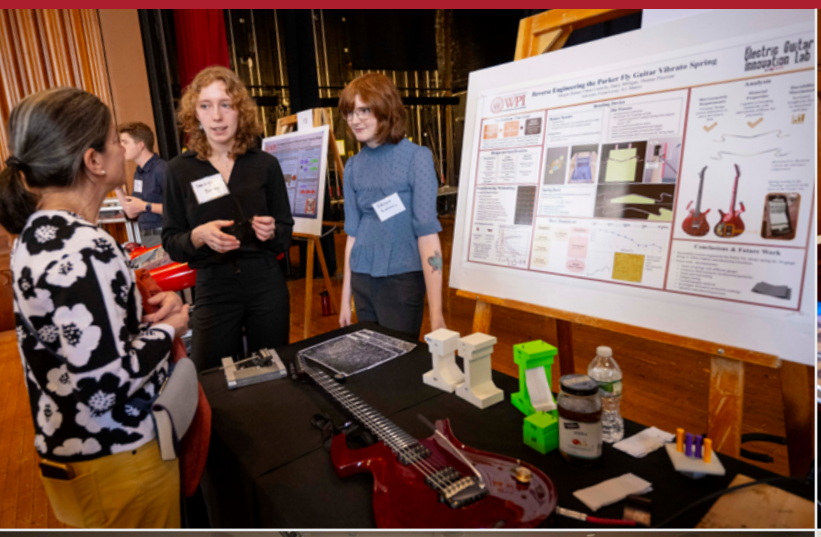
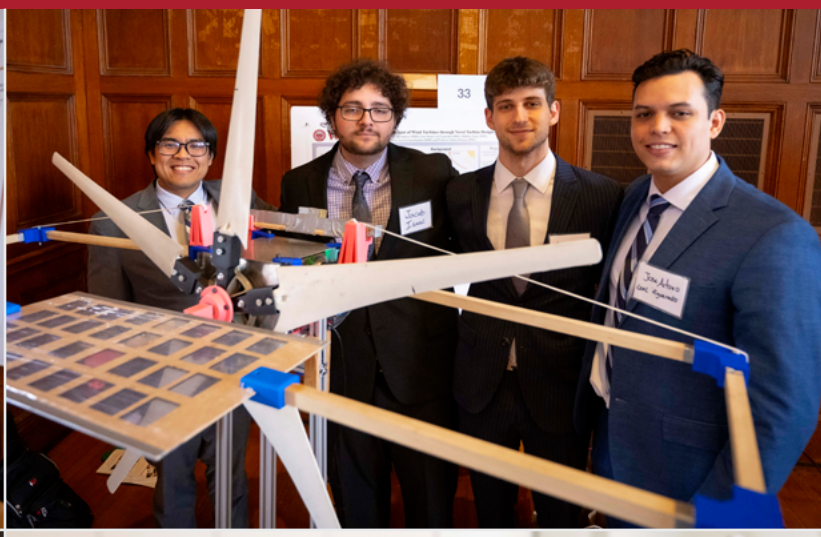
UNDERGRADUATE RESEARCH

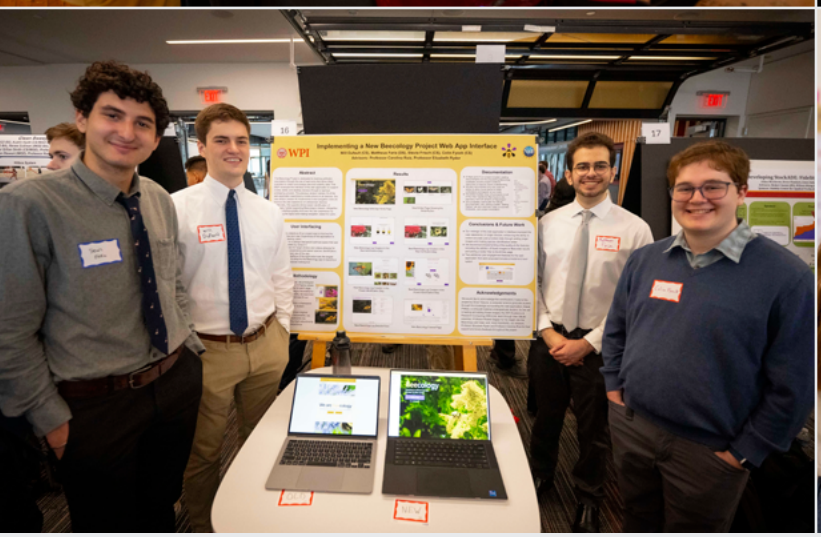
Projects Showcase

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

APRIL 25, 2025







Worcester Polytechnic Institute

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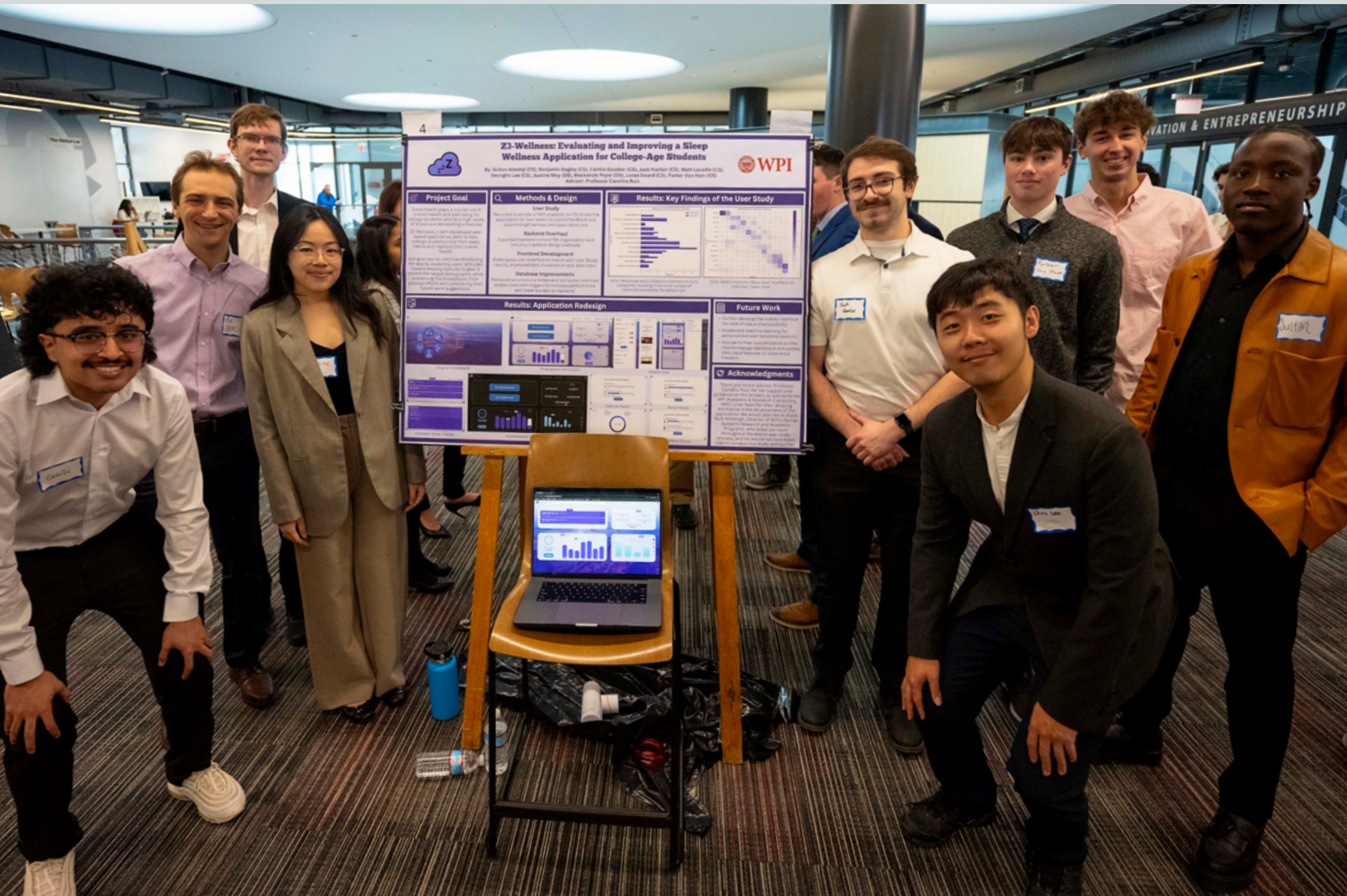
LET'S CONNECT



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: Higgins Labs 218

8:30am
Fixed Wing Micro-Drone Design for the SAE Aero Design Competition
Ladd Breinholt, Brendan Fainer, Rhick Falcon, Thomas Joyner, Samuel Neves, Eren Ozcilingir, Kelly Pritchard
Advisor: Prof. Olinger

8:50am
Design and Analysis of an Actuating Converging Diverging Nozzle for Subscale Testing
Cameron Best, Sophie Brochu, Kate Dobson, Tobias Enoch, Joshua Garcia, Allison Granger, Daniel Jarvis
Advisor: Prof. Jayachandran

9:10am
Performance Analysis of a Nuclear Reactor Heated Turbine
Cameron Boucher, Hunter Daris, Ana Dykeman, Ellie Ramirez-Richer, Rashad Stepney, Matthew Urrea, Elijah Witsenhause
Advisor: Prof. Blandino

9:30am
Design and Testing of Streams Wing Prototype
Adrian Asante, Miah Bilal, Ian Cody, Eli Landry, Evan Mandel, and Celeste Vargas
Advisor: Prof. Olinger

BREAK 10 minutes

10:00am
Design and Analysis of a Constellation of CubeSat Radio Telescopes for the Imaging of Saturn's Rings
Mary Laurens, Zevulun Lieberman, Sjoerd Huitema, Mark Russo, Aquil·lí Rodríguez Plassa
Advisor: Prof. Taillefer, Prof. Demetriou

10:20am
Design and Analysis of a Low-Cost Anti-Missile Missile in Combination with a High-Powered Rocket
Olivia Art, Rachel Campbell, Anthony DeMarco, Jackie Edwards, Nora Griffiths, Melina Iannacchione, Reagan Kayhart, Reya Truher, Jonathan Wessler McCarthy (PH) Daniel Pearson, Domenico Straccia, Beck Carrier
Advisor: Prof. Demetriou, Prof. Taillefer

BREAK 10 minutes

11:00am
Development of an Ionic Wind Propelled Aircraft
Ella Agran, Ryan Correa, Declan D'Aleo, Chris Davis, Lyle Edwards, Jenner Johnson, Zachary Stahl, Justin Shen, Luca Scotto
Advisor: Prof. Taillefer, Prof. Cowlagi

11:20am
Micro Rover for Mars Ice Core Sample Extraction
Charles Kennedy, Lily Guiliano, Carolina Hernandez, Skyler Cole
Advisor: Prof. Karanjgaokar

11:40am
Tensile SHPB for High-Rate Testing of Aerospace Materials
David Buitrago, Fernanda Calix, John Lambert
Advisor: Prof. Karanjgaokar

12:00 pm
Conceptual Mission Design for Titan Sample Return
Matthew Crane, Maxwell Jacobson, Trevor Mohlman, James Nicoll, Kaitlyn Saidy, Isabela Sugden, Samuel Wing
Advisor: Prof. Lu

12:20 pm
Design of Morph Wings with Tunable Properties for Ultralight Aircrafts
Serena Dalo, Emre Danabasoglu, Demi Davis, Benjamin France, Fiona Leitner, Maxwell Maria, James Watson
Advisor: Prof. Yuan

Bioinformatics and Computational Biology Department

Odeum A/B

9:00am
Computational Analysis of Non-coding DNA Regions: Understanding the Role of ENCODE Candidate cis-Regulatory Elements in Cancer and Gene Regulation
Evan Dugas
Advisor: Elizabeth Ryder, Weng

9:00am
Development of a Eutrophication Simulation for High School Curriculum
Daniel Feng
Advisor: Elizabeth Ryder

9:00am
Investigation of Large Language Models in Generating Accurate identification of Molecular Machines Across Model Organisms
Kashish Gupta, Najum Soofi
Advisor: Dr. Dmitry Korkin

9:00am
Distributed Computing for Association Analysis of Whole Genome Sequencing Data

Kylie Hoar, Peter Howell
Advisor: Zheyang Wu

9:00am
Predicting Students' Mental Health Using Facial Expression Data
Pegah Emdad, Dale Asante, Aiden Johnson, Rosaline Guo, Dylan Grady
Advisor: Elke Rundensteiner, Shichao Liu, Oren Mangoubi, Kaitlyn Schneider

9:00am
Unlocking Yeast's Stress Resilience: Leveraging AlphaFold AI to Decode Unknown Genes for Industrial and Biotechnological Applications
Thomas O'Sullivan
Advisor: Eric Young

Biology and Biotechnology Department

Odeum A/B

9:00am
Exploring Microbacterium Foliorum-Targeting Bacteriophage Host Range Expansion Through EMS Mutagenesis
Katelyn Lombardo, Nicole Miller
Advisor: Michael Buckholt, Jill Rulfs

9:00am
Constructing Molecular Components for CAR T Cell Engineering
Maxwell Clift, Ellie Ungashick
Advisor: Jill Rulfs, Shakti Kumar Amabady

9:00am
Differential Effects of Artemisia sp., Artemisinin, and Dihydroartemisinin in Human Dermal Fibroblasts
Eliza Dutson, Trevor Bush, Meghan Urakawa
Advisor: Pamela Weathers

9:00am
Behavioral Investigation of Chronic and Acute Stress Exposure on Freshwater Crayfish, Faxonius virilis
Greta Achenbach, Josephine Conlon, Divya Kumar, Madeleine Ruley, Brooke Struble
Advisor: Lauren Mathews

9:00am
Understanding the Effects of Lead Exposure on Pseudomonas putida and the Native Soil Microbiome
Lauren McIlhenny
Advisor: Natalie Farny

9:00am
Investigating Potential Markers of Ferroptosis from *A. Annua* in Breast Cancer Cells
Bethany Atwood, Parker Goodrum
Advisor: Michael Buckholt, Jill Rulfs

9:00am
Characterization of A. annua Extracts: Investigating the Effects of Extract Composition on Breast Cancer Cells
Lori Ganjian, Emily Azevedo
Advisor: Michael Buckholt, Jill Rulfs

9:00am
The Effects of Artemisinin and its Derivatives on T Cell Lymphocyte Proliferation
Brendan Halloran, Nolan Warner
Advisor: Michael Buckholt, Jill Rulfs

9:00am
Future Implications of Using Artemisia species as Anticancer Therapies
Amber Powell, Anna Wix
Advisor: Michael Buckholt, Jill Rulfs, Elizabeth Stoddard

9:00am
Is the LD1171 C. Elegans Strain a Model System for Investigating the Effects of CBD on Parkinson's Disease?
Jenna Bushika, Katelyn Bergeron, Matt LaSata, Lily Eldridge
Advisor: Mike, Jill, Jagan Srinivasan, Carissa Olsen, Denstin Heilman

9:00am
Regulation of Genome Stability
Chiara Smith
Advisor: Amity Mannings

9:00am
The Impact of Rb Tumor Suppressor Status on Sensitivity to Epigenetic Inhibitors
Lilah Delbou
Advisor: Amity Mannings

9:00am
An Investigation into the Size Dependency of the Cdc25 Promoter
Maire Murphy
Advisor: Amity Mannings, Nick Rhind

9:00am
Characterizing the Effects of HIV Accessory Proteins on NK Ligand Expression Across Different HIV Strains
Sheldon Gentling, Tara Bromfield
Advisor: Louis Roberts

9:00am
***In vitro* evaluation of siRNAs targeting ADAM33 as a first step toward asthma treatment**
Nicole Rannikko
Advisor: Louis Roberts

9:00am
Phosphomimetic Mutation Alters the Kinetics of *S. cerevisiae* Malate Dehydrogenase-2
Olivia Santurri
Advisor: Louis Roberts

9:00am
Functional Analysis of the Exocyst and SCD Complexes in Moss
Leah Maciel, Jocelyn Hinchcliffe
Advisor: Luis Vidali

9:00am
RNAi-base Loss-of-Function Suggest Nonessential Roles in Exocytosis of Sec3 and MyTH1 and that Lyk5 Serves as the Chitin Receptor in Physcomitrium patens.
Kathryn Pagano, Sarah Mathew
Advisor: Luis Vidali

9:00am
Swapping & QTips: Evolutionary & Functional Analyses of dEGFR/Kek1 Binding
Sophia DiBara
Advisor: Joseph Duffy

9:00am
The Puzzle of Kek1 Binding Pocket
Jillian Crandall
Advisor: Joseph Duffy, Denstin Heilman

9:00am
Structural Studies of EGFR/Kek1 Binding: The Role of Ligand
Isabella Makabali
Advisor: Joseph Duffy

9:00am
Inhibition of HDACs by Treatment with Sodium Butyrate to Mitigate the Development of Huntington's Disease in C. elegans
Isabel Sumner, Brigid Hannibal
Advisor: Jagan Srinivasan

9:00am
The Brain-Gut-Microbiome Axis on Behavioral Response in C. elegans Model of Alzheimer's Disease
Madison Affsa
Advisor: Jagan Srinivasan

9:00am
Role of microbiome in associative learning in Alzheimer's Disease
Miles Williams, Arden Badhwar
Advisor: Jagan Srinivasan, Elizabeth Ryder

9:00am
Gut Feelings: Unraveling the Microbiome's Influence on Parkinson's Disease
Korinna Muller
Advisor: Jagan Srinivasan

9:00am
Characterizing the Effects of Light Exposure on Neurodegeneration
Aashi Akare
Advisor: Jagan Srinivasan

9:00am
Operation Tick hunt: Design and Refinement of PCR-Based Assays

Gina Millot, Maeve Hess
Advisor: Chris Colins

9:00am
Regulation of the DNA Repair Protein Xrs2 by Cdk1
Serene Gerome
Advisor: Reeta Rao, Jennifer Benanti (UMMS)

9:00am
Phylogeographic history and invasion patterns of crayfish (Faxonius virilis) in North America.
Steph Brownell, Gavin Burkhardt, Hannah Edlund, Norah Giles, Karyn Manning, Olivia Spielberger
Advisor: Lauren Mathews

9:00am
Engineering Bacteria for Lead (II) Remediation
Erik Breiling
Advisor: Natalie Farny, Jose Arguello

9:00am
Rare Earth, Rare Solution: Structural Insights into Synthetic Lanthanide-Sequestering Aptamers
Maline Demers
Advisor: Natalie Farny

9:00am
Identifying novel genes required for neuronal cilia morphogenesis
Nina Emens
Advisor: Inna Nechipurenko, Dimitry Korkin

Biomedical Engineering

Salisbury Labs Kinnicutt Hall Room 115

9:05am

AquaTherm: Working Towards Core Body Temperature Regulation in Surgery

Amin Badmos, Brett Marelli, Jeremiah Morgan, Kathryn Mulligan, Adrianna Niles

Advisors: Songbai Ji, Elizabeth Ryder

9:25am

Sensor Development for Syncope Prediction Device

Mila Mejia

Advisors: Yuxiang Liu, Yihao Zheng

9:45am

Wearable Sensor for Dairy Animals

Lily Brenner, Thomas Cox, Jayden Hart, Serena Tura

Advisor: Diana Alatalo

10:05am

Moving through Life with Uterine Fibroids: Insights from In Vitro Modeling of Sex Hormone Exposure on Fibroid and Myometrial Cells

Arthur Clark, Margaret Krawitz, Ainsley Poole, Alina Potashinsky

Advisor: Catherine Whittington

10:25am

Developing AI Algorithms for Ultrasound Diagnostics

Jennifer Chaves, John Peabody, Lauren Simonian

Advisor: Brenton Faber

10:55am

A Resistance-Based Colonoscopy Probe for Real-Time Polyp Analysis

Jamie Baines, Kyla Fu, Jessica Vo, Laurel Whitley

Advisors: Sakthikumar Ambady, Ahmet Sabuncu

11:15am

Shear-Induced Deformation and Drug Effects on Triple-Negative Breast Cancer Cells: Biomechanical Properties and Cytoskeletal Structure

Yasaman Ganjineh, Delaney Lippert, Eleni Xhupi

Advisor: John Obayemi

11:35am

Pawsthetics: Reimagining Canine Prosthetics for a More Natural Gait

Emma Gatti, Ella LaFortune, Ryan Mulcahy

Advisor: Diana Alatalo

11:55am

Tremor Reduction Device Using Vibrational Stimulus

Elizabeth Bowman, Devin Kachadoorian, Brendan May

Advisor: Karen Troy

Salisbury Labs Room 104

9:05am

Design of a Wireless EMG/ECG Device with Applications in Myoelectric Prostheses Control

Emma Barnes, Madison Boutin, Kimberly Huang, Anastasiia Likhanova

Advisors: Taimoor Afzal, Ted Clancy

9:25am

Developing a Papillary Muscle Adjustor for Atrioventricular Valve Simulators

Lily Beals, Mary Pecoraro, Samuel Thai

Advisor: Zhenglun "Alan" Wei

9:45am

A 3D Stretch Cell Mechanoculture Device

Alyssa Carta, John McCarthy, Tanner Ross, Emma VanBeek, Eric Whitty

Advisor: Kristen Billiar

10:05am

Free Flex: Cervical Spine Protection for Post-Traumatic Injuries

Jeremy Allen, Madeline Healey, Paige Sommers, Sroka (Haley) Sroka

Advisors: Brenton Faber, Karen Troy

10:25am

Antimicrobial-Loaded Bacterial Cellulose for Chronic Wound Applications

Isabella DeFronzo, Kelly Kane, Jewel Pauly, Joana Ripa

Advisor: Jeannine Coburn

10:55am

Arm Simulator for Mechanistic Study of Blood Pressure Measurement

Alyson Crawford, Ani Ladd, Isabella St. Angelo, Alopa Waje, Dhespina Zhidro

Advisor: Yihao Zheng

11:15am

Cardiomyocyte Development through Substrate Design

Danielle Cook, Benjamin Nye, Drema Uttecht, Lisa Vickery

Advisor: Sakthikumar Ambady

11:35am

Characterization of Single-Cell Anisotropy via Indentation and F-Actin Visualization

Owen Beaver

Advisor: Kristen Billiar

Salisbury Labs Room 105

9:05am

Precision 3D Mapping of Cardiac Vasculature using Intracardiac Robotic Catheter Steering

Robert Gunduz, Hannah Peloquin, Amanda Shea, Olivia Vogel

Advisor: Haichong "Kai" Zhang

9:25am

Development of Optical Light System for Photothermal Conversion and Light Induced Drug Release by MXene Nanomaterials

Priyal Anand, Molly Busby, Shaylie Lagasse, Isaac Levine

Advisor: Jeannine Coburn

9:45am

Investigating Endothelial Responses to Tissue Under In-Vitro Flow: System Development for the Preclinical Evaluation of Draper's LEAP Valve

Fatimah Daffaie, Emma DeMartino, Adeline Fede

Advisors: Kristen Billiar, Corin Williams (Draper)

10:05am

Soft Substrates, Small Molecules: Exploring Stem Cell Differentiation

Jillian Burns, Han Chiem, Hiba Khan, Gabrielle Van Kammen, Udaya Rattan

Advisor: Sakthikumar Ambady

10:25am

Graphene-PDMS Nanocomposite Materials: Influence of Mechanical and Structural Properties on Breast Cell-Surface Interactions

Andrew Cochran, Alejandro Clermont-Delgado, Matthew McLellan, Kayla Vega

Advisor: John Obayemi

10:55am

A Therapeutic Analysis of a Ligament Regeneration System

Cassidy Choquette, Katelyn Lunny, Emma Record, Jenna Young

Advisors: George Pins, Karen Troy, Dr. David Magit (BIDMC)

11:15am

***DermaMend*™: A Wound Healing Hydrogel Patch from Adipose Tissue-Derived ECM**

Ryan Forcina, Veronika Gorski, Niamh Grehan, Lauren McAdams

Advisor: Sakthikumar Ambady

11:35am

Development of a Temperature Regulating Bra Insert for Lactational Assistance

Daniel Boutin, Brynne MacWilliams, Noah Scott, Taryn Stevens, Michael Tsillas

Advisors: Diana Alatalo, Yihao Zheng

Salisbury Labs Room 305

9:05am

***Artemisia sp.*, Artemisinin, and Artemisinin Derivative Drugs Against Fibrosis Using 3-D Models**

Sophia Lally, Isha Medasani, Emiliano Sola

Advisor: Pamela Weathers

9:25am

An *In Vitro* Model to Mimic Altered Molecular Transport in Uterine Myometrium

Lillian Gallinoto, Ava Mattimore, Michelle Miller

Advisor: Catherine Whittington

9:45am

Characterization of LeaVS Perfusion for Scaffold Vascularization

Aaron Lowy, Olivia Thibaudeau, Suzan Unver

Advisor: George Pins, Yonghui Ding

10:05am

The Design and Development of an Oxygen Concentrator for Neonates in Low-Income Countries

Mary Lombardi, Emily Narouz, Kirsten Sailer, Salma Riad

Advisor: Solomon Mensah, Dirk Albrecht

10:25am

Flow System for 3D In-Vitro Artery Model

Milad Jaffari, John Steglitz

Advisor: Yonghui Ding

10:55am

Neuroprosthetic Device for Computer Assistance

Lucas Costa, Morgan Owen, Annalise Russo, Savoy Volcy

Advisor: Taimoor Afzal

11:15am

Microfluidic Bioreactor System for Modeling Cell Migration in Tissue Engineered Heart Valves

Alex Colleoni-Pimenta, Allison DeVillers, Brady Gardner, Alex Wolf

Advisor: Kristen Billiar

11:35am

Mammary Cell Microfluidic Thermal Device

Kitty Guo, Morgan Polinski, Harish Suresh, James Teague

Advisor: Diana Alatalo

11:55am

Role of Hyaluronic Acid in Endothelial Cell and Cancer Cell Interactions *in-vitro*

Victoria Cormier, Kimberly Daniels, Namya Saini, Ryan Thivaharraja

Advisor: Solomon Mensah

The Business School

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

A Guide for New Small-Scale Oyster Farmers: Understanding Strategies to Improve Environmental Sustainability and Economic Feasibility
Mengqi Hong (BU), Angela Kroi (BU), Tionge Nakazwe (EVS), Jadon Thomas (MGE)
Advisors: Adrienne Hall-Phillips, Elizabeth Stoddard (EVS)

Adapting to the Hybrid-Electric Shift – Recommendations for Automakers & Automotive Retailers
Amanda Mui (MGE), Isabella Royal (MGE)
Advisor: Walter Towner

Automating Resonant Frequency and Weight Characterization of Percussion Drumsticks at Vater Percussion
Samantha Arroyas (IE), Nicholas DeMasi (IE), Tej Melekote (IE)
Advisors: Brajendra Mishra (ME), Walter Towner
Sponsor: Vater Percussion

Create the Fidelity Metrics Store
John Chau, (DS, MGE), Halim Faker (FT, IE), Mansi Gera (DS), Harshith Iyer (CS), Sophia John (DS)
Advisors: Marcel Blais (MA), Joshua Cuneo (CS), Kwamie Dunbar, Wilson Wong (CS)
Sponsor: Fidelity Investments

Creating Social Change on the WPI Campus
William Barton (BU), Aidan Callahan (BU), Michaela Cluett (BU), Matthew Creed (BU)
Advisor: Adrienne Hall-Phillips

Cyber Defense Center Analysis
Lolita Cani (MIS), Ava Dickman (BU, IST), Alexse LaGuerre (MIS), Jan Pilja (MIS)
Advisors: Kwamie Dunbar, James Ryan, Daniel Treku
Sponsor: State Street

Digitization-Driven Process Improvement in the Acoustic Java Roastery
Jared Bailey (IE), Juliana Fox (IE), Aaron Skaling (IE)
Advisors: Sara Saberi, Joseph Sarkis, Abdullah Yildizbasi
Sponsor: Acoustic Java Roastery

Drumstick Sanding and Cutoff Process Design at Vater Percussion
James Calarese (IE), Avila Thompson (MGE)
Advisors: Walter Towner
Sponsor: Vater Percussion

Evaluating the Operations and Cost-Effectiveness of the UMass Memorial Health Mobile Integrated Health Program MQP
Olivia Dunn (MGE), Sophia Merolle (IE), Cosette Salaun (MGE), Bettina Valentiner Morrison (IE)
Advisor: Renata Konrad
Sponsor: UMass Memorial Hospital

Increasing Awareness of Research Labs at the WPI Business School Through Marketing and Website Development
Noor Andre (IST), Michael LeDuc (MIS), David Pham (MGE)
Advisors: Soussan Djamasbi, Farnoush Reshadi
Sponsor: WPI Business School

Inventory Management at AIS
Allan Anderson (MGE), Joseph Beauregard (MGE), Benjamin Brooks (IE), Antonio Ruiz (IE), Klaidi Varfi (IE)
Advisors: Matthew Hodson, Walter Towner
Sponsor: Affordable Interior Systems (AIS) Inc.

Investigating Artificial Intelligence in Construction of Transportation Infrastructure
Michael Demetriou (MGE), Michael Iannucci (MGE), Akil Morris (CE), Timothy Reidy (MGE)
Advisors: Jessica Rosewitz (CE), James Ryan
Sponsor: New England Infrastructure, Inc

MBTA Beltway Line
Thomas Burns (CE), Eric DePiero (MGE), Nicholas Pye (CE)
Advisors: Leonard Albano (CE), James Ryan
Sponsor: Turner Construction Company

Open Banking Tracking & Insights
Nicholas Leslie (CS), Matthew Maguire (BU), Alexander Presser (CS), Danilo Ruberti (BU, DS), Gabriel Shiu (CS)
Advisors: Marcel Blais (MA), Adrienne Hall-Phillips, Wilson Wong (CS)
Sponsor: Citizens Bank

Optimizing Early Career Talent Forecasting and Allocation
Camden Harris (FT), Michael Sensat (CS), Taeha Song (CS, DS), Seyda Usalan (MGE), Arjun Venat (CS, DS)
Advisors: Marcel Blais (MA), Xin Gao, Adrienne Hall-Phillips, Wilson Wong (CS)
Sponsor: Fidelity Investments

Optimizing WooSox Ticket Sales and Fan Engagement Strategies
Justin Che (DS), Gavin George (BU), Jack Mahoney (DS), Akshay Shinde (DS), Nathan Willemsen (DS)
Advisors: Marcel Blais (MA), Adrienne Hall-Phillips
Sponsor: Worcester Red Sox

Return on Investment: Converting Efficiency into Profitability
Agustin Alzate (IE), Amrit Kaur (IE), Pedro Leao (DS), Jack O'Connell (BU), Matthew Rosenberger (DS, IE), Vaughn Weston (MIS)
Advisors: Fatemah Emdad (DS), James Ryan, Joe Zhu
Sponsor: Sonic Tools USA

Rx Refill Metrics & Prior Authorizations Dashboard
Kenyan Coleman (CS), Hannah Moran (MIS), Hanzalah Qamar (CS), Madison Quattlander (BU), Alexandr Samarin (CS), Deena Selitsky (DS)
Advisors: Marcel Blais (MA), Adrienne Hall-Phillips, Daniel Treku, Wilson Wong (CS)
Sponsor: Mass General Brigham

Saint-Gobain Abrasives: Optimizing the Finishing Process in Bond Plant 7
Aidan Eldridge (IE), Lauren Mitcheson (IE), Abigail Stack (IE), Sean Sullivan (IE)
Advisor: Walter Towner
Sponsor: Saint-Gobain

Sustainable Investments Return and Risk Expectations
Trajan Espelien (CS, MA), Andrew Kovacs (FT), Vu Le (CS), Brandon Lui (CS), Humza Qureshi (DS)
Advisors: Matthew Ahrens (CS), Marcel Blais (MA), Kwamie Dunbar, Daniel Treku
Sponsor: Green Future Wealth Management

Transdisciplinary Design of a Smart Insole for Regulating Shuffling Gait in Parkinson's Disease and Dementia with Lewy Bodies
Mithil Amin (ECE), Michael Gates (ECE), Victoria Grasso (MGE)
Advisors: Xinming Huang (ECE), Elizabeth Long Lingo
Sponsor: WPI ECE Department and UMass Medical School Geriatric Medicine

Chemical Engineering

POSTER SESSION, 9:00 A.M. – 11:30 A.M

Location Alden Hall

Exploring the Role of Food Processing in Transforming Apple Allergens
Samantha Grahn, Jordan Hodgson, Brian Leverock, Sarah Tozier
Advisor: Stephen Kmiotek

Limiting Air Emissions from Cannabis Prod with Biofiltration
William LaCourse, Abigayle McNamara
Advisor: Stephen Kmiotek

WPIPA
Carson Kershner, Devin Kunkel, Gregory Phillips, Noah Poulin
Advisor: Stephen Kmiotek

Investigating Soil Amendments for Mycoremediation of Heavy Metals
Paige Agostini, Val Corrente, Mya Darrow
Advisors: John Bergendahl (CEAE), Stephen Kmiotek, Elizabeth Stoddard (ESS)

Utilizing Microphotocatalytic Packed Beds for Industrial Pharmaceutical Applications
Lucas Anthony, Belle Sethachutkul
Advisors: Stephen Kmiotek, Andrew Teixeira

Fabricating Fruit Textures with Continuous Flow Spherification
Abbigaile Cote, Rachel Gealow
Advisor: Andrew Teixeira

Characterization and Post Processing of Medical Grade Quantum Dots
Chloe Hatstat, Oliver Johnson, Omer Roma, Carter Washock
Advisor: Andrew Teixeira

Solvolysis of Biomass Using Crude Methanol
Emma Neumann
Advisors: Stephen Kmiotek, Michael Timko, Alex Maag

Plastic to Chemicals
Marissa Burati, Amelia Montgomery, Kristine Roy
Advisors: Michael Timko, Alex Maag

Evaluating Bamboo as a Viable Feedstock for Hydrothermal Liquefaction: Product Analysis, TEA and LCA
Jackson Pelletier, Nick Tomasetti
Advisors: Michael Timko, Timothy Woodard

Optimizing Performance for UV Curable Resin from Recycled Canola Oil
Thomas Boyle (ME), Alaina Ehmer, Julia Spillane
Advisors: Alex Maag, Mehul Bhatia (ME)

Development of a Continuous Process for the Molten Salt Pyrolysis of Polystyrene
Paige Grisson, Ashley Hutchings
Advisors: Laila Abu-Lail, Ravindra Datta

Antimicrobial Efficiency of Lactoferrin Toward Staphyloccus Epidermis Biofilms
Nicole Calandra, Rayna Jacob
Advisor: Elizabeth Stewart

Transporter Engineering for Metabolism Optimization
Justin Roberts
Advisor: Eric Young

Paclitaxel Transporter Characterization
Aili Bray
Advisor: Susan Roberts

Varying the Wavelength of Light to Increase Growth Rate and Paclitaxel Production in T. Chinensis Plant Cell Cultures
Taylor Fiore
Advisor: Susan Roberts

Trophoblast Invasiveness Influencing Exosome Communication and Lipid Nanoparticle Delivery in the Placental Microenvironment
Kerstin Andrews, Adelyn Fisher
Advisor: Christina Bailey-Hytholt

High Energy Density Magnesium-Air Battery for Shipping, Rail and Aviation Electrification and Grid Storage
Grady Howell (ME), Peter Poulos, Konstantinos Saranopoulos (ME)
Advisors: Aaron Deskins, Adam Powell (ME)

Direct Carbon Fuel Cell for Efficient Negative Emissions Electricity
Eric Aimone, Jacob Fleischer, Matthew Ford, Casey LaMarca, Chris Pandapas (ME)
Advisors: Grant Burrier (SSPS), Adam Powell (ME)

Magnesium Production and Recycling for Clean Energy
Dimitry Blazy (ME), Jameson Courtney (ME), Sarah Fenton, Charles Logman, Connor Wirsing
Advisor: Adam Powell (ME)

Not Presenting in Chemical Engineering

Design of a Novel-Absorbing Composites for Impact-Resistant Transportation and Defense Applications
William Brownell, Elizabeth Goncalves, Isabella Ibrahim (ME), Pedro Salomao (ME)
Advisor: Diana Lados (ME), Anthony Spargenberger (ME)
Presenting in ME

Quantifying Residual Sources of PFAS
Megan Manning, Amelia McDonough (CEAE), Sophia Tomaselli (CEAE)
Advisors: John Bergendahl (CEAE), Stephen Kmiotek
** Presenting in CEAE**

Design of a 3D Printable, Scalable Biochar and Plastic-Based Composite Structure for Remediation
Anthony Gilbert, Nikolaus Pallis (CEAE)
Advisors: John Bergendahl (CEAE), Carrick Eggleston (CEAE), Brajendra Mishra (ME)
** Presenting in CEAE**

Ca-Intercalated 1DL with Cementitious Materials
Sean Corman
Ronald Grimm (CBC), Michael Timko
** Presenting in CBC**

Not Presenting

Adsorption Method for Gadolinium Species Differentiation

Stephen Kmiotek, Dr. Marie – Noelle Pons (University of Lorraine, Nancy France)
Anne Cater, Yashvi Gosalia

CBC/URPS

POSTER SESSION, 9:30am to 11:30am

Location: Campus Center Odeum

Title of Presentation: "Fabrication of Asymmetric Phosphatidylinositol/Phosphatidylcholine Mixed Vesticles"

Name: Hannah Ketelhohn (1)
Advisor: Arne Gericke

Title of Presentation: "Enhancing the Properties and Scalabilities of $Ti_3C_2T_x$ MXene: Covalent Functionalization for Tunable Optoelectronics and a Novel Air-Free Synthesis for Scalable Production"

Name: Olivia Dube (1)
Advisor: Ronald Grimm

Title of Presentation: "Monitoring the Interactions Between Human VPS45 and Syntaxin16"

Name: Roey Chen (1)
Advisor: Mary Munson and Luis Vidali

Title of Presentation: "Shedding Light on the Evolution of Highly Pathogenic Avian Influenza A H5N1 with Mutagenic Analysis"

Name: Sarah Durant (1)
Advisor: Jeremy Luban (Umass Chan) and Destin Heilman (WPI)

Title of Presentation: "Signals Associated with RIPK1/Caspase-8-Mediated Cell Death and Inflammation"

Name" Lauren Brooks (1)
Advisor: Dr. Egil Lien (Umass Chan) and Suzanne Scarlata (WPI)

Title of Presentation: "Surface Tethering of Heavy Metal Ligands on Silicon Surfaces"

Name: Amanda Haner (1)
Advisor: Ronald Grimm

Title of Presentation: "Modifying Caps on UiO-67 Post-Attachment and Computational Approaches to Quantify MOF Pore Size at Molecular Caps"

Name: Samuel Darer(1)
Advisor: Ronald Grimm and Dmitry Korkin

Title of Presentation: "Kirchhoff Graphical Representations of Reaction Systems Yield Mechanistic Insight"

Name: Grace Baumgartner (1)
Advisor: Ronald Grimm and Joseph Fehribach

Title of Presentation: "Synthesis of Flavylium Photocatalysts for Chromenone Functionalization"

Name: Joe Jiang (1)
Advisor: Anita Mattson

Title of Presentation: "Covalent Derivatization of Concrete Aggregate Surfaces with a Biomimetic Catalyst for Increased Strength and Self-Healing Behavior"

Name: Allison Morin (1)
Advisor: Ronald Grimm

Title of Presentation: "Analyzing the Impact of Excess Dietary Sugar on Metabolism in *Caenorhabditis elegans*"

Name: Mia Holroyd and Peter Allen (2)
Advisor: Carissa Olsen

Title of Presentation: "Cation intercalation in 1DL Titania: Applications in Lithium Storage and Cementitious Materials"

Name: Sean Corman (1)
Advisor: Ronald Grimm and Michael Timko

Title of Presentation: "Biofilm Information in Moving Fluids"

Name: Ryan Fischer (1)
Advisor: Christopher Lambert

Title of Presentation: "The Molecular Basis of Neuronal Transition Metal Homeostasis"

Name: Mackenzie Rae, Christian Wagner, and Madeline Young (3)
Advisor: Robert Dempski

Title of Presentation: "Determining the antimicrobial dosage of pH-responsive liposomes formulated to improve drug delivery to *Staphylococcus epidemidis*"

Name: Jane Tucker and Lindsey Gorham (2)
Advisor: Elizabeth Stewart, Christina Bailey-Hytholt, and Christopher Lambert

Title of Presentation: "Expression, Purification, and Analysis of Several Variants of Renalase: a Potential Target for Type 1 Diabetes"

Name: Fiona Morris (1)
Advisor: Nese Kurt-Yilmaz (Umass Chan) and Destin Heilman

Title of Presentation: "Renewed Research Into the Structure and Localization of the Human Torque Teno Virus VP3"

Name: Maxwell Seager, Clarice Stumpf, and Isabella Kirby (3)
Advisor: Destin Heilman

Title of Presentation: "Assessing Copper Removal Using Nucleic Acid Aptamers"

Name: Willa Royce-Roll (1)
Advisor: Natalie Farny and Jose Arguello

Sequestration of Pb (II), Cd (II), and Hg (II) Wastes"

Name: Madison Reiber and Demetrios Kennedy (2)
Advisor: Drew Brodeur

Title of Presentation: "Investigating the Role of Protein Structure in the Multimerization and Localization of *Circoviridae* Proteins: Insights for Cancer Therapeutics"

Name: Aileen Peddie, Samuel Hawthorne, and Margaret McCarthy (3)
Advisor: Destin Heilman

Title of Presentation: "Developing a Reagant to Induce Cell Apoptosis"

Name: Sarah Sponenberg (1)
Advisor: Suzanne Scarlata

Title of Presentation: "Cannabidiol and Oxidative Stress: Investigating ROS Modulation in *C. elegans* with Amyloid Beta Plagues"

Name: Chase Ouellette (1)
Advisor: Destin Heilman

Title of Presentation: "Exploring Plasmalogen Supplementation in Alzheimer's Models of Caenorhabditis elegans"

Name: Evan Dapsis and Yunxin Li (2)
Advisor: Carissa Olsen

Title of Presentation: "Solving the Puzzle of the Kekkon1 Binding Pocket"

Name: Jillian Crandall (1)
Advisor: Destin Heilman and JB Duffy

Title of Presentation: "Exploring the Effects of Cannabidiol on Reactive Oxygen Species in *C. elegans* with β-amyloid Expression as a Model for Alzheimer's Disease"

Name: Kaitlyn Bergeron
Advisor: Destin Heilman, Jill Rulfs, Michael Buckholt, and Jagan Srinivasan

Title of Presentation: "Bacterial Genome Engineering for Lead (PbII) Aptamer Expression"

Name: Erik Breiling (1)
Advisor: Natalie Farny (BBT) and Jose Arguello (CBC)

Title of Presentation: "Is the LD 1171 C. *Elegans* strain a model system for investigating the effects of CBD on Parkinson's Disease?"

Name: Lily Eldridge, Jenna Bushika, and Matthew LaSata (3)
Advisor:

Civil, Environmental, and Architectural Engineering

POSTER SESSIONS, 12:30pm-3:00pm

Kaven Hall

1. Hôpital Source de Vie
Benjamin Coe (AREN)
Marcos Legros (AREN)
Pratham Patel (AREN)
Spencer Romain (AREN)
Advisor: L. Albano, S. Farzin, N. Ma

2. Urban Cooling Infrastructure Design Informed by Social Network Data Modeling
Vanessa Sam (DS)
Zabelle Simmons (AREN)
Nicholas Sirota (AREN)
Kathy Tran (AREN + ME)
Kathleen Wang (DS)
Advisor: N. Ma, F. Murai, N. Rahbar

3. Auxetic Cementitious Composites
Mahmoud Ahmed (CE)
Advisor: N. Rahbar

4. Comparison of Light-Frame and CLT Construction
Alexander Abrahamsen (CE)
Lucas Amaral (CE)
Kolby Robertson (CE)
Advisor: L. Albano

5. Disaster-Resilient Building Design: Informing Context-Aware Window Choices with Computer Vision
Aidan Bryar (DS)
Sage Fredrich (AREN)
Jacquelian Ngo (AREN)
Collin Shields (CS)
Advisor: N. Ma, F. Murai

6. Intersection Redesign with CTDOT
Kaylee Carr (CE)
Natalie Leigh (CE)
James Mieszczanski (CE)
Charlie Szwartz (CE)
Advisor: S. LePage

7. Culvert Removal and Stream Restoration
Benjamin Hood (CE)
Madison Morales (EVE)
Zarrin Rahman (EVE)
Sarah Saeed (CE)
Advisor: J. Dudle

8. Feasibility of Phytoremediation to Improve Water Quality of Salisbury Pond
Josephine Fazio (EVE)
Emily Graves (EVE + ESS)
Sydney Kerivan (EVE)
Abigail Morris (ESS)
Advisor: J. Dudle

9. High Rise Wood Design
Allison Califano (CE)
Jimmy Espinal (CE)
Marcus Kowalski (AREN)
Tyler Wong (CE)
Advisor: T. El-Korchi, S. Van Dessel

10. Designing for Productivity, Exploring the Cognitive Impact of Architectural Design
Alissa Cloutier (AREN)
Meghan Lyle (DS)
Adrienne Saucier (AREN)
Advisor: M. Ahrens, S. Farzin

11. El Cano Project
Aaron Landry (CE)
Alison Lopez (AREN)
Hillary Quezada (CE)
Elion Sholla (CE)
Advisor: A. Sakulich

12. Feasibility and Design of Granular Activated Carbon (GAC) as a Technology Standard for Drinking Water
Ella Devault (CE)
Meghan Doane (EVE)
Advisor: H. Walker

13. Green Infrastructure for Urban Stormwater Mitigation
William Crawford (EVE)
Caitlyn Dasaro (EVE)
Mickey Mikitarian (EVE)
Ella Moreau (ESS)
Tanner Thatcher (EVE)
Advisor: P. Mathisen

14. Investigating Artificial Intelligence in Construction of Transportation Infrastructure
Akil Morris (CE)
Advisor: J. Rosewitz, J. Ryan

15. Mass Timber Bridge Design and Construction
Erin Brodigan (CE)
Gavin Chieff (CE)
Advisor: J. Rosewitz

16. MBTA Beltway Line
Thomas Burns (CE)
Eric DePiero (MME)
Nicholas Pye (CE)
Advisor: L. Albano, J. Ryan

17. Nanobubbles for Lake Restoration: Preliminary Feasibility and Design Aspects
Sophia Bogartz (EVE)
Advisor: H. Walker

18. Extent Of PFAS Contamination of Drinking Water Sources in Rhode Island
Rebecca Schultz (EVE)
Advisor: J. Bergendahl

19. Quantifying Residential Sources of PFAS
Megan Manning (CHE)
Amelia McDonough (CE)
Sophia Tomaselli (EVE)
Advisor: J. Bergendahl, S. Kmiotek

20. Quarry Concert Hall Design Competition
Ethan Camplese (AREN)
Eleanor Fields (AREN)
Felicia Link (AREN)
Lily Ratcliff (AREN)
Advisor: L. Albano, S. Farzin

21. Design of a 3D Printable, Scalable Biochar and Plastic-Based Composite for Heavy Metal Remediation
Anthony Gilbert (CHE)
Nikolaos Pallis (EVE)
Advisor: J. Bergendahl, C. Eggleston, B. Mishra

22. Regional Shared Use Path in the Town of Oxford
Jacqueline Herera (CE)
Advisor: L. Albano

23. Elevating Wellbeing: A New Vision for Health and Fitness
Anthony Cuccovia (CE)
Audrey Dino (CE)
Jack Duryea (CE)
Leah Kolb (AREN)
Advisor: T. El Korchi, S. Farzin

25. ACE Engineering Workshop: Kaven Hall Addition
Habibi Haji (AREN)
David Sullivan (AREN)
Benjamin Turner (AREN)
Advisor: S. Liu, J. Rosewitz, S. Van Dessel

26. Sanford Riley Hall Renovation
Jordan Brown (CE)
Margaret Johnston (CE)
Advisor: L. Albano

27. Self-sensing Construction Materials
Justin Liona (CE)
Jack Pszeniczny (CE)
Advisor: N. Rahbar

28. Sensory Driven Design
Veronica Crispin Garcia (AREN)
Elisia McLean (CE)
Peter Tzanetos (CE)
Alexis Vilmenay (AREN)
Advisor: L. Albano, S. Farzin

29. Long Span Structural Design with Glulam-CLT Composites
Aidan Behilo (CE)
Ryann Dionne (CE)
Amber Lyons (CE)
Advisor: L. Albano, M. Richard

30. Renovation of WPI Townhouses for Community Space
Keanna Bruce (AREN)
Jane Curtis (CE)
Annalise Maloney (CE)
Advisor: L. Albano, S. Van Dessel

31. Beaver Conflict Mitigation: Building Roadway Flooding Resiliency in W. Boylston
Mateo Blumenthal (EVE + ESS)
Hildey McCorkell (EVE)
Lydia Ponomarenko (EVE)
Laura Romania (EVE + ESS)
Advisor: J. Dudle

32. The Roman Dodecahedron: A Surveying Tool?
John Donovan (ME)
Maya Gallego-Borkowski (ME)
Elizabeth Howie (CE)
Cassandra Zimmerman (CE + ME)
Advisor: A. Sakulich

33. UP! Sustainable Vertical Expansion for Enhanced Campus Utilization
Dimitris Graikos (PHYS)
Brenna Hannam (AREN)
Tea Magner (AREN)
Amun Spears (CE)
Advisor: I. Stroe, S. Van Dessel

34. Redesigning Bus Transit in Worcester, Massachusetts
Aseel Kambal (CE)
Lottie McLeod (CE)
Oliver Nosal (CE)
Advisor: S. LePage

35. Entrance Evolution: Re-Envisioning WPI's Entry Points
Geethika Chandragiri (CE)
Stephanie Dean (CE)
Taylor Walker (CE)
Advisor: S. LePage, J. Rosewitz

Computer Science

POSTER SESSIONS
Innovation Studio, Second Floor
Session A: 10:00 am to 12:00 pm

Development of Open-source Educational Tools for Security Analysis of Integrated Circuits
Nathan Dynko, John Paul, Sharon Rose
Advisor: Fatemeh Ganji (ECE), Patrick Schaumont (ECE)

Second Brain: A Memory Support Application for Early Dementia Patients and Caregivers
Kayla Afonseca, Tanishka Dalavi, Ellena Dimitrova, Chloe Foucault
Advisor: Xiaoyan Sun, Xinming Huang (ECE)

Tools and Techniques for Cybersecurity Education
Katherine Jesse, Adelynn Martin, Piper O'Connell
Advisor: Robert Walls

EcoTarium Explorer: Enhancing Accessible Navigation
Parker Frizzle, Sophia Kalavantis, Arnav Mishra, Myles St. Jean
Advisor: Rodica Neamtu
Sponsor: EcoTarium

Memoria Altera
Ellys Gorodisch, Owen Knizak
Advisor: Rodney DuPlessis (IMGD), Michael Engling, Karen Stewart (IMGD)

HAM: Generative AI Engine for Streamlining RFI/RFP Processes
Alexsandra Antoski, Abelardo Broche Ortiz, Thomas McDonagh, Edward Smith, Joseph Thesmar
Advisor: Lane Harrison, Xiangnan Kong
Sponsor: Hamilton Company

Terraforma
Mackenzie Appleyard (IMGD), Thomas Branchaud, Jade Logan, Juliet Morin (IMGD), Andrew Simonini, Emanuel Sweeney
Advisor: Rodney DuPlessis (IMGD), Michael Engling, Edward Gutierrez (IMGD), Ben Schneider (IMGD)

7Factor 2024-2025: Staffing Tool/Project Force (Team 1)
Ansel Chang, Nick Rogerson, Nicolas Valentino, Ryan Wright
Advisor: Joshua Cuneo
Sponsor: 7Factor Software, LLC

An Exploration of Phishing and Hardware Key Multi-Factor Authentication
Jacob Glick, Maeve Norton, Jonathan Pantojas, Ian Poulsen, Jamie Rapal
Advisor: Craig Shue

Performance Architecture Team - PowerSense NVIDIA
Owen Rago, Alexander Samra
Advisor: Mark Claypool, Lane Harrison
Sponsor: NVIDIA
Project Center: Silicon Valley, CA

IQP Data Collection Tool
Christopher Lam, Christian Poulin, James Walden, Gustave Montana, Nathaniel Schneider
Advisor: Wilson Wong

Topic Detection in a Set of Documents using Large Language Models
Rajesh Ganguli, Amina Laddaoui, Khoi Pham, Sarah Semy, Kashvi Singh
Advisor: Roee Shraga
Sponsor: Haystack ID

AI-Driven Gameplay Footage Generation
Harry Radenberg, Elijah Rothschild, Simon Scott
Advisor: Gillian Smith

7Factor 2024-2026: Staffing Tool/Project Force (Team 2)
David Gobran, Cierra O'Grady, Alexander Rickards, Daniel Stoiber
Advisor: Joshua Cuneo
Sponsor: 7Factor Software, LLC

AR Glasses Application and Design for Education
Jake Olsen, Kenneth Smith, Samantha Yeung, Aarsh Zadaphiya
Advisor: Matthew Ahrens

7 Factor AWS Analysis
Esha Bajwa, Ezra Barboza , Nel Castelli , Noah Leibowitz , Samuel McCaffery
Advisor: Joshua Cuneo
Sponsor: 7Factor Software, LLC

Exploring the Coding Practices of Neurodiverse Students
Sarah Olson, Thomas Pianka
Advisor: Jacob Whitehill

Dual-Mode Language-Model Mobile Assistant: A Multilingual Application Integrated with InnoSpire Glasses for Supporting Visually Impaired and Blind Individuals
Yitao Hong, Andrew Mesa, Lianrui Sun
Advisor: Chun-Kit Ngan (DS)
Sponsor: InnoSpire Technology Limited

Optimizing Database Queries using Source Program Analysis
Qixing Xue
Advisor: Roee Shraga

Project BOCA
Saida Bahtierova, Ethan Chen, Chonlada DiMascolo, Adrian Johnson, Allison Lee, Mauricio Mergal, Alexandra Mintz, Immanuel Pabon, Camille Prats
Advisor: Matthew Ahrens, Farley Chery (IMGD), Edward Guttierrez (IMGD)

Advancing Climate Resilience in Worcester Through a "Cool Routes" Pedestrian Navigation Application
Katelyn Beirne, Jacob Friend, Anthony Previte
Advisor: Stephen McCauley (IGS), Chun-Kit Ngan (DS)

Mapping Global China: Visualization Design and Development
Rachel Foye, Justin Healey, Edward Stump, Jack Weinstein
Advisor: Lane Harrison, Jennifer Rudolph (HUA)
Sponsor: Mapping Global China

AI for Impact: App Development for Inferring Risk for Mental Distress and Suicide via Smartphones
Duncan Farquharson, Dana Granara, Emily Hudson, Priyanka Narasimhan, Anthony Titcombe, Alexander Zhang
Advisor: Elke Rundensteiner
Sponsor: CAPES NIH Center

Evaluating Control Assistance for Latency Compensation in Cloud-Based Racing Games
Francesco Di Mise, Jesse Kinsmann, Michael Neff
Advisor: Mark Claypool

PC Pets
Matthew Brown, Christian Consiglio, Parker Glispin
Advisor: Michael Engling

Exploration of Novel Methods for a More Efficient Implementation of the Feature Embedding Method
Andrew Brush, Zelin Hao, Kobe Richards, Jacob Silvester
Advisor: Torumoy Ghoshal

Assessing Performance Differences of Various Machine Learning Methods in Alzheimer's Detection Across Male and Female Structural MRI (sMRI) Data
Jackson Martinez Balcazar, Noah Martins, Mahir Sowad
Advisor: Dmitry Korkin, Benjamin Nephew (BBT), Angela Incollingo Rodriguez (SSPS)

Navigating Seasonality and Distribution Drift: Forecasting User Traffic for DraftKings
Aaron Brady, Alysha Creelman, Megan Gilman, Jane Howard, Erika Sojka
Advisor: Donald Brown (ECE), Randy Paffenroth
Sponsor: DraftKings

Overgrown
Emilia Krum, Vijay Mistry, Ryan Price, Nathaniel Prickitt, William Smith
Advisor: Adryen Gonzalez (HUA), George Heineman, Melissa Kagen (IMGD), Ben Schneider (IMGD)

SPI-Glass
Jason Kardon, Sumi Lew, Matthew Neuffer, Justin Smith
Advisor: Ben Schneider (IMGD), Matthew Ahrens

WPI & MGB Scribing, Rx Refills and Lab Abstraction
Kenyon Coleman, Hannah Moran, Hanzalah Qamar, Madison Quattlander, Aleksandr Samarin, Deena Selitsky
Advisor: Marcel Blais, Adrienne Hall-Phillips, Daniel Treku, Wilson Wong
Sponsor: Mass General Brigham
Project Center: WPI Fintech Project Center

Spiral Development to Post-Release 2025
Elijah DelCastillo (IMGD), Spencer Dill (CS), Justin Ignatowski (IMGD), Nha Hoang (IMGD), Samuel Wilensky (IMGD), Micah Vargas (IMGD+CS)
Advisor: Taylor Andrews (CS), Walt Yarbrough (IMGD)

Meissa Microgrid | Multi-Tenant Renewable Energy Monitoring Platform with Solar PV Tracker Controls
Edward Dang, Aliaa Hussein, Vien Le, Andrew Qi, Yinuo Zhao
Advisor: Berk Calli (RBE), Seyed Zekavat (Physics)
Sponsor: 360 Energy

Spatial-Temporal Multi-Tasking Model
William Abraham, Jeffrey Chan, Nicholas Ishigami
Advisor: Yanhua Li

Recommendation System for Event Planning
Aaron Zhang, Rishi Patel, Youssef Benchikhi, Kai Zhou
Advisor: Xiangnan Kong

FinTech Project B24 - Green Future Wealth Management - Sustainable Investments Return and Risk Expectations
Trajan Espelien, Andrew Kovacs, Humza Qureshi, Vu Le, Brandon Lui
Advisor: Matthew Ahrens, Marcel Blais (Math), Kwamie Dunbar (Business/DS), Daniel Treku (Business/DS), Wilson Wong
Sponsor: Green Future Wealth Management
Project Center: Fintech Project Center

Project Title: Disaster-Resilient Building Design: Informing Context-Aware Window Choices with Computer Vision
Aidan Bryar, Sage Fredrich, Jacquelian Ngo, Collin Shields
Advisor: Fabricio Murai, Nan (Nancy) Ma

Slicing the Hypercube
Blake Bruell, Nathaniel Itty, Ryan Offstein
Advisor: Daniel Reichman, Gabor Sarkozy

Citizens - Open Banking Tracking & Insights
Nicholas Leslie, Matthew Maguire, Alexander Presser, Danilo Ruberti, Gabriel Shiu
Advisor: Marcel Blais (Mathematical Sciences), Adrienne Hall-Philips (Business), Wilson Wong
Sponsor: Citizens Bank

Machine Learning in Cybersecurity
Sarah Kogan, Nathan Poch, Yang Yi
Advisor: Randy Paffenroth

CS: MQP: Harrison: ReVISit-ing the Classics: Evaluating A Framework for Replicable Data Visualization Experiments
Antonio Ferreira, Ashton Kittur, Abigail Kratman, Kayla Lem, Iris Nycz
Advisor: Lane Harrison

Building an AI Companion For Enhancing Financial Literacy
Ryan Dalton, Leo Hirano, Olivia Perez, Rohan Prasad, Andy Truong
Advisor: Marcel Blais (MA), Shubbhi Taneja, Daniel Treku (BUS), Wilson Wong
Sponsor: ProsperOn Inc.
Project Center: WPI Project Center

FinTech Project B24 - MGH-Brigham - IBO Enhancement
Lakshmi Gade, Luke Grady, Emma Paradis, Dhruv Patel, Shafath Zaman
Advisor: Marcel Blais (MA), Daniel Treku (BUS), Wilson Wong
Sponsor: Mass General Brigham
Project Center: Fintech Project Center

POSTER SESSIONS
Innovation Studio, Second Floor
Session B: 1:00 pm to 3:00 pm

SNAPT: SQL/NoSQL AI Powered Transpiler for Database Queries
Lucas Lamenha, Gabriel Olafsson, Ashleigh Perez, Alexander Siracusa, Hanna Trinh
Advisor: Rodica Neamtu, Wilson Wong

Colombian Factory Management: Developing Mobile and Web Applications for Payroll and Employee Management
Jess Elmhurst, Sophia Woodward
Advisor: George Heineman, Lina Muñoz-Márquez
Sponsor: CincoE

A Language Anchor-Guided Method for Robust Noisy Domain Generalization
Zilin Dai
Advisor: Ziming Zhang

CS MQP: Studying Privacy Protection Landscape for Web and Mobile Platforms
Henry Hribar, Kendall Hulbert, Winston Lewis, Aashi Mehta, Conor Slattery
Advisor: Grant Burrier (Integrative & Global Studies), Craig Wills

Making The Prosetta Esolang
Flynn Duniho, Milo Jacobs, Nate Westfall
Advisor: Charlie Roberts

A Spiral Development MQP for the 2024-2025 WPI
Spencer Dill, Micah Vargas
Advisor: Taylor Andrews (CS), Walt Yarbrough (IMGD)

ADArC: A Web-based Automated Circuit Designer and Code Generator for Arduino Circuits
Myles Ku, Aaron Mar, Carlos Medina, Braden Swain, Giovanni Larson Vasquez
Advisor: David Brown, Pradeep Radhakrishnan (ME)

Analyzing the Impact of Frametime Spikes on Navigation-Based Tasks in 2D Platformers
Nathan Anderson, Jonathan Asher, Connor Chartier
Advisor: Mark Claypool
Sponsor: NVIDIA Corporation

Computational Simulations of Moving Objects
Joseph Caproni, Shawn Greenwood, Sean Thornton
Advisor: Jennifer Mortensen

Paying It Back: The Impact of Data Visualization on Loan Repayment Behavior
Amanda Blanchard, Ryan Dillon, Kylie Flerlage, Selina Tran
Advisor: Daniel Reichman, Lane Harrison

ARFlow+: Multi-Device AR Experimentation Framework
Khang Luu, Thinh Nguyen
Advisor: Tian Guo

Bridging Intelligent Tutoring Systems and Chatbots: Development and Evaluation of a Conversational AI Tutor (CAIT)
Ryan Nguyen, Cody Rueda, Cam Robbins
Advisor: Neil Heffernan

Accelerating and Standardizing Robotics Development Through Platform & Frameworks
Skyler Wiernik
Advisor: Taylor Andrews, Pradeep Radhakrishnan (ME)

Operating Systems Isolation
Ryan Hunter, Alton Miles, Steven Oliner, Zachary Rioux
Advisor: Craig Shue

Local and Remote Control of a Raspberry Pi for Signal Generation Equipment
Thea Caplan, Stryder Crouse, Audrey Mongillo
Advisor: Lane Harrison
Sponsor: Applied Signal Technology
Project Center: Silicon Valley, California Project Center

Improving Automated Coronal Hole Detection Algorithms through Coronal Hole Annotation using Semi-automatic Methods
Cutter Beck
Advisor: Rudra Kafle (PH), Khagendra Katuwal (NMSU), Jacob Whitehill

Text-to-Speech 3D Modeling
Rawindhya Hettiarachchi
Advisor: Ziming Zhang (ECE)

Expanding Human-Robot Interaction in an Open-Source, Toddler-Sized 3D-Printed Humanoid Robot: YOLO-Based Vision, Voice Commands, and Gripper-Based Manipulation
Elowyn Akers, David Alex, Shiivek Agarwal, An Phan, Preston Van Fleet
Advisor: Taylor Andrews, Pradeep Radhakrishnan (MME & RBE & ECE)

PMKS+: An Application for Generating and Analyzing Planar Linkages
Jeremy Bornstein, Gabriel Curet-Irizarry, Javier DeLeon, Matthew Gatta, Sebastian Gurgol
Advisor: David Brown (CS), Pradeep Radhakrishnan (ME)

Docker + Checkpoint/Restore for Tegra Chip Simulators
Sapphire Hu, Vivek Voleti
Advisor: Mark Claypool, Lane Harrison
Sponsor: NVIDIA
Project Center: Silicon Valley Project Center

GraphRAG vs. RAG: A Comparative Evaluation of LLM Performance
Anna Balin, Andrew Cash, Roberto Sabater, Inaya Siddiqui, Katie Strogach
Advisor: Shamsnaz Bhada (ECE), Marcel Blais (MA), Wilson Wong
Sponsor: TPG Angelo Gordon

Beyond the Visual - enhancing the exploration of the Worcester Art Museum with mobile applications for people with disabilities
Timory Goggin, Blake McLeod, Julie Vieira
Advisor: Francesca Bernardi (MA), Rodica Neamtu
Sponsor: Worcester Art Museum, EcoTarium

Modeling of High Density Crowds: Agent-Based Modeling
April Bollinger, Arayah Remillard, Brendan Sheehan
Advisor: Jennifer Mortensen, Kun-Ta Wu (PHYS)

Enhancing Ground Station Visualization Capability in the Space Flight Domain
Haley Slaney, Timothy Stecko
Advisor: George Heineman
Sponsor: MIT Lincoln Laboratory
Project Center: MIT Lincoln Laboratory - Lexington, Massachusetts Project Center - MQP

Server-Side System Call Filtering and Enforcement for Cyberattack Mitigation
Lily Bromberger, Ella Dunne, Keaton Mangone, April Zingher
Advisor: Jun Dai

Co-Designing MathFlowLens: a Teacher-Focused Tool for Identifying Strategic Thinking in Mathematics
Christian Rua
Advisor: Erin Ottmar (LST), Roee Shraga
Sponsor: NSF

Policy Analysis with Generative AI: Harnessing Language Models and System Dynamics for Deeper Insights
Michael Alicea, Romish Khatri, Hongye (Phoebe) Li, Luca Makarushka-Napp, Elizabeth McGinn, Meenakshi Meyyappan
Advisor: Crystal Brown (SSPS), Xiaozhong Liu, Raha Moraffah, Oleg Pavlov (SSPS)

Congestion Control over a Satellite Network
Sam Ollari, Benjamin Skarnes
Advisor: Mark Claypool
Sponsor: Viasat

Analyzing System-Level Behaviors of Malware
Maryna Ilyanok, Kai Kaufman, Brooke Podlipec, Cara Salter
Advisor: Xiaoyan Sun

Personalized Music Listening Habit Visualization Application
Ivy Bixler, Ava Chadbourne, Samuel Randa, Michael Sterk
Advisor: Matthew Ahrens, Taylor Andrews

Rare Phenomena in Quantum Walks
Jake Brady, Peter Cancilla (ISP), Kristen Heller
Advisor: Bill Martin (MA), Hanmeng Zhan

Wedding Planning Simulator
Ananya Jayamoorthy, Alexandra Mahany, Elizabeth Papa, Kruti Shah, Bryan Suria
Advisor: Rose Bohrer, Adryen Gonzalez (HUA), Matthew Scinto (HUA)

Researching and Analyzing a Ghanaian board game
Bernhardt Adler, Will Sakalauskas
Advisor: Brigitte Servatius (MA), Herman Servatius

Secure WPI Imager Integrated circuit (IC) Design
Hubert Liu, Kelu Liu Frankie Marrocco, Philip Miu, Yuran Xue
Advisor: Arslan Ay Sakire, Suat Ay

Building and Testing Underwater Drones
Taniya Crosby, Marc Donahue, Sofia Eckerson, Samantha Germano, Ben Perrin, Mir Valentine
Advisor: Ahmet Sabuncu (ME), Shubbi Taneja
Sponsor: General Dynamics Electric Boat

Generating Biological Knowledge with Large Language Models
Kashish Gupta, Najum Soofi
Advisor: Dmitry Korkin

Song Slicer: An Application for Evaluating and Implementing Music Structure Algorithms
Vincent Boothroyd, Seth Frank, Gibson Phillips
Advisor: Scott Barton (HUA), Jacob Whitehill

FPGA Accelerated SAT Solver
Colin Streck
Advisor: Koksal Mus (CS), Herman Servatius

Modifying Caps on UiO–67 Post-Attachment and Computational Approaches to Quantify MOF Pore Size at Molecular Caps
Samuel Darer
Advisor: Ronald Grimm (CBC), Dmitry Korkin

PolySolve Calculator
Alexander Gu, Conner Olsen
Advisor: Randy Paffenroth

Data Science Program

POSTER SESSION, 2:30pm to 4:00pm
Unity Hall 400

FATE: A Fourier Accelerated Tensor Engine for Neural Networks
Jack Adiletta (DS/ECE)
Advisor: Ulkuhan Guler & Bashima Islam

Urban Cooling Infrastructure Design Informed by Social Network Data
Kathleen Wang (DS), Zabelle Simmons (Arch Eng), Nicholas Sirota (Arch Eng), Kathy Tran (ME/Arch Eng), & Vanessa Sam (DS)
Advisor: Fabricio Murai, Nan (Nancy) Ma, Nima Rahbar

Navigating Seasonality and Distribution Drift: Forecasting User Traffic for DraftKings
Aaron Brady (DS), Jane Howard (DS), Alysha Creelman (DS), Erika Sojka (DS), & Megan Gilman (CS)
Advisor: Rick Brown & Randy Paffenroth

FinTech Project B24 - GFWM - Sustainable Investments
Humza Qureshi (DS), Vu Le (CS/DS), Trajan Espelien (CS/Math), Brandon Lui (CS), & Andrew Kovacs (FinTech)
Advisor: Marcel Blais, Kwamie Dunbar, Matthew Ahrens, & Wilson Wong

MGH-Brigham: Scribing, Rx Refill and Lab Abstraction Metrics
Deena Selitsky (DS), Kenyon Coleman (CS), Hanzalah Qamar (CS), Hannah Moran (MIS), Aleksandr Samarin (CS), & Madison Quattlander (BUS)
Advisor: Wilson Wong, Adrienne Hall-Phillips, Daniel Treku, Kwamie Dunbar, & Marcel Blais

Spatial-Temporal Multi-Tasking Model
William Abraham (DS), Jeffrey Chan (DS), & Nicholas Ishigami (CS)
Advisor: Yanhua Li

AI for Impact: App Development and Deep Learning for Inferring Risk for Mental Distress and Suicide via Smartphones
Anthony Titcombe (CS), Priyanka Narasimhan (CS), Alexander Zhang (CS), Emily Hudson (CS/Math), Dana Granara (CS/Math), Duncan Farquharson (DS)
Advisor: Elke Rundensteiner & Randy Paffenroth

Building an AI Companion For Enhancing Financial Literacy
Ryan Dalton (DS), Rohan Prasad (DS), Andy Truong (CS), Olivia Perez (CS), Leo Hirano (CS)
Advisor: Wilson Wong, Marcel Blais, & Shubbhi Taneja

Citizens - Open Banking Tracking & Insights
Danilo Ruberti (BUS/DS), Matthew Maguire (BUS/DS), Nicholas Leslie (CS), Alexander Presser (IMGD), & Gabriel Shiu (CS)
Advisor: Adrienne Hall-Phillips, Marcel Balis, & Wilson Wong

Disaster-Resilient Building Design: Informing Context-Aware Window Choices with Computer Vision
Collin Shields (CS), Jacquelian Ngo (Arch Eng), Sage Fredrich (Arch Eng), & Aidan Bryar (DS)
Advisor: Fabricio Murai & Nan (Nancy) Ma

CS: MQP: Generative AI Engine for Hamilton Storage (Sponsored MQP)
Edward Smith (CS/DS), Joseph Thesmar (CS), Alexsandra Antoski (CS), Abelardo Broche Ortiz (CS), & Thomas McDonagh (CS)
Advisor: Lane Harrison & Xiangnan Kong

CS: MQP: Harrison: ReVISit-ing the Classics: Evaluating A Framework for Replicable Data Visualization Experiments (2024-2025)
Iris Nycz (DS), Abigail Kratman (CS), Ashton Kittur (CS), Antonio Henrique Costa Ferreira (CS), & Kayla Lem (CS)
Advisor: Lane Harrison

CS: MQP: Mapping Global China: Visualization Design and Development
Rachel Foye (DS), Jack Weinstein (CS), Edward Stump (CS), & Justin Healey (CS)
Advisor: Lane Harrison

EcoTarium Explorer: Enhancing Accessible Navigation
Arnav Mishra (CS/DS), Myles St. Jean (CS), Parker Frizzle (CS), & Sophia Kalavantis (CS)
Advisor: Rodica Neamtu

Assessing Performance Differences of Various Machine Learning Methods in Alzheimer's Detection Across Male and Female Structural MRI (sMRI) Data
Noah Martins (DS), Mahir Sowad (CS), & Jackson Martinez Balcazar (CS)
Advisor: Angela Incollingo Rodriguez, Benjamin Nephew, & Dmitry Korkin

Designing for Productivity, Exploring the Cognitive Impact of Architectural Design
Meghan Lyle (DS), Alissa Cloutier (Arch Eng), & Adrienne Saucier (Arch Eng)
Advisor: Matthew Ahrens & Soroush Farzin

Return on Investment: Converting Efficiency into Profitability
Pedro Leao (DS), Matthew Rosenberger (DS/IE), Vaughn Weston (MIS), Agustin Alzate (IE), Amrit Kaur (IE), Jack O'Connell (BUS)
Advisor: Fatemeh Emdad, Jim Ryan, & Joe Zhu

Distributed Computing for Association Analysis of Whole Genome Sequencing Data
Kylie Hoar (BCB/DS) & Peter Howell (BCB)
Advisor: Zheyang Wu

POSTER SESSION, 2:30pm to 4:00pm
Unity Hall 500

Exploration of Novel Methods for a More Efficient Implementation of the Feature Embedding Method
Zelin Hao (DS), Kobe Richards (DS), Andrew Brush (DS), & Jacob Silvester (CS)
Advisor: Torumoy Ghoshal

Fidelity FMT - Create The Fidelity Metrics Store
Mansi Gera (DS), Sophia John (CS), Harshith Iyer (CS), John Chau (DS/Man Eng), & Halim Faker (BUS/IE)
Advisor: Marcel Blais, Renata Konrad, Joshua Cuneo, Wilson Wong, & Xin Gao

Fidelity Investments: Early Career Portal
Taeha Song (CS/DS), Michael Sensat (Man Eng), Camden Harris (FinTech), & Seyda Usalan (CS)
Advisor: Wilson Wong, Kwamie Dunbar, Marcel Blais, & Xin Gao

FinTech Project B24 - MGH-Brigham - IBO Enhancement
Lakshmi Gade (DS), Emma Paradis (DS), Luke Grady (CS), Shafath Zaman (CS), & Dhruv Patel (CS)
Advisor: Wilson Wong & Marcel Blais

Dual-Mode Language-Model Mobile Assistant: A Multilingual Application Integrated with InnoSpire Glasses for Supporting Visually Impaired and Blind Individuals
Andrew Mesa (CS/DS), Yitao Hong (CS), & Lianrui Sun (CS)
Advisor: Chun-Kit Ngan

Intelligent Drone-Based GPR for Root-Zone Soil Moisture Characterization: Data Collection and Analysis
Charlotte Larson (DS), Dylan Hoffman (DS), & Patrick Hussey (DS)
Advisor: Doug Petkie & Seyed Zekavat

Slicing the Hypercube
Nathaniel Itty (CS/DS), Ryan Offstein (CS), & Blake Bruell (CS)
Advisor: Daniel Reichman & Gabor Sarkozy

Machine Learning in Cyber Security
Yang Yi (DS), Sarah Kogan (CS), & Nathan Poch (Math)
Advisor: Randy Paffenroth

Meissa Microgrid | Multi-Tenant Renewable Energy Monitoring Platform with Solar PV Tracker Controls
Edward Dang (CS/DS), Vien Le (CS), Yinuo Zhao (CS/RBE), Andrew Qi (ME), Aliaa Hussein (RBE)
Advisor: Berk Calli & Seyed Zekavat

Monitoring Indoor Heat Stress Using Cellphones During Extreme Heat
Sander Coscia (DS), Sam Chiu (DS), & Hazel Green (CS)
Advisor: Shichao Liu & Ziming Zhang

Optimizing Database Queries using Source Program Analysis
Qixing Xue (CS/DS)
Advisor: Roee Shraga

Advancing Climate Resilience in Worcester Through a "Cool Routes" Pedestrian Navigation Application
Jacob Friend (DS/ESS), Katelyn Beirne (DS), & Anthony Previte (CS)
Advisor: Chun-Kit Ngan & Stephen McCauley

Optimizing WooSox Ticket Sales and Fan Engagement Strategies
Justin Che (DS), Akshay Shinde (DS), Nathan Willemsen (DS), Jack Mahoney (DS/Man Eng), Gavin George (BUS)
Advisor: Adrienne Hall-Phillips & Marcel Blais

Predicting Students' Mental Health Using Facial Expression Data
Aiden Johnson (DS), Dylan Grady (DS), Rosaline Guo (CS/Math), Dale Asante (CS/Psy Sci), Pegah Emdad (BCB/DS)
Advisor: Elke Rundensteiner, Kaitlyn Schneider, Oren Mangoubi, & Shichao Liu

Neural Imaging Classification and Feature Importance
Olivia Cava (DS)
Advisor: Randy Paffenroth

Principal Score Modeling for the Survivor Average Treatment Effect
Sean Sullivan (Act Math/DS)
Advisor: Adam Sales

Recommendation System for Event Planning
Kai Zhou (DS), Rishi Patel (CS), Youssef Benchikhi (CS), & Aaron Zhang (CS)
Advisor: Xiangnan Kong

Topic Detection in a Set of Documents using Large Language Models
Kashvi Singh (DS), Raj Ganguli (CS), Khoi Pham (CS), Sarah Semy (CS), Amina Laddaoui (DS)
Advisor: Roee Shraga

Evaluating Machine Learning Models for Autism Detection: A Structural MRI Study of Male vs. Female Brain Patterns
Alisha Peeriz
Advisor: Angela Incollingo Rodriguez, Benjamin Nephew, & Dmitry Korkin

Electrical and Computer Engineering

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

Adaptive Beamforming for Anti-Jamming
Rachel Donati, Oly Holguin
Advisor: Bo Tang

AI Powered 3D Facial Generation for Robotic Interface
Michael Dugan, William Tyrrell
Advisor: Bo Tang

Automation of Photon Emission Analysis: Pipeline for Hardware Security
Spencer Harding, Keegan Kuhn, Scott West
Advisors: Fatemeh Ganji, Shahin Tajik

Autonomous Surface Vehicle for Shallow Water Bathymetry
Marcel Guzik, Michael Dodge, Ibraheim Ibraheim, Melissa Perry
Advisors: Donald Brown, Zane Weissman

Design and Test of a Transcutaneous Oxygen Sensor Prototype
John Lemieux (ECE & CS)
Advisor: Ulkuhan Guler

Design of a Hybrid Renewable Microgrid System for Remote Populations
Elie DeLaVille, Alexander Galvin, Thomas Rua, Domenic Sena, Vincent Vu
Advisor: Gregory Noetscher

Design of a Wireless EMG/ECG Device with Applications in Myoelectric Prostheses Control
Emma Barnes (ECE/BME), Madison Boutin (ECE/BME), Kimberly Huang, Anastasii Likhanova (ECE/BME)
Advisors: Ted Clancy, Taimoor Afzal (BME)

Developing an Intelligent System for Maximizing Photovoltaic Array Output Power Based on Varying Environmental Conditions
Saketh Dinasarapu, Frank Parsons, Kyle Rabbitt, Micaela Tourtellot
Advisor: Gregory Noetscher

Developing Hybrid Renewable Solutions for Residential Living
Lexi Carim, Sage Curtis, Julia Colucci, Fraser Milligan (ME)
Advisor: Pradeep Radhakrishnan (ME, RBE)
Sponsor: Matthew Jette

Development of an MRI-Compatible Mock Circulatory Loop
Jean-Luc Bourget, John Mahoney
Advisors: Sergey Makaroff, Zhenglun Wei (BME)
Sponsor: PracticePoint

Development of Secure CMOS Image Sensor
Hubert Liu (ECE/CS), Kelu Liu (ECE/CS), Francesco Marrocco, Philip Miu, Yuran Xue (CS)
Advisors: Sakire Arslan Ay (CS), Suat Ay, Ibrahim Bozyel , Ulkuhan Guler
Sponsor: National Science Foundation

Digital Twin Apparatus
Ava Gaughan (ME), Dang K. Nguyen
Advisor: Zhu Mao (ME)

Enhancing Electrical Vehicle Efficiency Through Power Electronics
Nathan Cloutier
Advisor: Ziming Zhang

The Establishment of Green Meadow Elementary School, in Maynard, MA
Monica Doan, Kristina Meneses
Advisor: Greg Noetscher

Faraday Cage for Removing Electromagnetic Interference (EMI) for Electrophysiological Experimentation
Steven Hess
Advisors: Sergey Makaroff, Padma Sundaram (Assistant Professor, Harvard Medical School)

FATE: A Fourier Accelerated Tensor Engine for Neural Networks
Jack Adiletta (ECE, DS)
Advisors: Ulkuhan Guler, Bashima Islam

Formula SAE Electric Racecar: 2024-2025
Eric Hughs-Baird (ECE,/CS), Liam Jennings (CS), Samantha LeBlanc (ME), Amanda Lota (ME), Pari Mandalapu (ME), Sean Obert (ME), Syrena Prytko, Steve Rosario (ME/RBE), Sage Ugras (ME)
Advisors: William Michalson (ECE, RBE, ME, CS), Andre Rosario (RBE)

GaN-Based DC/DC Converter for Fuel Cell Applications
Dominic Brunetti, Eli Budde, John Clendenin, Bora Hurst, Sara Kelly, Vanessa Narciso
Advisor: Greg Noetscher
Sponsor: Honeywell

GraphRAG vs. RAG: A Comparative Evaluation of LLM Performance
Anna Balin (CS/MA), Andrew Cash (CS), Roberto Sabater, Inaya Siddiqui (MA), Katie Strogach (CS)
Advisors: Shamsnaz Bhada, Marcel Blais (MA), Wilson Wong (CS)

Hardware Accelerated Super Resolution
Diyar Aljabbari, Will Buchta (ECE/CS), Parker Langa, Parker Lavering (CS), Adam Spencer
Advisor: Patrick Schaumont

Isolated-String Electric Guitar Transducer
Samuel Forero Miranda, Rachel Turman
Advisors: V.J. Manzo (HA), Alexander M. Wyglinski

Measurement Techniques of High Quality Factor Micro Ring Resonators on Photonic Integrated Circuits
Joshua Andrade, Maria Bechwati, Christelle El Bitar (PH)
Advisors: James Eakin (PH), Doug Petkie (PH)

SCApegoat: Expanding Side-Channel Analysis Research Through Open-Source Tools
Nathan Dynko (CS), Sharon Rose John Paul
Advisors: Fatemeh Ganji, Patrick Schaumont

Sound Source Localization System
Lucca Chantre (CS), Philip Heney (CS/RBE), Drew Trust
Advisor: Bo Tang

Transdisciplinary Design of a Smart Insole for Regulating Shuffling Gait in Parkinson's Disease and Dementia with Lewy Bodies
Mithil Amin, Michael Gates, Victoria Grasso (BUS)
Advisors: Xinming Huang, Elizabeth Lingo (BUS)

Uninterruptible Power Supply Design: Theoretical and Simulated Modeling of Buck and Boost Converters
Francisco Diaz, Daniel Lenshin
Advisor: Bo Tang
Sponsor: Schneider Electric

Humanities & Arts

Unity Hall Room 520

12:00pm
Welcome
Kathryn Moncrief, HUA Department Head

12:10pm
Finding my Way Through the Wood: stage Managing *A Midsummer Night's Dream*
Lauren Braconnier
Advisor: Laura Eckelman

12:30pm
A Case Study in the International Inability to Regulate Human Rights Abuses Committed Through the Use of Surveillance Technologies
Aashi Mehta
Advisor: Peter Hansen

12:50pm
Variable Tilt-Axis Wind Turbine (VTAWT)
Kemal Rifky
Advisor: Peter Hansen

Interactive Media and Game Development

Fuller Labs Upper Perreault Hall

12:30pm
Memoria Altera
Ellys Gorodisch, Keenan Jones, Hayden Padula, Caleb Prouty, Ben Skiba
Advisor: Rodney DuPlessis, Michael Engling, Karen Stewart

12:45pm
Overgrown
Emilia Krum, Vijay Mistry, Nathaniel Prickett, Ryan Price, William Smith
Advisor: Adryen Gonzalez, George Heineman, Melissa Kagen, Ben Schneider

1:00pm
Project Boca
Saida Bahtierova, Ethan Chen, Chonlada DiMascolo Allison Lee, Alexandra Mintz, Immanuel Pabon, Camille Prats
Advisor: Matthew Ahrens, Farley Chery, Ed Gutierrez

1:15pm
Midnight Oil
Alexander Barker, James Cannon, Anthony DiRuzza, Brittany Ficarra, Mauricio Mergal
Advisor: Charlie Roberts, Ralph Sutter

1:30pm
Break

1:45pm
Hypotheon
Gabbie Eng, Wade Greiner, Alexander McInerney, Owen Pugh, Ryan Waters, Ethan Wilson
Advisor: Adryen Gonzalez, Ed Gutierrez, Karen Stewart

2:00pm
TerraForma
Mackenzie Appleyard, Thomas Branchaud, Jade Logan, Juliet Morin, Andrew Simonini, Emanuel Sweeney
Advisor: Rodney DuPlessis, Michael Engling, Ed Gutierrez, Ben Schneider

2:15pm
Third Culture Threads
Tanya Ali
Advisor: Gillian Smith, Yunus Telliel

2:30pm
Break

2:45pm
SPI-Glass
Jason Kardon, Sumi Lew, Matthew Neuffer, Justin Smith
Advisor: Matthew Ahrens, Ben Schneider

3:00pm
And The World Went Dark
Bashar Alqassar, Raeda Baird, Logan Boutwell, Daniel Brower, Grace Phillips, Perla Walling-Sotolongo
Advisor: Ben Schneider

3:15pm
Japan Project Center 2025
Mia Bourguignon, Audrey Gross, John Sheeran
Advisor: Ralph Sutter

3:30pm
Wedding Bells
Ananya Jayamoorthy, Alexandra Mahany, Elizabeth Papa, Kruti Shah, Bryan Suria
Advisor: Rose Bohrer, Adryen Gonzalez, Matthew Scinto

3:45pm
Break

4:00pm

Spiral Development 2025

Elijah DelCastillo, Nha Hoang, Justin Ignatowski, Micah Vargas, Samuel Wilensky

Advisor: Taylor Andrews, Walt Yarbrough

4:15pm

Prosetta

Flynn Duniho, Milo Jacobs, Nate Westfall

Advisor: Charlie Roberts

4:30pm

Latency and Jitter Compensation for Cloud-based Game Streaming

Francesco Di Mise, Jesse Kinsmann, Michael Neff

Advisor: Mark Claypool

4:45pm

The Terrorbirds

Kyla Driscoll, Colin Gallagher, Owen Lacey, Christopher Mason, Quinn Sandberg

Advisor: Melissa Kagen, Gillian Smith

Mathematical Sciences Dept.

Stratton Hall 201

PRESENTATIONS, 9:00am to 1:40pm

9:00am

AI for Impact: Developing the LEMURS Mental Health Screening Smartphone App

Emily Hudson, Dana Granara

Advisor: Randy Paffenroth, Elke Rundensteiner

09:12am

GraphRAG vs. RAG: A Comparative Evaluation of LLM Performance

Anna Balin, Inaya Siddiqui, Andrew Cash, Katie Strogach, Roberto Sabater

Advisor: Marcel Blais, Wilson Wong, Shamsnaz Bhada

09:24am

Title

Trajan Espelien

Advisor: Marcel Blais

09:36am

Reconstruction of Current Density in MXenes using Magnetic Field Data from Quantum Sensors

Camille Williams, Sona Hanslia

Advisor: Vadim Yakovlev, Kateryna Kushnir Friedman, Raisa Trubko

9:48am

Optimal Defect Layer Position In Electromagnetic Energy Absorbers

Zachary Adams

Advisor: Burt Tilley, Vadim Yakovlev

BREAK, 10:00am to 10:12am

10:12am

Marketing Analysis for Music

Aayan Krishan, Nate Kaalman, Keyang Li, Paige Scully

Advisor: Fangfang Wang, Frank Zou

10:24am

FPGA Accelerated SAT Solver

Collin Streck

Advisor: Herman Servatius

10:36am

Analyzing a Ghanaian Board Game

William Sakalauskis, Bernhardt Adler

Advisor: Brigitte Servatius, Herman Servatius

10:48am

Unique and Stable Determination of a Crack in a Half Space Governed by Laplace's Equation

Karl Ramus

Advisor: Darko Volkov

11:00am

Scalable Solver for Helmholtz Equation

Nicholas Kirby

Advisor: Marcus Sarkis-Martins

11:12am

Derivation of a general solution to the Euler-Bernoulli Beam Equation using the similarity transformation method.

Will Perri

Advisor: Bill Sanguinet

BREAK, 11:24am to 11:36am

11:36am

Polysolve, a Graph-Based Calculator

Alexander Gu, Conner Olsen

Advisor: Randy Paffenroth

11:48am

Changes in Radiomic Feature Outputs

Ronit Avadhuta

Advisor: Brigitte Servatius, Herman Servatius

12:00pm

Kirchhoff Graphs Hold Chemical Meaning

Grace Baumgartner

Advisor: Joseph Fehribach, Ronald L. Grimm

12:12pm

Developing a Thermal Energy Storage System for Energy Efficiency

Matthew Lydon

Advisor: Burt Tilley, Mehdi Mortazavi

12:24pm

Investigation of cortical vs rat ionic channels in transcranial magnetic stimulation simulations

Jared Seehusahai

Advisor: Bill Sanguinet

BREAK, 12:36pm to 12:48pm

12:48pm

Franchise Value and Interest Rate Sensitivity

John King

Advisor: Barry Posterro and Jon Abraham

1:00pm

Machine Learning in Cyber Security

Nathan Poch, Yi Yang, Sarah Kogan

Advisor: Randy Paffenroth

1:12pm

Equivalent resistances in finite and infinite dual graphs

Lil Peeler

Advisor: Brigitte Servatius, Mostafa Asheghan

1:24pm

Toward Discrete, Incomplete Market Cost Efficiency

Konrad Gomez-Haibach

Advisor: Stephen Sturm

Mechanical and Materials Engineering (MME) Department Projects

Time: 8.30am – 12pm (Harrington Auditorium)

1. Soggy-Free Food Container MQP
Students: Melissa Hasbrouck, Grace Maund, Julia Horrocks, Ava Labik, Molly Cronin, Rebecca Emme
Advisor: Mehdi Mortazavi

3. Tremor Reduction Device Using Vibrational Stimulus
Students: Elizabeth Bowman, Brendan May, Devin Kachadoorian
Advisor: Karen Troy

4. Designing a UUV and Updating a Parametric Design Tool
Students: Taniya Crosby, Marc Donahue, Sofia Eckerson, Samantha Germano, Benjamin Perrin, Mir Valentine
Advisors: Ahmet Sabuncu, Taneja Shubbhi
Sponsor: General Dynamics Electric Boat

5. Smart Thermal Management with EHD: From Earth to Orbit
Students: Ziyad Ali, William Cifone, Collin Mello, Aabid Peermohammed
Advisor: Jamal Yagoobi
Sponsor: National Aeronautics and Space Administration (NASA)

6. Design & Prototyping of a Low-Cost Lawn Waste Clean-Up Robot
Students: Grace Audette, Sean Hart, Aman Khalifa
Advisor: Joe Stabile

7. Prototyping a Variable Tilt-Axis Wind Turbine
Students: Nathan Oneill, Nathan Rubio, Kathryn Juliuson, Kemal Rifky
Advisors: Aswin Gnanaskandan, Ahmet Sabuncu

8. Formula SAE Electric Racecar: 2024-25
Students: Amanda Lota, Sean Obert, Sage Ugras, Eric Hughs-Baird, Steve Rosario, Pari Mandalapu, Samantha LeBlanc, Liam Jennings, Syrena Prytko
Advisors: William Michalson, Andre Rosendo

9. PMKS+: An Application for Generating and Analyzing Planar Linkages
Students: Jeremy Bornstein, Gabriel Curet-Irizarry, Javier DeLeon, Matthew Gatta, Sebastian Gurgol
Advisors: David Brown, Pradeep Radhakrishnan

10. Undersea Deployment of an Encapsulated Aerial Vehicle
Students: Ryan Bendremer, Trinity Gibbs, Sophie Sakamoto, Christian Healy, Benjamin Penti, Kyle Dinwoodie, Theresa Ng, Max Cisneros, Ian Sullivan
Advisors: Mehul Bhatia, Shana Lessing, Donald Brown
Sponsor: General Dynamics Electric Boat

11. 3D Printed Knee Brace
Students: Henry Ball, Nathan Russell, Jake Bowen, Lasya Thavanati, Mia Gilmore
Advisor: Joe Stabile

12. Designing Active Aerodynamic Components for Automotive Applications
Students: Cody Potvin, Nathan Holmes, James Kiefer, Bryce Lukacs
Advisors: Selcuk Guceri, Guanrui Li

13. Robotic Poop Scooper
Students: Jeremiah Maylum, Nate Levine, Simeon Hoffler, Bryce Illingsworth
Advisor: Joe Stabile

14. Cardboard Box Cutter
Students: Aman Hiregoudar, Megan Jordan, Jeremy Peters, Giai Phan, Kevin Zhou
Advisor: Mehul Bhatia
Sponsor: Robosource, LLC

15. ADArC: A Web-based Automated Circuit Designer and Code Generator for Arduino Circuits
Students: Myles Ku, Aaron Mar, Carlos Medina, Braeden Swain, Giovanni Larson Vasquez
Advisors: David Brown, Pradeep Radhakrishnan

16. An Autonomous Robotic Solution for Tool Replacement in Surface Finishing of Complex Internal Geometries
Students: Sarah Listzwan, Natalie Carrington, Benjamin Hayden, Alfredo Sanchez
Advisor: Yihao Zheng

17. Design of Disaster Relief Delivery Drone
Students: Ethan Nogueira, Ezequiel Gonzalez Solano, Antonio Varela
Advisor: Mustapha Fofana
Sponsor: MIRAD Labatory

18. Design and Testing of Rotational Speed Sensor with Zero Latency for Unmanned Ground Vehicle
Students: Jiayang Chen, Brady Hogan
Advisors: Vladimir Vantsevich, Lee Moradi, Hunter Zhang
Sponsor: Autonomous Vehicle Mobility Institute

19. Recycling Plastic Waste and Its Education
Students: Grayson Brooks, Dominic St. Pierre, Nicholas Prayner, Patrick Robock, Maxwell Smith, Alyssa Stoffel
Advisors: Mehul Bhatia, Bashima Islam

20. Tray Carry Assistive Device
Students: Davis Howland, Ashwin Sukthankar, Nicole Morris
Advisor: Eben Cobb

21. Energy Harvesting for the Army
Students: Alexander Kirkman, Matthew Saluzzi, Nicolas Olson
Advisors: Pratap Rao, Gregory Noetscher
Sponsor: DEVCOM Soldier Center

22. Environmentally Friendly Recycling of E-Wastes
Students: David Fitzgerald, Jesse Frey, Louis Heck
Advisor: Jianyu Liang

23. Wings of Gompei: Design, Analyze, Build, Test, and Fly an RC Plane
Students: Caitlin Bagdasarian, Andrew Costas, Ryan Malone, Katlyne Mio, Nick Sloan, Nguyen Vo
Advisor: Reza Ebadi

24. Design of a Getter-Based System for Reducing Absorbed Interstitial Elements in Metal Feedstock Powder During Heat Treatment
Students: Lauren Braconnier, Andrew Cunningham, Dylan Furtado, Audrey Johnson
Advisors: Kyle Tsaknopoulos, Danielle Cote

25. Sound Down: Targeted Noise Reduction in Indoor Environments
Students: Graham Ornstein, Henry Sica, Kaveer Malik, Jake Schwartz, Nicholas Szuba
Advisor: Joe Stabile

26. Neutron Generator Heat Exchanger and Vacuum Chamber Redesign
Students: Camille Gipson, Corbin Narita
Advisor: William McCarthy

27. Automatic Book Page Turner
Students: Colleen Buckley, Patrick O'Brien, Tyler Bobbin, Matthew Biando, Chris Sakellariadis
Advisor: Eben Cobb

28. NHRL Battlebot
Students: Aiden Deady, Carlos Jones, Maksymilian Robidoux, Quinn Connor, Virginia Shea
Advisor: Mehul Bhatia

29. High Energy Density Mg-Air Battery for Shipping
Students: Peter Poulos, Grady Howell, Konstantinos Sarantopoulos
Advisor: Adam Powell

30. Steady Sip Drinking Aid
Students: Cece Daniele, Melanie Dostie, Ethan Gomes, Jillian Maguire, Sean Maguire
Advisor: Sarah Jane Wodin-Schwartz

31. The Design and Fabrication of Novel Guitar Frets and Fretboards for Manufacturability and Wear Resistance
Students: Leagsaidh Collis, Mia Katz, Andrew Klegraefe, Carter Melanson
Advisors: Fiona Zoutendyk, V. J. Manzo

32. The Design and Prototyping of a Low-Cost & Efficient Ocean Cleanup Robot
Students: Yan Acevado, Samantha Booher, Evan Carmody, John Hall, Renata Kaplan, Joshua Keselman, Cooper Mann
Advisors: Vincent Aloi, Selcuk Guceri

34. 3D Printing-Based Silicone Earmold Fabrication for Pediatric Hearing Aids
Students: Spencer Doran, Marshall Wo, Abigail Silvia
Advisor: Yihao Zheng

35. Desktop CNC Milling: Open-Source Innovations for Cost-Effective Manufacturing
Students: Echo Baumer, Rafael Caballero, James Carroll, Camren Chaplak, Michael Doucette, Perrin Kristoff, Andrew Petro, Daniel Petro, Michael Primavera, JR Thaiprayoon, Dante Uccello
Advisors: Pradeep Radhakrishnan, Snehalata Kadam, Joshua Cuneo

36. Development of a Self-Contained Compliant Tongue Prosthesis with Miniaturized Electronics for Oral Cancer Patients
Students: Daniel Bottrill, Andrea Malaver, Tanisha Mitra, Troy DiStaso
Advisors: Pradeep Radhakrishnan, Dirk Albrecht

37. Electric Ridable Vehicle
Students: Benjamin Guilbault, Alex Lin, Abbie Wang, Jonathan Blecherman
Advisors: Reza Ebadi, Joe Stabile

38. A Resistance Based Colonoscopy Probe for Real-time Polyp Analysis
Students: Jamie Baines, Kyla Fu, Jessica Vo, Laurel Whitley
Advisors: Ahmet Sabuncu, Sakthikumar Ambady

39. Adapted Snow Boot for AFO Users
Students: Kristina MacLeod, Sarah McCarthy, Julia Karman , Brianna Levasseur
Advisors: Karen Troy, Sarah Jane Wodin-Schwartz
Sponsors: Erika Baum and Nicky Nyeh

40. Small Scale Energy Storage
Students: Tara Checko, John Michienzi, Emma Carroll
Advisor: Fiona Zoutendyk

41. UGV Redesign for Off-Road Mobility
Students: Nico Alvarado, Nicholas Healy, Lorenzo Hess, Alexandra Joseph
Advisors: Vladimir Vantsevich, Lee Moradi, Hunter Zhang

42. Design and Fabrication of an Apparatus to Evaluate the Dynamic Loading Response of Aerospace Materials
Students: Ben Furman, Federico Lenson, Jacob Saunders, Karl Schletzbaum
Advisors: Diana Lados, Anthony Spangenberger

43. Electrical and Mechanical Redesign of a Humanoid Robot to Assist Locomotion
Students: Matthew Amodea, Parker Hunt, William Pagliarulo, Ligia Portugal, Jared Revell, Greg Reppucci, Donavan Segelhorst
Advisors: Pradeep Radhakrishnan, Taylor Andrews

44. Design and Optimization of Novel Impact-Resistant Composites with Structural and Functional Properties for Transportation and Defense Applications
Students: William Brownell, Elizabeth Goncalves, Isabella Ibrahim, Pedro Salomao
Advisors: Diana Lados, Anthony Spangenberger

45. PEM Fuel Cell Flow Field Optimization
Students: Caitlyn Harrington, Adam Flores, Maximo Anderson, Nicholas Richardson, Marshall Ismail
Advisor: Mehdi Mortazavi
Sponsor: Honeywell Aerospace

46. Developing Thermal Energy Storage for Energy Efficiency
Students: Matthew Lydon, Rebekah Shields
Advisors: Mehdi Mortazavi, Burt Tilley

47. Advanced Design of an Apparatus for Impact Testing and Evaluation of Novel Energy-Absorbing Composites for Transportation and Defense Applications
Students: Ethan Edmondson, Jonah Potter, Ryan Siepmann, Nicolas LeSieur
Advisors: Diana Lados, Anthony Spangenberger

48. Analysis, Design, and Application of Improved HighSpeed Mechanisms for Middle-Ear Characterization Under High-Acoustical Loads
Students: Luke Thomas, Donovan Joyce, Sean Welch
Advisors: Cosme Furlong-Vazquez, Dirk Albrecht
Sponsor: Massachusetts Eye & Ear, Boston MA

49. Development of an Improved Modular System, Swapping Station, and Autonomous Cart for EndEffectors in a 3D-Printed Humanoid Robot
Students: Theodore Zisserson, Joseph Nixon, Christopher Levin, Hunter Crossman, Jack Aylesworth
Advisors: Pradeep Radhakrishnan, Taylor Andrews

50. Engineering of a Modern Storage Bed with Integrated Electrical
Student: Connor Lepore
Advisor: Sarah Jane Wodin-Schwartz

51. Design and Fabrication of a Small-Scale Rotating Cylinder Valve Engine
Students: Stella Burfeind, Thomas Casey, Mason Connell, Brooke Peloquin, David Szymanczyk, Jarrett Tousignant
Advisors: Selcuk Guceri, Germano Iannacchione

52. Manufacturing a Model 1867 Otto-Langen Atmospheric Gas Engine
Student: Colin Lysaght
Advisor: Robert Daniello

53. Development of Elbow Exoskeleton with Printed Stretchable Electronics and Sensors
Students: Connor Ehrensperger, Ethan Lilley, Panayotis (Perry) Pesiridis
Advisors: Pratap Rao, Lane Harrison

Physics Department

POSTER SESSION

10:00 am to 12:00pm
Olin Hall 208 and Olin Hall 211

Analysis of TOPTICA TeraScan System in the Terahertz Domain
Eric Stegehuis
Advisor: Douglas Petkie

A PER Aligned Nuclear Physics Experiment for IPL
Tristen Davis
Advisors: David Medich, Thomas Noviello

Covariant Integral Quantization of the L^2(S^2) Sphere
Rahul Sunil
Advisor: Romain Murenzi

Developing an Interactive Training Program for Radiation Safety
Nicole Allraum
Advisor: David Medich

Development of a Low Attenuation Fusion Target Cooler
Corbin Narita-PH, Camille Gipson-ME
Advisor: William McCarthy

Difference in Impact of Ungrading by Gender
Jake Maglio
Advisor: Thomas Noviello

Dynamics of Active Fluids in Lid-Driven Cavity Flow Systems
Tianxing Weng
Advisor: Kun-Ta Wu, Robert Pelcovits (Brown University), Thomas Powers (Brown University)
Sponsor: National Science Foundation (CBET-2045621)

Effective Monitoring and Optimizing of a Desktop CNC Mill
Echo Baumer-PH, ME; Raeael Caballero-ME; James Carroll-ME; Camren Chraplak-RBE, CS; Michael Doucette-ME; Perrin Kristff-ECE; Andrew Petro-ME; Daniel Petro-ME; Michael Primavera-RBE/ JR Thaiprayoon-ME; Dante Uccello-ME
Advisors: Pradeep Radhakrishnan-ME, Snehalata Kadam-PH, Joshue Cuneo-CS

Enabling High Dose Brachytherapy with Tungsten-181
Lucy Adams
Advisor: David Medich

Enhancing Physics Education in Underrepresented Communities with a Math-Centered Pedagogical Approach
Michael Nixdorf
Advisor: Thomas Noviello

Magnetic Imaging of Current Flow using Quantum Sensors
Sona Hanslia, Camille Williams
Advisor: Raisa Trubko

Shear Stress Sensing of Cancer Cells
Ezra Yohay
Advisor: Qi Wen
Sponsor: UMass Chan Medical School, Department of Neurobiology

Terahertz Spectroscopy for Material Characterization
Abigail Johnson
Advisor: Douglas Petkie

UP! Sustainable Vertical Expansion for Enhanced Campus Utilization
Dimitris Graikos
Advisors: Izabela Stroe, Steven Van Dessel – CEAE

Humanities & Arts/Professional Writing

POSTER SESSION, 11:00am to 12:00pm
Unity Hall Room 520

Does Diagnostic AI Consider the Social Determinants of Health?
Vishali Baker
Advisor: Brenton Faber

The Rhetoric of Well-being: Mental Health, Crisis Communication, and the Work of Care
Noah Bedard
Advisor: Yunus Telliel

Beyond "Basic" vs "Applied": A New Visualization Tool to Help Students Reflect on their Project Work
Josephine Conlon
Advisor: Ryan Madan

Patient Trust Enhances Medical Device Adoption
Danielle Cook
Advisor: Brenton Faber and Chrystina Soloperto (UMass Chan)

Digital and Student Loan Repayment Resources: A Genre Criticism of Online Federal Financial Guides
Ryan Dillon
Advisor: Sarah Riddick

The Use of Drone Surveillance in Law Enforcement: Analyzing Rhetoric and Language
Trinity Gibbs
Advisor: Shana Lessing

Redesigning Unified Robotics III Labs
Sam Honor
Advisor: Sarah Riddick

Game Design as Worldbuilding: Interactive Worlds and Imaginative Acts in LARP (Live Action Role-Playing
Owen Lacy
Advisor: Yunus Telliel

Understanding Polarized Perspectives on Generative AI- A Rhetorical Analysis
Sophie Sakamoto
Advisor: Shana Lessing

Assessing the Mental Health Needs of Patients at Free Medical Service Programs in Worcester
Sarah Sponenberg
Advisor: Brenton Faber and Adara Bochanis (UMass Chan Medical School)

Robotics Engineering

POSTER SESSION, 8:45am to 12:00pm
Robot Pits

PRESENTATIONS, 1:30pm to 3:00pm
Sports and Recreation Center Meeting Room 1

A Mergeable Infrastructure for Swarm Programming
Team Members: Lorenzo Manfredi Segato; Filippo Marcantoni; Emma Pollak
Advisor: Carlo Pinciroli

A System for Watering and Autonomously Monitoring Plants (SWAMP)
Team Members: Emilia Gutman; Lauren Harrison; Jessica Hart; Isabella Lucas; Colleen Mullane
Advisor: Gregory C. Lewin

Advanced Autonomous Tour Guide Robot
Team Members: Jacob Ellington; Aashi Goel; Sukriti Kushwaha; Vivek Voleti
Advisors: Nitin Sanket; Greg Lewin; Fiona Yuan; Jing Xiao

Advancing Humanoid Robots: Development of Balancing and Assisted Walking Along with Improved Hardware
Team Members: Gabriel Bohorquez; Ethan Glasby; Jai Jariwala; Lily Jones; Sahil Mirani; Alana Reid; Jessica Wong
Advisors: Pradeep Radhakrishnan; Taylor Andrews

Ball Catching Drone
Team Members: Sebastian Baldini; Connor Tompson; Enrique Pohl
Advisor: Nitin Sanket

BiQu
Team Members: Wyatt Harri; Adam Kalayjian; Sean Lendrum; Jared Morgan; Kai Nakamura; Owen Sullivan
Advisors: Mahdi Agheli; Jing Xiao; Guanrui Li

Developing an Autonomous Drone for Avalanche Search and Rescue
Team Members: Kevin Chin; Samuel Honor; Chad Nguyen; Brianna Sahagian
Advisor: Kevin Leahy

Development of Elbow Exoskeleton with Printed Stretchable Electronics and Sensors
Team Members: Connor Ehrensperger; Ethan Lilley; Panayotis (Perry) Pesiridis
Advisors: Pratap Rao; Lane Harrison

Disc Golf Inventory Automation Machine
Team Members: Anthony Gonzales; Aiden Higuera; Jenna Marcinkowski; Katy Stuparu; Cassie Youn; Keyla Zelaya
Advisors: Greg Lewin; Jing Xiao; Zimming Zhang

Expanding Human-Robot Interaction in an Open-Source, Toddler Sized 3D-Printed Humanoid Robot: YOLO- Based Vision, Voice Commands, and Gripper- Based Manipulation
Team Members: Shivek Agarwal; Elowyn Akers; David Alex; Gabriel Bohorquez; An Phan; Preston Van Fleet
Advisors: Taylor Andrews; Pradeep Radhakrishnan

General Robot Assistant for Common Errands (GRACE)
Team Members: Brent Weiffenbach; Alexander Beck; Gwenaelle Deleo
Advisors: Reza Ebadi, Constantinos Chamzas, Jing Xiao

HexaFlex: Design and Testing of a Hexapod with a flexible Origami-Inspired Spine
Team Members: Dongquan Ji; Yanbo Hua; Jiaming Du; ZeHai Li
Advisors: Cagdas Onal; Robin Hall; Gabrielle Conrad

Integration of Open-Source Controls and Sensors in a Low-Cost Desktop CNC Mill
Team Members: Michael Primavera; Camren Chraplak; Echo Baumer; Perrin Kristoff; Andrew Petro; Daniel Petro; Dante Uccello; James Carroll; JR Thaiprayoon; Michael Doucette; Rafael Caballero
Advisors: Professor Radhakrishnan; Professor Kadam; Professor Cuneo

Lunabotics
Team Members: Sam Rooney; Jonathon Tran; Matthew Copeland
Advisors:Kenneth Stafford; Loris Fichera

Meissa Microgrid | Multi-Tenant Renewable Energy Monitoring Platform with Solar PV Tracker Controls
Team Members: Edward Dang; Vien Le; Yinuo Zhao; Andrew Qi; Aliaa Hussein
Advisors:Berk Calli; Seyed Zekavat

Motion Control Photography
Team Members: Matthew Winchell; Michael Conroy
Advisors:Andre Rosendo; Ralph Sutter

PRIMO (Mobil Printer)
Team Members: Warwick Barker; Colin McGinty; Luke Sanneman; Marc Wehbe
Advisor: Mahdi Agheli

SACRED: Strain-Aware Continuum Robot for Estimating Deformation
Team Members: Nikesh Walling; Cameron Wian; Shivangi Wirsiwal
Advisors: Loris Fichera; Cagdas Onal

SailBot 24-25
Team Members: Max Berman; Bryce McKinley; James Purnell; Gavin Tingley
Advisors: Kenneth Stafford; William Michalson

SMAC 6.0
Team Members: Sakshi Gauro; Al Jarmoszko; Minh (Mo) Nguyen; Katarzyna Racka; Jingxu (Rick) Wang; Tracy Wang
Advisors: Carlo Pinciroli; Gregory Lewin; XinMing Huang

Soft Aerial Robot (SoAR)
Team Members: Andrew Roush; Ao Jiang; Chris Walczak
Advisors: Cadgas Onal; Timothy Jones

Soft Robotic Eel
Team Members: Natalie Essig; Christopher Hunt; Pranav Jain; Dexter Stark
Advisors: Cadgas Onal; Robin Hall

Terrawarden Drone Cleanup
Team Members: Mark Caleca; Zephyr Conley; Jakub Jandus; Samuel Markwick; Kevin Siegall; S. Taylor
Advisors: Berk Calli; Kevin Leahy; Guanrui Li

The Design and Prototyping of a Low-Cost & Efficient Ocean Cleanup Robot
Team Members: Yan Acevado; Samantha Booher; Evan Carmody; John Hall; Renata Kaplan; Joshua Keselman; Cooper Mann
Advisors: Vincent Aloi; Selcuk Guceri

UAV/UGV Docking and Charging System
Team Members: Myrrh Khan; Albert Lewis; Michael Monda; Istan Slamet
Advisors: Kevin Leahy; Nitin Sanket

Ultrasound Guided Needle Insertion Device for Percutaneous Nephrolithotomy
Team Members: Vishali Baker; Emerson Shatouhy; Ethan Zhong
Advisors: Haichong Zhang; Yichuan Tang

VR Telepresence Robot
Team Members: Maxwell Friedman; Luis Garcia Valecillos; Prahladh Raja; Tristin Youtz
Advisors: Andre Rosendo; Fabricio Murai

Social Science & Policy Studies

POSTER SESSION

9:30am to 1:00pm
Salisbury Labs 411

Psychological & Cognitive Sciences

Rest Periods as a Buffer for Cortisol Reactivity to Unexpected Stress: An Experimental Study
Mikayla Prue & Mckenzie Anderson
Advisors: Angela Incollingo Rodriguez, Stacy Shaw

Perceptions of Microaggressions Among Black Students at WPI: A Semi-Structured Interview Study
Alexander D. Scott
Advisor: Jim Doyle

Predicting Students' Mental Health Using Facial Expression Data
Dale Asante
Advisors: Kaitlyn Schneider, Shichao Liu, Oren Mangoubi

Viability of *Artemisia sp*. and Artemisinin Treatment on *Caenorhabditis elegans* Modeling Neurodegenerative Disease
Meghan Urakawa
Advisors: Kaitlyn Schneider, Pamela Weathers

Neurophysiological Correlates of Social Feedback on a Mock Social Media Platform
Brianna Romero
Advisor: Richard Lopez

The Influence of Motivation and Group Identity on Implicit and Explicit Attitudes Toward Women in STEM
Brenna Pfisterer
Advisor: Jeanine Skorinko

Improving Well-Being and Reducing Stress Through Gratitude and Serenity Journaling
Ashley MacGilvray, Assumption University
Advisor: Maria Parmley, Assumption University

Using Retrieval Practice to Learn and Apply Principles of Cognitive Behavioral Therapy
Danny Portillo, Assumption University
Advisor: Leamarie Gordon, Assumption University

How Caregiving Experience Affects Responding to Infant Crying
Abigail Block and Lorilei Jones, Assumption University
Advisor: Nicole Pantano, Assumption University

Under Pressure: How Extracurricular Activities Influence Anxiety and Depression in Students
Claire Thomassen, Assumption University
Advisor: Hannah Smith, Assumption University

Technology, Policy & Sustainability

Enzymatic Soil Stabilization
Alexander Pantoliano
Advisors: Robert Krueger, Nima Rahbar

Policy Analysis with Generative AI: Harnessing Language Models and System Dynamics for Deeper Insights
Luca Makarushka-Napp, Elizabeth McGinn, Meenakshi Meyyappan, Michael Alicea, Romish Khatri, Hongye (Phoebe) Li
Advisors: Crystal Brown, Oleg Pavlov, Xiaozhong Liu, Raha Moraffah

Future Implications of Using Artemisia Species as Anticancer Therapies
Anna Wix, Amber Powell
Advisors: Elisabeth Stoddard, Jill Rulfs, Mike Buckholt

Interventions for Strengthening Resilience to Extreme Heat in Worcester, Mass.
Julia Silvestrone
Advisor: Stephen McCauley

Phylogeographic and Invasion History of Crayfish (*Faxonius virilis*) in North America
Gavin Burkhardt, Hannah Edlund, Stephanie Brownell, Norah Giles, Karyn Manning, Olivia Spielberger
Advisor: Lauren Mathews

Stormwater Mitigation through Green Infrastructure at WPI
Ella Moreau, William Crawford, Caitlyn Dasaro, Mickey Mikitarian, Tanner Thatcher
Advisor: Paul Mathisen

Feasibility of Phytoremediation to Improve Water Quality of Salisbury Pond
Abigail Morris, Emily Graves, Josephine Fazio, Sydney Kerivan
Advisors: Elisabeth Stoddard, Jeanine Dudle

A Guide for New Small-Scale Oyster Farmers: Understanding Strategies to Improve Environmental Sustainability and Economic Feasibility
Tionge Nakazwe, Angela Tarantino, Mengqi Hong, Angela Kroi, Jadon Thomas
Advisors: Elisabeth Stoddard, Adrienne Hall-Phillips

Investigating Soil Amendments for Mycoremediation of Heavy Metals in Soil
Paige Agostini, Val Corrente, Mya Darrow
Advisors: Elisabeth Stoddard, Stephen Kmiotek, John Bergandahl

Healthy Plates, Healthy Planet: Developing Interactive Games on Food and the Environment in Thessaloniki
Jacob Friend
Advisors: Elisabeth Stoddard, Melissa Butler

Investigating the History of Human-Beaver Conflict in North America
Hildey McCorkell, Mateo Blumenthal, Lydia Ponomarenko, Laura Romania
Advisor: Jeanine Dudle

Environmentally Friendly Recycling of E-Wastes
Jesse Frey, David Fitzgerald, Louis Heck
Advisors: Elisabeth Stoddard, Jianyu Liang

What do WPI Students Know about Personal Finance?*
Aedan Bingham
Advisor: Alexander Smith
**Independent Study*

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 Lisa Drexhage, Associate Director, Corporate Relations, University Advancement, at ocp@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.

To contact a specific academic department, please refer to the list below.
(Note: All numbers begin with 508-831-).

Aerospace Engineering – 5221
Bioinformatics and Computational Biology - 5357
Biology and Biotechnology - 5543
Biomedical Engineering - 5447
Business - 5218
Chemical Engineering - 5250
Chemistry and Biochemistry - 5371
Civil, Environmental, and Architectural Engineering - 5294
Computer Science - 5357
Data Science - 4883
Electrical and Computer Engineering - 5231
Humanities and Arts - 5246
Integrative & Global Studies - 5547
Mathematical Sciences - 5241
Mechanical Engineering - 5236
Physics - 5258
Professional Writing - 5198
Robotics Engineering - 6665
Social Science and Policy Studies - 5296
STEM Education Center - 5512

ABOUT WPI

WPI is a premiere STEM-focused university and a recognized pioneer and global leader in project-based learning. Founded in 1865 on the principle that students learn most effectively by applying the theory learned in the classroom to the practice of solving real-world problems, WPI's continued mission is to transform lives, turn knowledge into action to confront global challenges, and revolutionize STEM through distinctive and inclusive education, projects, and research. WPI's project-based curriculum engages undergraduates in solving important scientific, technological, and societal problems throughout their education and at more than 50 project centers around the world. Today WPI offers more than 70 bachelor's, master's, and doctoral degree programs across 18 academic departments in science, engineering, technology, business, the social sciences, and the humanities and arts. Its faculty and students pursue groundbreaking research to meet ongoing challenges in health and biotechnology; robotics and the internet of things; advanced materials and manufacturing; cyber, data, and security systems; learning science; and more.