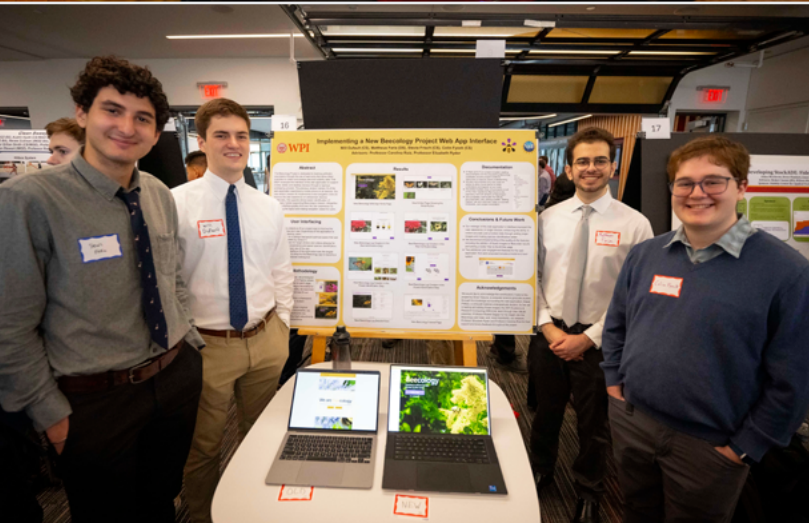
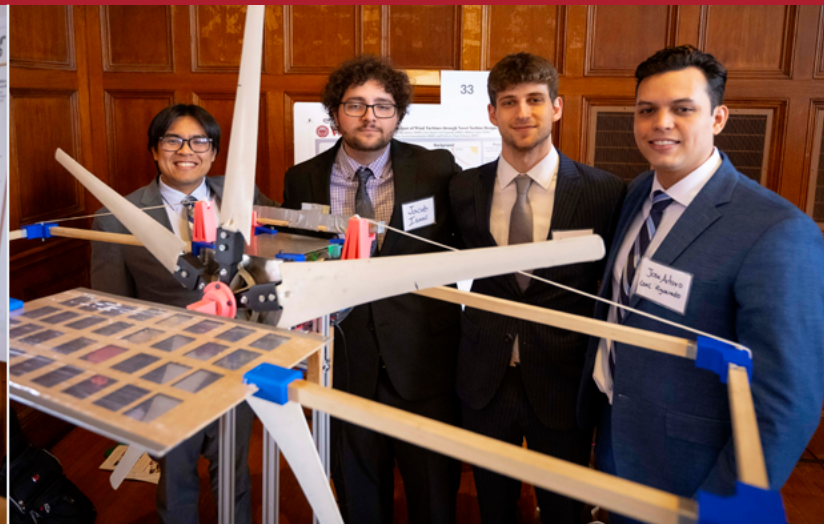
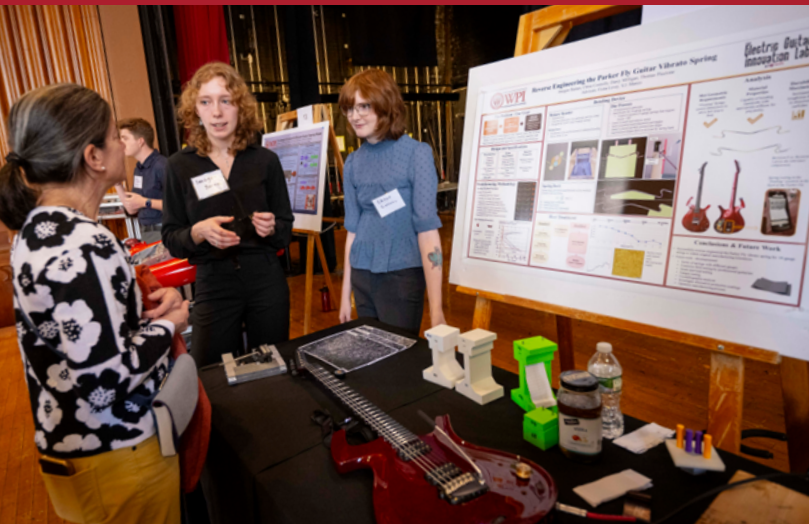


UNDERGRADUATE RESEARCH

Projects Showcase

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

APRIL 25, 2025



Worcester Polytechnic Institute

Project sponsors include...

Angelo, Gordon & Co.

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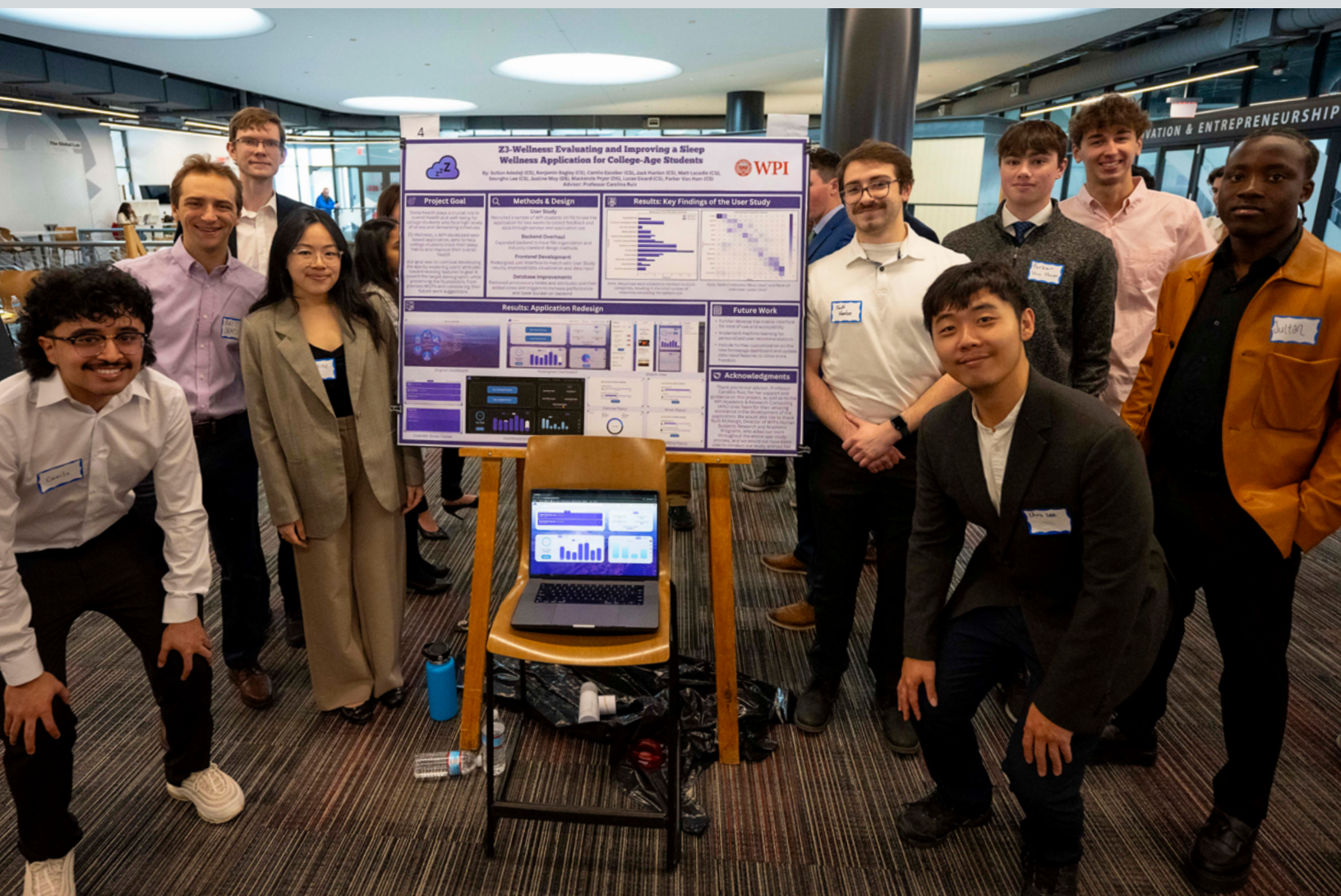
The Charles Stark Draper Laboratory, Inc.

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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

4	<u>Aerospace Engineering</u>	30	<u>Data Science</u>
5	<u>Bioinformatics and Computational Biology</u>	33	<u>Electrical and Computer Engineering</u>
6	<u>Biology and Biotechnology</u>	35	<u>Humanities and Arts</u>
9	<u>Biomedical Engineering</u>	37	<u>Interactive Media & Game Development</u>
12	<u>Business</u>	38	<u>Mathematical Sciences</u>
14	<u>Chemical Engineering</u>	40	<u>Mechanical Engineering</u>
17	<u>Chemistry and Biochemistry</u>	45	<u>Physics</u>
20	<u>Civil, Environmental, and Architectural Engineering</u>	46	<u>Professional Writing</u>
25	<u>Computer Science</u>	47	<u>Robotics Engineering</u>
		49	<u>Social Science and Policy Studies</u>

[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 Witsenhouse

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-Íl 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, Dmitry 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 Thivaharaja
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 Djamassbi, 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 Kmietek

Limiting Air Emissions from Cannabis Prod with Biofiltration

William LaCourse, Abigayle McNamara

Advisor: Stephen Kmietek

WPIPA

Carson Kershner, Devin Kunkel, Gregory Phillips, Noah Poulin

Advisor: Stephen Kmietek

Investigating Soil Amendments for Mycoremediation of Heavy Metals

Paige Agostini, Val Corrente, Mya Darrow

Advisors: John Bergendahl (CEAE), Stephen Kmietek, Elizabeth Stoddard (ESS)

Utilizing Microphotocatalytic Packed Beds for Industrial Pharmaceutical Applications

Lucas Anthony, Belle Sethachutkul

Advisors: Stephen Kmietek, 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

Solvolytic of Biomass Using Crude Methanol
Emma Neumann

Advisors: Stephen Kmietek, 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 Staphylococcus 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 $\text{Ti}_3\text{C}_2\text{T}_x$ 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 Flavylum 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 Dempksi

Title of Presentation: “Determining the antimicrobial dosage of pH-responsive liposomes formulated to improve drug delivery to *Staphylococcus epidermidis*”

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 Reagent 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 Plaques”

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 Schwartz (CE)

Advisor: S. LePage

7. Culvert Removal and Stream Restoration

Benjamin Hood (CE)
Madison Morales (EVE)
Zarrin Rahman (EVE)
Sarah Saeed (CE)

Advisor: J. Duddle

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. Duddle

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. Kmietek

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. Duple

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. UPI 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: Roe 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: Roe 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 Gutierrez (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), Roe 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: Koksai 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, & Shubhi 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), Jacquelin 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), Alexandra 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: Roe 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: Roe 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

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

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 McNerney, 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 Sakalauski, 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 UAV and Updating a Parametric Design Tool

Students: Taniya Crosby, Marc Donahue, Sofia Eckerson, Samantha Germano, Benjamin Perrin, Mir Valentine
Advisors: Ahmet Sabuncu, Taneja Shubghi
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 Hughes-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 Laboratory

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 Klegraeffe, 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 Aloji, 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
Spangenberg

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, Donovan 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
Spangenberg

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
Spangenberg

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 Zisseron, 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 Gucer, 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; Raael 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 Pincirolì; 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 Siegal; 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 Aloï; 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 Lorlei 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 Duddle

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 Kmietek, 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 Duddle

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.

