)

Improving Director Preferences and Creating a User Interface for the Global Opportunities Allocation Tool
   Olajumoke Jackson, Kate Sincaglia, Marissa Thomas, Nicole Whipping
   Advisors: Lane Harrison, Andrew Trapp (IE, MA, DS)

Passive Mobile Mental Health Screening Using Machine Learning
   Praise Eteng
   Advisor: Emmanuel Agu

USDA Food Poisoning Prevention
   John Carroll, David Leandres, Cole Noreika, Isabel Alvarado Blanco Uribe, Nicholas Vachon
   Advisor: Elke Rundensteiner
   Sponsor: USDA

Content reflects information as of April 15, 12pm.
NASA Lunabotics
Jesulona Akinyele, Manjusha Chava, Peyton Grant, Corinne Hartman, Karen Hou, Nikita Jagdish, Tyreese James, Sarah McCarthy, Nathan Ng, Jacob Parker, Michael Rossetti, Julia Sheats, Thomas Sterrett, Jacob Yurcak
Advisors: Joshua Cuneo, Yarkin Doroz (ECE), Therese Smith, Kenneth Stafford (ME/RBE), Walter Towner (MGE)

Understanding Profiling Side-channel Attacks and Defenses
Arthur Robinson IV
Advisor: Robert Walls
Sponsor: MITRE

Jigsaw Puzzle Solver
Matthew Aguiar, Jack Ayvazian, Jadon Laforest, Winnie Ly, Ryan Wheeler
Advisor: Jacob Whitehill

BATS: Creation of a Biosignal Analysis Toolkit and Pipeline for Polytrauma Research
Nathan Draudt, Claire Nicolas, Carlos Velasquez, Lauren Wasserman
Advisors: Mark Claypool, Adam Lammert (BME)

Building and Visualizing a Database from Wildlife Trafficking Reports with NLP
Devin Coughlin, Maylee Gagnon, Victoria Grasso
Advisors: Renata Konrad (BUS), Kyumin Lee
Sponsor: Meredith Gore, Patricia Raxter

Analysis of U.S. Job Market and Reddit Sentiment
Luke Gebler, Andrew Nicklas
Advisors: Marcel Blais, Robert Sarnie, Wilson Wong
Sponsor: Angelo Gordon

IndexPen: Two-Finger Text Input with Millimeter Wave Radar
Haowen Wei
Advisor: Erin Solovey(CS), Kaveh Pahlavan (ECE)
Sponsor: None
Project Center: WPI CWINS Lab & HCI Lab

Programming Virtual Instruments: Breather VST
Benjamin Slattery
Advisor: Jacob Whitehill

UNiT: A Universal Toolkit for Nanoindentation Exploration
Katelyn Barron, Aaron Krueger, Eric Schmid
Advisors: Danielle Cote (MME, MTE), Rodica Neamtu

NAML: An Easy-to-Deploy Application for Time Series Classification
Patrick Houlihan
Advisors: Rodica Neamtu, Erin Solovey

Albanian Spac Prison – An Interactive Application
Duncan Bertetti, Kevin Dang, Daniel Stusalitus
Advisors: Joshua Cuneo, Robert Hersh (IGS), Ralph Sutter (IMGD)
Sponsor: Cultural Heritage without Borders - Albania

Preparing the E-TRIALS Minimum Viable Product for Release: Improving Platform Usability, Security, & Infrastructure
Edward Philippo, Matthew Spofford
Advisor: Neil Heffernan
Sponsor: The ASSISTments Foundation

Elaine Chen, Madeline Perry
Advisors: Jennifer deWinter (IMGD/HUA), Charles Roberts (CS/IGMD), Yunus Telliel (HUA)
Sponsor: Kyoto VR
Project Center: Japan

Necode: An Environment for In-Class Programming Activities
Trevor Paley
Advisor: Charles Roberts

Automatic Pain Estimation System
Suryansh Goyal
Advisor: Jacob Whitehill

Detecting Academic Dishonesty in Computer Science Courses
Matthew Hulbut-Coke, Matthew Olson, Marcelino Puente-Perez
Advisor: Joseph Beck

Evaluating Energy Efficiency of State-of-the-art Hardware Using Machine Learning Benchmarks
Brett Foster
Advisor: Shubbhi Taneja

Interactive Visualization of a Robotic Music Ensemble
Rose McGovern
Advisors: Scott Barton (HUA), Charles Roberts
POSTER SESSION, 1:00pm to 3:00pm
Innovation Studio Second Floor,
Rooms 203 and 205

Automated Measurement and Defect Detection in 3D Printed Parts and Process
Madison Eisenhour, Mark Forte, Ryan Malkowski
Advisors: David Brown, Pradeep Radhakrishnan

Quality of Experience Evaluation for Buffer Sizing of Cloud-Based Game Streaming
Brennan Aubuchon, Morgan Langstaff
Advisor: Mark Claypool
Sponsor: Google Stadia

Advancing the Current Emergency Medical Response System
Emily Mahoney
Advisor: Therese Smith

7Factor Staffing Tool
Dyllan Cole, Evan Llewellyn, Noah Olson, Andrew Whitney
Advisor: Joshua Cuneo
Sponsor: 7Factor

Contextual Bandit Approaches to Personalized Tutoring
Alan Healy
Advisors: Neil Heffernan, Ethan Prihar

Creating an End-to-end Testing Framework for an Open Source Minecraft Server
Alexander Kinley, Matthew Worzala
Advisor: Joshua Cuneo

Performing Bug Fixing for Open Source Software
Ezra Werlinich
Advisor: Therese Smith

Auditory Grouping
Cheng-Hsuan Jan, William McDonald, Zachary Wagner, Chen Yang
Advisors: Scott Barton (IMGD), Jim Doyle (PSYCH), Gillian Smith

Audio Journal App Continuation
Caleb Farwell, Amy Orozco, Benjamin Robinson
Advisors: Lane Harrison, Rodica Neamtu
Sponsor: Audio Journal

Webhooks-as-a-Service: A Custom API Design
Veronica Andrews, Carley Gilmore, Jonathan Rosenbaum, Ryan Stebe
Advisor: Joshua Cuneo
Sponsor: 7Factor Software

Bubbles
Alexis Caira, Alexa Freglette, Eva Labbe
Advisors: Oren Mangoubi (DS), Patrick Schaumont (ECE), Robert Walls

CryptKeeper: Tools for Practical Cryptographic Attacks
Gwyneth Ormes, Avery Smith
Advisor: Michael Engling

K-means Clustering of Student Behavioral Patterns and Advanced Visualization Methods of Learning Technology Data
Reilly Norum
Advisors: Lane Harrison, Erin Ottmar

Shape - A DEX REPL for Interactive Debugging
Marcus Chalmers, Felix Chen, Timothy Goon
Advisor: Mark Claypool
Sponsor: Shape Security, F5
Project Center: Silicon Valley, California
Project Center

SDN-Controlled Isolation Orchestration
Jake Baker, Lia Davis, Nour Elmaliki
Advisor: Craig Shue

Fidelity Procurement Categorization of the Current Spend Trends
Luke Deratzou, Neville Ingram, Olivia Reneson, Ziqian Zeng
Advisors: Marcel Blais (MA), Robert Sarnie (BUS), Wilson Wong
Sponsor: Fidelity Investments Inc.

Integrating Development Operations Procedure into ASSISTments LIVE-CHART Service
Taylor Cox
Advisor: Neil Heffernan
Sponsor: ASSISTments

Assessing Student Support Effectiveness
Benjamin Babalola, Morgan Lee
Advisor: Neil Heffernan
Sponsor: ASSISTments

Content reflects information as of April 15, 12pm.
Yoake (Daybreak)
Mariko Endo, Matthew Johannesen
Advisors: Farley Chery (IMGD), Ben Schneider (IMGD), Gillian Smith

Developing Knowledge Tracing for Problem Mastery in ASSISTments
Yang Lyu
Advisor: Neil Heffernan

Simulations and Machine Learning for Parachute Navigation
Grace Malabanti, Joseph Scheufele, Juliette Spitaels
Advisors: Oren Mangoubi (MA), Randy Paffenroth
Sponsor: DEVCOM Soldier Center

Cleaning On Demand with a Recommender System (CODeRS)
Ashley Schuliger, Christopher Vieira
Advisors: Danielle Cote (ME), Rodica Neamtu

Robot Escape Room MQP
Eddie Matava, Matthew Nagy
Advisors: Berk Calli, Gillian Smith

Development of a Cloud-Based Enterprise Resource Planning System for Gompe’s Goat Cheese
Christopher Guerrette, Natalie Mohn
Advisors: James Ryan, Therese Smith

AutoMSLA
Jacob Arciszewski, Jean-Luc Pierre-Louis, Matthew Plympton, Benjamin Tetreault
Advisors: Mehul Bhatia (ME), Shawn Burdette (CBC), Joshua Cuneo, Maqsood Ali Mughal (ECE)
Sponsor: Tinkerbox

Modeling Pedestrian Flow: A Path-finding Approach
Victoria Mirecki, Ally Salvino
Advisors: George Heineman, Sarah Olson (MA)

7Factor MQP: AWS Cost Analysis
Edward Carlson, Katie Lin, Joshua McKeen, Benjamin Staw
Advisor: Joshua Cuneo
Sponsor: 7Factor

A New Interface for Remote Music Performance
Benjamin Klaiman
Advisors: Charles Roberts

Augmented Reality for Ultrasound Imaging
Mary Barsoun, Sadie Lombardi, Ian Scott
Advisors: Haichong Zhang (BME), Yihao Zheng (ME)

From Bumblebees to Butterflies: Expanding the Beecology Citizen Science Project Webapp and Database
Aidan Pecorale, Jared Poulos
Advisors: Carolina Ruiz, Elizabeth Ryder
Sponsor: National Science Foundation

On-Campus Delivery Robot
Lucas Buermeyer, Tian Yu Fan, Nicholas Hom
Advisors: Nicholas Bertozzi (RBE/ME), Michael Engling, Brad Miller (RBE)

Data Science

POSTER SESSION, 1:00pm to 3:00pm
Unity Hall 400

Deep Learning for Mental Health Screening using Smartphone Data
Lillian Garfinkel, Madeline Halley, Nicholas Jurovich, Mairéad O’Neill, Brian Phillips, Jyalu Wu
Advisor: Prof. Elke A. Rundensteiner

Novel Machine/Deep Learning Methods Trainable on Real-World Incompletely Labeled Data Sets
Ryan Astor, Kyle Costello, Joshua DeOliveira, Alek Lewis
Advisor: Prof. Elke Rundensteiner

DraftKings MQP 2021
Ardavasd Ardhaldjian, Hailey Delphia, Kaustubh Vivek Pandit, River Yan
Advisors: Donald Brown (ECE), Randy Paffenroth (MA)
Sponsor: DraftKings

Managerial Foresight: Sports Analytics
Jacob Bissonette, Christopher Francis
Advisors: Kenny Ching (Bus), Randy Paffenroth (MA)
Sponsor: Professor Kenny Ching

In-Database Analytics
Bailey Schmidt, Justin Amevor, Junyu Lyn, Tyrone Patterson
Advisor: Mohammad Eltabakh
Improving Director Preferences and Creating a User Interface for the Global Opportunities Allocation Tool
Olajumoke Jackson, Kate Sincaglia, Marissa Thomas, Nicole Whipkey
Advisors: Lane Harrison (CS), Andrew Trapp (Bus)
Sponsor: Global Experience Office

Predictive Models for NBA Sports Gambling
NBA Data Analytics
Evan Hatton, Philip Rago, Andrew Shanaj
Advisor: Lane Harrison (CS), Craig Wills (CS)

Controlling Covid-19 via Vaccination, a Case Study in Massachusetts
Sam Berbeco, Alvin Lee, Larson Ost, Tom Strow, Xizhao Zhang
Advisors: Roger Lui (Math), Oren Mangoubi (Math)

Data Visualization Literacy
Ryan Birchfield, Maddison Caten, Errica Cheng, Madyson Kelly, Truman Larson, Hoang Phan Pham
Advisor: Lane T. Harrison (CS)

Exploring End-Sequence to Sequence Ensemble Model for Predicting RNA Secondary Structure
Aukkawut Ammartayakun
Advisor: Dmitry Korkin (CS)
Sponsor: InnoTech Precision Medicine

Defect Detection Automation for Metal Additive Manufacturing With Deep Learning.
Collin Broderick (Computer Science), Adrianna Staszewska (Computer Science, Data Science)
Advisors: Professor Rodica Neamtu (CS, DS), Professor Diana Lados (ME)

Electrical and Computer Engineering

Intelligent Wireless Power for Enabling Enhanced Personal Mobility
Emily Bubencik, Vibhuti Pathare, Anna Shi
Advisors: Bashima Islam, Alexander Wyglinski

5G User Equipment Selective Jammer
Maya Flores, Devon Poisson, Colin Stevens
Advisor: Alexander Wyglinski

Multi-Lead Wireless ECG
Emma Fountain, Nisha Goel, Benjamin Guerriero, Joshua Reeder, Logan Young
Advisors: Ted Clancy, Songbai Ji (BME)

Formula SAE Electric Car
Andreas Ake Akesson, Jessica Babcock, William Burnham, Gabriel Dudlicek, Jorgo Gushi, Alexandra Heline, Nicholas Karatzas, Aditya Kumar, Giahuy Lenguyen, Nicholas MacHado, Anthony Macrina, Austin Master, Nicholas Panzardi, Kevin Ramos, Alexander Rivera, Iiyas Salhi, Shawn Salvatto, Molly Steinberg, Oliver Thode, Alexander Thurley, Herbie Wolff
Advisors: William Michalson, David Planchard (MME)

POSTER SESSION, 9:00am to Noon
Atwater Kent Labs, Hallway Floor 2

Detection and Localization of RFI in P25 Trunked Radio Systems
Joseph Murray
Advisors: Adriyel Nieves, Alexander Wyglinski

Chemical Synthesis Automation CS MQP TS2
Joshua Smith
Advisor: Therese Smith (CS)

Chaos or Noise? Characterization of Meta-stable Behavior of Bistable Rings
Isabel Herrero Estrada, Victor Mercola
Advisors: Fatemeh (Saba) Ganji, Shahin Tajik

High Altitude Balloon – HAB3
Madeline Kasznay, Shamiha Khan, Alexander Kobsa, Sizhuo Li
Advisor: Maqsood Mughal

Miniaturized Blood pH Sensor
Evan Buckley, Joshua Geyster, Benjamin Larkin
Advisor: Ulkuhan Guler

Smart Motorcycle Helmet Device
Lindsey Ambrosino, Rosina Comatas, Alex Mondro
Advisors: Stephen Bitar, Songbai Ji (BME)

Cloud Motion Vector Sensor System (CMVS) to Monitor and Predict Output Power of a Photovoltaic (PV) System in Real-Time
Habeebullah Adua, Jonathan Ferreira, Timothy Lewis, Stephen Natale, Evan Sauter
Advisor: Maqsood Mughal
RowHammer; A Review of a Hardware-based Memory Exploit and its Potential Impact on Crypto. Schemes
Andrew Adiletta
Advisor: Berk Sunar

POSTER SESSION, 9:00am to Noon
Atwater Kent Labs, Pumpkin Lounge

PCB Verification using Built-in FPGA Security Monitoring IP
Maxwell Westreich
Advisor: Shahin Tajik

Solar Silicon Production by Molten Salt Electrolysis
Alexander Alonzo, Peter Catalino, Andrew Charlebois, Evan Costa, Tyler Melo
Advisors: Stephen Bitar, Adam Powell (MME)

eTextile Interface for Generative Design Software
Jenna Charron, Kyle Mikolajczyk, Noielle Morgan
Advisors: Shamznaz Bhada, Gillian Smith (CS)

Electronically Controlled Exoskeletal Hand (9am-11am)
Jack Tatirosian
Advisors: Gregory Fischer (RBE), Mohammad Mahdi Agheli Hajiabadi (RBE)

IndexPen: Two-Finger Text Input with Millimeter-Wave Radar
Haowen Wei
Advisors: Kaveh Pahlavan, Erin Solovey (CS)

Cloud-Based Nutrient Delivery System
Students: Molly Clem, Wenting Li
Advisor: Stephen Bitar

Atwater Kent Lab 233
Zoom presentation
Meeting ID: 954 0812 4871
Passcode: WPIECE

9:30am
Fire Service Technology
Nisreen Aljumaili, Michael Bedard, William Donovan, Timothy Feeher, Bryce McCue, Matthew Sanford, David Schwartz, Matthew Vindigni
Advisors: Torumoy Ghoshal (DS), Reinhold Ludwig

9:45am
Games for Teaching Children
Shangjin Zhong, Zaiyang Zhong
Advisors: Maqsood Mughal, Therese Smith (CS)

10:00am
Impact of Chia Cryptocurrency to Decrease SSD Environmental Impact at End-of-Use
Tramy Truong
Advisor: Maqsood Mughal

10:15am
Smart Home Security
Noelle Johnson
Advisor: Andrew Clark

10:30am
Solar Agribots
John Benoit, Raymond Carter, Nicholas Hudgins, Stephen Kendrish, Nathan Maldonado, Samuel Ng, John Pattinson, Calvin Thomas, Calvin Zhang
Advisors: Nicholas Bertozzi (RBE), Mehul Bhatia (MME), Kaveh Pahlavan

Humanities and Arts
Higgins House, Library

International and Global Studies

12:00pm
The Future of Conflict Over Water in Arid Climates
Kiersten Potts
Advisor: Joe Doiron (Integrative & Global Studies)

Drama/Theatre

12:15pm
Exploring the Night Sky: Scenic Design Process and Standards
Braden Foley
Advisors: Laura Eckelman, Despoina Giapoudzi

Content reflects information as of April 15, 12pm.
12:30pm
My Theatrical Journey: Advice from a Senior
Talya Feldman
Advisors: Laura Eckleman, Despoina Giapoudzi

English/Creative Writing

12:45pm
Never Set in Stone: The Creative Process in
Transformative Fiction
Adraesteia Wong
Advisor: Kate McIntyre

Music

1:00pm
Sacred Renaissance Polyphony: Setting the Divine
Mercy Sunday Texts for the Liturgy
Benjamin Slattery
Advisor: Joshua Rohde

Interactive Media and
Game Development

Upper Perrault, Fuller Labs

12:00pm
Robot Escape Room
Owen Buckingham, Edward Matava, Alyssa Moore,
Matthew Nagy
Advisors: Berk Calli (RBE), Gillian Smith
(IMGD/CS)

12:15pm
Moonsighted
Charles Baldwin, Jasmine Duerk,
Kaamil Lokhandwala, Dylan Valev
Advisors: Farley Chery, Gillian Smith (CS)

12:30pm
Visual Novel Anthology
Fernando Barzuna, Daniel Enriquez, John Frazia,
Julian Herman, Matthew Selva
Advisor: Brian Moriarty (IMGD/CS)

12:45pm
Rigs of Color - Tool Development
Terry Deng, Paloma Gonzales Galvez, Patrick Luck,
Sophia Marcus
Advisor: Farley Chery

1:00pm
Rigs of Color - Character Creation
Hannah Belan, Caroline Grella
Advisor: Farley Chery

1:15pm
Graphic Novel
Stanley Cliché
Advisors: Adryen Gonzalez, Edward Gutierrez

1:30pm
Jazz History Virtual Museum
Nicolas Fish, Anne Higgins
Advisors: Ralph Sutter, Keith Zizza

2:00pm
Interactive Soundscape Gallery
Hannah Goodsell
Advisor: Keith Zizza

2:15pm
Operation Silo
Justin Gaborit, Brendan Horack, Morgan Jones,
Garet Mildish, Payton Roche
Advisor: Brian Moriarty

2:30pm
Grithjörð: From the Heart
Janelle Knight
Advisors: Adryen Gonzalez, Edward Gutierrez

2:45pm
Imina: A Game About Grief
Mariko Endo, Matthew Johanneson
Advisors: Farley Chery, Ben Schneider, Gillian Smith

3:00pm
IMGD Marketing
Katrina Rifenburgh
Advisor: Jennifer deWinter

3:15pm
GeoBlade
Owen Aguirre, Luke Bodwell, Cameron Jacobson
Advisors: Lane Harrison (CS), Brian Moriarty,
Keith Zizza
3:30pm
Unfinished Business
Emily Austin, James Flynn, Vladimir Karashchuk, Hannah Miller, William White
Advisors: Gillian Smith (CS), Walt Yarbrough

4:00pm
Implementing Procedural Narrative and Characters to Explore Player-NPC Relationships
Miquel Sans Cornet (MS Candidate)
Advisors: Gillian Smith, Ben Schneider (reader)

4:30pm
Walker’s Encyclopedia Pagrodina
Andrew Nichols-Melton (MS Candidate)
Advisors: Jennifer deWinter, Farley Chery (reader)

5:00pm
Reliqua
McKenna Gameros (MS Candidate)
Advisors: Yunus Telliel, Ben Schneider (reader)

Mathematical Sciences
Higgins Labs, 218

9:00am
3-d Liftings and Edge-Crossing Replacements of Quad Dominated Frameworks
Georgina Quinn, Samuel Leonard
Advisors: Brigitte Servatius, Herman Servatius

9:15am
The Calkin-Wilf Tree: Extensions and Applications
Ben Gobler
Advisors: Brigitte Servatius, Herman Servatius

9:30am
Simulations and Machine Learning for Parachute Navigation
Grace Malabanti, Joseph Scheufele, Juliette Spitaels
Advisors: Oren Mangoubi, Greg Noetscher (ECE), Randy Paffenroth
Sponsor: DEVCOM_SC

9:45am
Modeling Pedestrian Flow: A Path-Finding Approach
Victoria Mirecki, Ally Salvino
Advisors: George Heineman (CS), Sarah Olson

10:00am
Curve-Fitting Reserves
Zachary Ahearn, Kieran Lee
Advisors: Jon Abraham, Barry Posterro

10:30am
Classification and Prediction Using Artificial Neural Networks
Anna Fitzpatrick, Molly Folino, Laura Staugler
Advisor: Andrea Arnold

10:45am
Improving Director Preferences and Creating a User Interface for the Global Opportunities Allocation Tool
Marissa Thomas
Advisor: Andrew Trapp
Sponsor: Global Experience Office

11:00am
Copula Modeling: An Application to Workers’ Compensation Claims
Lexi Ferrini, Alison Lambert, Donovan Robillard
Advisors: Jon Abraham, Barry Posterro
Sponsor: The Hanover Insurance Group

11:15am
Entropic Uncertainty Relations (EURs) and Their Connections to Quantum Key Distribution Protocols
Ethan Washock
Advisors: Padmanabhan Aravind (PH), Herman Servatius

11:30am
Fidelity Procurement Categorization of the Current Spend Trend
Luke Deratzou, Neville Ingram, Olivia Reneson, Ziqian Zeng
Advisors: Marcel Blais, Robert Sarnie (BU), Wilson Wong (CS)
Sponsor: Fidelity Investments

11:45am
Predicting US Job Market using Google Trends and Monitoring Sentiments on Wallstreetbets
Luke Gebler, Zhifei Ma, Andrew Nicklas
Advisors: Marcel Blais, Robert Sarnie (BU), Wilson Wong (CS)
Mechanical Engineering

POSTER SESSION: 9am to Noon
Alden Memorial, Great Hall

3D Printed Humanoid Robot
Raymond Beazley, William Engdahl, David Fournet, Anthony Galgano, Alexandria Lehman
Advisors: Kaveh Pahlavan (ECE), Pradeep Radhakrishnan

3D Printing with Liquid Silicone
Blake Audibert, Augustus Doggett, Jackson Hauman, Nathaniel Meyer, Eliza Smith
Advisor: Joe Stabile

A Cantilevered Piezoelectric Energy Harvester Driven by Vortex-Induced Vibrations on a Cylinder in Water
Talya Feldman, Joseph Gilmartin, Evan McCauley, Brendan Merritt, Alyssa Tep
Advisor: Brian Savilonis

A Portable Teleoperated Robot for Ultrasound Diagnostic Imaging
Tianyang Gao, Michael Gobran, Jonathan Valsamis
Advisors: Ziming Zhang (ECE), Yihao Zheng

A Robotic Platform for Endoscopic Spinal Surgery
Rui Hou, Yongxiang Jin, Te Lu
Advisors: Loris Fichera (RBE), Yihao Zheng

A Robotic Platform for Neuro-intervention
Adam Daniel Vespi, Ke Zhao
Advisor: Yihao Zheng

A Thermodynamic Analysis of Solid Oxide Fuel Cells
Devan Blechinger-Slocum, Mostafa Chehadeh, Tarik Ourdyl, Mitra Tabandeh
Advisor: Yu Zhong
Sponsor: Saint-Gobain Research North America

Air Flow in Automotive Engines
Devin Guerrera, William Kelly, Joseph Scafidi, Peter Springer, Erik Wegge
Advisor: Selçuk Güçeri

Alternate Energy Harvesting
Meghan Brady, Dylan Connors, Mikaela Drake, Taylor Nowak, Maureen Ye
Advisor: Brian Savilonis

An Improved Firebrand Generator
Emilia Casagrande, Matthew Nicastro, Matthew Rotman
Advisor: James Urban (FPE)

Artificial Prosthetic Tongue
Xavier Curney, Ace Holod, Suela Miloshi, Nadia Singh
Advisors: Kaveh Pahlavan (ECE), Pradeep Radhakrishnan

Automated Packaging Design Concept for Reusability
William Arthur, Melissa Bazakas-Chamberlain, Genavieve Lombara, Nathan Kumar, Natalie Mathews
Advisor: Pradeep Radhakrishnan

Autonomous Exoskeleton for Paraplegic Assistance
Zachary Chapins, Ricardo Ferrua, Dina Habboosh, Alek Hersum, Jack Waterman
Advisors: Mehul Bhatia, Gregory Fischer (BME, RBE), Jeanine Skorinko (Psychological and Cognitive Science)
Sponsor: Maxon Motors

Axiomatic Design of a Football Helmet
Blake Bragaw, Derrick Doncaster, Alexander Gladu, Alex Kalmar-Gonzalo, Matthew O’Donnell
Advisor: Christopher Brown

Construction of a Variable Compression Engine for the Classroom
Michael Arbore, Siddhant Damle, John Riley, Dylan Turetsky
Advisor: Robert Daniello

Crocheting Aid
Samantha Barakian, Hailey Fink, Mariah Haney, Marissa Li, Taylor Ostrum, Thanh Trac
Advisor: Eben Cobb

CSTEM and its Application to the Designing and Analyzing of an Automobile Engine
Mitchell Sroka, Matthew Stevens
Advisors: Mostafa Fofana, Robert Krueger (Social Sciences and Policy)

DaR3D: Detecting and Recognizing 3D Printing Defects
Madison Eisenhour, Mark Forte, Ryan Malkowski
Advisors: David Brown (CS), Pradeep Radhakrishnan
Design and Analysis of a 3D Printed Musical Instrument
Claire Dollins, Eli Breithart Frischling, Joshua O’Grady, Meghan Scruton
Advisor: John Sullivan

Design and Manufacturing of a Testing Rig for Reverse Engineered Vibrato System
Katherine Burkes, Lanna Delaney, Andrew Fauerbach
Advisors: Fiona Levey, V.J. Manzo (HUA)

Design of a Snowmaking Distribution System
Nicholas Dal Porto, Natalie Dionne, Meghan Hendry, Isabelle Ho, Shane Jackson, Kelsey Wilkinson
Advisor: Christopher Brown

Design of an Electrical Biopsy Tool for White Light Colonoscopy
Mary Decelles, Hannah Lindsey, Advisors: Ahmet Sabuncu, Cagdas Onal (RBE)

Designing a Low-Profile Home Speaker Utilizing a Moving Magnet Transducer
Ethan Farrah, Brendan Green, Jasper Rankin, Thaddaeus Zuber
Advisor: Joe Stabile

Developing Next Generation Micro Research Reactor
Seamus Flanagan
Advisors: David Medich (Physics), Richard Sisson

Development of a Fully 3D Printed Autonomous Vehicle
Benjamin Amado, Joseph Calcasola, Anthony LoPresti, Matthew Maloney, Kwesi Sakyi
Advisors: Kaveh Pahlavan (ECE), Pradeep Radhakrishnan

Electrohydrodynamically-Enhanced Atmospheric Water Generation
Brian Desjardins, Grace Olaya, Benjamin Verdesi
Advisors: Aswin Gnanaskandan, Jamal Yagoobi

First Alert Escape Ladders
Students: Grete Bressner, Meaghan Downing, Timothy Lanoue, Zachary Stone
Advisor: John Sullivan
Sponsor: First Alert

How to Extract Water from the Martian Environment
Lydia Ellen Tonani
Advisors: John Bergendahl (Civil, Environmental, and Architectural Engineering), Carrick Eggleston (Civil, Environmental, and Architectural Engineering), John Sullivan

Impact of Heat Treatment on Carbon Steel Alloys
Wenlan Fan, Samuel Furman, Dawson Scheid, Daniel Tengdin
Advisors: Stephen Bitar (ECE), Jianyu Liang, Brajendra Mishra, Walter Thomas Towner (BUS)

Innovating the Electric Jet Ski
Dianjenis Abreu, Erik Herrera, Zach Le, Connor Melone, Ayna Ramseur-Moore, Wayde Whichard
Advisors: Mehul Bhatia, Maqsood Mughal (ECE)
Sponsor: Zero Motorcycles

Leak Tester Design
Daler Kang, Yasaman Khosravi
Advisors: Ahmet Sabuncu, Joe Stabile

Light Actuated Microvalve
Matteo Cugno, Tyler Stack, James Stolarczyk
Advisor: Balaji Panchapakesan

Load-Absorbing Figure Skate Blade
Connor Sullivan, Michael Viozzi
Advisor: Christopher Brown

Lorentzian Water Wheel
Wayne Nolette
Advisor: Ahmet Sabuncu

Michael Cuddy, Kevin Neidhart, Griffin O’Neil, Timothy R. B. Snow
Advisors: Robert Daniello, Fiona Levey

Measurement and Simulation of Thermal Distributions Across a Quantum Diamond Sensor with Nitrogen Vacancy Centers
Alexander Puhalski
Advisors: Pratap Rao, Raisa Trubko (Physics)
Microplastic MQP
Kelly Perfetto, Mitchell Mudge, Alyssa Richardson, Aaron Rosner
Advisor: Sarah Jane Wodin-Schwartz

NASA Lunabotics
Jesulona Akinyele, Manjusha Chava, Payton Grant, Corinne Hartman, Karen Hou, Nikita Jagdish, Tyreese James, Sarah McCarthy, Nathan Ng, Jacob Parker, Michael Rosetti, Julia Sheats, Thomas Sterrett, Jacob Yurcak
Advisors: Joshua Cuneo (CS), Yarkin Doroz (ECE), Therese Smith (CS), Kenneth Stafford (RBE/ME), Walter Towner (MGE)

Palm Print
Alvaro Gonzalez, Ana Paula Navarro Aguayo, Igor De Moraes, Nathan Morin
Advisor: Joe Stabile

Repurposing PLA into 3D Printing Filament
Anna Catlett, Dominick Gravante, Casey Willis
Advisor: John Sullivan

Semi-Autonomous Vehicle to Reclaim Derelict Fishing Nets from Ocean Garbage Patches
Brian Pacheco, Delia Smith, Richard Steinberg
Advisor: Selçuk Güçeri

Smart Wearables Devices: An IoT-Enabled Bicycle Helmet for Recreational and Mountain Cyclists
Aaron Andrade, Amber Beliveau, Ruchita Choksey, Nichole Leveille
Advisor: Mehul Bhatia

Solar Agribots
John Benoit, Raymond Carter, Nicholas Hudgins, Stephen Kendrish, Nathan Maldonado, Sam Ng, John Pattison, Calvin Thomas, Calvin Zhang
Advisors: Nicholas Bertozzi (RBE), Mehul Bhatia, Kaveh Pahlavan (ECE)

Solar Silicon Epitaxy by Molten Salt Electrolysis: Life Cycle Analysis and Experimental Augmentations
Alex Alonzo, Peter Catalino, Andrew Charlebois, Evan Costa, Tyler Melo
Advisors: Stephen Bitar (ECE), Adam Powell
Sponsor: SilarTe

Sound Pulse TM
Ryan Keegan, Madison Kronke, Dorian Isidore, Lauren Paul, Katherine Pawlak, Elizabeth Rocco
Advisor: Joe Stabile

SproutBot - A Robotic Growing System for Sprouts
Cole Kraus
Advisor: Christopher Brown

Stirling Engine Design
Marika Bogdanovich, Elizabeth DiRuzza, Julia Leshka Jankowski, Sophie Kurdziel
Advisors: Mustapha Fofana, Sophie Kurdziel (SSPS)

Traffic Cone Setter
Charlie Dursin, Nathan Reed, Tyson Wiseman
Advisor: Eben Cobb

Triboelectric Energy Generation for the U.S. Army
Peter Fagerholm, Kaleigh Hess, Caitlin Kean, Kyle Postans, Joshua Woodruff
Advisors: Gregory Noetscher (ECE), Pratap Rao
Sponsor: U.S. Army Combat Capabilities Development Command (DEVCOM)

Youth Soccer Headgear
Brendan Corcoran, Frederic Ghonda, Tanner McCarthy, William Morton
Advisor: Brian Savilonis

Physics

POSTER SESSION
Olin Hall, 1st Floor

Group A 9:30am to 10:45am
Group B 10:45am to Noon
Group C 1:00pm to 2:15am

IA
Design and Testing of a Surface UnderSea Kite (SUSK) Model
Thomas Rau
Advisors: Nancy Burnham and David Olinger (AE)

1B
Education Research on Ungrading: The implications of removing grades on student and instructor experiences
Ben Petkie
Advisor: Ben Pollard
Optoelectronic Investigation of Titanium-Based Quaternary Derived Nano-Structures
Ryan Hanna
Advisors: Ronald Grimm (CBC) and Lyubov Titova

Introduction to QBism
Robert Kramer
Advisor: P.K. Aravind

Supplementing the Learning of Physics through the Focused Instruction of Graphicacy
Simon Rees
Advisor: Rudra Kafle

Simulating the Hawking Effect and Black Hole Evaporation for Kerr-Newman Black Holes
William Aaron, Patrick O’Mullan, Advisors: Ramdas Ram Mohan, Sarah Olson (MA), L. Craig E. Wills (CS)

Optical Properties of Cs2TiBr6, a New Solar Energy Material
Maranda Allen, Caroline Jaeger
Advisors: Ronald Grimm (CBC), Robert Krueger (SSPS), Lyubov Titova

A Search for Exotic Higgs Decay to the 4b Final State
Kaitlyn Morrison
Advisors: Rafael Coelho Lopes de Sa (UMass-Amherst), Raisa Trubko (WPI)

Ultrafast Carrier Dynamics in MXene Films
Javery Mann
Advisor: Lyubov Titova

Modeling Measurements of Black Body Radiation to Analyze Data provided by ALMA Satellites
Nicole Garay, Nickolas Gardner
Advisors: Rudra Kafle, Douglas Petkie

Development of an Inexpensive Brachytherapy Afterloader for Use in Low Resource Settings
Brian Zawacki
Advisor: David Medich

An Analysis of the Planetary Disk and Gap Structure around HL Tau
Jacob Casey
Advisors: Rudra Kafle and Doug Petkie

Olin Hall, 2nd Floor

3D Microfabrication of Waveguides using Two-Photon Polymerization
Brady Jeong
Advisor: Douglas Petkie

Investigating the Effects of Bending on PEO Doped Flexible Perovskite Solar Cells
Brigitte Lefebvre, Samuel Skinner
Advisors: Nancy Burnham, Oluwaseun (Kenny) Oyewole (ME), Wole Soboyejo, (Provost)

Optical Variability of Active Galactic Nuclei in Accretion Disks
Bhanuj Jain
Advisors: Francesca Bernardi, (MA) Rudra Kafle, Douglas Petkie

Imaging and Sensing of Materials for the Smart World
Yifan Gu
Advisor: Douglas Petkie

Effect of Deposition Surface on the Resuspension Factor
Holden Snyder
Advisor: David Medich

Generalized Extrapolation of Temperature and Energy from Light Emissions in a Fusor
Michael Laemmle
Advisors: Doug Leonardi, David Medich
7A
Development of a MicroCollimator Array
Brock Jolicoeur
Advisor: David Medich

7B
Quantum Cloning
Daniil Volkov, Yonglong Zhan (through zoom)
Advisors: P.K. Aravind, Darko Volkov (MA)

7C
Statistical Variability and Thermal Stability of Photonic Integrated Circuits
Morgan Kaler
Advisors: James Eakin, Douglas T. Petkie
Sponsor: Spark Photonics

8A
Entropic Uncertainty Relations (EURs) and Their Connections to Quantum Key Distribution Protocols
Ethan Washock
Advisors: P.K. Aravind (PH), Herman Servatius (MA)

8B
Structure of Modified Neuropeptides in Relation to the Cell Entering Mechanism
Presenters: Allison Hershoff, Benjamin Lunden
Advisors: Jagan Srinivasan (BBT,) Izabela Stroe

8C
Measurement and Simulation of Thermal Distributions across a Quantum Diamond Sensor with Nitrogen Vacancy Centers
Alexander Puhalski
Advisors: Professors Pratap Rao (ME), Raisa Trubko

9A
MCNP Analysis of a Novel W-181 HDR Brachytherapy Source
Kyle Marquez
Advisor: Professor David Medich
Presenting in the summer….
"Diffuse interface model for energy and mass transport through a cellulose fiber wall “
Presenter(s): Nicholas Mills
Advisor(s): Burt S. Tilley (MA) and Alex A. Zozulya

9B
“Terahertz Gas-Phase Spectroscopy for Interstellar Applications”
Presenter: Kaitlin Mason
Advisor: Professor Petkie

Professional Writing
POSTER SESSION: 11:00am to 12:00pm
Higgins House, Great Hall

Courtroom Perceptions and Decisions: The Effects of Perspective Taking, Victim Impact Statement Content, and Victim Gender
Emily Bendremer
Advisors: Ryan Madan

A Study of Knowledge Bases
Noah Brennick
Advisor: Kevin Lewis
Sponsor: WPI IT Services and Support

A Tsuboniwa: A Garden Dream
Elaine Chen
Advisors: Jennifer deWinter, Yunus Telliel
Sponsor: Kyoto VR

Thinking About Narrative Medicine: UMMS Humanities Lab and the Rise of Narrative in Medical Education
Sarah Doherty
Advisor: Yunus Telliel

Rhetoric and Ethics of the Ownership of Genetic Data
Cameron Fiddes
Advisor: Yunus Telliel

Addressing Stigma and Privacy Concerns of COVID-19 and Contact Tracing
Alexa Freglette
Advisor: Kevin Lewis

API Documentation for Users and Developers
Carley Gilmore
Advisor: Kevin Lewis
Sponsor: 7Factor

Perceptions of Intentional vs Non-Intentional Death
Karen Ho
Advisors: Shana Lessing, Ryan Madan
Examining the Culture of Safety and Patient Outcomes in New York Hospitals
Liza Hote
Advisors: Brenton Faber, Yunus Telliel

Exploring Stylistic and Structural Conventions in Biological Review Articles: A Genre Analysis
Rachel Maurice
Advisors: Ryan Madan, Sarah Riddick

A Rhetorical Inquiry: Molecular Characterization of the Histone Methyltransferase Suv420 as a Grant Proposal
Cristian Nunez
Advisor: Ryan Madan

Post-Production Workday Opportunities: Operational and Communication Strategies
Bridgette Paredes
Advisor: Esther Boucher-Yip
Sponsor: Veronica Brandstrader, WPI Information Technology

Communicating Results of Engineering Studies
Erin Perry
Advisor: Kevin Lewis

Examining the Culture of Safety and Patient Outcomes in New York Hospitals
Silvana Reid
Advisors: Yunus Telliel, Brenton Faber

Robotics Engineering
Unity Hall – Floors 1 and 2

8:15 am
Multi-Robot SLAM
Tyler Ferrara, Connor McLaughlin, Peter Nikopoulos
Advisor: Carlo Pinciroli

8:30 am
Beach Swarm
Samuel Bello, James Casella, Matthew Langkamp, Lauren Sowerbutts
Advisors: Nicholas Bertozzi, Bradley Miller

8:45 am
Escape Room Robotics
Owen Buckingham, Edward Matava, Alyssa Moore, Matthew Nagy
Advisors: Berk Calli, Gillian Smith

9:00 am
Augmented Reality for Ultrasound Imaging
Mary Barsoum, Sarah Lombardi, Ian Scott
Advisors: Haichong Zhang, Yihao Zheng

9:15 am
Bio-inspired Exosuit
Peter Buterbaugh, Lily Durkin, Haojun Feng, William Shaver
Advisors: Marko Popvic, Ziming Zhang

9:30 am
NASA Extreme Terrain Mobility
Stephen Chavez, Kathryn Stoval
Advisor: Marko Popovic

9:45 am
Design of Mobile Robotic Base
Kenneth Armijo, Alexander Corey, Braden Foley, Edward Jackson, Timothy McCarthy
Advisors: Berk Calli, William Michalson

10:00 am
DigSafe Auto Cable Detection System
Brigid Auclair, Casey Gosselin, Amber Lindberg, Kyle Mitchell
Advisors: Greg Lewin, Jing Xiao

10:15 am
A Hopping Two-Wheeled Segway Robot
Christian Defranco, Russell DeSouza, Samuel Mwangi
Advisor: Siavash Farzan

10:45 am
6 Axis 3D Printer
Christopher Cook, Caden Crist, James Krigsman
Advisors: Michael Gennert, Mohammad Mahdi Agheli Hajiabadi

11:00 am
Robotics for Recycling Industry
Nathan Bargman, Kaitlyn Fichtner, Mary Marquette, Garett Ruping, Conrad Tulig, Lauren Wach
Advisors: Berk Calli, Jennifer Rudolph, Sarah Jane Wodin-Schwartz
11:15 am

Solar Agribots
John Benoit, Raymond Carter, Nicholas Hudgins, Stephen Kendrish, Nathan Maldonado, Sam Ng, John Pattison, Calvin Thomas, Calvin Zhang
Advisors: Nicholas Bertozzi, Mehul Bhatia, Kaveh Pahlavan

11:30 am

Wildland Firefighting Robots
Anna Eng, Nigel Kobayashi, Andy Li, Trang Pham
Advisors: Carlo Pinciroli, Albert Simeoni, James Urban

11:45 am

Electronic Exoskeletal Hand
Matthew Rothman
Advisors: Gregory Fischer, Mohammad Mahdi Agheli Hajiabadi

1:00 pm

SMAC (RAINSTORM)
Elias Benevedes, Dominic Ferro, Samantha Gould, Filip Kernan
Advisors: Greg Lewin, Markus Nemitz, Carlo Pinciroli

1:15 pm

Electric Snowboard
James Englander, Nicholas Franzini, David Smith, Erin Thibeault
Advisors: William Michelson, Kenneth Stafford,

1:30 pm

Stair Capable Vacuum
Benjamin Draper, Sawyer Wofford
Advisors: Siavash Farzan, Jing Xiao

1:45 pm

3D Humanoid Robot
Raymond Beazley, William Engdahl, David Fournet, Anthony Galgano, Alexandria Lehman
Advisors: Kaveh Pahlavan, Pradeep Radhakrishnan

2:00 pm

CLARA – Continuum Locomotion Alternative for Robotic Adaptive Exploration
Brian Katz, Katelyn Wheeler
Advisors: Cagdas Onal

2:15 pm

NASA Lunabotics
Jesulona Akinyele, Manjusha Chava, Payton Grant, Corinne Hartman, Karen Hou, Nikita Jagdish, Tyreese James, Sarah McCarthy, Nathan Ng, Jacob Parker, Michael Rosetti, Julia Sheats, Thomas Sterrett, Jacob Yurcak
Advisors: Joshua Cuneo, Yorkin Doroz, Therese Smith, Kenneth Stafford, Walter Towner

2:30 pm

Design Novel Colonoscopy Probe
Mary Decelles, Hannah Lindsey
Advisors: Cagdas Onal, Ahmet Sabuncu

3:00 pm

Origami (OREO’d)
Tyler Looney, Archie Milligan, Daniel Perno, Nathan Savard, Michael Scalise, Augustus Teran, Ryley Wheelock
Advisors: Markus Nemitz, Cagdas Onal, Carlo Pinciroli

3:15 pm

Autism, Anxiety Assist Robots (PABI)
Jennifer Lewitzky, Erin Perry, Elizabeth Roberts
Advisors: Gregory Fischer, Kevin Lewis, Jeanine Skorinko

3:30 pm

Simulation of Nursing Robot Tasks
Kushal Gandhi
Advisor: Jane Li

3:45 pm

On-Campus Delivery Robot
Lucas Buermeyer, Nicholas Hom, Tian Yu Fan
Advisors: Nicholas Bertozzi, Michael Engling, Bradley Miller

4:00 pm

Metamorphic Manufacturing
Patrick Siegler
Advisors: Berk Calli, Sniha Narra, Adam Powell, Craig Putnam
4:15 pm
Lionfish Harvesting Robot – Phase V
Owen Blaufuss, Kathleen Cochran, Atharva Dikshit, Julia Meisser, Justin Mitchell, Brandon Snapperman
Advisors: William Michalson, Bradley Miller, Craig Putnam

4:30 pm
Partial Hand Prosthetic: Core Function
Liam Benjamin, Adele Burton, Ander Carbajo Perez
Advisor: Marko Popovic

4:45 pm
Partial Hand Prosthetic: Experimental Features
Nicole Dressler, Brian Fay, Andrew Fisher, Luke Reid
Advisors: Joshua Cuneo, Gregory Fischer, Marko Popovic

5:00 pm
Sailbot
Andrew Del Velcchio, Renee Gruner-Mitchell, Deep Kumar, Tom Nurse, Jieyuan Song, Molly Sykes, Anthony Tesriero, Jarius Thomas
Advisors: William Michalson, Kenneth Stafford

5:15 pm
FSAE Electric Car
Andreas Akesson, Jessica Babcock, William Burnham, Gabriel Dudlicek, Jorgo Gushi, Alexandra Helene, Nicholas Karatzas, Aditya Kumar, Giahuy Lenguyen, Nicolas Machado, Anthony Macrina, Austin Master, Nicholas Panzardi, Kevin Ramos, Alexander Rivera, Ilyas Salhi, Shawn Salvatto, Molly Steinberg, Oliver Thode, Alexander Thurley, and Herbie Wolff
Advisors: William Michalson, David Planchard

5:30 pm
Bot on a Wire
Rushab Patil
Advisor: Professor Greg Lewin

Social Science and Policy Studies
Unity Hall, Room 420

9:00am
Courthouse Perceptions and Decisions: The Effects of Perspective Taking, Victim Impact Statement Content, and Victim Gender
Emily Bendremer
Advisors: Ryan Madan (HUA), Jeanine Skorinko

9:15am
Scared of Blowing it? Relations Between Risk Taking, Learning, and Anxiety
Rylee Ferguson (Assumption College)
Advisor: Cremone Caira (Assumption College)

9:30am
Exploring Calming Activities for Intellectually & Developmentally Disabled Adults
Anish Nakahara, Malvina Piziak, Rachelle Wailes
Advisors: James Doyle, Adrienne Hall-Phillips (BUS), Jeanine Skorinko

9:45am
Math Testing Anxiety: Measuring Math Performance and Physiological Effects in College Students
Paul Pacheco
Advisors: Erin Ottmar, Stacy Shaw

10:05am
Using Digital Software to Train ABA Delivery Staff
Patrick Davidson (Assumption College)
Advisor: Karen Lionello-DeNolf (Assumption College)

10:20am
Autonomous Exoskeleton for Paraplegic Assistance
Ricardo Ferrua Elmudesi
Advisors: Mehul Bhatia (ME), Greg Fischer (RBE), Jeanine Skorinko

10:35am
Will Love Tear Us Apart? Effects of Parental Divorce on Romantic Relationships in Emerging Adults
Ariel Squier (Assumption College)
Advisor: Regina Kuersten-Hogan (Assumption College)
10:50am
An Analysis of the Relationship between
Depression and Post-Treatment Lyme Disease
Carol D’Agostinto (Assumption College)
Advisor: Leonard Doerfler (Assumption College)

11:25am
Psychosocial Validation of 3D Food Printing
Ellie Koptsev
Advisors: Danielle Cote (ME), Angela Rodriguez

11:40am
Neuroanatomical Biomarkers for Suicidality in
Dissociative Identity
Lilly-Beth Linnell
Advisors: Ben Nephew (NEU), Jeanine Skorinko

11:55am
Anxiety, Autism, and Socially Assistive Robots
Jennifer Lewitzky, Elizabeth Roberts
Advisors: Gregory Fischer (RBE), Jeanine Skorinko

12:10pm
Auditory Grouping and Machine Learning
Zachary Wagner
Advisors: Scott Barton (HUA), James Doyle,
Gillian Smith (CS)

12:25pm
Perceptions of Intentional vs Non-Intentional
Death
Karen Ho
Advisors: Shana Lessing (HUA), Ryan Madan (HUA),
Angela Rodriguez, Stacy Shaw

9:00am
Public Policy and School Shootings in the
United States
Rosalyn Bates
Advisors: Crystal Brown, Gbetonmasse Somasse

9:15am
Transdisciplinary Design of a Blood Pressure
Monitor for Pregnant Women in Ghana at High-
Risk of Developing Preeclampsia
Hailey Hurrell
Advisor: Robert Krueger
WPI Projects Program and Sponsorship

The projects program at WPI is the university’s signature approach to undergraduate education, combining theoretical study with practical problem solving. It brings together the brilliant minds and talents of our student teams and faculty advisors with a wide variety of corporate, government, and nonprofit organizations. Collaboratively, it addresses real business needs, synergizing to create meaningful results.

Project work is one of the most distinctive aspects of a WPI education and has been at the core of WPI’s undergraduate curriculum for more than 50 years. It provides students the opportunity to gain professional skills, a talent for teamwork, and the confidence to dive right in. Together with our corporate partners, we are making progress, one project at a time.

WPI welcomes sponsorship for our Major Qualifying Projects. If you are interested in discussing company engagement strategies, including projects such as these, please contact David Ortendahl, Executive Director, Corporate Relations Office, University Advancement, at dortendahl@wpi.edu.

General guidelines for project sponsorship:

• The best types of projects support or enhance current activities.
• A project cannot be “mission critical” or on the “critical path.”
• Most MQPs consist of a team of students (2–4) and a faculty advisor, although in some cases—depending upon the scope of the project and the disciplines of the student team—there may be additional advisors.

For more information about sponsoring a project, visit wpi.edu/+engage.
In January 2022, WPI opened Unity Hall, a 100,000-square-foot state-of-the-art academic and research facility. The facility features versatile learning spaces that can be configured in multiple ways to inspire learning through doing: flexible research, collaborative, and graduate student space designed to bring great minds together to solve important problems; and faculty offices to support expansion and maintain the teaching and learning environment for which WPI is well known. The building also features an integrated Student Academic Services Center, which will conveniently connect students with the support and guidance they need to help them succeed throughout their WPI journey—and beyond.

ABOUT WPI

Founded in 1865 in Worcester, Mass., WPI is one of the nation’s first engineering and technology universities. Its 14 academic departments offer more than 50 undergraduate and graduate degree programs in science, engineering, technology, business, the social sciences, and the humanities and arts, leading to bachelor’s, master’s, and doctoral degrees. WPI’s talented faculty members work with students on interdisciplinary research that seeks solutions to important and socially relevant problems in fields as diverse as the life sciences and bioengineering, energy, information security, materials processing, and robotics. Students also have the opportunity to make a difference to communities and organizations around the world through the university’s innovative Global Projects Program. There are more than 50 WPI project centers throughout the Americas, Africa, Asia-Pacific, and Europe.