SCOPE SUMMIT 2024-2025

SCOPE
Senior Capstone Projects

Accelerate Wind

Amazon Robotics

Blue Origin

Boston Scientific

Boston University (WISE)

LineVision

MA Dept of Early Education and Care

Microsoft NERD

Moderna

New Balance

Pfizer

Santos Family Foundation / Volpe Center

Olin College of Engineering

Hello and welcome to SCOPE Summit!

Today we're gathered to celebrate the 64 Olin seniors who are presenting their work as part of the Senior Capstone Program in Engineering (SCOPE). We're so glad that you're with us today to participate in our Summit, both in person and via livestream.

SCOPE is the culmination of the students' Olin experience. Through SCOPE students put into practice everything they learned at Olin about problem solving, technical and design skills, collaboration and team building. SCOPE teams work together for a full academic year to solve challenging, real-world problems. You'll hear about projects representing a broad range of topics across different industries: students designed and built things, coded software, developed expertise in new domains and applied human-centered design methods while also sharpening their skills in project management, team dynamics, budgeting and tackling unforeseen challenges. They grew personally and professionally, collaborating with sponsors and faculty.

Students: we're proud of you. You made it!

We wish to thank our sponsors for 13 amazing projects. You provided us with projects which were important to your organization and challenging for our students, projects which matched the technical skills and interests of our students. Most of the outcomes you'll hear about today will be taken up and applied by you, our sponsors. This resulted in a meaningful and exciting experience for our students, which will impact them for years to come.

We want to offer a special thank you to the individuals who made this work possible - - the liaisons from each sponsor who supported and mentored the teams throughout the year and the Olin faculty advising team and subject matter experts who mentored and coached teams.

Lastly, this year Sarah Bloomer is completing her 3 years as Academic Director of SCOPE, handing off her role into the more than capable hands of Jessica Townsend and Scott Hersey with their extensive experience leading SCOPE.

We hope you enjoy this year's SCOPE Summit!

Sarah Bloomer
Academic Director of SCOPE,
Visiting Professor of Design

Jessica McCarthy
SCOPE Program Director

Lauren Palmer
Associate Director of
Partnership Development

Alessandra Ferzoco
Assistant Professor of
Measurement Science

Lawrence Neeley
Associate Professor of
Design and Entrepreneurship

Jessica Townsend
Professor of Engineering

SCHEDULE OF EVENTS

FRIDAY, MAY 9, 2025

12:30–1:00 PM	**Registration** Milas Hall Lobby
1:00–1:10 PM	**Welcome from Olin Leadership** Norden Auditorium, Milas Hall
1:10–2:15 PM	**Presentations by SCOPE Teams**
2:15–2:30 PM	**Break**
2:30–3:30 PM	**Presentations by SCOPE Teams**
3:30–4:30 PM	**Poster Session & Concurrent Reception** Milas Hall

Olin College of Engineering
SCOPE

ACCELERATE WIND

Installing the Future of Wind

Accelerate Wind is developing rooftop wind turbines that can harness the increased wind speeds that occur at the edges of buildings. Through our collaboration with Accelerate Wind, we supported the installation process by creating infrastructure to characterize and evaluate mounting structures for varied building types, and for characterizing the electrical system. We also developed devices that are capable of monitoring turbine performance to support ongoing operation of their turbines.

Team Members

James Jagielski
Lauren Nalajala
Phillip Post
Gabe Zak

Faculty Advisor

Alessandra Ferzoco

Project Poster

AccelerateWind

AMAZON ROBOTICS

Robotic Manipulation using Tactile Feedback

Amazon Robotics is investigating new ways to manipulate packages and items in Fulfillment Centers. The effort focuses on grasping mechanisms that can enable manipulation of a wider variety of item and package sizes and types compared to the state of the art. To help Amazon Robotics' research and development efforts, this year's SCOPE team created a robotic system that utilizes tactile and vision sensors to grasp a ball and throw it to reach a specified target. Identifying relevant sensor data will help inform Amazon's use of tactile sensing and adaptive gripping in logistics.

Team Members

Jess Brown
Stephanie Cho
Arturo Joya
Evan Lockwood
Miranda Pietraski

Faculty Advisor

Alessandra Ferzoco

Project Poster

BLUE ORIGIN

CNC Conformal Coating Machine

A semi-automatic robotic spray-coating machine for simplifying and accelerating Blue Origin's current in-house PCB rework process.

Team Members
Danny Burns
Joseph Gilbert
Rowan Jansens
Jacob Prisament
William Skelly

Faculty Advisor
Lawrence Neeley

Project Poster

BOSTON SCIENTIFIC

Sustainable Design for Forceps' Lifecycle

The Single Use Biopsy Forceps are a medical device designed to collect tissue endoscopically for histologic examination. This project involved the development of processes and design changes which can enhance the sustainability of Boston Scientific Single Use Biopsy Forceps, assisting them in meeting their goal of being carbon neutral by 2050. This can be achieved by reducing the carbon dioxide emissions from the creation, use, and waste streams of their line of Biopsy Forceps products, while maintaining their performance and use.

Team Members
Miriam Rich
Madeline Robertson
Cassandre Roos
Kai Scott
Lillian Shoemaker
KD Vo

Faculty Advisor
Jessica Townsend

Project Poster

Boston Scientific
Advancing science for life™

BOSTON UNIVERSITY WHEELOCK INSTITUTE FOR THE SCIENCE OF EDUCATION

Creating Generative-AI Powered Learning Systems to Facilitate Equitable K-2 Literacy Education

The BU WISE SCOPE team worked with large-language models to create a web-app that acts as a “literacy buddy" for students and a teaching assistant for teachers. This web-app provides a platform for students to play literacy-building games and collects performance data. This data is integrated directly with a visualization tool that allows teachers to view the students’ progress and an ML model that summarizes and determines how best to support the students’ success with further interventions. We hope that this tool augments the capabilities of teachers and students alike in developing stronger literacy skills and confidence in their communication.

Team Members
Prisha Bhatia
Aaron Codrington
Cherry Pham
Richard Li
Anmol Sandhu

Faculty Advisor
Jessica Townsend

Project Poster

WISE

LINEVISION

CV Detection of Powerline Encroachment

LineVision challenged the Olin SCOPE team to investigate the performance capabilities of our next-generation edge infrastructure through the development of a proof-of-concept system for real-time monitoring of the transmission-line right-of-way.

Team Members

Amit Kumar
Hermosillo
Kate McCurley
Olga Pidruchna
Daniel Quinteros
Aditi Vinod

Faculty Advisor

Alessandra Ferzoco

Project Poster

MASSACHUSETTS DEPARTMENT OF EARLY EDUCATION AND CARE

Redesign of the Child Care Search Tool for the Commonwealth of Massachusetts

The Commonwealth of Massachusetts is working on critical initiatives to improve the way constituents interact with them, especially regarding child care needs. High-quality child care and out-of-school time programs help prepare children for school and life success. For many families, child care is too expensive and they encounter barriers to obtaining child care including out-of-date tools, challenges finding available child care providers, and challenges paying for child care. The Massachusetts Department of Early Education and Care (EEC) is updating several tools to improve the family experience of obtaining financial and practical support for child care, with the goal to disrupt the cycle of poverty. The SCOPE team improved the current family user experience finding child care with a redesign of the Child Care Search tool, making it faster and easier for families to find the resources they need.

Team Members
Karina Lamoreux
Emma Mascillaro
Clay Oates
Lucy Platt
Brooklyn Wakefield

Faculty Advisor
Sarah Bloomer

Project Poster

MASSACHUSETTS
Department of
Early Education and Care

MICROSOFT NEW ENGLAND RESEARCH & DEVELOPMENT (NERD)

Empower: A Consent Framework for Health Data

The 2024-2025 collaboration between Microsoft Research NERD's Project Resolve team and Olin College's SCOPE team focused on creating a public-facing consent framework for the community served by flok Health. This framework is tailored for individuals managing rare metabolic conditions, offering them clear, accessible ways to control their data sharing and research involvement. The project emphasizes secure, ethical data handling practices and seeks to build trust within health communities by prioritizing informed consent. Ultimately, it aims to help increase community engagement in research by ensuring that people maintain agency over their data.

Team Members
Vaani Bhatnagar
Kat Canavan
Norah Evans
Daniel Park

Faculty Advisor
Sarah Bloomer

Project Poster

Microsoft New England Research & Development Center

MODERNA

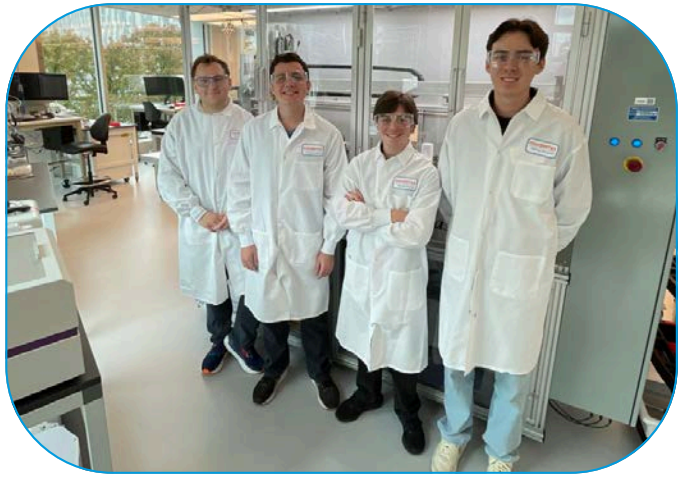
Open-source Biotech Robot Orchestrator

Moderna's mission is to deliver the greatest possible impact to people through mRNA medicines. Rapid development of new formulations requires reliable, high-throughput, and highly integrated robotic systems. Current orchestration and scheduling software for biotechnical instruments and robots falls short in areas of parallelism, human intervention, and process development. We developed an open-source lab orchestration solution, improving the speed and quality of automated biotech labs.

Team Members
Kenta Burpee
AJ Evans
Sam Mendelson
Luke Witten

Faculty Advisor
Alessandra Ferzoco

Project Poster



NEW BALANCE

Push Test Automation

New Balance footwear manufacturing processes may include a manual quality check where operators push with their thumbs at several points around the shoe. The purpose of this check is to check for potential defects in the adhesive bonding of the sole to the upper of the sneaker. This is physically taxing for operators, who may perform up to about 8,000 presses per shift. The quality check may also be prone to variation between tests, operators, and manufacturer locations. Our team worked to automate this process by designing tooling that reduces the manual strain on thumbs and improves the consistency of the quality check.

Team Members
Oliver Buchwald
Aja Capel
Mateo Macias
Sahil Patel
Ellie Ramos

Faculty Advisor
Lawrence Neeley

Project Poster

NEW BALANCE

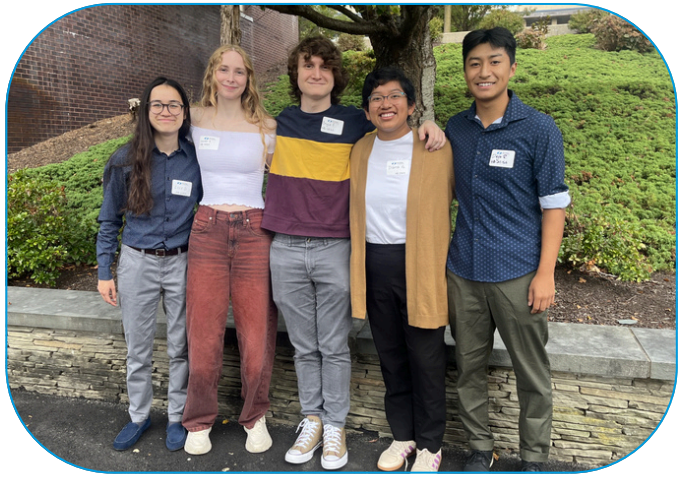
Identifying Manufacturing Variations in Computerized Stitching

Our team worked with New Balance to investigate certain manufacturing processes for New Balance shoes at their Lawrence, MA factory. We mainly looked into the causes of potential variations in stitch location that become apparent during computerized stitching processes. To investigate this, we tested the stitching process with different materials and adjusted pallets based on our findings and observations of experts working at the facility. Our goal was to collect data to experimentally determine root causes of the variations.

Team Members
Lauren Armstrong
Lily Dao
Bryce Ferguson
Diana Garcia
Diego Riverbay

Faculty Advisor
Lawrence Neeley

Project Poster



PFIZER

Clinical Supply Process Optimization Tool

At Pfizer, we apply science and our global resources to bring therapies to people that extend and significantly improve their lives. To support this, Pfizer's Global Clinical Supply (GCS) manages the sourcing and delivery of medications for clinical trials, where the complexity and variability of these trials can introduce process-related risks. This year's SCOPE team worked to create an AI-driven tool that identified opportunities to accelerate the delivery of life-changing treatments and enable data-informed rapid decision making, while limiting clinical supply process risks.

Team Members

Marc Eftimie
Lily Jiang
An Grocki
Raiyan Siddique
Madison Tong

Faculty Advisor

Jessica Townsend

Project Poster

SANTOS FAMILY FOUNDATION / VOLPE CENTER

Data Illuminators: Scalable Data Collection for Nighttime Crosswalk Lighting

According to the U.S. Department of Transportation, 76% of pedestrian fatalities occur in dark conditions, even though only 25% of traffic occurs after dark. To reduce these fatalities, it is important to identify crosswalks at higher risk and those that do not meet recommended lighting guidelines.

The process of evaluating the lighting of every crosswalk in any significant geographic area is time-consuming and currently impractical for governments. With the goal of saving time and money on these data collection and evaluative processes (and save lives!), our SCOPE team, in collaboration with the Santos Family Foundation and the Volpe National Transportation Systems Center, worked to provide a reliable, scalable data collection method to determine driver visibility of pedestrians in crosswalks at night.

Ultimately, our SCOPE team aimed to provide a streamlined, efficient data collection method and analysis process to inform decisions of street lighting and pedestrian-vehicle safety teams for 2-3 municipalities in Massachusetts and beyond.

Team Members

Maya Cranor
Rucha Dave
Allyson Hur
Daeyoung Kim
Natsuki Sacks

Faculty Advisor

Lawrence Neeley

Project Poster

SANTOS FAMILY FOUNDATION

U.S. Department of Transportation Volpe Center