ASEE Northeast Section Conference

Inclusive Excellence and Student Success in Engineering Education

Wentworth Institute of Technology
Boston, Massachusetts

April 22nd and 23rd, 2022

Conference Sponsors

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COVID POLICY for ASEE NE 2022: We require anyone who has symptoms or who has been exposed and is not fully vaccinated and boosted if eligible to stay home. We ask anyone coming to campus who is not fully vaccinated and boosted if eligible to have a 3rd party test result in the days leading up to their visit. All attendees should be prepared to present their vaccination card or test result if asked. Masks though optional, are recommended when not actively eating or drinking, especially in closed spaces with many people like the poster session.

Photography: Photos taken at the conference are the property of ASEENE2022 and may be used by the conference organizers, especially for promotional and marketing materials in future. If you object to your picture being used, please send an email to the conference chair at your earliest and before April 23, 2022

Internet: Visitors to the campus should use LepordGuest. If you have any questions, you can get help from our tech support in black shirts with "Tech Spot" written on their shirts. Tech Spot is located on the third floor of the Beatty Hall.

Parking: is free for conference visitors. A parking pass can be found on our website.

Registration: is in the Beatty Hall, Multipurpose room on Friday April 22, 2022, and on Saturday April 23, 2022, up to 8:30 am. Registration will be in Watson Auditorium after 9 am on Saturday, April 22, 2022. If you arrive on campus on April 23, 2022, please come straight to Watson Auditorium.

Please feel free to contact our track chairs if you have any questions during our conference. If the question is urgent, please cc kamata@wit.edu

Dean's Message

As Dean of Wentworth Institute of Technology, I am delighted to welcome all of you to the 2022 ASEE Northeast Section Conference on behalf of the organizing and technical committees. Wentworth is located in the great city of Boston, which contains a rich tourist-attracting history, a bustling scientific community, and a hub of higher education with 35 colleges and universities.

The conference is organized around a central theme of inclusive excellence and student success in engineering education. In the US, graduation rates in engineering have been around 50%-60% for many decades. However, graduation rates in diverse, underrepresented populations are even lower, as continuously shown in ASEE by the Numbers. This equity gap has been exacerbated during the pandemic. One of the grand challenges for higher education institutions that offer engineering is that diverse, underrepresented populations are increasing, but their graduation rates are not improving. Thus, to narrow this equity gap and meet this grand challenge, academic institutions must have a community that cultivates an inclusive excellence spirit in the classroom and beyond. Therefore, this conference hopes to have intentional and thoughtful discussions, talks, and workshops around this topic.

The reality is that the world is changing rapidly, and the problems that engineers solve are more complex and require an interdisciplinary approach. Furthermore, these problems require analysis from diverse perspectives to ensure inclusive solutions. One area that excites me the most at the Section Conferences is the students presenting their work. As an academician who has focused on student engagement and learning, I enjoy seeing the impact of our higher education community in creating engineers that are prepared to tackle the future.

I hope that this conference provides participants with an experience that will orient their compass with a mindset that all academic institutions have to be culturally competent and that all students must have a chance to reach their full potential. Once we all have the proper heading, we can take steps in the right direction as a community. I look forward to meeting you all at the conference.

Best regards,

José Sánchez, Ph.D.
Dean and Professor, School of Engineering
Wentworth Institute of Technology

ASEE NE Section Chair's Message

We are honored to welcome you to the 2022 American Society for Engineering Education-Northeast Section (ASEE-NE) Conference at the Wentworth Institute of Technology (WIT). We are happy to have a large number of contributions from faculty and students from many institutions and several states to this conference. This is the second Northeast Section in-person conference in six months in the post-pandemic era. We are very thankful to our Northeast Section members for their continuous support and determination to elevate engineering education in the region.

Our mission is to showcase the latest developments in engineering education and strengthen partnerships among engineering educators in the region. We are committed to bringing together the best talents from our engineering community and fostering their growth. This is an ideal forum to interact with engineering educators, listen to the methods of educators in other institutions, and listen to undergraduate and graduate students' research. We hope that this regional conference on engineering education will inspire and motivate our younger generation to pursue a career in engineering fields that uplift our world and allow them to play an essential role in the ever-evolving technology world.

Our past conferences were excellent, with outstanding presentations, and this year's agenda is rich and diverse, with workshops, keynote talks, several sessions, and networking events. We hope that you will benefit from this year's conference. We thank all the participants, committee members, and sponsors for their impressive support - a special thank you to the WIT faculty and staff who worked very hard to make ASEE-NE2022 a successful event.

Bala Maheswaran, Ph.D.
Northeastern University
Chair-elect, ASEE NE

ASEE NE2022 Conference Chair's Message

On behalf of the ASEENE2022 Organizing Committee, it is my pleasure to welcome you to the 2022 Annual Conference Northeast Section (ASEE-NE) at Wentworth Institute of Technology on April 22nd – 23rd.

The theme of the conference is "Inclusive Excellence and Student Success in Engineering Education". We define inclusive excellence as actively and intentionally cultivating a diverse and culturally competent institution where each member has the opportunity and support to reach their full potential and make contributions to our campus community and beyond. Another focus of this conference is on student success which is about not only students' persistence, performance, and degree completion but also preparing engineering students for the future of the work and the world that will demand more complex problem solvers.

We look forward to a rich program with professional paper presentations, extended abstract presentations, student paper presentations and poster presentations within various engineering disciplines and engineering education. There will be multiple awards for best papers and posters.

The conference will also include campus tours, workshops for professionals and a professional's banquet. In addition to the conference, we will be hosting a pre-conference workshop on Essentials of Effective Instruction, on Thursday, April 21st, 2022.

The ASEENE2022 Organizing Committee, Professors Afsaneh Ghanavati, Douglas Dow, Hadi Kazemiroodsari, Mansour Zenouzi and Marisha Rawlins have worked hard the whole year to bring this conference to you. Along with the organizing committee, Dean José Sánchez and I cannot wait to see you on our campus at the conference!

Anuja Kamat, Ph.D.

Associate Professor of Civil Engineering, School of Engineering
Wentworth Institute of Technology
Conference Chair, ASEE NE 2022
Chair-elect, ASEE NE

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Keynote Speaker

What Would You Do if You Weren't Afraid?

When the Lean-In author and Chief Operating Officer of Meta Platforms (formerly known as Facebook), Sheryl Sandberg, posed the question "What would you do if you weren't afraid?", her target audience was women, including women prone to struggling with the archaic theory of a woman's place being at home, in the kitchen, rather than in an office. Yet, the reality is that fear is not limited to women and workplace issues. Fear does not discriminate. Fear is a real challenge to people across genders and ages, regardless of ethnicity, and throughout various religious sectors. And fear exists over a gamut of contexts including those fighting for political change, environmental action, and trying to succeed in the engineering classroom.

For this talk, Dr. Bosman will leverage her prior experiences working for a federally recognized tribal college (College of Menominee Nation; Keshena, WI) and her current experiences working for a research-intensive university (Purdue University; West Lafayette, IN) to provide thought-provoking discussion on how fear may be preventing our engineering students from reaching their full potential. The talk will provide useful and transformative strategies for engineering educators to level the playing field and promote IDEA (inclusivity, diversity, equity, and access) within the engineering classroom.

Lisa Bosman, Ph.D. in Industrial Engineering, is a tenure track assistant professor at Purdue University. Prior to joining Purdue, she spent about a decade working for a federally recognized tribal college (College of Menominee Nation) where she built up and directed the pre-engineering program. Dr. Bosman's desire to increase STEM (science, technology, engineering, mathematics) education accessibility and attainment has resulted in her founding of the Purdue University iAGREE Labs (www.iagree.org). Her education research interests include the entrepreneurial mindset, interdisciplinary education, broadening participation in STEM, and faculty professional development. Dr. Bosman co-authored the recent texts, Teaching the Entrepreneurial Mindset to Engineers (2018) and Teaching the Entrepreneurial Mindset Across the Curriculum – An Integrative Approach (2021); and has authored over 60 publications in international and national journals and conferences. As a Principal Investigator (PI), she has obtained over $2M in education research funding from agencies including the National Science Foundation, Environmental Protection Agency, National Aeronautics and Space Administration, and Agency for International Development. Dr. Bosman has been an invited speaker and workshop facilitator for numerous national and international education-related engagements. She serves as a division officer for the American Society for Engineering Education (Industrial Engineering Division) and engineering councilor for the Council on Undergraduate Research.

ASEE Leader's Talk

Re-Designing Engineering Culture to Embrace Systems-Level Thinking to Engineer for a Sustainable Future

Engineers design for society, for our built world, for technological improvements, and for our planet. However, the underlying function for which we are engineering has changed shape significantly - and continues to change. Unfortunately, our approaches have evolved slowly, but are perceived and treated as optima. These approaches need to be revisited. Because the underlying function for which we are engineering will continue to change, we also need to develop a process that enables approaches to evolve strategically and continuously so they truly are optima.

Our engineering culture - what we say and how we go about doing it - determines whether the field of engineering can truly solve 2021 problems or just create even larger 2050 problems. The American Society for Engineering Education has launched a task force endeavoring to restructure those portions of our engineering culture that make us more vulnerable and less able to meet the challenges of today and the future. This talk will focus on the motivations and need to adopt inclusive systems-level analyses into engineering practice. Discussions aim to initiate conversations that define the limitations of the present state and envision pathways and processes to a better future set of practices that embrace systems-level analyses.

Adrienne R. Minerick is Director of ADVANCE at Michigan Tech, Professor of Chemical Engineering, and is now serving as President of ASEE. She has served as Associate Dean for Research and Innovation in the College of Engineering, Assistant to the Provost for Faculty Development, Dean of the School of Technology, founded the College of Computing and most recently served as Interim Dean of the Pavlis Honors College. She has received numerous honors and awards, including the distinction of Fellow of AAAS and ASEE, a National Science Foundation CAREER Award, the Raymond W. Fahien Award from the Chemical Engineering Division of ASEE, and Michigan Tech's Fredrick D. Williams Instructional Innovation Award. She and her students have published over 75 archival journal publications, book chapters, or proceedings articles and earned 23 best paper/presentation awards. Adrienne previously served as the President of the American Electrophoresis Society and on the ASEE's Board of Directors as First Vice President and Professional Interest Council I Chair. She also chaired ASEE's National Diversity Committee. Her research and service interests regularly intersect and involve underserved individuals with an emphasis on research experiences to increase engagement and retention.

2022 ASEE Northeast Conference Schedule

Friday, April 22nd 2022

Breakfast	Breakfast and Registration start at 7:30 AM	7:30 - 8:30 AM	Beatty Hall, Multipurpose Room
Welcome	Dean's Welcome	8:00 - 8:15 AM	

Session 1,2	Professional Papers and Extended Abstracts (details below)	8:30 - 10:00 AM	Beatty Hall, Rooms 418-421

Workshop	The Social Conscious and Design Decision Making	10:15 – 11:30 AM	Beatty Hall, Multipurpose Room
Lunch	Pick up box lunch before next workshop	11:30-11:45 PM	
Workshop	Equity minded Educators Impact Student Success	11:45 – 1:00 PM	

Session 3, 4	Professional Papers and Extended Abstracts (details below)	1:15 - 2:45 PM	Beatty Hall, Rooms 418-421
Session 5, 6	Professional Papers and Extended Abstracts (details below)	3:00 - 4:30 PM	

Tour	Campus/Lab Tour - *Leaves from Multipurpose room*	4:30 – 5:30 PM	Beatty Hall, Multipurpose Rm.

Networking*	Appetizers and Drinks	5:15-6:15 PM	Watson Auditorium
Keynote*	What Would You Do if You Weren't Afraid?	5:45 -6:30 PM	
Dinner*	Banquet Dinner	6:30 -7:30 PM	

** Faculty and Industry Professionals events only - No Students*

Professional Paper Sessions

Session 1	The Future of Technology for Today's Students	8:30 - 10:00 AM	Beatty Hall, Rm. 420
Session 2	A Teaching Pedagogy to Enhance Learning	8:30 - 10:00 AM	Beatty Hall, Rm. 421
Session 3	A Reflection of the Energy and Engineering Curricula	1:15 - 2:45 PM	Beatty Hall, Rm. 420
Session 4	A Deeper Look into Future Technologies	3:00 - 4:30 PM	Beatty Hall, Rm. 420
Session 5	Engineering Reimagined, Ethics, and Applications	3:00 - 4:30 PM	Beatty Hall, Rm. 421

Extended Abstract Paper Sessions

Session 1	Innovative Courses and First-Year Engineering	8:30 - 10:00 AM	Beatty Hall, Rm. 419
Session 2	Innovative Thoughts and Tools for Engineering Courses	8:30 - 10:00 AM	Beatty Hall, Rm. 418
Session 3	Innovative Engineering Research	1:15 - 2:45 PM	Beatty Hall, Rm. 419
Session 4	DE+I and Active Learning	1:15 - 2:45 PM	Beatty Hall, Rm. 418
Session 5	Online Education Assessment and Technical Writing	3:00 - 4:30 PM	Beatty Hall, Rm. 419

2022 ASEE Northeast Conference Schedule

Saturday, April 23rd 2022

Breakfast	Breakfast and Registration start at 7:30 AM	7:30 - 8:30 AM	Beatty Hall, Multipurpose Room
Welcome	Dean's Welcome	8:00 - 8:15 AM	

Sessions 1,2,3	Student Paper Presentations	8:30 - 10:00 AM	Beatty Hall, Rooms 419-421

Note: Registration will move to Watson Auditorium at 9:00 AM. If you arrive after 9:00 AM, go to Watson Auditorium

Workshop	Student Poster Presentation and Presentation	10:15 – 12:15 PM	Watson Auditorium
Lunch	Pick up box lunch	12:15 - 12:30 PM	
ASEE Leader's Talk	Re-Designing Engineering Culture to Embrace Systems-Level Thinking to Engineer for a Sustainable Future	12:30 PM - 1:00 PM	

Session 4,5,6	Student Paper Presentations	1:15 - 2:45 PM	Beatty Hall, Rooms 418-421
Tour	Campus/Lab Tour - *Leaves from Watson Auditorium*	1:30 – 2:30 PM	Watson Auditorium

Awards	Awards and Closing Ceremony	3:00 PM – 4:00 PM	Watson Auditorium

Student Paper Sessions

Session 1	Engineering Education and Educational Tools	8:30 - 10:00 AM	Beatty Hall, Rm. 419
Session 2	Smart Sensors and Structural Health Monitoring	8:30 - 10:00 AM	Beatty Hall, Rm. 420
Session 3	First Year Program - Creating and Harvesting Energy	8:30 - 10:00 AM	Beatty Hall, Rm. 421
Session 4	Engineering Education and Diversity, Inclusion, and Equity	1:15 - 2:45 PM	Beatty Hall, Rm. 419
Session 5	Engineering Multi-domain Applications of Smart Sensors	1:15 - 2:45 PM	Beatty Hall, Rm. 420
Session 6	Multi-disciplinary innovation and Additive Manufacturing	1:15 - 2:45 PM	Beatty Hall, Rm. 421

2022 ASEE Northeast Conference Organizing Committee

	**José Sánchez, Ph.D.** Dean and Professor School of Engineering Wentworth Institute of Technology
	**Anuja Kamat, Ph.D.** (Conference Chair) Associate Professor Civil Engineering, School of Engineering Wentworth Institute of Technology
	**Douglas E. Dow, Ph.D.** Professor Electrical and Computer Engineering, School of Engineering Wentworth Institute of Technology
	**Afsaneh Ghanavati, Ph.D.** Assistant Professor Electrical and Computer Engineering, School of Engineering Wentworth Institute of Technology
	**Hadi Kazemiroodsari, Ph.D.** Associate Professor Civil Engineering, School of Engineering Wentworth Institute of Technology
	**Marisha Rawlins, Ph.D.** Assistant Professor Electrical and Computer Engineering, School of Engineering Wentworth Institute of Technology
	**Mansour Zenouzi, Ph.D.** Professor Mechanical Engineering, School of Engineering Wentworth Institute of Technology

2022 ASEE Northeast Conference Committees

Professional Papers Track Chairs: Afsaneh Ghanavati, Ph.D., Wentworth Institute of Technology Mansour Zenouzi, Ph.D., Wentworth Institute of Technology
Student Papers Track Chairs: Marisha Rawlins, Ph.D., Wentworth Institute of Technology Shinae Jang, Ph.D., University of Connecticut
Extended Abstracts Track Chair: Hadi Kazemiroodsari, Ph.D., Wentworth Institute of Technology
Student Poster Track Chair: Douglas E. Dow, Ph.D., Wentworth Institute of Technology
Event Organizing Chairs: Doreen Cialdea, Wentworth Institute of Technology William Cashel-Cordo, Wentworth Institute of Technology
Sponsorship Chairs: Afsaneh Ghanavati, Ph.D., Wentworth Institute of Technology Marisha Rawlins, Ph.D., Wentworth Institute of Technology
Other Ad-Hoc Task Volunteers: Sara Hammond, Wentworth Institute of Technology Joseph Diecidue, Wentworth Institute of Technology Abhishek Kumar, Ph.D., Wentworth Institute of Technology Tugba Arsava, Ph.D., Wentworth Institute of Technology Herb Conners, Wentworth Institute of Technology Filip Cuckov, Ph.D., Wentworth Institute of Technology Trinh Huynh, Wentworth Institute of Technology

Workshops

The Social Conscious and Design Decision Making

Juval Racelis, *Wentworth Institute of Technology*
Gloria Ma, *Wentworth Institute of Technology*
James McCusker, *Wentworth Institute of Technology*

Multipurpose Room, Beatty Hall
10:15 am-11:30 pm

One of the tasks that engineering design education is to ensure students to have a strong understanding of their customers and environments. They must understand the context of their decision-making and how it impacts people in diverse and inclusive communities. This requires students to develop sensitivity regarding issues of race, gender, religion, nationality, age, physical ability, and much more.

Under a funded EPIC project, a team of engineering and humanities/social science faculty, as well as Wentworth staff specializing in social diversity developed a set of socially-conscious design exercises in the past two years. These exercises are designed to be completed within a single lecture (50~75 minutes) and could be facilitated by a variety of instructors. Several iterations had already been made through pilot study with senior design classes and focus groups. The pilot study shows positive feedback that these exercises help students understand their design environment and identify possible prejudices before they are an issue; they also help create a more globally aware student, ready to be a positive citizen in society. In addition, an assessment tool is under development for ABET accrediting: ABET Outcome 2 (An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors).

With this workshop faculty/staff will learn how to use the designed exercises to help students' aware social conscious impact on design decision making.

Juval V. Racelis earned his PhD in Applied Linguistics with a concentration Second Language Writing and TESOL. In his teaching, he focuses on the writing development needs of students from multilingual and diverse backgrounds. His research focuses on writing program development and pedagogical innovations in composition courses.

Gloria Ma is a Professor in School of Engineering at Wentworth Institute of Technology. Her research interests are dynamics and system modeling, project-based engineering design, and robotics in manufacturing. She is actively involved in community services of prompting STEM to girls.

James R. McCusker is an Associate Professor at Wentworth Institute of Technology in the Department of Electrical Engineering. Since joining Wentworth in 2010, he has been heavily involved with an array of interdisciplinary design courses that range from introductory to capstone courses.

A special thanks to Dr. Aaron Carpenter for his help in the creation of this workshop.

Equity minded Educators Impact Student Success

Nichole Price, *Wentworth Institute of Technology*
Caitlin Wells, *Wentworth Institute of Technology*

Multipurpose Room, Beatty Hall
11:45 am-1:00 pm

The purpose of a STEM education is to provide each student with the conceptional, and technical foundations needed to explore, create, and innovate in a dynamic career field. Conventional teaching and learning strategies often fall short of this goal because they fail to factor in the varied learning needs of the students who make up the modern classroom.

Through this highly interactive, 75-minute workshop, participants are invited to identify obstacles to educational access within the STEM classroom. Building upon these reflections, participants will explore equity minded alternatives to conventional methods and will practice using these strategies to plan for an accessible classroom environment that is inclusive of all students.

In preparation for this course, participants with teaching experience should bring a printed copy of a syllabus from a course that they have previously taught or a course that they are planning to teach in the future.

Student participants and/or professionals who do not have experience teaching in a college classroom should bring a printed copy of a syllabus from a course that they are currently taking or that they have taken in the past.

Nicole Price is a diversity and inclusion thought leader with over 20 years of experience supporting inclusive excellence within public and private institutions. Nicole holds a BA in Rhetoric and Communications from the University of Virginia and a J.D. from William and Mary Law School. Nicole serves as the Vice President of Diversity, Equity, and Inclusion at Wentworth Institute of Technology.

Catlin Wells is an equity minded professional, with over a decade of experience in education. First as an early childhood educator and then as a DEI practitioner within colleges and universities, Catlin's career has focused on using data informed processes and evidence-based strategies to promote equal access to educational programs and activities. Catlin is a licensed attorney in the state of Ohio. She holds a BA in Communication from The Ohio State University and both a J.D. and an M.Ed. from the University of Cincinnati. In her current role at Wentworth Institute of Technology, Catlin serves as the Title IX Coordinator and the Executive Director of Equity and Compliance.

Friday April 22nd, 2022

Professional Paper Sessions

Session 1: The Future of Technology for Today's Students

Location	Session Time	Session Chairs
420, Beatty Hall	8:30 am – 10:00 am	Dr. Brian Hong & Dr. Marisha Rawlins

I. **8:30am – 8:50am:** *A Closed-form Algorithm to Shadow Segmentation using a Single Image*
Michael G Joseph and Khaled Elleithy (University of Bridgeport)

II. **8:50am – 9:10am:** *A Step Towards an Inclusive Future via Piezo Generators*
Bala Maheswaran, Catherine Costa, Minnah Uddin, Morgan Mica Williams, and Ingrid Alika (Northeastern University)

III. **9:10am – 9:30am:** *Utilizing Virtual Reality to Support the ASCE UESI Student Surveying Competition*
Dimitrios Bolkas (Pennsylvania State University, Wilkes-Barre Campus), Jeffrey Chiampi, and Carol Morman (Cincinnati State Technical and Community College)

IV. **9:30am – 9:50am:** *The Virtual Laboratory: A Natural Vehicle for Simulation in Engineering Education*
Brian Hong (MathWorks) and Afsaneh Ghanavati (Wentworth Institute of Technology)

Session 2: A Teaching Pedagogy to Enhance Learning

Location	Session Time	Session Chairs
421, Beatty Hall	8:30 am – 10:00 am	Dr. David Simpson & Dr. Andrew Seredinski

I. **8:30am – 8:50am:** *Student Self-Assessment Questionnaires using Hierarchical Bloom's Taxonomy*
Ashanthi Maxworth (University of Southern Maine)

II. **8:50am – 9:10am:** *Let's Take a Look at the Exam Figure: A Heat Transfer Exam Review Activity*
Najmus Saqib (University of Indianapolis)

III. **9:10am – 9:30am:** *Exit Tickets for the Introductory Engineering Physics Classroom*
Andrew Michael Seredinski (Wentworth Institute of Technology)

IV. **9:30am – 9:50am:** *Redesigning the Flipped Mechanics of Materials Course to Support Diverse Learners*
Sarira Motaref (University of Connecticut)

Session 3: A Reflection of the Energy and Engineering Curricula

Location	Session Time	Session Chairs
420, Beatty Hall	1:15pm – 2:45 pm	Dr. Yannis Levendis & Dr. Sarira Motaref

I. **1:15pm – 1:35pm:** *Use of Capstone Engineering Design Projects to Construct a Teaching Laboratory*
Yiannis A. Levendis (Northeastern University)

II. **1:35pm – 1:55pm:** *Catalyzing Capstone Project Success through Readiness Reviews and Reflection*
Hugh McManus and Kris Jaeger-Helton (Northeastern University)

III. **1:55pm – 2:15pm:** *Refining Competency-Based Grading in Undergraduate Programming Courses*
Marisha Rawlins and Pilin Junsangsri (Wentworth Institute of Technology)

IV. **2:15pm – 2:35pm:** *Silent Waterfalls – A Review of Salinity Gradient Osmotic Energy Conversion Technologies*
Mansour Zenouzi (Wentworth Institute of Technology), Gregory J Kowalski (Northeastern University), and Aliagha Rezvani (Northeastern University)

Session 4: A Deeper Look into Future Technologies

Location	Session Time	Session Chairs
420, Beatty Hall	3:00 pm – 4:30 pm	Rafe H. Steinhauer & Dr. Marisha Rawlins

I. **3:00pm – 3:20pm:** *A Wideband Vivaldi Antenna for Drone-Based Microwave Imaging System*

Allan Estuardo Rodas (Raytheon Company) and Kai Ren (Wentworth Institute of Technology)

II. **3:20pm – 3:40pm:** *Lab-Based Antenna Course Using Full-Wave Numerical Simulation Software FEKO*

Kai Ren (Wentworth Institute of Technology)

III. **3:40pm – 4:00pm:** *Printable Robots for Remote Learning*

Markus Nemitz, Ryley Ian Wheelock, Gus Taylor Teran, Savita Vitthalrao Kendre, Lauryn Whiteside, and Tyler C. Looney (Worcester Polytechnic Institute)

IV. **4:00pm – 4:20pm:** *The Engineering Accreditation Process for STEM-Designated Study Programs: Ukrainian Catholic University Case*

Yuliia Kleban (Ukrainian Catholic University)

Session 5: Engineering Reimagined, Ethics, and Applications

Location	Session Time	Session Chairs
421, Beatty Hall	3:00 pm – 4:30 pm	Dr. Brian Hong & Dr. Kai Ren

I. **3:00pm – 3:20pm:** *Robust Cellular Connection-Based Smart Street Lighting System for Supporting Strategic IoT Smart City Applications*
Ahmed Hassebo, Sharif IM Sheikh, and Wayne Bynoe (Wentworth Institute of Technology)

II. **3:20pm – 3:40pm:** *Engineering Reimagined: (Re)designing Next-Generation Engineering Curricula for Industry 5.0*
Filip Cuckov, Marisha Rawlins, Pilin Junsangsri, Wayne Bynoe, James R. McCusker, and José R. Sánchez (Wentworth Institute of Technology)

III. **3:40pm – 4:00pm:** *Embedding Environmental Ethics in Engineering Courses*
Uma Balaji and Isaac Macwan (Fairfield University)

IV. **4:00pm-4:20pm**: *The Engineering Design Process: The Example of the Rio-Antirrio Bridge*
Basile Panoutsopoulos (Community College of Rhode Island)

Extended Abstract Sessions

Session 1: Innovative Courses and First-Year Engineering

Location	Session Time	Session Chairs
418, Beatty Hall	8:30 am – 10:00 am	Dr. Gloria Ma & Dr. Douglas Dow

I. **8:30am – 8:45am:** *Filling the Gaps Between Courses: A Proposal to Develop a Network Analysis Laboratory Manual*
Ahmed Hassebo, Afsaneh Ghanavati, and Sharif IM Sheikh (Wentworth Institute of Technology)

II. **8:45am – 9:00am:** *The Effect of High School ACT Scores on First-Year GPA of First-Generation Engineering Undergraduates*
Ning Fang (Utah State University)

III. **9:00am – 9:15am:** *Youth and the Engineering Outreach Industry*
Diane Ward (Educator)

IV. **9:15pm – 9:30am:** *Introduction to Computer Science + Society: A Multidisciplinary Course for All*
Cuong H Pham (Wentworth Institute of Technology)

V. **9:30am – 9:45am:** *Using the MATLAB Robotics Toolbox with an Introductory Robotics Course*
Justin Dansereau (University of New Haven)

Session 2: Innovative Thoughts and Tools for Engineering Courses

Location	Session Time	Session Chairs
419, Beatty Hall	8:30 am – 10:00 am	Dr. Abhishek Kumar

I. **8:30am – 8:45am:** *A Visually Interactive MATLAB Toolkit for Thermodynamics Courses*
Kai-Tak Wan and Ahmet Umit Coskun (Northeastern University)

II. **8:45am – 9:00am:** *Some Thoughts for Teaching Engineering Statics*
Xiaobin Le and Richard L Roberts (Wentworth Institute of Technology)

III. **9:00am – 9:15am:** *A Statics Project to Teach Centroid, Potential Energy, Stability and Virtual Work Principle*
Kai-Tak Wan and Marguerite Matherne (Northeastern University)

IV. **9:15am– 9:30am:** *Smart Doorknob Cleanser*
Naziah Edwards, Elphaz Girma Gesesse, and Nathan Sahle (University of Bridgeport)

Session 3: Innovative Engineering Research

Location	Session Time	Session Chairs
419, Beatty Hall	1:15pm – 2:45 pm	Dr. Paul Crilly & Dr. Kai Ren

I. **1:15pm – 1:30pm:** *Plasma Antennas – A Gentle Introduction*
Paul Benjamin Crilly and Julian Blanco (U.S. Coast Guard Academy)

II. **1:30pm – 1:45pm:** *Inclusion of PCB Fabrication and Testing within Lab experiments*
Sharif IM Sheikh, Ahmed Hassebo, and James R. McCusker (Wentworth Institute of Technology)

III. **1:45pm – 2:00pm:** *Deployable Log-Periodic Dipole Array Antenna for CubeSats*
Gagik Sarkisian and Kai Ren (Wentworth Institute of Technology)

IV. **2:15pm – 2:30pm:** *Detection of Red Palm Weevil Infestation in Palm Trees*
Sharif IM Sheikh (Wentworth Institute of Technology), Ahmed Hassebo (Wentworth Institute of Technology), Forhad Hossain (King Fahd University of Petroleum & Minerals), and Kai Ren (Wentworth Institute of Technology)

V. **2:30pm – 2:45pm:** *Direction Finding Using a Single Cellphone Antenna*
Anna White and Kai Ren (Wentworth Institute of Technology)

Session 4: DE+I and Active Learning

Location	Session Time	Session Chairs
418, Beatty Hall	1:15 pm – 2:45 pm	Dr. Navarun Gupta & Dr. Steven Sherrin

I. **1:15pm – 1:30pm:** *Statistical Tools to Produce Accurate and High-Value DEI Insights*
Steven Sherrin (Wentworth Institute of Technology)

II. **1:30pm – 1:45pm:** *Promoting Professional Identity Formation in the First-year Engineering Classroom Using Metacognitive and Reflective Pedagogical Practices*
Josh Luckens and Afsaneh Ghanavati (Wentworth Institute of Technology)

III. **1:45pm – 2:00pm:** *An Equity-Minded Framework to Support the Integration of Equity and Inclusion in Learning*
David L Simpson, Catlin Wells, Tes Zakrzewski, and Nicole Price (Wentworth Institute of Technology),

IV. **2:15pm – 2:30pm:** *Active and Project-Based Learning in Medical Device Design*
Susan Freudzon (Fairfield University)

V. **2:30pm – 2:45pm:** *Effectiveness, Enjoyment, and Equity: A Framework for Scaffolding, Monitoring, and Evaluating Teamwork in a Capstone Engineering Design Course with Industry-Sponsored Projects*
Rafe Steinhauer and Solomon G. Diamond (Dartmouth College)

Session 5: Online Education Assessment and Technical Writing

Location	Session Time	Session Chairs
419, Beatty Hall	3:00 pm – 4:30 pm	Dr. Chris Brigham & Dr. Jessica Ventura

I. **3:00pm – 3:15 pm:** *Monitoring and Management of Classroom Presentation Technology Using Crestron Fusion*

Ben Thomas Bassett, Douglas Eric Dow, and Johanna Pierson (Wentworth Institute of Technology)

II. **3:15pm – 3:30pm:** *How to conduct oral exams as a more equitable and inclusive alternative format for knowledge assessment*

Ying Yu, (University of Hartford)

III. **3:30pm – 3:45pm:** *Coupling On-line Education with Workforce Development Initiatives in Surveying*

Anthony R Vannozzi (University of Maine)

IV. **3:45pm – 4:00pm:** *Mapping Technical Writing Across the Civil Engineering Curriculum*

Katie Heckman, Corinna Marie Fleischmann, Hudson V. Jackson, and Kassim M. Tarhini (U.S. Coast Guard Academy)

Saturday April 23rd, 2022

Student Paper Sessions

Session 1: Engineering Education and Educational Tools

Location	Session Time	Session Chairs
419, Beatty Hall	8:30am-10:00am	Dr. Paul Crilly & Dr. Tooran Emami

I. **8:30am – 8:45am:** *Co-Creating a Cyber-Physical Systems Educational Module: A Project-Based Learning Approach*

Grace Remillard (University of Massachusetts Lowell), Sarah Kamal (University of Massachusetts Lowell), Justin An (University of the District of Columbia), Charles Thompson (University of Massachusetts Lowell), and Kavitha Chandra (University of Massachusetts Lowell)

II. **8:45am – 9:00am:** *Low-Cost Open-Source Robotics for Education*

Brennan Miller-Klugman, Yali Izzo, Corey Comperchio, and Marisha Rawlins (Wentworth Institute of Technology)

III. **9:00am – 9:15am:** *Materials Testing Machine: Design, Fabrication, and Assembly of a Benchtop Universal Materials Tester*

Michael Cuddy, Timothy Reno Baci Snow, Kevin Neidhart, Griffin O'Neil, Fiona Levey, and Robert Daniello (Worcester Polytechnic Institute)

IV. **9:15am – 9:30am:** *External Factors Affecting a Successful and Inclusive Secondary School STEM program*

James Accuosti (University of Bridgeport)

V. **9:30am – 9:45am:** *Alternative Education Options for Future Engineering Students*

Brian Bartelo and Sean W. Bartelo (Genesee Community College)

Session 2: Smart Sensors and Structural Health Monitoring

Location	Session Time	Session Chairs
420, Beatty Hall	8:30am-10:00am	Dr. Shinae Jang & Pierredens Fils

I. **8:30am – 8:45am:** *Sewage Pipeline Inspection Tool & Robot*

Jiaqiao Liang, Louis Munson, Chandler Chen, Gloria (Guohua) Ma, and James R McCusker (Wentworth Institute of Technology)

II. **8:45am – 9:00am:** *Structural Evaluation of the Ontario & Western Railway's Original Bridge at Fish's Eddy*

Brian M. Golliher, Luke H. Monaco, and David F. Mazurek (U.S. Coast Guard Academy)

III. **9:00am – 9:15am:** *Technical Survey and Literature Review on Bridge Joint Monitoring Practices*

Daisy Ren, Pierredens Fils, Shinae Jang (University of Connecticut)

IV. **9:15am – 9:30am:** *Damage Identification of Crumbling Foundation using Non-Destructive Methods and Image Processing*

Rinchen Tsewang Sherpa, Kay Wille, and Shinae Jang (University of Connecticut)

V. **9:30am – 9:45am:** *Cast-off Smartphone for Controlling Electronic Appliances*

Kyle Robert Sawicki, Bavesh Matapathi, Nathan E Israeloff, Don Heiman, and Haridas Kumarakuru (Northeastern University)

Session 3: First-Year Program - Creating and Harvesting Energy

Location	Session Time	Session Chairs
421, Beatty Hall	8:30am-10:00am	Dr. Abhishek Kumar & Christopher Thierauf

I. **8:30am – 8:45am:** *Heat Energy Harnessing via Seebeck Generators*

Rithvik Rao Katikaneni, Matteo Farah, Carlos Mario Martinez, Kabato Butka, Tobechukwu Chigozirim Aniagboso, and Bala Maheswaran (Northeastern University)

II. **8:45am – 9:00am:** *Energy Creation via Seesaw Up and Down*

Jake Robert Ross, Kevin You-Ichiro Ohgami, Nicholas Jasper Gillespie, Owen Krivacek, Benjamin Service, and Bala Maheswaran (Northeastern University)

III. **9:00am – 9:15am:** *Harnessing Rotational Energy at the Gym*

Ashley Ruth Banaszewski, Andrew Hartley, Kevin Mai, Amy Xu, Megan Claire Baginski, and Bala Maheswaran (Northeastern University)

IV. **9:15am – 9:30am:** *Harnessing Rotational Energy of Revolving Doors*

Maxwell B Boulerice, Megan Claire Baginski, Dominic Gomes, Alexander S Nikolov, and Bala Maheswaran (Northeastern University)

V. **9:30am – 9:45am:** *How Daily Human Activity Can Produce Useful Energy: Proposal for Harnessing the Rotational Energy of Spinning Chairs*

Gabriella C Butler, Hailey Dooley, Liam O'Buachalla, Matthew John Urbano, and Bala Maheswaran (Northeastern University)

Session 4: Engineering Education and Diversity, Inclusion, and Equity

Location	Session Time	Session Chairs
419, Beatty Hall	1:15pm-2:45pm	Dr. Ashanthi Maxworth & Dr. Navarun Gupta

I. **1:15pm – 1:30pm:** *A practical method for improving Diversity, Equity, and Inclusion in Nuclear Science*

James Olson, Emily Liu, and Malcolm Porterfield (Rensselaer Polytechnic Institute)

II. **1:30pm – 1:45pm:** *Inclusive Teamwork: Using Participatory Action Research (PAR) to Improve Teamwork Projects in Intro to Mechanical Engineering*

Emily Deterding, Carter Keough, Sumudu Lewis, Nathan Agyeman, Kavitha Chandra, and Susan Thomson Tripathy (University of Massachusetts Lowell)

III. **1:45pm – 2:00pm:** *An Application Driven Framework for Delivering System and Product Life-Cycle Management Concepts in Engineering Education*

Vacharaporn Paradorn, Sunita Rajni Virk Singh Poma, Nathan Agyeman, Charles Thompson, Kavitha Chandra, and Susan Thomson Tripathy (University of Massachusetts Lowell)

IV. **2:00pm – 2:15pm:** *Improving the Learning Experience of Neurodiverse Students in a Fluid Mechanics Course During the COVID-19 Pandemic*

Caressa Adalia Wakeman, Amvrossios Bagtzoglou, and Maria Chrysochoou (University of Connecticut)

Session 5: Engineering Multi-domain Applications of Smart Sensors

Location	Session Time	Session Chairs
420, Beatty Hall	1:15pm-2:45pm	Dr. Shinae Jang & Dr. Xiaoqi (Jackie) Zhang

I. **1:15pm – 1:30pm:** *Autonomous Inventory Tracking*

Maria Katerina Apostle, Luke Clarke Bassett, and Saurav Basnet (Wentworth Institute of Technology)

II. **1:30pm – 1:45pm:** *Determination of hBN thickness by optical contrast*

Tedi Qafko, Trevyn Larson, and Andrew Michael Seredinski (Wentworth Institute of Technology)

III. **1:45pm – 2:00pm:** *Smart HomeKit-Enabled Peephole Camera*

Emmanuel James Theodore, Brendan Gibbons, Cameron James Dore, and Saurav Basnet (Wentworth Institute of Technology)

IV. **2:00pm – 2:15pm:** *DIY Remote Accessed Robot Car*

Trinh Huynh and Pilin Junsangsri (Wentworth Institute of Technology)

Session 6: Multi-disciplinary innovation and Additive Manufacturing

Location	Session Time	Session Chairs
421, Beatty Hall	1:15pm-2:45pm	Dr. Paul Crilly & Christopher Thierauf

I. **1:15pm – 1:30pm:** *Finite Element Analysis of 3D-Printed Implants in Knee Replacements*

Stephanie DeCarvalho, Jun Li, and Sarah D Dulac (University of Massachusetts Dartmouth)

II. **1:30pm – 1:45pm:** *Open Source Hand-Crank Phone Charger*

Daniil Slutskiy, Ricardo Moreira, Michael McGuire, and Saurav Basnet (Wentworth Institute of Technology)

III. **1:45pm – 2:00pm:** *Limiting Overuse of Water in Agriculture by Monitoring Water Content*

Isabella Serrano, Kaitlyn Williams-Koester, Kaden Clark, Blade Rocket Kalikow, Bennett Hartley, and Bala Maheswaran (Northeastern University)

IV. **2:00pm – 2:15pm:** *Kinetic Mousepad*

Eric Concannon, Casey Goyette, Emily Michelsen, Zephaniah Hatano Langley, and Bala Maheswaran (Northeastern University)

V. **2:15pm – 2:30pm:** *The Morse Code Game: Morse in a Minute*

Heather Morrell, Aaron Muldrew, Nathan E Israeloff, Don Heiman, and Haridas Kumarakuru (Northeastern University)

VI. **2:30pm – 2:45pm:** *Design, Analysis, and Fabrication of A 3D Printed Violin for the Public*

Claire Marie Dollins, Meghan Scruton, Eli Ross Breitbart Frischling, Joshua Patrick O'Grady, and John M Sullivan Jr (Worcester Polytechnic Institute)

Student Posters

Damage Monitoring of Glass/carbon Hybrid Composites Under Dynamic Shear Loading

Mazharul Lincon and Vijaya Chalivendra

University of Massachusetts Dartmouth

Electro-mechanical Studies of Carbon/Glass Intra-ply Thermoplastic Composites

Mohammed Shonar and Vijaya Chalivendra

University of Massachusetts Dartmouth

Analysis of Shear Characterization in Acrylonitrile Butadiene Styrene (ABS) Utilizing Fused Deposition Modeling

Joshua Letizia and Vijaya Chalivendra

University of Massachusetts Dartmouth

Analysis and Optimization of a DIY Wind Turbine

Daniella F. Giannotti, Jacqueline E. Collins, Hannah R. Darling, Christopher L. Michaud, Jake M. Stamos, John B. Walton, and Gordon Stewart

Roger Williams University

Fracture Mechanics of 3D Printed Bi-Material Polymers Under Quasi-Static Bending Conditions

Austin Sa and Vijaya Chalivendra

University of Massachusetts Dartmouth

Modular Hydroponic Control System

Alberto Labrada and Nhat Pham

University of Bridgeport

Floating Hands

Younes Ramzi

Disability Assistant System Using Brain-Computer Interface and EEG Signals

Sief Atari, Eric Bialczak, and Celso Lopez

University of Bridgeport

Autonomous Shipping Robots

Jacob Johnson
University of Bridgeport

Robotic Surgery Training Device

Susan Freudzon, Jenna Madigan, Stephanie Prado, Clarissa Rotonto, and Chloe Stokinger
Fairfield University

Small Engine Water Injection System

Christian DeJarnette, Faisal Alkhater, and Derek Cerulli
University of Bridgeport

Waste Compression Bin

Yasmidt Mendoza Torres, Juan D. Palacios Silva, and Armand Perez
University of Bridgeport

Life Cycle Analysis and Implications of 3D Printed Bio-based Homes, a Preliminary Study

Claire Liedtka
University of Maine

Renewable Energy Powered Portable Saltwater Desalination System

Raeef Alharbi
University of Bridgeport

Pose Variation and Occlusion Based Driver Expression Recognition Using Convolutional Neural Network

Susruthababu Sukhavasi, Ahmed El-Sayed, Abdelrahman Elleithy, Khaled Elleithy, and Suparshya Babu Sukhavasi
University of Bridgeport & William Paterson University

A Novel Architecture Combining Convolutional Neural Network and Support Vector Machine for Expression Recognition in Driving Environment

Suparshya Babu Sukhavasi, Ahmed El-Sayed, Abdelrahman Elleithy, Khaled Elleithy, and Susruthababu Sukhavasi
University of Bridgeport & William Paterson University

The Next Generation of Electric Vehicles Batteries

Mohamed Mohamed and Khaled Elleithy
University of Bridgeport

Image Classification with Quantum Neural Networks

Nadine Matondo-Mvula, Hepseeba Kode, and Khaled Elleithy
University of Bridgeport

Polymer Graphene Oxide Nanofibrous Scaffolds for Wound Dressing

Isaac Macwan, Emre Aydin, Ky Duyen Le, Alexander Maier, Arjun Sudhalkar, Bibek Timalsina
Fairfield University & Edison High School

Bus Stop Load Design Criteria

Eurico Moreno and Hersi Dorne
Wentworth Institute of Technology

Wireless Communication System Implementation with FPGA

Shamrock Barrera
Fairfield University

Compact FM Transmitter Design for Wireless Operation of MEMS Capacitive Vibration Sensors

Dahnesh Upton and Mustafa Guvench
University of Southern Maine

Exploratory Research of New Variant of BSCCO-2212 Superconductor

Terris R. Reddick, Patricia Sadde Mujicap, Andrew Seredinski, and John Voccio
Wentworth Institute of Technology

Monitoring and Management of Classroom Audio Video Technology Using Crestron Fusion

Ben Bassett, Douglas E. Dow, and Johanna Pierson
Wentworth Institute of Technology

Economic and Environmental Impacts of Offshore Wind Farms - A Literature Review
Tooran Emami, Jacquelyn Carter, Magdalena Perez, and Philip Rogers
U.S. Coast Guard Academy

Water Quality Trends
Saanvi Gowda
Ron Burton Training Village

Linear Actuating Pillow (LAP)
Kaitlyn Kozak, Ryan Dandrea, Caleb Lawson, Phone Thu, and Federica Aveta
Wentworth Institute of Technology

Shootaround: AI Basketball Coaching to Improve Athletic Development
Craigon Confer
Wentworth Institute of Technology

Automatic Guidance and Collision Detection for Electric Wheelchairs
Kloe Foster, Marc Alcarese, Jake Barrows, Pilin Junsangsri
Wentworth Institute of Technology

Heads Up Display Visor Insert for Firefighter Self Contained Breathing Apparatus
Nathan J. Giarnese, Nick Madsen, Pilin Junsangsri
Wentworth Institute of Technology

Fan Deck
Daniel Khoury and Saba Kochadze
Wentworth Institute of Technology

Automatic Wake-up Roller Shade
Vincent W. Rudolph, Rene Marquez, and Saurav Basnet
Wentworth Institute of Technology

Arcade Version of Connect 4
Belinda Truong, Maxim Manwelian, and Nicholas Souza
Wentworth Institute of Technology

Inductive Charging Kitchen Countertop

Suraj P. Pandya, Omar M. Shanniek, Emmanuel Theodore, Cameron R. Johnstone, and Saurav Basnet
Wentworth Institute of Technology

Non-human Primate Monitoring System

Zach Jacques, Nuno Bazarian, Amir Poudel, and Saurav Basnet
Wentworth Institute of Technology

Boston Based Renewable Energy System Simulations

Nick Cerone, Jacob Najjar, Jonathan Padrazo, Debra Shepard, and Saurav Basnet
Wentworth Institute of Technology

Distracted Driving

Md Nezad and Saurav Basnet
Wentworth Institute of Technology

Wearable Automatic Fall Detection Device

James Sidhom, Angela Blaisdell, Joseph Grow, and Stephen Moszynski
Wentworth Institute of Technology

Fire Detection and Suppression System for Homes

Mlak Samaan, Claudia Cobani, Matthew Nguyen, and Douglas E. Dow
Wentworth Institute of Technology

Automatic Soil Testing Device for Agriculture

Vikranth Vakati, Nitin Bohra, Mark Rosado, and Douglas E. Dow
Wentworth Institute of Technology

Affordable Private Security System

Edson Tenorio
Wentworth Institute of Technology

Sonar Assisted Remotely Operated Vehicle (ROV) Navigation

Brennan Miller-Klugman, Hien Pham, Ethan Rowe, Sara Al Hady, and Douglas E. Dow
Wentworth Institute of Technology

Healthcare Monitoring System for Household Use

Krisila Hammett, Ryan Pasquel, Collin Paquin, and Douglas E. Dow

Wentworth Institute of Technology

University Campus Photovoltaic Integration for Carbon Emission Reduction Compliance

Jack Kelley, Elijah Costa, and Andy Em

Wentworth Institute of Technology

Wearable Vibration Device to Assist with Navigation for the Visually Impaired

Kelley Roberts, Seth Bannish, Bailey Cote, Jared Robbins, and Douglas E. Dow

Wentworth Institute of Technology

Energy Efficiency Monitoring and Control System for Home Appliances

Timothy Knief, Kathryn D. Dechambeau, Kirsten M. Gramajo, Afsaneh Ghanavati, and Douglas E. Dow

Wentworth Institute of Technology

Campus Power Monitoring for SCADA

Christopher Men, Jefferson Urena, Kevin Salomon, Douglas E. Dow, and Afsaneh Ghanavati

Wentworth Institute of Technology

Automated Window

Akeem Baker, Joseph Gbedema, Wendy N. Lebron, Jennifer Anitus, Douglas E. Dow, and Xiaobin Le

Wentworth Institute of Technology

Ambient Assisted Living for Home Healthcare Services Using the Internet of Things

Hamza Khalid, Brendan Gibbons, and Douglas E. Dow

Wentworth Institute of Technology

Mechanical CPR System for Use by the Public

Michael DeVito, Corey Comperchio, and Douglas E. Dow

Wentworth Institute of Technology

Improving Spatial Awareness in Low Visibility Scenarios

Andrew Kulbaski, Kevin Huang, Christopher J. Darragh, Cameron M. Avellani, Sharif I. M. Sheikh, and Douglas E. Dow
Wentworth Institute of Technology

Heat Seeking Fan

Daniel Clapp, Ethan Barbosa, Brady Harkins, and Afsaneh Ghanavati
Wentworth Institute of Technology

Improving Laundry Services Through App Design

Brian Nolasco Ramirez, Michael Sarner, and Afsaneh Ghanavati
Wentworth Institute of Technology

Music Recognition and Synchronization

Zachary Ippolito, Zachary Kuleba, Jackson R. Smith, and Douglas E. Dow
Wentworth Institute of Technology

Analysis of Ruggles/Parker intersection

Cameron Rutherford
Wentworth Institute of Technology

Proposed Solution for Tremont and Parker Street

Aria Martin and Joseph Ruble
Wentworth Institute of Technology

How to Improve the Performance of Parker St. and Forsyth Way Intersection

Kenny Nguyen, Owen Bailey, Erik Vogt, and Kyle Whitcomb
Wentworth Institute of Technology

Robotic Cart Intraoffice Transport

Chris Falcon, Chirag Bohra, and Douglas E. Dow
Wentworth Institute of Technology

Electromagnetic Projectile Defense System

Norbert Mazurek
Wentworth Institute of Technology

Development of a User-Friendly MatLab Toolkit for Thermodynamics

Bjorn Kierulf, Ahmet Coskun, and Kai-Tak Wan
Northeastern University

Low-Cost Wheelchair Motorization Kit

Jake Goldberg, Isaac V. Mihailescu, and Saurav Basnet
Wentworth Institute of Technology

Rodent Stimuli Testing chamber

Yagmur Y. Ayata, Tüker Küyel, and Saurav Basnet
Wentworth Institute of Technology