ABOUT WPI

Founded in 1865 in Worcester, Mass., WPI is one of the nation’s first engineering and technology universities. Its 14 academic departments offer more than 50 undergraduate and graduate degree programs in science, engineering, technology, business, the social sciences, and the humanities and arts, leading to bachelor’s, master’s and doctoral degrees. WPI’s talented faculty work with students on interdisciplinary research that seeks solutions to important and socially relevant problems in fields as diverse as the life sciences and bioengineering, energy, information security, materials processing, and robotics. Students also have the opportunity to make a difference to communities and organizations around the world through the university’s innovative Global Projects Program. There are more than 40 WPI project centers throughout the Americas, Africa, Asia-Pacific, and Europe.
Project sponsors include...

AbbVie
ACI Worldwide
Angelo, Gordon & Co.
Arthur G. Russell Co.
BAE Systems
Barclays
Bose Corporation
Boston Scientific Corporation
Chitika
City of Worcester
Deep Space Ecology
Deployed Resources
Draper Laboratory
Endicia
GE Healthcare Life Sciences
General Electric
Gillette

The Hanover Insurance Group
Headwall Photonics
Instrumentation Laboratory
Juniper Networks
Massport
MathWorks
Microsoft
MilliporeSigma
MIT Lincoln Laboratory
The MITRE Corporation
National Grid
National Institutes of Health
New Balance
NVIDIA
Ocean Spray Cranberries
Omni Labs
Pacific Can

Phoenix Life Insurance
PrimeTals Technologies
Qt Company
Reliant Medical Group
RightHand Robotics
Roche
Saint-Gobain
Shape Security
Skyworks Solutions
Stantec
Suneovion Pharmaceuticals
TransDev Services
University of Massachusetts Medical School
Unum
Zurich University of Applied Sciences

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. We bring together the brilliant minds and talents of our student teams and faculty advisors with a wide variety of corporate, government, and non-profit organizations. Collaboratively, we address 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 45 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 (MQP). If you are interested in discussing a possible sponsorship opportunity, please contact Sharon Deffely, Executive Director of Academic and Corporate Engagement, at 508-831-5635 or sdeffely@wpi.edu.

Following are some general guidelines for project sponsorship:

- A project cannot be “mission critical” or on the “critical path.”
- The best types of projects support or enhance current activities.
- 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, please visit -> wpi.edu/+engage.

“MilliporeSigma has sponsored a number of Major Qualifying Projects (MQPs) over the past several years. We have been consistently impressed with the technical depth, collaborative approach and professionalism demonstrated by WPI students in the completion of these projects.”

Michael Whalen
Head of Process and Technology Separations Technology Cluster
MilliporeSigma

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

Aerospace Engineering – 5576
Biology and Biotechnology - 5543
Biomedical Engineering - 5447
Business - 5218
Chemical Engineering - 5250
Chemistry and Biochemistry - 5371
Civil and Environmental Engineering - 5294
Computer Science - 5357
Electrical and Computer Engineering - 5231
Environmental Engineering - 5330

Humansities and Arts - 5246
Interactive Media and Game Development - 4977
Interdisciplinary and Global Studies - 6699
Mathematical Sciences - 5241
Mechanical Engineering - 5236
Physics - 5258
Professional Writing - 5198
Robotics Engineering - 6665
Social Science and Policy Studies - 5296
Once a year, WPI students take time out from their studies to present to their faculty advisors and sponsors the results of their Major Qualifying Projects, or MQPs (one of two significant academic projects all WPI students complete). The MQP is a professional-level design or research experience generally completed in teams and often sponsored by corporations or other external organizations. The projects mirror the kinds of professional work students will tackle in their careers.

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

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

**Presentations by Department**

2 Aerospace Engineering  
2 Biology and Biotechnology  
3 Biomedical Engineering  
4 Business  
6 Chemical Engineering  
7 Chemistry and Biochemistry  
8 Civil and Environmental Engineering  
9 Computer Science  
11 Electrical and Computer Engineering  
12 Humanities and Arts  
12 Interactive Media & Game Development  
13 Mathematical Sciences  
14 Mechanical Engineering  
17 Physics  
17 Professional Writing  
18 Robotics Engineering  
19 Social Science and Policy Studies
**Project Presentation Day Schedule**

**Aerospace Engineering**

**Higgins Labs, Room 116**

**8:40am**

Remote Control Aircraft for SAE Aero Design West Competition

Ryan Capozzi, Emily Chretien, Shintaro Clanton, Elio Daci, Timothy Jones, Andrew Libby, Stephen Peccherillo, Blake Rice, John Russell, Kamyar Sajjadi, Clifford Smith, Nabeel Tokatli

Advisors: Raghvendra Cowlagi, David Olinger

**9:00am**

Estimation of a Plume with an Unmanned Terrestrial Vehicle

Sylvestre Halama, Spiridon Kasapis, Marios Kontopyrgos, Owen McGrath, Benjamin Preston

Advisor: Michael Demetriou

**9:20am**

Interactive Planning and Sensing with Autonomous Vehicles

Roger Audu, Augustine Kelty, Maria Sierra Rossi, Thomas Stilwell, Mary Vierling, Daniel Whittle

Advisor: Raghvendra Cowlagi

**9:40am**

Quasi-Static and Dynamic Testing of Composite Materials

Jeremy Campo, Zachary Estrella, Steven Gandolfo, Brian Healy, Zachary Ligham, Amelia Mattezen

Advisor: Nikhil Karanigaokar

**10:15am**

Design and Analysis for CubeSat Missions

Nicholas Bograd, Gregory Jacobson, Patrick Kroyak, Caitlin Lopez, Jackson Peters

Advisor: Nikolaos Gatsonis

**10:30am**

Design of CubeSats for Formation Flying and Extreme Low Earth Orbit

Adam Koubeck, Colin Maki, Matthew Sanchez, Tristam Winship

Advisor: Michael Demetriou

**10:55am**

Design and Analysis of CubeSats in Low Earth Orbit

Matias Campos Abad, Robert Crockett, Matthew Escalante-Hurtado, Alexander Kant, Jacob Nichols, Marcus Knodler, Lucas Mancinelli

Advisor: John Blandino

**Biology and Biotechnology**

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

**Rubin Campus Center, Odeum**

- Can Plant Chloroplasts Function in Mammalian Cells?
  - Ian Diamond
  - Advisor: Tanja Dominko

- Microbes to Molecules
  - Liam Goodale
  - Advisor: Mike Buckholt

- Association of C3PO and PLCβ
  - Samuel Carley
  - Advisors: Suzanne Scarlata, Dave Adams

- Interaction of the Zinc Finger Proteins 146 and 507 with the Transposable Element LINE-1
  - Eric Larsen
  - Advisors: David Adams, Robert Dempski
  - Sponsor: UMass Medical School, Jeanne Lawrence, MD

- Regulation of Gene Expression by 5’ UTRs in Mycobacterium smegmatis
  - Carlie Logan Alfaro, Katie Nugai
  - Advisors: Scarlet Shell, Lou Roberts

- Caenorhabditis elegans Experiences
  - Isabella Garver, Emily McGlam
  - Advisor: Jagan Srinivasan

- Use of a Portable XRF Device to Measure Lead Levels in Bones of Loons
  - Kimberley Kirchner
  - Advisor: Dave Adams
  - Sponsor: Marc Pokras, Tufts Vet School
Investigating the Role of Microglia in Regulating Excitation/Inhibition Balance in the Brain
Shannon Becker
Advisor: Jagan Srinivasan
Sponsor: UMass Medical School, Dorothy Schafer, MD

Illuminating the Metabolic Mystery of Alzheimer’s Disease
Nathan McNeill, Timothy Consedine, Lily Randle
Advisors: Jagan Srinivasan, Carissa Olsen

New Drugs for an Old Disease: Screening for Natural Compounds to Target Tuberculosis
Casey Catherine Maffucci, Rachel Lee Murphy, Caeli Constance Tegan
Advisors: Mike Buckholt, Scarlet Shell

Antibiotics Against TB
Amanda Sullivan and Maria Snyder
Advisors: Mike Buckholt, Scarlet Shell

Physician Bias in Skin and Soft Tissue Infections and the Importance of Antimicrobial Stewardship Programs
Ally Day
Advisor: Jill Rulfs
Sponsor: UMass Medical School, John Haran, MD

When Life Gives You Lyme: Investigating Repressors Important in the Transmission of Lyme Disease
Sarah Martin, Virginia Massa, Hannah Miller, Shanelle Reilly
Advisor: Natalie Farny

Effect of Promensil on Breast Cancer Cells in Regard to Estrogen Receptor Beta
Rachel Wambach
Advisors: Jill Rulfs, Mike Buckholt

Effects of Bisphenols on the Cellular Stress Response
Chandler Friend, Megan Hoppe, Jingyi Wu
Advisor: Natalie Farny

A Comparative Study of the Virulence of Candida isolates and Examination of the Correlation Between Virulence and Drug Resistance
Brittney Lambert, Nina Murphy-Cook, Natalie Fabrizio
Advisor: Reeta Rao

Bee-cology: A Citizen Science Mobile App
Jacob Moon (BCB)
Advisors: Liz Ryder, Carolina Ruiz, Rob Gegear

Biomedical Engineering

SESSION 1: 9:00am to Noon
Salisbury Labs, Room 115 (Kinnicutt)

9:10am
Design of a Semi-Quantitative Stimuli Delivery System for MRI Regimes
Josephine Leingang (ME), Shivam Mehta, Joseph Miceli, Jonathan Perry
Advisors: George Pins, John Sullivan (UMass)

9:30am
A Programmable Syringe Pump for Studying Cellular Signaling in Microfluidic Dynamic Environments
Shaimae Elhajjaj, Andrea Karduss
Advisors: Dirk Albrecht, Amir Mitchell (UMass)

9:50am
Designing a Wearable Shoulder Exoskeleton for Hemiparetic Patients
Emily DiRuzza, Alyssa Marzella, Tess Meier, Veronica Rivera
Advisors: Tiffiny Butler, Gregory Fischer (ME)

10:10am
Design of a Bio-impedance Analyzer and Development of a Tissue Phantom Model for Pressure Ulcer Prevention
Sanjay Batchu, Konstantinos Tako
Advisors: John McNeill (ECE), Yitzhak Mendelson

10:40am
Mechanical Stimulation of Engineered Muscle
Stephanie Godding, Susannah Gray, Rebecca Hamilton
Advisor: Raymond Page

11:00am
Design of a Perfusable Structure for 3D Bioprinting Utilizing Decellularized Plant Vasculature
Danilo Lozada, Emily Mora, Alexa Pomerleau
Advisor: Glenn Gaudette

11:20am
Design of a Wearable Sensor System for the Estimation of Lower Limb Joint Loading
Jessica Cheu, Robert Kirch, Stephanie Silvestris, Rhaine Sziy
Advisor: Karen Troy
SESSION II: 9:00am to Noon
Salisbury Labs, Room 104

9:10am
Canine Tracheal Stent Design
Harry Chartoff, Anna Kjelgaard, Tyler Marshall, Joe Switzer
Advisor: Marsha Rolle

9:20am
A Compact Trocar System for Laparoscopic Tissue Extraction
Casey Arpin, Leslie Tepanecatl, Alexandra Wolfe
Advisor: Tiffiny Butler, Ryan Callery (UMass)

9:50am
Exosome Level Retention
Monique Desnoyers, Kaylee Perron, Kyle Skillings, Darin Trzeciak
Advisor: Raymond Page

10:10am
Canine Tracheal Stent: Biocompatibility
Sydney Garcia, Jason Lowder, Rory Washburn
Advisor: Marsha Rolle, Elizabeth Rozanski (Tufts), Karen Troy

10:40am
3D Perfusable, Endothelialized Tumor Model
McKenzie Brunelle, Nicole Chittim, Ryan Conlan, Emily Newman, Emma Sheils
Advisor: Jeannine Coburn

11:00am
Project SOAR: Sensing Oxygen Autonomously in Real-Time
Erin Dixon, Emma MacIntyre, Alex Markoski, Tyler McNell
Advisors: Kirsten Billiar, Jonathan Coppeta (Draper), Philip Keegan (Draper)

11:20am
Improving Microinjection Into Hydrogel Encapsulated Organisms via Induced Vibration
Christopher Rockwell, Noah Rockwell (ME)
Advisors: Dirk Albrecht, Pradeep Radhakrishnan (ME)

SESSION III: 9:00am to Noon
Salisbury Labs, Room 105

9:30am
A fabrication system for chondroitin sulfate methacrylate particles for drug release
Fabian Bonilla Sabillon, Mohammed Masrur Rahman, Kathy Suqui, Leonela Sabrina Vega Loaisa
Advisor: Jeannine Coburn

9:50am
Fracture Healing Analysis: Creating a Micro-displacement in Distal Radii to Diagnose Healing Defects
Daniel Amirault, Maddison Caron, Julie McLarnon, Alex Witkin
Advisor: Karen Troy

10:10am
Extracellular Matrix Antimicrobial Scaffold: A Treatment for Diabetic Foot Ulcers
Hanna Gru Sihman, Allyson Mills
Advisor: Marsha Rolle

10:40am
Design of a Topical Antimicrobial Peptide Delivery Vehicle for the Treatment of Acne Vulgaris
Abigail Hanson, Joshua Mace, Frederick Metters, Nicole Sherlock
Advisor: Marsha Rolle

11:00am
Hyperspectral Fluorescence Imaging
Tom Blais, Yenyu Chen, Xiang Pan
Advisor: Sakthikumar Ambady

11:20am
hMSC BioFactory
MacKenzie Brandes, Brooke Klepper, Albert Languet, Edward Van Atten
Advisor: Glenn Gaudette

Business

POSTER SESSION, 8:30am to Noon
Washburn Shops, Room 229

Analysis of Cryptocurrency
Matthew Rodricks
Advisors: Dimitrios Koutmos, David Planchard (ME)

Analyzing Fast-Track Effectiveness at ReadyMED Plus Worcester
Katharine Dunphy, Sophia Gomarlo, Katherine Moore
Advisor: Renata Konrad
Sponsor: Reliant Medical Group
Big Data Analytics and Tactical Decision Making
Andrew Aberdale, Juan Carlos Chavez Guerrero, Juan Pablo de Lima, Zhi Hui, Benjamin Sarkis, Rekik Tafesse
Advisors: Jonathan Abraham (MA), Michael Ciaraldi (CS), Reinhold Ludwig (ECE), Kevin Sweeney
Sponsor: Vestigo Ventures

Bulk Analysis of Mortgage Data with Cluster Computing
Evan King, Thyagarajan Ramachandran
Advisors: Michael Ciaraldi (CS), Renata Konrad, Kevin Sweeney
Sponsor: Angelo, Gordon & Company

Business Conditions and Cost of Capital: Evidence from the Field
Ama Biney, Brianna Dozier, Kelsey Saucier
Advisor: Dimitrios Koutmos

Business Solution for Smart Home Building Automation
Matthew Assael, Won Ik Chang, Nguyen Le
Advisor: Amy Zeng
Sponsor: Siemens Beijing

Commercializing a Novel MPPT Technique
Akaki Tsivadze
Advisors: Youssef Mahmoud (ECE), Joseph Sarkis

Conceptual Design of an Underground Subway System for the City of Asunción, Paraguay
Antonio Goncalves, Javier Lawes Martinez
Advisors: Guillermo Salazar (CEE), Walter Towner, Helen Vassallo

Creating a Culture of Philanthropy at WPI
Madison Beck, Stasha Greenalch, Kelly Rathje, Aaron Todd
Advisors: Francis Hoy, Eleanor Loiacono, Jerome Schaufeld
Sponsor: WPI Office of Lifetime Engagement

Designing a Production Planning Software for YO Sperm Test
Shira Shartiag
Advisors: Isa Bar-On (ME), Renata Konrad
Sponsor: Medical Electronic Systems, Ltd.

Developing a Mobile App to Aid Communication in a Maternity Ward
Robert Curtis, Scott Friedlander, Andrew Gelinas, Christopher Hammer, Anthony Perullo
Advisor: Bengisu Tulu
Sponsor: UMass Memorial Hospital

Evaluating the Commercial Pathway of Cardiac Patch Technology
Gabrielle France, Rachael Lanni, Morgan Maiola
Advisors: George Pins (BME), Walter Towner, Helen Vassallo

Forecasting Demand of Beer at Raps callion Brewery
Natalia Cervoni, Anthony Mower, Brendan Nemes
Advisor: Joe Zhu
Sponsor: Raps callion Brewery

The International Consortium for Outsourcing and Networking - Global Mind
Marco Castro, Michael Cevallos, Takayoshi Tsutsui
Advisors: Francis Hoy, Amy Zeng
Sponsor: Sergei Krivoshlykov

Investment Recovery Granulator Waste Stream Cost Analysis at National Grid
Alexander Murphy, Connor Reardon
Advisors: Walter Towner, Helen Vassallo
Sponsor: National Grid USA Service Company

Layout Improvement and Tool Change Optimization at Primetals
Paul DeMarco, Pavel Eroshenko, David Robinson, Christopher Rodgers, Justine Sherman
Advisors: Sara Saberi, Walter Towner, Helen Vassallo
Sponsor: Primetals Technologies

MilliporeSigma Inventory Control
Luciana Alvestegui Von Borries, Renee Laliberte, Naomi Phillips,
Advisors: Sara Saberi, Amy Zeng
Sponsor: MilliporeSigma

MyChef: The Design and Simulation Study of a Peer-to-Peer Food Sharing Platform
Carlos Carle Martinez, Hamza Hachim, Maximillian Hoerhold
Advisor: Renata Konrad

Organizational Strategies for Engaging and Retaining Millennial Employees
Daniela Costa, Colette Pellegrini de Paur, Jacob St. Germain
Advisor: Sharon Wulf
Sponsor: Peter Thomas (WPI Office of Lifetime Engagement)

Throughput Time Reduction at Saint-Gobain Abrasives
Allison Holmes, Katherine LaPierre, Celeste Nicoletti, Ashley White, Chelsea White
Advisors: Sara Saberi, Walter Towner, Helen Vassallo
Sponsor: Saint-Gobain
Wall Street: Engineering Investment
Profit and Loss Reporting Pipeline
Jacob Aki, David Deisadze
Advisors: Michael Ciaraldi (CS), Xin-Ming Huang (ECE), Reinhold Ludwig (ECE), Kevin Sweeney
Sponsor: Angelo, Gordon & Company

Warehouse Inventory Barcode Design and Integration to SAP at Emuge
Eric Cosmopulos, Shane Farley
Advisors: Walter Towner, Helen Vassallo
Sponsor: Emuge

Chemical Engineering

POSTER SESSION, 8am to 12:00pm
Olin Hall, Room 126

Catalytic Dehydration of Hydrous Ethanol in the Liquid Phase
Andersen DeRosier, Jeremy Filteau
Advisor: Michael Timko

Bioalcohol Extraction with Supercritical Carbon Dioxide
John Frigo
Advisor: Michael Timko

The Effect of Physio-Chemical Treatments on Dissolved Organic Matter
Hayley Boigenzahn, Rachel Whalen
Advisor: Stephen Kmiotek

Analysis of Biodiesel Fuel
Sara Velleca
Advisors: Stephen Kmiotek, Michael Timko

North Country Diacetyl Project
Carlos Chong, Claudia Dufour, Joshua Moniz, Patrick Wang
Advisor: Stephen Kmiotek

Evaluation of Subcritical Water Hydrolysis for Sugar Extraction from Malt Bagasse
Carolyn Morales Collado, Constantina Eleni Drakontis, Sotirios Filippou, Stephanie Gulezian
Advisor: Michael Timko

CFD Modeling for Transacetylization of Glycerol in Fixed-bed Reactor
Hoang Chi Duc
Advisor: Anthony Dixon

Freezing System Optimization
Errando B. Jayapurna, Logan Mies, Stephen Stephansky, Valentina Zapata
Advisors: Stephen Kmiotek, Sarah Jane Wodin-Schwartz (ME)

Analysis of Polyelectrolytes and Functionalized Silica for Precious Metal Catalyst Recovery
Patrick Bresnahan, Amy Toscano
Stephen Kmiotek, Drew Brodeur (CBC)

Investigating the Efficiency of Canola and Corn Oil used for Potato Chip Frying at Frito Lay
Lidy Gembrameskel, Pacificque Mugaboo, Nelson Ndahiro, Estefania Trinidad
Advisor: Stephen Kmiotek

Fate of Chlorine Species in Fenton Electrolysis Treatments
Lenna Quackenbush, Christine Schondek
Advisors: Stephen Kmiotek, Emmanuel Mousset

POSTER SESSION, 8am to 12:00pm
Olin Hall, Room 223

A Study of Potential Organometallic Photosensitizers for TiO₂ Using Density Functional Theory
Gillian Colman, Peter Melendez
Advisor: Aaron Deskins

Experimental and Theoretical Optimization of Bil3 Selective-Contact Solar Cell Materials
Michaella Balicki, Andrew Callahan, Gina Capobianco, Danielle Cote
Advisors: Aaron Deskins, Pratap Rao (ME)

Durability of Polymer Electrolyte Membrane Fuel Cell (PEMFC) Directly Hybridized with Supercapacitor Storage Devices
Martin Burkardt, Marcus Lundgren
Advisor: Francois Lapicque (ENSIC)

Localization of Paclitaxel
Lexi Crowell, Margaret LaRoche
Advisor: Susan Roberts

Inorganic Nanowire-Modified Polyelectrolytes for Vaniol Flow Battery Membranes
Brandon Clark
Advisors: Amy Peterson, Youssef Mahmoud (ECE)

Enhanced Diffusivity of Metal Organic Frameworks
Matthew Bennett, John Palumbo, Corey Scott, Colby Whitcomb
Advisor: Andrew Teixeira

A QCM-D Analysis of Nanosilver Interactions with Supported Lipid Bilayers (SLBs) in the Presence of National Organic Matter (NOM)
Charles DeWitt, Katie Hurlock, Ian Smith, Kara Upton
Advisor: Terri Camesano
Sponsor: Ramanathan Nagarajan, US Army Natick Soldier RD&E Center
Developing a Non-Enzymatic Electrochemical Glucose Biosensor
Zihao Li, Randy Melanson
Advisor: Hong Susan Zhou

Electrochemical Hydrogenation of Nitrobenzene to Aniline
Eric Chang, Evan Morris
Advisors: Ravindra Datta, Andrew Teixeira

The Effect of Plant Extracts on Mammalian Cancer Cells
Michelle Addai, Miya Bidon, Yaw Opare-Sem
Advisors: Susan Roberts

Culture Morphology as a Biomarker for Somatic Embryogenesis in Pinus taeda
Michael Bodanza, Nathan Hague
Advisor: Susan Roberts

Chemistry and Biochemistry

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

Assessing Human Immunodeficiency Virus (HIV) Protease Inhibition with Resistant Variants and Novel Inhibitors
Mina Henes, Klajdi Kosovrasti
Advisors: Anita Mattson, Destin Heilman
Sponsor: Celia Schiffer, Akbar Ali, Ellen Nalivaika (UMass Medical School and Schiffer Lab)

Visualization of PLCβ1 Using CRISPR-Cas9 Mutagenesis
Kaitlyn Valla
Advisor: Suzanne Scarlata

Association of C3PO & PLCβ
Samuel Carley
Advisors: Suzanne Scarlata, David Adams (BBT)

Interaction of Zinc Finger Proteins 146 & 507 with the Transposable Element LINE-1
Eric Larsen
Advisors: David Adams, Robert Dempski, Sponsor: Jeanne Lawrence

Examination of a Putative Cu+ Importer in Pseudomonas aeruginosa
Virginia Nunez Mir
Advisors: José Argüello, Scarlet Shell (BBT)

Design and Synthesis of Zika Virus Protease Inhibitors
Colby Johnson
Advisor: Drew Brodeur
Sponsor: UMass Medical School

Membrane Composition Analysis of Caenorhabditis Genus Members
Brianna Heisler
Advisor: Carissa Olsen

Study of Inhibitory Properties of Small Molecule Compounds on Histone Deacetylases
Christofer Welsh
Advisor: Destin Heilman
Sponsor: Nathan Lawson (UMass Medical School)

Illuminating the Metabolic Mystery of Alzheimer’s Disease
Timothy Consedine, Nathan McNeill, Lily Randle
Advisors: Carissa Perez Olsen, Jagan Srinivasan (BBT)

Photoelectrochemistry of n-Silicon and Bismuth(III) Iodide
Clare Masucci
Advisor: Ron Grimm

Copper Homeostasis is Important for Pathogenesis of Pseudomonas aeruginosa in Caenorhabditis elegans
Tristan Cano
Advisor: José Argüello
Sponsor: National Institute of Health

Generation and Mitigation of Cell Debris in a Manufacturing Scale Disc Stack Centrifuge
Kathryn Merritt, Kayla Sica
Advisors: Destin Heilman, Stephen Kmiotek (CM)
Sponsor: Amgen

Novel Roles of MTF1 in Myogenesis
Cristina Tavera
Advisors: Drew Brodeur, Teresita Padilla-Benavides (UMMS)
Sponsor: UMass Medical School

Exploring Nematode Aquaporin 7
Kaye Dandrea
Advisors: Carissa Perez Olsen, Mark Alkema (UMMS)
Sponsor: UMass Medical School

Neuroblastoma: The Role of the BRG1 Gene in Chemotherapy Drug Resistance
Naomi Otoo
Advisors: Arne Gericke, Joae Wu (Umass)
Sponsor: UMass Medical School

Analysis of Polyelectrolytes and Functionalized Silica for Precious Metal Catalyst Recovery
Patrick Bresnahan, Amy Toscano
Advisors: Drew Brodeur, Stephen Kmiotek (CM)
Sponsor: Sunovion Pharmaceuticals
Metal Ions and Quorum Sensing in Bacterial Growth
Jared Watson
Advisor: Christopher Lambert

Effect of Gasdermin D on Pyroptosis
Colleen O’Shea
Advisors: Arne Gericke, Egil Lien (UMMS)
Sponsor: UMass Medical School

Analysis of Subcellular Localization Using Mutant Variants of PCV1-VP3
Lauren Farris, Rebekah Johnson
Advisor: Destin Heilman

Characterization of IQGAP1-C Binding to Phosphoinositides
Christopher Dallarosa
Advisors: Arne Gericke, Siddartha Yerramilli

The Gut Microbiota and Neurological Diseases: Using a Caenorhabditis elegans Model to Test the Effects of Various Bacterial Diets on Neuronal Health
Eiko Iwashita
Advisor: Carissa Perez Olsen
Sponsor: Mark Alkema (UMMSI)

Civil Engineering

POSTER SESSIONS, 1:15 to 3:30pm

Kaven Hall, 1st Floor Hallway

Design of Sustainable Pavements
Guilherme Motta Baracchini, Basriel Demessie, James Vorosmarti
Advisor: Rajib Mallick

WPI Pedestrian Bridge and Athletic Building: Structural Design
Liam Beal, Joseph Berger, Conor Hoey, Kaitlin Travers
Advisors: Leonard Albano, Hussam Saleem

Sustainable Rooftop Technologies: A Structural Analysis of Buildings at WPI
Sebastian Miranda, Ryan Stokes, Ian Taylor
Advisor: Leonard Albano

Support Services for the Engineering Works of the Panama Canal
Samantha Eaton
Advisor: Aaron Sakulich
Sponsor: Autoridad del Canal de Panamá

Application of Hydraulic Simulations and Flexibility in Engineering Design Methods to the Panama Canal
Evelyn Grainger (CE/IS)
Advisor: Aaron Sakulich
Sponsor: Autoridad del Canal de Panamá

Maintenance Plan Development | The Atlantic Bridge
Brandon King (CE/IS)
Advisor: Aaron Sakulich
Sponsor: Autoridad del Canal de Panamá

Exploring the Properties of Fiber Reinforced Concrete
Rita Bagala, Lauren Fraser, RiAnna May
Advisor: Aaron Sakulich

Evaluating 3D Printed Alternatives to Weather Monitoring
Rachel Santarsiero (CE/PW), David Smallwood (CE/PW)
Advisor: Aaron Sakulich

Conceptual Design of an Underground Subway System for the City of Asunción, Paraguay
Antonio Goncalves (IE), Javier Lawes (CE/IE)
Advisors: Guillermo Salazar, Walter Towner (FSB), Helen Vassallo (FSB)

Treasure Valley Road Design
Ryan Coran, Garrett Peters, Phillip Royal, Kevin Walsh
Advisor: Suzanne LePage

Kaven Hall, 2nd Floor Hallway

Functionally Graded Soft Robotic Actuator
Reynaldo Duran (ME), Jiacheng Liu (CE/ME), Steven Rangel (ME), Adam White (RBE)
Advisor: Nima Rahbar

Evaluating BMP Designs for Phosphorus Removal in Cambridge
Stephanie Cappelli, April Locke, Jessica Wey
Advisors: Leonard Albano, Suzanne LePage
Sponsor: Stantec, Inc.

Fish Passage Design for the High Street Dam in Bridgewater, Massachusetts
Caroline Armstrong, Warren Staver, Yamaris Terrero Martinez
Advisor: Paul Mathisen
Sponsor: Massachusetts Division of Marine Fisheries

Environmental Impacts of Pavement Rejuvenators
Jacqueline Barr, Daniel Cammarata, Rachel Rivera (CHE), Christian Walck (CHE), Justin Waters
Advisor: John Bergendahl
A New Sprayed Fire Resistant Material (SFRM) with Superb Ductility
John DeVine Jr.
Advisor: Nima Rahbar

Landmark Sign for Worcester Solar Array
Cassy Rios
Advisors: Tahar El-Korchi, Mingjiang Tao
Sponsor: City of Worcester and Honeywell

The Design of Ski Ward Hill Parking Lots: Solving Flooding Issues with Resurfacing and Drainage Applications
Andrew Boynton, Mack Eberhardt, Derek Pacheco, Daniel Page
Advisor: Mingjiang Tao
Sponsor: Ski Ward Hill

A Site and Stormwater Management Plan for a Boy Scout Council Service Center in Worcester
Sydney Brooks, Abigail King, Thea Reymann
Advisors: Suzanne LePage, Paul Mathisen
Sponsor: The Mohegan Council of The Boy Scouts of America

Site Design for Utilities and Stormwater Management in Belmont, Massachusetts
Marissa Bernard, Cierra Ford, Kayla Salmon
Advisors: Leonard Albano, Suzanne LePage
Sponsor: Stantec, Inc.

Intersection Redesign in Tewksbury, Massachusetts
Craig Barrett, Vanessa Beutel, James Macfarlane, Patrick Murphy
Advisor: Suzanne LePage
Sponsor: Town of Tewksbury, Mass.

Bridge and Intersection Design at Louisiana State University
Anna Gore, Megan Hanshaw, Taylor Venter
Advisors: Leonard Albano, Suzanne LePage
Sponsor: Stantec Consulting Services

Effects of Tempering Steel in Frame Design
Kelly Soto Soldevilla (CE/ME)
Advisor: Leonard Albano

Kaven Hall, Room 204

Worcester Technical High School Greenhouse: The Repurposing of an Abandoned Structure into a Four-Season Greenhouse
Matthew Howard, Cody Lattin, Leah Morales (AREN/ECE), Derrick Naugler, Abigail Sawyer
Advisor: Leonard Albano, Kenneth Elovitz, Steven Van Dessel

Brutalist Building Retrofit
Priscilla Dunphy, Steven Knott, Katherine Tattersall
Advisor: Soroush Farzin-Moghadam, Hussam Saleem, Steven Van Dessel
Sponsor: Simpson, Gumpertz & Heger (SGH)

Designing a House for the 2019 Solar Decathlon Africa Competition
Kelsey Leigher, Alexis Moser, Hayley Poskus, Patrick Schenkenberg
Advisor: Kenneth Elovitz, Soroush Farzin-Moghadam, Hussam Saleem, Steven Van Dessel

FRP Curtain Wall Design and Intermediate Scale NFPA 285 Testing
Frederick Brokaw, Christine Deidrich, Rebecca Finacom, John Peter Ramos (ME)
Advisor: Nicholas Dembsey (FPE), Steven Van Dessel
Sponsor: Kreyssler and Associates

Computer Science

POSTER SESSION, 10:00am to Noon
Fuller Labs, 3rd Floor Hallway and Classrooms

CityView: Urban Data Visualization
Carlos Barcelos, Justin Myerson
Advisors: Xiangnan Kong, Yanzhu Li

Konbini Konnection: A Competitive Location-Based Multiplayer Game
Erik Cerini, Laurie Mazza
Advisors: Jennifer deWinter (IMGD), Clifford Lindsay
Sponsor: Ritsumeikan University
Project Center: Japan Project Center

General Game Level Generation
Spencer Beaupre, Thomas Wiles
Advisor: Gillian Smith

Permutation-Invariant Consensus Over Crowdsourced Labels
Michael Giancola
Advisors: Randy Paffenroth (MA), Jacob Whitehill

Multiple-Drug Interaction Analytics Platform
Brian McCarthy, Huy Tran, Andrew Schade, Brian Zylich
Advisor: Elke Rundensteiner

Distributed Deep Learning Pipeline for Scalable Model Training
Dylan Fontana, Brendan O’Connor, Andrew Pettit, Kartik Vasu
Advisors: Elke Rundensteiner, Eric Gieseke (ACI)
Sponsor: ACI Worldwide
Using Personality Traits and Chronotype for Personalized Feedback in a Sleep Web App
Holly Nguyen
Advisor: Carolina Ruiz

Reusable Software Components for Multi-Robot Foraging
Vanshaj Chowdhary, Tanuj Sane, Joseph Wilder
Advisors: George Heineman, Carlo Pinciroli (RBE)

Data Analysis with Splunk
Alexander Dyer
Advisor: Lane Harrison

CFI for Embedded Systems
Bradford Bonanno, Kodey Converse
Advisor: Robert Walls

Index of Virginia Printing
Leo Bowen-Biggs, Courtney Davis
Advisor: Wilson Wong

Autonomous Strategic Games and Robotic Design
Jon Berry, Evan Gilgenbach, Griffin Tabor
Advisors: Carlo Pinciroli, Ken Stafford

Drunk Selfie Detection
Colin Willoughby, Paul Roberts, Ian Banatoski
Advisor: Emmanuel Agu

World Wizards
Tyler Beaupre, Brian Keeley-DeBonis, Hope Wallace
Advisors: Jeff Kesselman (IMGD), Gillian Smith

Adverse Reaction Reports Analysis Tool
Derek Murphy, Oliver Spring, Cory Tapply, Daniel Yun
Advisor: Elke Rundensteiner

Blisk Inspection System
Kevin MacIntosh, Nicholas Hollan
Advisors: Craig Putnam (RBE), Kenneth Stafford (RBE)
Sponsor: G.E. Aviation

Depression Sensing
Damon Ball, Ada Dogrucu, Anabella Isaro, Alex Perucic
Advisors: Emmanuel Agu, Elke Rundensteiner

DOLDRUM
David Allen (IMGD), Kent Fong (IMGD), Matthew Szpunar (IMGD), Henry Wheeler-Mackta (IMGD), Kelly Zhang (CS/IMGD)
Advisors: Ralph Sutter (IMGD), Gillian Smith

Translating Alloy to SMT-LIB
Forrest Cinelli, Kyle McCormick
Advisor: Daniel Dougherty

POSTER SESSION, 1:00 to 3:00pm
Fuller Labs, 3rd Floor Hallway and Classrooms

A Holographic Navigation Heads-up Display for Cars
Can Alper, Alexander Gaines, Binam Kayastha, Yang Liu
Advisor: Michael Ciaraldi

Unseeable
Isaiah Cochran, Alexander Horton, Drew Tisdelle, Tommy Trieu
Advisors: David Brown, Brian Moriarty (IMGD), Ralph Sutter (IMGD)

Designing a Modern Software Engineering Training Program with Cloud Computing
Brett Cohen, Brianna Greenlaw
Advisor: George Heineman

Fact or Fiction
Charles Lovering, Anqi Lu, Cuong Nguyen, Huyen Nguyen
Advisor: Emmanuel Agu
Sponsor: Microsoft
Project Center: Microsoft

CS2303 AutoGrader
Jonathan Morse
Advisor: Hugh Lauer

Mobile Behavior-based Authentication
Bryan Benson, Ben Huchley, Derrek Rueger
Advisor: Emmanuel Agu

OnePlusTwo
Frank Egan, Dimitar Vouldjef
Advisor: Wilson Wong

Perception of Outliers in Correlated Data
Tyler Jaskoviak
Advisors: Lane Harrison, Jeanine Skorinko

Data and Dynasties: Using Games to Improve Data Literacy
Chris Bianco, Brian Copeland, Will Craft, Chris Griffin, Natalia Kononenko
Advisor: Lane Harrison

IntoxiGait Deep Learning
Joe Bremner, Nicholas Cheung, Quoc Ho Lam, Sam Huang
Advisor: Emmanuel Agu

Bee-cology: A Citizen Science Mobile App
Jacob Moon, Ziaoyng Yu
Advisors: Robert Gegear (BBT), Carolina Ruiz, Elizabeth Ryder (BCB)

Models for Automatic Estimation of Student Engagement
Eli Skeggs
Advisor: Jacob Whitehill
Sailbot 2017–2018
Jordan Burklund, Hans Johnson, Travis Norris, Liam Shanahan
Advisors: William Michalson (ECE), Kenneth Stafford (RBE)

Big Data Analytics and Tactical Decision Making
Andrew Aberdale, Ben Sarkis, Juan Pablo de Lima, Chavez Guerrero, Juan Carlos, Tafesse, Rekik, Hui, Zhi
Advisors: Kevin Sweeney, Mike Cirialdi, Jon Abraham, Reinhold Ludwig
Sponsor: Vestigo Ventures
Project Center: Wall Street/FinTech

The IMAGS App: An Android Application for Studying the Effects of Music on Chronic Pain
Joseph Kaiser, AmyBea Waldner
Advisors: Vincent Manzo (HUA), Wilson Wong
Sponsor: American Osteopathic Association

Graph-Based Sports Rankings
Daniel Alfred, Matthew Beader, Matthew Jackman, Ryan Walsh
Advisors: Gabor Sarkozy, Craig Wills

JapanActionGo
Corey Dixon, William Kelley, Patrick Malone
Advisors: Jennifer deWinter (IMGD), Cliff Lindsay
Sponsor: Ritsumeikan University
Project Center: Japan

Symbolic Execution for Function Matching
Samantha Comeau
Advisor: Robert Walls
Sponsor: The MITRE Corporation
Project Center: MITRE

Electrical and Computer Engineering

Atwater Kent Labs, Room 219

10:00am
Mapping Urban Pollution
Mateo Carvajal, Kayleah Griffen
Advisors: Susan Jarvis, Yousef Mahmoud, Alexander Emanuel

10:15am
Geomagnetically Induced Currents
Alex Legere
Advisor: Alexander Emanuel

10:30am
Formal Verification of ASIC Design Equivalence
Jonathan Ariza
Advisor: Berk Sunar, Isa Braun

Atwater Kent Labs, Room 233

10:00am
Ice Detection for LED Headlights
Cameron Back, Thomas Vining
Advisor: Stephen Bitar

10:15am
Off-Grid Inverter with Regulated Output Voltage Amplitude
Ryan Cooney, Niang Suan Thang, Tianyi Xu
Advisor: Shamsur Mazumder

10:30am
Autonomous Boat Docking System
Tin Bui, Ching-Hsaing Chen, Zachary Peasha
Advisor: Stephen Bitar

10:45am
Virtuoso: Art for the Disabled
John Mastascusa, Regina Reynolds, Connor Weeks
Advisor: Stephen Bitar

11:00am
Reconfigurable Multiparameter Wireless Wearable Vital Monitor
Swarnadeep Majumder, Michael Morisseau, Shanshan Xie
Advisor: Reinhold Ludwig

11:15am
The Simulation of the Propagation of Terahertz Waves in Nonlinear Isotropic Media
Miguel Aranda
Advisor: Reinhold Ludwig

11:30am
Internet of Things and Smart Health: SmartWalker
Tyler Ducharme, Brian Mitchell, Justin Trott
Advisor: Xinming Huang

11:45am
Wireless Electrocardiogram
Elizabeth Rooney, Peter Smith
Advisor: Edward Clancy
12:00pm  
**Design of a Compact Electromyograph Data Acquisition System**  
Kevin Lee, Alexander Rawley, Xinyuan Zhang  
Advisor: Edward Clancy

12:15pm  
**Sealed Lead-Acid Battery Smart Charger**  
Adam Garcia, Aidan Lippert  
Advisor: Fred Looft

1:00pm  
**Goat Cart**  
David Baker, Alexander Briskman, Camila DiFino Napolitano, Matthew Mahan, Jared Perkins, Jade Pierce  
Advisor: Alexander Wyglinski

1:15pm  
**FSAE Vehicle Management System**  
James Beucler, Gage Laskowski, Galahad Wernsing  
Advisor: Alexander Wyglinski, David Clifton Planchard (ME)

1:30pm  
**Autonomous Pedestrian Detection in Transit Buses**  
Thomas Fong, Kazim Hyder Nizam Shaikh, Alima Kargbo, Franc Luga, Dario Martinovic, Michael Milliard, Michael Padberg, Abdelrahman Sirry, Patrick Trant  
Advisor: Alexander Wyglinski

1:45pm  
**Self Driving on 1/10 Racer Car**  
Junbo Chen, Andrew Huynh, Zitong Jiang, Zhizhen Wu  
Advisor: Jie Fu

2:00pm  
**Automotive Security: Implementing Cryptographic Hash Functions on CAN Bus**  
Joseph Asante, Valerie Moore, Tasnim Rahman, Timothy Reuter  
Advisor: Alexander Wyglinski

2:15pm  
**CERBERUS Unmanned Sentry Robot**  
Marissa Bennett, Kenneth Quartuccio, Jeffrey Tolbert  
Advisor: Kenneth Stafford (RBE), Alexander Wyglinski

2:30pm  
**High Accuracy Electrodynamical Calculations Using Hermite Finite Elements**  
Siddhant Pandey  
Advisor: L. R. Ram-Mohan (PH)

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**Humanities and Arts**

**Higgins House, Library**

12:30pm  
**FPE in Worcester, MA**  
Sarah Stuart  
Advisor: David Spanagel

12:50pm  
**Race, Religion, and Sartre’s Being-for-Others and Identity**  
Abdullah Hajjar  
Advisor: Jennifer McWeeny

1:10pm  
**Application of Hydraulic Simulations and Flexibility in Engineering Design Methods to the Panama Canal**  
Evelyn Grainger  
Advisor: Peter Hansen, Aaron Sakulich (CEE)  
Sponsor: Panama Canal Authority

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**Interactive Media & Game Development**

**Fuller Labs, Lower Perreault**

1:00pm  
**Doldrum**  
David Allen, Kent Fong, Matt Szpunar, Henry Wheeler-Mackta, Kelly Zhang  
Advisors: Gillian Smith, Ralph Sutter

1:20pm  
**Konbini Konnection**  
Erik Cerini, Laurie Mazza  
Advisors: Jennifer deWinter, Clifford Lindsay (CS)  
Sponsor: Ritsumeikan University, Japan

1:40pm  
**Taming the Black Dog**  
Kyle Baker, Junfeng Guo, Sean Welch  
Advisors: Farley Chary, Lee Sheldon

2:00pm  
**Maze of Rebirth**  
Corey Dixon, William Kelley, Patrick Malone  
Advisors: Jennifer deWinter, Clifford Lindsay (CS)  
Sponsor: Ritsumeikan University, Japan
2:40pm
*Virtuoso: Art for the Disabled*
John Mastascusa, Regina Reynolds, Connor Weeks
Advisors: Stephen Bitar (ECE), Michael Ciraldi (CS), Joshua Rosenstock

3:00pm
*Shiki*
Joe Crimi, Larisa Motova, Rachel Plante, Andrew Walter
Advisors: Jennifer deWinter, Clifford Lindsay (CS)
Sponsor: Osaka University, Japan

3:20pm
*World Wizards*
Tyler Beaupre, Brian Keeley-DeBonis, Hope Wallace
Advisors: Jeff Kesselman, Gillian Smith

3:40pm
*Unseeable*
Isaiah Cochran, Alex Horton, Drew Tisdelle, Thomas Trieu
Advisors: David Brown (CS), Brian Moriarty, Ralph Sutter

4:00pm
*Data and Dynasties: Using Games to Improve Data Literacy*
Chris Bianco, Brian Copeland, Will Craft, Chris Griffin, Natalia Kononenko
Advisor: Lane Harrison

9:00am
*Improving Employer Outcomes: Supervised Learning to Predict Hiring Success*
Emily Bigwood, Owen Chace, Stephanie Martin, Ranier Gran
Advisor: Randy Paffenroth

9:20am
*Scaffolds, a Graph-based System for Tensor Products*
Daniel Perreault
Advisor: William Martin

9:40am
*Workers’ Compensation Tiering Model*
Hannah Kraus, Thomas Leonard, Hary Teklegiorgis, Sarah Wutka
Advisors: Jon Abraham, Barry Posterro
Sponsor: Hanover Insurance Liaison: Isin Ozaksoy

10:00am
*Stochastic Reserves for Term Life Insurance*
William Bourgeois, Alicia Greenalch, Anthony Rodriguez
Advisors: Jon Abraham, Barry Posterro

10:20am
*Currency Risk Management*
Andrea Bayas
Advisor: Gu Wang
Sponsor: Zurich University of Applied Sciences

11:00am
*Ensemble of Feedforward Neural Networks Applied to Credit Default*
Juan Luis Herrero Estrada (joint work with Everett Harding, Luke Buquicchio)
Advisors: Randy Paffenroth, Stephan Sturm
Sponsor: Zurich University of Applied Sciences

11:20am
*Analyzing the Effects of Trade Compression on Risk Propagation in Over-the-Counter Derivative Markets*
Stephen Kosmo
Advisor: Stephan Sturm

11:40am
*Illustrations Wanted*
Andrew Bauer, Dominic Redding
Advisor: Brigitte Servatius

12:00pm
*Network Anomaly Detection Utilizing Robust Principal Component Analysis*
Kevin Guth
Advisor: Randy Paffenroth

12:20pm
*Permutation-Invariant Consensus Over Crowdsourced Labels*
Michael Giancola
Advisors: Randy Paffenroth, Jacob Whitehill (CS)
Mechanical Engineering

POSTER SESSION: 8:30 to 11:30am
Alden Memorial, Great Hall

Biomechanical Engineering

Equine Lung Function Testing
David Frederick, Brandon Hoghaug,
Justin Shanahan, Aaron Weeks
Advisors: Robert Daniello, Songbai Ji (BME)
Sponsor: Melissa Mazan (Tufts Cummings School
of Veterinary Medicine)

Dynamic Correction of Postural Kyphosis
Kirsten Herchenroder, Spenser Martin,
Connor Mastropoll, Maria Manuela Perez Luna,
Silvio Torres Betancur
Advisors: Gregory Fischer, Tiffiny Butler (BME),
Loris Fichera (CS)

Cough Counter for Dogs
Michael Hellmich, Allie McCarthy,
Larissa Naidoo
Advisor: Songbai Ji (BME)
Sponsor: Tufts University

Humanoid Walking Robot
Kenneth Colpritt, Andrew Curran,
Shannon Moffat, Mariah Sullivan
Advisors: Marko Popovic (PH), Selçuk Gucer

Impact Reduction Design
Priscilla Cole, Nicholas Maio, Dan Salisbury,
Joseph Silva, Lucas Zuccolo
Advisor: Brian Savilonis

Sea Turtle Prosthetic
Maura Buckley, Katelyn Chagami,
Kara Martin, Julia Veitch
Advisor: Brian Savilonis

Self-Sustaining Cooling System
Michael Bahnan, Kristen Bender,
James Mosteller, Joseph Tomellini
Advisors: John Sullivan, Ryan Madan (HU)

The Design and Prototyping of a Medical
Lifting Device
Alvaro Galindo, Aaron Hartford,
Jasmine Higuera, Colin Mashack
Advisor: John Sullivan

Assistive Technology Individual
Guitar String Plucker
Lorenzo Dube (BME), Michael Eaton,
Andonios Kouninis, Jia Zhou
Advisor: Holly Ault

Design

Automated Fish Feeder
Mackenzie Banker, Charlie Brooks,
Jake Halverson, Rachel Huntley
Advisor: Eben Cobb

Automated Salt Shaker
Harrison Czajkowski, Matthew Lenthall
Advisor: Eben Cobb

Development of a Modular Seesaw Safety Device
Samuel Bickham, Matthew Eaton,
Matthew Garcia
Advisor: Eben Cobb

Water Cooler Bottle Loader
Nicolas Martin, Marlon Matthews,
Benjamin Schooler
Advisor: Eben Cobb

Show & Tell: What Fun Can Do
Franklyn Bucknor, Alexis Gamez, Miguel Ortiz
Advisor: Paul Cotnoir

Motorcycle Rear Suspension
Jacob Bryant, Allysia Grant, Zachary Walsh
Advisor: Robert Daniello

Automation of Assembly
Marissa Ford, Haruna Okada,
Muhammad Ali Shah
Advisor: Cosme Furlong
Sponsor: MilliporeSigma

Development of Miniaturized Otoscope for
Middle Ear Diagnostics by High-Speed
Holography
Jessica Grabinsky, Peter Hurley,
Ajay King, Benjamin Morton
Advisor: Cosme Furlong
Sponsor: Massachusetts Eye and Ear Infirmary

Water Desalination: Designing a Seawater
Purification System
Spencer Austin, Trevor Gehring,
Michael Wilkinson, Benjamin Zogby
Advisors: Stephen Kmiotek (CM),
Robert Daniello

Acrylic Microfluidic Chip
Katherine Comeford, Susan Elliott,
Storie Nevers, Emma Ryan
Advisor: Yuxiang Liu

Design of Bicycle and Solar-powered Lighting
System for Rural Vietnamese Students
Cassondra Dale, Emilee Gancarz, Chau Tran
Advisor: Fred Looft (ECE)

Design of a Ferry Kite Powered Water Pump
Megan Errichetti, Xiaozhu Liu,
Ronglin Na, Zebulon Shippee
Advisor: David Olinger
Design and Optimization of a FSAE Vehicle
Andrew Casella, Alex Deneault,
Patrick Donaghey, Mark Lightbody,
Jeffrey Robinson, Cote Taylor
Advisors: David Planchard, John Hall

Designing a Parametrically Scalable Prosthetic Arm for Low-End Rapid Prototyping Machines
Rachael Naoum, Alessandra Paolucci
Advisors: David Planchard, John Hall

Revolver Recoil Reduction
Jacob Grealis, Michael Griffin, Carlos Ordonez
Advisors: David Planchard, John Hall

Society of Automotive Engineers Baja Vehicle Frame Research and Design
James Muller, Louis Muller
Advisors: David Planchard, John Hall

Towards Automated Ear Surgery: Improved Calibration and Registration Procedures
Shannon Harrington, Christopher Salomone
Advisors: Marko Popovic (PH), Cosme Furlong
Sponsor: University Hospital Zurich

Automated Design
• Automated Design of Linkages
  Jonathan Andrews, Brandon Knox,
  Brad Leach, Guillermo Rivera

• Automated Generation of SolidWorks Assemblies of Gear-trains and Linkages
  Garrett Holman, Oluchukwu Okafor

• Automated Analysis of Gears and Shafts in a Gearbox
  Joseph Gallagher, Zhidong Ju
  Advisors: Pradeep Radhakrishnan, David Brown (CS)

Vertical Axis Wind Turbine for Remote Power Generation
Jeremy Lane, Theodore Lynn,
Saffiyah Rafieck, Travis Rossen
Advisor: Brian Savilonis

Development of Auto Body Tool
Marcus Pritchard, Justin Mancovsky
Advisor: Joseph Stabile

Low-Profile Home Speaker
• Force Balanced, Sealed Passive Bass Box
  Nick Borsari, Brett Carbonneau,
  Karim Elsayed, Jeremy Honig

• Resonant Panel
  Obianuli Obiora, Drew Sansoucy,
  David Zielinski

• Moving Coil Transducer
  Binh Phan, Ivanna Stuart, Amile Zaaf

• Moving Magnet Transducer
  Steven D’Agostino, Raymond DiMestico,
  Harrison Roy

• Signal Processing
  Corey Coogan, Mark Panetta,
  Suilio Simo, Avik Vimal
  Advisor: Joseph Stabile
  Sponsor: BOSE Corporation

Conveyor Belt 3D Printer
Shawn McCarthy, Zachary Palanchian, James Whelan
Advisor: John Sullivan

Harvesting Energy from Roads
Kurt Billis, Mary Osler, Sam Smith
Advisors: John Sullivan, Alex Emanuel (ECE)

3D Data Collection Package
Stephen Jendritz, Logan Mendelson,
Brad Scuzzarella
Advisor: John Sullivan

Collapsible Temporary Housing Design and Optimization
Reid Billings, Michael Morlock, Jack Nigro,
Ryan Rigney, Nasjela Thodhoraqi
Advisor: Sarah Wodin-Schwartz
Sponsor: Deployed Resources

Design of Water Delivery System for a Microgravity Environment
Rachel Welch
Advisor: Jamal Yagoobi
Sponsor: Deep Space Ecology

Manufacturing

Portable Power for Arid Regions
Nicole Alves, Rachel Rynazewski, Howard Vance
Advisor: Torbjorn Bergstrom

Mechanical Tic Tac Toe Board
Shane Bell, Tim Bill,
Abigail McAdams, Taylor Teed
Advisor: Robert Daniello

Modification of the Microcontact Printing Process for Conductive Ink Printing
Adam Cyran, Michaela Dowling
Advisor: Sarah Wodin-Schwartz
Sponsor: NTB

Materials

Sorting of Automotive Manufacturing
Wrought Aluminum Scrap
Shady Zummar
Advisor: Diran Apelian
Sponsor: Metal Processing Institute
Process Optimization for the Fabrication of Novel Polymer-Metal Composites Using 3D Printing
Justin Coppolino, Ann Kaczowka, Nde Nkimbeng
Advisors: Diana Lados, Germano Iannacchione (PH)

Transport Properties Measurement and Prediction in Cast and Wrought Aluminum Alloys
Andrzej Bielecki, Dexter Gutierrez
Advisors: Diana Lados, Germano Iannacchione (PH)

Light-Driven Actuators
Jake Kelley, Emily McLean
Advisor: Balaji Panchapakesan

Analysis of Shape Memory Properties in 3D Printed PLA
Tsering Dolma, Jesse Kauffman, Andrew Kelly, Emily Perkins
Advisor: Amy Peterson

FGM Soft Actuators
Reynaldo Duran, Jiacheng Liu, Steven Rangel, Adam White
Advisors: Nima Rahbar (CE), Cagdas Onal

Flexible Solar Cells
Jason Bugarin, Collin Chen, Jeremiah Leonard, Reese Peterson
Advisors: Pratap Rao, Cagdas Onal

Structural Features and Mechanical Properties of Five Species of Seaweeds
Rachel Sudol, Rachel Swanson
Advisor: Satya Shivkumar

A Metallurgical Investigation of the Effects of Double Tempering on the Hardness, Impact Toughness, and Microstructure of AISI 4140 Steel
Aiden Freeburg, Connor Hoeckele, Connor Ross, Kelly Soldevilla
Advisor: Richard Sisson

Stabilized NMC811 to Enable High Energy Density Lithium Ion Batteries
Yuxin Gao, Logan Visser
Advisor: Yan Wang

Material Processing of a HIPS/AC FDM Filament for Water Filtration
Bryant Babel, Jennifer Day, Chris Massar, Emily Matsco
Advisors: Sarah Wodin-Schwartz, Erica Stults

Robotics Engineering

Multi-Terrain Wheelchair
Joseph Abinader, Andrew Buley, Alexander Pappas, Victor Pina
Advisor: Torbjorn Bergstrom

Telenursing RoboPuppet
Brent Heavey, Matthew Lamare, Evan Stelly
Advisor: Zhi (Jane) Li

Autonomous Campus Mobility Platform
Garrison Hefter, Mitch Read, Dylan Roncati, Shamsur Saikat
Advisor: Cagdas Onal

Aquatic Robotic Recovery Craft (ARRC)
Justin Harris, Alexander Krasa, Patrick Murphy, Alberto Ramirez
Advisors: Ken Stafford, Michael Ciardaldi (CS)

Sailbot
Jordan Burklund, Hans Johnson, Travis Norris, Liam Shanahan
Advisors: Ken Stafford, William Michalson (ECE)

Thermofluids

Waste Heat Turbo Charger
John Bylund, Benjamin Freed, Yiannis Kaparos
Advisor: Torbjorn Bergstrom

Analytical Model for a Modular Geothermal System
Sabrina Guzzi, Brendan Harty, Karina Larson, Amanda Richards
Advisors: Robert Daniello, Christopher Scarpino

Deep Ocean Energy Harvesting
Jasmine Feliciano, Nicholas Hernandez, Yao Long, Julia White
Advisor: Robert Daniello

Conceptual Design of an Advanced 10 MW Ocean Thermal Energy Conversion System in Jamaica
Melody Shum, Valentina Vacarez
Advisor: Selçuk Guceri

Jet Blast Energy Harvester
Constantine Christelis, William Dziuban, Jessica Norman
Advisor: Fiona Levey

Computational Fluid Dynamics of a Wind Turbine
Harrison He, Alan Hunt, Charlotte Moore, Theodore Wallach
Advisors: David Planchard, John Hall

Energy Harvesting from Rainwater
Carolyn Detora, Kayleah Griffen, Nicole Luiz, Basak Soylu
Advisor: Brian Savilonis
Kármán Vortex Street Energy Harvester for Picoscale Applications
James Doty, Christopher Mayforth, Nicholas Pratt
Advisor: Brian Savilonis

Experimental Study of Flexible Electrohydrodynamic Conduction Pumping
Pavolas Christidis, Nathaniel O’Connor, Nicolas Vayas Tobar
Advisor: Jamal Yagoobi

Physics

Olin Hall, Room 107

9:00am
Quantum Random Walks
Austen Couvertier, Swarnadeep Majumder
Advisor: P. K. Aravind

9:15am
Simulation of the Propagation of Terahertz Waves in Linear and Nonlinear Media
Miguel Aranda
Advisors: Reinhold Ludwig (ECE), Lyubov Titova, Alex Zozulya

9:30am
Spatially Resolved Photoluminescence Spectroscopy of 2D Nanomaterials
Members: Patrick Fitzgerald
Advisor: Lyubov Titova

9:45am
Applying Cluster Computing with Raspberry Pi’s to Numerical General Relativity
Zachary Chester
Advisors: Shanshan Rodriguez, Leo Rodriguez (Assumption College)

10:15am
High Accuracy Electrodynamical Calculations Using Hermite Finite Elements
Siddhant Pandey
Advisor: L. R. Ram-Mohan

10:30am
Experimental Measurement of Anisotropy for an Iridium-192 Source Using Gafchromic Dosimetry
Nicole Beinsteind, Kenneth Fong
Advisor: David Medich

10:45am
Devising an Optimal Procedure to Study the Relationship Between Cytoskeletal Stiffness and Contractile Force in Cells
Aline Tomasian
Advisor: Qi Wen

11:00am
VIFs in Cellular Dynamics
Yu Jing
Advisor: Professor Qi Wen

11:15am
Hydrogen Peroxide Propulsion System for Small Satellites
Kevin Martin (AE), Finn O’Brien (PH/AE), Eric Pereira (ME)
Advisors: Nikolaos Gatsonis (ME), Germano Iannacchione
Sponsor: MIT Lincoln Laboratory

Professional Writing

POSTER SESSION
11:30am to 12:30pm
Higgins House, Great Hall

Human Respiratory Disorders
David Frederick
Advisor: Brenton Faber

Rhetorical Models of International Development
Rachel Santarsiero, David Smallwood
Advisor: Brenton Faber

A Technology Acceptance Model for Solar Adoption
Andrew Callahan
Advisor: Brenton Faber

Eiko Iwashita
Advisor: Brenton Faber

Sailbot: Communicating about Robotics Through Short-Form Video Documentary
Travis Norris
Advisor: Jennifer deWinter

Designing Capability Statements to Win Federal Contracts
Kristen Bender
Advisor: Ryan Madan
* China Project Award Winner
Fostering Innovation Through Curriculum in China
Kailun Liu, Eric Peterson, Jake Scheide, Daniel Venkitachalam

* China Project Honorable Mentions
Improving Transportation in Hangzhou, China, Through Citizen Feedback
Michaël Antonelli, Rosie Heidt, Emily Kolaya, Ryan O’Brien

Measuring Green Space Efficacy in Hangzhou, China
Laura Bauer, Matthew DeBenedictis, David Glangrave, Zachary Vaughan

Robotics Engineering
Atwater Kent Labs, Room 116

9:00am
Quadrupedal Robotics Platform
Zachary Armsby, Richard Cole, Brandon Coll, Joseph Martin, Andrew Nagal
Advisors: Gregory Fischer (ME), William Michelson (ECE), Craig Putnam (CS)

9:15am
Lionfish MQP: Harvester
William Godsey, Brandon Kelly, Joseph Lombardi, Nikolay Uvarov, Andrey Yuzvik
Advisors: Bradley Miller, Craig Putnam (CS), Kenneth Stafford

9:30am
Creating an Extension Board for the Khepera IV to Allow for Situated Communications
Leah Reppucci
Advisor: Carlo Pinciroli

9:45am
CERBERUS
Marissa Bennett, Kenneth Quartuccio, Jeffrey Tolbert
Advisors: Kenneth Stafford, Alex Wyglinski (ECE)
Sponsor: AFRL

10:00am
Sailbot 2017-2018
Jordan Burklund, Hans Johnson, Travis Norris, Liam Shanahan
Advisors: William Michelson (ECE), Kenneth Stafford

10:30am
Localization for FRC
Jinan (Dorothy) Hu, Peter Mitrano, Kacper Puczylowski, Nicolette Vere
Advisors: William Michelson (ECE), Bradley Miller

10:45am
Tactile Fabric Manipulation
Calum Briggs, Thomas Brown, Andrew Lewis, Sarah O’Grady, William Sullivan
Advisors: Stephen Bitar (ECE), Marko Popovic (PH)
Sponsor: New Balance Athletics

11:00am
Feasibility Study: Heterogeneous Swarm Solution for Disaster Reconnaissance
Carolyn Lowe, Turner Robbins, Jarrett Sarnell, Mathew Schwartzman, Lucy Stuehrmann
Advisors: Jianyu Liang (ME), Carlo Pinciroli

11:15am
GE Blisk Inspection System
Nicholas Hollan, Kevin MacIntosh
Advisors: Kenneth Stafford, Craig Putnam (CS)
Sponsor: General Electric

11:30am
Automated Sandwich Assembly Kiosk (Slice)
Derek Feehrer, Carter Reynolds, Jaime Stephen, Taylor Stephen
Advisors: Gregory Fischer (ME), William Michelson (ECE)

12:00pm
Yale’s Open Hand
Thai Dinh, Duong Nguyen, Hoang Nguyen
Advisors: Jie Fu (ECE), Zhi (Jane) Li (ME)
Sponsor: RightHand Robotics

12:15pm
Aquatic Robotic Recovery Craft
Justin Harris, Alexander Krasa, Patrick Murphy, Alberto Ramirez
Advisors: Michael Ciaraldi (CS), Kenneth Stafford

12:30pm
Industrial 3D Printer
Meghan Broughton, Matthew Carnein, Jonathan Luna, Tung Truong
Advisor: Craig Putnam (CS)
Sponsor: AGR Bodine

1:30pm
Reusable Software Components for Multi-Robot Foraging
Vanshaj Chowdhary, Tanuj Sane, Joseph Wilder
Advisors: George Heineman (CS), Carlo Pinciroli
1:45pm
Industrial Robotics Object Calibration System
Mingxin Yu, Jinwei Zhang, Yunze Zhu
Advisors: Torbjorn Bergstrom, Susan Jarvis (ECE), Craig Putnam (CS)

2:00pm
Self-Driving on 1/10 Racer Car
Junbo Chen, Andrew Huynh, Zitong Jiang, Zhizhen Wu
Advisors: Jie Fu (ECE), Xinning Huang (ECE), Zhi (Jane) Li (ME), Carlo Pinciroli

2:15pm
MIRA
Chris O’Shea Alex Taglieri, Ben Titus
Advisors: Susan Jarvis (ECE), Craig Putnam

2:30pm
Robotic Scaffolding
Nathan Beeten, Chris Cormier, Connor Willgress
Advisors: Cagdas Onal (ME), Carlo Pinciroli

3:00pm
Shared Autonomous System for Robot-Assisted Sewing
Dominic Cupo, Elijah Eldredge, Alexandra Emrick, Sophia Gudenrath, Mary Hatfalvi, Wyatt Henke
Advisors: Jie Fu (ECE), Zhi (Jane) Li (ME), Craig Putnam
Sponsor: New Balance Athletics

3:15pm
Adversarial Strategic Games and Robotic Design
Jon Berry, Evan Gilgenbach, Griffin Tabor
Advisors: Carlos Pinciroli, Kenneth Stafford

3:30pm
Automated Design of Planar Linkages
Jonathan Andrews, Brandon Knox, Brad Leach, Guillermo Rivera
Advisors: David Brown (CS), Pradeep Radhakrishnan (ME)

3:45pm
Automated Generation of SolidWorks Assemblies of Gear-trains and Linkages
Garrett Holman, Oluchukwu Okafor
Advisors: David Brown (CS), Pradeep Radhakrishnan (ME)

4:00pm
Automated Analysis of Gears and Shafts in a Gearbox
Joseph Gallagher, Zhidong Ju, Ricardo Ochoa
Advisors: David Brown (CS), Pradeep Radhakrishnan (ME)

4:30pm
Ibex: Robotic Mining Platform
Nikhil Castelino, Thomas Hagen, Rayyan Khan, Kushagra Kumar, Parmenion Patias
Advisors: Michael CiaraIdi, Kenneth Stafford

4:45pm
Humanoid Walking Robot
Kenneth Colpitt, Andrew Curran, Shannon Moffat, Mariah Sullivan
Advisors: Selçuk Guceri (ME), Marko Popovic

5:00pm
Telenursing RoboPuppet
Brent Heavey, Matthew Lamare, Evan Stelly
Advisor: Zhi (Jane) Li (ME)

5:15pm
Non-Invasive Neural Controller
Walter Gallati, Patrick Polley
Advisors: Joseph Beck (CS), Marko Popovic

5:30pm
Autonomous Campus Mobility Platform
Garrison Hafter, Mitch Read, Dylan Roncati, Shamzur Saikat
Advisor: Cagdas Onal (ME)

Social Science and Policy Studies
Salisbury Laboratories, Room 305

9:30am
Human Perception of Outliers in Data
Tyler Jaskoviak
Advisors: Jeanine Skorinko, Lane Harrison (CS)

10:00am
Analyzing Behavior Across Four Simple Economic Games
Morgan Brokaw, Nicol Garcia
Advisor: Alexander Smith
10:30am
Incorporating Green Infrastructure in the Worcestershire County Urban Habitat Action Plan
Katherine Pelissari
Advisor: Robert Krueger
Sponsor: Worcester County Council

11:00am
The Homelessness Reduction Act of 2017
Tess Hudak
Advisors: Patricia Stapleton, Jennifer deWinter (IMGD), Dominic Golding
Sponsor: Museum of Homlesness in London, UK

12:45pm
A Comparative Analysis of Breastfeeding Policies in Indonesia, the United Arab Emirates, and the Philippines
Michaela Dowling
Advisors: Patricia Stapleton, Lisa Stoddard

1:15pm
Improving Adverse Event Reporting at the U.S. Food and Drug Administration
Clare Masucci
Advisors: Kent Rissmiller

1:45pm
The Effect of Perspective Taking and Phenotypicality on Racial Sterotyping
Daniel Perkins
Advisor: Jeanine Skorinko
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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 45 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.

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- A project cannot be “mission critical” or on the “critical path.”
- The best types of projects support or enhance current activities.
- 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.

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

Aerospace Engineering – 5576
Biology and Biotechnology - 5543
Biomedical Engineering - 5447
Business - 5218
Chemical Engineering - 5250
Chemistry and Biochemistry - 5371
Civil and Environmental Engineering - 5294
Computer Science - 5357
Electrical and Computer Engineering - 5231
Environmental Engineering - 5330
Humanities and Arts - 5246
Interactive Media and Game Development - 4977
Interdisciplinary and Global Studies - 6699
Mathematical Sciences - 5241
Mechanical Engineering - 5236
Physics - 5258
Professional Writing - 5198
Robotics Engineering - 6665
Social Science and Policy Studies - 5296

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Michael Whalen
Head of Process and Technology Separations Technology Cluster
MilliporeSigma
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