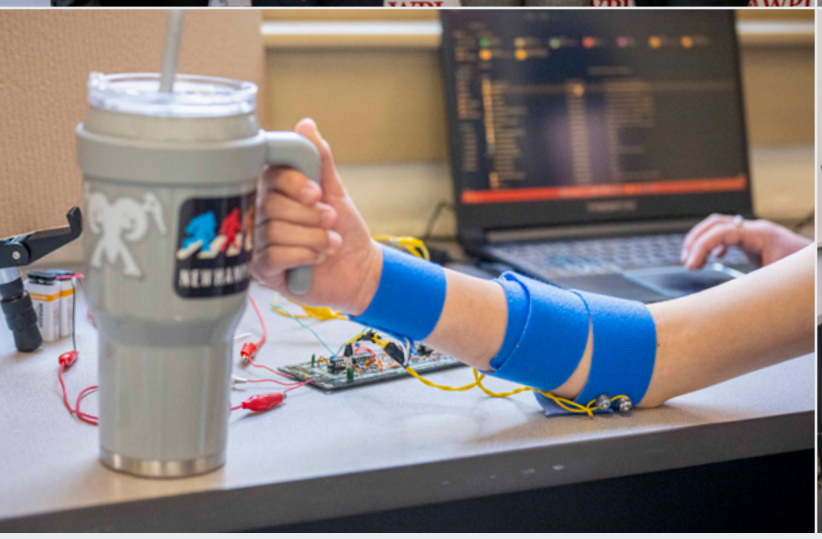
UNDERGRADUATE RESEARCH

Projects Showcase

[A celebration of all senior students' research, design, and creative theses]

APRIL 19, 2024



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LET'S CONNECT

Undergraduate Research Projects Showcase

A celebration of research, design, and creative theses—a requirement of every graduating senior through the Major Qualifying Project (MQP)—takes place each spring on campus. Classes are cancelled during the showcase so the entire community can appreciate the breadth and depth of undergraduate research activities—and their potential to change the world. Student teams representing all academic departments present their work to their faculty advisors, external sponsors, and the community-at-large, and the public is invited. One of three significant academic projects all WPI students complete, the MQP is the culmination of a project-based educational experience that prepares students for their journey after graduation.

The project experience provides students with the skills 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

Visit for details on coming to campus >

Aerospace Engineering Department

Location: HL 218

8:30am

Design and Testing of an Amphibious AUV
Ryan Chesanek, Graham Driscoll-Carignan, Spencer Granlund, Matthew McMahon, Evan Russell, Benjamin Twombly
Advisor: Prof. Demetriou

8:50am

RC Aircraft Design for AIAA Design, Build, Fly (DBF) Competition
Elias Monzayet, Bridget Muturi, Carson Murphy, Troy Santopadre, Wesley Schulz, Richard Shaw, Jack Robertson, Regina Valencia
Advisor: Prof. Yuan

9:10am

Novel Mobility Solutions for Extreme Lunar Terrain
Benjamin Cobb, Alexa Dahlquist, Michael Gouveia, Finnian Hamblett, Roman Henry, Joseph Kuchenmeister, Cristina Perez
Advisor: Prof. Karanjgaokar

9:30am

Aerodynamic and Structural Analysis of the Kaman K-16B
Andrew Carlton, Shannon Daly, Elizabeth Healy, Naoki Heginbotham, Cyril Ogbebor, Viren Punjabi, Douglas Shirakura, Akhilesh Yarlagadda
Advisor: Prof. Blandino

BREAK 10 minutes

10:00am

Design, Analysis and Testing of Ionic Wind Propulsion System for an Electric Aircraft
Cailin Borovicka, Colleen Henderson, Cole Lederman, Ariel Velasquez
Advisor: Prof. Taillefer

10:20am

Design and Testing of a Tethered Underwater Wing
Laurence Clancy, Michael Daton, Holly Perry, John Radzanowski, Charles Ritchie, Erika Varady, Zachary Winston
Advisor: Prof. Olinger

10:40am

Design and Analysis of a High-Powered Model Rocket
Nathan Brumble, Robert Doyle, Abigail Duval, Melissa Kelly, Cameron McAfee, Claire Matthews, Bryan Silva
Advisor: Prof. Taillefer

11:00am

Design of Thermally Efficient Cryogenic Tanks for Spacecraft
Quentin Collins, Roman Gowie, Alice Kelly, Rayden Morley, Sean Nuzio, Nathaniel Polus, Janelly Torres
Advisor: Prof. Jayachandran

BREAK 10 minutes

11:30am

Design of a CubeSat for Identifying, Tracking and Mitigating Space Debris -Part 1
Jackson Neu, Ellie Sherman, Domonic St. Pierre
Advisor: Prof. Taillefer

11:46am

Design of a CubeSat for Identifying, Tracking and Mitigating Space Debris – Part 2
Liam Piper, Ethan Prigge
Advisor: Prof. Demetriou

12:10 am

Coupled Sensor Configuration and Planning with UAVs
Alexandra Ballentine, Joseph Calomo, Jarrett Gulden, Peter Korfuzi, Jake Letourneau, Thomas Lamar, Marina Nelson
Advisor: Prof. Cowlagi

12:30pm

Design and Analysis of a Small Sat as a Communication Relay for Venus Atmospheric Probes
William C. Baxter, Gregoire Brougher, Jacob Ewen, Isaac Garry, George Love, Adam Osgood
Advisor: Prof. Lu

Bioinformatics & Computational Biology

POSTER SESSION, 9:30 am to 12:30 pm
Rubin Campus Center, Odeum

Deep Learning Analysis on Neuroimaging Data to Distinguish Anxiety and Depression Diagnoses in Adolescents
Olivia Deckers, Pitipat Kongsomjit
Advisor: Benjamin Nephew

Machine Learning Analysis of Neuroimaging (MRI) Data to Distinguish Patients with Focal Cortical Dysplasia Type II
Jonathan Golden, Vivek Kandasamy
Advisor: Benjamin Nephew

Transcriptomic Analysis of *Pseudomonas putida* in Varied Growth Conditions
Gabriella Guzman Jerry
Advisor: Natalie Farny

Transcriptomics of Myosin XI Conditional-loss-of-function in Moss
Carter Nakagawa
Advisor: Luis Vidali

Biology & Biotechnology

POSTER SESSION, 9:30am to 12:30pm
Rubin Campus Center, Odeum

Applications of Aptamers for Toxicological Remediation of PFOA
William Miller, Hayley Wigren
Advisor: Natalie Farny

***Artemisia annua* Tea Drug Interactions: New Method Development**
Ryan Polansky, Russel Kam
Advisors: Pamela Weathers, Suzanne Scarlatta

Artemisinin's Effect on Iron Metabolism in Breast Cancer Cells
Daisy Connors, Clare Nargi
Advisors: Jill Rulfs, Michael Buckholt

Assessing Nucleic Acid Aptamers for the Amelioration of Copper Toxicity
Stephanie E. Reis
Advisors: Natalie G. Farny, Jagan Srinivasan

Chillin' Out: The Role that CBD Plays in Parkinson's Disease Treatment
Jan Anthony, Katherine Corbin, Rachel Grandmaison, Mikayla Raffin
Advisors: Mike Buckholt, Jill Rulfs, Jagan Srinivasan

Comparison of Pre-Operative Site Sterilization Techniques in Equine Medicine
Holly Galvin
Advisors: Michael Buckholt, Jill Rulfs
Sponsor: Michael Myhre Equine Clinic

Conservation and Function of the N terminal Insert of Kek1
Josephine Patten
Advisor: Joseph Duffy

Discovery of a Novel Mutation in Rifampicin Resistant *E. coli*
Kyra Robinson
Advisor: Louis Roberts

Effects of Cortical Dynein on Chromosome Movement and Alignment
Nora Shanks
Advisor: Amity Manning

EGFR: Functional & Evolutionary Analyses of Domain V
Alexandra Poulhazan
Advisor: Joseph Duffy

Examining the Effects of Phytoestrogens on Ovarian Cancer Cells
Sarah Aspinwall, Vanessa Cenkollari, Hannah Gilmore, Komlavi Touglo
Advisors: Jill Rulfs, Michael Buckholt

Functional Analyses of the Kek5 Intracellular SLIM, CO1, in Drosophila and Disease Implications in Humans
Kelly Heffernan
Advisor: Joseph Duffy

Impacts of Loons Syringes on Vocalization
Maryam Al Hakeem, Caitlin Guilfoyle
Advisors: Michael Buckholt, Jill Rulfs, John Mager(ONU)

Implementation of Telehealth Techniques to Improve Emergency Department Best Practices in Suicide Prevention
Taylor Jane McGinty
Advisor: Jill Rulfs

Inducible mCardinal Genetic Circuit in *Pseudomonas putida* for Soil Contaminant Remediation
Lauren Abraham
Advisor: Natalie Farny

Metal Dyshomeostasis in Alzheimer's Disease: An Observation of the Role of ZIP12 in Zinc Uptake in Neuronal Cells
Madison Brown, Lily Lancellotti, Allison Walker, Morgan Whitney
Advisors: Robert Dempski, Lou Roberts

Mindfulness could change your brain... for the better!
Sakshi Joglekar
Advisor: Ben Nephew

Modulation of Cellular Stress Response by the RB Tumor Suppressor Protein
Grace McCarthy, Jacquelyn Nicoletti
Advisor: Amity Manning

Neural Mechanisms of Social Threat Processing Can Optimize Emotion Regulation Training to Improve Mental Health
Eva Petschek
Advisors: Richard Lopez, Benjamin Nephew

North American Moth Populations & the Effects of Changing Climate
Zoë Swartley, Michelle Kirtich
Advisor: Marja Bakermans

NUDIX Hydrolase Expression and Impact on mRNA Structure
Olivia Garrity, Kaleigh Caserta
Advisor: Louis Roberts

Operation Tick Hunt: Developing an Experimental Framework to Monitor Lyme Disease in Central Massachusetts
Dylan Mackisey, Connor McKaig, Ciara Moroney
Advisors: Michael Buckholt, Chris Collins

Optimizing Immunopurification of Exocyst Complex in Plants
Ren Vitellaro
Advisors: Luis Vidali, Edward Chocano Coralla, Mary Munson(UMass)
Sponsor: UMass

Psychosocial and Biochemical Correlates of Nicotine Administration via Vaping Behaviors
Mira Kirschner
Advisors: Angela Incollingo Rodriguez, Jagan Srinivasan

Purification and Characterization CLoG1 from Moss
Zachary Gogna
Advisors: Luis Vidali, Louis Roberts

Screening for ErbB Family Inhibitors to Identify Potential Cancer Therapeutics
Samuel Levitan
Advisor: Joseph Duffy

Stress-dependent Cilia Remodeling in *C. elegans*
Katelyn Quinn-Cyr
Advisors: Inna Nechipurenko, Jim Doyle

Suv420H2 Localization during Mitosis is Sensitive to Phosphorylation
Stephanie Lee
Advisor: Amity Manning

The Effect of Gut Microbiome Modifications on Chemosensory Deficiencies in *C. elegans* Models of Alzheimer's Disease
Grace Solod
Advisor: Jagan Srinivasan

The Role of the Map Kinase Pathway in *C. elegans* Immune Response Against *C. albicans*
Alexis Wood
Advisor: Reeta Rao

The Roles of RNA Degradation Proteins in Mycobacteria
Madelaine Freitas, Alana Lue Chee Lip
Advisor: Scarlett Shell

Biomedical Engineering

Salisbury Labs Kinnicutt Hall Room 115

9:05am
Encapsulation of Lithium in a Nanocarrier for Use During Pregnancy and Lactation
Cameron Carlin, Kayla Condon, Sarah Ossing, Violet Smiarowski
Advisors: Diana Alatalo, Christina Bailey-Hytholt

9:25am
Peak Stress Reduction in Below Knee Amputations
Riley Bent, Will Leland, Gabriella Rios, Priyanka Sunil
Advisor: Karen Troy

9:45am
Flow System to Study the Role of Vascular Endothelial Glycocalyx in Transendothelial Migration of Cancer Cells in-vitro
Helga Becka, Kerry Bushway, Samantha Cocchiaro, Jacob Elliott
Advisor: Solomon Mensah

10:15am
Design of a 3D Engineered Wound Healing Model of Ehlers-Danlos Syndrome
Madison Donahue, Maya Evohr, Morgan Foltz, Abigail Holmes, Spencer Whitford
Advisor: George Pins

10:35am
Automation of an Accurate, Auditory-Based Blood Pressure Monitor
Amirthavarshini Babu, Isabelle Benson-Clarke, Benjamin Breslov, Juliana Prisco, Benjamin Wheet
Advisors: Dirk Albrecht, Pradeep Radhakrishnan

10:55am
A Baby Bottle Device to Capture Intraoral Images of the Maxillary Palate
Kenza Bezzat, Jacob McDonald, Nicolas Loycano, Samantha Turner
Advisors: Diana Alatalo, Haichong Zhang

Salisbury Labs Room 104

9:05am
Ultrasound Guided Needle Insertion Device
Dhruv Chheda, Mikkel Hersum, Jena Taubert
Advisor: Haichong Zhang

9:25am
StomaSense: An Innovative Solution to Preventing Leaks in Ostomy Bags
Nick Coviello, Martin Fortou, Sophia Mularoni, Theresa Rosato
Advisors: Dirk Albrecht, Solomon Mensah

9:45am
Design of a Perfusable Vascularized Leaf Scaffold Housing Device
Codey Battista, Nishan Grandhi, Aidan Kaufman, Ariel Shirzadi
Advisor: George Pins

10:15am
Microfluidic Chip for Modeling Peritoneal Dialysis Ultrafiltration Failure
Sydney Breen, Roman Bolshakov, Isabella Mastriani, Antone Mello
Advisor: Catherine Whittington

10:35am
The KLAA: A Rescue Device for Diaphoretic EKG Acquisition
Lauren Averka, Kellie Bushe, Abigail Gallagher, Abbigail Poland
Advisor: Brenton Faber

10:55am
The Design of a Microfluidic Device for Measuring the Mechanical Properties of Lactating Mammary Cells
Brenna Hadad, Stephanie Low
Advisors: Kristen Billiar, Diana Alatalo

Salisbury Labs Room 105

9:05am

A Neuromorphic Model of the Peripheral Auditory System Implemented in MATLAB
Austin Aguirre, Jack Brazer, Hunter Lassard, Aidan Pereira
Advisor: Adam Lammert

9:25am

Cerebrospinal Fluid Pressure Gradient Model of the Central Nervous System
Louis Desy, Alexis Graziano, Samantha Robison, Isabella Sheeran
Advisor: Raymond Page

9:45am

Enhancing Medication Accessibility: Designing a Child Resistant Pill Bottle Cap for Diverse Users
Emma Bass, Joseph Connor Beane, Jennifer Mills, Nicholas Uy
Advisor: Zoe Reidinger

10:15am

Esophageal Variceal Hemorrhage Rescue Device: Var-Ex Tube
Lillian Dupuis, Guinevere Ferreira, Molly Mahoney, Sarah Percifull
Advisors: Solomon Mensah, Brenton Faber

10:35am

Developing an Optimal Procedure to Evaluate the Effects of Substrate Stiffness and Temperature on Lactating Mammary Epithelial Cells
Leithsa Dimanche, Jazmyn Ewing, Caroline Major, Taina Quinones
Advisor: Diana Alatalo

11:00am

Expanding the Functional Capabilities of the Tongue Prosthesis
Li DeWitt, Deborah Diniz, Avery Macomber, Mylla Santana
Advisors: Dirk Albrecht, Pradeep Radhakrishnana

Salisbury Labs Room 305

9:05am

Developing an in vitro Model to Modulate Molecular Transport in Uterine Myometrial Hypoxia
Eleanor Finberg, Tiffany Foote, Livia Hernon, Anna Kelly, Emily Strojny
Advisor: Catherine Whittington

9:25am

Identifying Magnitudes of Accelerative and Rotational Forces that Impact the Head when Mountain Bike Riding
Christopher Libby, Samuel Ott, Benjamin Pinto Baqueriza
Advisors: Songbai Ji, Benjamin Nephew

9:45am

High Strain Uniaxial Cell Stretching Device
Gabriel Cason, Stuart Elmhurst, Alyssa Morgan, Livia Skende, Angus Zuwallack
Advisor: Kristen Billiar

10:15am

Neuroprosthetic sEMG Device for Video Game Control
Francis Coghlan, Drew Silvernail
Advisors: Taimoor Afzal, Adam Lammert

10:35am

Leap into Learning: A Biomechanics Tool for Interactive Education in Jumping Mechanics
Tuvy Do, Amy Ngo, Chris Nguyen, Daniela Galvan Sanchez, Cara Yorina
Advisor: Karen Troy

The Business School

POSTER SESSION, 9:30am to 12:00pm
Unity Hall 420

Analyzing NFL Managerial Performance Using Sports Data
Evan Bettencourt (BU, MA)
Advisors: Kenny Ching, Randy Paffenroth (MA)

App X Application Proof of Concept
William Doyle (CS), Amitai Erfanian (CS),
Katelyn Tropeano (BU)
Advisors: Robert Sarnie, Wilson Wong (CS)

Automatic Flying Disk Inventory
Matthew Adam (IE, ME), Benjamin Antupit (RBE),
Claire Higginson (RBE)
Advisors: Greg Lewin (RBE), Walter Towner
Sponsor: Maple Hill Disc Golf

Botanical Conservatory for Aldus C. Higgins House Estate
Morgan Collins (AE), Megan Haley (MGE)
Advisors: Jim Ryan, David Samson, (HUA),
Steven Van Dessel (CEAE)

Building the Stride Score App for Informed Education and Career Decisions
Pooja Kawatkar (CS), Dang Nguyen (MIS),
Kseniia Romanova (CS)
Advisors: Jim Ryan, Rob Sarnie, Wilson Wong (CS)
Sponsor: Stride Funding

Creating a Minimum Viable Product for Worcester Red Sox's Enterprise Mobile Application
Mohamed Barry (CS), Miguel Duran (IE),
David Rosenstein (CS)
Advisors: Marcel Blais (MA), Sara Saberi,
Rob Sarnie, Wilson Wong (CS)
Sponsor: Worcester Red Sox

Creating a Project Engagement Portal for WPI Students
Brian Fox (MIS), Caroline McLaughlin (MIS, PW)
Advisors: Kevin Lewis (PW), Jim Ryan

Design and Prototype of a 5-DoF Robotic Surgical Instrument
Cameron Crane (BME, RBE), Calvin Page (ME, RBE),
Nick Johannessen (ME, RBE), Josh Kleiman (IE, ME)
Advisors: Sharon Johnson, Sajid Nisar (Kyoto University), Adam Powell (ME), Yihao Zheng (ME)
Sponsor: Kyoto University of Advanced Science

Development of a Working Prototype and Field Test of Pillar, a Solution to the Medication Non-Adherence Problem
Michael Akstin (CS), Walter Giardina (BU),
Tara Desrochers (ECE), Serena Mower (CS),
Andrew Sosa (CS), Grace Stevens (ECE)
Advisors: Stephen Bitar (ECE), Michael Engling (CS),
Edward Gonsalves, Walter Towner
Sponsor: Raymond Ranellone, Walter Towner

Equitable Employment Solutions: Enhancing Skills Matching for Marginalized Groups
Sasha Daraskevich (DS), Ben Erwin (IE),
Mikaela Milch, (CS, DS), Nolan Willoughby (IE)
Advisors: Daniel Reichman, (CS), Andrew Trapp,
Marcela Vasconcellos (DS)
Sponsor: Intrare

Evaluating the Effects of Suicide Risk Screening on Emergency Department Workflow
Katee Harrington (IE), Kirsten Harrod (IE),
Elijah Kennedy (IE)
Advisor: Sharon Johnson
Sponsor: Edwin Boudreaux

FCAT - Testing Public APIs for Next Generation Platform
Aidan MacNevin (CS), Drew Plunkett (MGE),
Rusen Sabaz (CS)
Advisors: Mehuel Bhatia (ME), Rob Sarnie,
Wilson Wong (CS)
Sponsor: Fidelity Center for Applied Technology

Fidelity: Customer Data Exploration and Analysis with a Geo-Spatial Focus
Janette Jerusal (DS), Jack Lafond (DS),
Sandra Phan (MIS, DS)
Advisors: Marcel Blais (MA), Jim Ryan, Robert Sarnie
Sponsor: Fidelity

Improvement to Site Selection and Due Diligence Process for Affordable Housing Projects in Worcester
Philip Bui (CS), Hasan Gandor (CS), Jack Hoover (CE),
Tyler Jordan (IE)
Advisors: Matthew Ahrens (CS), Suzanne LePage (CEAE),
Sara Saberi, Robert Sarnie
Sponsor: Worcester IS FAB Lab

Improving Machine Utilization at Sjogren Industries
Conor McGonigle (IE), Henry Sniezek (IE),
Christian Varela (IE)
Advisor: Renata Konrad
Sponsor: Sjogren Industries, Inc.

Integrating Generative AI into User Centered Design Approach
Veronica Deer (MIS)
Advisor: Bengisu Tulu

Integration of Environmental Social Governance (ESG) into Turner Construction Company's Supply Chain
Nicholas Battaglino (CE), Eugena Choi (EVE, EVS), Hannah George (BU, EVS), Jailyn Medeiros (AREN), Adam Tedesco (CE), Dreivone Townsend (AREN)
Advisors: Laila Abu-Lail (CE), John Lindholm, Jessica Rosewitz (CEAE), Elisabeth Stoddard (IGS)
Sponsor: Turner Construction Company

Looking Forward in the Chinese Real Estate Market
Shuailin Wang (BU)
Advisor: Walter Towner

Optimization of Tool Wear Versus Tool Change at Affordable Interior Systems
Phillip Cass (IE, ME), Ryan Martin (MGE)
Advisors: Christopher Brown (ME), Walter Towner
Sponsor: Affordable Interior Solutions

Optimizing Croi Platform: An Evaluation and Enhancement of the Croi Platform in High School Environments
Nicolas Gronda (MGE)
Advisors: Sandhya Balasubramanian, Rosanna Garcia
Sponsor: Croi, Inc.

Organizational Resiliency and Small and Medium Enterprises in New Zealand
Joel Brunzell (BU)
Advisors: Michael Elmes, Ingrid Shockey (EVS)

Post-Disaster Aid Distribution
Max Anderson (DS), Brock Dubey (DS), Kaycie Lam (MA), Madelyn Marcotte (DS), Justin Vo (DS, MIS)
Advisors: Andrew Trapp, Bengisu Tulu, Özge Aygül (DS)

Process Automation & Data Matching
Chase Goings (MIS), Griffin Curley (MA), Mirandi McCormick (CS)
Advisors: Marcel Blais (MA), Rob Sarnie, Wilson Wong (CS)
Sponsor: Micronotes

Rich Embedded Finance Solutions for Colleges and Students
Andrei Bornstein (CS), Nikola Grozdani (CS), Zach Newberg (BU)
Advisors: Rob Sarnie, Wilson Wong (CS)
Sponsor: Citizens Bank

Saint-Gobain Abrasives: Optimizing the Production Process in Bond Plant 7
Ryan Biberon (MGE), Andrew Lufkin (MGE), Stephen MacDonald (MGE), Giancarlo Orlandi (MGE)
Advisor: Walter Towner
Sponsor: Saint-Gobain Abrasives

Selection Criteria for Deployment of Collaborative Robots
Nikolaos Diakides (MGE), Jose Tamariz (IE, RBE), Francisco Yanes Gorbea (IE), Fangle Zhao (IE)
Advisor: Walter Towner

Tool Change Process Improvement at AIS
Kaitlyn Byrum (IE), Benjamin Chaves (IE), Haley Gilbert (IE), Raman Kaushik (IE), Matthew Wofford (MGE)
Advisor: Walter Towner
Sponsor: Affordable Interior Systems

UMass MIH Program: Preparing for Growth with Data Analysis
Shannon Reno (IE), Sarah Spencer (IE), Maryka Tousignant (IE), Adrianna Yuen (IE)
Advisor: Sharon Johnson
Sponsor: University of Massachusetts Memorial Hospital

Using Social Network Analysis to Understand Spontaneous Volunteerism after a Disaster
Leonardo Coelho (IE)
Advisor: Renata Konrad

Visualizing Policy Compliance for Enhanced Cloud Governance
Ryan Saklad (BU), Will Huang (CS), Ryan Kornitsky (CS)
Advisors: Rob Sarnie, Wilson Wong (CS)
Sponsor: State Street

Wearable Biometric Monitoring for Collegiate Soccer Athletes
Evan Brady (BME), James Carmody (ME), Krish Patel (ECE), Jennifer Russo (MGE)
Advisors: Taimoor Afzal (BME), Mehul Bhatia (ME), Bashima Islam (ECE), Walter Towner

Chemical Engineering
Harrington Auditorium
9:00 AM – 11:30 AM
Poster Session

The Separation of Microplastics by Froth Flotation
Kayla Carpenter, Lauren Eppinger, Paige Mesick
Advisor: Laila Abu-Lail

Examining the Influence of Lipid Nanoparticle Composition on Their Thermodynamic Properties Using Differential Scanning Calorimetry and pKa Analysis
Abigail Deichert, Julia Dowd, Caitlyn Swartz
Advisor(s): Christina Bailey-Hytholt, Ronald Grimm, Chemistry and Biochemistry

Encapsulation of Lithium in a Nanocarrier for Use During Pregnancy and Lactation
Cameron Carlin, Kayla Condon, Sarah Ossing, Violet Smiarowski
Advisor(s): Christina Bailey-Hytholt, Diana Alatalo, Biomedical Engineering

Formulating Liposomes for Increased Antimicrobial Activity Towards *Staphylococcus Epidermidis*
Mae Felkner, Emily Pimentel, Kate Stoncius, Hannah Wolfgang
Advisor(s): Christina Bailey-Hytholt, Elizabeth Stewart

Assessment of Lipid Nanoparticle Structure
Warren Callen, Steven Robinson
Advisor: Christina Bailey-Hytholt

Effects of Glucose Oxidase (Gox) on Synthetic Honey
Gabriel Garbes, Jonathan Martin
Advisor: Susan Roberts

Automated Shearing Devide for the Control of Aggregation in *Taxus Chinensis* Suspension Cultures
Jada Smith, Deah Zajmi
Advisor: Susan Roberts

Effect of Magnetism on Astaxanthin Production in *Xanthophyllomyces Dendrorhous*
Eric Kasischke
Advisor: Eric Young

ABS Plastic Cannot be Recycled Infinitely
Zachary Maynard
Advisor(s) David DiBiasio, Nancy Burnham, Biomedical Engineering
Professor Stefan Hengsberger and Professor Hans-Ulrich Sigenthaler of Haute école d'ingénierie et d'architecture de Fribourg.

Molybdenum-Based Double Transition Metal MXenes: A DFT Analysis of Properties
Benjamin Traverso
Advisor: Aaron Deskins

Catalytic Hydrothermal Liquefaction of Wastes
Candy Zhang
Advisor: Michael Timko, Aidin Panahi

Unlocking Bamboo's Biofuel Potential: A Delignification and Crystallinity Study Using Deep Eutectic Solvent Pretreatment
Kathleen Buek, Tyler Gambon, Zachary Manfredi
Advisor: Michael Timko

Waste to Energy: Understanding the Effects of Radical Initiators, Hydrothermal Liquefaction Pathways
Joelis Velez Diaz
Advisor: Michael Timko, with Alex Maag, Geoffrey Tompsett

Stranded Gas Valorization
Ethan Fox
Advisor(s): Nikolaos Kazantzis, Michael Timko

Renewable Hydrochar Adsorbent
Lili Hellerman, Andrew Troup
Advisor: Michael Timko

Co-Hydrothermal Liquefaction of Food Waste and Lignin
Skyler Kauffman
Advisor(s): Michael Timko, Alex Maag

Catalytic Upgrading of the Hydrothermal Liquefaction Aqueous Phase Using Zeolites
Alex Mosley, Oamfah Suwannapong, Jia Yazon
Advisor: Michael Timko

Visible Light Functionalization and Degradation of Plastics
Lucas Bazydola
Advisor(s): Michael Timko, Patricia Musacchio, Chemistry and Biochemistry

Mechanical Strength of Bamboo Fiber Biocomposites Within a Biorefinery Concept
Clayton Hanlon, Chase Herberich, Jacob Kayser, Terrence McFarland
Advisor(s): Michael Timko, Nima Rahbar, Civil, Environmental and Architectural Engineering

Recycling Used Canola Oil into 3D Printing Resin
Thomas Dell'Aera, Jessica Feeney, Richard Franzen, Daniel Shea, Emily Sollecito

Alex Maag, Mehul Bhatia, Mechanical and Materials Engineering

Production and Uses of Hydrochar from Fermented Fruit Waste
Emily Brindisi, Samantha Dubord, Evelyn Kellum, Leah Harnisch-Weidauer
Advisor: Stephen Kmiotek

Reactive Packed Bed Safety: Experimental Evaluation of TiCi4 Passivation for Metal Hydrides
Alexander Greally, Gavin Maloney, Jonathan Santos, Adrianna Tagayun
Advisor(s): Stephen Kmiotek, Andrew Teixeira

Evaluating PFAS Treatment Processes
Max Elwell, Madeline Goggin, Patrick McKenna, Nathan Raymond
Advisor(s): Stephen Kmiotek, John Bergendahl, Civil, Environmental and Architectural Engineering

*** Not Presenting in Chemical Engineering***

Analyzin PFAS Concentrations Along the Blackstone River Wathershed *(presenting in EVE)*
Noelle Noons, Alec Parish
Advisor: Stephen Kmiotek, John Bergendahl, Civil, Environmental and Architectural Engineering

Design and Analysis of an Automated Wine Bottle Opener *(presenting in BME and ME)*
Frank Almeida (BME), Cameron DiMeglio, Patrick King, Luke Rogers (ME)
Advisors: David DiBiasio, Kristen Billiar (Biomedical Engineering), Mustapha Fofana (Mechanical Engineering)

**** Not Presenting***

Dust Explosion of Niacin in the Animal Feed Industry *(not presenting)*
Joshua Roberts
Advisor: Stephen Kmiotek

Defining the Characteristics of Optical Sensors Dissolved Organic Matter Monitoring *(not presenting)*
Rachel Cabral
Advisor: Stephen Kmiotek

Study of the Hydrodynamics of Wastewater Treatment Plant Reactors *(not presenting)*
Maya Vartabedian
Advisor: Stephen Kmiotek

Analysis of Plasma Etching in Semiconductors *(not presenting)*
Nicholas Culkin
Advisor: Stephen Kmiotek

Chemistry and Biochemistry

POSTER SESSION, 9:30 to 11:30 am
Campus Center, Odeum A & B

Examination of the visual effects of NaCl exposure on the neurites of NGF differentiated PC12 cells
Charlotte Adams
Advisor: Suzanne Scarlata

Synthesis and SAR Studies of Coronavirus Main Protease Inhibitors
Patrick Bailey
Advisor: José Argüello and Akbar Ali (UMass)

Methods for Imaging Salmonella Biofilms
Meghan Barry
Advisor: Christopher Lambert

Metal Dyshomeostasis in Alzheimer's Disease: An Observation of the Role of ZIP12 in Zinc Uptake in Neuronal Cells
Madison Brown, Lily Lancellotti, Allison Walker and Morgan Whitney
Advisor: Robert Dempski and Lou Roberts (BBT)

Medium Chain Fatty Acids Cause Toxicity in C. elegans
Juliet Bolduc
Advisor: Carissa Olsen

Novel Synthesis of Biologically Relevant Heterocycles
Lilian Carleu
Advisor: Anita Mattson

Biochemical Studies of CDK16
Kallie Case
Advisor: Suzanne Scarlata

Characterization of Two Novel Apoptin Homologs via Structural and Localization Predictions and in vitro Confirmation
Megan Caten and Eva Plankey
Advisor: Destin Heilman

What impacts do artificial sweeteners have on clean drinking water? Remediation of Artificial Sweeteners in Drinking Water with Zeolites
Elizabeth Dahlberg
Advisor: Drew Brodeur

Searching for Cu Importers in Salmonella Typhimurium
Jocelyn Diaz
Advisor: José Argüello

Investigation of PCV1 VP3 Through Structural Prediction and Analysis of Protein Dynamics
Kylie Doehring and Nicholas Sorel
Advisor: Destin Heilman

Exploring the Impacts of Diet and Stress on Membranes in C. elegans
Diana DiTullio and Lilana MacDonald
Advisor: Carissa Olsen

Flavylium-Inspired Catalysts for Chromenone Functionalization
Olivia Guimaraes and Jacob Vosburg
Advisor: Anita Mattson

Monitoring biological interfaces for Salmonella resistance in a fluidic channel
Lindsay Hoey
Advisor: Christopher Lambert

Artemisia annua tea drug interactions: new method development
Russell Kam and Ryan Polansky
Advisor: Suzanne Scarlata and Pamela Weathers (BBT)

Exploring Cellular Dynamics: Monitoring PLCb1 Expression and Visualizing Subcellular Localization in PC12 Cells
Rafaela Kanli
Advisor: Suzanne Scarlata

Utilizing Sensitizers for Zinc Photocages
Sophie Loree
Advisor: Shawn Burdette

Amide Coupling Creates Hydrophilic Polymers for UiO-66 Attachment
David MacLeod
Advisor: Ronald Grimm

Investigation of porous metal-organic frameworks as solid supports for separation of organic molecules
Quinn McCue
Advisor: John MacDonald

Fabrication of Phosphatidylserine-Containing Asymmetric Giant Unilamellar Vesicles by Hemifusion
Jake McDonough
Advisor: Arne Gericke

Investigating the Effects of Salt Stress on the Morphology of PC12 Cells
Bailey Norris
Advisor: Suzanne Scarlata

Diazolation of 3-bromotetrahydrofuran Via Photoredox Catalysis
Matthew Resmini
Advisor: Patricia Musacchio

Conversion of Carboxylic Acids to Ketones Utilizing Nitrile Sources
Oliver Zaba
Advisor: Patricia Musacchio

Civil, Environmental, & Architectural Engineering

POSTER SESSION, 12:30pm to 3:00pm

Kaven Hall

1. Building Responsibly: Sustainability Within the Supply Chain
Nicholas Battaglino, Eugena Choi, Hannah George, Jailyn Mederios, Adam Tedesco, Dreivone Townsend
Advisors: Jessica Rosewitz, Laila Abu-Lail, Laureen Elgert, Soroush Farzin, John Lindholm, Lisa Stoddard

2. An Analysis of Water Scarcity in California and Recommendations for Management in Coalinga
Duncan D'Olimpio, Meilie Fromhein, Kayleigh George, Chloe Harrison, Richard Healey
Advisor: Jeanine Dudle

3. Evaluating the Initial Service Line Inventory and Replacement Plan Processes
Donald Crowley, Louis Lavenda, Ryan Malaquias, Joseph Peregrim
Advisor: Jeanine Dudle

4. The Lantern Student Hub: A Space for Better Mental Health
Jesse Ames, Anna Bauerle, Ethan Lockhart, Christina Tran
Advisors: Saroush Farzin, Leonard Albano, Crystal Brown

5. Developing a Space Improving Behavioral Patterns and Productivity
William Fallon, Jonathan Nguyen, Ethan Thompson
Advisors: Soroush Farzin, Ali Yousef

6. Design of Duxbury Boardwalk
Elidja Diakite, Ryan Tonry
Advisors: Suzanne LePage, Leonard Albano

7. Interchange Redesign: Modernizing Infrastructure in Sterling, Massachusetts
Samantha Calamari, Braeden Fruchtman, Abigail Pulling, Brandon Taranto
Advisor: Suzanne LePage

8. Advising the CTDOT on Accessibility Compliance, Safety, and Stormwater Management in Bridgeport, CT
Kendall Begin, Bridget Gillis, Margaret Paratore
Advisor: Suzanne LePage

9. Engineering Enclosures for Space: Architecture for The Next Frontier
Samuel Dickens, Joseph McNeill, Natanel Pinkhasov, Aunika Yasui
Advisors: Soroush Farzin, Carrick Eggleston, Nima Rahbar

10. East Haddam Downtown Roadway Redevelopment
Nicholas Manz, Jack Perriello, Aaron Swann
Advisor: Suzanne LePage

11. Botanical Conservatory for Aldus C. Higgins House Estate
Morgan Collins, Megan Haley
Advisors: Steven Van Dessel, Jim Ryan, David Samson

12. On-Campus Student Parking Garage & Recreation Center
Mario Barberio, Alexi Echevarria, Michael McLoughlin, Giovanni Ramirez
Advisor: Leonard Albano

13. Optimizing Storage Tank Design for Efficient Potable Water Supply
Bryce Curtin, Christian Davis, Robert Gyurcsan, Marcella Larrabee
Advisor: Jeanine Dudle

14. Comparing Retrofitting Strategies: Energy Goals in Northeast America & Northern Italy
Franklin Ford, Seton King
Advisors: Steven Van Dessel, Tahar El-Korchi

15. Corridor Study of Route CT-156 in East Lyme, Connecticut
Luna Daury, Michaela Dos Santos, Lauren Hess
Advisors: Suzanne LePage, Robert Kreuger

16. Developing a New Baseball Facility for WPI
DJ Brooks, Jacob DelMonte, Frankie Polito
Advisors: Leonard Albano, Mehul Bhatia

17. Simultaneous Degradation of Ammonia and PFAS in Landfill Leachate
Isabella Clowes, Bhargavi Ramesh, Liam Thomson
Advisors: John Bergendahl, Stephen Kmiotek

18. Analyzing PFAS in the Blackstone River Watershed
Noelle Noons, Alec Parish
Advisors: John Bergendahl, Stephen Kmiotek

19. PFAS Extraction via Divalent Catonic Interactions
Max Elwell, Madeline Goggin, Patrick McKenna, Nathan Raymond
Advisors: John Bergendahl, Stephen Kmiotek

20. Re-Imagining the Gordon Library
Joseph Hurley, Kyle Shriberg, Emmanuel Vargas
Advisors: Steven Van Dessel, Tahar El-Korchi

21. Restoration of the Mill Creek Salt Marsh in Chelsea MA
Joseph Horowitz, Adam Lepore, Rebekah Mendoza, Kaleigh Walsh
Advisors: Paul Mathisen, Crystal Brown

22. Analysis and Design of a New Community Recreation Center in Worcester
Jocelyn Bourgoin, John Mohareb, Ravyn Rapley, Vivian Vacharakupt
Advisor: Jessica Rosewitz

23. Mangrove Boardwalk Project
Deidra Anderson, Luke Barckholtz, Lenny Fils-Aime, Sarah Hull, Timothy Ryan
Advisor: Aaron Sakulich

24. Auxetic Steel-Concrete Structures
Ibrahim Hussam Smaili Krkoukli
Advisor: Nima Rahbar

25. Potable Water Reuse in Massachusetts
Carley Burns
Advisor: John Bergendahl

26. What Makes a Home?
Vivienne Evans
Advisor: Nancy Ma

27. Waste Pavilion
Dakota Lehner, Esrom Negash, Megan Tupaj
Advisors: Soroush Farzin, Leonard Albano, Nima Rahbar, Bridgitt Servatius, Herman Servatius

28. Reimagining of WPI Gordon Library - Retaining Wall Design
Elizebeth Fiscus
Advisors: Steven Van Dessel, Tahar El-Korchi

29. Biocemented Soil Stabilization with Enzyme Induced Carbonate Precipitation through Carbonic Anhydrase
Edward Jacoby
Advisor: Nima Rahbar

30. Designing a Community Space in Buxton, Guyana
Nathalie Larrea
Advisor: John Bergendahl

Computer Science

POSTER SESSIONS

Innovation Studio, Second Floor

Session A: 10:00am to 12:00pm

EcoTarium Explorer: Increasing Accessibility at the Worcester EcoTarium
Joseph Fox, Owen McGinley, Dylan Olmsted, Dylan Phillips, Brandon Vuong
Advisor: Rodica Neamtu
Sponsor: Worcester EcoTarium

DraftKings Fantasy Sports Data Analytics
Abigail Albuquerque, Vagmi Bhagavathula, Kristin Lavoie, Owen Radcliffe, Eric Schuman
Advisors: Donald Brown (ECE), Randy Paffenroth (Math)
Sponsor: DraftKings

Machine Learning, Image Processing, and Transfer Learning for Handwritten Text Recognition
Matthew Haley, Liam Hall, Christopher Langevin, Cameron Norton, Harsh Patel, Elliot Trilling
Advisors: Oren Mangoubi (MA), Randy Paffenroth (MA)
Sponsor: Professor Gregory Noetscher, U.S. Army Natick Soldier Systems Center

Z3-Wellness: Evaluating and Improving a Sleep Wellness Application for College-Age Students
Sultan Adedeji, Camilo Escobar, Seungho Lee, Lucas Sicard, Jack Hanlon, Benjamin Bagley, Matthew Lacadie, Parker Van Ham, Mackenzie Pryor (DS), Justine Moy (DS)
Advisor: Carolina Ruiz

AutoOD 2.0: Elevating User Experience and Multi-User Functionality
Talia Andrews, Ishayu Das, Tristan Sharich, James Yi
Advisor: Elke Rundensteiner

Interactive Experience Design
John Carrotta, Justin Santiago-Wonoski, Sriram Sundararajan, Madelyn Veccia
Advisors: Melissa Kagen, Erin Solovey

FinTech Project B23 - Stride Funding - Building Stride Score App for Informed Education and Career Decisions
Pooja Kawatkar, Dang Nguyen, Kseniia Romanova
Advisors: Jim Ryan, Robert Sarnie, Wilson Wong
Sponsor: Stride Funding

App X Application Proof of Concept
William Doyle, Amitai Erfanian, Katelyn Tropeano
Advisors: Sarnie Robert, Wong William
Sponsor: Seni Hazan

Mining Graph Patterns in Software Development from Code Repositories
Ethan Falcao, Nur Fateemah, Alexander MacDonald, Jakob Simmons
Advisors: Fabricio Murai, Frank Zou (Math)

Waste Sorting Robot for Recycling
Valerie Childers, Dylan Hunt
Advisors: Berk Calli, Sarah Jane Wodin-Schwartz

Exploring Adaptive Time Delay in First Person Shooter Games
Benjamin Gelinas, Andrew Hariyanto, Trevor Ng, Sophia Silkaitis
Advisor: Mark Claypool

Various Design Projects in the ASSISTments Foundation
Neha Kuchipudi
Advisor: Neil Heffernan
Sponsor: ASSISTments

Rich Embedded Finance Solutions for Colleges and Students
Andrei Bornstein, Nikola Grozdani, Zach Newberg
Advisors: Robert Sarnie, Wilson Wong
Sponsor: Citizens Bank
Project Center: Fintech Project Center

Enhancing Skills Matching for Marginalized Groups
Sasha Daraskevich, Ben Erwin, Mikaela Milch, Nolan Willoughby
Advisors: Daniel Reichman, Andrew Trapp (BUS, DS), Marcela Vasconcellos _(DS)
Sponsor: Intrare

Clean Sweep
Austin Hyatt, Nelson Pires
Advisors: Farley Chery (IMGD), Rodney DuPlessis (IMGD), Gillian Smith, Karen Stewart (IMGD)

Implementing a New Beecology Project Web App Interface
William Dufault, Mattheus Faria, Steven Frisch, Colin Fyock
Advisors: Carolina Ruiz, Liz Ryder (BB)

FCAT - Testing Public APIs for Next Generation Platform
Aidan MacNevin, Drew Plunkett, Emre Sabaz
Advisors: Mehul Bhatia (ME), Michael O'Connor, Robert Sarnie (BS), Wilson Wong
Sponsor: Fidelity Center for Applied Technology
Project Center: FinTech Project Center

Designing for Productivity, Exploring the Cognitive Impact of Architectural Design
William Fallon, Jonathan Nguyen, Ethan Thompson
Advisors: Soroush Farzin, Ali Yousefi

Creating a Comprehensive Pipeline for Exploring Cultural Variance in Data Visualization
Joselin Barbosa, Katie Bowles, Vivian Reno
Advisors: Lane Harrison, Noelle Rakotondravony

Performance of HPC Systems
Karl Brzoska
Advisor: Shubbhi Taneja

How the Human Brain Makes Sense of Natural Scenes
Shivali Mani, Alison McNicholas, Jose Morales
Advisor: Ziming Zhang

Leveraging Product Analytics to Streamline Application Flows and Triple User Retention for Perr, a File-sharing Application
Justin Luce, Michael McInerney, Aidan Syrgak
Advisor: Chun-Kit Ngan
Sponsor: Overthrow Inc.

Designing an Interactive Interface for FACET: Personalized Explanations in XAI
Randy Huang, Belisha Genin, Jacob Reiss, Katharine Dion, Alexander Pietrick
Advisor: Elke Rundensteiner

Aiding in the Migration of the E-Trials Platform
Kristine Guan, Sharon Wu
Advisor: Neil Heffernan
Sponsor: _The ASSISTments Foundation

Predicting Students' Mental Health Using Fitbit Data
Allison Escott, Kyle Lusignan, Noah Pins, Olivia Raisbeck
Advisors: Shichao Liu, Oren Mangoubi, Elke Rundensteiner

An Examination of Share Buyback Program Execution
Robert Chiocchio
Advisors: Marcel Blais (MS), Randy Paffenroth, Stephan Sturm (MS)
Sponsor: Bern University of Applied Sciences
Project Center: Switzerland

FACET: Finding Actionable Explanations for Unwanted AI Predictions
Katharine Dion, Belisha Genin, Randy Huang, Alexander Pietrick, Jacob Reiss
Advisors: Dr. Elke Rundensteiner, Peter VanNostrand, Dennis Hofmann

Jitter Compensation for Cloud-based Game Streaming
Nicholas Heineman, Yu-Chi Liang, Aaron Nguyen, William Ryan
Advisor: Mark Claypool

Operation Breadcrumbs
Tate Donnelly, Nicholas Frangie, Jack McEvoy

Advisors: Adryen Gonzalez (IMGD), Ben Schneider (IMGD), Gillian Smith

Enhancing the Robustness of Deep Neural Networks
Alasdair Campbell, Jared Lasselle
Advisor: Yanhua Li

7Factor 2023-2024: AWS Analysis
Cameron Goodrich, Joey Rozman, Nathaniel Sadlier, Oliver Shulman, Dov Ushman
Advisor: Joshua Cuneo
Sponsor: 7Factor

Customizing Large Language Models for Automated Academic Advising at Universities
Ronit Banerjee, Kate Butziger, Fabrizio Filizzola, Matt Kiszla
Advisor: Xiangnan Kong

Robot Escape Room
Iain McEwen, Conner McKevitt, Kaelin Panneton
Advisors: Berk Calli (RBE), Melissa Kagen (IMGD), Gillian Smith

Failed To Send
Evans Owusu, Carolyn Meyer
Advisors: Karen Stewart (IMGD), Gillian Smith

Predictors of Medically Significant Chronic Pain Response to Mindfulness-Based Treatment
Adeline Evans, Adina Palayoor
Advisors: Carolina Ruiz, Benjamin Nephew(BCB/BBT)

Session B: 1:00pm to 3:00pm

Isolation-Centric Operating Systems for the Enterprise
Annalisa Allan, Jacob Chlebowski, Quentin Hall, Zaq Humphrey, Charles Kneissl-Williams, Cole Ouellette, Mira Plante, Caleb Scopetski, Aidan Wech, Connor West, Edison Zhang
Advisors: Jun Dai, Craig Shue, Sherry Sun

Fine-Tuning Open-Source Large Language Models for Generating Math Explanations
Paul Godinez, Eli Hoffberg, Neena Xiang
Advisor: Neil Heffernan
Project Center: ASSISTments

Database Technology Comparisons and Exploration
Axel Luca, Ethan Pollack, Harrison Taylor
Advisors: Rodica Neamtu, Wilson Wong

Developing Reusable Robotic Code Library for Improving Quality of Controllers
Jair Meza, Austin Rebello, Brianna Sahagian
Advisor: George Heineman

Efficient Delivery of Geospatial Data for Web Visualization
Deepti Gosukonda, Nadav Konstantine, Nicholas Markou, Patrick Salisbury
Advisor: Lane Harrison
Sponsor: Tetra Tech

7Factor Staffing Tool #2
Matthew Adragna, Jackson Lundberg, Jordan Wecler
Advisor: Joshua Cuneo
Sponsor: 7Factor Software, LLC

Data Analytics/Visualization for Analyzing the Draft and Evaluation of Players in Professional Sports
Jacob Adamsky, Jinjia Ou, Engjell Ramadani
Advisor: Craig Wills

7Factor Staffing Tool One
Nicholas Borrello, Sean McNamara
Advisor: Joshua Cuneo
Sponsor: 7Factor

Improving QUIC Slow Start Behavior in Satellite Networks with SEARCH
Amber Cronin
Advisors: Mark Claypool, Alexander Wyglinski (ECE)
Sponsor: Viasat

Building a Platform for Data Visualization Learning
Joe Dobbelaar, Luke Foley, Ryker Germain, Matthew McAlarney
Advisor: Lane Harrison

ChordCraft: AI Chord Generator VST
Sameer Desai, Thomas Kneeland, Darren Kwee, Ilana Whittaker
Advisors: Scott Barton (HUA), Charles Roberts

ReVisit Study
Alvin Chen, Luke Gardone
Advisor: Harrison Lane

Mobile App for E-Waste Processors
Cortina Barbieri, Abigail Boafo, Abby Hoschouer, Madeline Mueting, Alyssa Ogi
Advisors: Robert Krueger, Harrison Lane, Mahamadou Sagna

Creating a Survey Tool for Users of American Sign Language
Julia Albrecht, Juliana Porto, Jenna Tripoli
Advisor: Erin Solovey
Sponsor: National Science Foundation, ASL Education Center

Exploring Use Cases and Evaluating Tools for Web3 Technology
Jacob Byrnes, Michael Gatti, Jack Lynch, Kody Robinson, Eric Zhou
Advisor: Craig Wills

Zero-th Annual Martin Gardner Exploration Project: 2048
Ethan Catania, Tucker Raymond
Advisor: Michael Engling

Software Engineering Healthcare Application Framework
Joseph Cardarelli, Bryce Lukens, Ari Schechter, Mike Wilkinson, Ian Wright
Advisor: Wilson Wong

Developing a Brain-Computer Interface to Enhance Storytelling in Games with the Identification of Cognitive States
James Cao, Andrew Nguyen, Jagger Polvino
Advisors: Max Chen (IMGD), Gillian Smith, Erin Solovey

Authentication Mechanisms
Charles Anderson, Ian Grzembski, Caitlyn Puiia, Daniel Onyema
Advisor: Craig Wills

Implementing Butterfly Data Visualization Tools for the Beecology Project
Joanna Hu, Bernhard Nordemann, Megan Sin, Aria Yan
Advisors: Carolina Ruiz, Elizabeth Ryder (BCB)

Voice Control of the HOPE Hand Exoskeleton for Individuals with Motor Impairments and Speech Aphasia
Connor Gaudette, Matthew McGourty, Allison Rozear, Keenan Segenchuk
Advisors: Christopher Nycz (RBE), Erin Solovey, Yunus Telliel, Haichong Zhang (BME/RBE)

Latency and Jitter Compensation for Cloud-based Game Streaming
Marek Garbaczonek, Jonathan Hsu, Mark Renzi
Advisor: Mark Claypool

RavenGuard MQP
Alex Marrinan
Advisor: Michael Engling

GoatConnect
Owen Lehane, John Mezzo, Isabella Pabon, Harry Rubin
Advisor: Rodica Neamtu

FinTech Project B23 - Creating A Minimum Viable Product for Worcester Red Soxï¿½s Enterprise Mobile Application
Mohamed Barry, Miguel Duran, David Rosenstein
Advisors: Marcel Blais (MA), Joshua Cuneo, Sara Saberi (WBS), Robert Sarnie (WBS), Wilson Wong
Sponsor: Worcester Red Sox
Project Center: FinTech Project Center

Automated Design Tool for Arduino Circuits
Gabriel Buziba, Yangyang Jin, Andres Negron, Casey Wohlers
Advisors: David Brown, Pradeep Radhakrishnan (ME)

PMKS+: An Application for Generating and Analyzing Planar Linkages
Nicole Burgess, Robert Eskridge, Tyler Evans
Advisors: David Brown, Pradeep Radhakrishnan

SCApeGoat: Side-Channel Analysis Library
Samuel Karkache, Trey Marcantonio
Advisors: Fatemeh Ganji (ECE), Patrick Schaumont

The Statistics of Subsequences
Chase Miller, Andrew Salls, Duncan Soiffer
Advisors: George Heineman, Daniel Reichman, Gabor Sarkozy

Radar and AI-based Soil Moisture Prediction for Efficient Farm Irrigation
Allen Cheung, Ruba Khan
Advisors: Oren Mangoubi, Seyed Zekavat (DS)

Automated Wearable ECG Data Editing with DNN
Vincenza Burdulis, Jacob Nguyen, Daniel Sardak
Advisor: Bashima Islam (ECE)

Dynamical Systems Approaches for Deep Learning
Neil Kale
Advisor: Randy Paffenroth

Assisting Learning Through Student Mastery Metrics
Noah Goodman, Justin Weintraub
Advisor: Neil Heffernan

Enriching Visually-Impaired Visitors Experiences at the Worcester Art Museum
Timothy Connors, Theo Coppola, Randolph Dyer
Advisor: Rodica Neamtu
Sponsor: Worcester Art Museum

soloPlane: Modular Electronic Mallet Instrument
William Merry, Robert Oleynick, Nathaniel Reppucci
Advisors: Scott Barton (CS, RBE), Patrick Schaumont (ECE)

Social Robot for Interactive Play
Joseph Baliestiero (RBE), Jayson Caissie, Kaley Du, Megan Jacques (RBE), Chloe Plasse, K. "V" Valery (RBE)
Advisors: Rose Bohrer, Jane Li (RBE)

Data Science

POSTER SESSION
Unity Hall 500

Group A 12:00pm to 1:30pm

#A

Building a Platform for Data Visualization Learning
Joseph Dobbelaar (CS), Luke Foley (CS), Ryker Germain (DS), Matthew McAlarney (CS)
Advisors: Lane Harrison

#A

Deep Learning Analysis of Neuroimaging (MRI) Data
Olivia Deckers (BCB), Jonathan Golden (CS), Vivek Kandasamy (BCB), Pitipat Kongsomjit (DS)
Advisors: Dmitry Korkin, Benjamin Nephew, Angela Incollingo Rodriguez (co-advisor)

#A

FinTech Project B23 - Enhancing Investment Management - Data Science
Dante Amicarella (DS), Sarah LaRusso (Math/CS), Maya Liao (DS), Nathan Shemesh (CS)
Advisors: Marcel Blais, Rob Sarnie, Wilson Wong

#A

Leveraging Product Analytics to Streamline Application Flows and Triple User Retention for Perr, a File-sharing Application
Justin Luce (CS), Michael McInerney (CS), Aidan Syrgak Uulu (DS)
Advisors: Chun-Kit Ngan

#A

Machine Learning for Predicting Effectiveness of Mindfulness for Chronic Pain Reduction
Adeline Evans (CS), Adina Palayoor (CS/DS)
Advisors: Carolina Ruiz

#A

Post-Disaster Aid Distribution
Maxime Anderson (DS), Brock Dubey (DS), Kaycie Lam (Math), Madelyn Marcotte (DS), Justin Vo (DS/MIS)
Advisors: Andrew Trapp, Bengisu Tutu

#A

RAPIDS: Rapid AI Platform for Innovating Data Science
Jai Patel (CS), Caleb Talley (CS), Natasha Ussrey (CS/DS)
Advisors: George Heineman, Xiaozhong Liu

#A

Sustainability Insights: Navigating Environmental Challenges through Data Exploration
Charlotte Carter (DS), Brandon Luong (CS), Sydney Peno (DS)
Advisors: Torumoy Ghoshal

#A

Supervised Machine Generated Text Detection Using LLM Encoders in Various Data Resource Scenarios
Marc Capobianco (CS/DS), Duong Luong (DS), Charles Phelan (DS), Matthew Reynolds (DS), Krish Shah-Nathwani (DS)
Advisors: Kyumin Lee

#A

Z3-Wellness: Evaluating and Improving a Sleep Wellness Application for College-Age Students
Sultan Adedeji (CS), Benjamin Bagley (CS), Camilo Escobar (CS), Jack Hanlon (CS), Matthew Lacadie (CS), Seungho Lee (CS), Justine Moy (DS), Mackenzie Pryor (DS), Lucas Sicard (CS), Parker Van Ham (CS)
Advisors: Carolina Ruiz

Group B 2:00pm to 4:00pm

#B

A Data-driven Analytical Approach for Improving Endurance Runners' Performance
Mason Perham (DS), Ethan Rudometkin (DS)
Advisors: Chun-Kit Ngan

#B

A Data-driven Framework for Competitive Machining Industry: Database, Analysis, and Dashboard
Kendall Haddigan (DS), Daniel Thu (DS)
Advisors: Fatemeh Emdad, Chun-Kit Ngan

#B

Addressing Imbalanced Data in Machine Learning: Methods and Challenges
Bishoy Soliman Hanna (DS)
Advisors: Ziming Zhang

#B

Customizing Large Language Models for Automated Academic Advising at Universities
Ronit Banerjee (CS/DS), Kathryn Butziger (CS), Jose Fabrizio Filizzola Ortiz (CS), Matthew Kiszla (CS)
Advisors: Xiangnan Kong

#B

Design of AI-enabled Chatbot
Federico Perez (DS), Colin Mettler (CS), Xiao Xiao (CS), Guillermo Morel Mendez (CS), Rolando Salamea-Lopez (ECE), QiHan He (ECE), Hrishikesh Nair (ECE), Quincy Payne (ME)
Advisors: Lin Cheng, Bo Tang

#B

DraftKings Fantasy Sports Data Analytics
Abigail Albuquerque (DS), Vagmi Bhagavathula (CS/DS), Kristin Lavoie (DS), Owen Radcliffe (CS), Eric Schuman (DS)
Advisors: Donald Brown, Randy Paffenroth

#B

Drone-Based Intelligent Soil Sub-Surface Characterization
Nicholas Latsis (DS), Ethan Reed (DS), Joshua Thurber (DS)
Advisors: Doug Petkie, Seyed Zekavat

#B

EcoTarium Explorer: Increasing Accessibility at the Worcester EcoTarium
Joseph Fox (DS), Owen McGinley (CS), Dylan Olmstead (DS), Dylan Phillips (CS), Brandon Vuong (CS)
Advisors: Rodica Neamtu

#B

Extending Course Planner for Broader Academic Coverage
Jennifer Kimball (DS), Matthew Suyer (DS)
Advisors: Andrew Trapp

#B

FACET System: Finding Actionable Explanations for Unwanted AI Predictions
Katherine Dion (DS), Belisha Geninn (CS/RBE), Randy Huang (CS), Alexander Pietrick (CS/DS), Jacob Reiss (CS)
Advisors: Elke Rundensteiner

#B

FinTech Project B23 - Fidelity - Customer Data Exploration and Analysis with a Geo-Spatial Focus
Janette Jerusal (DS), Jack Lafond (DS), Sandra Phan (DS/MIS)
Advisors: Marcel Blais, Jim Ryan, Rob Sarnie

#B

How the Human Brain Makes Sense of Natural Scenes
Shivali Mani (DS), Alison McNicholas (CS), Jose Morales (CS)
Advisors: Ziming Zhang

#B

Implementing a New Beecology Project Web App Interface
Will Dufault (CS), Mattheus Faria (DS), Stevie Frisch (CS), Colin Fyock (CS)
Advisors: Carolina Ruiz, Elizabeth Ryder

#B

Implementing Butterfly Data Visualization Tools for the Beecology Project
Joanna Hu (CS), Bernard Nordermann (CS), Megan Sin (DS), Aria Yan (DS)
Advisors: Carolina Ruiz, Elizabeth Ryder

#B

Improving Job Matching through Skill Elicitation
Sasha Daraskevich (DS), Ben Erwin (IE), Mikaela Milch (CS/DS), Nolan Willoughby (IE)
Advisors: Daniel Reichman, Andrew Trapp

#B

Creating a Comprehensive Pipeline for Exploring Cultural Variance in Data Visualization
Joselin Barbosa (CS), Katie Bowles (DS), Vivian Reno (CS)
Advisors: Lane Harrison

#B

Machine Learning, Image Processing, and Natural Language Processing for Handwritten Text Recognition
Matt Haley (DS), Liam Hall (CS), Christopher Langevin (DS), Cameron Norton (Math), Harsh Patel (CS), Elliot Trilling (CS/Math)
Advisors: Oren Mangoubi, Gregory Noetscher, Randy Paffenroth

#B

Mining Graph Patterns in Software Development from Code Repositories
Nur Fateemah (CS/DS), Alexander MacDonald (CS), Jakob Simmons (CS), Ethan Vaz Falcao (DS/Math)
Advisors: Fabricio Murai, Frank Zou

#B

Predicting Students' Mental Health Using Fitbit Data
Allison Escott (DS), Olivia Raisbeck (CS/DS), Kyle Lusignan (Math), Noah Pins (Math)
Advisors: Shichao Liu, Oren Mangoubi, Elke Rundensteiner

Electrical & Computer Engineering

POSTER SESSION, 8:30am to 12:00pm
Harrington Gym

Automated Wearable ECG Editing With DNN
Vincenza Burdulis, Jacob Nguyen,
Daniel Sardak (CS/DS)
Advisor: Bashima Islam

Design of AI-Enabled Chatbot
Qihan He, Rolando Salamea-Lopez, Colin Mettler (CS), Guillermo Morel Mendez (CS), Hrishikesh Nair, Quincy Payne (ME), Federico Perez (DS), Xiao Xiao (CS)
Advisors: Lin Cheng (MME), Bo Tang

Developing DC/DC Converter Topology for Fuel Cell Charging of 280-400V Hybrid-Battery Bus
Ryan Cote, Edison Doko, Efthymios Marios Loukedes, Kathlyn Sirowich, Meng Wang
Advisor: Gregory Noetscher
Sponsor: Honeywell International, Inc.

Development of ECE 331X
Alessandra Fabela
Advisor: Alexander Wyglinski

FPGA Accelerated SAT Solver
Sam David (ECE/CS), Joshua Eben, Andrew Gray, Patrick Hunter (ECE/CS), Matthew Lund, Coco Mao (Xinyun Mao)
Advisor: Koksal Mus

FSAE Electric Car
Hussain Bhatti, Harris Brancazio (ME), Henrique Checcucci Bahia dos Santos (ME), John Demedeiros, Emma Dimming (RBE), Connor Dowgielewicz (ME), Zoe Goodman, Carson Graham (CS), William Gunn (ME), Sam Kierstead (ME), Evelyn Maude (RBE), Arnav Sacheti (CS/ECE)
Advisors: William Michalson (RBE), David Planchard (MME), Andre Rosendo (RBE)

Hybrid GaN-SIC Power Switches for Future E-Mobility Applications
Wassim Faker
Advisor: Stephen Bitar

Industrial Control System
Christopher Danti, Casey Frommer
Advisor: Gregory Noetscher
Sponsor: Babcock Power Services

Integrated Solutions Towards Wireless Transcutaneous Oxygen Monitor
Ali Atta (ECE/BME), Olivia Kendzulak, Ryan McSweeney, Naisargi Mehta (ECE/BME)
Advisor: Ulkuhan Guler

Luminescence-Based Sensing for Transcutaneous CO2 and SpO2 Assessment
Evan Apinis, Kleo Golemi, Kosti Pano
Advisor: Ulkuhan Guler

Modular Gaming Table
Kaiwen Chen (ME), Jimmy Clemente (ME), Joshua DeVoy (ME), Nikolaos Konstantinou, Emma Nollman (ME), Chloe Trotta-Smith (ME)
Advisors: Medhi Mortazavi (MME), Donald Brown

Music for Muscular Dystrophy
Luke Harrington, Joshua Hollyer, Dexuan Tang
Advisor: Stephen Bitar

Open-Source Design of a Cryptographic ASIC
Trevor Drane
Advisor: Patrick Schaumont

Opportunistic Communication with Zero and Low Power Radios
Aisling Corcoran, Alberto Flores, Tai Le, Allan Villatoro, Elisabeth Whittemore
Advisor: Bashima Islam

Scanning Array for EMI Detection
Sarah Chen, Michael Iberger
Advisor: Gregory Noetscher

SCApeGoat: Side-Channel Analysis Library
Samuel Karkache (ECE/CS), Trey Marcantonio
Advisors: Fatemeh Ganji, Patrick Schaumont

Shunt Resistor Based Circuit Breaker Design for Ground Fault and Arc Fault Detection
Pari Nguyen, Olivia Peterson, Dominic Ridolfi, Elinor Ross, Mason Roth
Advisors: Reinhold Ludwig, Edvina Uzunovic
Sponsor: Schneider Electric

soloPlane: Modular Electronic Mallet Instrument
William Merry (RBE), Robert Oleynick (ECE/CS), Nathaniel Reppucci
Advisors: Scott Barton (HUA), Patrick Schaumont

Speech Driven 3D Modeling
Ryan Antes, Jacob Hand
Advisor: Ziming Zhang (ECE/CS)

T-Scope: Side-Channel Leakage Assessment with a Hardware-Accelerated Online TVLA Test
Andrew Malnicof, Hao Wang
Advisor: Patrick Schaumont

Wireless Wearable Electromyogram (EMG) Shoulder System
Julia Antocci, Thomas Flanagan, Max Kanefsky, Timothy Walsh
Advisor: Edward Clancy

Variable Planar Inductor
Abigail Brachtl, Maria Cox, Brendan O'Mullan, Brooke Schoen
Advisor: Gregory Noetscher

Humanities and Arts

PRESENTATIONS, 12:00pm to 1:30pm
Higgins House

12:00 noon
Welcome
Kathryn Moncrief, HUA Department Head

12:10 pm
Adapting Housing Policy for Post-COVID Affordable Housing: Lessons from Australia and New South Wales
Jack Hoover
Advisor: John Galante
Project Sponsor: City of Worcester and Worcester IS FAB Lab

12:30 pm
Terminology in Action: The Impact of Linguistic Choices on Gender Equality and Inclusion
Lauren Eppinger
Advisor: Rebecca Moody

12:50 pm
Becoming Artificial Intelligence
Caroline Major
Advisors: Sarah Lucie and Kathryn Moncrief

1:10 pm
Artificial Intelligence is not the End of the World: Performing as an A.I. Student
Jack Yebba
Advisors: Sarah Lucie and Kathryn Moncrief

1:30 pm
Architectural Influence on Scenic Design: A Case Study of New Brutalism
Adrienne Saucier
Advisor: Sarah Lucie

Interactive Media and Game Development

Fuller Labs Upper Perreault Hall

10:00am
Inari
Alessandro Brianti, Zhechuan (Joshua) Hu, Connor Peavey, Joseph Volpato, Xingge Yang
Advisor: Matthew Ahrens, Ralph Sutter

10:15am
3D Miniatures
Lauren Waddick
Advisor: Joshua Rosenstock, Ralph Sutter

10:30am
Epsilon Squad Adventures: A Concept Artbook
Jeff Chen, Alistair Gilmour
Advisor: Adryen J. Gonzalez, Ed Gutierrez

10:45am
Spiral Development
Jason Asidi
Advisor: Walt Yarbrough

11:00am
Break

11:15am
Failed to Send: An Internet Aesthetic Visual Novel
Carolyn Meyer, Evans Owusu
Advisor: Gillian Smith, Karen Stewart

11:30am
Ravenguard
Griffin Bowers, Alex Marrinan, Michael Weideman, Charles West
Advisor: Michael Engling, Walt Yarbrough

11:45am
Latency and Jitter Compensation for Cloud-Based Game Streaming
Marek Garbaczonek, Jonathan Hsu, Mark Renzi
Advisor: Mark Claypool

12:00pm
Lunch Break

1:30pm
Raveling Dreams
Ethan Chau, Aidan von Conta, Luca Wol
Advisor: Rose Bohrer, Farley Chery

1:45pm
DROPTABLE
Zesheng Chen, Bright Lin
Advisor: Charlie Roberts

2:00pm
Exploring Adaptive Time Delay in First Person Shooter Games
Benjamin Gelinas, Andrew Hariyanto, Trevor Ng, Sophia Silkaitis
Advisor: Mark Claypool

2:15pm
Break

2:30pm
Operation Breadcrumbs
Tate Donnelly, Nicholas Frangie, Jade McEvoy, Schuyler Rae Pritchard, Abigail Rauch, Kerri Thornton
Advisor: Adryen J. Gonzalez, Ben Schneider, Gillian Smith

2:45pm
Clean Sweep
Zachary Adams, Renee Cullman, Conor Dolan, Austin Hyatt, Jessica Liano, Nelson Pires
Advisor: Farley Chery, Rodney DuPlessis, Gillian Smith, Karen Stewart

3:00pm
Not An MQP
Ed Carrotta, Justin Santiago-Wonoski, Sriram Sundararajan, Madelyn Veccia
Advisor: Melissa Kagen, Erin Solovey

Mathematical Sciences Dept.

Unity Hall 520

POSTER SESSION, 8:45am to 9:30am

Interactions of Per-Occurrence and Aggregate Deductibles
Abigail Barksdale, Allison McMorrow
Advisor: Jon Abraham, Barry Posterro

Heat Loss Effects of Thermal Inactivation of Pathogens in Aerosols through Electromagnetic Heating
Kai Chhoeuk
Advisor: Burt Tilley

The association scheme of the dihedral group and its designs
Benjaminh Brodeur
Advisor: William J. Martin

Analyzing NFL Managerial Performance Using Sports Data
Evan Bettencourt
Advisor: Kenny Ching, Randy Paffenroth

BREAK, 9:30am to 9:45am

PRESENTATIONS, 9:45am to 12:15pm

9:45am
Machine Learning, Image Processing, and Transfer Learning for Handwritten Text Recognition
Matthew Haley, Liam Hall, Christopher Langevin, Cameron Norton, Harsh Patel, Elliot Trilling
Advisor: Oren Mangoubi, Randy Paffenroth

10:00am
Stochastic Modeling of Neuron Dynamics
Natalie Tierney
Advisor: Andrea Arnold

10:15am
Pricing Sequence Risk
Jack Cascone, Matthew Letourneau, Zachary Pitts
Advisor: Jon Abraham, Barry Posterro

10:30am
The Statistics of Subsequences
Chase Miller, Andrew Salls, Duncan Soiffer
Advisor: George Heineman, Daniel Reichman, Gabor Sarkozy

10:45am
3D Image Reconstruction of a Fossil Using Neutron Tomography
Augustine Benjamin, Scarlett Clarke
Advisor: David C. Medich, Vadim V. Yakovlev

BREAK, 11:00am to 11:15am

11:15am
Waste Pavillion
Megan Tupaj
Advisor: Brigitte Servatius, Herman Servatius

11:30am
Delsarte $\mathcal{T}$-designs in the dihedral groups
Sycamore Herlihy
Advisor: William J. Martin

11:45am
Machine Learning for System Identification and Parameter Estimation
Caitlin Ho
Advisor: Andrea Arnold

12:00pm
Dynamical Systems Approaches for Deep Learning
Neil Kale
Advisor: Randy Paffenroth

Mechanical and Materials Engineering Department

POSTER SESSION, 8:30am to 12:00pm
Alden Hall

Design and Kinematic Evaluation of a 5-DoF Surgical Instrument
Josh Kleiman, Cameron Crane, Calvin Page, Nicholas Johannessen
Advisor: Adam Powell, Yihao Zheng, Sharon Johnson

NASA Lunabotics
Zeb Carty, Kelli Huang, Ian MacInerney, James Nguyen, Terence Tan, Sean Thal, Giovanni Giacalone, Brendan Byrne
Advisors: Ken Stafford, Carlo Pinciroli

Wearable Biometric Monitoring for Collegiate Soccer Athletes
Evan Brady, James Carmody, Krish Patel, Jennifer Russo
Advisors: Mehul Bhatia, Bashima Islam, Taimoor Afzal, Walter Towner

Design and Fabrication of an Operational RCV Internal Combustion Engine
Michael Zembruski, Molly Vincent, James Ralph, Devin Patel, Jack Parker, Jiwon Shon
Advisor: Selcuk Guceri

Augmented Reality for Ultrasound Imaging
Jack Charpentier, Brian DeFlaminio, Kavya Mani, Jordan Pina
Advisors: Yihao Zheng, Ziming Zhang

Wings of Gompei
Michael Magalhaes, Aaron Vaz, Marc Rich, Daniel Barmakian, Matthew Gadziala, Adelan Latli, Lauren Faulkner
Advisor: Alireza Ebadi

WPI Assists MS: A New TECHnique
Jonathan Adams, Evan Wertz, Joseph Puia, Douglas Cain
Advisor: Alireza Ebadi

Autonomous Intervention Medical Tools
Bailey Koestner
Advisor: Lee Moradi

Design and Evaluation of a Propulsion Aid Device for Folding Wheelchairs
Amanda Borden, Megan Jacene, Stephanie Steriti
Advisors: Sarah Jane Wodin-Schwartz, Elisabeth Stoddard

Engineering Enclosures for Space: Architecture for The Next Frontier
Samuel Dickens, Joseph McNeill, Natanel Pinkhasov, Aunika Yasui
Advisors: Soroush Farzin, Nima Rahbar, Carrick Eggleston

Introduction to Acoustics Course Development
Samuel Lambert, Lauren Meinhold, Jacob Bendick, James Obermaier
Advisors: Joseph Stabile

Automated Design Tool for Arduino Circuits
Gabriel Buziba, Yangyang Jin, Andres Negron, Casey Wohlers
Advisor: David C. Brown, Pradeep Radhakrishnan

The Design and Prototyping of a Low-Cost & Efficient Ocean Cleanup Robot
Gabriel Espinosa, Danny Ngo, Sebastian Valle, Alexander Wadsworth
Advisors: Selcuk Guceri, Vincent Aloi

Design of an Airborne Particle Concentrator
Lucien Wallace
Advisors: Sarah Jane Wodin-Schwartz, Elisabeth Stoddard, Holly Ault

PMKS+: An Application for Generating and Analyzing Planar Linkages
Nicole Burgess, Robert Eskridge, Tyler Evans
Advisors: David C. Brown, Pradeep Radhakrishnan

Wankel MQP
Michael Bragg, Giovanni Vecchiarino, Andrew Wirtz, Jack O'Neill, Nikki Lam, Peter FernHolz
Advisor: Selcuk Guceri

Designing and Testing a Safe and Adjustable Bicycle for a Child with Achondroplasia
Avinash Bissoondial, Eliza Dion, Katharine Miller, Kelsey Reno, Sequoia Truong
Advisors: Sarah Jane Wodin-Schwartz, Zoe Reidinger

Expanding the Functional Capabilities of the Tongue Prosthesis
Li DeWitt, Avery Macomber, Mylla Santana, Deborah Diniz
Advisors: Pradeep Radhakrishnan, Dirk Albrecht

Open Source Desktop CNC Mill
Alex Brown, Gabriel Brown, Brian English, Abigail Hodges, Luke Hoy, Jacob Schools
Advisor: Pradeep Radhakrishnan

Reversible Solid Oxide Cell Performance Optimization
Aritro Deb Sarker, Elliot Dunham, Shannen Preble
Advisor: Yu Zhong

Breakfast Sandwich Robot
Trevor Faber, Ethan Moynihan, Mathew Balquin, Samson Hodges
Advisors: Pradeep Radhakrishnan, Fiona Levey, Bo Tang

Lightweight and Efficient Manifold Design for Hydrogen Fuel Cell Powered Unmanned Aerial Vehicles (UAVs)
Sophia Islam, Avery Purtell, Liam Hemmerling, Michael Bonito, Jack Cassidy
Advisor: Ahmet Sabuncu

Design and Construction of a Tilting Platform in a Wind Tunnel for Wildfire Testing
Dillon McDermott, Samuel Griffiths, Sophia Lindsay, Eric Montiverdi
Advisor: Albert Simeoni

Energy Harvesting for the Army
Joel Eckstrom, Flint Eller, Keston Holohan, Yashas Honnavalli, Ethan Shaw
Advisors: Pratap Rao, Gregory Noetscher

Wearable Near-Infrared Spectroscopy Device for Acute Orthopedic Trauma
Krishram Kothimbakam, Timothy Lee, Alex Moreira, Gautham Rajeshkumar
Advisor: Yihao Zheng

Development of a Modular Upper-Body Strength Enhancement Powered Exoskeleton Device
Ilyssa Delizo, Nathaniel Dixon, Matthew Frey, Mionna Green, Christopher Johnson
Advisors: Mehul Bhatia, Andre Rosendo, Stephen Bitar

A Robotic Platform For Neurointervention
Alexander Masiero, Maria Aranda Ramirez, Luka Christianson, Edward Flanagan, Tyler Brown
Advisors: Yihao Zheng, Ziming Zhang

Wāwāmalu Water Tank and Irrigation System Design
Zackary DiCelico, Jack Yebba
Advisors: Selcuk Guceri, Lauren Mathews

Palm Print
Cameron Shelley, Matthew Folenta, Justin DeBeaucourt, Tereza Hruba, Isaac Lau, John Mansour
Advisor: Joseph Stabile

Parametric UUV Design Tool
Joshua Barney, Belkys Felix Nova, Emma Gilroy, Keelan Smith
Advisor: Ahmet Sabuncu

Detecting and Correcting Bends in Medical-Grade Endoscopes using Computer Vision and Cold-Rolling Processes
Abigail Clemence, Nikita Igoshin, Chenhao Li, Praniva Pradhan, Jessica Rhodes, George Shelton
Advisor: Pradeep Radhakrishnan

Modular Gaming Table
Kaiwen Chen, Jimmy Clemente, Joshua DeVoy, Nikolaos Konstantinou, Emma Nollman, Chloe Trotta-Smith
Advisors: Medhi Mortazavi, Donald Brown

Automated Flying Disc Inventory
Matthew Adam, Tristan Andrew, Benjamin Antupit, David Costa, Claire Higginson, Daniel Ouellette, Jonathan Whooley
Advisors: Greg Lewin, Walter Towner

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Advisors: Greg Lewin, Walter Towner

Formula Electric Racecar
Arnav Sacheti, Carson Graham, Connor Dowgielewicz, Emma Dimmig, Evelyn Maude, Harris Brancazio, Henrique Checcucci, Hussain Bhatti, John Demedeiros, Samuel Kierstead, William Gunn, Zoe Goodman
Advisor: William Michalson

Hydroelectric Power for Off-the grid Farms
Juancarlo Mantica
Advisor: Ahmet Sabuncu

PLA Recycler
Samuel Appiah Kubi, Evan Arenburg, Nathan Dorman
Advisors: Mehul Bhatia, Andre Rosendo

SailBot 2023-24
Erin Murphey, Theodore Winters, Anthony Virone, Matthew Gomes
Advisors: William Michalson, Kenneth Stafford

Design & Assembly of a 3D Printed Humanoid for At-Home Assistive Care
Merel Sutherland, Anna McCusker, William Michels, Shivank Gupta
Advisors: Pradeep Radhakrishnan, Derren Rosbach, Dirk Albrecht

Design of a High-Impulse Mechanical Apparatus for Dynamic Testing of Novel Energy-Absorbing Composites
Andrew Amkreutz, Alessia Kodhimaj, Cory Abraham, Konstantin Nikolaychuk
Advisors: Diana Lados, Anthony Spangenberger

Magnesium Production and Recycling for Clean Energy
Artem Iurkovskyi, Cooper Langner
Advisor: Adam Powell

Design and Fabrication of a Gas Turbine Engine
Terrence Benedict, Hunter Carey, Jacob Sledge, Isaac Kreiger
Advisor: Selcuk Guceri

Reinventing Shoe Soles Using Axiomatic Design to Reduce Lower Leg Injuries
Sean B. Foody
Advisor: Christopher A. Brown

Design and Optimization of Novel Impact-Resistant Composites for Energy-Efficient Transportation Applications
Matthew Boisvert, Kiana-Karla Layam, Mark Ruddat, Joseph Saladino
Advisors: Diana Lados, Anthony Spangenberger

Multi-orientation Autonomous 3D Welding with an Industrial Robot Manipulator
Cameron Earle, Jack Tervay
Advisors: Andre Rosendo, Jianyu Liang

Kinematics Design and Analysis for Recovery Evaluation of Spinal Cord Injury (KARESCI 2)
Apollinaris Rowe, Landen Kovens
Advisors: Michael Engling, Yuxiang Liu

Design, Realization, and Application of a Positioner for High Resolution Optical Metrology in Aerostructures
Paige Campagna, Ryan Powers
Advisor: Cosme Furlong-Vazquez

Physics Department

Olin Hall 107

9:30am
Terahertz Time Domain Spectroscopy for Characterizing Properties of Carbon Nanotube Yarns
Natalie Frey
Advisor: Kateryna Friedman, Lyubov Titova

9:45am
Laboratory Gas Phase Molecular Spectroscopy
Valerie Bennett
Advisor: Douglas Petkie

10:00am
Simulation and Characterization of Silicon Nitride Photonic Integrated Circuits
Maximillian Hubbard, Charlie Tribble
Advisor: Douglas Petkie
Co-Advisors: James Eakin (LEAP), Eoghan Gallagher (LEAP)
Sponsors: Spark Photonics, Small Business Innovation Research Program

10:15am
Investigating Fetch-Limited Wave Growth in The Coastal Alaskan Arctic
Michelle Sangillo
Advisor: Nancy Burnham

10:30am Break

11:00am
Developing an X-ray Fluorescence System for use in Developing Countries and Determining its Minimum Detectable Limits of Lead and Uranium
Kylar Coleman-Foley
Advisor: David Medich
Co-Advisor: Peter Hansen (IGSD)

11:15am
Explorations in Modified Gravity and Dark Matter Energy
Alexandra Spezzano
Advisor: Germano Iannacchione

11:30am
3D Image Reconstruction of a Fossil Using Neutron Tomography
Isaac Benjamin, Scarlett Clarke (MA)
Advisor: David Medich, Vadim Yakovlev (MA)
Sponsor: Paul Scherrer Institute

11:45am
Electromagnetic Simulations for the He6-CRES RF System
Luciano Malavasi
Advisor: David Medich

Professional Writing

POSTER SESSION, 11:00am to 12:00pm
Higgins House

Environmental Rhetoric and Social Media
Jia Yazon

Advisors: Sarah Riddick (PW) and Michael T. Timko (ChE)

Game Wikis for Clean Sweep and Raveling Dreams IMGD MQPs
Ethan Chau

Advisors: Sarah Riddick (PW); Rose Bohrer (CS); Farley Chery (IMGD)

Partnering With The United States Department of Treasury To Implement an American Rescue Plan Act Grant At Free Medical Programs
Lauren Averka, Kellie Bushe, Kylie Doehring, Kelly Hefferman
Advisors: Brenton Faber (PW & BME), Destin Hellman (Biochemistry) and Joseph Duffy (Biology & Biotechnology)

Clinical Studies of Malignant Tumors, Tissue Growth, and Cysts in Gynecological Research
Tiffany Foote
Advisors: Brenton Faber (PW & BME); Catherine Whittington (BME)

The Rhetorical Construction of the 'Chemical Imbalance Theory,' and the Potential for Gut-Centric Alternatives
Alexis Wood
Advisors: Shana Lessing (PW) Reeta Prusty Rao (BBT)

Behind the Biomedical Engineer: A WPI BME Podcast
Alyssa Morgan
Advisors: Brenton Faber (PW) and Kristen Billiar (BME)

Creating a Marketing Plan for the WPI Project Engagement Portal
Caroline McLaughlin
Advisors: Kevin Lewis (PW) and Jim Ryan (MIS)

Robotics Engineering

AM Session

Unity Hall 243

8:30 am
Opening Remarks

8:45 – 9:00 am
Voice Control of a Hand Exoskeleton for Traumatic Brain Injury Patients with Motor Impairments and Aphasic Speech
Team Members: Connor Gaudette; Matt McGourty; Keenan Segenchuk; Allison Rozear
Advisors: Tess Meier; Christopher Nycz; Yunus Doğan Telliel; Erin Solovey; Haichong Zhang

9:00 – 9:15 am
FASTR – Flexible Articulating Surgical Transoral Robot
Team Members: Chase Beausoleil; Mark Gagliardi; Samay Govani; Cole Parks
Advisors: Stephen Bitar; Loris Fichera; Yuxiang Liu; Haichong Zhang; Yihao Zheng

9:15 – 9:30 am
Robotics Intracardiac Catheter Steering System
Team Members: Megan DeSanty; Isabelle Lachaux; Elizabeth Minor; Rebecca Young
Advisors: Loris Fichera; Shang Gao; Zhenglun Wei; Haichong Zhang; Yihao Zheng

9:30 – 9:45 am
Automated Control of External Ventricular Drain for Neuro-ICU
Team Members: Matthew Duncan; Yujie Guo; Haotian Liu; Haoran Zhang
Advisor: Christopher Nycz

9:45 – 10:00 am
Augmented Reality Human-Robot Interface for Assisting Robotic Manipulation
Team Members: Tyler Giroux; Justin Kyi; Dimitri Saliba; Alexander Sun; Bryon Tom
Advisors: Jane Li; Koksal Mus

10:00 – 10:15 am
SOPHT: Soft Prosthetic Hand
Team Members: Christina Aube; Jeff Davis; James Doucette
Advisors: Mahdi Agheli; Markus Nemitz; Haichong Zhang

10:15 – 10:30 am
Soft Assistive Robotics for Helping Daily Tasks
Team Members: Luis Aldarondo; Antonios Sevastos; Ethan Weisse; Hannah Zink
Advisors: Berk Calli; Loris Fichera; Cagdas Onal

10:30 – 10:45 am
Progressive Molding of Soft Robots for Ocean Conservation
Team Members: Sara Frunzi; Dilce Oliveira; Owen Rouse
Advisors: Cem Aygül; Markus Nemitz

Unity Hall 400

8:45 am
Opening Remarks

9:00 – 9:15 am
Development of Cube Swarm for Search and Rescue Applications
Team Members: William Albert; Phillip Brush; Benjamin Dodge; Timothy Klein; Andrew McCammon; Jason Rockmael; Dang Tran
Advisors: Greg Lewin; Shubbhi Taneja; Reinhold Ludwig

9:15 – 9:30 am
Social Robot for Interactive Play
Team Members: Joseph Baliestiero; Jayson Caissie; Kaley Du; Megan Jacques; Chloe Plasse; K. (V) Valery
Advisors: Rose Bohrer; Jane Li

9:30 – 9:45 am
LEMUR: Learning and Education of Machine Learning for Undergraduate Robotics
Team Members: Ashe Andrews; Andrew McKeen; Tuomas Pyorre
Advisors: Matt Ahrens; Kevin Leahy; Greg Lewin

9:45 – 10:00 am
Modular Hybrid Flux Motor Development for High Torque Robotics Applications
Team Members: Kaeden Berry; Adam Blanchard; Arturo Lemos
Advisors: Yarkin Doroz; Andre Rosendo

10:00 – 10:15 am
Multi-Robot Persistent Coverage Under Fuel and Stochastic Failure Constraints
Team Members: Camden Cummings; Samara Holmes; Yaşar İdikut
Advisor: Carlo Pinciroli

10:15 – 10:30 am
BranchBot: Autonomous Quadcopter for Branch Attachment
Team Members: Zane Altheimer; Keelan Boyle; Cooper Dean; Andrew Kerekon
Advisors: Dmitry Korkin; Robert Krueger; Oren Mangoubi; Andre Rosendo

10:30 – 10:45am
Symbiotic Multi-Agent Construction 5.0
Team Members: Genna Brown; Edward Enyedy; Can Güven; Isa Kaplan; Cambria Pomeranz; Isabella Rosenstein
Advisors: Greg Lewin; Carlo Pinciroli; Markus Nemitz

10:45 – 11:00 am
Underwater Filmography Using Robots
Team Members: Riley Blair; Christopher Chow; Gabriel Demanche; Olivia Simon
Advisor: Markus Nemitz

PM Session

Unity Hall 400

1:00 – 1:15 pm
NASA Lunabotics
Team Members: Brendan Byrne; Zeb Carty; Giovanni Giacalone; Kelli Huang; Ian MacInerney; James Nguyen; Terence Tan; Sean Thal
Advisors: Carlo Pinciroli; Ken Stafford

1:15 – 1:30 pm
Trashbot: Autonomous Trach Collecting Robot
Team Members: Liliana Loughlin; Cristobal Rincon Rogers; Matthew Sweeney; Yuhan Wu
Advisors: Fabricio Murai; Neil Rosenberg; Andre Rosendo,

1:30 – 1:45 pm
SailBot
Team Members: Mathew Gomes; Erin Murphey; Anthony Virone; Theodore Winter
Advisors: William Michalson; Kenneth Stafford

1:45 – 2:00 pm
BiQu: Bimodal Quadruped Robot
Team Members: Ethan Chandler; Akshay Jaitly; Yifu Yuan; Puen Xu; Lehong Wang; Tao Zou
Advisors: Mahdi Agheli; Jing Xiao

2:00 – 2:15 pm
Design and Assembly of a 3D Printed Humanoid Robot for At-Home Assistive Care
Team Members: Shivank Gupta; Anna McCusker; Wil Michels; Merel Sutherland
Advisors: Dirk Albrecht; Pradeep Radhakrishnan; Derren Rosbach

2:15 – 2:30 pm
Waste Sorting Robot for Recycling
Team Members: Valerie Childers; Brett Cohen; Dylan Hunt; Nicholas Moy; Isaac Noble; Gabriel Ward; Lily Wolf
Advisors: Berk Calli; Sarah Jane Wodin-Schwartz

2:30 – 2:45 pm

Advancing Humanoid Robots: Demonstration of Standing and Assisted Walking Alongside a New Simulation Framework

Team Members: Stephen Fanning; Jatin Kohli; Dylan Nguyen; Scott Pena; Jack Rothenberg; Ana Roure

Advisors: Dirk Albrecht; Pradeep Radhakrishnan

2:45 – 3:00 pm

Eve - Agricultural Harvesting Robotic System

Team Members: Soumaya El Mansouri; Lexi Krzywicki; Timothy Rinaldi

Advisors: Berk Calli; Yarkin Doroz; Sarah Wodin-Schwartz

POSTER ONLY

Automated Flying Disc Inventory

Team Members: Benjamin Antupit; Jonathan Whooley; Daniel Ouellette; David Costa; Tristan Andrew; Matthew Adam; Claire Higginson

Advisors: Greg Lewin; Walter Towne

POSTER ONLY

The Design and Prototyping of a Low-Cost & Efficient Ocean Cleanup Robot

Team Members: Gabriel Espinosa; Danny Ngo; Sebastian Valle; Alexander Wadsworth

Advisors: Vincent Aloi; Selcuk Guceri

POSTER ONLY

HURON: Full-size Humanoid Robot (Lower Body)

Team Members: Thai Duc Doan; Sahen Jueja; Nhi Nguyen; Carlos Giralt Ortiz

Advisors: Berk Calli; Mahdi Agheli; Markus Nemitz; Nitin Sanket

3:00 pm

Closing Remarks

Social Science & Policy Studies

POSTER SESSION

9:30am to 1:00pm

Salisbury Labs 411

Psychological & Cognitive Sciences

Psychophysiological Effects of Social Feedback During Social Media Use
Lorena Silva Nunes
Advisor: Richad Lopez

Stress-Dependent Cilia Remodeling in C. elegans
Katelyn Quinn-Cyr
Advisors: Jim Doyle, Inna Nechipurenko

Neural Mechanisms of Social Threat Processing Can Optimize Emotion Regulation Training to Improve Mental Health
Eva Petschek
Advisors: Richard Lopez, Benjamin Nephew

Psychosocial and Biochemical Correlates of Nicotine Administration via Vaping Behaviors
Mira Kirschner
Advisors: Angela Incollingo Rodriquez, Jagan Srinivasan

Building an Inclusive Park for Holden: Understanding Community Needs, Priorities, and Expectations
Samantha Curtis
Advisor: Erin Ottmar

Academic Cheating at the University Level
Samuel Borge, Assumption University
Advisor: Karen Lionello-DeNolf, Assumption University

Learning Lecture Content Through AI-Driven Spaced Retrieval
Olivia Shan, Assumption University
Advisor: Leamarie Gordon, Assumption University

The Role of Active Student Responding in Post-Secondary Education Settings
Ryan Singley, Assumption University
Advisor: Nicole Pantano, Assumption University

Technology, Policy & Sustainability

Evaluating the Feasibility of Repeat Photography as a Service to Monitor the Effects of Climate Change
Mateo Blumenthal
Advisors: Elisabeth Stoddard, Dominic Golding

Design and Evaluation of a Propulsion Aid Device for Folding Wheelchairs
Amanda Borden, Megan Jacene, Stephanie Steriti
Advisors: Elisabeth Stoddard, Sarah Jane Wodin-Schwartz

Designing a Resilience Hub for Vulnerable Populations in Las Carolinas, Puerto Rico
Tara Checko
Advisors: Elisabeth Stoddard, John-Michael Davis

Exploring Value Systems: Māori Perspectives in Scholarly Literature on Mice-Invertebrate Interactions in Aotearoa New Zealand
Laura Romania
Advisors: Elisabeth Stoddard, Leslie Dodson, Ingrid Shockey

Design of an Airborne Particle Concentrator
Lucien Wallace
Advisors: Elisabeth Stoddard, Holly Ault, Sarah Jane Wodin-Schwartz

Integration of Environmental Social Governance (ESG) into Turner Construction Company's Supply Chain
Eugena Choi, Hannah George, Nicholas Battaglino. Jailyn Medeiros, Adam Tedesco, Dreivone Townsend
Advisors: Elisabeth Stoddard, Laureen Elgert, Laila Abu-Lail, Soroush Farzin, John Lindholm, Jessica Rosewitz

Restoration of the Mill Creek Salt Marsh in Chelsea, Massachusetts
Adam Lepore, Rebekah Mendoza, Joseph Horowitz, Kaleigh Walsh
Advisors: Crystal Brown, Paul Mathisen

Evaluating the Desire for Humanoid Robots in Assisted Living Facilities
Merel Sutherland
Advisors: Derren Rosbach, Pradeep Radhakrishnan

Disparities in Mortgage Denials Based on Race and Debt-to-Income Ratio in Massachusetts and Worcester County
Alexandria Sheehan
Advisors: Alexander Smith, Gbetonmasse Somasse

Mobile App for E-Waste Processors
Cortina Barbieri, Abigail Boafo, Abby Hoschouer, Madeline Mueting, Alyssa Ogi
Advisors: Robert Krueger, Mahamadou Sagna, Lane Harrison

Corridor Study for CT-156 in East Lyme, Connecticut
Lauren Hess, Luna Daury, Michaela Dos Santos
Advisors: Robert Krueger, Suzanne LePage

Financial Resources from the Inflation Reduction Act (IRA) for Boston-Area Concrete Manufacturers to Integrate Environmental, Social, Governance (ESG) Through Turner Construction
Ellie Burress
Advisors: Elisabeth Stoddard, Laureen Elgert, John Lindholm, Jessica Rosewitz

BranchBot: Autonomous Quadcopter for Branch Attachment
Keelan Boyle, Zane Altheimer, Cooper Dean, Andrew Kerekon
Advisors: Robert Krueger, Dmitry Korkin, Oren Mangoubi, Andre Rosendo

Climate Change May Affect the Seasonality of Native Silk Moths
Zoë Swartley, Michelle Kirtich
Advisor: Marja Bakermans

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Robotics Engineering - 6665
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