

Dec 2023

FALL 2023 NEWSLETTER



MECHANICAL AND INDUSTRIAL ENGINEERING DEPARTMENT

As we conclude the fall semester, we celebrate the triumph of the Mechanical and Industrial Engineering Department at the University of New Haven. The success of the MIE showcase was a testament to our students' and faculty's exceptional work. Thank you to everyone for your hard work and support this semester. Here's to a restful and enjoyable break, and we're excited for more achievements in the coming year!



NEWSLETTER HIGHLIGHTS

- Note from the Chair
- New Department Website
- Publications
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- Research Talk
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- MIE Showcase
- Programs Outreach

Editor: Marzieh Soltanolkottabi, PhD

Co-editor: Kagya Amoako, PhD

A NOTE FROM THE CHAIR

Dear Department
members/Colleagues/Reader,

I am thrilled to share the exciting news of a remarkable achievement by our department that fills me with immense pride.



Together, we have reached a significant milestone that reflects the collective dedication, talent, and hard work of each member.

It is my pleasure to announce our achievements including securing research grants, achieving high student success rates, publishing impactful research, winning awards, installing a brand new department website, launching the MIE Showcase, etc. These accomplishment is a testament to the excellence that defines our department and showcases the outstanding contributions of each and every one of you.

As the interim chair of this esteemed department, I want to express my deepest gratitude for your unwavering commitment to our shared goals. Your passion, innovation, and collaborative spirit have played a pivotal role in reaching this milestone. This achievement not only reflects positively on our department but also reinforces our standing within the larger academic community.

Let us take a moment to celebrate this success together, acknowledging the hard work and dedication that have brought us to this point. It is through such collaborative efforts that we continue to elevate our department and make a lasting impact.

I am excited about the future possibilities and the potential for even greater achievements as we work together to further advance our department's goals. Your continued commitment to excellence is truly inspiring.

Once again, congratulations to each and every member of our department for this outstanding achievement. Thank you for your continued dedication and contributions.

Best regards,
Kagya Amoako Ph.D.
Interim Chair

WE HAVE A NEW DEPARTMENT WEBSITE

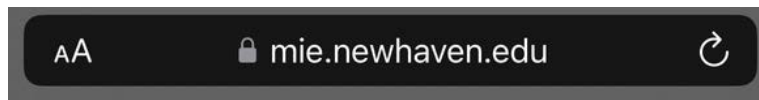
It's official!

We now have a unified website that is live and googleable, and Dr. Amoako is excited to have led its development.

Take a second to explore all the new and exciting developments at the department at **<https://mie.newhaven.edu>**

Facing both the public and student body, the website is a one-stop-shop for all things mechanical and industrial engineering at the University of New Haven, and it puts key resources at the fingertips of students, program directors, faculty, and administrators to support our core competency, which is the business of delivering experiential education.

Parents and future engineers can now learn about our mechanical engineering and industrial engineering programs, recent developments, our incredible student focus, and more through a unified portal.



**Mechanical and
Industrial Engineering**
University of New Haven



PUBLICATIONS

Student and Faculty Authors,

In a world where knowledge is key, your research stands as a beacon of excellence. The depth of your insights, the meticulousness of your methodology, and the clarity of your findings are a testament to your expertise and commitment to advancing your respective fields.

Your collective effort has not only added valuable knowledge to our academic discourse but has also inspired your peers and future researchers. It is through the dedication of individuals like you that we continue to push the boundaries of understanding and innovation.

Congratulations!

Kagya Amoako Ph.D.

- D. Muhammad, R. Mishra, A. A. Junaid, O. F. Emon, "Extrusion Mechanisms for Printing Thermosetting Prepolymers," 2023, Oct. 29-Nov. 2, New Orleans, LA, Paper No.: IMECE2023-113409.
- E.T. Gulnergiz, S. Dilibal, B. Gormus, J.O. Danquah, O.F. Emon, "Additively Manufactured Soft Pneumatic Gripper Integrated Remotely Operated Underwater Vehicle (ROV) for Grasping Archeological Remains," 2023, 5th International Congress on Human-Computer Interaction, Optimization and Robotic Applications (HORA), Istanbul, Turkiye, pp. 01-05.
- M.S. Suwal, M. Soltanolkottabi, V. Behzadan, "Reinforcement Learning Approach to Evaluation and Decision-Support of Lockdown Policies for Epidemic Outbreaks", Institute of Industrial and Systems Engineering (IISE) Annual Conference, 2023, New Orleans, USA .

CONFERENCE PRESENTATIONS

- M.S. Suwal, M. Soltanolkottabi, V. Behzadan, "Reinforcement Learning Approach to Evaluation and Decision-Support of Lockdown Policies for Epidemic Outbreaks", Institute of Industrial and Systems Engineering (IISE) Annual Conference, 2023, New Orleans, USA .
- F. Ghalenoei, M. Soltanolkottabi, H.A. Khorshidi, "Uncertainty Analysis of Implementing Whole Genomic Sequencing Evaluation in Cancer Treatment", Institute of Industrial and Systems Engineering (IISE) Annual Conference, 2023, New Orleans, USA.

RESEARCH AWARDS AND GRANTS

Dr. Sumith Yesudasan won the NASA CTSGC Faculty Research Grant for conducting the research titled "Testing Passive Radiative Cooling for Spacecraft Thermal Protection". The Grant will support two undergraduate BSME students and is aimed at developing a world class testing facility for spacecraft thermal protection materials.



Dr. Omar Faruk Emon has been awarded the University Research Scholar (URS) appointment at the University of New Haven. This prestigious three-year appointment, with a potential extension for two additional years, provides Dr. Emon with support in the form of teaching workload release and research funds.

Dr. Emon's research will focus on 3D-printed polymer composites for piezoelectric energy harvesting. This exciting project aims to understand the piezoelectric phenomenon of an ionic liquid (IL)-polymer network with the ultimate goal of developing a 3D-printed energy harvesting device.

Incorporating ionic liquids into polymers can induce piezoresistivity and piezoelectricity in the polymer matrix, offering a promising avenue for developing new energy-harvesting technologies. Dr. Emon's research will investigate the interactions between mechanical and electrical stimuli on a solid-state IL-polymer membrane, aiming to elucidate the material's piezoelectric characteristics. Additionally, the work will explore the system/machine requirements and rheological properties of prepolymers suitable for 3D printing harvesting devices.

This research has the potential to lead to significant advancements in the field of energy harvesting, paving the way for new self-powered devices and contributing to a more sustainable future.

RESEARCH AWARDS AND GRANTS

Understanding Supply Chain Complexities through a Bullwhip Effect Simulation Promoting Entrepreneurial Minded Learning (EML) in the INDE 6641- Supply Chain Management course

This grant has been awarded to Dr. Narjes Sadeghiamirshahidi to support the promotion of entrepreneurial-minded learning (EML) through a role-play simulation game tailored for the INDE 6641- Supply Chain Management course. This game aimed to assist students in experiencing the Bullwhip Effect, a common issue in conventional supply chains resulting from inadequate information sharing and collaboration among different levels of the supply chain. Through active participation in the simulation, students gained a profound understanding of Inventory Management Complexity and the dynamics underlying the Bullwhip Effect.



RESEARCH TALK

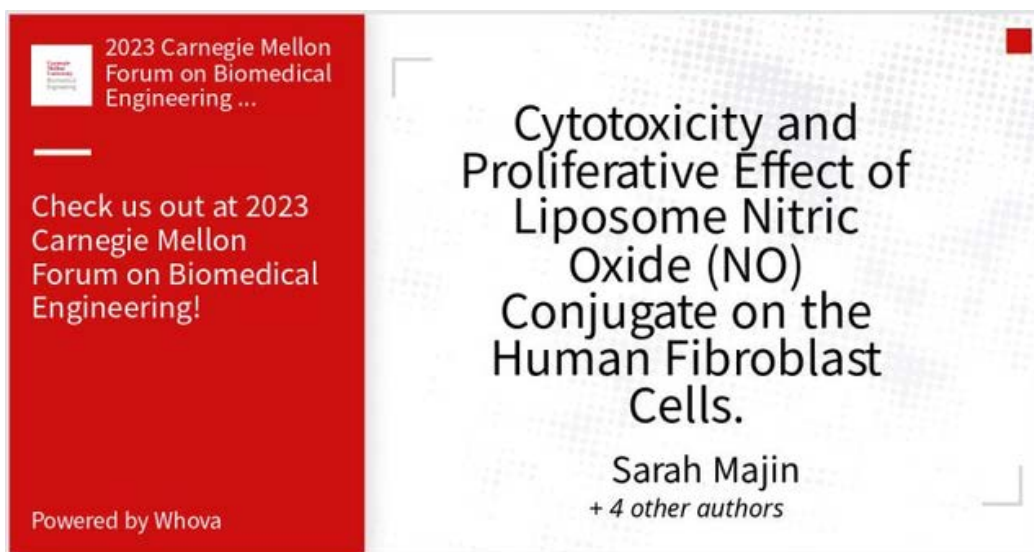
Got Nanomedicine?

Kudos to a great job done by Dr. Amoako's lab members, Sarah Majin, Chika Gloria Okwuogori, Romario Pusey, Waad Antwan Matti Haddad who presented the work below at the Carnegie Mellon Forum on Biomedical Engineering.

Please reach out if we could potentially collaborate on research. Pulmonologists, hematologists, and biomolecular engineers with cell-targeting expertise are especially welcome.

Abstract:

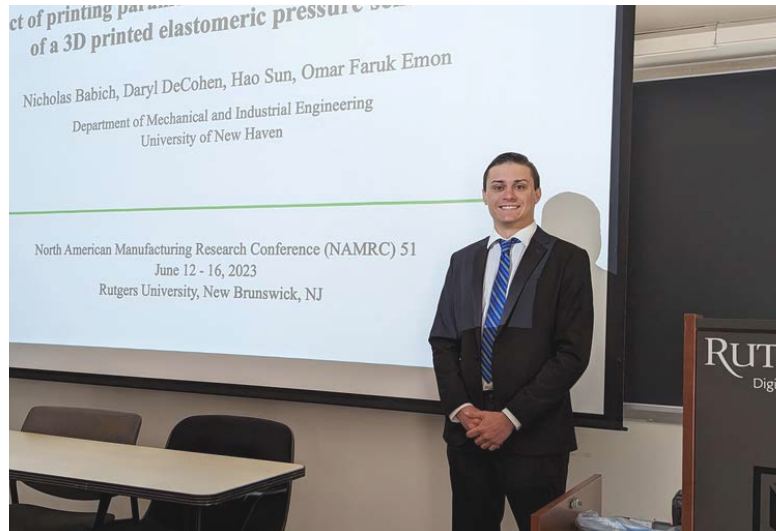
Nitric oxide, a bioregulatory molecule produced by many cells has diverse effects on the human body, including peristalsis, hormone secretion, neurotransmission, smooth muscle vasodilation, and cell cycle based on its concentration. Due to its short half-life and high reactivity, the bioavailability of nitric oxide diminishes when directly introduced into the human body. Its complexation with a carrier before administration could address this challenge. One way is to load the nitric oxide into liposomes which are spherical vesicles of a lipid bilayer mainly consisting of phospholipids that can incorporate water-soluble drugs inside their hydrophilic core, or a lipid-soluble drug in their lipid bilayer with size ranges from 50 nanometers to several micrometers. At various concentrations of NO, this study aimed to understand the cytotoxic and proliferative effect of NO on fibroblast cells, the most common type of connective tissue cells, and how liposomes target these cells.



Check out this work at www.unhbmdilab.com

STUDENTS' ACHIEVEMENTS

Nicholas Babich, BSME senior, received the NSF travel award to present at the North American Manufacturing Research Conference (NAMRC 51) at Rutgers University, NJ. He presented his research on the Effect of printing parameters on the sensing performance of a 3D-printed elastomeric pressure sensor at Rutgers University in June 2023.



Sundar Dangol, MSME student, received TCoE Endowed Graduate Fellowship for the 2023-24 academic year. He will be working at the Smart Fabrication Lab under Dr. Emon's supervision on multi-material 3D printing of functional polymer for electronics.

Abid Ali Junaid defended his thesis in September 2023. Abid worked with Dr. Emon on nonplanar 3D printing of thermosetting polymers. He was the recipient of the TCoE Endowed Graduate Fellowship award and also received the Outstanding Graduate Student Award (ME) for academic excellence in 2023. Abid developed a program to generate print paths that overcome many limitations associated with conventional 3D printing processes. He is the lead author of a conference proceeding that has been accepted for presentation at the IMECE 2023 conference.



MECHANICAL AND INDUSTRIAL ENGINEERING SHOWCASE

The Department of Mechanical and Industrial Engineering is excited to share the success of our inaugural MIE Showcase event held on Nov 30, 2023, from 4 to 7:30 pm, in the Alumni Lounge at the University of New Haven.

To start the MIE Showcase Event, Dr. Ronald Harichandran, the Dean of the College of Engineering, delivered an inspiring opening speech. He set an enthusiastic tone for the day, emphasizing the college's dedication to innovation, academic excellence, and the crucial role of research in the academic journey.



Afterward, Dr. Kagya Amoako gave a comprehensive overview of the recent triumphs in the Mechanical and Industrial Engineering (MIE) department, spotlighting the launch of their new website as a pivotal step in displaying their activities to a wider audience. He expressed gratitude to key contributors, highlighted the department's first showcase event, praised student achievements, emphasized practical learning, introduced the MIE Newsletter to keep everyone updated, and invited attendees to join in celebrating the MIE community's collective successes.



MECHANICAL AND INDUSTRIAL ENGINEERING SHOWCASE

Keynote Speakers

At the heart of the MIE Showcase Event were two illuminating keynote speeches by esteemed speakers, Ms. Magdalena Garcia and Mr. Joseph Leveillee, each bringing unique insights into the fields of industrial and mechanical engineering.

Ms. Magdalena Garcia, a renowned figure in industrial engineering, delivered an insightful talk on the “Role of Industrial Engineer in Modern Corporation.” Her presentation delved into how industrial engineers are pivotal in shaping the efficiencies and innovations within contemporary corporations. She emphasized the evolving role of these engineers in integrating technology, optimizing operations, and spearheading sustainable practices, offering a comprehensive view of the challenges and opportunities faced in today’s corporate and industrial landscape.



Mr. Joseph Leveillee, an illustrious alumnus of the University of New Haven (UNH), captivated the audience with his speech on “Mechanical Engineering at UNH - What Does Success Look Like?” His talk was a blend of nostalgia, personal experiences, and professional insights. Joe explored the key factors that contribute to a successful career in mechanical engineering, drawing from his journey since graduating from UNH. He highlighted the importance of continuous learning, adaptability, and innovation, illustrating how UNH’s program equips students with the necessary skills and mindset to excel in a rapidly evolving field.

MECHANICAL AND INDUSTRIAL ENGINEERING SHOWCASE

Projects in the Showcase

The MIE Showcase received a total of 17 submissions of which 9 poster presentations and 4 oral presentations were shortlisted and featured, covering a spectrum of topics, and displaying the diverse and high-quality research undertaken by our students. These presentations provided an in-depth exploration of key engineering concepts, offering students a valuable platform to share their insights with the broader MIE community.

A big shout-out to all the students who presented their projects at the MIE Showcase.



Oral Presentations

01.

Reinforcement Learning Approach to Evaluation and Decision Support of Lockdown Policies for Epidemic Outbreaks

Presenter: Merishna Singh Suwal
Faculty Advisor: Dr. Marzieh Soltanolkottabi and Dr. Vahid Behzadan

02.

Non-Planar 3D Printing of Functional Polymers

Presenter: Dewan Wardy Hasan and Abid Ali Junaid
Faculty Advisor: Dr. Omar Faruk Emon

03.

Application of Agent-Based Simulation and Game Theory in Evaluating the Implementation of Whole Genomic Sequencing in Treating Lung Cancer

Presenter: Fateme Chalenoei
Faculty Advisor: Dr. Marzieh Soltanolkottabi

04.

Visual Intelligence: Image Processing for Robotic Arm Operations

Presenter: Ishaq Shahzad Syed
Faculty Advisor: Dr. Cheryl Li

MECHANICAL AND INDUSTRIAL ENGINEERING SHOWCASE

Poster Presentations

01.

Smart Bag

Presenter: Kiran Jakkli Sounder Karthi
Faculty Advisor: Professor. Laurence Levine

02.

Bridging AI and Emotions: Expanding Horizons in Robotics, Biomimicry, and Automation

Presenter: Mathew Sprouse and Savanna Pantoja
Faculty Advisor: Dr. John Kelly

03.

OZORA – Oxygen Recovery System

Presenter: Biswajit Rout, Shreya Banik and Manali Suryawanshi
Faculty Advisor: Professor. Heegun Park

04.

The Impact of Consumer Panic Buying and Stockpiling on Supply Chain Performance

Presenter: Sarthak Saxena and Shubham Raval
Faculty Advisor: Dr. Marzieh Soltanolkottabi and Dr. Narjes Sadeghiamirshahidi

05.

Non-Planar 3D Printing of Functional Polymers

Presenter: Dewan Wardy Hasan and Abid Ali Junaid
Faculty Advisor: Dr. Omar Faruk Emon

06.

An Accessible Multi-Material 3D Printing System for Functional Polymers

Presenter: Sundar Dangol
Faculty Advisor: Dr. Omar Faruk Emon

07.

A Comparative Study of Weekday vs. Weekend Traffic Patterns at the University of New Haven

Presenter: Victhoria De Castro Lima
Faculty Advisor: Dr. Ali Montazer

08.

3D Printing of Functional Polymers for Sensing Applications

Presenter: Nicholas J Babich
Faculty Advisor: Dr. Omar Faruk Emon

09.

A Custom-Built Core XY 3D Printer for Enhanced Speed and Precision

Presenter: Laila Soliman
Faculty Advisor: Dr. Omar Faruk Emon

MECHANICAL AND INDUSTRIAL ENGINEERING SHOWCASE

Winners

Oral Presentation Winner



Merishna Singh Suwal
ISE Research Assistant

Project: Reinforcement Learning Approach to Evaluation and Decision Support of Lockdown Policies for Epidemic Outbreaks

Faculty Advisor: Dr. Marzieh Soltanolkottabi and Dr. Vahid Behzadan



Poster Presentation Winners



Nicholas J Babich
Mechanical engineering undergraduate

Project: Printing of Functional Polymers for Sensing Applications

Faculty Advisor: Dr. Omar Faruk Emon



Kiran Jakkli Sounder Karthi
Engineering & Operations Management graduate

Project: Smart Bag

Faculty Advisor: Professor. Laurence Levine



Laila A Soliman
Mechanical engineering undergraduate

Project: A Custom-Built Core XY 3D Printer for Enhanced Speed and Precision

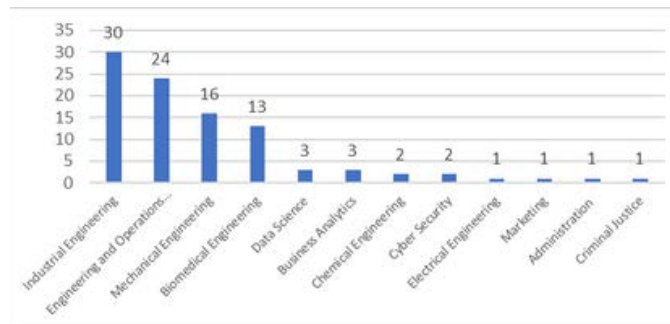
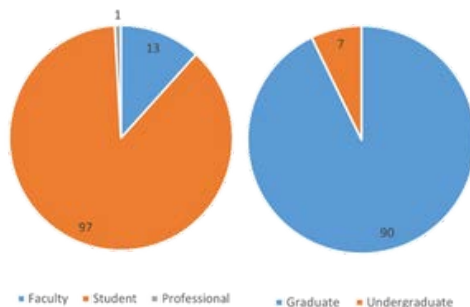
Faculty Advisor: Dr. Omar Faruk Emon

MECHANICAL AND INDUSTRIAL ENGINEERING SHOWCASE

Attendees & Feedback

The MIE Showcase event garnered an overwhelming response, with a total of 111 check-ins. Of these, 53 participants pre-registered and attended the event, while 58 opted for on-site registration, showcasing enthusiasm towards this event.

The breakdown includes 13 faculty registrations, 97 student attendees, and 1 working professional. Among the students, 90 were graduate students, and 7 were undergraduate students. The following shows the breakdown of student attendees.



We received feedback from 22 participants which yielded an impressive overall satisfaction **rating of 4.59 out of 5**.

Thanks to everyone who contributed to the success of the MIE Showcase 2023, especially the organizers of this event: Dr. Kagya Amoako, Dr. Marzieh Soltanolkottabi, Dr. Sumith Yesudasan, and graduate student Kiran Jakkli Sounder Karthi.



PROGRAMS OUTREACH

Engineering summer camp for middle school students

Dr. Omar Faruk Emon hosted a week-long engineering summer camp for middle school students at the University of New Haven. The camp provided hands-on learning opportunities, exposing students to various engineering disciplines through engaging projects. Beyond technical skills, the camp fostered teamwork, communication, and problem-solving skills in a fun and engaging environment.



Collaborative Robots on the Loose

Industry representatives and students looking to join the job market probably had some collaborative robot (COBOT)-served M&Ms at the University of New Haven's two-day career fair that was organized by the Career Development Center (CDC). Thanks to our Mechatronics lab led by Dr Li Cheryl and her mechanical engineering students for the COBOT showpiece and to Matt Caporale, Anita Sebabi and the rest of the CDC team for providing us the set-up space. Also, thanks to Mr Kelley John our labs supervisor for helping install the COBOTs.

Students interested in learning about COBOTs for applications in healthcare, advanced manufacturing, and entertainment should contact our lead faculty Dr Li Cheryl (mechanical engineering) and Dr. Shayok Mukhopadhyay (electrical engineering and computer engineering).





Alumni and friends,

As the year comes to a close, we want to take a moment to express our heartfelt gratitude and extend warm wishes to you and your loved ones. The holiday season is a time for reflection, joy, and togetherness, and we are grateful to have such an incredible support base to celebrate with.

This year has been filled with achievements, collaboration, and the shared pursuit of excellence. Each one of you has played a vital role in making our department a community of dedicated and talented individuals.

May the holiday season bring you moments of peace, laughter, and happiness. May you find time to relax and recharge, surrounded by the love of family and friends. Let's take this opportunity to reflect on our accomplishments and look forward to the exciting possibilities that the coming year holds for us.

Thank you for supporting the hard work, creativity, and commitment of our faculty making positive world impact by training the next generation of leaders. Your contributions make our department a vibrant and thriving community, and we are excited about the continued journey ahead.

Wishing you and your loved ones a joyous holiday season and a New Year filled with success, good health, and prosperity.

Sincerely,
Interim Chair,
The Department of Mechanical and Industrial
Engineering