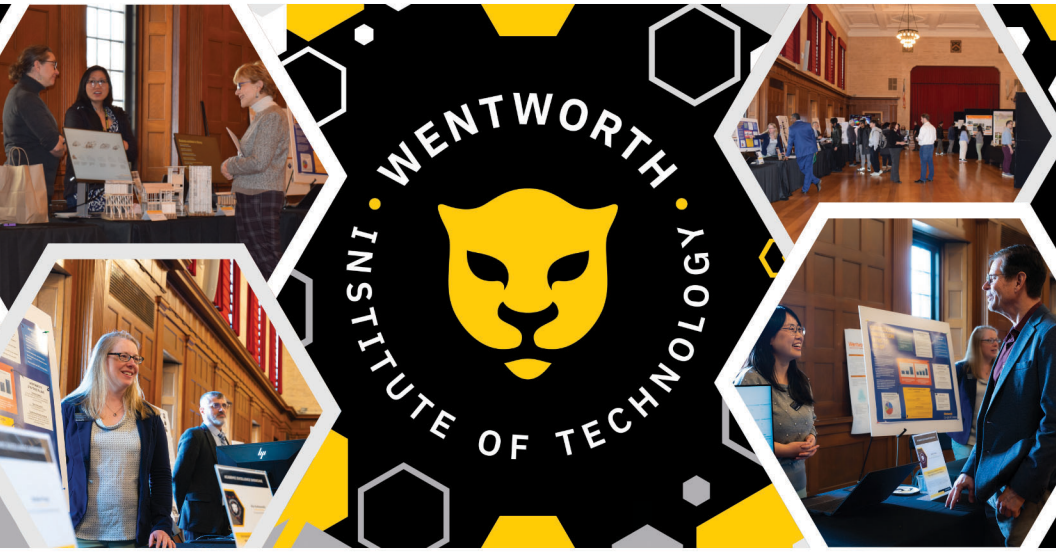
ACADEMIC EXCELLENCE SHOWCASE



Thursday, March 26, 2026

11:00am - 2:00pm

CEIS Lobby

SHOWCASE CONTENTS

A Domain-Based Curriculum for Undergraduate Applied AI

Mehmet Ergezer, Associate Prof., School of Computing and Data Science
Weijie Pang, Assistant Professor, School of Computing and Data Science
Ella Howard, Professor, School of Sciences and Humanities
Brian Ernst, Assistant Professor, School of Sciences and Humanities

Computing programs increasingly need to prepare graduates who can apply AI in context, not just write software. We present a transferable model for an undergraduate B.S. in Applied AI that treats application domains (e.g., Business, Life Sciences) as co-equal with a rigorous AI technical core. To widen participation while maintaining depth, we replace the traditional calculus sequence with a tailored "Mathematics for AI'' track. The 120-credit curriculum is anchored by a technical AI core, required co-operative education, and a culminating one-semester senior design project, with ethics explicitly threaded throughout. Our contribution to the higher education community is a pragmatic blueprint for institutions that aim to broaden participation and produce integrated AI practitioners. We share our domain-based curriculum, course maps, learning outcomes, and launch domains co-developed with partner schools, with institutional adoption planned for Fall 2026.

AI-Supported Course Coordination and Professional Document Workflow Integration

Sharon Brown, Associate Professor, School of Management

This showcase presents a multi-part instructional model that integrates AI-generated video modules, coordinated course structures, and AI-supported analysis of professional documents across disciplines. The presentation will demonstrate how AI video scaffolding supports student learning, section consistency, and faculty efficiency in multi-section courses. It also shows how AI can be used to analyze business documents such as schedules, estimates, reports, contracts, and technical submissions to teach real-world professional skills. Attendees will learn practical strategies for embedding document-based workflows into their courses using AI as a coaching and analysis tool. The session provides a scalable framework for improving instructional quality, coordination, and workforce readiness across academic programs.

An Interactive 3D Carbon Emissions Map for Environmental Assessment of Buildings at Wentworth: An Introduction to Undergraduates in Construction Management Program

Kushagra Varma, Assistant Professor, School of Management

Buildings use large amounts of energy and water, making them a major source of greenhouse gas emissions in the U.S. This research developed a web-hostable 3D ArcGIS map of Wentworth Institute of Technology's campus to show building energy, water, and emissions trends, while also supporting sustainability education in construction management courses. The project aims to raise awareness, improve decision-making, and help train future professionals in sustainable building practices through data analysis and user feedback.

An Invitation to Collaborate on Error Analysis to Address Students' Misconceptions

Mami Wentworth, Assoc. Prof., School of Computing and Data Science
Mel Henriksen, Assoc. Prof., School of Computing and Data Science
Mark Mixer, Professor, School of Computing and Data Science
Youssef Qranfal, Professor, School of Computing and Data Science
Deirdre Donovan, Assoc. Dean, School of Computing and Data Science

In Foundations of Calculus, we have employed a pedagogical strategy called Error Analysis to support student learning. By presenting a solution method with intentional errors, students must challenge their misconceptions and correct them. We will present our methodology, improvements in students' performance, and their feedback. We invite instructors of all fields to join us in employing error analysis to address student misconceptions for potential future publication. This presentation is based on work previously presented at the 2025 MathFest conference in Sacramento, California. This research is being prepared for journal publication.

Animated Materiality

Katarina Richter-Lunn, Assistant Prof., School of Architecture and Design

This work represents ongoing research into the ways physical environments can register, respond to, and resonate with human affective states. Building on a series of empirical studies conducted as part of Professor Richter-Lunn's doctoral dissertation, the project extends these findings through the design and fabrication of a full-scale prototype that demonstrates the aesthetic, embodied, and interactive potential of programmable materials. Using physiological sensing to drive subtle material responses, the installation explores how architecture can dynamically engage with the body rather than remain static. More broadly, the research contributes to larger discussions around the role of advanced technological tools, such as physical computing and machine learning, in increasing the malleability of the built environment and advancing socially engaged, human-centered design practices.

Architectural Memory: Experiencing the Villa Livia and the Villa dei Misteri in VR

Tatjana Crossley, Assistant Professor, School of Architecture and Design

This work-in-progress presents an immersive VR exploration of the Villa Livia and the Villa dei Misteri, investigating how spatial reconstruction, atmosphere, and interaction can activate architectural memory. The experience moves beyond static visualization to test experiential qualities such as scale, movement, and perceptual sequencing within historically and culturally significant spaces. Through early experiments in interactivity, the project is asking how virtual environments can function as tools for architectural research, pedagogy, and cultural interpretation. The showcase offers a preview of an evolving digital archive that integrates immersive media with emerging AI-assisted workflows for heritage documentation.

Battery Cycling Project

Ryan Arbid, Student, School of Engineering
Elliot Duprat, Student, School of Engineering
John Voccio, Associate Professor, School of Engineering

The purpose of this project was to design, build, and test a circuit to cycle lithium-ion battery packs automatically and record data to track the degradation of the battery over time. This cycling includes a charging phase and discharging phase where the voltage and current going into and out of the battery would be monitored. This was done by using multiple INA219 current sensors, USB-based switching, and a load resistor to control and measure power flow to and from the battery. In theory, this circuit would reliably cycle the battery and collect consistent measurements, enabling long-term analysis of battery performance and degradation. This circuit could be a low-cost and effective method for characterizing lithium-ion batteries behavior, which is important for improving battery reliability and lifespan evaluation. The hopeful ending to this project would use this circuit to test a custom battery charging and see if this custom charger is more efficient than regular chargers in charging a battery pack.

Brownfield Secure Software Development - Identifying Logical Partitions

Jasdish Singh, Student, School of Computing and Data Science
Aspen Olmsted, Assoc. Prof., School of Computing and Data Science

Modern applications often evolve organically, leading to complex and undocumented architectures that hinder maintenance, refactoring, and feature development. This poster presents a novel approach to reverse-engineer the physical partitioning of production applications.

Brownfield Secure Software Development - Visualization of Physical and Logical Partitions

Jake Carter, Student, School of Computing and Data Science
Aspen Olmsted, Assoc. Prof., School of Computing and Data Science

By utilizing the visualization technology provided by PlantUML, combined with the code tracing ability of Xdebug, we can create a small-scale prototype of a program that can both record code traces, and then visualize them in a comprehensible diagram for user observation.

Comparing Individual Study Guides and Structured Group Study in Enhancing Plan Reading Skills in Construction Management Students

Farzam Maleki, Associate Professor, School of Management
Farnaz Jafari, Visiting Assistant Professor, School of Management

This study examines how two different pre-exam study approaches affect construction management students' performance on a midterm exam focused on plan reading. One group used a traditional individual study guide, while the other participated in a structured, instructor-facilitated group study session emphasizing peer instruction and collaboration. Student exam performance and perceptions of collaborative learning mechanisms were analyzed and compared. Preliminary findings suggest that structured group study can improve comprehension, reduce cognitive load, and enhance retention, with students highlighting peer explanations and group error correction as particularly helpful.

Competitive Battle Bot

Mia Cunningham, Student, School of Engineering
Yamyl Zapata Gonzalez, Student, School of Engineering
Jasper Mayone, Student, School of Computing and Data Science
Evan Gold, Student, School of Engineering
Tory Lam, Assistant Director and Lab Coordinator, School of Engineering

This is the main project for the Wentworth robotics club at the moment. We are designing, manufacturing, assembling, and testing a twelve pound competitive combat robot to compete in the National Havoc Robot League (NHRL) during the summer semester in Norwalk, CT.

Covert File Transfer with RF Emissions

Daniel Conde, Student, School of Computing and Data Science

This project demonstrates file exfiltration from an air-gapped system using electromagnetic emissions. By modulating CPU workload, data is encoded into VRM-generated RF signals and captured with a software-defined radio. Results show that sensitive data can be leaked without network connectivity, highlighting hardware-level security risks.

Design and Additive Manufacturing of Smart Pressure Sensing Systems for the Prevention of Pressure Ulcers in Non-Mobile Patients

Massie Kazemi, Visiting Assistant Professor, School of Engineering
Adam Khiyaty, Student, School of Engineering

This project develops a smart pressure sensor using additive manufacturing and liquid-metal microchannel technology to help reduce the risk of pressure ulcers in non-mobile patients. By emphasizing durable, repeatable, and low-profile designs, the sensor enables real-time pressure monitoring that can improve patient care in hospitals, home-care settings, and long-term care facilities. Beyond healthcare applications, the project provides hands-on learning opportunities for engineering students, advances accessible manufacturing methods, and demonstrates how mechanical engineering innovation can address pressing societal and quality-of-life challenges.

Determining the Remaining Lifetime of Underline Asset

Semere Gebresilasie, Assoc. Prof., School of Computing and Data Science
Andrew Giacalone, Student, School of Computing and Data Science

In reliability studies that track the time until a sample reaches a failure state, it is essential to calculate the expected remaining life of an object. This is often done using the median residual lifetime (MERL), which offers advantages over the mean residual lifetime because it is more resistant to censoring and outliers. In this paper, we demonstrate how the MERL is calculated and use simulations to examine its asymptotic properties as the sample size approaches infinity. We also explore several applications of the MERL. In financial prediction, measuring how long a stock remains above or below a moving average allows us to use the MERL to estimate when it may cross that average again. In clinical trials, patients on different treatments are monitored for survival time or duration of illness; applying the MERL to each treatment group can help reveal which therapies are more effective.

Enhancing Problem-Solving Skills of Electrical and Computer Engineering Students

Federica Aveta, Assistant Professor, School of Engineering
Yugu Yang-Keathley, Assistant Professor, School of Engineering

Problem-solving skills—particularly the ability to identify, analyze, and resolve issues within an engineering system under time pressure and with incomplete information—are essential in modern engineering practice, yet they remain underemphasized in many engineering curricula. To address this gap, faculty in the Electrical and Computer Engineering (ECE) programs launched an initiative to reimagine hands-on engineering education by embedding structured troubleshooting activities into required electric circuits courses. Building on positive student feedback from a Fall 2023 pilot in an introductory course (Network Theory I), where a troubleshooting laboratory exercise was designed and implemented, the team is now expanding the approach to an intermediate-level course (Network Theory II). This expansion represents a broader pedagogical shift from traditional, procedure-driven laboratory exercises toward inquiry-driven, active troubleshooting and learning experiences. Such a shift holds the potential to strengthen students' technical confidence, perseverance, critical thinking, and problem-solving abilities, ultimately better preparing graduates for the evolving demands of contemporary engineering industries.

Enhancing Undergraduate Data Science Education Through Structured, Project-Based Learning

Weijie Pang, Assistant Professor, School of Computing and Data Science
Mehmet Ergezer, Associate Prof., School of Computing and Data Science

The project presents the design and impact of project-based learning in course Data Science Fundamentals, delivered in seven sections from 2023 to 2025, the course emphasizes real-world skills through two major projects. The presentation will briefly describe the course structure and share reusable prompts and rubrics. We aim to spark discussion, find collaborators, and gather feedback on adapting this model across diverse fields.

Evaluating Construction 4.0 Technologies: Applications and Educational Integration

Cristina Cosma, Professor, School of Management

This showcase will describe research conducted through a Bistline Grant to examine how automation and robotics are transforming the built environment and influencing the construction industry. The study reviewed current and emerging technologies associated with Construction 4.0, including robotic arms, humanoid robots, collaborative robots (cobots), AI-enabled systems, and swarm robotics, with attention to their capabilities, maturity, and application across construction project phases. Literature analysis and case study review were used to evaluate how these technologies address productivity, safety, and cost challenges traditionally associated with labor-intensive, site-specific construction processes. This showcase will discuss the findings of this review, their implications for the Construction Management (CM) curriculum at Wentworth Institute of Technology, and the development of a proposed project-based technical elective.

Feasibility of a Microgrid for an Urban College Campus

Kaitlyn Kozak, Graduate Student, School of Engineering
Aidan Frates, Student, School of Engineering
Afsaneh Ghanavati, Program Director, School of Engineering
Marisha Rawlins, Associate Professor, School of Engineering

We are currently researching the feasibility of a microgrid to service the Colleges of the Fenway and the surrounding areas. A microgrid is a controllable energy system that stores energy generated from solar, wind, and other sources to be used during non-generation hours. It works with the main grid to buy and sell power, limit costs, and help during times of peak demand.

First-Year Research and Design: Process of Designing a Community Center

Lora Kim, Associate Professor, School of Architecture and Design

First-year students researched both traditional courtyard housing typologies from around the world and contemporary architectural examples where exterior spaces are located on the corner, the building elevation, and multiplied to create dispersed voids. Students then applied their knowledge from vernacular and current examples to create a community center in a hot climate, where the shaping of outdoor open space and interior programmed space inspired the design intentions. The mass-void relationship and the interior-exterior synergy are powerful design ideas that generate endless possibilities while responding to climate, environmental, social, and public-private relationships. The presentation will showcase student research from China, Mexico, Egypt, Japan, Switzerland, and the United States, and how the ideas translated into innovative design solutions.

Flying into Agile

Hollis Greenberg, Associate Professor, School of Management

Learning the differences between project management techniques does not have to be an academically boring exercise. Every spring, students enrolled in Applied Project Management (MGMT 2550) spend a class session designing, building, and testing paper airplanes. During this highly engaging in-class activity, students build paper airplanes using traditional project management, followed by a second round of construction using agile methodologies. Afterward, we debrief by discussing and comparing the two project management methodologies. The session concludes with a “Fly Off”, where student teams select their best airplane builds to compete against each other … just for fun!

From Awareness to Action: Designing Learning Experiences That Change Behavior

Megan Grandmont-Melendy, Technology Training and Communications Manager, Digital Technology Services
Justin Ragsdale, Senior Project Manager, Digital Technology Services

What does it take to move learners from awareness to action? This poster shares a case study from Cybersecurity Awareness Month 2025 that explores how intentional learning experience design can lead to meaningful behavior change. Over four weeks, DTS combined short, focused cybersecurity learning moments and coordinated communications into a spaced learning campaign, which was associated with a sustained reduction in phishing risk across two consecutive months. We’ll share the strategies behind this campaign so attendees can apply similar approaches to designing learning experiences that encourage real-world action in academic or workplace settings.

GDP Nowcasting App

Joshua-Calebe Vieira, Student, School of Computing and Data Science
Minh Huy M Van, Student, School of Computing and Data Science
Yuchen Dong, Mathworks
Weijie Pang, Assistant Professor, School of Computing and Data Science

Under the guidance of faculty and industry supervisors, this co-op position focuses on developing a standalone MATLAB application for GDP nowcasting based on an existing open-source model developed by the Federal Reserve Bank of New York. The original GDP Nowcasting code is implemented in MATLAB and designed primarily for research use. The goal of this project is to transform the codebase into a user-friendly, standalone MATLAB app with improved visualization, usability, and overall user experience.

Global Research Studio - Greece

Meliti Dikeos, Associate Professor, School of Architecture and Design

This proposed showcase will present design work by Master of Architecture students engaged in faculty-directed research following a ten-day travel period in Greece, including Athens, Delphi, and Hydra (Fall 2025). The work centers on a speculative written proposal exploring the potential for architectural intervention on the island of Hydra, grounded in preliminary research and critical readings. The projects reflect a phenomenological understanding of place shaped by history, culture, landscape, and human presence. Through close observation of terrain, light, materials, and lived experience, students developed architectural proposals responsive to the experiential qualities of the land. Select final drawings and models will be featured in the Academic Excellence Showcase.

Green and Cool Roof Retrofit Feasibility – Chelsea, MA.

Justin Munoz Pena, Student, School of Sciences and Humanities, School of Management

Green roofs provide critical green space in dense urban environments where open land is limited, particularly in Environmental Justice Populations disproportionately affected by heat and pollution. This study evaluates the feasibility of retrofitting green roofs on existing buildings in Chelsea, Massachusetts, designated as an Environmental Justice Population under state criteria, using spatial analysis in ArcGIS Pro. Roof suitability is assessed based on slope, area, and land use to identify buildings appropriate for modular tray green roof systems. Where structural or economic constraints limit vegetation, reflective cool roofs are evaluated as an alternative heat mitigation strategy. Findings aim to inform equitable climate adaptation planning and cost-effective green infrastructure deployment in underserved urban communities.

How AI Impacts Design: Embedding an AI Component into Visual Communication Curriculum

Liza Lynch, Assistant Professor, School of Architecture and Design

I developed a Visual Communication (2D graphic design course) project that allows students to compare and contrast the work they designed, the work designed by AI, and the work designed in combination, student and AI. This allowed students to be able to identify the pros and cons of using AI. I executed this by embedding the AI component I created into a Visual Communication project which allowed students to examine how AI impacts design. I taught this class three times over the last two years which allowed me to make direct comparisons over the semesters. This project affected the students by introducing them to AI tools that they may need to know how to use during co-op or in their careers after Wentworth. This project impacted the program by allowing the faculty to understand if the students are learning what they need to know about AI, if this is the right course for an embedded AI project, if the project could be used elsewhere more effectively or if the project should change.

How Can Faculty Use News and Contemporary Examples to Enhance Students' Knowledge and Understanding of Concepts in the Field of Business and Finance

Hossein Noorian, Professor, School of Management

I share the information and the methods that I have been using in increasing students' interests in subject matters such as different sources of renewable energy and coupling them with many aspects of finance. This technique has been very useful in increasing students' attention to many fundamental issues such as cost of capital and capital budgeting, breakeven point analysis and different aspects of budgeting in the field of Finance.

How Co-ops & Careers Uses AI to Support WIT Students

Ria Kalinowski, Assistant Director of Advising & Career Education, Co-ops and Careers

The Co-ops & Careers Office teaches students how to use ethical and effective AI strategies to enhance their job search. This presentation will show how our AI Job Search Guide helps students refine resume bullets, tailor cover letters, and prepare for interviews and networking events. We will share “prompt engineering” techniques we teach for all aspects of the job search. We will also share how these resources are integrated into 1:1 career advising appointments and featured in our “AI in the Job Search” workshops to help students build confidence. Together, these offerings demonstrate our commitment to providing innovative, high impact support that empowers learners in a rapidly evolving career landscape.

How Much Context Does the Brain Need? Comparing AI Models for Decoding EEG During Real-World Experiences

Mehmet Ergezer, Associate Prof., School of Computing and Data Science

Electroencephalography (EEG) measures brain activity using sensors placed on the scalp. In this work, we study how well different artificial intelligence models can interpret EEG recorded while people watch natural, real-world video clips. This setting is more realistic than traditional experiments that use highly controlled, simplified stimuli, but it is also much more challenging because brain responses unfold over time and reflect many overlapping processes. We compare several deep learning approaches that differ in how they use temporal context, or information from earlier moments in the recording. Our goal is to understand which model designs are most effective for capturing meaningful patterns in naturalistic EEG. This benchmark helps clarify how model architecture and temporal context influence decoding performance and can guide the development of more effective tools for studying brain activity in realistic settings.

Identifying Source Code Sequence Through Reverse Engineering with AI

Gia Gill, Student, Simmons University
Julia Bisse, Student, School of Computing and Data Science
Jasdish Singh, Student, School of Computing and Data Science
Aspen Olmsted, Assoc. Prof., School of Computing and Data Science

Modern applications often evolve organically, leading to complex and undocumented architectures that hinder maintenance, refactoring, and feature development. This poster presents a novel approach to reverse engineer the physical partitioning of production PHP applications by leveraging detailed execution traces generated by PHP’s XDebug extension. The methodology focuses on analyzing XDebug’s function call and file access logs to identify logical groupings of code (e.g., modules, services, or layers) that represent distinct physical partitions within the application’s runtime behavior. By mapping these identified partitions, derived directly from real-world execution flows, onto a UML activity diagram, we aim to provide a clear and accurate visual representation of the application’s internal structure and interpartition interactions. This technique offers a practical and automated means to generate up-to-date architectural documentation, facilitating a deeper understanding of legacy systems and supporting informed decisions for architectural improvements and migration strategies.

Injecting Software Guarantees in Brownfield Software Development

Ishi Golub, Student, School of Computing and Data Science
Aspen Olmsted, Assoc. Prof., School of Computing and Data Science

Securing a large codebase that is in production is a persistent challenge in software engineering. This project introduces a novel Logic-Driven Code Weaving Framework that elevates UML from passive documentation to an active, executable specification.

Interactive Mathematics Through the Lights-Out Puzzle

Nathan Bednar, Student, School of Computing and Data Science
Igor Minevich, Assistant Prof., School of Computing and Data Science
Gabe Cunningham, Assoc. Prof., School of Computing and Data Science

This project transforms graph theory and the classic Lights Out puzzle into an interactive, web-based platform accessible to both casual users and researchers. Built largely from the ground up using JavaScript and grounded in linear algebra, it enables users to explore abstract mathematical concepts through gameplay and experimentation. The platform continues to evolve with new features aimed at mathematicians and casual players alike, promoting hands-on discovery.

Learning-Based Robust Control for Mechanical and Aerospace Systems

Mahmut Reyhanoglu, Professor, School of Engineering

Modern technologies such as drones, satellites, and robotic systems must operate reliably in uncertain and changing environments. Disturbances such as wind, modeling errors, and unexpected conditions can significantly affect system performance. Designing controllers that can maintain stability and accuracy despite these uncertainties is a central challenge in engineering. This talk presents a learning-based control approach that enables mechanical and aerospace systems to adapt while they operate. The method combines ideas from nonlinear control theory with simple learning rules that allow the controller to estimate and compensate for unknown disturbances in real time. As a result, systems can remain stable and accurately follow desired motions even when their exact dynamics are not fully known. Potential applications include robotics, autonomous vehicles, and aerospace systems.

MATH 4100: Industrial Problems in Applied Math

Austin Harper, Student, School of Computing and Data Science
Devon Lapierre, Student, School of Computing and Data Science
Daniel Tapia, Student, School of Computing and Data Science

The modern investment industry offers limited large-scale customization for individual investors. Many portfolio construction tools apply generalized models that do not account for differences in investor financial situations, risk tolerance, or tax environments. This issue was introduced to us by CEO Dan diBartolomeo of Northfield Information Services, Inc. which is a financial analytics firm specializing in portfolio optimization and risk modeling. Our model incorporates Modern Portfolio Theory, investor characteristics, tax considerations, and diversification preferences tailored to individual use cases.

Mind Your Business

Michael Mozill, Associate Professor, School of Management
Santiago Umaschi, Assistant Professor, School of Management

Professors Mozill and Umaschi are creating a podcast called “Mind Your Business” to help disseminate knowledge about management while strengthening the broader academic community. Through engaging conversations with faculty, students, industry professionals, and alumni, the podcast will translate management concepts into practical, real-world insights that listeners can easily understand and apply. At the same time, it will highlight the strengths and opportunities of the academic program by showcasing courses, projects, and student achievements, helping to promote the program to prospective students. By regularly featuring alumni as guests and contributors, Mind Your Business will also provide a platform for graduates to share their experiences and stay connected with the program, fostering an active and engaged professional network.

Nature Walks and What Thoreau Can Teach Us

Gloria Monaghan, Professor, School of Sciences and Humanities

This nature project focuses on the Muddy River Project, the Victory Garden and the Emerald Necklace. Using the essays of Thoreau and the time he spent in isolation at Walden Pond, students create nature journals to observe birds, trees and plants found in the Victory Garden and Muddy River. Students create a research question and develop annotated bibliographies to answer their question. Some students received a Certificate of Amateur Naturalists based on their perseverance walking and observing nature in the frigid winter temperatures.

Neurostimulation-Driven Insect Biobots: Control, Power Optimization, and Educational Integration

Tahmid Latif, Assistant Professor, School of Engineering

Biobots or biological robots are live, instrumented, and remotely controlled insects developed for search-and-rescue applications. The biobots are traditionally controlled by neurostimulation pulses (a form of electrical pulse) applied to neural interfaces—a boundary formed by an electrode (an electrical conductor) implanted in a biological entity, like a tissue medium. Such technology is used to stimulate or record neural activity, enhance the nervous system, and control a prosthesis. The work investigates neural interfaces in invertebrates to enable the control of their locomotion as biobots, improving the operational duration of their electronic system, and developing related robotic platforms for use in education and research. The desired outcomes were the development of “efficient” biobots, development of relevant robotic platforms, and equipping the Wentworth student community with skills to investigate neural interfaces and learn about the relevant applications in modern-day medical prostheses.

Phillips Road Bridge Replacement

Elijah Edwards, Student, School of Management

This project presents the structural analysis and redesign of a steel girder replacement rail bridge in Upstate New York, developed in accordance with Allowable Stress Design (ASD), and American Railway Engineering and Maintenance-of-Way Association (AREMA) methodology. The proposed structure was evaluated under combined dead, live, wind, and snow loads. Governing bending moments, shear forces, and serviceability criteria were determined, and members were selected to satisfy allowable stress limits for ASTM A992 structural steel. The final design satisfies strength requirements and provides a safe, durable bridge suited to withhold the loading conditions of a freight locomotive hauling crude oil tankers and coal rail cars.

Plasma Treatment in Graphene Exfoliation: Comparing Corona and Atmospheric Plasma to Oxygen Plasma in Pre-Treating SiO2 Wafers

Christina Issa, Student, School of Engineering
Benjamin Marble, ‘24, School of Engineering
Alan Hoang, Boston University
Salwa Karroum, ‘25, School of Engineering
Michael Geiwitz, Boston College
Salil Desai, Assistant Professor, School of Engineering
Kenneth Burch, Boston College
Andrew Seredinski, Associate Prof., School of Sciences and Humanities

Oxygen plasma pretreatment of silicon dioxide substrates is commonly employed in graphene exfoliation. The plasma’s thorough cleaning of adsorbates from the substrate improves the surface interaction between the graphitic flakes and the substrate. However, oxygen plasma systems are seldom portable and can be large and costly. We compare few-layer graphene exfoliation yields from two oxygen plasma pretreatment recipes to atmospheric plasma pretreatment, portable corona system pretreatment, and a control, testing each condition with both kish graphite and highly oriented pyrolytic graphite. We find some evidence that the these alternatives generally perform worse than the traditional oxygen plasma, supporting their absence from current graphene exfoliation procedures and indicating significant differences between the impact of these pretreatments for the different types of bulk graphite.

Predicting Quantum Mechanical Energies Using Neural Networks

Abia Hasan, Student, School of Computing and Data Science
Brian Ernst, Assistant Professor, School of Sciences and Humanities

Density Functional Theory (DFT) is a widely used method for calculating the energy of systems with many electrons by describing how electrons are distributed in space. While several energy contributions in DFT are well understood, accurately modeling the remaining residual energy remains a major challenge. In this work, integrals are derived from the electron density as descriptors and apply interpretable machine learning models to predict the residual energy after known contributions are removed. By enforcing sparsity, these models select a subset of influential descriptors, providing insight into which features of the electron density most strongly influence complex energetic behavior beyond standard DFT approximations.

Quad-Band Planar Magnetic Inductive Waveguide for Next-Generation Wireless Wearables

Shelby Tommy, Student, School of Engineering
Jayshri Kulkarni, Assistant Professor, School of Engineering

This dual-layer planar magnetic-inductive (MI) waveguide is designed for next-generation wearable wireless systems. The structure has an overall size of 158 mm × 12 mm and is designed on a flexible PET substrate with a relative permittivity ($\in_r$) of 2.6 and a thickness of 0.8 mm, making it suitable for integration into smart textiles. The waveguide features 13 resonating loops on the top layer and 13 complementary loops on the bottom layer, arranged in a face-to-face configuration to enable strong inter-layer magnetic coupling. This arrangement supports multiple inductively coupled modes, achieving quad-band operation at 2.6, 3.25, 3.96, and 4.55 GHz. Full-wave simulations, including reflection (S11/S22) and transmission (S21/S12) analyses, demonstrate efficient energy transfer, low reflection, and stable propagation under bending conditions. Additionally, specific absorption rate (SAR) evaluations on circular and rectangular human-body phantoms confirm that the design meets wearable safety limits.

Reconstructing a Low-Cost Laparoscopic Abdominal Training Model

Schephatia Feron, Student, School of Engineering

Minimally invasive (laparoscopic) surgery requires advanced hand–eye coordination and depth perception, yet many commercial training systems are expensive and inaccessible. This project presents the design and development of a low-cost, modular laparoscopic training simulator that allows users to practice essential surgical skills in a controlled environment. The platform includes interchangeable task modules that simulate real surgical challenges such as object transfer, precision cutting, and suturing. User testing demonstrated measurable improvements in accuracy and coordination over repeated trials. By prioritizing affordability and adaptability, this system aims to expand access to surgical skills training for students and early trainees.

Reflections on Specs Grading Without Students

Sunjae Park, Associate Professor, School of Computing and Data Science

Specs grading is a concept where students are evaluated based on their mastery of learning targets, called “specs,” rather than points from exams and assignments. Each spec is assessed as pass/fail, and students may reattempt multiple times until they pass. While most studies emphasize student benefits, this study focuses exclusively on the impact on final grades. We analyzed grades from a traditional course in which students had multiple opportunities, similar to specs grading, and compared those grades to what they would have been under a hypothetical specs grading system.

Reframing Communication with Stakeholders in Construction Projects Through Integrative Pedagogical Approaches

Sarah Williamson, Visiting Assistant Professor, School of Management

An elective course was developed to reframe communication with stakeholders in construction projects. Using integrative pedagogical approaches—including project-based assignments, task-based activities, and guest lectures from industry experts—the course addressed a gap between classroom communication practices and industry realities. Guided by student feedback, the course introduced a rotating set of topics that encouraged learners to identify stakeholders, connect concepts across contexts, and develop their own communication strategies and best practices.

Sabbatical Research Activities (Fall 2026)

John Voccio, Associate Professor, School of Engineering

During his Fall 2026 sabbatical semester, Prof. Voccio focused on a few different, unrelated research topics—superconducting magnets, battery charging and technology for the visually impaired. Working with Solid Materials Solutions (N. Chelmsford, MA) on two NASA-funded Phase II SBIR programs, Prof. Voccio performed mechanical, electrical and thermal design of some new superconducting magnets and facilitated coil testing at 63 K using solid nitrogen. Regarding battery charging, Prof. Voccio investigated the improvement in charging behavior using a new patented charger. Finally, working mostly with the Carroll Center for the Blind (Newton, MA), Prof. Voccio helped teachers for the visually-impaired (TVI) understand 3D-printing capability and started developing new tactile maps for visually-impaired individuals.

Simulation Driven Design in Metal Casting

Joshua Hofer, Student, School of Engineering
Serdar Tumkor, Associate Professor, School of Engineering

Metal casting is a complex manufacturing process where geometry, thermal behavior, and solidification dynamics strongly influence final part quality. Casting simulation software enables defects such as shrinkage, porosity, and uneven cooling to be predicted and simulated prior to pouring, reducing trial and error. Wentworth Institute of Technology, has helped integrate simulation tools into student projects, including Cast in Steel Competition and Research on Casting, to support data driven design decisions. This work highlights the educational value of casting simulations and their direct connection to modern foundry practices.

Soaring Hills Housing that Elevates

Dominic Biarrio, Student, School of Architecture and Design

Soaring Hills Housing provides flexible, prefabricated modular units designed for students and young professionals with temporary living needs. Each unit integrates mechanical, plumbing, and environmental systems, as well as built-in furniture, creating self-contained, high-performance spaces. The building balances a stable structural framework with movable components, allowing adaptability, personalization, and future expansion. The design responds to site-specific conditions such as slope, sunlight, and views while connecting residents to the surrounding community. By combining modularity, sustainability, and adaptability, Soaring Hills Housing demonstrates a research-driven approach to temporary urban living that is both functional and resilient.

SoTL@WIT

ATLAS (Advancing Teaching, Learning, and Scholarship) Center

ATLAS is developing resources to support Scholarship of Teaching and Learning (SoTL) at Wentworth. Please stop by our booth to share your ideas. We would like to hear about your scholarship in this area or have a more informal discussion about teaching and learning activities and approaches that could become areas of research. Our long term goal is to develop resources that meet the needs of our faculty and support productive collaboration around classroom inquiry and assessment. Please stop by to learn about our SoTL support and share your ideas with us!

State of Student Health and Wellbeing

Maura Mulligan, Dean of Health and Wellbeing, Student Affairs
Leanne Fisher, Associate Director of Health Promotion and Education, Student Affairs

During the spring of 2025, The Center for Wellness at Wentworth conducted the Healthy Minds Study with current students. The survey provides an in-depth look at the prevalence of mental health outcomes, knowledge and attitudes about mental health and utilization of resources. This poster will showcase some key findings from the study related to Wentworth student health and wellness.

Student Poetry Reading

Gloria Monaghan, Professor, School of Sciences and Humanities
Students from Spring 2026 Poetry Workshop Course

Students from the Spring 2026 Poetry Workshop course (Elise Perry, Dylan Thomas, Corey Rondeau, Anette Garcia, Abdulla Kanoo, Joshua Stewart, Katrina Hoppe, Keith Bakke, Morelia Estefania Cervantes Saldana, and Sonia Abdel-Fattah) will read their original poems.

Summary Report of Launch Grant-funded Project, "Statistical Data Analysis of Mechanical Properties of Metal 3D Printing Parts"

Xiaobin Le, Professor, School of Engineering
Masoud Olia, Professor, School of Engineering
Herbert Connors, Laboratory Director, School of Engineering
Gabriel Dell'Isola, Graduate Student, School of Engineering
Calvin Dobson, Graduate Student, School of Engineering
David Bilia, Student, School of Engineering
Sean Rowbotham, Student, School of Engineering

Statistical Data Analysis of Mechanical Properties of Metal 3D-Printed Parts" is a two-year research project funded by a Launch Grant. Hundreds of metal 3D-printed specimens were fabricated and mechanically tested. This report presents statistical analyses of their mechanical properties, including static and fatigue strengths. Two graduate students and two undergraduate students were actively involved in the project, and their activities and contributions are described in this report. The report also concisely presents the research results and discusses key challenges encountered during the project.

Superfund ARG AI

Adam Toscano, Student, School of Computing and Data Science
Ella Howard, Professor, School of Sciences and Humanities
Mehmet Ergezer, Assoc. Prof., School of Computing and Data Science
Josh Larson, Director of Digital Transformation and Academic Technology Services, Digital Technology Services

In an interdisciplinary, experimental research project, we are exploring the potential of retrieval-augmented generation for analysis of a large corpus of historical documents. Focusing on the historical records of the federal Superfund project, we seek to test and document analytical workflows using emerging technology. In this first phase of the project, we are establishing appropriate workflows to ensure accurate data collection and documentation practices.

The Historical Significance of Early Wentworth Institute Campus Buildings

Darina Tokoldoshev, Student, School of Architecture and Design
Alana Adams, Student, School of Architecture and Design

For the Innovation Scholars Program, we researched Wentworth's early history, its first campus buildings, and the architects behind them. We gathered information for a preliminary draft of a Massachusetts Cultural Resource Information System (MACRIS) Inventory Form. Previous MACRIS information on Wentworth is outdated and inaccurate. We found that Wentworth's early buildings held architectural significance, as they were designed by recognized Boston architects in a Classical Revival style that was important to the early twentieth-century development of the Fenway/Kenmore neighborhood. Additionally, the school was a pioneering institution, paving the way for specialized industrial education and technical institutes.

The Intersection of Industrialized Construction, Housing Performance and Affordability

Zuo Jiali, Student, School of Architecture and Design
Payam Bakhshi, Professor, School of Management

This research examines industrialized residential construction systems developed in Europe, assesses their adaptability to Massachusetts conditions, evaluates their scalability as housing-delivery solutions, and identifies workforce, policy, and delivery implications for addressing the region's housing crisis.

Three Years of WITipedia: Outcomes from Wikipedia Editing Events about Women in STEM

Andrew Seredinski, Associate Prof., School of Sciences and Humanities
Faith Litchock-Morellato, Asst. Prof., School of Sciences and Humanities
Allison Lange, Professor, School of Sciences and Humanities
Kelsey Irvine, Associate Director for Research & Collections,
Douglas D. Schumann Library and Learning Commons
Nadine Stecher, Assistant Professor, School of Sciences and Humanities

Wikipedia is one of the most visited websites globally and is a commonly used source of information among students, academics, and large language models alike. To contribute to correcting known gender disparities on the platform and to address a diversity of learning outcomes, we have engaged students in editing articles about notable women in STEM for the past three years. We analyze the impact of these editing assignments and events on students, Wentworth, and Wikipedia. This analysis includes work funded by grants through Wentworth's Faculty Ambassadors for Inclusive Excellence program and the Wikimedia Foundation with additional support from the School of Sciences and Humanities.

Toolkits for Participatory Design

Brie Blanchette, Student, School of Architecture and Design
Anne-Catrin Schultz, Professor, School of Architecture and Design
Ignacio Cardona, Associate Professor, School of Architecture and Design

As participatory design becomes more widely adopted in architecture, planning, and community development, the toolkits that support these practices differ greatly in accessibility, structure, and approaches to power sharing. This research examines contemporary participatory design and community engaged toolkits to understand who they serve, how participation is organized, and how methods vary across disciplines and project contexts. By comparing these toolkits, the study reveals how design processes are shaped by underlying assumptions about community, knowledge, and collaboration.

Vacuum Evaporative Water-Based Air Conditioner

Joseph Breeden, Student, School of Engineering
John Voccio, Associate Professor, School of Engineering
Mansour Zenouzi, Professor, School of Engineering
Neville Patel, Independent Inventor

This research focuses on improving the functionality of a green air conditioning system that uses water instead of refrigerant for cooling. Mid-semester work focused on installing a flowmeter and optimizing pump performance to ensure measurable and stable coolant flow. These improvements help establish reliable system operation and move the project further in its prototypical stage.

Vertical Axis Wind Turbine Project

Brett Tata, Student, School of Engineering
John Voccio, Associate Professor, School of Engineering
Bo Tao, Associate Professor, School of Engineering
Neville Patel, Independent Inventor

Areas with a lot of wind can use wind turbines as a source of renewable energy. Vertical Axis Wind Turbines (VAWT) are particularly helpful in areas with a lot of wind that typically comes one direction, such as a 'wind tunnel' found in many city streets. Knowing the direction of the wind, it begs the question, if you were able to help direct the wind into the correct part of the VAWT, would this increase energy production of the VAWT? If it does increase energy production, how much of an increase could we expect to see? Using a VAWT and a source of wind in one direction, we can answer these questions with a series of tests. Determining the energy production of the VAWT with and without a wind diverter, we can compare the results and arrive to a conclusion based on experimental results.

THANK YOU

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Academic Excellence Showcase Co-chairs

Alisha Sarang-Sieminski, Executive Director of ATLAS and Professor of Biological Engineering

Anne-Catrin Schultz, Faculty Fellow for Undergraduate Research and Professor of Architecture

The Advancing Teaching, Learning, and Scholarship (ATLAS) Center, Undergraduate Research Program, and Honors Program, with the Office of the Provost, are pleased to showcase and celebrate the scholarly and innovative work and collaborations happening at Wentworth.

THANK YOU FOR COMING!

For more information, contact teach@wit.edu.