May 3, 2024

Boston University Photonics Center

2024 Biomedical Engineering Senior Design Projects Conference

BOSTON UNIVERSITY

Boston University College of Engineering
Department of Biomedical Engineering

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Department of Biomedical Engineering
Boston University College of Engineering

39TH ANNUAL

Senior Design Projects 2024

Friday May 3, 2024

John A. White
Professor and Chair,
Department of Biomedical Engineering

Diane Joseph-McCarthy
Executive Director, BTEC
Professor of the Practice, BME, Chem

Michael Smith
Associate Professor, BME, MSE

Darren Roblyer
Associate Professor, BME

CONTENTS

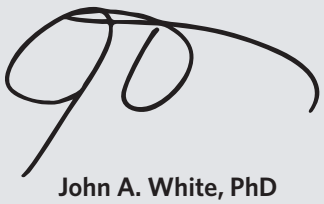
WELCOME FROM THE CHAIR

It is my great pleasure to welcome our guests, our alumni, our industry representatives, our faculty and our students to **Boston University's 39th Annual Biomedical Engineering Senior Design Projects Conference.** This conference is an annual rite of passage for all BU BME seniors, and culminates our year-long Senior Design Project Program. Our Senior Design program is recognized as a national model for the capstone independent design and communication experience for BME undergraduates. Over the course of the day, our talented students will present their innovative designs through oral presentations, as they complete their BS degrees from one of the top Biomedical Engineering programs.

Biomedical Engineering synthesizes engineering, computation, math and physical sciences with the life sciences to advance our understanding of biology, physiology and the medical sciences. This knowledge is then leveraged to develop new devices and methods to improve healthcare, and accelerate cutting-edge research. Our ABET-accredited BS degree program in Biomedical Engineering is one of the oldest such programs in the country, and is designed to provide integrated training in life, physical, and engineering sciences as preparation for a variety of careers in bioengineering, applied biotechnology, and medicine. Engineering design is woven through each year of our curriculum. Earlier design courses complement the senior design experience and help us train the future leaders and innovators in biomedical engineering.

This year's senior design project program was directed by **Professors Diane Joseph-McCarthy**, **Darren Roblyer**, and **Michael Smith**. This team invested much energy and organizational skills to sustain the level of excellence and impact for which this program is renowned. They were assisted by a very talented team of technical advisors from Boston University, BU Medical and Dental Schools, the Harvard hospitals, and medtech, pharma, and biotech industries. These technical advisors met regularly with their teams to guide the work, and grade and comment on assignments including proposal drafts, progress reports, and oral presentations. Their efforts helped ensure that the program continues to sustain its high level of distinction. I served as part of this team and was fortunate to enjoy the program in all of its dimensions. We were able to increase our enagement with industry partners, including sponsors of the new Bioengineering Technology & Entrepreneurship Center (BTEC) at BU. Many students utilized the state-of-the-art BTEC facilities to carry out their design and experimentation. Interactions with industry were facilitated with the help of BU's General Counsel, Martin Oppenheimer. I also want to acknowledge the assistance of David Shawn, Adam Kane, and Olga Drepanos from the BU Writing Program, as well as the guest lecturers who educated students on topics ranging from professional development to intellectual property to entrepreneurship and regulatory affairs. Finally, a very special thank you to John Benducci for his sustained support of the Senior Design Program this year.

Our students are remarkable at rising to the challenge, and I have no doubt that their presentations today will impress, inform and entertain you. Enjoy!



John A. White, PhD
Professor and Chair, Department of Biomedical Engineering

Primary Faculty

SAMAGYA BANSKOTA

Assistant Professor, Biomedical Engineering

PhD, Biomedical Engineering, Duke University

Drug delivery, biomolecular engineering, biomaterials design, genome editing, synthetic biology, functional genomics and protein engineering.

IRVING BIGIO

Professor, Biomedical Engineering;
Electrical & Computer Engineering; Physics; Medicine;
Associate Chair for Undergraduate Program

PhD, Physics, University of Michigan

Medical applications of optics, lasers and spectroscopy; biomedical optics and biophotonics; biomolecular dynamics; applied spectroscopy, especially to biomedical problems; nonlinear optics; quantum electronics and laser physics.

DAVID BOAS

Professor, Biomedical Engineering;
Electrical & Computer Engineering;
Director, Neurophotonics Center

PhD, Physics, University of Pennsylvania

Neurophotonics; biomedical optics; functional near infrared spectroscopy; microscopy methods; oxygen delivery and consumption; neuro-vascular coupling; physiological modeling.

CHRISTOPHER S. CHEN

Professor, Biomedical Engineering;
Materials Science & Engineering;
Director, Biological Design Center

MD, Harvard Medical School; PhD, Medical Engineering and Medical Physics, Harvard-MIT Health Sciences and Technology Program

Vascular, cardiac, and stem cell biology and engineering; mechanobiology; micro- and nanotechnology; biomaterials cell adhesion and extracellular matrix.

JI-XIN CHENG

Professor, Biomedical Engineering; Electrical & Computer Engineering;
Chemistry; Physics; Materials Science & Engineering;
Moustakas Chair Professor in Photonics and Optoelectronics

PhD, Chemical Physics, University of Science and Technology of China

Molecular spectroscopic imaging technologies; label-free microscopy; medical photonics; neurophotonics; cancer metabolism; photonics for infectious diseases.

BRIANNE CONNIZZO

Assistant Professor, Biomedical Engineering

PhD, Bioengineering, University of Pennsylvania

Aging; orthopaedic and soft tissues; mechanobiology; multiscale biomechanics; extracellular matrix assembly and remodeling.

CHARLES DELISI

Dean Emeritus, College of Engineering
Professor, Biomedical Engineering; Physics;
Metcalf Professor of Science and Engineering

PhD, Physics, New York University

Developing and applying computational/mathematical methods, and high throughput experimental methods for inferring the structure and function of protein networks.

BRIAN DEPASQUALE

Assistant Professor, Biomedical Engineering

PhD, Neurobiology and Behavior, Columbia University

Machine learning; computational neuroscience; theoretical neuroscience.

ANNA DEVOR

Professor, Biomedical Engineering

PhD, Hebrew University of Jerusalem, Israel

Cellular and systems-level neuroscience; microscopy; physiological underpinning of noninvasive imaging.

MARY DUNLOP

Associate Professor, Biomedical Engineering,
Associate Chair for Graduate Programs

PhD, Mechanical Engineering, California Institute of Technology

Understanding how microorganisms use feedback to respond to changes in their environment, studying naturally occurring examples of feedback to understand their implications for survival in changing conditions, and engineering novel, synthetic feedback control systems.

MICHAEL ECONOMO

Assistant Professor, Biomedical Engineering

PhD, Biomedical Engineering, Boston University

Systems neuroscience; motor control; long-range neural circuits; computational neuroscience, neurotechnology.

SOLOMON EISENBERG

Professor, Biomedical Engineering;
Electrical & Computer Engineering;
Senior Associate Dean for Academic Programs, College of Engineering

ScD, Electrical Engineering, Massachusetts Institute of Technology

Electrically mediated phenomena in tissues and biopolymers; cartilage bio-mechanics; computational modeling of electric field distributions in the human thorax and heart during defibrillation; transcranial magnetic stimulation.

JAMES GALAGAN

Professor, Biomedical Engineering;
Microbiology, Chobanian & Avedisian School of Medicine;
Associate Director, Precision Diagnostics Center

PhD, Computational Neuroscience, MIT

Biosensor development; computational biology; systems biology; genomics.

ALEXANDER GREEN

Associate Professor, Biomedical Engineering

PhD, Materials Science and Engineering, Northwestern University

Synthetic biology; nucleic acid nanotechnology; low-cost diagnostics; nanomaterials.

MARK GRINSTAFF

Professor, Biomedical Engineering; Chemistry;
Materials Science & Engineering;
Director, Nanotechnology Innovation Center

PhD, Chemistry, University of Illinois Urbana-Champaign

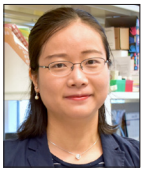
Biomaterials; tissue engineering; drug delivery; macromolecular chemistry and engineering, self-assembly; nanodevices.

XUE HAN

Professor, Biomedical Engineering

PhD, Physiology, University of Wisconsin-Madison

Neurotechnology; optical neural modulation; optogenetics; neural prosthetics; neural network dynamics; brain rhythms; neurological and psychiatric diseases; cognition.



LIANGLIANG HAO

Assistant Professor, Biomedical Engineering

PhD, Chemical Biology, Northwestern University

Noninvasive disease detection and treatment monitoring at the Point-of-Care; tissue-specific transcriptome engineering; multimodal systemic imaging.

MIGUEL JIMENEZ

Assistant Professor, Biomedical Engineering

PhD, Chemistry, Columbia University

Microbial devices, bioelectronic devices, synthetic biology, biosensors, bioactuators, diagnostics & therapeutics, in situ directed evolution, human health, food & water security, countermeasures for exploration space travel.

Primary Faculty Cont.

DIANE JOSEPH-MCCARTHY

Professor of the Practice, Biomedical Engineering,
Department of Chemistry
Executive Director, Bioengineering Technology & Entrepreneurship Center
PhD, Physical Chemistry, Massachusetts Institute of Technology
Chemical biology, biophysics; computational science; drug discovery & development.

SIMON KASIF

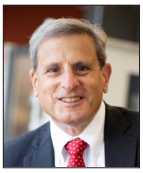
Professor, Biomedical Engineering;
Bioinformatics; Computer Science
PhD, Computer Science, University of Maryland
Genomic systems biology; P4 medicine, wellness and disease prevention; medical bioinformatics; artificial intelligence; machine learning; high performance systems; reproducibility and science informatics.

AHMAD (MO) KHALIL

Professor, Biomedical Engineering;
Associate Director, Biological Design Center
PhD, Mechanical Engineering, Massachusetts Institute of Technology
Synthetic and systems biology; gene regulation; protein aggregation; microbial communities; laboratory evolution.

CATHERINE KLAPPERICH

Professor, Biomedical Engineering; Mechanical Engineering; Materials Science & Engineering;
Director, Precision Diagnostics Center;
Associate Director, DAMP-CTL
PhD, Mechanical Engineering, University of California, Berkeley
Design of new molecular diagnostics and appropriate technologies for healthcare.



KENNETH R. LUTCHEN

Boston University Provost ad interim and Former ENG Dean,
Professor, Biomedical Engineering
PhD, Biomedical Engineering, Case Western Reserve University
Airway and lung tissue mechanics and ventilation; computational modeling of structure-function relations in the lung; mechanical ventilation; integrated biomechanics of the lung; linear and nonlinear systems identification; blood-glucose regulation.

JEROME MERTZ

Professor, Biomedical Engineering; Physics;
Electrical & Computer Engineering
PhD, Physics, Université Paris VI and University of California, Santa Barbara
Development and application of new optical microscopy techniques to biological imaging.

JOHN NGO

Associate Professor, Biomedical Engineering
PhD, Biochemistry and Molecular Biophysics, California Institute of Technology
Protein structure and engineering; molecular and cellular engineering; single-molecule biophysics; cell signaling; fluorescence and electron microscopy.

HADI T. NIA

Assistant Professor, Biomedical Engineering;
Materials Science & Engineering
PhD, Mechanical Engineering, Massachusetts Institute of Technology
Tumor microenvironment; physical sciences of cancer; intravital imaging and animal models of cancer; mechanobiology and biomechanics.

TIMOTHY O'SHEA

Assistant Professor, Biomedical Engineering
PhD, Medical Engineering and Medical Physics, Massachusetts Institute of Technology
Glia Engineering, biomaterials, neural engineering, spinal cord injury, stroke, glial neurobiology, regenerative medicine, cell transplantation.

ERICA D. PRATT

Assistant Professor, Biomedical Engineering;
Materials Science & Engineering
Moorman-Simon Interdisciplinary Career Development Professor
PhD, Biomedical Engineering, Cornell University
Engineering-focused cancer research; liquid biopsy and rare cell detection; multi-omics in oncology; microfluidics and microfabrication; pancreatic cancer.

DARREN ROBLYER

Associate Professor, Biomedical Engineering;
Electrical & Computer Engineering;
Director of BME PhD Program Admissions
PhD, Bioengineering, Rice University
Optical functional imaging; diffuse optics; near infrared spectroscopy; monitoring of emerging targeted and cytotoxic therapies in oncology; non-invasive monitoring of tumor metabolism.

KAMAL SEN

Associate Professor, Biomedical Engineering;
Director of Admissions and Recruitment for Master's Programs
PhD, Physics, Brandeis University
Electrophysiological recording of neural responses in auditory processing; theoretical methods to characterize neuronal encoding; computational models of natural sound processing.

MICHAEL L. SMITH

Associate Professor, Biomedical Engineering;
Materials Science and Engineering
PhD, Biomedical Engineering, University of Virginia
Cellular mechanotransduction through the extracellular matrix; fibronectin structural biology; microfabricated surfaces for engineering cell function.

DIMITRIJE STAMENOVIĆ

Professor, Biomedical Engineering;
Materials Science and Engineering
PhD, Mechanics, University of Minnesota
Respiratory mechanics; cell mechanics; rheology of soft tissues; mechanics of foam-like structures.

MATTHIAS STANGL

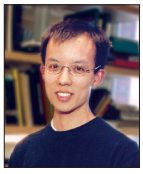
Assistant Professor, Biomedical Engineering
PhD, German Center for Neurodegenerative Diseases & Otto-von-Guericke University Magdeburg
Cognitive neuroscience, neurotechnology, human brain imaging methods, signal processing and data analysis methods.

BÉLA SUKI

Professor, Biomedical Engineering;
Materials Science and Engineering
PhD, Biomechanics, Jozsef Attila University, Szeged (Hungary)
Mechanical properties of living tissues; modeling the dynamic and nonlinear behavior of complex biological systems; pulmonary physiology.

MICHELLE TEPLENSKY

Assistant Professor, Biomedical Engineering;
Materials Science and Engineering
PhD, Chemical Engineering, University of Cambridge
Engineering nanotechnology to program immune cell connectivity, processing, and communication by design and harnessing these insights to synthesize potent vaccines; immunotherapeutics.



JOE TIEN

Associate Professor,
Biomedical Engineering;
Materials Science & Engineering
PhD, Physics, Harvard University
Vascularization of biomaterials; quantitative physiology of engineered tissues; biomaterials for microsurgical applications; lymphatics; interstitial transport; inverse problems in vascular imaging.

Primary Faculty Cont.

ADRIANA TOMIC
Assistant Professor,
Biomedical Engineering;
Microbiology
PhD, Infection Biology, Hannover Medical School
At the interface between computational immunology, infection biology and clinical research, aiming to define the immunological signature of protective immunity in infectious diseases.

LUCIA M. VAINA
Professor, Biomedical Engineering;
Neurology, Chobanian & Avedisian School of Medicine
PhD, Mathematical Logic, Sorbonne, Paris; MD/PhD, Neurology, Doctorat d'Etat ès Sciences and in Médecine (MD PhD); Institut National Toulouse, France
Behavioral, functional imaging (fMRI and MEG) and theoretical & computational approaches to study the neural basis and the plasticity of high-level visual functions in the human brain.

SANDOR VAJDA
Professor, Biomedical Engineering;
Systems Engineering; Chemistry;
Director, Biomolecular Engineering Research Center
PhD, Chemistry, Hungarian Academy of Science
Scientific computing applied to problems in engineering, biochemistry, and biology, with focus on molecular mechanics, protein structure determination, protein-ligand interactions, docking, and drug design.

JOHN WHITE
Chair, Biomedical Engineering
Professor, Biomedical Engineering;
Pharmacology and Experimental Therapeutics; Neuroscience
PhD, Biomedical Engineering, Johns Hopkins University
Mechanisms of episodic memory; pathophysiology of epilepsy; computational neuroscience; design of real-time instrumentation; imaging of activity in neurons and astrocytes.

JOYCE WONG
Professor, Biomedical Engineering;
Material Science and Engineering
PhD, Materials Science and Engineering, Program in Polymer Science and Technology, Massachusetts Institute of Technology
Biomaterials, tailoring cell-material interfaces for drug delivery and tissue engineering applications; direct, quantitative measurement of biological interactions.

WILSON WONG
Associate Professor, Biomedical Engineering
PhD, Chemical Engineering, University of California, Los Angeles
Developing ways to control mammalian cell functions through engineering, biological network design, molecular biology, and chemical biology for medical applications at four different levels of regulation: receptor signaling, post-transcription, transcription, and DNA.

MUHAMMAD ZAMAN
Vice Chair, Biomedical Engineering;
Professor, Biomedical Engineering;
Materials Science & Engineering
PhD, Physical Chemistry University of Chicago
Comprehensive and quantitative approaches to develop a multiscale understanding of cell-matrix interactions for fundamental biological and applied clinical research.

Lecturers

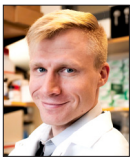
OUSAMA M. A'AMAR
Senior Lecturer,
Biomedical Engineering
PhD, with Distinction, Electrical Engineering,
The National Polytechnic Institute of Lorraine (INPL), France

XIN BROWN
Senior Lecturer,
Biomedical Engineering;
Biointerface Technologies Facility Manager
PhD, Boston University School of Medicine

MARIO CABODI
Master Lecturer,
Research Assistant Professor,
Biomedical Engineering,
Director of Masters Programs
PhD, Cornell University

ANDY FAN
Lecturer,
Biomedical Engineering
PhD, Electrical Engineering,
Massachusetts Institute of Technology

KAVON KARROBI
Lecturer,
Biomedical Engineering;
Manager,
Bioengineering Technology & Entrepreneurship Center
PhD, Biomedical Engineering, Boston University



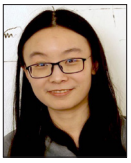
JOSHUA KAYS
Lecturer,
Biomedical Engineering
PhD, Biomedical Engineering, Boston University

CHRISTINE MULVEY
Senior Lecturer,
Biomedical Engineering
PhD, Biomedical Engineering, Boston University

Research Faculty

ELIZABETH BARTOLAK-SUKI
Research Assistant Professor,
Biomedical Engineering
MD, General Medicine, Szent-Gyorgyi Medical School,DSc, Molecular Cell biology, Semmelweis Medical School
Inter/intracellular signaling and molecular/ medical pathology.

DIMITRI BEGLOV
Research Assistant Professor,
Biomedical Engineering
PhD, Molecular Biophysics, Moscow Physical and Technical Institute
Computational chemistry and biology; protein structure and function; computational characterization and prediction of biomolecular interactions.



XIAOJUN CHENG
Research Assistant Professor,
Biomedical Engineering
PhD, Physics, City University of New York
Exploiting light scattering and speckles to investigate brain dynamics.

AARON COLBY
Research Assistant Professor,
Biomedical Engineering
PhD, Biomedical Engineering, Boston University
Developing novel delivery systems including nanoparticles and drug concentrating devices as tools for treating cancer.

EDWARD DAMIANO
Research Professor,
Biomedical Engineering
PhD, Applied Mechanics, Rensselaer Polytechnic Institute
Integrated cellular and extracellular biomechanics; biofluid dynamics; microhemofluidics; microcirculation; vestibular biomechanics; non-Newtonian rheology; closed-loop blood-glucose regulation.

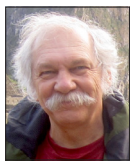
AURELIE EDWARDS
Research Professor,
Biomedical Engineering
PhD, Chemical Engineering, Massachusetts Institute of Technology
Developing mathematical models of water and solute transport in the kidney, at different scales, to address physiological and pathological questions.

JEROEN EYCKMANS
Research Assistant Professor,
Biomedical Engineering
PhD, Medical Sciences, Katholieke Universiteit Leuven
Tissue repair and regeneration; wound healing biomechanics; biomimetic tissue-on-chip models; skeletal organoid biology; reverse tissue engineering, fibrosis.

ODED GHITZA
Research Professor,
Biomedical Engineering
PhD, Electrical Engineering, Tel Aviv University
Formulation of cortical computation principles that underlie the speech decoding process and that are capable of predicting human performance in speech perception tasks.

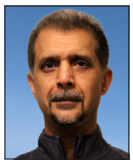
DIMA KOZAKOV
Research Associate Professor,
Biomedical Engineering
PhD, Biomedical Engineering, Boston University
Development of protein-protein and protein-ligand docking algorithms, fast and efficient scoring functions for screening large number of potential docked complexes, protein homology models suitable for docking.

BRIAN SNYDER
Research Professor,
Biomedical Engineering
MD/PhD, Biomechanics, University of Pennsylvania
Basic and applied research in musculoskeletal biomechanics, cellular processes, and gene expression.



THOMAS L. SZABO
Research Professor,
Biomedical Engineering;
Mechanical Engineering
PhD, Physics, University of Bath, UK Medical imaging; diagnostic ultrasound; tissue characterization; transduction; biomedical signal processing; wave propagation; nonlinear acoustics.

MARTIN THUNEMANN
Research Assistant Professor,
Biomedical Engineering
PhD, Biochemistry, Eberhard-Karls-Universität Tübingen, Germany, Biochemistry, Dr. rer. nat.
Cellular and systems-level neuroscience, microscopy, electrophysiology, preclinical imaging.



ZAHID YAQOOB
Research Associate Professor,
Biomedical Engineering
PhD, Optics, University of Central Florida
Label-free interferometric microscopy; fluorescence imaging; neurophotonics; cellular biomechanics; organoid screening; artificial intelligence.

MERYEM YUCEL
Research Associate Professor,
Biomedical Engineering
PhD, Biomedical Engineering, Boğaziçi University, Istanbul, Turkey
Functional neuroimaging (fNIRS, fMRI, EEG); fNIRS signal processing; cognitive neuroscience.

Adjunct Faculty

MERCEDES BALCELLS-CAMPS, PHD
Adjunct Research Professor,
Biomedical Engineering

ALLISON M. DENNIS, PHD
Adjunct Assistant Professor,
Biomedical Engineering

LAURA LEWIS, PHD
Adjunct Assistant Professor,
Biomedical Engineering

CHRISTINE MCBETH, PHD
Adjunct Research
Assistant Professor,
Biomedical Engineering

JULIO COLLADO VIDES, PHD
Adjunct Research Professor,
Biomedical Engineering

Emeritus

CHARLES CANTOR, PHD
Professor Emeritus,
Biomedical Engineering

H. STEVEN COLBURN, PHD
Professor Emeritus,
Biomedical Engineering

EVAN EVANS, PHD
Research Professor Emeritus,
Biomedical Engineering

MAXIM D. FRANK-KAMENETSKII
Professor Emeritus,
Biomedical Engineering

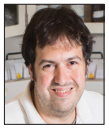
STEPHEN GROSSBERG, PHD
Professor Emeritus,
Biomedical Engineering

ARTHUR ROSENTHAL, PHD
Professor of Practice Emeritus,
Biomedical Engineering

TEMPLE F. SMITH, PHD
Professor Emeritus,
Biomedical Engineering

MALVIN TEICH, PHD
Professor Emeritus,
Biomedical Engineering
Physics

Affiliated Faculty



MICHAEL ALBRO, PHD
Assistant Professor,
Mechanical Engineering

MARGRIT BETKE, PHD
Professor,
College and Graduate School of Arts & Sciences, Computer Science

THOMAS BIFANO, PHD
Professor,
Mechanical Engineering;
Materials Science & Engineering;
Director, Photonics Center

DAVID BISHOP, PHD
Professor, Electrical and Computer Engineering; Physics; Materials Science & Engineering; Mechanical Engineering; Head, Division of Materials Science & Engineering;
Director, CELL-MET Engineering Research Center

CHANDRAMOULI CHANDRASEKARAN, PHD
Assistant Professor,
Anatomy & Neurobiology; Psychological and Brain Sciences; Center for Systems Neuroscience

JERRY CHEN, PHD
Assistant Professor,
Biology

BRIAN CLEARY
Assistant Professor,
Computing and Data Science; Biology

QIANG CUI, PHD
Professor,
Chemistry

JACK DENNERLEIN, PHD
Professor,
Department of Physical Therapy

DOUGLAS DENSMORE, PHD
Professor,
Electrical & Computer Engineering

SHYAMSUNDER ERRAMILLI, PHD
Professor,
Physics

JEFFREY GAVORNIK, PHD
Associate Professor,
Biology

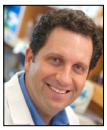
FRANK GUENTHER, PHD
Professor,
Sargent College of Health and Rehabilitation Sciences

MICHAEL HASSELMO, PHD
Professor,
Biology;
Director, Center for Systems Neuroscience

LAERTIS IKONOMOU, PHD
Assistant Professor,
Medicine
Chobanian & Avedisian School of Medicine

W. CLEMENT KARL, PHD
Professor,
Electrical & Computer Engineering

NANCY KOPELL, PHD
Professor,
Mathematics



DARRELL N. KOTTON, MD
Professor,
Medicine,
Chobanian & Avedisian School of Medicine;
Director, Center for Regenerative Medicine

ANN MCKEE, MD
Professor,
Neurology & Pathology,
Chobanian & Avedisian School of Medicine

PANKAJ MEHTA, PHD
Professor,
Physics

ELISE F. MORGAN, PHD
ad interim Dean, College of Engineering,
Maysarah K. Sukkar Professor of Engineering Design and Innovation
Professor,
Mechanical Engineering
Materials Science & Engineering

S. HAMID NAWAB, PHD
Professor,
Electrical & Computer Engineering

ELAINE O. NSOESIE, PHD
Assistant Professor,
School of Public Health

IOANNIS PASCHALIDIS, PHD
Professor,
Electrical & Computer Engineering

TYLER PERRACHIONE, PHD
Associate Professor,
Sargent College of Health and Rehabilitation Sciences

STEVE RAMIREZ, PHD
Assistant Professor,
Psychological & Brain Sciences

TOMMASO RANZANI, PHD
Assistant Professor,
Mechanical Engineering;
Materials Science & Engineering

ROBERT M. G. REINHART, PHD
Associate Professor,
Psychological & Brain Sciences

MICHELLE SANDER, PHD
Associate Professor,
Electrical & Computer Engineering;
Materials Science & Engineering

BENJAMIN SCOTT, PHD
Assistant Professor,
Psychological & Brain Sciences

DANIEL SEGRÈ, PHD
Associate Professor,
Biology

SATISH K. SINGH, MD
Associate Professor,
Gastroenterology
Chobanian & Avedisian School of Medicine

CARA STEPP, PHD
Professor,
Sargent College, Speech, Language & Hearing Science

ROBERT A. STERN, PHD
Professor,
Neurology, Neurosurgery, and Anatomy; Neurobiology
Chobanian & Avedisian School of Medicine

NANCY SULLIVAN, PHD
Professor,
Chobanian & Avedisian School of Medicine; Biology

LEI TIAN, PHD
Assistant Professor,
Electrical and Computer Engineering

Affiliated Faculty Cont.

M. SELIM ÜNLÜ, PHD
Professor,
Electrical & Computer Engineering

ARTURO VEGAS, PHD
Assistant Professor,
Chemistry

ARCHANA VENKATARAMAN, PHD
Associate Professor,
Electrical and Computer Engineering

ZEBA WUNDERLICH, PHD
Associate Professor,
Biology

RABIA YAZICIGIL, PHD
Professor,
Electrical & Computer Engineering

MEG YOUNGER, PHD
Assistant Professor,
Biology

KATHERINE YANHANG ZHANG, PHD
Professor,
Mechanical Engineering

XIN ZHANG, PHD
Professor,
Mechanical Engineering; Electrical & Computer Engineering;
Materials Science & Engineering

Postdocs

POSTDOCTORAL ASSOCIATES

Razan Alnahhas
Virgile Andreani
James Angstman
Tsz Him Ching
Jakub Czuchnowski
Feiyang Deng
Natalie Fomin-Thunemann
Emily Hager
Yujin Han
Mustafa Cagatay Karakan
Suntae Kim
Ian Kinstlinger
Heidi Klumpe
Gulce Kureli
Micheal Mclellan
Hagar Moussa
Maria Moya
Mai Ngo
Jacob Norman
Nikit Patel
Pablo Perez
Thao Pham
Arjun Ravikumar
Michael Raymond
William Shaw
Subramanian Sundaram
Indorica Sutradhar
Mohammad Mahdi Tajdini
Li Chang Jessica Teo
Victor Tierrafria Pulido
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BIOENGINEERING TECHNOLOGY & ENTREPRENEURSHIP CENTER

AT BOSTON UNIVERSITY'S COLLEGE OF ENGINEERING

The Bioengineering Technology & Entrepreneurship Center (BTEC) is designed to transform education and innovation for bioengineering students through hands-on learning. BTEC is a 5000-square-foot, bioengineering "maker space" with a Molecular, Cellular, and Tissue Engineering Suite, a BioSensors and Instrumentation Suite, and the eClinicalWorks Digital and Predictive Medicine Design Suite.

BTEC advances corporate-academic partnerships which include industry-mentored student projects. These partnerships are realized through an extraordinary advisory board made up of leaders in the biotechnology, pharmaceutical, and medical technology industries. Board companies gain early insights into faculty research and activities while providing explicit input on educational program content at the consortium-level to best prepare students for the workforce.

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BU's Biomedical Engineering Department is among the largest of its kind in the US, and is home to numerous research labs:

Artificial and Biological Intelligence Lab
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BU RESEARCH CENTERS

BU has eight interdisciplinary research centers that are directed by BME faculty:

BTEC

Bioengineering Technology and Entrepreneurship Center

Transforming education and innovation for bioengineering students through hands-on learning in partnership with industry, from gene editing to biosensors to digital medicine

BDC

Biological Design Center

To rigorously understand life's design principles and re-engineer them to revolutionize our approach to addressing critical challenges in human health and the environment

BMERC

Biomolecular Engineering Research Center

Developing and applying computational methods for the analysis and design of structures, functions, interactions, regulation and evolution of biological macromolecules

CFD

Center on Forced Displacement

Fostering research and engagement with the global challenge of forced displacement, through multidisciplinary teams from across BU, around the country, and around the world

CELL-MET

NSF Engineering Research Center in Cellular Metamaterials

Developing tissue-engineering principles to create scalable, low-cost technologies for growing clinically significant cardiac tissues from cell-level building blocks

BUnano

Nanotechnology Innovation Center

Where nanomaterials intersect medicine and energy through collaborative interdisciplinary research

NPC

Neurophotonics Center

Advancing our understanding and treatment of brain disorders through advanced optical science and photonic systems

PDC

Precision Diagnostics Center

Discovery, design and development and clinical translation of technology for disease screening and monitoring, treatment management and health maintenance

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David Shawn, Associate Director for Writing in the Disciplines, Boston University

Ray Han*, Managing Director, Accenture

Thomas P. McNulty*, Counsel, Lando & Anastasi (**BTEC Sponsor**)

Careers Paths Panel:

Michelle Teplensky, Assistant Professor of Biomedical Engineering, Boston University

Uros Kuzmanovic*, CEO and Co-Founder, BioSens8

Kathleen Rice*, Reliability Engineer, Philips

Rachita Chaudhury-Floros*, Senior Clinical Operations Lead, Sarepta Therapeutics

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BME
Senior
Design
Projects
Conference

2024

Conference Agenda

BU Department of Biomedical Engineering

BME
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Projects
Conference

2024

Conference Agenda

May 3, 2024 9:30am - 4:30pm
Track 1 PHO 206 | Track 2 PHO 203
Reception to follow at the Hotel Commonwealth

9:30 - 10:00 Continental Breakfast and Check-in **Atrium**

Track 1 - PHO 206

Affiliations not specified are BU BME

10:00 - 10:05 WELCOME Prof. Diane Joseph-McCarthy

Session A

Biomechanics PHO 206

Session Chair: Prof. Michael Smith

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10:05 - 10:20 **Investigating Sex-Dependent Differences in Tensional Homeostasis** 27
Team 17: Diya Desai, Josephine Dunphy, Nourhan El Sherif, Marin Perez, & Sabrina Wilderotter
Advisors: Brianne Connizzo, Michael Smith

10:20 - 10:35 **Design and Fabrication of A Novel Negative Pressure Ventilator for Mice and Large Animals**
Team 9: Jung Won Park
Advisor: Hadi T. Nia

10:35 - 10:50 **Translation of a Novel Microstructured Tissue Fastener into a Coronary Stent** 28
Team 25: Isabelle Nguyen, Marianne Palmieri, Mark Ruta, Vrishin Sundaram and Nicole Zajac
Advisors: Peyton Fitzgerald, Joseph Urban and Corin Williams (Draper)

10:50 - 11:05 **Design of an Improved Optical Measurement Method for Spinal Deformation in Spinal Metastatic Disease** 29
Team 37: Massimo Siracusano, Teluck Sharma
Advisor: Ron Alkalay (Department of Orthopedic Surgery, Beth Israel Deaconess Medical Center)

11:05 - 11:20 **Engineering Functional Recovery of Hyperproliferative Hepatocytes for Implantable Liver Grafts** 30
Team 16: Veronica Hui, Chi (Jeffrey) Li
Advisors: Amy Stoddard, Delaney Gray-Scherr, Christopher Chen

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11:20 - 11:40 Coffee Break **Atrium**

Session B

Digital and Predictive Medicine **PHO 206**

Session Chair: Prof. Brian DePasquale Page

11:40 - 11:55 **Computational Investigation of PFAS Molecules Binding to Human Fatty Acid Binding Protein** 33
Team 13: Billy Zhai, Chunlin Zhu, Prakruti Dholiya
Advisors: Diane Joseph-McCarthy, Joyce Wong

11:55 - 12:10 **Building Computational Framework to Better Research on Cancerous Spinal Strength and Integrity** 34
Team 20: Ismail Sufi, Natalie Will
Advisor: Ron Alkalay (Center for Advanced Orthopedic Studies Beth Israel Deaconess Medical Center)

12:10 - 12:25 **Scoring the Druggability of Proteins Based on Results of Advanced Protein Prediction Tools** 35
Team 29: Sulaiman Alsalamah, Madelyn Keller, Sydney Sorbello
Advisor: Sarah Spencer (Novartis)

12:25 - 1:15 Lunch **Atrium**

1:15 - 1:30 **Innovative Strategies in Venous Blood Collection: iCoagLab's Vision for Minimally Invasive and Enhanced Care** 36
Team 21: Victoria Gonzalez Canalle, Noelle Flanagan, Zoe McCarthy, Jessica Spada, Melina Teguis
Advisor: Aniket Joshi (Coalesenz)

1:30 - 1:45 **Image signal processing for quantification of microvascular tissue damage in Alzheimer's disease** 37
Team 27: Olivia Border, Rose Coviello, Victoria Rodriguez
Advisors: Barnaly Rashid, David Salat (Niji Neuro Corp)

1:45 - 2:00 **Investigation of Weakly Supervised Multi-label Image Classifier for Microscopy Image Representation** 38
Team 28: Jen Hsin Chiao, HyoJoo Kim, Sunni Lin, Susan Zhang (ME)
Advisors: Chien-Cheng Shih, Minhua Qiu (Novartis Institute for Biomedical Research)

2:00 - 2:15 **Parent University for Language** 39
Team 15: Tanner Armstard, Evan Kwong, Christian Montoya, Jane Yoo
Advisor: Andrey Vyshedskiy

Session C

Cell and Tissue Engineering PHO 206

Session Chair: Prof. Michelle Teplensky Page

2:15 - 2:30 **A Novel Method to Synthesize PET Nanoparticles and Measure Their Uptake in Edible Plants** 43
Team 35: Bharat Bandi, Ishika Mehta, Navya Shetty, Shantanu Vaid
Advisor: Joshua Kays

2:30 - 2:45 **Aptamer Nanostructures as Adenocarcinoma Immunotherapeutics**
Team 8: Yulianna Estrada, Siyuan Li
Advisor: Michelle Teplensky

2:45 - 3:00 **Nanoparticle-Chemotherapy Testing in Microfluidics Model of the Tumor Microenvironment** 44
Team 24: Ahona Dev, Dilek Aylin Manav, Sharani Nasankar, Athena Wang
Advisors: Jeffrey Borenstein, Alex Markoski (Draper, Brown University)

3:00 - 3:15 Coffee Break **Atrium**

3:15 - 3:30 **Modeling a Nanomagnetic Culturing System for Uterine Fibroid Organoids with MCF-7 Spheroids** 45
Team 2: Ricardo Fernandez, Anika Joglekar, Fernando Ortiz, Abbigale Shi
Advisors: Catherine Klapperich, Lena Landaverde

3:30 - 3:45 **Improving Throughput in the Geometric Viability Assay to Measure Bacterial Growth** 46
Team 6: Aidan Chan, Chris Chan, Andrew Chang, Youssef Haider, Sungmin Hwang
Advisor: Mary Dunlop, Owen O'Connor, Eric South

3:45 - 4:00 **Development of Bioprinting Techniques for Manufacturing Skin/Tumor Models** 47
Team 22: John Carlson, James Coleman, Reina Dreyer
Advisor: Seung-Schik Yoo (Brigham and Women's Hospital/Harvard Medical School)

Track 2 - PHO 203

10:00 - 10:05 WELCOME Prof. Darren Roblyer

Session A

Neuroengineering PHO 203

Session Chair: Prof. Timothy O'Shea

11:20 - 11:40 Coffee Break **Atrium**

Session B

Optics PHO 203

Session Chair: Prof. Irving Bigio

12:25 - 1:15 Lunch **Atrium**

Session C

Devices **PHO 203**

Session Chair: Prof. Bela Suki

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3:00 - 3:15 Coffee Break **Atrium**

3:15-3:30 **A Fiber Stretching and Imaging System** 72
Team 11: Weikang Ai, Wang Yu
Advisors: Yuqing Deng, Bela Suki

3:30-3:45 **Stretcher-Ventilator System for Mechanotransduction Studies of Mice Tracheas** 73
Team 12: Ethan Curtis, Natalia Feced Garcia, Christopher Wu
Advisors: Joseph Hall, Bela Suki

3:45 - 4:00 **Exosome-Based Biomarker Discovery and Disease Diagnostics** 74
Team 31: Michelle Yung, Yilin Zhou
Advisors: Fei Liu, Wen Peng Liu, Yi Li (Brigham and Women's Hospital, Harvard Medical School)

4:00 - 4:30 Awards and Closing Remarks **PHO 206**
Prof. Diane Joseph-McCarthy, Prof. Darren Roblyer, Prof. John White

Projects Previously Presented

Projects containing confidential information (private presentations)

Evaluating the Suitability of an In-vitro Human Endothelial Cell-based Assay to Assess CNS Penetration of Compounds
Team 19: Teertha Ayanji, Vatsal Shrivastava
Advisor: Praveen Bahadduri (C4 Therapeutics)

Track 1

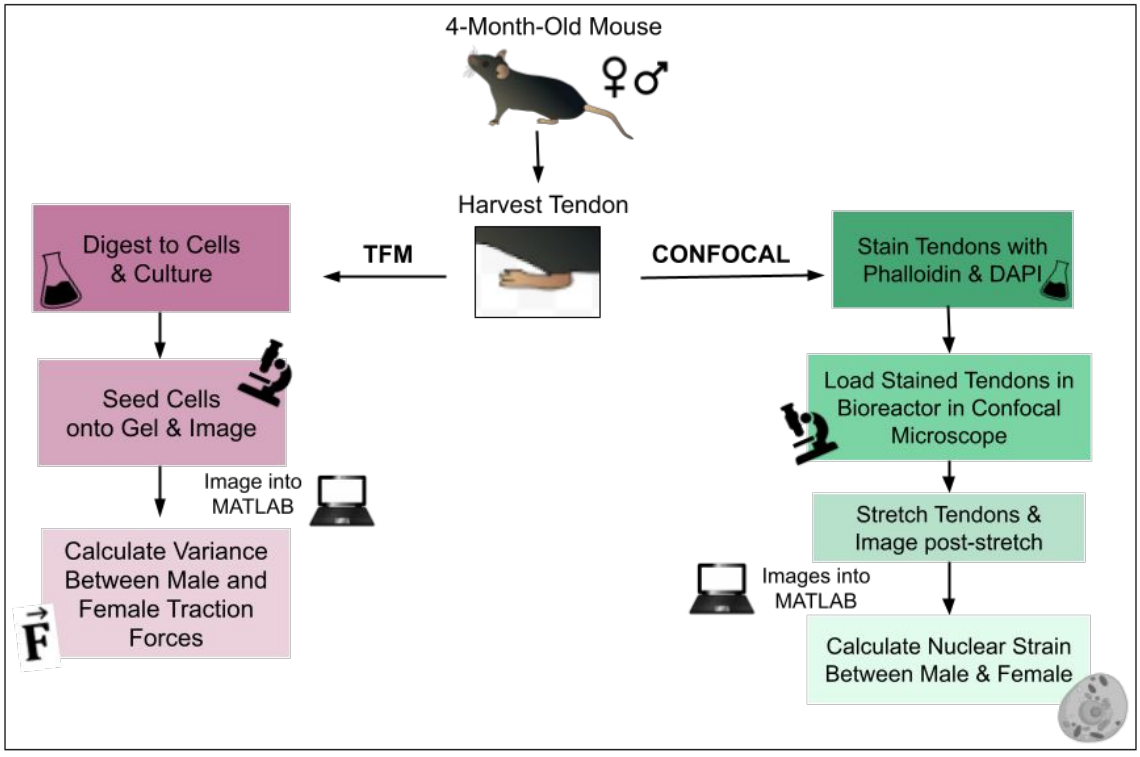
Session A

Biomechanics

Investigating Sex-Dependent Differences in Tensional Homeostasis

Team 17: **Diya Desai, Josephine Dunphy, Nourhan El Sherif, Marin Perez, & Sabrina Wilderotter**
Advisors: **Brianne Connizzo, Michael Smith**

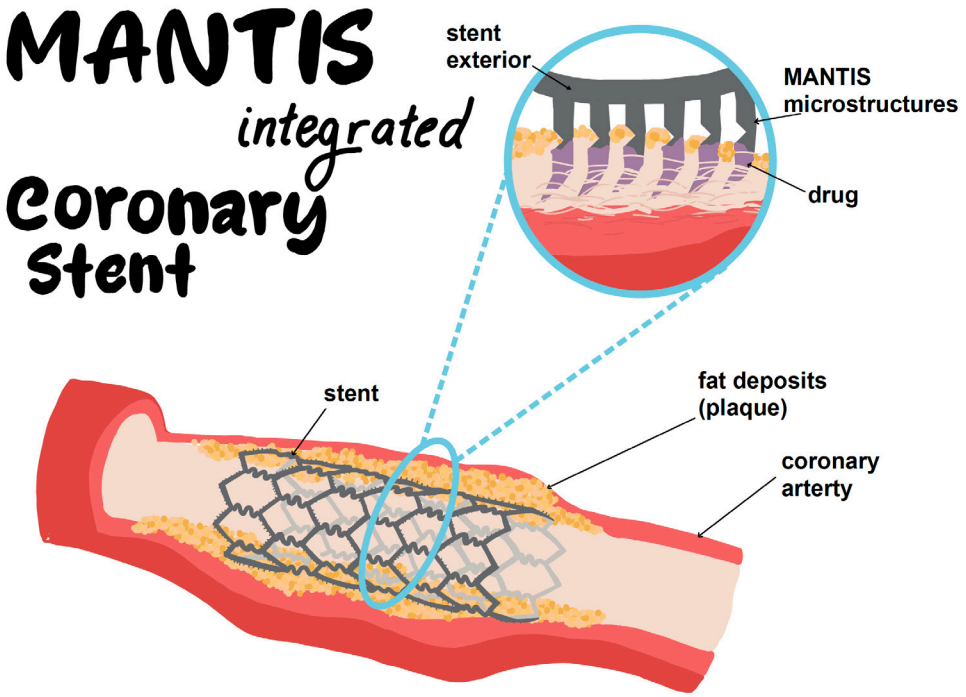
Sex-dependent variances in cellular and tissue mechanics are poorly understood despite evidence showing females' increased susceptibility to soft tissue injuries and degenerative diseases compared to males. This project outlines a collaborative effort between the Smith and Connizzo labs to explore sex-specific differences in cellular mechanosensing, focusing on how cells respond to external stimuli to maintain a resting level of mechanical stress (tensional homeostasis) and extracellular matrix (ECM) remodeling. Using traction force microscopy and a novel tissue bioreactor system, the study aims to quantify differences in tensional homeostasis maintenance between male and female tenocytes and investigate strain transfer through the ECM in mouse flexor digitorum longus tendons. The process involves two components: cellular and tissue levels, described as follows. At the cellular level, mouse tenocytes are extracted through digestion, seeded onto polyacrylamide gels, and then imaged to determine the coefficient of variance in traction forces between the sexes. On the tissue level, tendons are stained for their nucleus and cellular membrane, loaded onto a bioreactor, inserted into a confocal microscope, stretched, and imaged. Initial results reveal challenges in cell culture viability, but successful staining protocols for live tissue imaging have been obtained with images from male and female tendons subjected to strains of 0%, 3%, 6%, and 9%. Subsequent image analysis will calculate nuclear and cellular strain differences between the sexes. The ongoing study will provide crucial insights into sex-dependent mechanisms underlying tissue mechanosensing and potential implications for gender-specific therapeutics.



Translation of a Novel Microstructured Tissue Fastener into a Coronary Stent

Team 25: **Isabelle Nguyen, Marianne Palmieri, Mark Ruta, Vrishin Sundaram and Nicole Zajac**
Advisors: **Peyton Fitzgerald, Joseph Urban and Corin Williams (Draper)**

Coronary stents play a crucial role in cardiovascular care, but face challenges like stent recoil (SR), which refers to contraction of the stent after implantation, and in-stent restenosis (ISR), characterized by tissue overgrowth over top the stent. Both challenges lead to compromised blood flow and heightened susceptibility to ischemia due to reduced lumen size. Draper's Mechanical Adhesion to Tissue (MANTIS) technology uses hook-shaped microstructures to create a velcro-like system for tissue adhesion. Our goal is to integrate MANTIS microstructures onto a drug eluting stent to reduce the rate of SR by adhering the stent to the artery and to reduce the rate of ISR by inhibiting tissue proliferation through an immunosuppressant coating. To test our hypothesis, we employed two methodologies, mechanical testing evaluating MANTIS adhesion to bovine coronary artery tissue for SR and drug delivery testing using MANTIS microstructures coated with PLGA and Rhodamine B in alginate hydrogels for ISR. Mechanical testing confirms MANTIS's efficacy in tissue adhesion with a singular microstructure demonstrating maximum tensile forces of 13.6 mN, which is over three times stronger than the control. Drug delivery results found that using a 0.1M concentration of calcium chloride with a 2% sodium alginate solution resulted in the formation of an optimal tissue surrogate gel. Moreso, coated MANTIS coupons with PLGA and Rhodamine B in the hydrogels were imaged, showing promising results of drug diffusion. Moving forward, we aim to conduct further drug delivery and mechanical tests and finalize a coronary stent prototype incorporating MANTIS.

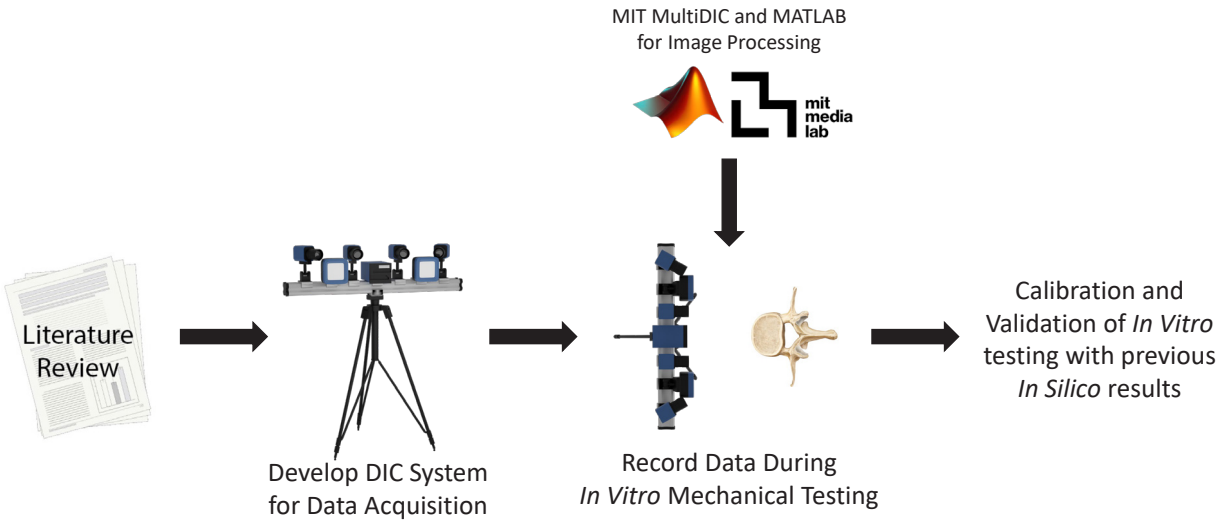


Design of an Improved Optical Measurement Method for Spinal Deformation in Spinal Metastatic Disease

Team 37: **Massimo Siracusano, Teluck Sharma**

Advisor: **Dr. Ron Alkalay (Department of Orthopedic Surgery, Beth Israel Deaconess Medical Center)**

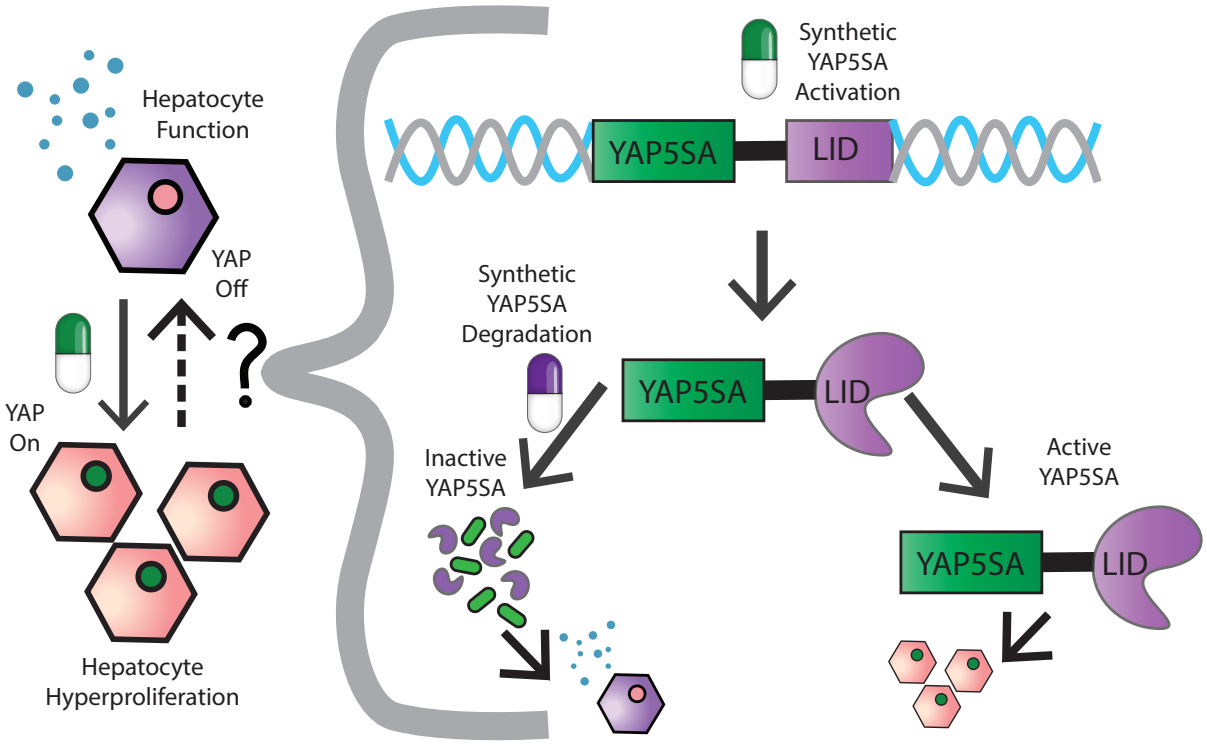
Spinal cord compression, displacement, and collapse are some of the most debilitating complications of cancer and other spinal metastatic diseases. There are currently limited methods for healthcare providers to predict the probability and severity of spinal cord load-bearing failure due to deformation caused by metastasized tumors. In order to remedy this issue, this project aimed to explore different methods to conduct stress and deformation analysis on 2-3 vertebral segments under variable load. By conducting a research review on the current methods to measure deformation, the team compared the feasibility of application to the human spine and concluded Digital Image Correlation (DIC) analysis was the best approach to record accurate data within 5 microns without significant physical alterations to the spine segments. The team then designed a 4-camera DIC array to conduct contactless measurements for use in the lab. The data gathered will be analyzed through an algorithm in MATLAB that will produce real-time stress distribution of the disks and vertebra, which would be validated and corroborated with simulations conducted on models previously by the lab. Our novel application of this data acquisition strategy allows us to better understand the various ways in which the location and size of metastases can affect the dynamics of the spine, leading to a more quantifiable analysis of risk factors, leading to more personalized care and improved patient outcomes.



Engineering Functional Recovery of Hyperproliferative Hepatocytes for Implantable Liver Grafts

Team 16: **Veronica Hui, Chi (Jeffrey) Li**
Advisors: **Amy Stoddard, Delaney Gray-Scherr, Christopher Chen**

Engineered liver grafts have emerged as a promising new therapy that could bolster liver function and improve the survival of patients awaiting a life-saving organ transplant. To reach a clinically relevant size for humans, previous work drove the implanted hepatocytes into a hyperproliferative state by using a constitutively active mutant Yes-associated protein (YAP5SA) in the YAP signaling pathway. However, while YAP5SA hepatocytes proliferate robustly, they lose differentiated liver functions, thereby limiting their clinical utility. We hypothesize the loss in function occurs when YAP5SA competes with hepatocyte nuclear factor 4 alpha (HNF4a), a protein associated with hepatocyte function, for mutual transcriptional cofactors. Therefore, we aim to genetically engineer hepatocytes that can modulate between a hyperproliferative and functional phenotype. To do so, we evaluated the effect of active YAP5SA signaling duration and protein stability on functional recovery. Then, we designed and validated a construct consisting of a ligand-induced degron (LID) attached to the YAP5SA protein for an inducible and accelerated degradation response. Lastly, we assessed the functional response of hepatocytes by measuring HNF4a, urea, and albumin levels. Our findings show that longer durations of YAP5SA exposure reduce hepatocyte function and its ability to recover function, indicating that the extended half-life of YAP5SA may hinder its functional capabilities. Our engineered YAP5SA-LID construct reduces half-life, showing potential for improved functional recovery. Based on these results, modulating protein kinetics may become a promising addition to regulating liver graft growth and function for implantable therapies.



Track 1

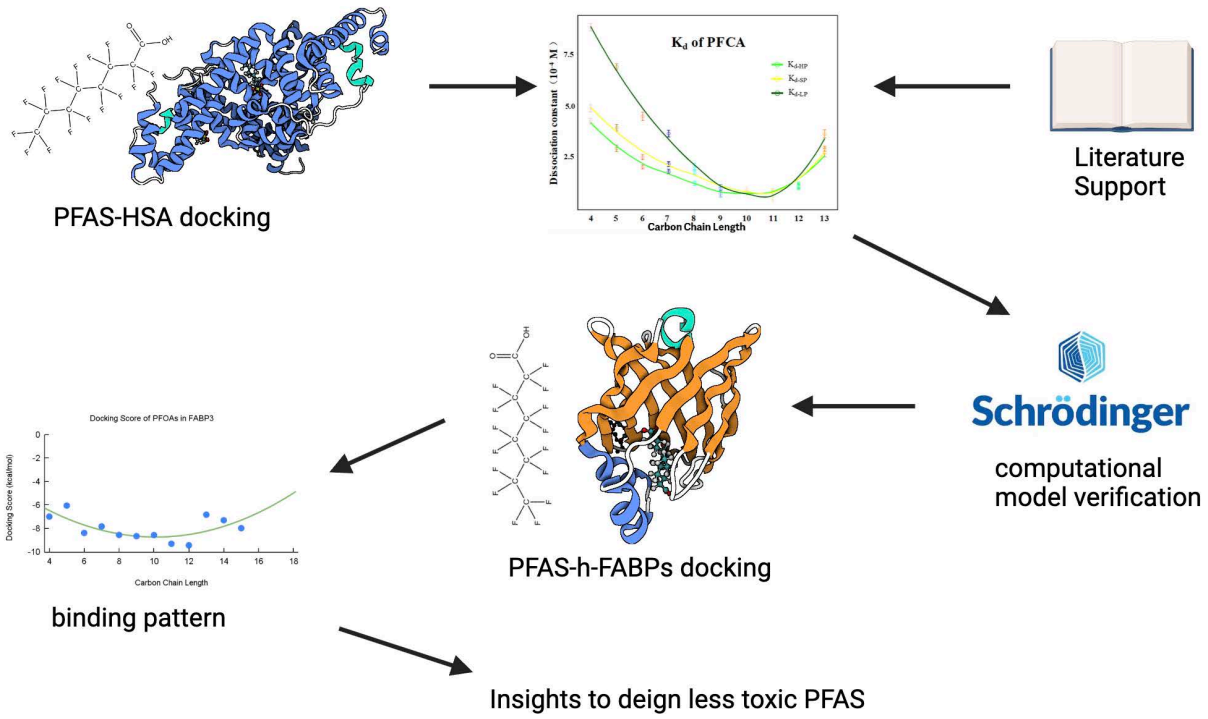
Session B

Digital and Predictive Medicine

Computational Investigation of PFAS Molecules Binding to Human Fatty Acid Binding Protein

Team 13: **Billy Zhai, Chunlin Zhu, Prakruti Dholiya**
Advisors: **Diane Joseph-McCarthy, Joyce Wong**

Per- and polyfluoroalkyl substances (PFAS) are groups of molecules that have multiple fluorine atoms attached to an alkyl chain. This distinct structure endows PFAS with properties such as high chemical stability and significant oil and water repellency, leading to their widespread use in medical instruments, cookware, and stain-resistant fabrics. However, PFAS are also persistent environmental contaminants and have been implicated in a range of human health issues, including liver dysfunction, developmental disturbances, altered lipid metabolism, and thyroid disorders. Recent studies have revealed that these effects are attributed to PFAS's ability to disrupt various endogenous proteins. In response, researchers have devised both experimental and computational models to investigate these interactions in detail. For instance, Gallagher et al. utilized Quantitative Structure-Activity Relationship (QSAR) modeling to elucidate the U-shaped binding patterns of PFAS to human serum albumin (HSA). In this study, we developed a computational model to explore PFAS interactions with human adipocyte fatty acid binding protein (h-FABP4), a crucial protein in placental lipid transport and metabolism. Utilizing the Schrödinger software suite, specifically Maestro for visualization and Glide for molecular docking, our model successfully replicated the binding patterns previously observed with HSA. This not only validates our model but also provide new insights on the binding mechanisms of PFAS-protein interactions, thereby aiding the design of improved biomaterials.

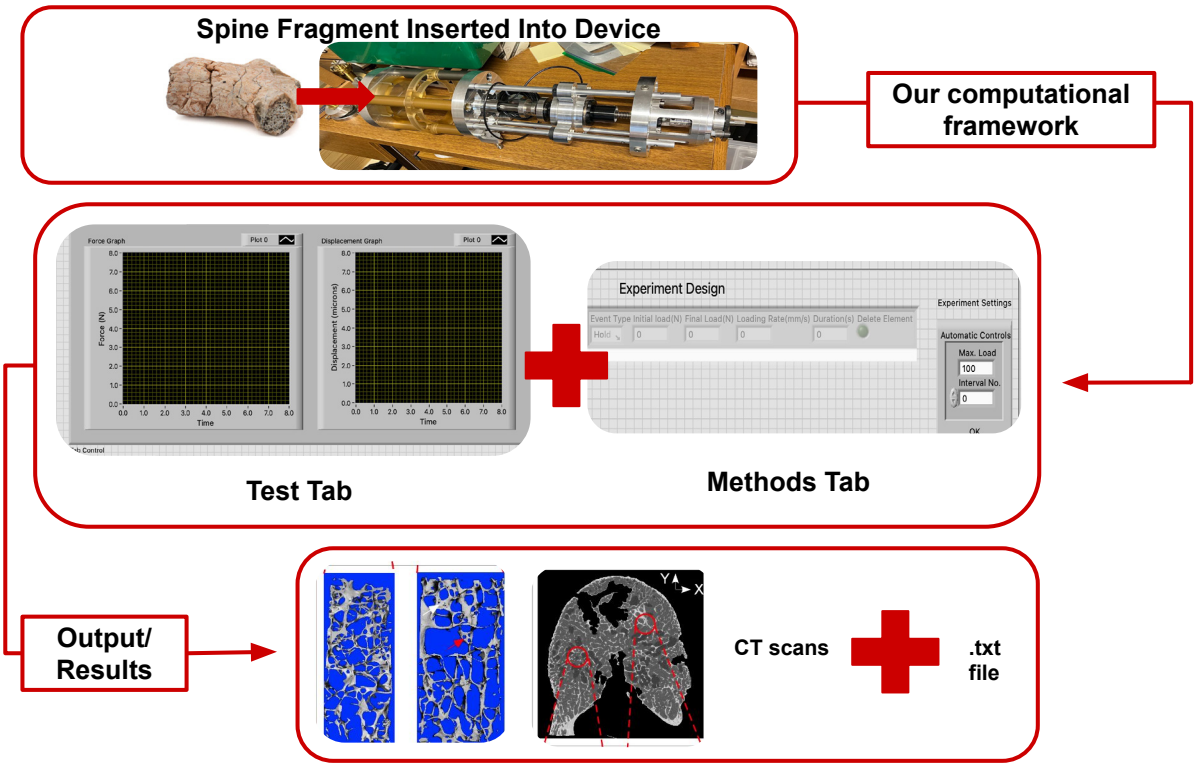


Building Computational Framework to Better Research on Cancerous Spinal Strength and Integrity

Team 20: **Ismail Sufi, Natalie Will**

Advisor: **Dr. Ron Alkalay (Center for Advanced Orthopedic Studies Beth Israel Deaconess Medical Center)**

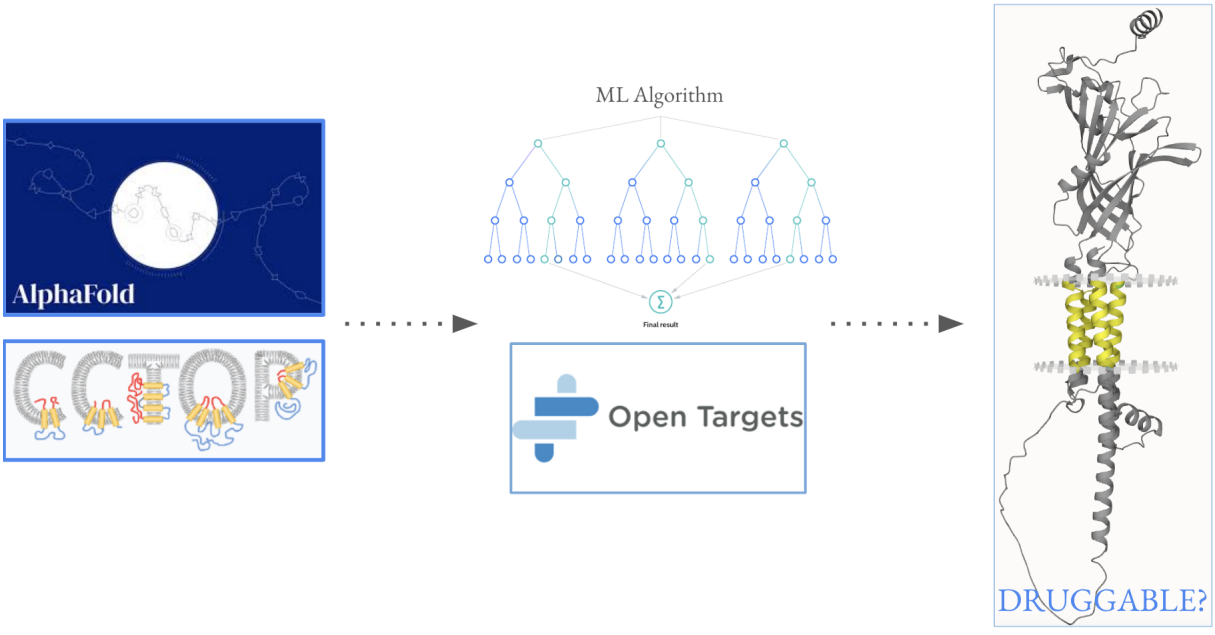
Millions of people every year are diagnosed with cancer which can often affect vertebral bone integrity, causing pain and bone failure for many cancer patients. This failure can lead to vertebral fracture, paralysis, and collapsed vertebrae. Understanding how cancer affects spinal strength is vital to improving quality of life for cancer patients. Currently, doctors and researchers use Finite Element Analysis (FEA) to predict cancer's effect on the spine, however FEA is not highly accurate since it is solely predictive, limiting doctor's ability to adequately treat cancer patients. A better method would be comparing spinal load testing with Computed Tomography (CT) scans, compiling the data and connecting it back to FEA to increase its accuracy. There exists an already built spinal column mechanical testing device that currently requires user operation to apply a load. We designed a computational framework to actuate a motor and automatically apply a desired load inputted by the user. Our framework, created in NI LabVIEW, consists of two tabs, methods and test, and a home page. The methods tab allows users to design the test they want to run using either "load" or "hold" inputs, the device will be held and a CT scan is taken. Users can either manually input every step into a cluster or input the maximum load and number of steps, the program then automatically evenly spaces out steps. The test tab loads a previously saved method, runs the test, continuously graphically displays and saves the force, displacement, and time data.



Scoring the Druggability of Proteins Based on Results of Advanced Protein Prediction Tools

Team 29: **Sulaiman Alsalamah, Madelyn Keller, Sydney Sorbello**
Advisors: **Sarah Spencer (Novartis)**

Proteins play an essential role in living things and almost every cellular function. Transmembrane proteins exist within the membrane of the cell and are studied as potential drug delivery targets. Knowing the structure of the protein and other features can greatly assist in determining the 'druggability' of the protein or its ability to be a drug target. Traditional computational assessments of proteins for druggability potential primarily focused on small molecular weight modality and used traditional amino acid sequence based predictions. We propose comparing different protein prediction tools and using specific predicted features to assess the druggability of transmembrane proteins for numerous modalities. The protein prediction models include the newly-developed AI-driven TmAlphaFold and the Consensus Constrained TOPology prediction server (CCTOP). After extracting information about the extracellular (EC) domains and confidence scores of the prediction, the information is used in a random forest classifier machine learning algorithm. Thorough evaluations of the extracted data revealed greater accuracy from the CCTOP predictions with varying amounts of similarity between the two tools for the same proteins. Current protein drug targets as identified by OpenTargets were used to help train the algorithm. We found that the total size of the EC domains and confidence played a more significant role than the number of EC domains per protein.



Innovative Strategies in Venous Blood Collection: iCoagLab's Vision for Minimally Invasive and Enhanced Care

Team 21: **Victoria Gonzalez Canalle, Noelle Flanagan, Zoe McCarthy, Jessica Spada, Melina Teguis**
Advisor: **Aniket Joshi (Coalesenz)**

Blood coagulation tests play a critical role in diagnosing hemorrhagic conditions, assessing the effectiveness of hemostatic treatments, and determining bleeding risk during surgical procedures. Prompt and precise identification of the causes of bleeding is vital for the patient's survival. These tests require healthcare workers to perform venipuncture using a vacutainer, which collects around 4-5 mL of blood. Drawing larger volumes of blood through venipuncture increases the risk of hemorrhage or prolonged bleeding in high-risk individuals. Our proposal is a new method for venous blood draw that decreases blood volume drawn and collection time. Our target is to extract a few drops of blood from the dorsal hand vein and transfer it to a cartridge utilized in the iCoagLab coagulation device. Our testing setup includes a syringe pump, a phlebotomy kit, and our 3D-printed collection device. The device features a 21G spring-loaded needle, a translucent collection chamber capable of holding a few drops of blood, equipped with a polydimethylsiloxane gas permeable membrane, and incorporates a button-hinge mechanism for needle retraction. The collection chamber fills with blood as the patient's blood is extracted. Activating the spring-loaded button on the top of the device causes the needle to retract into the main body, which stops the blood collection. The user opens the main body of the device by removing the end cap, and blood is retrieved from the chamber. Our device significantly enhances the blood collection process by reducing the volume of venous blood drawn by 99.5%, ultimately preserving patients' blood and minimizing waste.

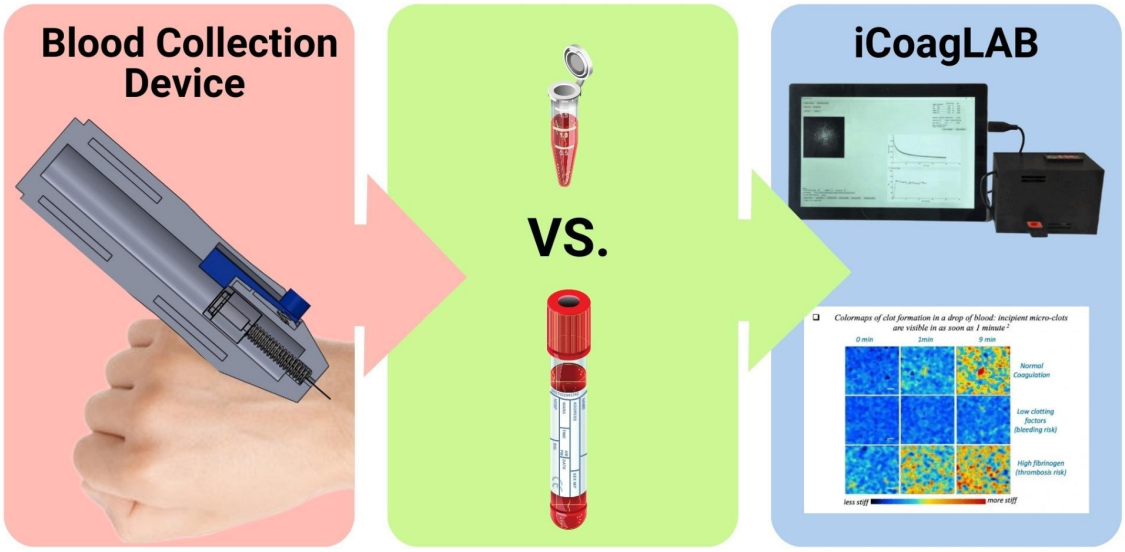
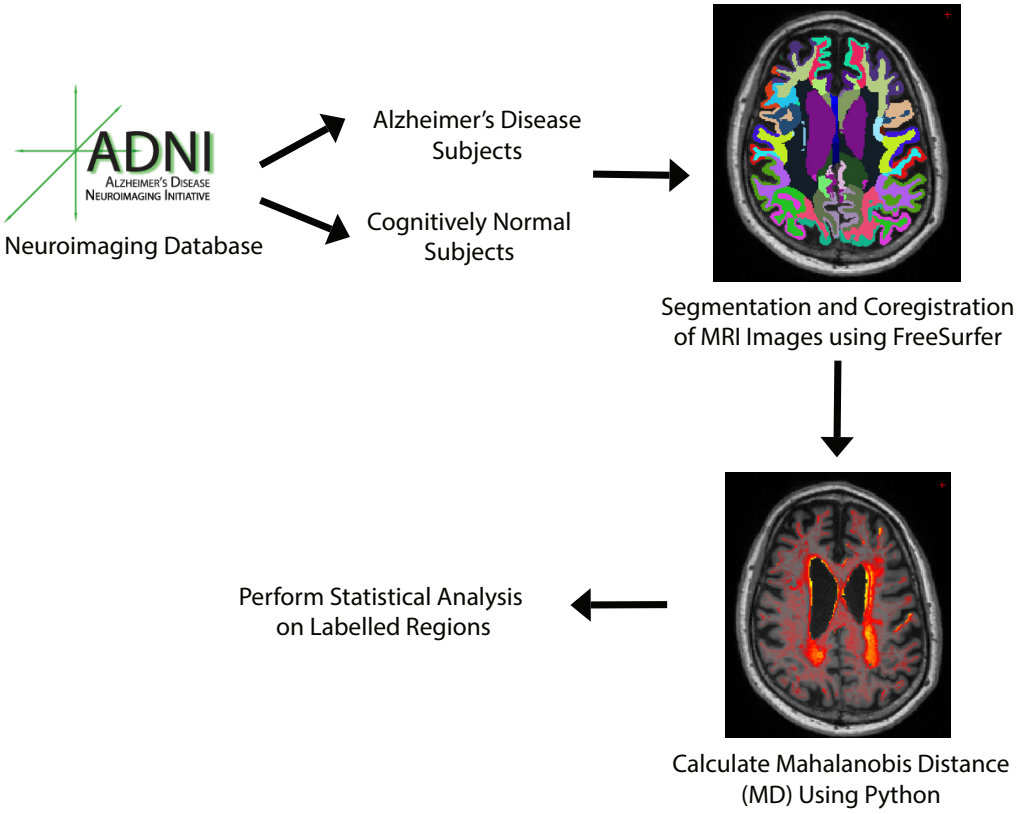


Image Signal Processing for Quantification of Microvascular Tissue Damage in Alzheimer's Disease

Team 27: **Olivia Border, Rose Coviello, Victoria Rodriguez**
Advisors: **Barnaly Rashid, David Salat (Niji Neuro Corp)**

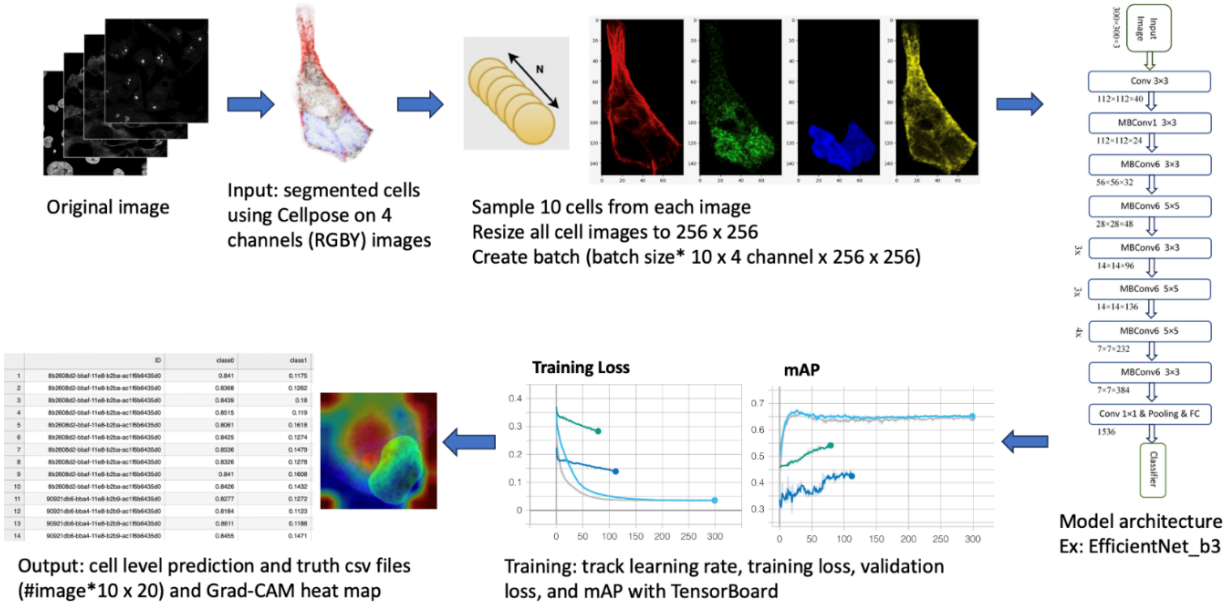
Alzheimer's Disease (AD) currently affects an estimated 10-12 million Americans, has an unknown cause, and insufficient diagnostic measures. Current research focuses on quantifying biomarkers, such as white-matter lesions (WML), scaled on a binary system. However, efficacy remains insufficient. In collaboration with Niji Neuro Corp, we performed a deeper analysis of WML values, obtaining a new, non-binary value to use as an AD predictive measure: the degree of damage per voxel in WML. To perform this analysis, we built a comprehensive pipeline that intakes patient data and outputs their further analyzed WML values. First collecting MRI scans of AD and cognitively normal (CN) patients, we processed two types of scans (T1- and FLAIR-weighted) per patient using FreeSurfer, obtaining their standard WML values. We then performed data manipulation, including co-registering files to align voxels throughout different weighted scans. The Mahalanobis Distance was calculated using Python to quantify the amount of damage per voxel by measuring the data distribution and covariance. We then performed statistical analysis on the voxel values from different brain regions across all AD and CN patients, using T-tests to compare group means to test for significant region differentiation. We concluded that the most significant regions in differentiating between AD and CN subjects were the inferior-temporal and middle-temporal labels, with higher sensitivity in differentiating between AD and CN subjects than the total volume of WML. Our results suggest that focusing on these regions can lead to earlier diagnosis and further therapeutic discoveries.



Investigation of Weakly Supervised Multi-label Image Classifier for Microscopy Image Representation

Team 28: **Jen Hsin Chiao, HyoJoo Kim, Sunni Lin, Susan Zhang (ME)**
Advisors: **Chien-Cheng Shih, Minhua Qiu (Novartis Institute for Biomedical Research)**

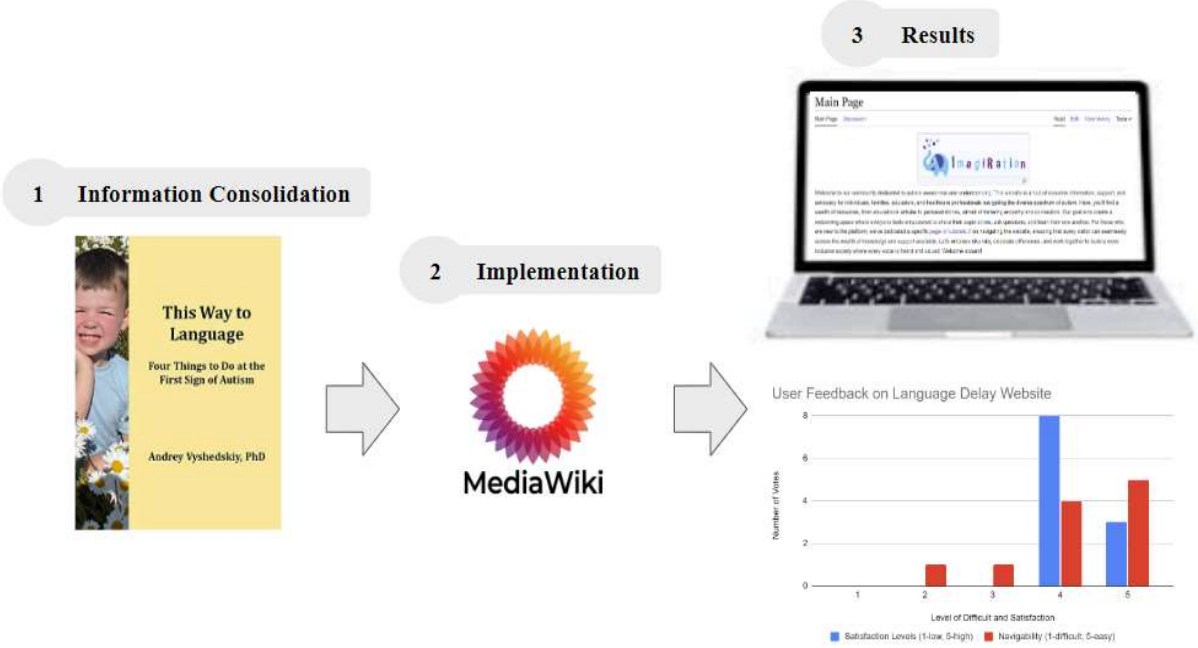
Phenotypic representation for microscopy images has been demonstrated as a powerful method for research in cell biology, which can also serve as a tool for profiling perturbations in drug discovery. However, reaching a single-cell level of cellular annotations is often difficult due to the vast scale of compound screening. Deep learning methods have been proposed as a solution to encode high quality image representations that both recapitulate features of the datasets and provide explainable information, despite often being hard to interpret. Here, we propose a framework that combines the results of weakly supervised learning (WSL) with Class Activation Mapping (CAM) to enhance explainability. We test our idea using the 2021 Human Protein Atlas Kaggle Challenges to build our testing framework for crafting a multi-channel, multi-label classifier. This framework integrates a Cellpose-based single cell segmentation, an image preprocessor, and varied network architectures to provide plug-and-play finetuning. For model inspection, we leverage Gradient-weighted Class Activation Mapping (Grad-CAM) as the main tool to visualize the focus of our model during the inference phase, thereby providing explainability to the model performance. We subsequently apply this framework to the Broad Bioimage Benchmark Collection (BBBC) datasets to understand the representation on Cell Painting images associated with the mechanism of action (MoA) in molecules. Our aim is to expedite drug development by providing a deep learning-based phenotypic representation that aligns closely with experimental design, while still offering sufficient explainability for scientific decision-making.



Parent University for Language

Team 15: **Tanner Armstard, Evan Kwong, Christian Montoya, Jane Yoo**
Advisor: **Andrey Vyshedskiy**

Intervention during early childhood is essential for language development in children with autism spectrum disorder (ASD). Children display increased neuroplasticity before the age of five, which marks this period as critical for language development. Multiple studies have shown that early intervention can improve intellectual ability, autonomy, and overall quality of life for children with ASD. However, parents often struggle to secure timely diagnoses and access affordable language therapy. Therefore, we aim to develop a website that provides accurate information on ASD, enabling parents to gain a comprehensive understanding of ASD and perform at-home language therapy. Our approach includes using the hosting service provider Godaddy.com, the web hosting control panel software cPanel, and the MediaWiki software to create a free, open-source website accessible in multiple languages. We curated content from reputable scientific journals and Dr. Vyshedskiy's book, This Way to Language: Four Things to Do at the First Sign of Autism. The website also incorporates moderation functionalities and a user-friendly interface to provide users with a safe, efficient learning environment to share their experiences and information about ASD. Additionally, our approach applies an iterative design process to improve the site based on user feedback. Our initial round of user surveys showed that 80% of users rated the site's navigability as easy or very easy, and over 85% found the site's information helpful or very helpful. We will continue to iterate and implement user feedback to enhance accessibility and usability, empowering parents and facilitating the language development of children with ASD.



Track 1

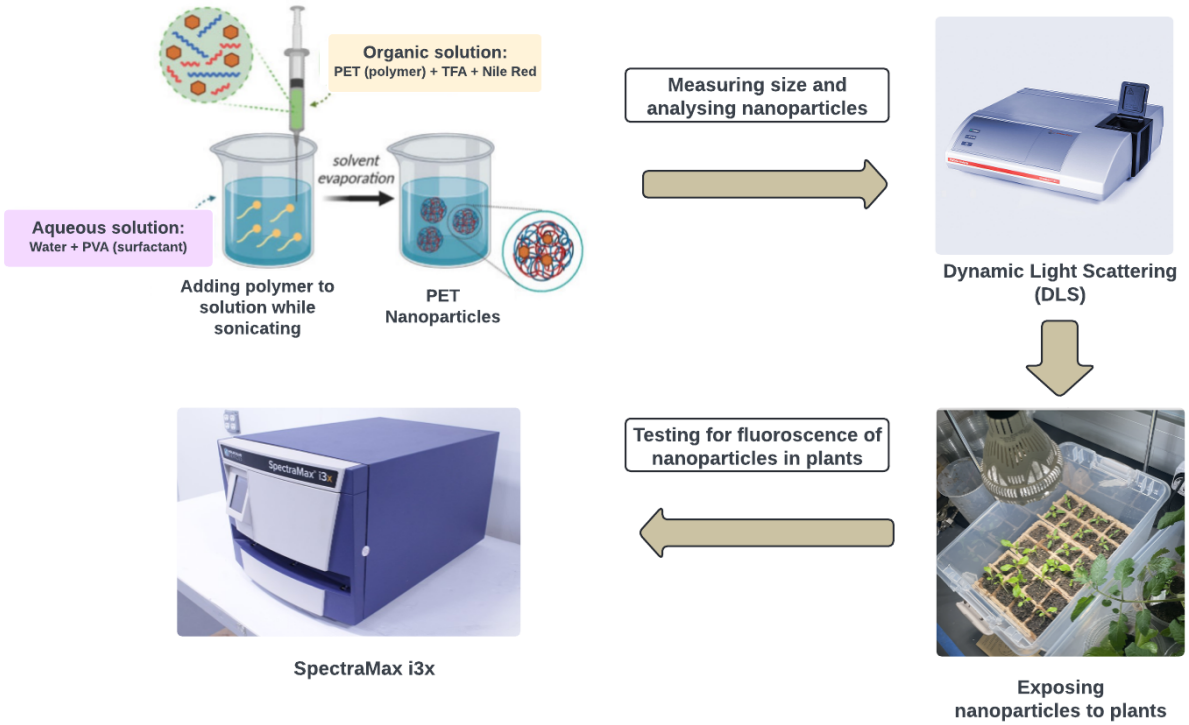
Session C

Cell and Tissue Engineering

A Novel Method to Synthesize PET Nanoparticles and Measure Their Uptake in Edible Plants

Team 35: **Bharat Bandi, Ishika Mehta, Navya Shetty, Shantanu Vaid**
Advisor: **Joshua Kays**

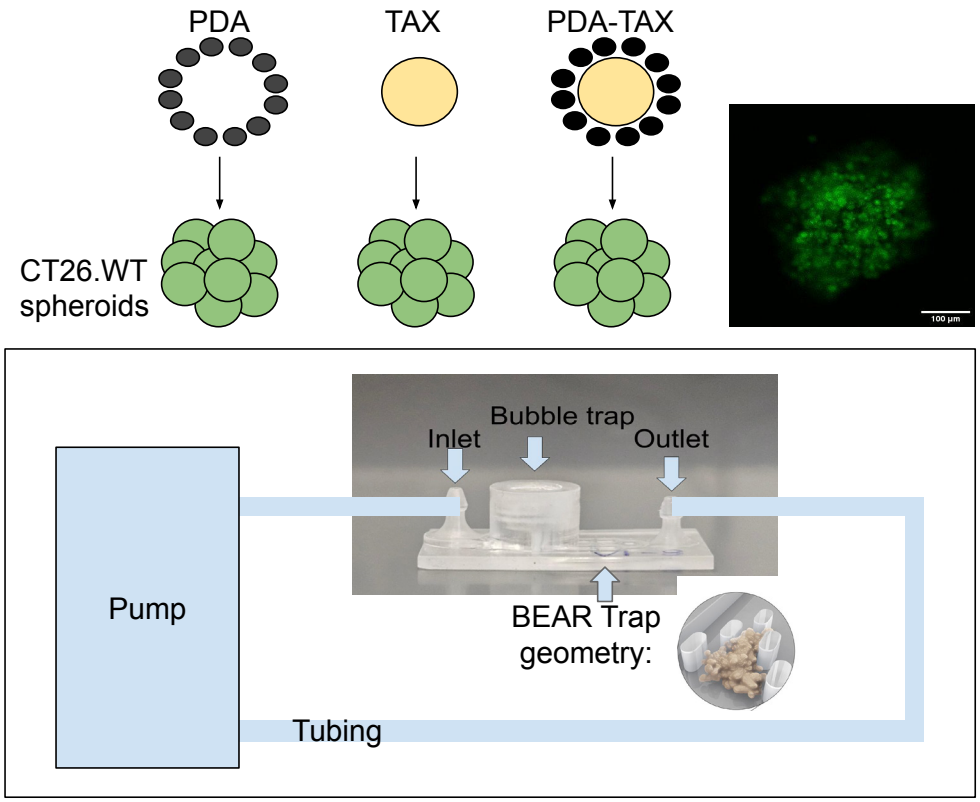
Humans produce 350 million tonnes of plastic waste every year from cosmetic, daily and industrial use. When this plastic waste is exposed to sun, water, and wind it causes it to degrade, eventually forming nanoplastics. The uptake of these nanoplastics by plants can contaminate the food chain and can be a risk to human health. However, a lot about the uptake of nanoplastics within plants is not understood. In this work we demonstrate a bottom-up approach to generate nanoplastics. Starting with polyethylene terephthalate (PET) from a water bottle, we used trifluoroacetic acid (TFA) to dissolve the plastic and create an organic solution of our dissolved polymer. Then we injected it into a solution of polyvinyl alcohol (PVA), which is a surfactant, and water while sonicating and stirring, to help stabilize our nanoplastics during formation. By tuning variables like concentration of PET and surfactant we managed to create nanoplastics from 150 nm to 500 nm. We used Dynamic Light Scattering (DLS) to measure the size and perform further analysis on our nanoplastics. In order to detect our nanoparticles, we incorporated our PET in TFA with a dye called nile red. To measure the quantity of nanoplastics we used a plate reader to read fluorescence, however, since plants are quite fluorescent themselves, we had to incorporate a bleaching step to remove the background signal without disrupting our nanoparticles. This research will enable further studies to be conducted on PET nanoplastics as well as evaluate their impact on human health.



Nanoparticle-Chemotherapy Testing in Microfluidics Model of the Tumor Microenvironment

Team 24: **Ahona Dev, Dilek Aylin Manav, Sharani Nasankar, Athena Wang**
Advisors: **Jeffrey Borenstein, Alex Markoski (Draper, Brown University)**

Model systems in cancer are used to evaluate tumor growth, as well as various therapies' efficacy on antitumor effects. Current models do not accurately mimic human body responses. Moreover, proposed drugs for cancer treatment have a high rate of failure during clinical trials. We propose the application of a 3D-printed microfluidics device called the Biological Examination Array Trap (BEAR Trap) to provide a more accurate tumor microenvironment to test candidate chemotherapies more efficiently and effectively. Here, we use the BEAR Trap to test polydopamine paclitaxel (PDA-TAX) nanoparticle efficacy in drug delivery under both static and flow conditions. We used CT26.WT mice colon carcinoma cells stained with CellTracker Green and formed into 300-micron diameter spheroids. The fluorescence of CellTracker Green is analogous to the density of live cells in the spheroids, and therefore cell viability. To test the efficacy of the PDA-TAX compound, 2 controls were also introduced: PDA nanoparticles produced in-lab and bare TAX solution. Before their introduction, each batch was loaded with purple dye to contrast against the CellTracker Green and be imaged for cellular uptake. The device was connected to a syringe pump, the spheroids were loaded onto the device and media was pumped through the microfluidic channel. We expect to see the biggest drop in cell viability in the PDA-TAX spheroids. Through this device, pharmaceutical companies can test the effectiveness of various other chemotherapeutic drugs (similar to TAX) and increase the likelihood of the drug's approval.



Modeling a Nanomagnetic Culturing System for Uterine Fibroid Organoids with MCF-7 Spheroids

Team 2: **Ricardo Fernandez, Anika Joglekar, Fernando Ortiz, Abbigale Shi**
Advisors: **Catherine Klapperich, Lena Landaverde**

Uterine fibroids are benign tumors that occur in over 70% of women under the age of 50. Despite affecting such a large population, current treatments are either hampered by high recurrence rates or have adverse side effects like infertility. Organoids are three-dimensional tumor models that can advance our understanding of tumor physiology and are crucial for developing novel treatment plans, however, they suffer from low throughput and high variability. We propose that improved fibroid models will allow for more efficient research, and so we tested a myriad of 3D cell culturing techniques with a simplified tissue model known as a spheroid to produce a reproducible protocol. We internalized magnetic nanoparticles (NPs) into MCF-7 breast cancer line cells — which are well-established in the field of 3D cell culture — and manipulated them with neodymium magnets to encourage sphericality in our spheroids. We used 96-well U-bottom plates to increase the output of our spheroids per experiment and so the amount of data generated. We also ran modified MTT assays for each experiment and confirmed cell viability in the presence of our NPs. Despite this, our preliminary images suggest that the nanoparticles are not a efficacious method of decreasing spheroid variability, however a larger sum of data is required for definitive conclusions. Regardless, establishing a highly reproducible, high-throughput protocol for creating 3D models such as spheroids and organoids will lead to greater sample sizes for future uterine fibroid studies.

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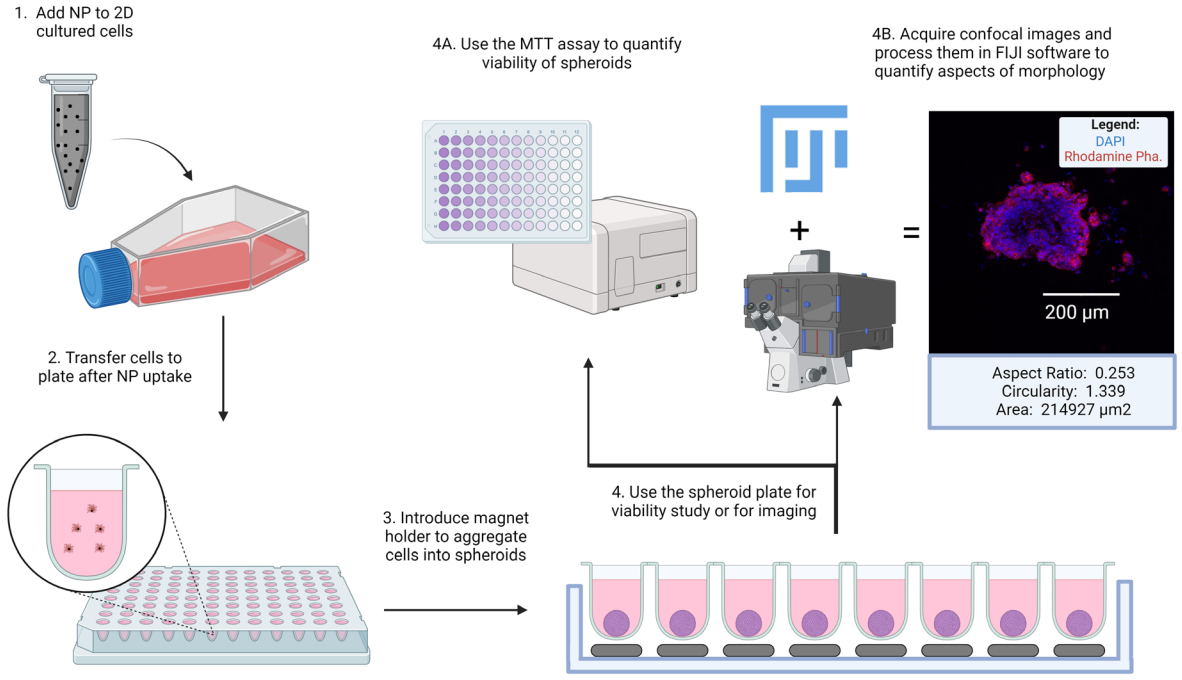
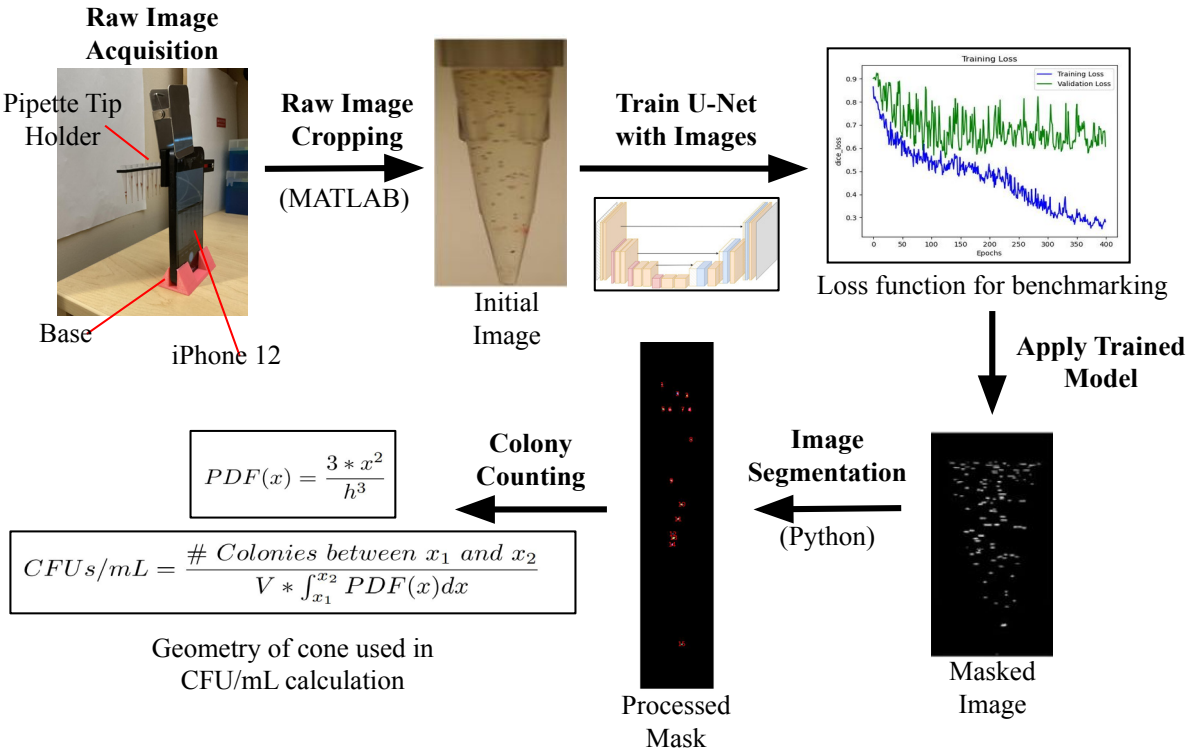


Improving Throughput in the Geometric Viability Assay to Measure Bacterial Growth

Team 6: **Aidan Chan, Chris Chan, Andrew Chang, Youssef Haider, Sungmin Hwang**
Advisors: **Mary Dunlop, Owen O'Connor, Eric South**

The Geometric Viability Assay (GVA) is a novel technique for measuring microbial concentration quickly and efficiently, making it an attractive alternative to the traditional Colony Forming Unit (CFU) assay. However, GVA's accuracy depends heavily on time-intensive manual counts of microbial colonies. Our goal is to enhance the GVA by developing an automated pipeline that streamlines the entire process, from capturing initial images to calculating the final CFUs/mL. Our innovative computational framework employs advanced machine learning and image processing techniques, like U-net and Otsu thresholding, to automatically identify, segment, and label microbial colonies in high-throughput viability assays. Additionally, we have incorporated a user-assisted image cropping feature that allows the system to adapt to different sample areas, enhancing both flexibility and precision in our analysis. This pipeline takes advantage of the probability density function associated with the conical structure of the assay to estimate CFU concentrations without the need for labor-intensive serial dilutions. Using numerical integration within this geometric space to calculate CFU/mL, we aim for precise and reliable viability measurements. By automating these processes, we are setting a new standard for microbial viability assays, with significant benefits for microbiological research and clinical diagnostics. This shift towards a more sustainable, high-throughput approach could revolutionize how we conduct these analyses in the future.

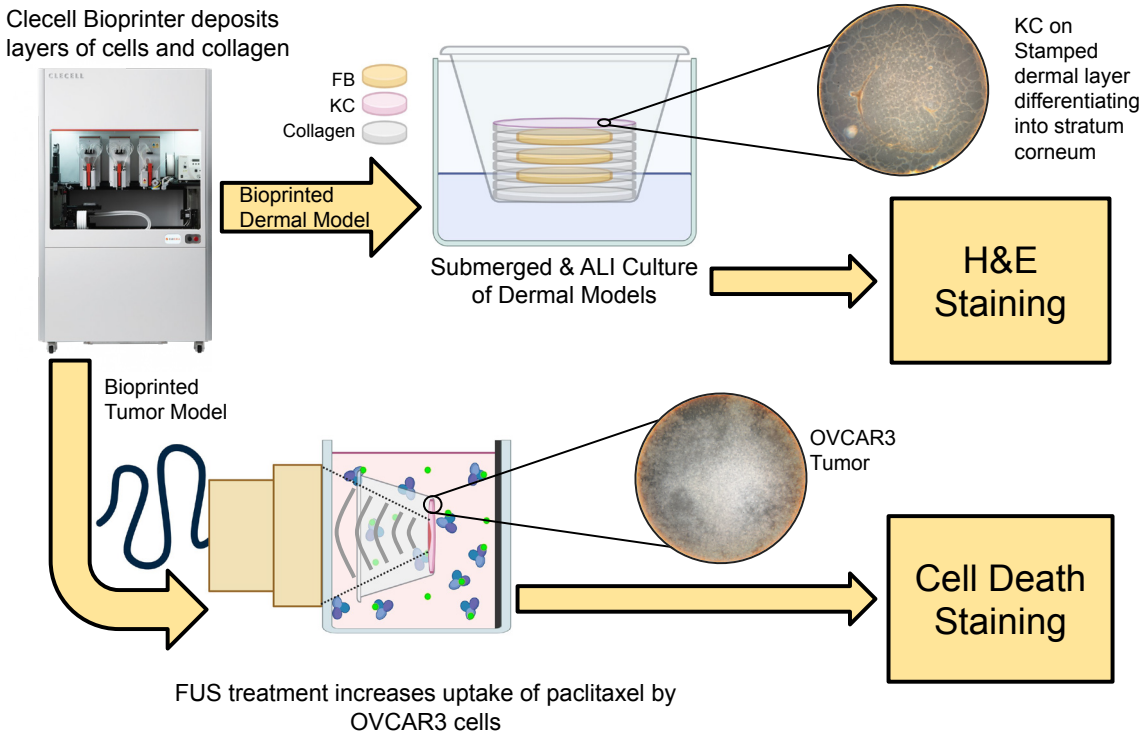


Development of Bioprinting Techniques for Manufacturing Skin/ Tumor Models

Team 22: **John Carlson, James Coleman, Reina Dreyer**

Advisor: **Seung-Schik Yoo (Brigham and Women's Hospital/Harvard Medical School)**

Bioprinted skin models currently lack proper biomimetic morphology such as the dermal-epidermal junction (DEJ) characterized by its Rete ridges (RR). Traditional bioprinting techniques alone do not provide sufficient spatial resolution to achieve the scale required for constructing RRs. In our study, we devised a method to induce RR-like structures in full-thickness bioprinted skin models by using solid-state 3D-printed stamps (via stereolithographic approach) in combination with collagen embedded fibroblasts (FB), seeded keratinocytes (KC), and differentiated corneocytes. Bioprinted FB embedded collagen prints were mechanically stamped after FB proliferation in media submersion. Prints were seeded with KCs, and subsequently differentiated in air liquid interfaces (ALI) to create an epidermal layer. The constructed full-thickness skin models underwent histological analysis to examine morphology and showed the formation of biomimetic DEJ containing RR-like architecture. Bioprinting was also applied to construct an in vitro ovarian cancer model (OVCAR3 cell line) over ALI inserts. Then, the model was used to test the feasibility of using low-intensity, non-thermal focused ultrasound (FUS) to temporarily disrupt the plasma protein binding (PPB) between paclitaxel (PTX; a commonly used chemotherapeutic drug) and albumin, enhancing the delivery of PTX to the in vitro tumor. The viability of OVCAR3 at the sonicated location was compared to the areas that were not exposed to FUS, which showed higher tumoricidal effects in the sonicated regions. We concluded that bioprinting offers flexibility in creating various biomimetic models which can be used as potential platforms for drug development or testing.



FUS treatment increases uptake of paclitaxel by OVCAR3 cells

Track 2

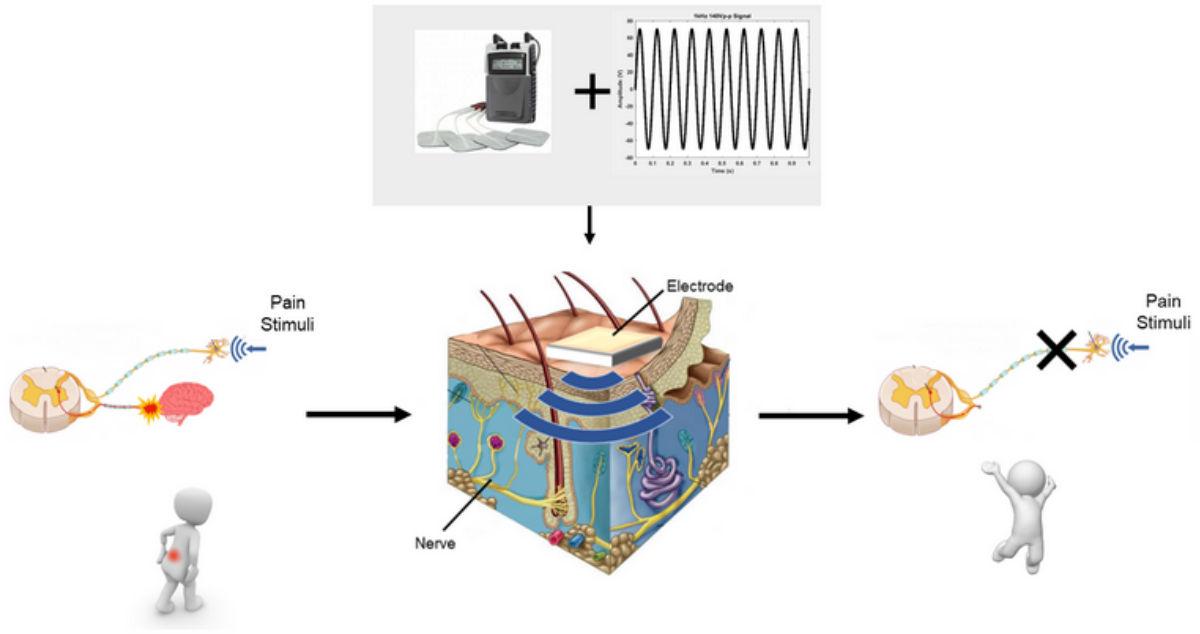
Session A

Neuroengineering

High-intensity and High-frequency Transcutaneous Electric Nerve Stimulation for Pain Management

Team 5: **Anna Kawai, Kelly Lam, Grace Lange, and Nik Swanson**
Advisors: **Ezra Cohen, Eric Hazen, Kavon Karrobi, and Rishi Vaidya**

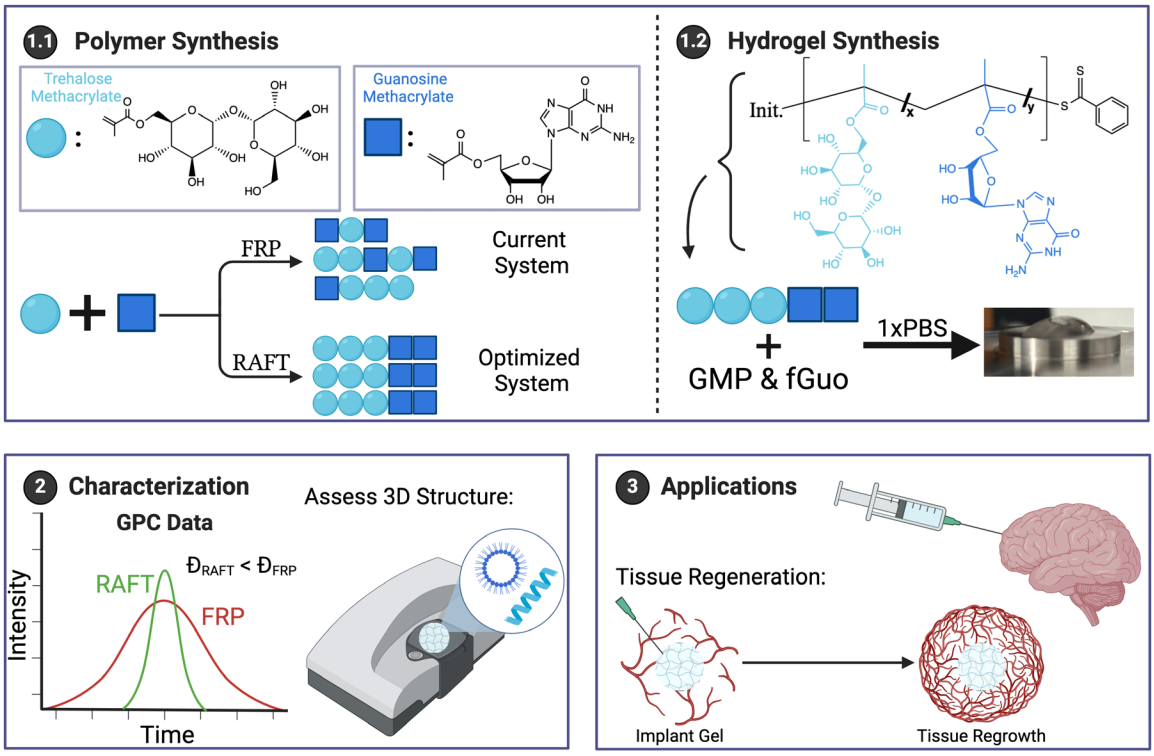
Pain, both chronic and acute, drastically affects people's quality of life. While nerve stimulation has been explored as an alternative to the largely drug-based standard of care, current devices often come with uncomfortable sensations and fail to achieve complete pain elimination. Literature supports that high-frequency signals of 1kHz minimize skin impedance and high-intensity signals of 140 Vpp achieve nerve blockage; hence, a potential pain treatment could be a transcutaneous nerve stimulation device with these parameters. Focusing on anesthetizing the digital nerve in the finger, we leveraged previous research to develop skin impedance models that we used to test different frequencies to determine which values minimized skin impedance and maximized effectiveness and safety. LTSpice was used to design and simulate a circuit with the capacitive and resistive properties of the tissues surrounding the digital nerve, and porcine skin samples were used for ex vivo testing. These tests have demonstrated that optimal frequency at 1 kHz. They have also shown that the signal significantly increases the skin temperature, but causes no charge accumulation. Electrode gels were tested on ex vivo samples to identify the lowest skin impedance without skin irritation. Establishing 140 Vpp and 1kHz as the target intensity and frequency of the signal, a PCB was made, involving a Digital-to-Analog Converter to produce a sinusoidal waveform, and an OpAmp with ±70 V voltage supplies to attain the desired signal amplitude. Leveraging our results and literature research, our device aims to achieve hypoalgesia of the digital nerve without causing tissue damage.



Glyco-nucleoside Supramolecular Hydrogels for Glia Repair

Team 7: **Christian DiMatteo, Manal Alshamrani, and Mohammed Alwelyee**
Advisors: **Timothy O'Shea and Eric DuBois**

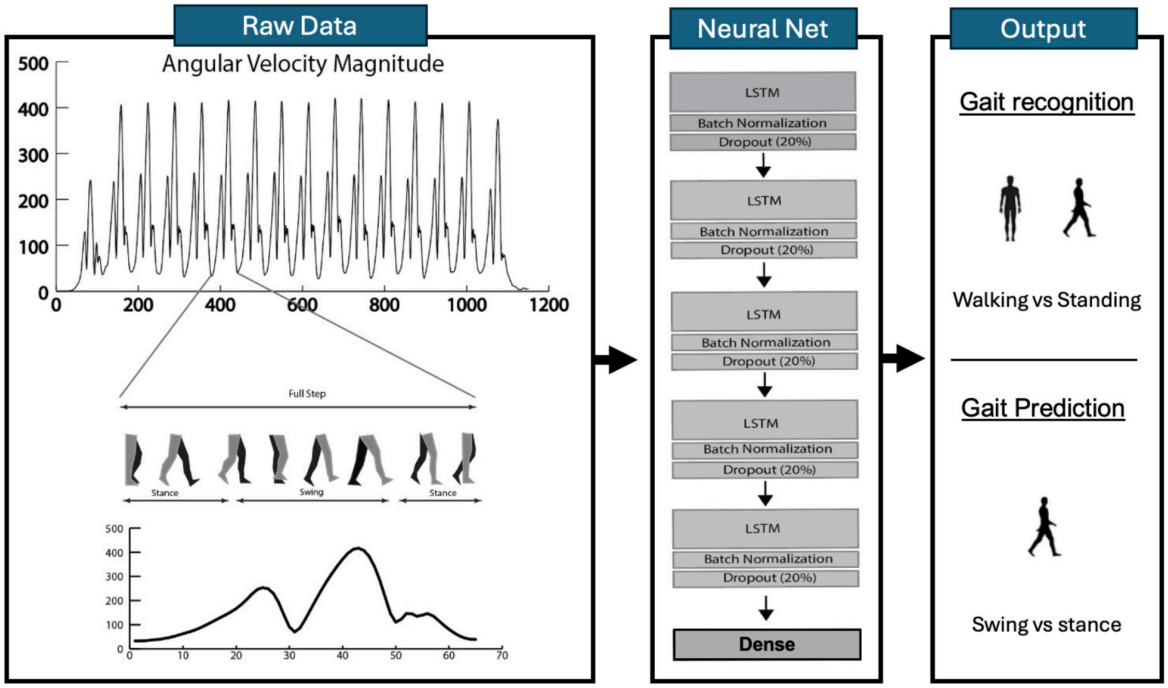
This project improves upon the previously synthesized poly(trehalose-co-guanosine) statistical glycopolymers (pTreGuo) developed by the O'Shea Lab which were used to form hydrogels for the treatment of central nervous system (CNS) injuries. These hydrogels were able to promote axon regrowth within lesions in the CNS by activating latent endogenous repair mechanisms. However, due to limited control over the synthesis of pTreGuo copolymers, the resulting hydrogel materials were difficult to formulate and rapidly resorbed in vivo, limiting their translational capacity. To tackle these issues, the previously used free radical polymerization (FRP) method was substituted out in favor of reversible addition-fragmentation chain-transfer polymerization (RAFT). This synthesis procedure resulted in better control over the molecular weight (MW) and the dispersity (Đ) of pTreGuo than previously reported, as well as enabled the formation of a di-block copolymer, demonstrating enhanced control of monomer arrangement. These improvements on copolymer synthesis allow for the formation of hydrogels with increased stability and more tunable rheological properties than previously reported. Additionally, experimental conditions for the synthesis of pTreGuo copolymers were investigated to determine the tunability of reaction parameters while still facilitating polymer synthesis, creating a blueprint for future work in glycopolymer development and enabling the design of a wide variety of regenerative treatments for CNS injuries.



Classifying Human Gait Features with Machine Learning

Team 4: **Jiahe Niu, Xiang Yuan**
Advisors: **Xue Han, Hua-an Tseng, Erynne San Antonio**

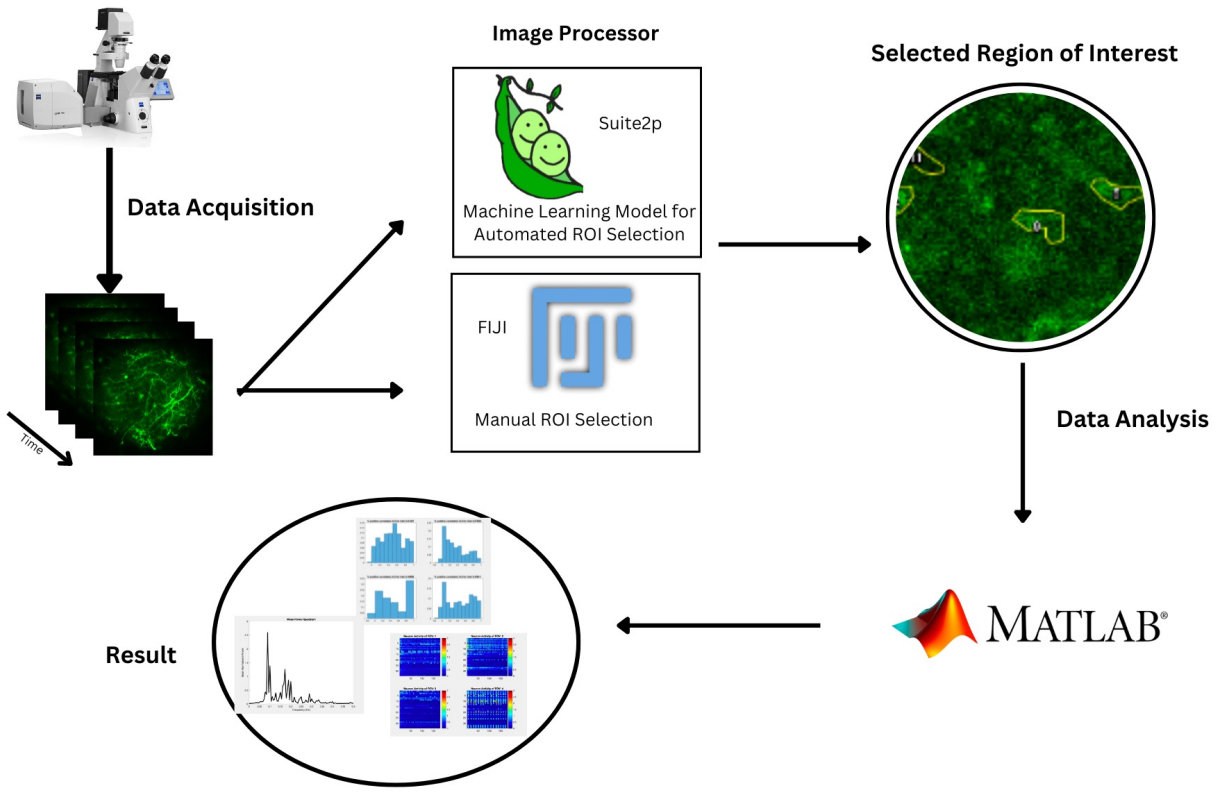
The analysis of gait dynamics is crucial for developing effective rehabilitation strategies. This study focuses on refining data collection protocols and computational analysis methods to better understand gait mechanics. Using a tri-axial accelerometer, we captured human movement with minimal interference. We developed a custom MATLAB graphical user interface to synchronize accelerometer data with corresponding video recordings of gait, enabling precise labeling for subsequent analysis. A key component of our analysis was the application of Dynamic Time Warping to predict 'swing' and 'stance' gait phases, based on the average step of manually labeled angular velocity magnitude. This approach significantly streamlined the phase labeling process, facilitating a more efficient transition to deep learning applications. We have also successfully developed a long short-term memory (LSTM) based model that facilitates almost real-time detection of gait phases. These LSTM models represent a significant step towards precise and automated gait phase classification. Building upon this, the Han Lab plans to integrate our gait analysis software into broader human gait studies under varied conditions, more specifically with specific auditory cues and how they enhance movement. Therefore, this research established a solid foundation for future exploration into gait, sensory cues, and human rehabilitation.



Automated Analysis of Neural Activity in Down Syndrome Using Ca^{2+} Imaging in Human Cortical Organoids Derived from Induced Pluripotent Stem Cells (iPSCs)

Team 1: **Hang Yang, Wuyi Zhang**
Advisors: **Christopher V Gabel, Ella Zeldich (BU Chobanian & Avedisian School of Medicine)**

Human cellular organoid systems derived from Induced Pluripotent Stem Cells (iPSCs) offer a promising model for understanding Down Syndrome neuropathology, intellectual deficits, and associated Alzheimer's disease. Calcium imaging, tracking fluorescence intensity changes of calcium indicators, is crucial for observing neuronal activities in these organoids. However, analyzing Calcium imaging data is complex and labor-intensive. To enhance efficiency, we customized existing automatic selection software for regions of interest (ROIs) in Calcium imaging, fine-tuning parameters and classifiers to fit our lab's data. Using "Suite2p," a powerful software, we optimized parameters through multiple trials and manually corrected ROIs selected by the built-in classifier. Deep AI learning capabilities in the classifier improve automatic selection accuracy with corrections. Additionally, we developed a MATLAB script for streamlined data analysis. Users select desired "csv" data files, provide names for MATLAB variables and output files, and the script generates neuron activity heatmaps, fluorescence intensity versus firing frequency plots, activity correlations, and firing duration plots. This combined approach significantly enhances efficiency and reduces human errors in Calcium imaging data analysis. Moreover, our project holds potential for commercial applications, particularly in research institutions and labs studying neurodevelopmental and neurodegenerative disorders.



Speech Interactive Therapy App for children with Autism

Team 32: **Emre Karabay, Raghavan Ramaswamy, Jeffrey Gao, Will Gard**
Advisor: **Dr. Andrey Vyshedskiy**

The project aims to develop a Speech Interactive Therapy app for children with autism, focusing on speech recognition and feedback mechanisms to aid speech therapy. The application uses Long Short-Term Memory (LSTM) Machine Learning models trained on children speech datasets to recognize accuracy of pronunciation specific to children with autism. The project uses real-time feedback mechanisms, providing positive reinforcement based on children's pronunciations of words which has proven effective in speech therapy in the past.

The application uses Mel-Frequency Cepstral Coefficients (MFCC's) to analyze audio signals, while the model uses a bidirectional LSTM layer to process data in both directions to better analyze the speech inputted into the machine learning model.

The model is fine-tuned using the hyperband method, optimizing LSTM units, dropout rates, and dense layer sizes, thus preventing overfitting. Our success criteria include a 90% accuracy rate in speech recognition, user engagement metrics, and quality feedback collected from users and caregivers. The product aims to be a frontrunner amongst online ASD education platforms due to its integrated feedback mechanism. We aim for user friendly, supportive, and effective technology which will show major long term educational and linguistic advancements for children with autism.

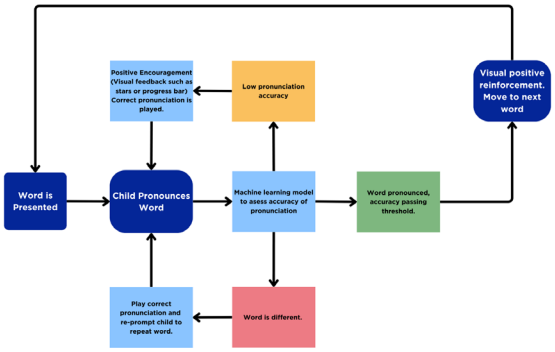
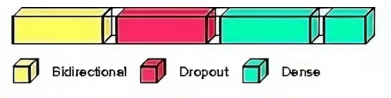


Figure 1 depicts a flowchart of how our application works using a feedback loop to process and refine data dynamically.

Model Design and Visualization



Layer (type)	Output Shape	Param #
bidirectional_1 (Bidirectional)	(None, 512)	608256
dropout_1 (Dropout)	(None, 512)	0
dense_2 (Dense)	(None, 32)	16416
dense_3 (Dense)	(None, 10)	330

Total params: 625002 (2.38 MB)
Trainable params: 625002 (2.38 MB)
Non-trainable params: 0 (0.00 Byte)

Figure 2 shows a detailed view of a neural network's layers, including types and parameters, emphasizing the model's structure.

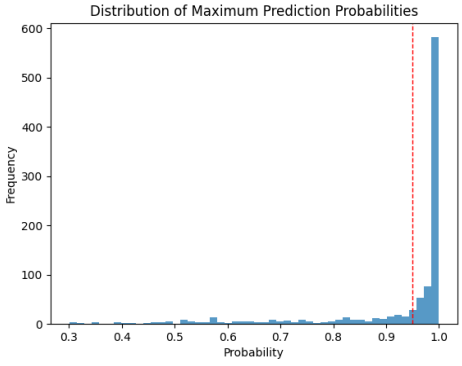


Figure 3 illustrates a comparison of prediction outcomes using similarity scores based on probability distributions.

Track 2

Session B

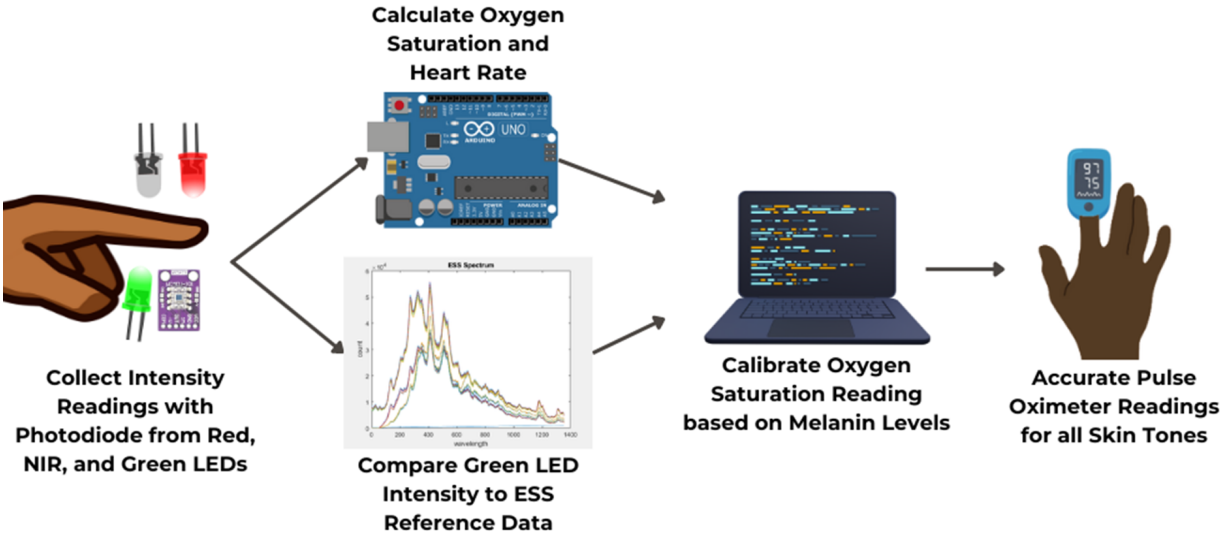
Optics

Design and Implementation of a Portable Oximeter for Accurate Measurement of Oxygen Saturation Across a Wide Range of Skin Pigmentation

Team 10: **Bernadelle Boateng, Maya Frazier, Jenna Ludvigsen, and Arya Padalkar**

Advisors: **Ousama A'Amar, Irving Bigio, Stephen Pittman, and Andrew Wellman (Apnimed, Inc and Sleep Disordered Breathing Lab at Brigham & Women's Hospital)**

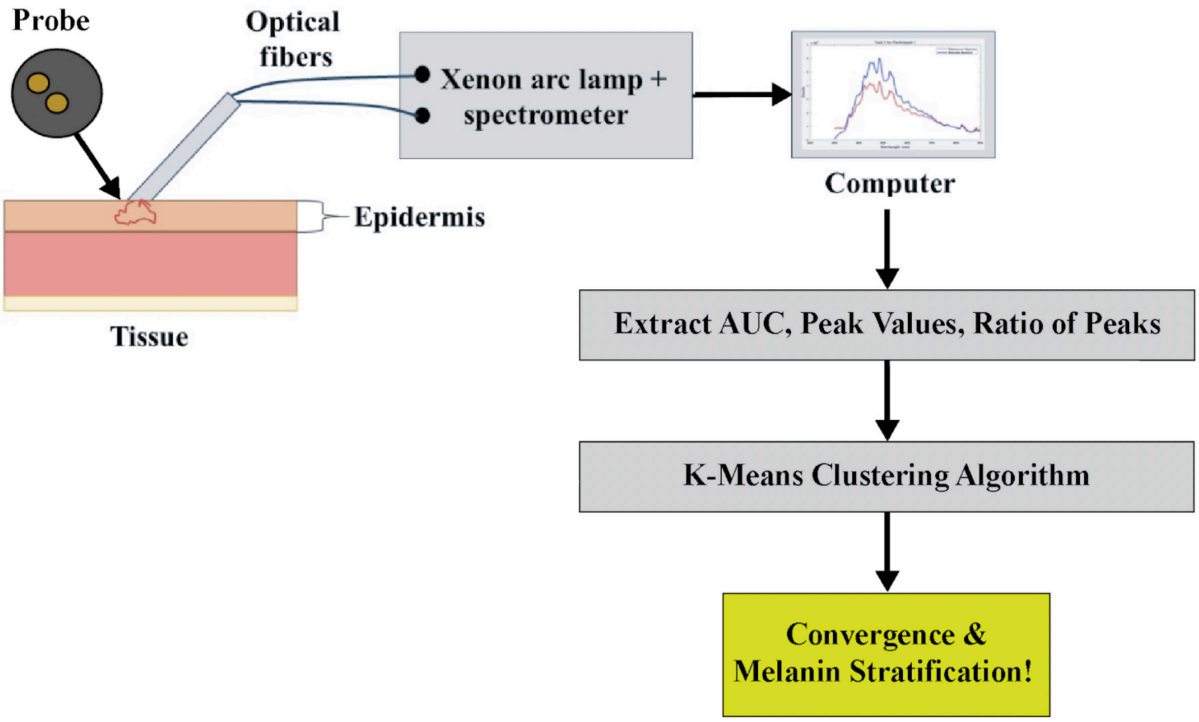
Discrepancies in pulse oximetry readings across varying skin pigmentations has been a critical issue, often leading to inaccurate medical assessments of oxygen saturation on darker skin tones, particularly highlighted during the COVID-19 pandemic. Addressing this gap, our project develops an oximeter designed to accurately measure oxygen saturation across a broad spectrum of skin tones. We used Elastic Scattering Spectroscopy (ESS) to measure light absorption across varying skin tones in healthy subjects, revealing that those with higher melanin levels exhibit lower reflection due to increased absorption. The ESS data showed that the spectral peaks and troughs correlate with variations in tissue scattering properties and that oxygenated hemoglobin tends to absorb less light at higher wavelengths compared to deoxygenated hemoglobin. After testing an assortment of wavelengths, we identified a calibration wavelength of 525 nm as optimal for quantifying melanin levels in skin. To mitigate discrepancies, this novel wavelength introduces a calibration mechanism that adjusts the brightness of red and NIR LEDs by comparing its intensity to the collected ESS data, fine-tuning the device's accuracy in real-time oxygen saturation calculations.To validate the efficacy of our method, we utilized custom tissue phantoms that mimic a range of skin pigmentations using dyes to mimic the optical properties of melanin, enabling comprehensive testing and optimization of the device. The potential impact of this project would result in the enhancement of the accuracy of pulse oximetry readings and contribute to more equitable healthcare outcomes.



Elastic Scattering Spectroscopy: A Promising Approach Towards Stratifying Melanin

Team 18: **Ethan Bosworth, Maks Levin, Tyler Sanabria, Arjavi Vyas, Sarah Wolf**
Advisors: **Christine Mulvey, Brian Koo (Yale School of Medicine)**

Restless Leg Syndrome (RLS) is a neurological sensory-motor disorder characterized by creeping sensations and restlessness deep inside the lower legs. Although 7 to 10 percent of the United States population is affected by this condition, a limited number of objective criteria exist to make a clinical diagnosis for RLS, and there is no cure. A collaborator on the project recently found that RLS symptoms were triggered in mice administered with alpha-melanocyte stimulating hormones (α-MSH) and adrenocorticotropic hormones (ACTH), both of which stimulate the amino acid production of melanin in the skin. Using elastic scattering spectroscopy (ESS), our probe extracts the optical properties of the skin from the UV-to-visible wavelength spectrum, which are sensitive to the absorption and scattering effects due to melanin seen in a range of skin tones. Additionally, a k-means clustering algorithm takes in an input of recorded backscattered light from the sample, reduces additional noise, and uses the area under the curve in the UV range to separate sample categories based on melanin levels. By creating a probe designed to account for melanin scattering and absorbance specifically, along with algorithms to find the area under the melanin spectra curves and stratify this data, we can develop a tool that has the capability to help our collaborator further their research towards enhancing RLS diagnosis.

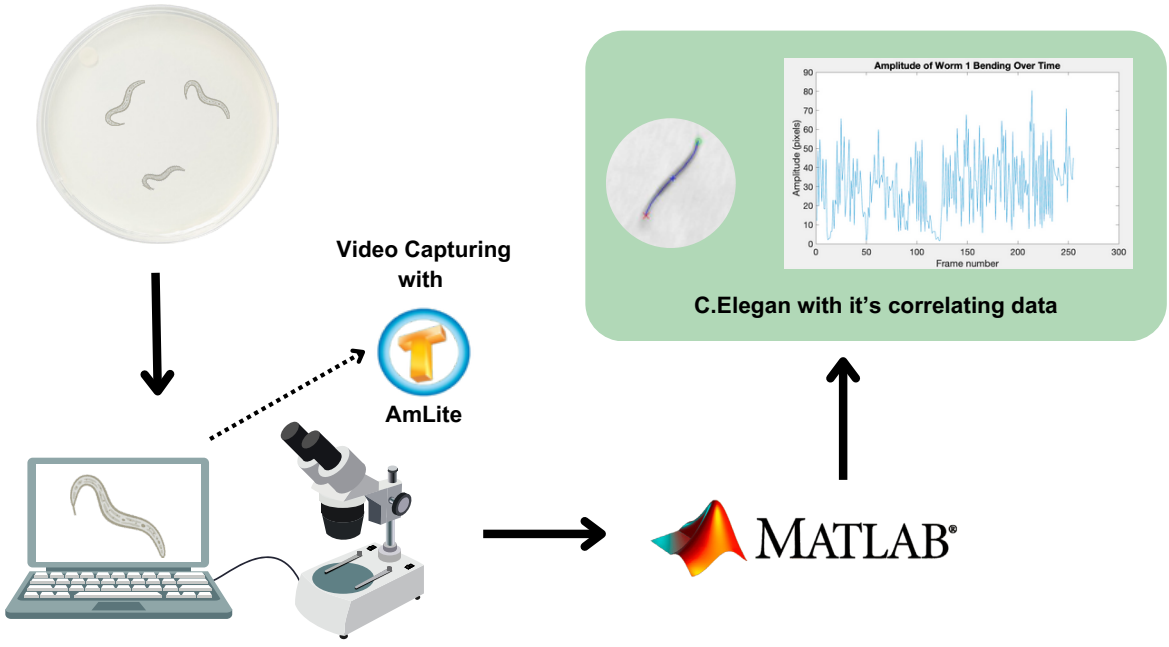


Automated Imaging System for the Analysis of C.elegan Behavior

Team 23: **Alexa Lara, Joshua J. Mendoza, Celeste I. Vega**

Advisor: **Christopher V. Gabel (Dept. Pharmacology, Physiology and Biophysics, Chobanian & Avedisian School of Medicine, Boston University)**

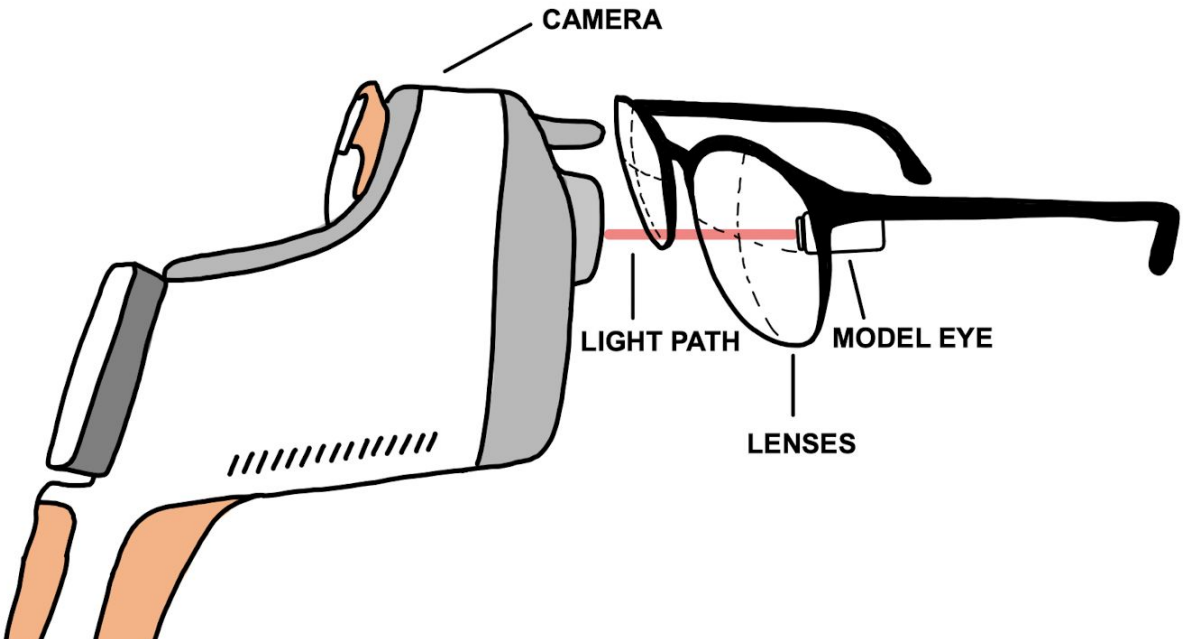
The nematode Caenorhabditis elegans, C. elegans, are recognized as an ideal model in the field of anesthesiology for studying human responses to anesthesia due to their ability to accurately represent the distinct stages of anesthesia-related behavior observed in humans. The ability to quantify the nematode's behavioral responses to anesthetic compounds such as Ketamine, offers a deeper understanding of anesthetic impacts on neurological functions but also serves as a tool for identifying genetic variants with different anesthetic sensitivity. While previous research has provided valuable insights into the effects of ketamine as an anesthetic agent, it often lacks a high-throughput and automated approach. This restricts the ability to conduct detailed quantitative analysis and limits the accuracy in measuring the behavioral and physiological responses of C. elegans to anesthetic exposure. Here we propose a system that leverages a high-definition camera coupled with the AmLite software for precise video capture of C. elegans movements under anesthetic influence. Analysis of the captured video data is conducted via a custom algorithm built in MATLAB, which quantitatively assesses the worms' motion. Our results include a multitude of locomotive parameters, such as, bending amplitude, frequency, and duration of movement, to determine the neuromuscular effects of the anesthetics. Automating the process addresses the challenge of manually quantifying subtle and complex movement patterns, thereby reducing the potential for human error and increasing the efficiency of the research process.



Development and Integration of a Lensometer Attachment into a Commercial Handheld Autorefractor

Team 30: **Hanna Alarcon, Mario Rodriguez Santana**
Advisors: **Shivang Dave, Alec Wehse (PlenOptika, Inc.)**

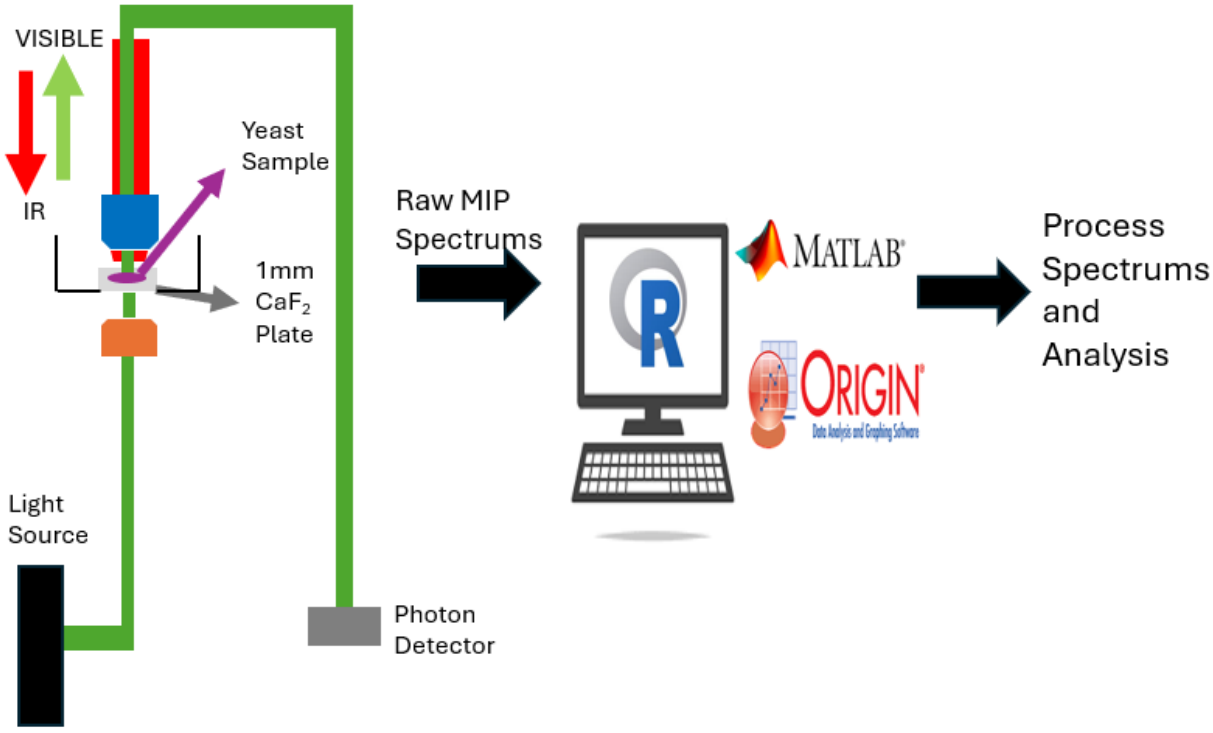
QuickSee Free is a commercially available, handheld, wavefront autorefractor that accurately measures a patient's refractive error but is unable to measure patients' eyeglasses. Lensometers are medical devices used to measure the spherical, cylindrical, and axis power of lenses. Vision exams can be streamlined with lensometry because it provides a starting point for subjective refraction by allowing doctors to narrow down the range of refractive error a patient might have. An attachment was developed that would incorporate lensometry into QuickSee Free to expand its clinical and retail capability. This involved market research, mechanical design, prototyping, and optical validation. The design integrity of each lensometer prototype was tested, with a focus on a user-friendly mechanism. For optical validation, trial lenses of varying spherical and cylindrical power were measured in increments of 0.50D using the prototypes and a bench-top optical system currently used in the Quality Assurance of QuickSee Free as the golden standard. Agreements between each version of the prototypes and the golden standard were evaluated using a Bland-Altman analysis. The lensometer attachment prototype V3.0 had a strong correlation to the golden standard with a spherical equivalent correlation coefficient of R = 0.99. The prototype lensometer attachment performed equivalently to the bench-top optical system while maintaining QuickSee Free's handheld and portable features.



Structural and Compositional Kinetics of α-Synuclein and its Pathological Mutants in Living Cells by Fluorescence Guided Mid-infrared Photothermal Spectroscopy

Team 33: **Ezekiel Cruz, Hanhminh Nguyen, Logan Packard**
Advisors: **Ji-Xin Cheng, Zhongyue Guo**

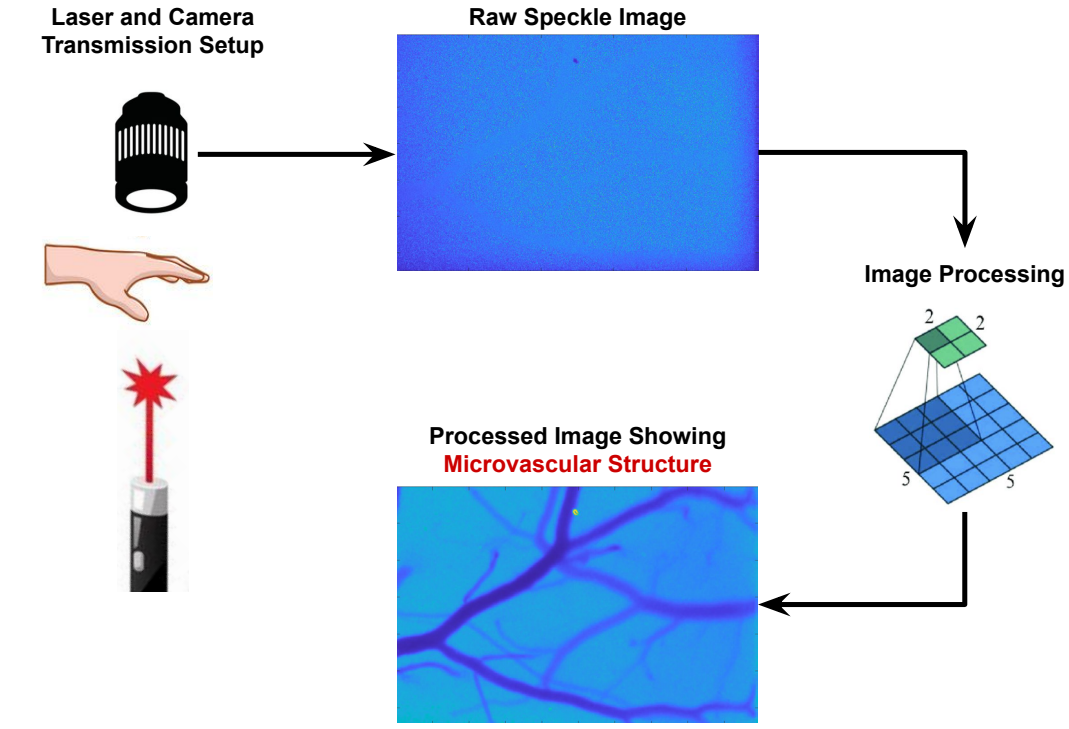
The protein α-synuclein, present in the brain, is associated with Parkinson's Disease (PD) and other neurodegenerative diseases. Genetic mutations of this protein can cause it to aggregate and damage the lipid membranes of dopaminergic cells. Our study was conducted to measure the aggregation properties of several such mutations of the α-synuclein protein and their interactions with lipid membranes in living yeast cells. This was done using mid-infrared photothermal microscopy to measure the ratio of beta sheets to alpha helices in the protein, a marker of aggregation, and to measure the amount of lipid the protein has bound with. This kind of imaging has a higher spatial and temporal resolution than previous techniques and allows imaging in living cells. Data collected and analyzed so far finds that after 72 hours to aggregate, there is significantly more aggregation among wild type, A30P, and 3K mutants than in a healthy control, but there is no significant difference between the mutants. We also expect that once all the data is collected and analyzed we may see that aggregation and lipid interaction increases over time and are different between mutants at earlier time points. The information learned with this study could be used to help develop treatments for PD that target the mutant α-synuclein protein or prevent either aggregation or lipid interaction.



Laser Speckle Contrast Imaging for Superficial Tissue Blood Flow Visualization

Team 36: **Nadia Chitkushev, Ariel Lin**
Advisors: **Jerome Mertz, Shuqi Zheng**

Visualizing vasculuture and measuring the rate of blood flow are important indicators of tissue health and condition. Current methodologies, such as Doppler ultrasound and electromagnetic flowmeters, are widely used but face limitations due to their invasiveness, cost, and resolution, particularly in their inability to measure capillary-level flow in superficial tissues. To address these challenges, our project introduces an innovative, non-invasive, and cost-effective system for the high-resolution visualization of microvascular blood flow in superficial tissues. This system consists of a 785 nm Volume Holographic Grating Stabilized Laser Diode to generate laser speckle patterns sensitive to blood flow, a camera to capture these patterns over time, and a novel algorithm for bias-free image analysis and signal filtering. Our team aims to develop a portable laser speckle contrast imaging system that provides detailed 2D mapping of superficial microcirculatory blood flow. Initially, we identified the optimal setup configuration of the camera, laser, and the subject's examination area to ensure high-resolution imaging of speckle patterns. We then developed an innovative algorithm to offer unbiased 2D map visualization of the microvasculature and quantitative blood flow velocity measurements with up to 98% accuracy. We anticipate that the outcomes of this project will significantly enhance diagnostic tools for analyzing capillary-level blood flow dynamics. Moreover, advancements in our image analysis algorithm could inspire further innovations, potentially broadening the impact of biomedical image analysis in clinical settings and beyond.



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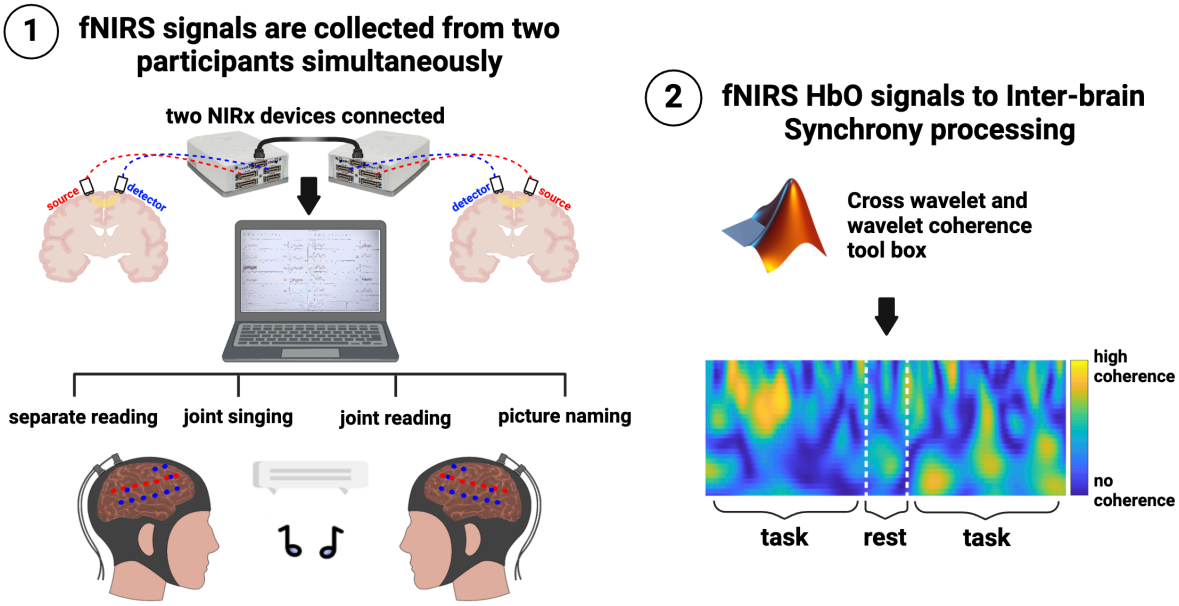
fNIRS-Based Hyperscanning To Investigate Inter-brain Neural Synchronization in Communication-Based Language Therapy for Aphasia

Team 3: **Xingxiao Li, Yiwen Zhang**
Advisor: **David Boas**

Aphasia is a stroke-induced language disorder affecting around 1 million people, with 180,000 new cases annually in the United States. Language therapy is the standard behavioral treatment to patients with aphasia for improving functional communication, which is defined as the ability to communicate efficiently and successfully in typical, everyday interactions and situations. While previous neuroimaging studies have identified a correlation between effective communication and inter-brain synchrony (IBS), limited research has explored the impact of IBS on the effectiveness of language therapy for aphasia. Prior efforts to identify individual responses to therapy have not consistently answered the fundamental question: how well individuals improve their functional communication ability during language therapy. Therefore, our project quantifies the extent to which different types of aphasia treatments induce IBS. To achieve this, we constructed a hyperscanning functional Near-Infrared Spectroscopy (fNIRS) system to measure hemodynamic signals between healthy dyads participating in cooperative singing, reading, and naming therapies for aphasia. We then applied MATLAB-based Wavelet Coherence Analysis to compute inter-brain coherence in the bilateral language network using pre-processed fNIRS oxy-hemoglobin signals. Paired with behavioral performance, localized inter-brain coherence reveals a significant correlation between language therapy and the patterns of IBS-induced brain activation. This finding prompts further investigation into whether damage to the IBS region can be repaired and if such improvement may enhance outcomes in aphasia rehabilitation. With the empirical measurement of IBS, our project established the basis for the development of more personalized therapy for individuals with aphasia.



Track 2

Session C

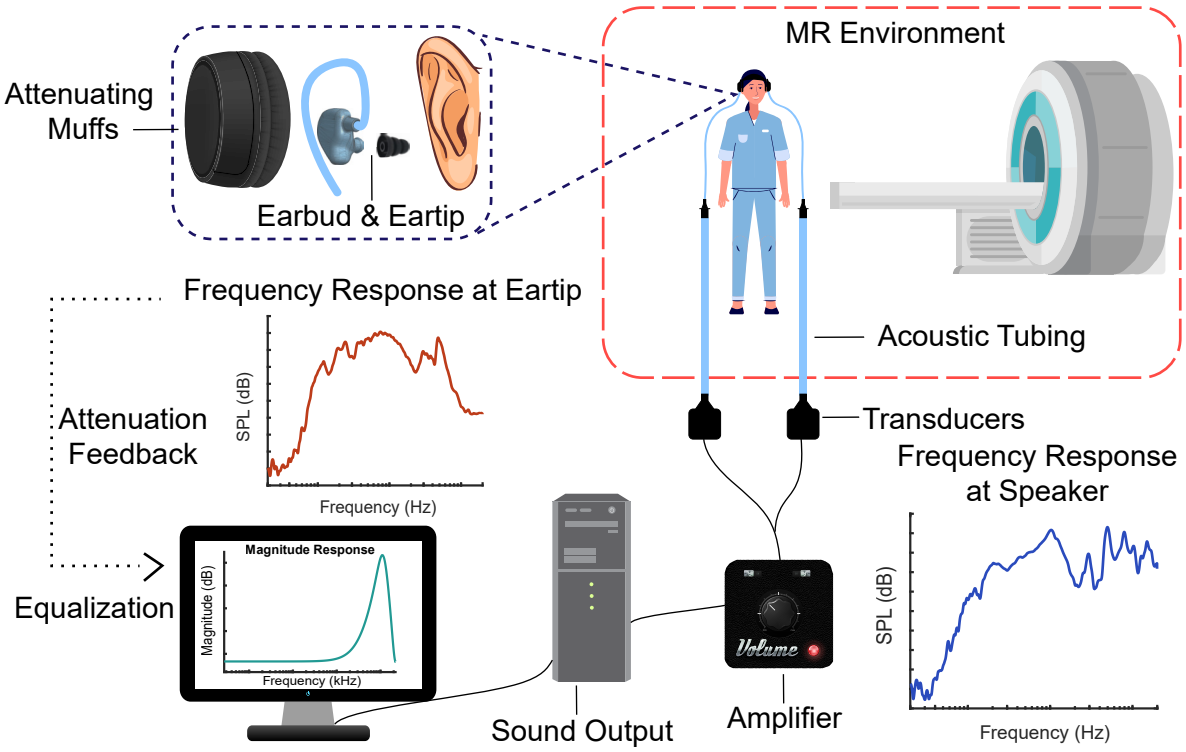
Devices

Ergonomic Earphone Design for High-Fidelity Audio Delivery During Functional Magnetic Resonance Imaging (fMRI) and Electroencephalography (EEG)

Team 26: **May Aon, Massinissa Bosli, Rahul Rangarajan**

Advisors: **Laura Lewis, Stephanie Williams (Massachusetts Institute of Technology, Institute for Medical Engineering and Science, Department of Electrical Engineering and Computer Science)**

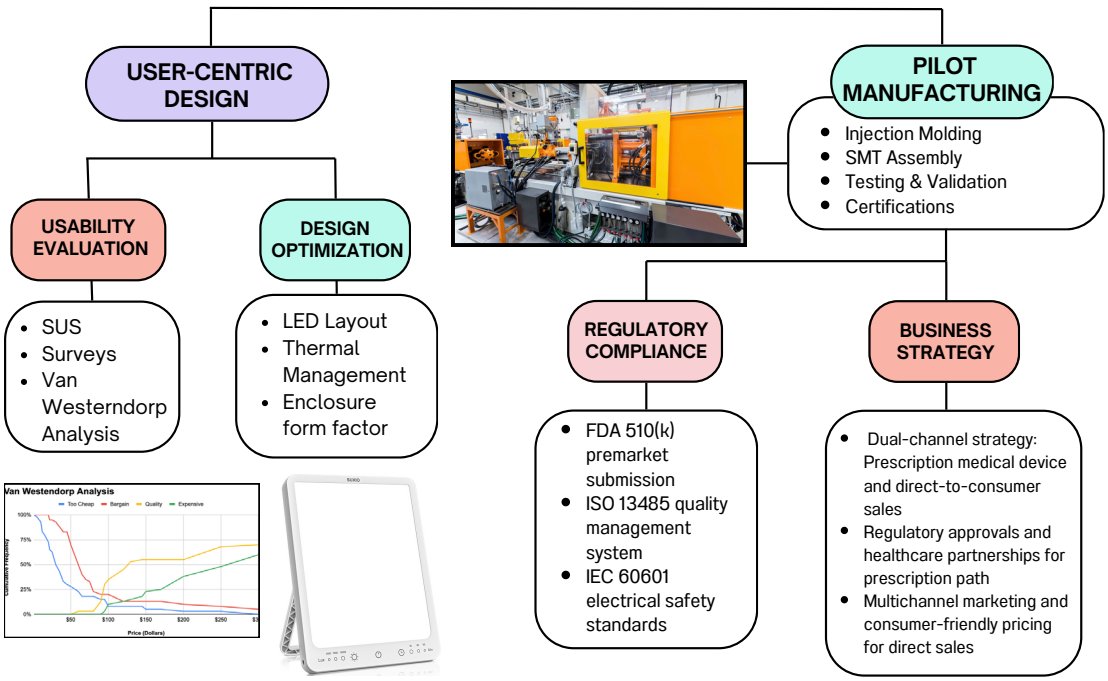
Simultaneous electroencephalography (EEG) and functional magnetic resonance imaging (fMRI) is a non-invasive, multi-modal imaging technique used to analyze neural activity and hemodynamics in the brain. The combination of the two imaging modalities allows researchers to image with high spatial resolution (fMRI) and high temporal resolution (EEG) simultaneously. Often, cognitive tasks are performed during scans to evoke neural and hemodynamic responses. When the task stimuli are acoustic in nature, they become extremely challenging to administer on account of the loud and cramped MR environment. Current MRI-safe earphone devices are either uncomfortable, thus limiting scan duration, or are unsuited for simultaneous EEG use owing to resultant artifacts in the EEG. To overcome these limitations, we propose a new design for a comfortable device that prioritizes subject comfort to allow for extended EEG-fMRI recordings (>4 hours), while also insulating the subject's ears from noise intrusion and delivering audio with improved fidelity than currently available devices. To accomplish this, we used acoustically insulative materials and tubing composed of ethylene-vinyl acetate (EVA) to transmit quality audio across a broad range of frequencies. The relocation of the transducer to the exterior of the MR environment allows for the production of audio signals without the risk of electrical distortion to the EEG. This device will improve subject comfort during auditory experiments and will aid in the collection of undistorted EEG data during simultaneous EEG-fMRI, thereby fostering further exploration in the field of auditory neuroscience that might have been previously avoided due to limitations in audio delivery.



Treating Alzheimer's with 40Hz Light

Team 14: **Miriam Bounar, Roop Chakrabarti, Jasper Ezekiel, Gary Gega, Abdulrahman Kobayter**
Advisor: **Andrey Vyshedskiy (Boston University, AlzLife)**

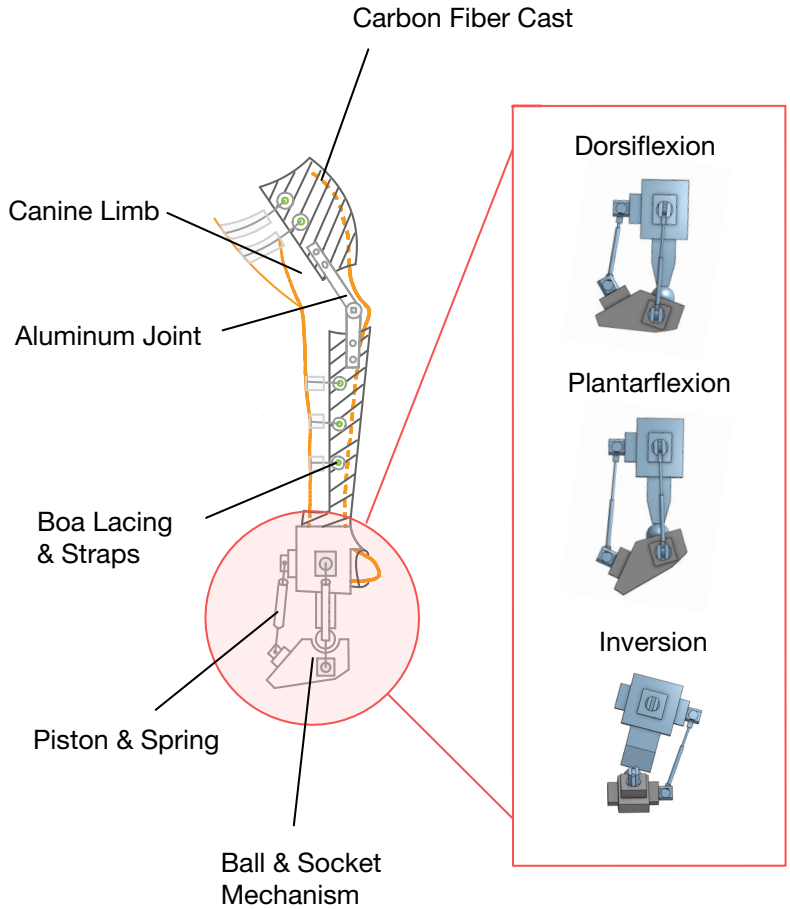
Alzheimer's disease and other forms of dementia affect millions of people worldwide, with a significant burden on patients, caregivers, and healthcare systems. While current treatments focus on managing symptoms, there is a pressing need for novel, non-invasive therapies that can improve cognitive function and slow disease progression. Emerging research has demonstrated the potential benefits of 40Hz light and sound stimulation in enhancing neuronal activity and plasticity, leading to improvements in memory, attention, and sleep quality for Alzheimer's patients. (Chan, et al. 2022) This project aims to develop an accessible and affordable 40Hz light therapy device to facilitate the widespread adoption of this promising therapeutic approach. The core innovation is a compact, stand-alone LED panel engineered to flicker at the precise 40Hz frequency shown to elicit therapeutic effects. Through an iterative user-centric design process involving patients, caregivers, and clinicians, the panel's form factor, thermal management, and user experience have been optimized for ease of use and safety. Extensive testing and validation have been conducted, including usability evaluations, photodiode-based light output verification, accelerated durability assessments, and detailed thermal characterization. In parallel, large-scale manufacturing processes like injection molding and surface mount technology assembly have been explored to enable cost-effective production volumes and establish regulatory compliance pathways. By delivering a clinically validated, user-approved, and scalable 40Hz light therapy solution, this project has the potential to improve the quality of life for millions of Alzheimer's and dementia patients worldwide. With its non-invasive nature, accessibility, and potential for slowing cognitive decline, this innovative device offers a transformative therapeutic option for a disease that has long eluded effective treatments.



Canine Partial Limb Prosthetic

Team 34: **Benjamin Fang, Angelina Marrero, Owen O'Brien, Claudia Zaglewski**
Advisors: **Christopher Arena, Aleksandrs Zosuls**

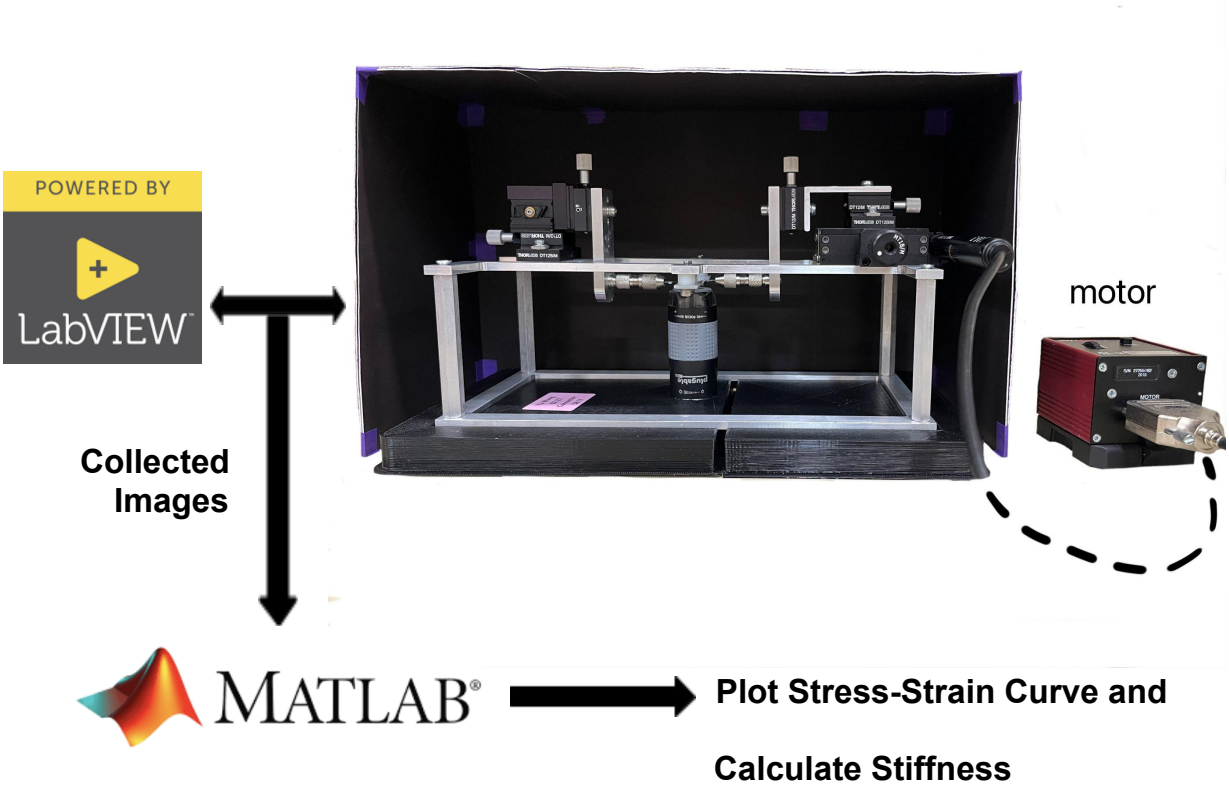
Many available products in the canine prosthetic market lack affordability and adaptability. In order to address this gap in the market, we worked with a one year old rescue dog named Thimble to develop a prosthetic that would be adjustable for varying amputations as well as have a greater range of motion. Thimble has a unique disability in that she is missing just the bottom half of her left paw. Her partial amputation creates complications for her when she walks, and makes it difficult to find a prosthetic device that best suits her. To address her needs as well as the larger target market, we designed and developed a prototype partial limb prosthetic. The prototype was modeled on CAD and built using materials such as aluminum and carbon fiber. Based on extensive research of typical prosthetic design features, we were able to come up with some novel ideas to implement into our own design. This includes a ball and socket mechanism, which allows for rotation on multiple axes. Linked with the ball and socket are piston-springs which allow for stabilization of the joint. These design features together help to simulate the natural biomechanics of Thimble's paw. In addition to the mechanism that extends from her carpal joint, the prosthetic includes a carbon fiber brace which would protect the tissue that extends from Thimble's paw and keeps the prosthetic secure around the rest of her leg.



A Fiber Stretching and Imaging System

Team 11: **Weikang Ai, Wang Yu**
Advisors: **Yuqing Deng, Bela Suki**

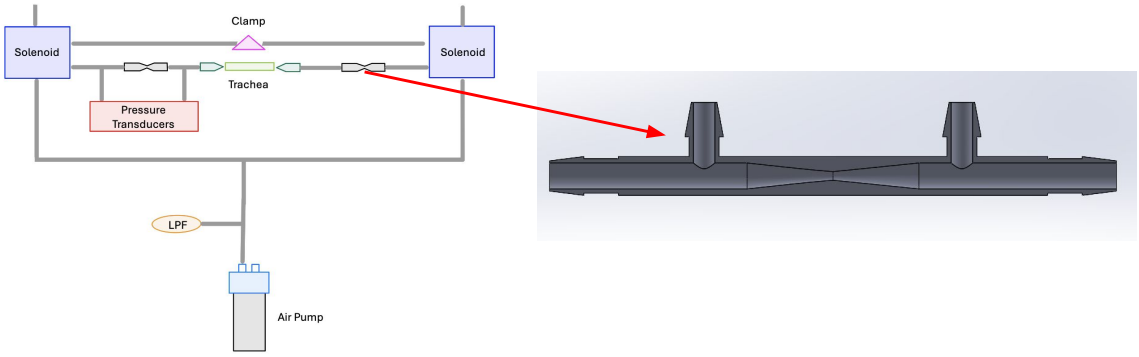
The intricate network of the extracellular matrix (ECM) provides essential structural support to tissues and plays a pivotal role in cellular function and disease progression. Central to this network is collagen, whose mechanical properties under stress are crucial, yet insufficiently understood, particularly in the context of lung diseases like emphysema. Our senior design project aims to refine and enhance the analysis of the mechanical behavior of collagen fibers by improving an existing tensile testing and imaging system. The focus is on better cost-efficiency and increased adaptability for modern programming platforms. Initially, fibers are imaged using an advanced microscope, and their dimensions are quantified using ImageJ. The examination of mechanical behavior is then facilitated through a uniaxial tensile tester, which comprises optical microneedle probes and a motorized actuator—controlled via a real-time LabVIEW imaging program. This program also manages a digital camera to capture the stretching process at predefined time intervals. The entire setup is housed within a 3D-printed base and encased in a black paper enclosure to minimize background light. Subsequent analysis is performed using MATLAB, where images are processed to plot the stress-strain curve and calculate the fibers' stiffness. This methodology not only simplifies the process but also enhances fault tolerance and reproducibility in data collection.

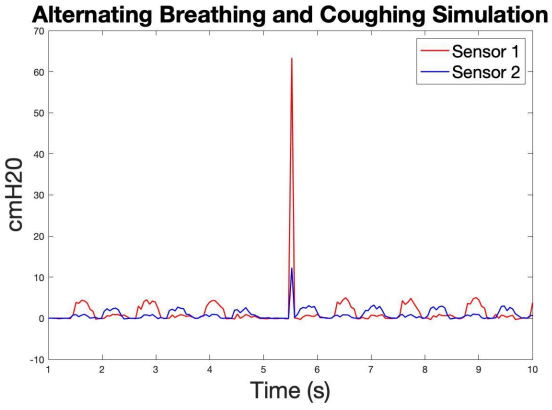


Stretcher-Ventilator System for Mechanotransduction Studies of Mice Tracheas

Team 12: **Ethan Curtis, Natalia Feced Garcia, Christopher Wu**
Advisor: **Joseph Hall, Bela Suki**

Respiratory diseases are among the leading global causes of death with chronic respiratory diseases accounting for 4 million deaths in 2019. Understanding the intricacies of the respiratory system is crucial in combating these ailments. When studying the respiratory system, ciliated cells are an essential part of our system serving as the frontline defense against pathogens. These cells, predominant in the airway epithelium, play a vital role in cleansing our airways and safeguarding against infections. However, bridging the gap between understanding the role of ciliated cells and implementing effective treatments poses challenges. One of these challenges is the cost associated with mechanical ventilation. With prices ranging from $6,000 to $60,000, accessibility to ventilators is limited, particularly in research settings. To address these challenges, our project aims to improve knowledge of airway mechanotransduction by developing a proper and accessible tool capable of mimicking airflow and stretch conditions. We aim to study the mechanical forces acting on ciliated cells and replicating them on a mouse trachea. This has broad clinical applications as it allows for a better understanding of diseases and promotes the development of more effective treatments. We propose a solenoid-based ventilator offering affordability, rapid response times, and versatility. This innovation allows for precise control over airflow, replicating real physiological conditions (i.e. coughing) which is crucial for understanding respiratory pathology. Alas, it can be integrated into a stretcher system, simulating real physiological conditions onto mouse tracheas and broadening the applicability of our research.

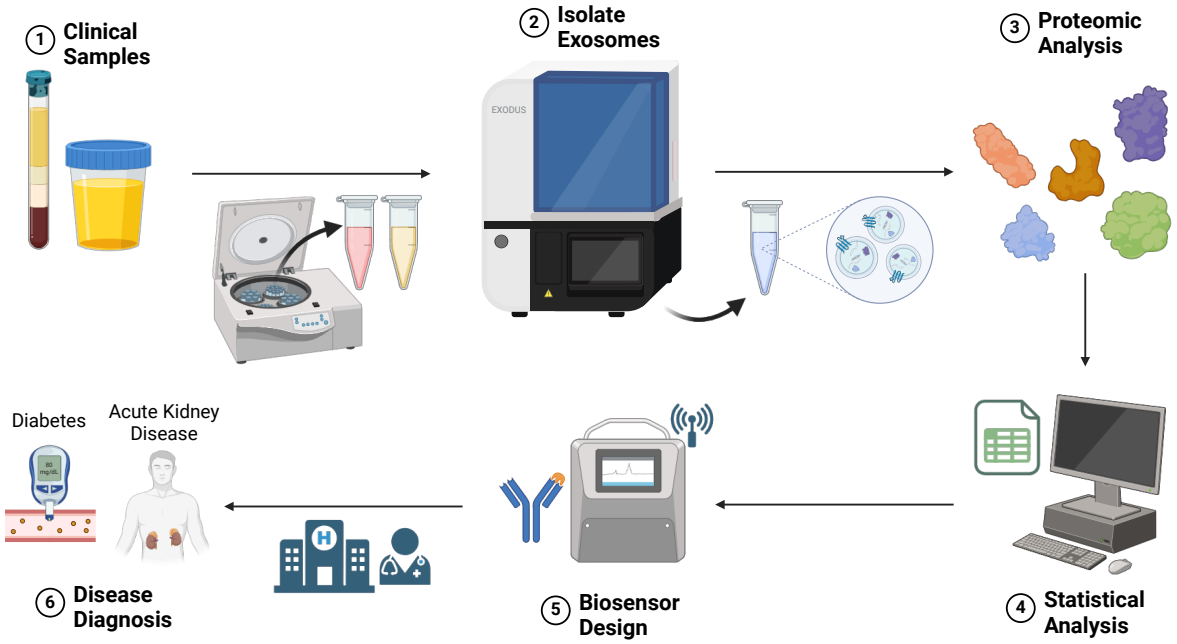




Exosome-Based Biomarker Discovery and Disease Diagnostics

Team 31: **Michelle Yung, Yilin Zhou**
Advisors: **Fei Liu, Wen Peng Liu, Yi Li (Brigham and Women's Hospital, Harvard Medical School)**

Exosomes, small membrane-bound vesicles secreted by most human cells, contain lipids, proteins, and genetic materials. In the body, exosomes facilitate cell-to-cell communication and exchange of cellular materials or information thus studying exosomes can provide insights into the biogenesis, state, and functions of the secreting cells. By comparing exosome constituents of healthy versus diseased samples, disease-specific protein biomarkers can be identified. This project aims to discover protein biomarkers for diabetes and acute kidney disease to facilitate the development of an exosome-based biosensor utilizing antibody-antigen binding techniques for rapid and reliable diagnosis with minimal invasiveness. First, clinical plasma samples are collected from both healthy individuals and those with diabetes while urine samples are obtained from individuals with or without acute kidney injury. The EXODUS machine is employed to isolate exosomes from these clinical samples followed by proteomics analysis. Through comparison of mass spectrometry data with information available in the Protein Data Bank (PDB), over 500 protein species found in isolated exosomes are identified and compared to healthy ones as potential biomarkers for integration into a biosensor platform. Ultimately, this project will culminate in the development of a clinically applicable device aimed at streamlining the diagnostic processes related to diabetes or acute kidney disease.



BME
Senior
Design
Projects
Conference

2024

Student Resumes

BU Department of Biomedical Engineering

WEIKANG AI

wai@bu.edu | 617-982-8633 | Boston, MA

EDUCATION

Boston University Boston, MA
B.S., Biomedical Engineering Expected May 2024
Minor in Computer Science

- GPA: 3.57
- *Relevant Coursework:* Engineering Programming • Fluid Mechanic • Signal and Control • Systems Physio • Thermodynamics • Medical Imaging • Machine Learning • Nonlinear systems • Software systems design

RESEARCH EXPERIENCE

Undergraduate Researcher Boston, MA
LU Lab at Boston University Medical Campus Oct 2022 - Present

- Analyzed podocyte surface topography in 3 pairs of kidney disease mouse models utilizing field emission scanning electron microscopy (FE-SEM), to aid in advancing therapeutic drug development in Lu Lab
- Dissected kidneys from 15 diseased mice, followed by slicing of tissue samples. Ensured optimal sample quality through careful washing and fixation processes

PROJECTS

Fiber Stretching and Imaging System Project Sep 2023 - Present

- Designed one portable fiber stretching and imaging system to study response of collagen fibers to mechanical forces, simulating condition Emphysema
- Utilized a digital camera, computer, motorized actuator/stretcher, and micropipette in a collaborative effort with one other team member
- Developed a LabVIEW program to control stretcher's speed and acceleration, with capabilities for saving images in either single or continuous capture modes
- Created a MATLAB program for analyzing input images, accurately calculating displacement of micropipette and diameter of collagen fibers in each image

Automatic Wheelchair Light Project Sep 2021 - Dec 2021

- Designed an attachable automatic light source, on a team of 4, using Arduino Nano, LED lights, light sensors, batteries, and so on, to create a safer environment for wheelchair users in dark
- Developed a C program capable of sensing ambient light levels to automatically activate light source in dim conditions, with additional functionality for manual activation by user as needed

Room Temperature Alert System Project Jan 2021 - May 2021

- Engineered and assembled a temperature alert box with a preset threshold; included buzzer, temperature sensor, LEDs, and LCD screen, all integrated with an Arduino Uno; Programmed system using C

LEADERSHIP

BU Delightfully X Club, Club member, Boston, MA Jan 2022 – Present

- Attend and help organizing club meeting

Ping Pong Club, Club leader, Somers, NY Jan 2019 – May 2020

- Organize ping pong matches every week and manage school supply

AWARDS

Undergraduate Research Opportunities Program student research award from Boston University

SKILLS

Laboratory: Compound Microscope, Spectrometer, Centrifuge, Agarose Electrophoresis, Thin Layer Chromatography.
Computer Applications: Python, MATLAB, Java, C, OnShape, SnapGene, Visual Studio 2022, Microsoft Office.
Manufacturing: Building circuits, Soldering.
Languages: English, Mandarin.

Hanna Alarcon

hannamalarcon@gmail.com | (214)729-9941 | www.linkedin.com/in/hannalarcon

Education

Boston University College of Engineering — **Boston, MA**
Bachelor of Science in Biomedical Engineering — Expected: May 2024
Concentration in Technology Innovation

Coursework: Quantitative Biomedical Optics, Nanotechnology, Molecular Cell Biology & Biotechnology, Solid Biomechanics, Device Diagnostics & Design, Business of Technology Innovation, Biomedical Signals & Controls, Statistics & Data Science

Professional Experience

PlenOptika, Inc. — **Boston, MA**
Engineering & Business Development Intern — Jan 2023 - Present

- Oversaw quality control of FDA class 1 510(k)-exempt medical equipment following QMS protocols to prevent defects, improving customer satisfaction.
- Performed repairs on an average of 10 medical devices per week for customers, consistently meeting a 5-day turnaround. Implemented multiple databases to automatically track sales data, streamlining data input process of commercial metrics.
- Conducted market trend analysis for VP of Strategy to identify suitable sectors for upcoming product launch.

Boston University Medical Center — **Boston, MA**
Research Assistant, Pulmonary Department — Sep 2021 - Dec 2022

- Managed study of over 150 participants independently by organizing, uploading, and shipping biological samples of study participants.
- Executed quarterly/yearly questionnaires and patient visits, following HIPAA protocols.

Abbott Laboratories: Nutrition Division — **Lake County, IL**
Operations Intern, Regulatory Affairs — May - Aug 2021

- Drafted and distributed survey to over 200 people to determine features users needed to drive SharePoint site usage.
- Implemented and refined SharePoint site user-interface, improving site usage.

Abbott Laboratories: Diagnostics Division — **Irving, TX**
Intern, Manufacturing — Jun - Aug 2020

- Initiated refurbishment procedure of Alinity s-series (medical instrument) to reduce wasted material.
- Minimized production time of Alinity s-series manufacturing to increase throughput.

Intern, Systems Integration — Jun - Aug 2019

- Extracted, reviewed & categorized Alinity ci-series Verification Protocol Scripts for convenient accessibility.
- Automated and tested Alinity ci-series Reagent & Sample Manager Transport Scripts.

Technical Projects

Development & Integration of a Lensometer Attachment for QuickSee Free — Sep 2023 - Present

- Designed, prototyped, and tested a lensometer attachment to an existing product to enable new revenue stream.
- Conducted in-depth research of ophthalmic equipment market to determine customer expectations, value proposition, set product requirements, and regulatory pathway to create 2-year finance projectization roadmap.
- Gained comprehensive understanding of taking a project from ideation into market.

SmartScrub, 3D Designer — Jan - May 2023

- Engineered and prototyped automated glove donning device using Onshape to mitigate cross-contamination risks while scrubbing into surgical operating rooms.
- Researched and analyzed market to ascertain viability of product and its competitive advantage.

COVID-19 Trend Analysis — Sep - Dec 2021

- Developed MATLAB program to analyze over 10,000 data points on COVID-19 cases in Texas across a 10-week period.
- Created prediction model using machine learning for comparison to actual data trends. Discrepancies amongst both models were analyzed to pinpoint events that led to higher cases of COVID-19.

Leadership

Society of Hispanic Professional Engineers, Treasurer — Mar 2022 - Present

Skills

Languages: English (Native), Spanish (Fluent)
Laboratory: Gel electrophoresis, Spectrometry, PCR Testing, Chromatography, Microscopy
Programs: MATLAB, Arduino, C++, Onshape

Sulaiman Alsalamah

a1@bu.edu | linkedin.com/in/sulaiman-alsalamah | Boston, MA

Education

Boston University, College of Engineering Boston, MA | Expected May 2024
Bachelor of Science in Biomedical Engineering, Concentration in Technology Innovation
Recipient of the *KAUST Gifted Student Program (KGSP)* Scholarship.

Relevant Coursework: *Molecular Biotechnology / Diagnostics Design and Clinical Applications / Biomaterials / Biomechanics / Statistics & Data Science for Engineering / Business of Technology Innovation / Strategy for Tech Firms.*

Leadership and Volunteer Commitments:

- **President of *Global Engineering Brigades at BU**:* led a service trip to rural Honduras to collaboratively design 6,000 meters of water piping, 95 household connections, and a 15,000-gallon water storage tank, to serve 351 village members.
- **Engineering Mentor**: eased international underclassmen's transition to advanced classes and guided opportunity pursuits.
- ***Alternative Service Breaks**:* cleared rugged wilderness trails of Shawnee National Forest alongside USDA teams.
- ***Student Food Rescue:*** delivered food donations from bakeries and grocers to shelters in Greater Boston.
- **Student Film Production Assistant**: scouted scene locations, troubleshooted equipment, and slated.

Experience

Senior Design Researcher, Novartis Boston, MA | Sep 2023 – Present

- Designing a Python module to integrate outputs of protein structure tools; to compare predicted membrane placement and underscore limitations of different computational modeling methods for transmembrane proteins.
- Comparing the predicted membrane placements and underscore limitations of various computational modeling methods for transmembrane proteins with a focus on proteins' ability to be drugged.

Research Assistant, Boston University Environmental Health Lab Boston, MA | May 2022 – Present

- Conducting literature research to examine links between altered gut microbiomes and the central nervous system.

Resident Assistant*,* Boston University Residence Life Boston, MA | May 2022 – Present

- Fostered a living environment for +200 diverse undergraduate residents, and often resolved conflicts and concerns.
- Counseled students in distress during overnight on-call shifts in communication with emergency resources.

Select Projects

3D Bioprinted Regenerative IVD Scaffold – Bioengineering Technology & Entrepreneurship Center (BTEC) at BU
Analyzed the biomaterial properties required for a scaffold and reviewed suitable bioinks to address degenerative disc disease. Utilized Bio X to print CAD models using an alginate-based bioink to test its shape and material properties.

EEG Beanie for Children with Autism – Engineering Product Innovation Center (EPIC) at BU
Identified an unmet need of a less-stimulating EEG method to detect epileptic activity for autistic patients ageing 8-14 years old, by interviewing parents, clinicians, and university researchers. Rapidly and iteratively prototyped a dry, comfortable, child-friendly, and aesthetically-pleasing beanie embedded with electrodes to measure brain activity.

Nootropics' effect on Heart Rate and Reaction Time – Systems Physiology Lab at BU
Spearheaded an experiment on the combined and isolated effects of caffeine + L-Theanine on heart rate and reaction time.

Skills

Computing: Programming (MATLAB, Python, C and R), CAD Solidworks, EEG, EKG, Arduino, Microsoft Office.
Lab: 3D Bioprinting, fluorescent microscopy, cell culture, biochemical assays, rapid prototyping, biomaterial loading.

Manal Alshamrani

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EDUCATION

Boston University | Boston, MA — Expected May 2024

B.S. in Biomedical Engineering, Concentration in Technology Innovation (Dean's List, top 30%) — GPA: 3.86/4.0

INDUSTRY INTERNSHIPS & LEADERSHIP

Oliver Wyman | Riyadh, Saudi Arabia

Consultant Intern — Jul – Aug 2023

- Conducted 20+ benchmarks of policies to provide strategic recommendations for a corporate tax national project.
- Analyzed 250+ company profiles (e.g., estimated tax revenues, parent entities, incorporation location, etc.) to present qualified tax groups to client while collaborating with a team of senior consultants and partners.

Boston University Saudi Cultural Club | Boston, MA

Vice President & Social Chair — Mar 2022 – May 2023

- Planned and led meetings, oversaw budget and finance, and coordinated social events (e.g. Saudi National Day).
- Organized a large networking event with 150+ Saudi student attendees in the Boston greater area by partnering with the Harvard University Saudi Student Association.

McKinsey & Company Qimam Fellowship | Riyadh, Saudi Arabia — Jun – Jul 2022

- Nominated after a rigorous evaluation process of selecting 50 students out of 17,000+ applicants from Saudi Arabia.
- Engaged in one-on-one mentorship sessions with venture capitalists and senior leaders, visits to leading national and international company offices, and membership in the Qimam Alumni Network with 200+ members.

RESEARCH EXPERIENCE

Gila Engineering Lab at Boston University | Boston, MA

Research Assistant – Department of Biomedical Engineering — Sep 2023 – Present

- Collaborating with senior project team to develop a novel glyco-nucleoside copolymers using enzymatic monomer synthesis and polymerization techniques to enhance stability and bioactivity of hydrogels for glia repair applications.

Bloodworks Northwest Medical Research Institute | Seattle, WA — Jul – Aug 2022

Research Assistant – Division of Hematology, Department of Medicine, University of Washington

- Investigated Hemopexin use as a biomarker for complications induced by Left Ventricular Assist Device (LVAD) in patients as part of a longitudinal study conducted in collaboration with Dr. Jing-fei Dong's laboratory team.
- Constructed study framework and performed ELISA to measure Hemopexin concentrations on 150+ samples.

PROJECTS

AI Surgical Navigation System — Feb – May 2023

Boston University Questrom School of Business | Boston, MA

- Worked on a business model to develop a surgical navigation system startup that will utilize advanced control systems and incorporate AI algorithms to provide real-time feedback during minimally invasive surgeries.

Drug Preservation Device — Aug – Dec 2021

Boston University School of Engineering, Department of Biomedical Enginering | Boston, MA

- 3D printed a low-cost, accurate, portable drug preservation device to maintain temperature and humidity of stored medications for up to 48 hours and modeled product layout using CAD.
- Used DHT22 sensors and thermoelectric coolers to monitor and control temperature by programming Arduino chip.

Maydan Sports App Start-up — Jul – Aug 2021

Global Entrepreneurship and Innovation Program, Arizona State University | Tempe, AZ

- Trained for 60+ hours to construct a business plan and a financial strategy, with the primary goal of launching a startup promoting a sport app to connect female athlete minorities in Saudi Arabia.
- Won 1st place in the program start-up pitch competition, and received funding offers from panelists.

AWARDS & HONORS

Recipient, *KAUST Gifted Student Program (KGSP) Full Tuition Scholarship* — Aug 2019 – Present

Representative, *United Nations Economic and Social Council Youth Forum, New York City* — Apr 2023

SKILLS

Language: Arabic & English (Bilingual)

Molecular Biology:
- Characterization: PCR, qRT-PCR, TEM, SEM, Next Generation & Sanger Sequencing, ELISA
- Assays: Purification of viral and bacterial DNA, RNA, and protein markers, plasmid isolation

Technical:
- Design: Engineering freehand sketching, AutoCAD, 3D printing, Ultimaker Cura
- Programming: MAT Lab, Excel, Python, limited R studio, C

MOHAMMED ALWELYEE

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EDUCATION

Boston University, College of Engineering, Boston, MA **May 2024**

Bachelor of Science in Biomedical Engineering; Concentration in Nanotechnology

- Dean's List for 7 consecutive semesters
- Relevant Coursework: *Nanotechnology, Cell Biophysics, Biomaterials, Transport Phenomena, Thermodynamics*

RELEVANT EXPERIENCE

Boston University College of Engineering **Sep 2023 – Present**

Research Assistant – O'Shea Lab – Biomedical Engineering Dept.

- Worked with Prof. Timothy O'Shea on developing glycol-nucleoside supramolecular hydrogels for glia repair
- Synthesized block copolymers through RAFT polymerization that yielded greater hydrogel stability in-vitro
- Performed dynamic rheology studies on the developed hydrogel to assess its mechanical properties

PricewaterhouseCoopers (PwC) Middle East **July – August 2023**

Consulting Intern – Health Industries Business Unit

- Developed a technical proposal for the Council of Health Insurance (CHI) on implementing value-based payment in the Saudi healthcare system
- Prepared an accompanying $4.5 million-dollar commercial proposal
- Created a project charter document for the Ministry of Interior (MoI) Medical Cities Project
- Drafted a technical proposal for the Department of Health in Abu Dhabi to introduce a Gate Keeping Program

Northeastern University Chemical Catalysis REU Program **May – August 2022**

Research Assistant – Engineered Living Material Lab – Chemistry Dept.

- Worked with Prof. Neel Joshi on mimicking certain aspects of cephalopod's camouflage mechanism using living hydrogel actuators
- Engineered E. coli genetically to autonomously change hydrogel's size by altering the pH of its environment
- Co-authored a publication titled "Microbially driven reversible size- and color-changing materials" in Matter (2024), contributing to advancements in the field of material science

PROJECTS

Machine Learning Pet Image Classification Model **Sep – Dec 2022**

- Utilized Machine learning to train a binary classifier to distinguish between dog and cat images
- Achieved 90% accuracy rate in classifying pet images when model was used on a training set

Truss Simulation & Optimization **Jan – May 2022**

- Designed a MATLAB model that uses truss matrix inputs to predict system's buckling members and maximum load
- Optimized model within budget constraints to withstand more than 3.2 lbs, a 40% load increase from initial design

HONORS & AWARDS

Recipient – *Rhodes Scholarship* **Nov 2023 – Present**

- The Rhodes Scholarship is the oldest and most prestigious fully funded postgraduate award in the world, enabling talented students to pursue a graduate degree at the University of Oxford in the UK

Recipient – *KAUST Gifted Student Program (KGSP) Scholarship* **August 2020 – Present**

- KGSP is a prestigious scholarship awarded by King Abdullah University of Science & Technology (KAUST) to a select group of Saudi students allowing them to pursue undergraduate degrees in STEM fields in the US

LEADERSHIP & ACTIVITIES

President, *Boston University Saudi Cultural Club (BUSCC)* **May 2023 – Present**

- Led club's e-board and coordinated large-scale events with other organizations in Boston to promote the Saudi culture in the community

Member, *Boston University Biomedical Engineering Society (BMES)* **Sep 2021 – Present**

Member, *Boston University Running Club* **Sep 2021 – Present**

SKILLS

Computer: Microsoft Office (Excel & PowerPoint), MATLAB (Advanced), R (Intermediate), C (Beginner), and Benchling

Lab: NMR, Organic Synthesis, Column Chromatography, PCR, Gibson Assembly, Primer Design, and Mictopipetting

Language: Arabic (Native), English (Fluent)

Nefeli Maria Andreades

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617-992-5403 – nefeli@andreades.com – LinkedIn: https://www.linkedin.com/in/nefeli-andreades-151528233/

Education

Boston University, College of Engineering — Boston, USA
BS in Biomedical Engineering, minor in Art History — Expected May 2024
Bachelor's Degree GPA: 3.24

- Core Courses: Intro to Programming, Intro to Engineering Design, Machine Learning, Mathematics, Physics, Chemistry, Biology, Thermodynamics, Statistics, Electricity, Transports in Living Systems, Healthcare and Disease in Displaced People.
- Art History Courses: Contemporary Art, Art in Africa and Latin America, Modern Art, Art and politics, Paris Architecture and Urbanism
- Projects: designed and created a temperature-controlled drug container device that protects drugs by keeping them in the target temperature
- Abroad experience: Semester in Paris for an architecture course

Technical Skills

MATLAB and C programming, Arduino, circuit design and electrical wiring, environmental awareness, teamwork, pharmaceutical manufacturing, data analysis, handling of hazardous materials, problem solving, laboratory skills, ethical reasoning

Professional Experience

Nicosia, Cyprus
Cyprus Handicraft Service in collaboration with renowned designer Fani Xenophontos — June – August 2023

- Participated on a project inspired by the Traditional Cypriot Intangible Heritage Artworks
- Leveraged deep understanding of local art history for effective project contribution
- Communicated and applied art theory in collaboration with artisans and designers
- Collaborated seamlessly across diverse CHS workshops and with various management levels
- Demonstrated strong organizational, multitasking, and time management skills, ensuring efficient task completion
- Gained valuable experience complementing studies in the History of Art

Temenos AG – Global Leader in Banking Software — Athens, Greece
Global CSR and Sustainability trainee — June – July 2022

- Submitted the Dow Jones Sustainability Index Report
- Filed the annual report sustainability section by processing data and doing statistical analysis
- Responsible for digital media coverage for ESG on LinkedIn, Instagram, and internal platforms
- Worked with development offices located in India to calculate energy expenses for use in carbon calculator
- Organized community action for the Greek Temenos team to clean-up a local river
- Adopted the rebranding of the company and transferred documents to the new template
- Held senior management meetings where next steps for reducing carbon footprint were discussed
- Brainstormed a new internal innovative learning platform which would help future new employees

Lonza Group AG – Leading manufacturing company for pharmaceuticals — Visp, Switzerland
Laboratory Intern — August – September 2019

- Learned about manufacturing and chemistry of drug synthesis and production
- Overviewed large-scale production of pharmaceuticals and documented the process being made
- Attended meetings with clients such as Astra Zeneca, and the FDA for potential new drugs and approvals

LIFELINE Cord Blood and Tissue Bank — Nicosia, Cyprus
Laboratory Intern — June – July 2019

- Processed umbilical cord and blood tissue arriving from hospitals, for further manipulation to extract STEM cells
- Learned to safely discard unwanted tissue by using state of art technology
- Prepared samples for cryopreservation and was responsible for regular checks on the cells

Centre Medical Universitaire (CMU) – Luscher Lab researching drug addiction — Geneva, Switzerland
Laboratory Intern — June – July 2018

- Studied drug evoked neural plasticity under one of the leading professors of neuroscience
- Designed in vivo stimulations in mice to study behaviour related to pleasure and punishment
- Accumulated results in mice behaviour and extrapolated to humans using parameters provided
- Demonstrated laboratory techniques such as brain implantation on mice, gene manipulation and chromatography
- Took samples from mice and performed PCR for DNA analysis in order to record any changes in DNA
- Documented mice behaviour by recording videos of movements, essential for reaching conclusions

Co-curriculars

Music, piano (grade 7), native in French, English and Greek, art, painting and design, yoga, snowboarding, athletics (competed in Pancyprian competitions), theatre productions (attended weekly lessons for 2 years)

MAY AON

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EDUCATION

Boston University, College of Engineering — Boston, MA
B.S., Biomedical Engineering — Aug 2024

PROFESSIONAL EXPERIENCE

Research Assistant — Cambridge, MA
Lewis Lab at MIT — Sep 2021 - Present

- Completed 100+ hours of overnight research looking into effects of total sleep deprivation on patients diagnosed with major depressive disorder (MDD)
- Mastered EEG data collection through working and engaging with over 40 subjects
- Analyzed over 10 fMRI scans to locate and track the cerebrospinal fluid in human brains through the FreeSurfer software
- Operate and set up MRI scanner while simultaneously activating eye tracking software for multiple ongoing studies for up to two hours at a time
- Supervised and trained two full time research assistants on lab and research procedures
- Wrote MATLAB code to optimize sleep scoring during data collection periods

PROJECTS

Comparing Human Brain Fluid Dynamics Across the Lifespan — Jan 2022 - Present

- Analyze simultaneously acquired EEG and fMRI data from subjects aged 18-80
- Wrote MATLAB code to undergo statistical analyses of cerebrospinal fluid flow across states of wakefulness and arousal conditions in young versus old adults

Senior Capstone: EEG Compatible MRI Safe Earphones — Sep 2023 - Present

- Developed an earbud design using CAD and 3D modeling that effectively transmits clear and highly audible sound while optimizing comfort and ease of use
- Characterize the frequency spectrum of transmitted sounds and noise intrusion
- Perform signal/waveform analysis of acquired audio data to determine the ideal design

Total Sleep Deprivation Alters Spectral Dynamics Detectable with Fast fMRI — Dec 2021 - Dec 2023

- Supervised sleep deprived subjects overnight while conducting EEG exams hourly
- Monitored real-time eye movement through use of Tobii glasses to ensure wakefulness
- Collected fast fMRI data while subjects complete an emotionally salient task under two arousal conditions

Actigraphy-Based Sleep Monitoring for Patients with MDD — May 2022 - Aug 2022

- Investigate relationship between mood and average sleep duration in depression through short term sleep deprivation under overnight laboratory monitoring
- Measure subjects' motor activity using the Cole-Kripke algorithm on an actigraphy device sensitive to movement and light

SKILLS

Laboratory: Operate an MRI, EEG Setup and Analysis, MATLAB, Python, C, FreeSurfer, Actigraphy, Gel Imaging, Microscopy, Gel Electrophoresis, PCR
Multilingual: Fluent in Arabic and English, proficient in French

COURSEWORK

Neurotechnology Devices
Business of Technology Innovation
Clinical Applications of Biomedical Design
Biomedical Signals and Controls

ACTIVITIES

Biomedical Engineering Society (September 2020 - May 2021)

Tanner Armstard

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EDUCATION

Boston University College of Engineering — Boston, MA
Bachelors of Science in Biomedical Engineering — Expected May 2024

SKILLS

General Skills: MATLAB, Excel, PowerPoint, Cura, C, Image Processing and Data Analysis, Proficiency in Documentation and Lab Reporting
Lab Skills: Light Spectroscopy, Organic Chemistry, Fluorescent Microscopy, Gel Electrophoresis, Gel Imaging

RELEVANT COURSEWORK

Thermodynamics and Statistical Mechanics, Systems Physiology, Electric Circuits, Device Diagnostics and Design, Quantitative Neuroscience, Molecular and Cellular Biology, Biomedical Measurements and Analysis, Biomedical Signals and Controls, Electric Circuits, Probability, Statistics, and Data Science for Engineers

PROJECTS

Senior Design Project — Spring 2024
- Integrated a 5-man design team to aid parents of children with autism to communicate and provide key information and insight for people worldwide
- Facilitated the creation, development, and management of Language Delay Wiki

Preeclampsia Detection Project — Spring 2024
- Collaborated with a BME students and clientele to design an affordable, portable, and intuitive monitoring device
- Designed a monitoring functionality of detecting a user's risk of preeclampsia using photoplethysmography and user surveys
- Tested clinical applications of photoplethysmography in heart rate and blood pressure monitoring
- Coordinated meetings with clientele to gauge risk assessment and understand crucial components in patient management

Truss Design Project — Spring 2023
- Constructed a truss out of acrylic to withstand a load of over 21.8 ounces
- Coded an algorithm in MATLAB to assess effectiveness, structural integrity, and potential sites of buckling

Multimode Flashlight Project — Fall 2022
- Cooperated with a designated client to manufacture a multimodal flashlight for users with limited dexterity
- Coded a program in an Arduino to switch LED light intensity
- Utilized milling machine to drill necessary openings for device components

Temperature Sensor Project — Spring 2022
- Assembled a device to track surrounding temperature and notify users
- Created a CAD model, 3-D printed components, and adjusted enclosure via milling machines

EXTRACURRICULAR ACTIVITIES

- 7 years of experience playing piano
- 4 years of experience volunteering at the Northeast Louisiana Food Bank

TEERTHA AYANJI

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EDUCATION

Boston University, College of Engineering — Boston, MA
Bachelor of Science, Biomedical Engineering — Expected May 2024
Minor in Mathematics
GPA: 3.76/4.00
Honors: 5x College of Engineering Dean's List Award Winner

EXPERIENCE

C4 Therapeutics — Watertown, MA
Intern — Sep 2023 - Present

- Verified a novel *in vitro* pharmacokinetic assay kit mimics human blood-brain barrier
- Performed Cell Culture Experiments for pharmacokinetic assay data collection
- Analyzed liquid chromatography/mass spectroscopy data to measure drug concentration

Shafiee Lab at Harvard Medical School — Boston, MA
Research Assistant — Sep 2022 - Aug 2023

- Engineered a patent-pending 3D-printed POC viral detection device harnessing nanoparticle assay and expedited patent date from one year to six months
- Prepared assay experimentation of platinum nanoparticles and magnetics beads to detect Omicron SARS-CoV-2 and HIV
- Conducted experiments in BSL2+ setting testing Covid patient samples and blood plasma
- Mentored two trainees to be successors by assigning tasks to assist and teaching laboratory skills

PROJECTS

Internally-Generated Representations of the Brain Classifier — Nov 2023 - Present

- Built a classifier to a past study on whether subjects depended on visual perception or imagination to guess trajectory of a visual stimuli
- Implement a novel Bayesian Network Classifier to classify visual stimuli to different perceptions of subject

Automatic Surgical Glove Donning Device — Jan 2023 - May 2023

- Invented a novel glove donning mechanism utilizing a linear rail system and motion sensors for surgeons to efficiently wear surgical gloves with minimal contamination

Phage Therapy: A Promising Approach to Target HER2 Breast Cancer Proposal — Jan 2023 - May 2023

- Proposed a novel phage therapy mechanism harnessing gold nanorods to specifically target HER2 breast cancer cells and minimize metastasis

Hands-Free Multiple-Wavelength Microscope Light — Jan 2022 - May 2022

- Designed and developed a microscope light system, operated via a foot pedal, capable of illuminating various wavelengths of visible light to achieve high specificity in cell visualization

COVID-19 Mask Use vs Cases Regression Analysis — Nov 2020 - Dec 2020

- Formulated a regression analysis utilizing United States public data to indicate how each state's preventative measures affect COVID-19 cases

SKILLS

Computer: MATLAB, Python, C, C++, Java, ImageJ, AutoCAD
Laboratory: Inorganic Nanoparticle Development, BSL2+, Cell Culture, Spectroscopic Analysis, Mass Spectroscopy, Chromatography, Microscopy, Image Analysis, PCR
Languages: Marathi, Spanish, Hindi

Bharat Bandi
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EDUCATION

Boston University College of Engineering, Boston, MA **May 2024**
Bachelor of Science in Biomedical engineering, Minor in Business Administration, Concentrating in Technology Innovation
GPA: 3.50/4.00
Dean's List **Fall 2020, Spring 2021, Spring 2022**
Relevant Coursework: Hands on Engineering | Principles of Molecular Cell Biology and Biotechnology | Probability, Statistics, and Data Science for Engineers | Signals and Systems | Introduction to Biomedical Material Sciences | Device Diagnostics and Design | Thermodynamics and Statistical Mechanics | Fundamentals of Biomaterials | Computational Biology | Introduction to CAD and Machine Components | Polymers and Soft Materials | Probabilistic and Statistical Decision-Making for Management |

EXPERIENCE AND INTERNSHIPS

Biocon Biologics **July 2023 – August 2023**
DRD Product Life Cycle Management Intern
- Operated in device team in Research and Development department understanding development of pen injectors and steps taken for a medical device to be designed and made available in market
- Conducted research on current trends in pen injectors analyzing potential mechanisms and designs for the future landscape of medical delivery devices
- Innovated 6 different ideas for potential next generation pen injectors and proposed to device team including a detailed report of designs

Narayana Health **July 2022 – August 2022**
Intern Trainee
- Undertook 4-week training at the Hospital including site visits involving breakdown and analysis of medical equipment
- Collaborated with other on field Biomedical Engineers observing and understanding equipment malfunctions in hospital and fixing devices improving functionality within the healthcare environment
- Directed focus towards the Radiology Department observing the procedure and acquiring knowledge about specialized equipment in diagnostic imaging

Research at Colorado University Boulder **June 2019 – July 2019**
Research Intern
- Conducted research at the Ferguson lab with Professor Virginia Ferguson on effects of hindlimb suspension on aging
- Measured bone mineral content and bone mineral density utilizing whole body Dual energy X-Ray Absorptiometry scans
- Devised a research poster summarizing study and proposed it to other professors and peers

PROJECTS

Uptake and Quantification of Nanoplastics – Senior Design **September 2023 – Present**
- Designed and executed experiments to synthesize PET Nanoparticles using bottom-up approach and assessed uptake in edible plants (tomato, lettuce, radish)
- Optimized protocols for controlling size of Nanoparticles changing variables including type and concentration of surfactant and analysed data using Dynamic Light Scattering
- Exposed plants to Nanoplastics dyed with Nile red and developed protocols for plant tissue digestion to detect presence of nanoplastics using a fluorometer

Smart Intubation Device **January 2023 – May 2023**
- Constructed a removable silicon device that attaches onto laryngoscope preventing oral injuries during intubation
- Directed stakeholder interviews and executed killer experiments improving design and efficacy of device
- Collaborated with a team of 4 to develop a functional prototype reducing force exerted by laryngoscope on patients teeth

Microscope Light **January 2022 – May 2022**
- Constructed a foot pedal activated light microscope to utilize various wavelengths without needing to free hands
- Led a group of 4 and displayed it to client meeting requirements of product

Temperature Monitor – Final Project **February 2021 – April 2021**
- Built a temperature sensor by developing Arduino code alerting users when temperature is not in a specified range
- Demonstrated circuit model made from 3D modeling and Onshape to exhibit device's functions and feature

SKILLS AND INTERESTS

- **Software:** Microsoft Office, C, MATLAB, SOLIDWORKS, Onshape, Arduino
- **Laboratory Skills:** Dynamic Light Scattering, PCR, Microscopy, Nanoprecipitation
- **Languages:** English, Telugu (Native), Hindi, Spanish (Elementary)
- Soccer, Boston University Cricket Club, Chess, Travel, Volunteer (Trustee at Seva Bharat Trust)

Bernadelle Boateng

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EDUCATION

Boston University **Boston, MA**
Bachelor of Science in Biomedical Engineering Graduating: May 2024
Honors: Dean's List GPA: 3.50

PROJECTS

Detecting Toxic Substances Engineering Design Project **April 2021**
- Collaborated with a team of 3 to design and build a vaporizing device that can heat solid substances to 60 degrees celsius and guide the vapor up into the MX908 for detection

MATLAB Truss Model Design **December 2021**
- Collaborated with a team of 3 to design and build a truss capable of holding a minimum of 32 ounces of weight while meeting other cost, dimension, and material constraints guided through a computer program model
- Utilized MATLAB to analyze failure loads of various designs, predict each truss' performance, and troubleshoot

Timing of Systemic Cancer Therapy Relative to Surgery to Optimize Wound Healing **August 2021**
- Conducted a review of official prescribing information documents and compiled clinical guidelines to recommend a timeline for perioperative administration of systemic cancer therapies to minimize wound healing complications.
- Presented at Annual Biomedical Research Conference for Minority Students and awarded Presentation Award

CLINICAL AND RESEARCH EXPERIENCE

Sanofi Pharmaceuticals **Framingham, MA**
BioAnalytics Intern May 2023 – Present
- Collaborated with a supervisor to design and execute an improved cell bank for assay-ready cells, analyze data, and interpret results, enhancing cell-based potency assays efficiency.
- Conducted and managed mammalian cell culture experiments, presenting results to cross-functional teams, and contributing to technical reports and SOPs, ensuring adherence to GMP and rigorous documentation standards.

Biomedical Optical Technologies Lab at Boston University **Boston, MA**
Research Assistant September 2022 – Present
- Conducted research to propose Spatial Frequency Domain Imaging (SFDI) as a tool to efficiently and accurately diagnose and prognose scleroderma severity in a quantitative and objective manner based on optics.
- Worked on an optical phantom to replicate fiber structures and melanin to mimic skin affected by scleroderma.

Memorial Sloan Kettering Cancer Center **New York, NY**
Summer Clinical Oncology Research Intern June 2022 – September 2022
- Collaborated with Dr. Meredith Bartelstein to perform a retrospective analysis of postoperative wound complications after hip fracture surgery for patients with metastatic disease to bone being treated with Bevacizumab
- Rounded on patients' rooms for an assigned floor, shadowed various metastatic orthopedic bone disease surgeries, shadowed biweekly in clinical appointments

LEADERSHIP POSITIONS

National Society of Black Engineers **Boston, MA**
Vice President of Internal Affairs, Outreach and Community Help Chair, Freshman Representative September 2020 – Present
- Provides and executes a vision for enhancing the experience of over 50 students of color at Boston University's College of Engineering by create and plan over 30 programs resulting in a 33% increase in membership
- Created over five new partnerships with major companies such as Google, Ametek, Bloomberg, and more to sponsor events for students and assist in professional development

LABORATORY SKILLS

- mRNA extraction, Micro Pipetting, Titration, Staining Culture of Microorganisms Centrifugation, Gel Electrophoresis, PCR

RESEARCH AND COMPUTER SKILLS

MATLAB, C++, Python, Java, Arduino, Microsoft Office (Excel, Word, PowerPoint)
Engineering Design, Data Analysis, Experimental Design

Olivia Border

olibord@bu.edu | 484-500-4846 | Linkedin | Project Portfolio | Boston, MA

EDUCATION

Boston University Boston, MA
Bachelor of Science, Biomedical Engineering Expected May 2024

- Dean's List (Spring 2023)

EXPERIENCE

Quality Systems Engineering Intern May 2023 - Aug 2023
Boston Scientific Quincy, MA

- Coordinated with mentors and employees across site to remediate detection levels, controls, and verification of effectiveness on PFMEAs in response to NCEP
- Developed Adobe Sign Workflow and Template to automate daily file completion and transfer between three teams
- Reviewed and ranked two sites' yearly CAPA records to determine nominations for BSC's CAPA Quality Cup

Undergraduate Research Assistant June 2022 - May 2023
Green's Lab and STEM Pathways Research Cohort Boston, MA

- Developed in-vitro multiplexed diagnostic assays with CRISPR/Cas9
- Utilized MinION DNA sequencer and CRISPR/Cas9 to amplify and read specified regions
- Trained and provided mentorship to two other undergraduate research assistants
- Created project timeline, compiled, and presented data for UROP Student Research Award

PROJECTS

Image Processing for Quantification of Alzheimer's Disease w/ Niji Corp Oct 2023 - May 2024

- Automating quantification of microvascular tissue damage in controls and subjects with Alzheimer's disease with Python and Freesurfer
- Performing t-test and Mahalanobis distance to find trends in progression and present data

Smart Intubation Device Spring 2023

- Designed bite blocker using CAD OnShape and 3D Printing to reduce oral injuries during endotracheal intubation with team of four engineers
- Interviewed medical professionals for market research, pitched stakeholders for design feedback
- Iterated our design after conducting experiments based on design failure modes

Statistics MATLAB Project Fall 2022

- Classified images on MATLAB using averages of training data with linear and quadratic discriminant analysis algorithms; Compared error rates of misclassified images

SKILLS

Software: MATLAB, Arduino, C Programming, CAD Onshape, Python, FreeSurfer, Adobe Sign, Microsoft office, Minitab, Prism, Adobe Illustrator

Lab: Assay development, Nu-pack, SnapGene, Plate readers, RPA, IVT, Cell inoculation and transformation, Gel electrophoresis

Lab Certifications: BSL 1 and 2, Bloodborne pathogens safety, Recombinant DNA/IBC policies

LEADERSHIP & ACTIVITIES

Kappa Delta Sorority

- Appointed panhellenic recruitment counselor for 2023 and 2024, financial officer for 2022, and member of community service committee for 2022 and 2023

Massinissa Y. Bosli

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EDUCATION

Boston University, College of Engineering — Boston, MA
B.S. in Biomedical Engineering, Concentration in Machine Learning — Expected May 2024
Minor in Mechanical Engineering — GPA: 3.98/4.00
Awards: Dean's List (7/7 semesters), National Merit Scholar, UROP Research Scholar

EXPERIENCE

***Research Assistant*, Lewis Lab at MIT, Cambridge MA** — Aug 2022 – Present

- Investigated mechanisms underlying paradoxical antidepressant effects of sleep-deprivation in a subset of individuals diagnosed with major depressive disorder (MDD) using various neuroimaging techniques.
- Acquired neurological data including electroencephalography (EEG), functional magnetic resonance imaging (fMRI), and simultaneous EEG-fMRI from 50+ subjects. Collected qualitative patient data, including mood and alertness.
- Analyzed EEG timeseries of 30 MDD subjects to explore alpha power oscillations throughout the course of sleep-deprivation.
- Utilized pupillometry data as a proxy to autonomic arousal to quantify arousal of the brain in individuals with MDD while sleep-deprived and well-rested. Employed statistical analysis to explore within-subject effects.
- Prepared and delivered numerous progress reports and research presentations during lab meetings.

***Web Developer*, Dept. of Anatomy and Neurobiology at CAMED, Boston MA** — Oct 2020 – Present

- Developed and maintained a new, aesthetic, and functional department website per the specifications desired by the department director using HTML, CSS, and JavaScript. *For reference:* https://www.bumc.bu.edu/anatneuro/
- Coordinated with 20+ principal investigators to tailor individual lab sites to specific requirements. Formulated methods to enhance functionality and efficiency.
- Developed and presented research findings and resources in user-friendly formats for laboratory and public use.

***Software Team Lead*, FIRST Robotics Competition Team #6324, Salem NH** — Sep 2016 – May 2021

- Mentored and trained a team of five students in developing robot control software for autonomous and directed control.
- Coded and implemented a Proportional–Integral–Derivative controller (PID) on a RoboRIO controller for consistent and predictable movement of the robot during autonomous control.
- Coordinated efforts as well as delegated students with different coding skillsets to specific coding tasks.

PROJECTS & PUBLICATIONS

Development of a ML Model to Conduct Robust Pupil Measurements to Track Autonomic Arousal

- Engineered an offline machine learning algorithm independently to track the state of a patient's pupil during EEG-fMRI imaging using advanced image processing techniques.
- Developed a convolutional neural network in Python using TensorFlow. Involved threading and parallelization to train the network on over 30,000 images. Obtained an accuracy of 98%.
- Implemented Random Sample Consensus ellipse regression and leveraged computing power from computing cluster.

Simultaneous EEG-fMRI Compatible Earphones

- Collaborated with a team of three to design an MRI safe and EEG compatible device to deliver audio stimuli.
- Designed and fabricated several iterations of a prototype through CAD utilizing SolidWorks and 3D printing techniques.
- Measured and analyzed audio frequency response to implement equalization for improved sound quality.

Novel Ultrasound Probe Coverings

- Designed and manufactured a more intuitive ultrasound probe covering to preserve sterility during surgery.
- Conducted market research through interviews with medical professionals with relevant experience.

Williams, S.D., Yang, Z., Anakwe, S., Valdiviezo, Z., Tacugue, N., Vinal, I., Schimmelpfennig, E., Aon, M., **Bosli, M.**, Licata, J., Leonard., N., Ly, T., Ruiz, M., Fitzgerald, H., Otto, M., Lewis, L.D, "Task-related amygdala BOLD hemodynamics after acute sleep deprivation tracks major depression severity." (in progress)

AFFILIATIONS

FRC Robotics Team #6324, Alumni Mentor | Boston University Pre-Medical Society, Member | Parkland Medical Center Volunteer

SKILLS

Software: Python & the use of libs: TensorFlow, Keras, PyTorch. MATLAB for data analysis. HTML, CSS, Java, Django, SQL for web development. C/C++. Understanding of object-oriented approach. Microsoft Office.
Laboratory: Medical imaging: EEG, MRI, & EEG-fMRI. | Wet lab: Gel electrophoresis, PCR, Paper & TLC Chromatography, Titration, Distillation, Recrystallization, DNA extraction, Centrifugation, Staining, LoggerPro, Snap Gene
Electrical: Electric circuit analysis and design; KiCad; Linear and nonlinear circuit concepts; Signal analysis; Soldering
Mechanical: SolidWorks, Onshape, 3D Printing, Laser Cutting, Drilling, Milling, Material Selection

Ethan M. Bosworth
Boston, MA 02215 | (702)-843-9126 | ethanb@bu.edu | LinkedIn: ethan-bosworth-4b987729a

EDUCATION

Boston University **May 2024**
College of Engineering - *B.S in Biomedical Engineering*

- Relevant Coursework: Differential Equations, Medical Device and Diagnostic Design, Quantitative Neuroscience*, Principles of Molecular Cell Biology & Biotechnology, Signals and Controls, Fluid Mechanics, Thermodynamics, Transport Phenomena in Living Systems* (* indicates Spring 2023)

PERSONAL STATEMENT

Highly motivated and driven undergraduate senior seeking to gain more experience in the biomedical field. Extremely personable, with a strong background in leadership and communication, I am dedicated to achieving excellence and eager to make a meaningful contribution in any environment I join.

TECHNICAL SKILLS

Computer-based: Microsoft Office, MATLAB, C
Design / 3D Printing: CNC, GibbsCAM, SolidWorks
Lab: PCR, Mini-prep, Gel Electrophoresis, Restriction Enzyme Digestion, Microscopy

SOFT SKILLS

- Communication
- Leadership
- Time Management
- Emotional Intelligence
- Work Ethic
- Dependability
- Adaptability
- Resilience

EXPERIENCE

Boston University - Boston, MA **August 2023 - January 2023**
BE 403 Student Grader

- Graded student's homework and projects in Biomedical Signal Signals and Controls.
- Collaborated with fellow graders and Teaching Assistants to maintain efficient grading process.

Fellowship of Christian Athletes - Flagstaff. AZ **July 2022 & July 2023**
Camp Counselor

- Mentored a diverse group of 15-24 male middle school and high school students during week-long summer camps at Northern Arizona University.
- Collaborated globally with young adults to lead sports events and training sessions, promoting a diverse approach to leadership and teamwork for students.
- Completed comprehensive training to effectively engage and work with youth students, ensuring a safe and positive camp environment.

Navigators Collegiate - Boston, MA **December 2021 - Present**
Executive Student Leader

- Managed a $9,000 budget, ensuring financial sustainability through weekly meetings and collaboration with the President on budget allocations.
- Contributed to weekly Student Apostolic Leadership Team (S.A.L.T.) meetings and led initiatives to create an engaging on-campus space for community building.
- Provided mentorship to new students and peers, leading a weekly study for first-year students.
- Volunteered in Croatia during the summer of 2022, serving the underprivileged Roma population through a youth summer camp.

Sprouts Farmers Market - Las Vegas, NV **October 2019 - August 2020**
Courtesy Clerk

- Provided exceptional customer service by assisting various departments, including Delicatssen, Frozen Restock, and Cashiers.
- Demonstrated strong organizational skills by restocking daily inventory before store opening hours.

PROJECTS / ACTIVITIES

Senior Capstone **2023 - Present**

- Built and developed an ESS Probe to stratify melanin in the human body

Cell Counter Program **2023**

- Developed cell imaging script in MATLAB able to detect cell type and count from microscope images

SKILLS / PERSONAL ACHIEVEMENTS

Languages: Native proficiency in English and Spanish, beginner proficiency in Chinese.
Endurance Sports: Training for Ironman triathlon, completed Lake Mead Half Marathon, showcasing discipline and commitment to personal fitness goals.

MIRIAM (MIMI) BOUNAR

mbounar@bu.edu | 978-930-9710 | linkedin.com/in/miriam-bounar | Boston, MA

EDUCATION

Boston University, College of Engineering Boston, MA
Bachelor of Science, Biomedical Engineering May 2024
Dean's List | Scarlet Key Honor Society | Tri-Alpha National Honor Society.
Relevant Coursework: Biomedical Optics, Molecular Bioengineering, Signals & Controls, Thermodynamics & Statistical Mechanics, Organic Chemistry, Biomedical Measurements, Nanoscale Processes in Living System.

EXPERIENCE

BU Electrical & Computer Engineering Department Boston, MA
Lead Undergraduate Teaching Fellow Sep 2022 - Present

- Restructured lesson planning and preparation of instructional materials over span of 22 classes with professors.
- Instructed a class of 40 students in proper data collection and problem solving while supervising 7 other teaching assistants leading to a 32% increase in course grades.
- Evaluated 12 assignments with a 99.7% accuracy rate via MATLAB and provided statistical performance data.

Empatica Boston, MA
Operations Intern Aug 2023 - Dec 2023

- Analyzed returned medical device units to detect seizure trends in epileptic patients through data analysis.
- Optimized resource utilization by validating sensor functionality, repurposing components, reducing waste 10%.
- Enhanced patient experience by fostering open communication, leading to discovery of new seizure detection trends, and enabling continuous non-invasive monitoring via AI feedback channels.

AbbVie Worcester, MA
Validation Engineering Intern May 2023 - Aug 2023

- Executed over 15 decommissions of inactive assets via visual inspections and ensured disconnection of assets from documents. Updated SOPs to reflect changes while working with Quality and R&D.
- Led Cleaning Validation for Post-Validation Monitoring by developing and authoring protocols and coordinating sample collection with researchers.
- Facilitated sample testing performed by Quality to maintain repeatability of the Clean In Place.
- Collaborated with stakeholders to achieve project objectives and increased product quality by 11% by adapting protocols to adhere to proper cGMP.

BU Mechanical Engineering Department Boston, MA
Research Assistant Sep 2021 - Mar 2022

- Coded efficient MATLAB program to enhance data collection of cell culture particle movement by 32%.
- Acquired and analyzed data via single particle tracking and microscopic measurements to curate benchmark data.
- Strengthened procedural protocol alongside PhD candidates via implementation of different spectroscopy methodologies.

PROJECTS

Clear Wave Lighting System Sep 2023 - Present

- Direct strategic development of a cutting-edge Arduino-controlled circuit, engineered to power LEDs with precise 40Hz flickering, seamlessly synchronized with audio signals.
- Engineered an LED illumination system to deliver 40Hz flicker light therapy through a smartphone attachment, providing a non-invasive treatment option for Alzheimer's disease and dementia patients.

Easy Pill Dispenser Jan 2023 - May 2023

- Engineered an automated prescription dispenser for geriatric patients, optimizing medication management through a customized design, simple and dynamic assembly, and programming.
- Investigated market potential and ethics considerations and pitched project to stakeholders for investment.
- Executed holistic approach to development process from research on needs, stakeholder interviews, FMEAs, rigorous failure testing, and iterative improvements through discussion with users.

SKILLS

Computer Languages: C, C++, MATLAB, Java, Arduino, HTML, CSS, JavaScript.
Applications: OnShape CAD, MAXIMO, AttachePro, LIMS, OSI PI, GitHub, Adobe PhotoShop, Microsoft Office.
Laboratory: NanoDrop Spectrophotometer, cGMP, Gel Electrophoresis, PCR, DNA Extraction, NMR and IR Spectroscopy.

JOHN CARLSON

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EDUCATION

Boston University, College of Engineering Boston, MA
Bachelor of Science, Biomedical Engineering May 2024
Relevant Coursework: ENG BE492 Biomedical Measurements, ENG BE428 Device Diagnostics and Design ENG BE404 Modern Controls in Biomedical Engineering, ENG BE471 Quantitative Neuroscience

California State Polytechnic University, Pomona, College of Science Pomona, CA
Bachelor of Science, Biotechnology Sep 2020 - May 2021

EXPERIENCE

Brigham and Women's Hospital and Harvard Medical School Boston, MA
Radiology Research Trainee | NTEL Aug 2023 - Present

- Led a team of 3 developing precise bioprinting techniques for biomimetic replication of human dermal layer with Rete-ridge-like structures, human cells and collagen in Air-Liquid Interfaces
- Cultured primary cell lines for human fibroblasts, keratinocytes, and OVCAR3 ovarian cancer
- Analyzed focused ultrasound parameters on albumin plasma protein binding and fluorescent paclitaxel uptake in bioprinted ovarian cancer tumors using fluorescent microscopy
- Generated fluorescent intensity calibration curve procedures for detecting paclitaxel concentration inside ovarian cancer tumors after focused ultrasound

Mei Mei Dumplings South Boston, MA
Production | Farmers Market Staff Apr 2022 - Present

- Fulfilled orders at markets, manage customer sales, and increase company reputation in New England area
- Trained new employees in market expectations, food production, safe food practices, and communication skills with larger production facility and dining areas
- Reopened restaurant at new location in South Boston with 2022 James Beard Award winning leadership and staff

ACADEMIC PROJECTS

FAST-Finder | Device Diagnostics and Design Aug 2023 - Dec 2023

- Constructed a prototype portable ultrasound device in a team of 5 for EMS prediagnostic internal bleeding testing
- Interviewed leaders in EMS education and two doctors to innovate a viable prediagnostic product

Bioprinted PHVB IVD Scaffold| Biomedical Measurements Feb 2023 - May 2023

- Designed a biodegradable intervertebral disc template within a team of 5 with supplemental bioprinting practice
- Conducted bioink research on viable tissue bioprinting; established a preliminary manufacturing process

SKILLS

Laboratory | Biosafety Level 2: Primary Cell and Air-Liquid Interface Culturing, Histology, Cryosectioning, Phase Contrast Microscopy, Fluorescent Microscopy
Software: MATLAB, C/C++, Visual Studio, Arduino, Adobe Photoshop, Autodesk, Onshape, Solidworks
Hardware: CLECELL Bioprinting, SLA 3D printing, Focused Ultrasound

EXTRACURRICULARS & LEADERSHIP

Maui Strong Fund Aug 2023 - Dec 2023

- Dedicated business profits, promote charity, and spread awareness about relief funds at farmer's markets

Eagle Scout Aug 2020 - Aug 2020

- Excelled in community service, youth education, and problem-solving at Troop 201 of SVMBC Council
- Created museum display cases for the California History Center at De Anza College for the Eagle Scout Project

INTERESTS

Camping, Woodworking, Cooking, Bouldering, Computer Building

ROOP CHAKRABARTI

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EDUCATION

Boston University, College of Engineering — Boston, MA
B.S., Biomedical Engineering — May 2024

PROJECTS

40 Hz Alzheimer's Light Panel — Sep 2023 - Present

- Developing a light panel can emit 40 Hz light for user, has been shown to reduce Alzheimer's symptoms. The device was created using a custom made 3D printed PLA encasing
- Added the NeoPixel LED strip to encasing. Wired the LED strip to an independent battery source to the interior of the encasing and used Arduino IDE to display 40 Hz light
- Conducted surveys to acquire user feedback on the device, and changes continue to be made. Sent out to Alzheimer's caregivers and received over 40 responses

Pulse Oximeter — Sep 2023 - Dec 2023

- Collaborated with 2 team members to conceptualize and prototype a pulse oximeter for detecting human heart rate and Blood O2 readings
- Implemented second order filter circuits in order to remove unwanted frequencies, thus leading to collection of accurate and relevant oximetry data
- Applied 1 Red LED (625 nm) and 1 IR LED (880 nm) and 1 Photodiode to capture data, each programmed by the Arduino Nano
- Code was implemented using Arduino IDE to control LEDs and capture data. Converted data to an oxygen saturation reading and heart rate using Arduino IDE as well
- Conducted multiple trials to test accuracy of device. Custom Pulse Oximeter was within 1% of readings by other commercial pulse oximeters

Toxic Substance Heating Device — Sep 2021 - Dec 2021

- Developed a device to heat and vaporize toxic solids and liquids to 60°C to transfer to a mass spectrometer whilst maintaining a seal between device and the mass spectrometer
- Implemented measures to ensure reliability and effectiveness when transferring vaporized substances to mass spectrometer in a team of 5 engineering undergraduates

SKILLS

Programming Languages: Built up programming, documentation and debugging skills in MATLAB, C++, C, Java, and Arduino
Design Applications: Built up design and documentation skills in Onshape CAD, Autodesk, and Microsoft Office

EXPERIENCE

Oncology Shadow — Sep 2023 - Present
Mass General Hospital — Boston, MA

- Shadowed Dr. Aparna Parikh, a GI oncologist leading liquid biopsy efforts for the GI oncology group
- Analyzed how colorectal and pancreatic cancers are treated and handled, and the types of clinical trials provided
- Witnessed various diagnostic and therapeutic procedures, including endoscopies, biopsies, and minimally invasive surgeries

Surgical Oncology Shadow — Jun 2023 - Aug 2023
University Hospitals Observership — Cleveland, OH

- Shadowed Dr. Richard Hoehn, a surgical oncologist at University Hospitals in Cleveland OH. Observed patient consultations, diagnostic procedures, and treatment regimens
- Learned and developed an understanding of the process of treating a patient, and how to approach patients regarding treatment plan

AIDAN CHAN

acchan@bu.edu | 413-433-8366 | linkedin.com/in/aidanchanbu | Feeding Hills, MA

EDUCATION

Boston University, College of Engineering Boston, MA
Bachelor of Science, Biomedical Engineering Expected May 2024
Concentration in Technology Innovation

PROJECTS

Senior Design Project - GVA Setup May 2023 - Present

- Managed rapid prototyping via Onshape to create GVA setup to image 8 pipette tips at a time
- Design an image processing pipeline on PyTorch to automate colony segmentation with 90% accuracy in estimating CFU's

Blood Pressure Cuff Aid Jan 2023 - May 2023

- Led team of 4 engineers to aid motor-disabled elderly patients in measuring blood pressure
- Designed a 3D model along with several sketches and made a working prototype

Lambda Red Genome Engineering May 2022 - Aug 2022

- Performed experiments using 4 PCR templates, and QC with 4 antibiotics
- Presented results weekly to supervisor utilizing a cell imager

Drug Preservation Device Sep 2021 - Dec 2021

- Led team of 4 colleagues to design a portable device maintaining medicine at 10 C-30 C
- Built, tested, and modified over 5 prototypes to satisfy customer needs through 3D models

SKILLS

Laboratory: Bacteria culture, bacterial transformation, cell staining, gel electrophoresis, media preparation, pipetting, aseptic technique, PCR, microscopy, colony screening, spectroscopy
Technical: MATLAB, Python, SolidWorks, Onshape, Microsoft Office, ToupView, Arduino, 3D printing, Ilastik
Soft Skills: Spanish, problem-solving, innovation, time management, teamwork

EXPERIENCE

Organic Chemistry Laboratory Assistant Sep 2021 - Dec 2023
Boston University Boston, MA

- Maintained lab by cleaning equipment, prepared stations for classes
- Administered safety measures for handling biohazardous materials according to BioRAFT
- Created and updated record of all supplies to monitor inventory

Lab Technician Intern May 2022 - Aug 2022
Quintara Biosciences Cambridge, MA

- Implemented SOP to prepare plasmid DNA from customer samples into purified plasmid DNA in 1-3 weeks
- Performed DNA analysis through colony screening and sequencing 96-well plates
- Cleaned and sterilized equipment applying aseptic techniques

ACTIVITIES

Theta Tau Professional Engineering Fraternity
Boston University Club Volleyball

Christopher Chan

christopherdchan02@gmail.com | 845.729.6611 | github.com/chrisdchan | linkedin.com/in/christopher-chan-45b18b1b2

EDUCATION

Boston University, College of Arts and Science, College of Engineering **Boston MA |Expected May 2024**
B.A. in Computer Science, B.S. in Biomedical Engineering

EXPERIENCE

Beth Israel Deaconess Medical Center (BIDMC), *student researcher* **Boston MA | Jun 2021 - Present**

- Lead a two-person team and initiated a project developing a semi-supervised semantic segmentation algorithm for Glioblastoma patient MRI scans using Deep Convolutional Neural Nets
- Developed three desktop applications in C# to automate lab processes and analysis
- Analyzed over 300 metabolites found in the Cerebral Spinal Fluid of over 100 patients in R and submitted as a manuscript
- Instructed three lab members by designing a crash course for data analysis in R

Veeva Systems, *backend software engineer intern* **Boston MA | May 2023 - Aug 2023**

- Implemented two projects across two general releases, adding the ability to change ePRO responses to the MyVeeva For Patients Platform

Hack4Impact at Boston University, *full-stack developer* **Boston MA | Sep 2021 - May 2022**

- Built applications for nonprofit organizations using React, React Native, Flask, Express, MySQL, and MongoDB, collaborating with a team of 6 engineers

PROJECTS

Plan Quality Metric Processing App

- Increased productivity by 500% by creating a GUI to interpolate and generate a customizable graph of current density, electric field coverage, and specific absorption across tissue volume for lab at BIDMC
- Wrote unit tests with xUnit and implemented Model-View-ViewModel architecture in C# using WPF.NET

Tinder for Startups Website

- Developed a website that connects investors with startup companies with Next.JS and Flask winning first place in "Best Use of Microsoft Cloud" at BostonHacks Hackathon

Gantt-Chart App

- Built an app to store and track the workflow of over 20 models across 9 employees at BIDMC with C#, WPF.NET and SQLite

Dice Coefficient Calculator

- Programmed a desktop application in C# to co-register and compute the dice coefficient across stacks of large medical images to increase data analysis efficiency in a high throughput environment

SKILLS

Languages: Java, SQL, C#, Python, Go, JavaScript, MATLAB, Ocaml
Software: SpringBoot, PostgreSQL, AWS S3, Tauri, WPF.NET, Tensorflow, Git, SveleteKit, Arduino
Relevant Coursework: Distributed Systems, Deep Learning, Computational Biology, Intro to Analysis of Algorithms, Software Engineering, Computer Networks, Signals and Controls, Fundamentals of Data Science

EXTRACURRICULAR ACTIVITIES

Vice President: Men's Club Soccer
Treasurer: Tau Beta Pi

Andrew Chang

Andrewchang2020@gmail.com • (408) 334-2226 • linkedin.com/in/andrew-h-chang

EDUCATION

Boston University, College of Engineering Boston, MA
Bachelor of Science, Biomedical Engineering, GPA: 3.55 (Dean's List) Expected May 2024
Relevant Coursework: Engineering Design & Mechatronics, Electric Circuits, Probability, Statistics, and Data Science, Cell Biology and Biotechnology, Systems Physiology, Computational Linear Algebra, Signals and Controls, Thermodynamics, Biomechanics, Nanoscale Systems.

RELEVANT EXPERIENCE

Research Assistant Boston, MA
Dunlop Lab Aug 2023 - Present

- Optimized the High Throughput Geometric Viability Assay (GVA) development, reducing cell viability testing time by up to 36 times compared to traditional methods.
- Designed a CNN in PyTorch, delivering 95% accuracy in CFU detection and improving assay reliability.
- Printed and assembled a GVA setup, enabling rapid imaging of 120 pipette tips per hour for streamlined processing.
- Modeled colony distribution using a Probability Density Function, achieving 97% accuracy in CFU/ml estimates.

Research Assistant Boston, MA
High Dimensional Photonics Lab Jan 2022 - Sep 2022

- Researched phenomenon of 2-photon microscopy to create novel imaging devices allowing for less invasive scans of tissue.
- Characterized synthetic samples by passing a gaussian beam through and calculating the extinction factor.
- Polished optical fibers to observe higher order OAM modes.
- Built a controllable 3D-stage assembly for samples to be housed and moved.
- Programmed GUIs in MATLAB App Designer to control a servo motor and electro piezo stage for imaging.
- Created an aluminum servo motor assembly for a microscope through laser cutting and milling.
- Designed a set of gears in SolidWorks and fabricated through 3D printing.

Research Intern Berkeley, CA
Rosetta Institute of Biomedical Research May 2019 - Jul 2019

- Won first place in a research presentation on VEGF derived peptides and angiogenesis potential.
- Honed essential laboratory techniques, including pipetting, solution preparation, and sterile methods.
- Utilized advanced methods including flow cytometry, western blots, and qPCR for cellular and protein analysis.

LEADERSHIP

Society of Asian Scientists and Engineers, Treasurer

- Led fundraising initiatives with local businesses, raising over $15,000 for professional and cultural events.
- Coordinated with other clubs to host events reducing annual spending by 30%.

Theta Tau, Risk Management/Judicial Board

- Devised a new simplified system of managing fines 50% more efficient than the previous iteration.
- Coordinated with an elected board to lead mentoring events about professional culture.

TECHNICAL SKILLS

Laboratory: Cell and tissue culture, bacterial transformation, gel electrophoresis, media preparation, flow cytometry, pipetting.
Technical: Python, PyTorch, MATLAB, C++, SOLIDWORKS, Onshape, Google Suite, Microsoft Suite.
Languages: English, Chinese, Spanish.

Jen-Hsin Chiao

jcchiao@bu.edu | 617-838-0020 | Brookline, MA

EDUCATION

Boston University College of Engineering Expected May 2024

Bachelor of Science in Biomedical Engineering, Minor in Electrical Engineering

- 3.97 / 4.00 GPA, Dean's List all semester, Undergraduates Research Opportunities Program Student Award

Relevant Courses: Fabrication Technology for Integrated Circuits, Electronic Optical and Magnetic Properties of Materials, Physics of Semiconductor Device, Digital Signal Processing, Reinforcement Learning, Thermodynamics

EXPERIENCES

Boston University, Electrical Engineering, Semeter Lab, Undergraduate Researcher Jan 2022 - Present

- Investigated in the utility of GPS signals received by dual frequency consumer smartphones (Pixel 4 and 7) and Tremble NetR9 to study ionospheres and total electron content (TEC) for space weather
- Collaborated with MIT Haystack Observatory to obtain long term GPS, Galileo, Glonass satellite signals
- Analyzed and de-trended the obtained L1&L5 Pseudo Range and Carrier Phase signal using georinex package and constructed the corresponding TEC in Python

Novartis, Senior Design Student Researcher Sep 2023 - Present

- Developed transformer-based image autoencoder model on top of the 2021 Kaggle Challenge with Cellpose and Grad-CAM to predict protein localization in subcellular compartments for drug discovery purposes
- Inquired data argumentation, resampling techniques, redesigned loss function, and customized model to tackle class imbalance issue in multi-label image settings within Human Protein Atlas and Novartis in-house datasets

Taiwan Semiconductor Manufacturing Company Limited (TSMC), Process Integration Development Intern Jun - Aug 2023

- Examined FinFET and GAAFET underlying physics principles and manufacturing technologies in-depth, such as lithography, etching, CMP, CVD, PVD, and GIGAFAB automation
- Intensively investigated GAAFET manufacturing challenges regarding to leakage, quantum confinement, hole mobility, and wafer orientation, as well as proposing a potential solution to improve hole mobility
- Explored the experimental tuning process of advanced 3 nm CMOS technology on device performance

SEMI Taiwan, Intern in PR & Communication, Workforce Development Jun - Aug 2022

- Wrote, arranged, and dispatched press releases in SEMI Taiwan and SEMI headquarter in Milpitas, CA
- Organized in SEMI AUTO IC Master press conference with Global Automotive Advisory Committee
- Coordinated SEMICON Taiwan 2022 Student Tour, Vocational Education and Talent Development Forum, Women in Semiconductor Panel, Diversity, Equity, and Inclusion Panel, and sponsorship packages for TSMC

PROJECTS

IC Fabrication of PMOS NOR Gate on Silicon Wafer Sep - Dec 2023

- Designed lithography masks using AutoCAD and fabricated on 3" Si wafer in cleanroom by oxide deposition, photolithography, wet etching, wafer cleaning, metal deposition, wafer dicing, and packaging techniques
- Explored various fabrication technologies and properties such as types of diffusion source with rapid thermal annealing, image reversal photoresist, plasma etching, and analyzing wafer profile with Zygo

Reinforcement Learning PyTuxKart Oct - Dec 2022

- Trained the model using PyTorch to self-generate double aim points of the racetrack from image dataset via CNN and ResNet-50 to minimize race completion time (the best-performing team in class)

LEADERSHIP

- **Engineering Honor Society, Tau Beta Pi MA Eta Chapter**
- **BU ENG, EK200 Sophomore Mentor**
- **BU and U.S. Departments of State and of Education, International Education Week, Panelist**

SKILLS

Software: MATLAB, Python, C, LTSpice, AutoCAD, LabView, Arduino, Logger Pro, Lab Scribe 4, Picoscope
Laboratory: SEM, Photolithography, Wet Etch, Metal Deposition, Wafer Metrology, Oscilloscope, Manual Mill, Lathe

JAMES COLEMAN

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EDUCATION

Boston University, College of Engineering Boston, MA
Bachelor of Bioengineering and Biomedical Engineering, ENG Expected May 2024

PROJECTS

Handsaver Prototype Project Oct 2023 - Dec 2023

- Interviewed 3 clients to derive root problem in getting Carpal Tunnel Syndrome (CTS)
- Researched, designed, and constructed a working prototype for a CTS prevention device
- Presented at 3 separate design reviews to evaluate needs efficacy of project

Bioprinting IVD Scaffold Research Project Jan 2023 - May 2023

- Researched 2 potential alternatives to artificial IVD scaffolds
- Presented research in front of a board of 3 supervisors

Drug Preservation Device Project Sep 2021 - Dec 2021

- Built a portable device capable of regulating temperature and humidity to optimize drug efficacy
- Interviewed 1 client to determine device requirements for commercial use
- Presented in front of a class of 30 and 2 professors to showcase effectiveness and theory behind project

SKILLS

Computer: Arduino, ARToolkit, C#, Fusion360, MATLAB, Microsoft Office, Unity, URScript
Laboratory: Cell Staining, Centrifuging, CleCell Bioprinter, Cryosectioning, Gel Electrophoresis, Paper Chromatography, Gene Splicing, Small Animal Handling, Subculturing
Hardware: Arduino Circuitry, Rapid Prototyping, Soldering, Tapping

EXPERIENCE

Research Assistant, Radiology Sep 2023 - Present
Brigham and Women's Hospital Boston, MA

- Qualified for lab safety training in a biosafety level 2 lab
- Experimented extensively with CleCell bioprinter and Focused Ultrasound in team of 3 research trainees
- Cultured OVCAR3, Human Fibroblasts, and Human Keratinocytes for testing

Hardware Intern May 2023 - Aug 2023
Medivis New York, NY

- Prototyped over 13 unique designs for medical instrument attachments in endoscopic procedures
- Tracked medical instruments in AR workspace within Unity and the Microsoft HoloLens 2
- Coded remote AR control capabilities for a Universal Robots e-series arm using inverse kinematics

Research Intern, Biomedical Engineering Department Jun 2018 - Aug 2018
Memorial Sloan Kettering Cancer Research Center New York, NY

- Acquired proficiency with Arduino and Raspberry Pi coding
- Experienced and experimented with image processing in Octave to track organ movement over time

LEADERSHIP

Boston University Dancesport Team, President May 2023 - Present

- Creates, plans, and coordinates events for between 50 to 200 people
- Manages a selection of 7 e-board members to meet team goals

ROSE C. COVIELLO

coviello.rose@yahoo.com | 603.828.1531 | Portsmouth, NH 03801

EDUCATION

Boston University Boston, MA
Bachelor of Science, Biomedical Engineering Expected May 2024
Courses: Programming for Biomed. Eng. Data Analysis with Python | Intro .To Machine Learning

University of Washington Seattle, WA
Bachelor of Science, Undeclared Engineering Sep 2020 - Jun 2021
- UW Interdisciplinary Honors Department

Phillips Exeter Academy (PEA) Exeter, NH
High Honors/Honors throughout, 2016 - 2020 Aug 2016 - May 2020

EXPERIENCE

Han Lab, Boston University, Boston MA Aug 2019 - Jan 2020
- Assisted PhD candidate, Cara Ravasio, in conducting research on the therapeutic potential of deep brain stimulation (DBS) for neurodegenerative diseases, focusing on Alzheimer's Disease.
- Utilized single-cell imaging to analyze real-time responses to DBS in mouse models by monitoring neurological activity in the hippocampal region through calcium imaging.
- Investigated the impact of current stimulation frequencies to understand their effects on neuronal connectivity and firing rates. Employed MATLAB to extract and study calcium traces.

Molecular Genetics Course with Stan-X Project, PEA Aug 2019 - Jan 2020
- Collaborative research project with Stanford University and high schools. Published a scientific article in G3: Genes | Genomes | Genetics (htpps://academic.oup.com/g3journal/article/13/9/jk ad124/7190694).
- Utilized genomic isolation and sequencing techniques to identify insertion sites of P-elements within fruit flies through inverse and direct PCR method.

The Green Bean, New Castle, NH Jun 2018 - Aug 2021
- Held responsibilities of hostess, waitstaff, and cook, ensuring efficient opening/closing procedure.
- Trained employees under all positions held and excelled at alternating between positions to maintain exceptional customer satisfaction.

PROJECTS

Develop Guide Device with Motion Detection - Course Project Jan 2022 - May 2022
- Designed a device that illuminated a path to guide people in both large and small settings using a system of 3D-printed wireless boxes that communicated through the NRF24L01 Bluetooth module.

Brain image processing for diagnosis of Alzheimer's disease - Senior Project Oct 2023 - Present
- Acquired and analyzed MRI scans to expand upon the sensitivity of signal/image processing tool(s) in determining degree of microvascular brain tissue damage.
- Data processing entailed the use of automated segmentation software called Freesurfer, and Python, MATLAB, and UNIX/LINUX scripting for further statistical and machine learning investigations.

SKILLS/INTERESTS

Computer: MATLAB, Python, LINUX shell scripting (BASH), C ++(familiar), OnShape(beginner), Freesurfer
Lab: Mouse Handling, Single-cell fluorescent calcium imaging (proficient)
Interests: Backpacking, Reading biographies, Painting, Board/ Card games

LEADERSHIP

Women's Club Water Polo, Vice President '23, Captain '23, '24 Sep 2021 - Present
- Organized the funding and transportation of 30+ club members for local volunteer work, intermural scrimmages, and the 2023 Women's National Collegiate Club Championship @ UCLA.
- Raised $5,000+ through community and alumni outreach efforts and maintained strong communication between executive board members, ensuring deadlines were met. Awarded All-Conference, New England Division, First Team ('22) and Second Team ('23).

Ezekiel Cruz

Ecruz24@bu.edu • (203)-970-7894 • Trumbull, CT, 06611

EXPERIENCE

Boston University -Cheng Lab Boston, MA
Undergraduate Research Assistant Mar 2023 - Present

- Investigated how mutant forms of Alpha Synuclein prompt formation of aggregates within neurons and how it connects with onset of Parkinson's Disease.
- Initiated yeast cell growth and strategically inducing protein expression through application of estradiol and adapted a bespoke Mid-Infrared Photothermal Spectroscopy (MIP) system to capture precise measurements.
- Quantification of Alpha Synuclein protein secondary structures using R and subjected data to rigorous statistical analysis to discern significant differences between mutants structural aspects.
- Quantification of Lipid-Protein Interaction using MATLAB to refine spectral data using spline functions to pinpoint area and location of lipid peak, providing insights into strength and dynamics of lipid-protein interactions.
- Leveraged collaborator-provided fly brains processed through tissue clearing, minimizing light scattering and absorption from undesired tissues.
- Recognized challenge of leveraging typical tags due to bulkiness and potential alteration of biomolecular activity.
- Conducted a comprehensive analysis of DMSO MIP spectra in silent region, employing a co-propagation geometry and specific scanning parameters.
- Investigated variations in signals, identifying consistent peaks at 2100, 2225, and 2265 wavenumbers and explored impact of signal variations, specifically adjusting lock-in Gme constants and pulse widths.
- Devised LabVIEW Script to record harmonics in living neuro by adapting a template from a previous experiment, to record second through fourth harmonics.
- Recording MIP images for dynamic neuronal analysis Determined optimal signals for the IR laser to ensure a safe yet effective measurement period of 20 minutes without compromising vitality of living neurons.
- Processing MIP images for comprehensive analysis utilizing ImageJ to construct image stacks, providing a multi-dimensional view to confirm absence of morphological changes during measurement period.

SKILLS

Coding Languages: R, Labview, MatLab, Python, C, C+, C#, OriginLab: Wetlab: Cell growth techniques, incubation, induction, sterile procedures, growth medium creation.

LEADERSHIP

Boston University Triathlon Team, President May 2023 - Present

- Structured team meetings and practices for all components of training including swim, bike/spin, and running.
- Create a supportive and cohesive team by fostering open communication, providing encouragement, and continuously developing skills for each team member.

COURSEWORK

Programming for Engineers, Human Brain Mapping, Organic Chemistry I & II, Principles of Molecular Cell. Biology, Systems Physiology, Signals & Controls, Transport Phenomenon in Living Systems, Intro to Biomedical Optics, Neuro-engineering Devices, Biomedical Measurements I & II, Differential Equations, Computational Linear Algebra.

ETHAN CURTIS

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EDUCATION

Boston University, College of Engineering — Boston, MA
Bachelor of Science, Biomedical Engineering — May 2024
GPA: 3.65/4.00 (Dean's List)

EXPERIENCE

PATIENT CARE TECHNICIAN — Aug 2022 - Present
Beth Israel Medical Deaconess Center (BIDMC) — Boston, MA

- Provided vital support to nursing staff in delivering comprehensive care to patients undergoing cardiac surgery.
- Perform EKG, glucose, and bladder scan tests.
- Removed catheters and intravenous lines from postoperative patients.
- Submit vital signs, fluid intake, and daily activities through an online patient portal.

EMERGENCY MEDICAL TECHNICIAN (EMT) — Jan 2023 - May 2023
Boston University FitRec — Boston, MA

- Provided medical assistance to injured students at FitRec.
- Coordinated with local police and EMT providers to ensure patient transportation.

NEXGEN — Jun 2018 - May 2023
Construction — Sydney, ME

- Collaborated in a team of five to build modern day apartments. Assisted in concrete pours, plumbing, truss assembly, and shingle installation.
- Leveraged both arithmetic and engineering skills to design housing plans for future buildings.

PROJECTS

ImageXpress Pico Technical Review — Jan 2023 - May 2023

- Performed an in-depth analysis of a biomedical device utilized for live cell analysis.
- Prompted an inspection of literature to reverse engineer our instrument, describe main objectives, and define engineering principles for each mean.

Machine Learning Project — Sep 2022 - Dec 2022

- Designed code to filter through large data sets to determine whether a particular image represents either a dog or a cat.
- Utilized a training dataset to develop a classifier for analyzing testing datasets and assessing error rates.
- Implemented two classifiers, employing both quadratic discriminant analysis and linear discriminant analysis methodologies.

Automated Rat Trap — Jan 2021 - May 2021

- Led a team of four in developing an automated rat trap to send alerts to a user's phone upon trapping a rodent.
- The trap employs IR sensors for motion detection, activating the door closure mechanism via a servo motor. Additionally, it incorporates an IR remote for user-controlled door opening to release captured rodents.
- Developed proficiency in laser cutting, CAD design, Arduino programming, and fostering effective teamwork through hands-on experience.

Diya Sunil Desai
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Education

Boston University College of Engineering, *Bachelor of Science, Biomedical Engineering* **Expected May 2024**
GPA: 3.81, Dean's List for College of Engineering

Skills

Sterile Tissue Culture & Wet Lab	MATLAB & C	Programming For Engineers
Spectroscopy (Raman & NIR)	SIMCA	Probability, Statistics and Data Science
Optical Coherence Tomography (OCT)	Minitab	Computational Linear Algebra
Lyophilization	SolidWorks & OnShape	Signals and Controls
Assays (ELISA, GAG protein)	Phyllon OSeeT	Biomedical Measurements
Lighthouse Headspace Analysis	Electronic Lab Notebook	Engineering Design
Karl-Fischer Analysis	OPUS Spectroscopy Software	Cellular and Molecular Biology
Cell and Tissue Engineering Culture	Arduino	Thermodynamics

Work Experience

Manufacturing Intelligence PAT & Cobotics Intern: Pfizer, Peapack NJ — May 2023 – Present
- Designed newly developed OCT image evaluation strategy allowing for calculation of coated tablets and pellets that do not show visible coating layer.
- Managed OCT investigation study aiming to measure coating layer thickness for acceptable and out-of-specification batches.
- Created protocol for in-line micro-NIR for evaluating blending process step.
- Evaluated different robotics instruments such as Stokes Quadruped Robot, Boston Dynamics Spot Robot, and Universal Robot Robotic Arm for various use cases.
- Designed and implemented in-network webpages for Small Molecule and Robotics teams.
- Co-authored an article showcasing new OCT algorithm and its impact on dissolution testing at various Pfizer sites worldwide.

Manufacturing Intelligence PAT & Lyophilization Intern: Pfizer, Andover MA — May 2022 – September 2022
- Conducted a series of 10 lyophilization cycle experiments and data analysis in support of Process Analytical Technologies R&D using NIR and Lighthouse Headspace technologies.
- Assessed feasibility of select technologies in support of novel lyophilization process implementation roadmap.
- Presented study findings to 20+ divisional leads.

Office Assistant: Undergraduate Engineering Office, Boston University, Boston MA — September 2022 – Present
- Interact with 400+ currents and prospective students, and faculty to address needs.
- Responded to phone calls, answered to emails, and performed crucial operational tasks.

Laboratory Research

Undergraduate Researcher: Boston University's Growth Factor Lab, Boston MA — May 2021 – May 2022
Co-authored a research paper for presentation at a conference: *Mehrotra, D. R. et al, Raman Arthroscopy towards in-vivo monitoring of engineered cartilage growth. SPIE Photonics West. 2022.*
- Led analysis of 1000+ cartilage samples with Raman spectroscopy under Professor Albro.
- Designed and performed experiments, maintained tissue constructs, and conducted ELISA.
- Programmed in MATLAB to process multivariate spectrographic data.

Projects

Design and Fabrication of Humidity and Temperature-controlled Cell Tissue Chamber — September 2021 – November 2021
Modeled, fabricated, and completed the wiring of a portable device to maintain both humidity and temperature of cell tissues during lab experiments.

Senior Capstone: *The Influence of Healthcare Cost on Patient Decision Making* — September 2019 – May 2020
Reviewed literature, interviewed experts, and synthesized material to develop a research paper centered on betterment of healthcare industry. Presented at a conference.

Honors and Awards

Undergraduate Research Opportunity Scholar	May 2021 – May 2022
Top Ten in Women of Science MA Inter-High School Competition	December 2018

Leadership

Blood Drive Coordinator: Red Cross Boston University Branch	May 2020 – Present
Life Detection Team: Mars Rover Club	May 2020 – Present

AHONA DEV

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EDUCATION

Boston University, College of Engineering — Boston, MA
Bachelor of Science, Biomedical Engineering — Expected May 2024
- Nanotechnology Concentration, Dean's List recipient (3.6/4.0)

EXPERIENCE

Syntis Bio — Boston, MA
Nano and Data Processing Intern — May 2023 - Dec 2023
- Programmed multiple data analytical tools for image analysis, predictive models for drug distribution, data compilation, and simulating drug distribution through MATLAB
- Executed in-vivo, ex-vivo, and in-vitro experiments in team of 3 with pig tissue to assess drug formulation on target areas through Franz cell, assay-testing, and analysis of samples
- Synthesized PDA nanoparticles and experimented with composition and methodology to find best composition with completely spherical shape

Boston University — Boston, MA
Green Lab Research Assistant — Mar 2023 - Jun 2023
- Created a multiplexed flow immunoassay for lyme's detection after directing experiments testing overlap of multiple biomarkers needed and synthesized proteins for testing

Boston University — Boston, MA
Research Assistant in Natural Sounds & Neural Auditory Lab — Apr 2022 - Nov 2022
- Operated fNIRS machine to detect brain activity in participants while conducting auditory experiments
- Coded MATLAB for signal processing of collected data and studied functional brain mapping to analyze variability in neural responses to expected and unexpected auditory stimuli

Global Cardiac Monitors — Houston, TX
Biotech Manufacturing Intern — May 2022 - Aug 2022
- Designed prototype for bluetooth EKG through AutoCAD, fabricated device through assembly of multiple components, connecting through complex circuitry, and integrating feedback systems
- Programmed in C++ for signal processing, data acquisition, and data display for the EKG and implemented bluetooth by encoding bluetooth libraries and testing data reception
- Implemented database standards to improve data integrity by 30%

NASA — Houston, TX
Research Intern — May 2020 - Aug 2020
- Calibrated machinery used to study moon glass samples, and optimized written programs in order to assess metallic abundance in samples, study found abundance of titanium in samples
- Analyzed moon glass and mineral thin section utilizing electron microscope and Raman XRD for sample identification, and found an abundance of titanium in moon's rock sample
- Wrote a MATLAB program to give full elemental analysis from data collected from SEM, TEM, and other machines

PROJECTS

Cancer Immunotherapy Additive Manufacturing Platform, DRAPER — Sep 2023 - Present
- Collaborated with team of 4 to produce nanoparticle loaded chemotherapeutic drug to test drug delivery efficacy
- Passaged and shaped carcinoma spheroids, compared static and flow conditions, and used high resolution imaging program to analyze results

Drug Preservation Device, Boston University — Sep 2021 - Dec 2021
- Collaborated with 4 student to design a low-cost monitor detecting heartbeat using cascading OP AMPS, signal filtering, and speakers, and coded on C++ for data acquisition and feedback system

SKILLS

Technical: cell culturing, PCR, electrophoresis, AutoCAD, Microsoft Office tools, bluetooth integration, EKG, fNIRS, SEM, TEM, IR, NMR, signal processing, circuit design, drug formula, DLS, multiplexed assays
Languages: MATLAB, C++, Python

Prakruti Dholiya

prakruti@bu.edu ● www.linkedin.com/in/prakrutid ● Boston, MA ● 201-466-2023

Education

Boston University College of Engineering & College of Arts and Science ***Expected May 2025***

Double Major in ENG Biomedical Engineering & CAS Biology with Cell Biology, Molecular Biology, and Genetics Specialization (GPA: 3.50/4.00)

Technical and Research Experience

Biochemistry Researcher at the BU School of Medicine ***Sep 2021 - present***

- Analyzed endogenous *dot1l* gene with Auxin-Inducible Degron (AID) in colorectal cancer line (HCT-116) using CRISPR/Cas9 tagging
- Investigated various molecular mechanisms of DOT1L histone methyltransferase beyond its role of histone modification with RT-qPCR, and Western Blotting techniques
- Presented research at Yale University, and Boston University, and invited to attend Society for Immunotherapy of Cancer conference

Summer Intern at Worcester Polytechnic Institute Virtual BME Internship (VIBE ***Jun - Jul 2021***

- Designed a low-cost, solar-powered, phototherapy device to treat infant jaundice in low-resource areas in collaboration with three undergraduates
- Collected data via client interviews, collaborated on problem definition and concept selection, and presented final prototype

Business Management Intern at HAUS Realty and HAUS Design, Ridgewood N ***Sep 2019 - May 2020***

- Developed HAUS Design business with owner at real estate company, HAUS Realty (formerly HAUS Agency)
- Implemented public outreach and email campaigns with MailChimp and coordinated client-relationship management (CRM)
- Established and maintained new trade accounts and completed basic accounting tasks

Skills and Awards

Laboratory Experience | RT-qPCR, CRISPR/Cas9 genetic modification, Western Blot, PCR and Gel Electrophoresis, Transfection, Cell Culture Maintenance, Dynamic light scattering/UV-Vis Spectroscopy, FTIR analysis, Atomic Force Microscopy usage, Rotovap, NMR prep and analysis, Column Chromatography, ELISA assay, MTS cell proliferation assays, Laser Scanning Confocal Microscopy

Electron Microscopy Training | Sample prep and usage of Transmission Electron Microscope and Scanning Electron Microscope

Programming Experience | C++, MATLAB, C, Python

Native Trilingual | English, Gujarati, Hindi; Working Proficiency in Spanish

Undergraduate Research Opportunities Program (UROP) Awardee, 3x ***Fall 21, Summer 22, Fall 22***

Biochemistry research projects chosen for funding award 3x through BU UROP office

Third Place International Winner - Dartmouth Undergraduate Journal of Science ***Spring 2018***

Essay on targeting HIV using CRISPR/Cas-9 genome editing system, awarded third place internationally

Elks Most Valuable Student ***2020-2024***

Top 100 National Semifinalist Scholarship Recipient, Undergraduate Studies

Volunteer and Travel Experience

BU BUild Lab Innovation Pathway Member ***Spring 2021 - present***

- Applied and selected to the BUild Lab's Innovation Pathway for non-profit project to combat chronic homelessness in urban cities

BAPS Hindu Organization Volunteer ***2016 - present***

- Networking Lead and Sunday School Teacher (2016-2020), Active Regional Northeast Volunteer (2020-present)

Madrid BU Engineering Study Abroad Program ***Spring 2022***

- Selected to study abroad as a visiting engineering student at ICAI Madrid; Gained global understanding and cultural insights

UAE Cultural Immersion Ambassador ***May 2018***

- Served as a Cultural Immersion Program ambassador for Global Experience Program to the United Arab Emirates

Campus Organizations

BU Engineering Student Government, Class of 2024 Chair ***Sep 2021 - present***

- Planning and executing 5-10 academic, community-building, and professional events for engineering students throughout semester
- Collaborating and communicating with different chair members and other student governments regarding event planning

BU Beta Psi Omega, Eta Class ***Sep 2021 - present***

- Selected member of biology pre-professional fraternity, involved in various service-based, leadership, professional and community-building related activities and events

BU Global Engineering Brigades, PR/Outreach Chair ***Sep 2023 - present***

- Designed and implemented innovative outreach initiatives to grow organization on BU campus
- Expected to join brigade to low-resource community in Honduras to fabricate and assemble sustainable and durable clean water systems

CHRISTIAN DIMATTEO

Brookline, MA | cdima@bu.edu | (917) 562-7055

EDUCATION

Boston University | Boston, MA — Expected May 2024
Bachelor of Science in Biomedical Engineering
Concentration in Nanotechnology

COURSEWORK

Biomaterials Analysis | Cell Biophysics | Clinical Biomedical Design | Material Science | Deformation Mechanics | Biomedical Nanotechnology | Signal Analysis and Controls | Biomedical Signal Processing | Organic Chemistry

SKILLS

Tools: MATLAB | SOLIDWORKS | Chemistry Equipment | Microsoft Office | G-Suite |
Skills: Critical Thinking | Research | Polymerization Chemistry | Laboratory Experience | Biomaterial Analysis | Circuit Analysis/Assembly | Signal Processing | Technical Writing | Clinical Design | Prototyping
Social: Leadership | Management | Active Listening | Collaboration | End User Communication | English (Native) | Spanish (Basic)

RESEARCH

Polymer Synthesis | O'Shea Lab, Boston University — September 2023 – May 2024

- Iterated upon statistical random copolymers created in the O'Shea Lab, designed novel synthesis and purification procedures for diblock copolymers, and successfully synthesized target diblock copolymers with a yield of 90%
- Characterized novel copolymers, confirming improvements in control over length and polydispersity compared to previously synthesized polymers, determined by FTIR, NMR, and GPC.

Hydrogel Synthesis and Characterization | O'Shea Lab, Boston University — September 2023 – May 2024

- Synthesized supramolecular hydrogels from the diblock copolymer and free nucleosides, optimizing for maximum long-range order without causing crystallization. Confirmed and characterized results via rheology.
- Our next goal is to design in-vitro assays to analyze neuron response to synthesized hydrogels to determine properties such as hydrogel degradation and cell uptake of nutrients.

PROJECTS

Dexcom G6 CGM Adhesive | Boston University — May 2023

- Researched issues consumers face while using the product, conducted personal interviews with consumers, and identified skin irritation from the adhesive as a common complaint when using the device.
- Led a team of students to research the source of skin irritation, and propose novel solutions to alleviate irritation while retaining effectiveness.

ECG Finger Tracking | Boston University — November 2022

- Led a team of students and designed an experiment to differentiate between finger vs thumb motion before and after muscle fatigue using an ECG connected to participants' forearms.
- Directed research and read journal articles to understand the basis of experimentation and previous data.
- Conducted an experiment involving 20 participants and established significant data that demonstrated our design's ability to accurately differentiate movement between the thumb and the fingers in all scenarios tested.

Eagle Project | Boy Scouts of America — July – August 2020

- Acted as project manager to discuss client wants and needs, secure approval and funding, create a timeline, and source materials to reconstruct community compost bins totaling 256 cubic feet.
- Acted as project lead to create/analyze multiple designs and spearhead a team of 12 to deconstruct and remove the old structures, set foundations, and build new compost bins.

WORK EXPERIENCE

Stop and Shop | *Team member* — June – August 2022

- Collaborated with colleagues to optimize workflow, maintained inventory, participated in weekly meetings, and assisted customers with questions relating to products and store operations.

REINA DREYER

reinadreyer@gmail.com | 808.561.7224 | Allston, MA

EDUCATION

Boston University, College of Engineering Expected May 2024
B.S. in Biomedical Engineering; GPA: 3.79/4.00

RELEVANT COURSES

Introduction to Medical Imaging, Clinical Applications of Biomedical Design, Quantitative Neuroscience, Biomedical Signals and Controls, Fundamentals of Fluid Mechanics, Introduction to Logic Design, Organic Chemistry

SKILLS

Wet Lab: Cell Culturing, Cryosectioning, Histology, PCR, Plasmid design, Distillation, Recrystallization, Column Chromatography, Extraction, Filtration, Centrifugation
Analytical Techniques: Thin Layer Chromatography, Gas Chromatography, Infrared Spectroscopy, Nuclear Magnetic Resonance Spectroscopy, Mass Spectroscopy
Computer: MATLAB, C/C++, Verilog, Visual Studio, Arduino, Microsoft Office, Google Workspace
Language: Native in English and Japanese

RESEARCH & PROJECTS

Neuromodulation and Tissue Engineering Laboratory, Undergraduate Researcher Sep 2023 - May 2024
Brigham and Women's Hospital and Harvard Medical School

- Headed a team of 3 to optimize advanced 3D bioprinting methodologies to precisely deposit layers of cells and collagen hydrogel, creating biomimetic full-thickness skin and tumor models
- Cultured and observed 8 full-thickness skin models for 22 days, confirming model parameters of 80-100% confluent cell growth, model thickness of 1.2mm, and clear stamped rete ridge-like structures through imaging
- Applied focused ultrasound to bioprinted OVCAR3 tumor models to study its impact on albumin plasma protein binding and paclitaxel uptake through fluorescence microscopy
- Collaborated on the development and maintenance of records outlining experimental procedures, outcomes, and any observed variations, ensuring reproducibility of results and facilitating future research endeavors

3D-Bioprinted Scaffold for Intervertebral Discs Project Spring 2023

- Conducted an in-depth literature review to identify most optimal biomaterials suitable for intervertebral disc scaffolds, considering factors such as biocompatibility, mechanical properties, and degradation rates
- Presented findings to a 30 member audience and a panel, outlining the feasibility of electrospun PHBV and Bioglass composites, emphasizing structural integrity and potential for cellular integration alongside a team of 5
- Built a detailed 3D model of bioprinted scaffolds using computer-aided design (CAD) software, ensuring precision in design specifications and compatibility with bioprinting technology

MATLAB Image Analysis Project Fall 2022

- Employed MATLAB to transform and process image data in the frequency domain, implementing high-pass and low-pass filters to enhance various aspects such as blurriness, outlines, and sharpness
- Demonstrated expertise in stabilizing a 200-frame video through advanced techniques in image registration and cross-correlation in the frequency domain

Smart Rodent Trap Project Spring 2021

- Led a team of four to design and develop a portable, remote, humane, and reusable rodent trap with a focus on minimizing stress and harm to captured and released animals with a low production cost of $25
- Manufactured a prototype using CAD and an Arduino Nano with a trapping speed under 400ms

LEADERSHIP & EXTRACURRICULARS

Boston University Kendo Association, President & Member Sep 2021 - May 2024
Society of Asian Scientists and Engineers, Member Jan 2022 - Jan 2024

JOSEPHINE DUNPHY

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EDUCATION

Boston University — **Boston, MA**
Bachelor of Science in Biomedical Engineering — **Expected May 2024**
Cumulative GPA: 3.64 | Dean's List: Spring 2022, Fall 2022, Spring 2023

SKILLS

Technical: SLA 3D Printing | FDM 3D Printing | Drill Press | Oscilloscopes
Quality: Deviation | Change Control | CAPA | Quality Agreements | Batch Record Review | cGMP | GDP
Software: MATLAB | C/C++ | SOLIDWORKS | OnShape | Arduino | PreForm | Overleaf
Relevant Coursework: Programming for Engineers | Probability, Statistics and Data | Signals and Controls | Engineering Design | Human Brain Mapping | Systems Physiology | Clinical Applications of Biomedical Design

EXPERIENCE

Collegium Pharmaceutical — Boston, MA
Quality Assurance Intern — June 2023 - August 2023

- Initiated change control implementation plan for improvements to Batch Record Review and Release Procedures, including updates to streamline 2 SOPs and 6 checklist forms to improve efficiency for 5 commercial products
- Ensured a state of compliance by maintaining 3-5 quality system archives and trackers at any given time
- Collaborated on architecture of a new streamlined Approved Supplier Database, External/Internal Audit Report, and Quality Agreement Archive to ensure centralized location of information for 30-40 different suppliers

Adaptiiv Medical Technologies — Halifax, NS
Biomedical Engineering Intern — June 2022 - July 2022

- Collaborated with 5-6 research associates and software engineers on system testing for updated software versioning
- Installed and tested the Formlabs Form 3B 3D printer with BioMed Clear Resin for IC and HDR surface brachytherapy applicators, testing tunnel radius curvature accuracy using different PreForm software settings
- Executed precise research with 10 QMS documents including detailed product specification, development, commercialization, design history, risk assessment, and equipment procedure forms in a structured manner

LEADERSHIP

Boston University College of Engineering — Boston, MA
Student Advisor — September 2022 - Present

- Mentor and advisor to 15 freshmen by leading discussion-based activities, offering guidance on academic endeavors, and helping coordinate schedules with academic advisors

Lab Monitor and Teaching Assistant — September 2022 - Present

- Instruct up to 15+ students during circuits lab, diligently test and fix general equipment such as function generators, and multimeters for safety and proper use while implementing an organizational system to maintain efficiency

Gamma Phi Beta Delta Chapter — Boston, MA
President — December 2022 - Present

- Manage and provide support 6 executive board members regarding chapter engagement, involvement, and values
- Coordinate weekly chapter meetings while leading and encouraging 100+ members to be proactive with target goals
- Represent chapter authentically through recruitment, philanthropy, and International Headquarters relations

RELEVANT PROJECTS

Boston University Mars Rover Club — September 2021 - December 2022

- Engage cross-functionally between mobility and life detection team by conducting checks and balances
- Design wheel and axel utilizing CAD, conduct research on 3D printed materials, and review designs for manufacturing purposes while working with 8 other team members

Drug Preservation Device — September 2021 - December 2021

- Design, model, and build a device to preserve medication by controlling temperature and humidity fluctuations while following clients' requirements and working with 4 other team members
- Conduct 2 cohesive reports and 1 presentation utilizing sketches, Gantt charts, morph charts, and bill of materials

NOURHAN EL SHERIF

nourhane@bu.edu | (281) 908-2015 | www.linkedin.com/in/nourhan-e

Education

B.S. in Biomedical Engineering, *Minor in Computer Engineering,* **Boston University** **May 2024**

- Kilachand Honors College **GPA: 3.72 (Dean's List)**
- Engineering Study Abroad– Madrid, Spain
- Coursework: Signals & Controls, Software Engineering, Software Design, Data Structures & Algorithms, Client-Server Software Systems Design, Logic Design, Circuits, Thermodynamics, Solid Biomechanics, Clinical Biomedical Design, Bio Optics

Technical Experience

OLDP Engineering Intern, **Siemens Healthineers** **June 2023 – August 2023**

- Designed alarm system to improve efficiency of Diabetes Care Assays production line, reducing downtime by 166 hrs/yr.
- Executed testing and validation for product cartridge label vision inspection system upgrades, improving accuracy by 33%.
- Presented validation documents to the review board to secure approval for execution and implementation.
- Streamlined troubleshooting processes by mapping Photo-Eye sensors on production line using Siemens PLC and HMIs.
- Extracted 3 batch records from SQL server & analyzed control charts using MiniTab to monitor process variability.
- Installed new vision system to optimize final product package label inspection.

Research Assistant, **Boston Medical Center: Kidney Medical Engineering Program** **May 2022 – Present**

- Awarded R25-grant from the National Institute of Health (NIH) to pursue engineering research in renal disease.
- Investigated tensional homeostasis, mechanical stress, & cell contractility of endothelial and smooth muscle cells.
- Defined a new protocol for digesting, isolating, and purifying primary Vascular Smooth Muscle Cells derived from rat aorta.
- Fabricated fluorescent protein gel micropatterns using extracellular matrix proteins (fibronectin and gelatin).
- Presented at the NIDDK KUH Undergraduate Research Symposium.

Projects

Cell Tissue Chamber for Microscopy **December 2021**

- Collaborated with teammates to engineer an incubator to maintain optimal temperature and humidity conditions.
- Prototyped possible designs using technical drawings and created a CAD design of the incubator enclosure.
- Soldered circuit powered by rechargeable battery and coded the main program for the system using Arduino IDE.

C++ Software Engineering Project **December 2022**

- Developed a game using Object-Oriented Programming principles to create classes with hierarchical inheritance.
- Implemented elements from the STL library, exception handling, dynamic allocation, arrays/pointers, program organization.

Work Experience

Student Outreach Ambassador, **BU Technology Innovation Scholars Program** **September 2022 – Present**

- Mentor high school students from underserved communities through FIRST® LEGO® League & FIRST® Robotics Competition.
- Organized BUHHS: Engineering Hackathon for 100 high school students across Boston.

Teaching Assistant, **EK:125 Programming for Engineers** **September 2021 – January 2022**

- Facilitated MATLAB and C lecture, discussion, office hours, and exams.

Leadership

Vice President, Senator, **Engineering Student Government**
Vice President, **Islamic Society of Boston University**
*Peer Mentor & Ambassador***, Kilachand Honors College**
StrategyLab/ Casing Analyst, **BU Consulting Group**
Controls Team, **Mars Rover**
*Co-Founder***, North African Student Organization**

Skills

- **Programming**: C, C++, C#, HTML, CSS, Web Development, MATLAB, Python, SQL
- **Software:** CAD, MiniTab, Cognex In-Sight Vision Suite, WordPress, Microsoft Office, Google Suite
- **Lab**: Experiment planning, cell culture, primary cell isolation, tissue digestion, PCR, confocal microscopy, sterile culture, microtomy, tissue embedding, immunohistochemistry, immunofluorescence, gel electrophoresis, column chromatography
- **Languages**: English (fluent), Arabic (fluent), French (professional), Spanish (novice)

YULIANNA ESTRADA

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EDUCATION

Boston University College of Engineering, Boston, MA *May 2024*
B.S. Biomedical Engineering, Nanotechnology Concentration
Organizations: Society of Hispanic Professional Engineers, Pre-Medical Society, BU Global Medical Brigades

WORK EXPERIENCE

Advanced Materials Research Experiences of Undergraduates (REU), San Diego, CA *June 2022 – July 2022*
Undergraduate Research Student
- Synthesized PSS with block polymers of vinyltrimethoxysilane, to modify PEDOT:PSS and improve its biocompatibility on plants
- Chemically synthesized PEDOT:PSS and analyzed synthesis using a rheometer to measure viscosity, FTIR spectrum, and SEM/EDS to visualize topography and presence of sulfur
- Contributed to advancing a proposal for using conductive polymers in living systems

Summer Undergraduate Research (SURE) Program , Claremont, CA *June 2022 – July 2022*
Undergraduate Research Student
- Collected qPCR on Cpt1a, attained a 12% decrease in Th17 cells compared to undifferentiated CD4+ T cells
- Recommended chromatin immunoprecipitation, and Cpt1a knockout mouse experiments to amplify CREB sites in Cpt1a and Th17 cell differentiation. Increase in Cpt1a indicated a role in Th17 cells

COVID-19 Workforce Development in Community Response, Los Angeles, CA *June 2020 – September 2020*
Head Intern
- Administered and directed multiple groups of volunteers/workers to provide meals, produce, and other necessities to the Boyle Heights/East Los Angeles Community
- Continued collaborative efforts with organizations and partners in Boyle Heights while COVID-19 was rampant, supporting vulnerable populations: seniors, homeless, undocumented, and young families
- Exceeded daily targets by 20%, increasing the availability of meals and resources to the public

LEADERSHIP EXPERIENCE

Boston University Global Medical Brigades, Boston, MA *January 2024 – present*
Secretary
- Facilitated communication between other officers and external parties by accurately conveying information
- Lead teams in increasing club presence, meeting fundraising targets, and coordinating event logistics

PROJECTS

Teplensky Lab *September 2023 – present*
- Designed nanoscale strategies to block PD-L1 and PD-1 co-inhibitory checkpoints to prevent cancer immunosuppression
- Design and synthesized PD-1/PD-L1 targeting aptamers in unique nanostructures
- Targeted adenocarcinoma cell line to evaluate how PD-1/PD-L1 targeting could mediate T cell activation

Bio-entrepreneurship Drug Repurposing *Summer 2022*
- Researched, presented, and proposed altering current liver cancer drug (sorafenib) by adding chloroquine (CQ) increasing survival rate in patients with severe liver cancer (~1 year)
- Suggested 2 pre-clinical experiments, *in vitro* and *in vivo* animal studies, along with possible negative effects of CQ and showed proposed drug is estimated to increase drug profit by ~80% ($850 million)

Cell Tissue Chamber for Microscopy *Fall 2021*
- Developed, and composed a portable cell tissue chamber to maintain cells viable during transport in lab
- Collaborated with three other members to complete writing, molding, and presentation of final product

AWARDS

- TOYOTA/TELACU College Success Program Recipient *May 2020 - Present*
- Amplify Scholar Recipient *May 2020 – Present*
- RIMSE Exceptional Research SSELM *August 2023*

SKILLS

Technical: MATLAB | AutoCAD | Microsoft Office | NUPACK | CellInk HeartWare | Fusion360 | RP-HPLC
Language: Spanish, English

JASPER EZEKIEL

857-264-6308 | Jasper7302002@gmail.com | Boston, MA

EDUCATION

Boston University, College of Engineering Boston, MA

B.S. in Biomedical Engineering Sep 2020 - May 2024

GPA: 3.38

Concentration in Tech Innovation, Questrom School of Business: The Business of Technology Innovation| Strategy for Technology-Based firms|

Boston College High School Boston, MA

Weighted GPA: 4.19 May 2020

EXPERIENCE

Canaria Inc., *Product Management Intern,* Boston, MA / May 2023 - August 2023

- Communicate and present weekly with COO/CEO of AI-driven job search and career development platform to present findings and insights on market research, company partnerships, and company strategy.
- Perform primary research interviews and surveys with customers on their job search habits, tendencies, and preferences, interviewing over 30 customers to gain insight into the market.
- Collaborate with team of 3 other Product Management interns to develop different aspects and features of the product and platform.

Boston University Consulting Group, *Engagement Manager,* Boston, MA / May 2023 - August 2023

- Lead client-facing consulting project of 6 people developing a market entry strategy and competitive analysis strategy for client entrance into US market.
- Complete 3rd client engagement, after previously being an Associate and Senior Consultant.
- Manage the relationship with client and team, including setting scope for the project, preparing and executing workstreams, developing primary research strategy, and framing client presentations.

GymFast, *Founder***,** Boston, MA / Jan 2023 - Present

- Founder/CEO of startup delivering proprietary, data-driven consulting to small- and medium-sized gyms.
- Accepted to Innovation Pathway program with BUILD lab at BU providing mentorship, networking, coaching, and up to 5000 dollars in funding for project.
- Perform extensive primary and secondary research interviewing and polling over 100 customers, gym owners, and industry experts to find market insights and consumer preferences.

SKILLS

Technical: Arduino, SolidWorks, MATLAB, OnShape, Microsoft Office Suite, Product Design
Languages: Spanish (Fluent), Chinese (Proficient)

LEADERSHIP, AWARDS & ACTIVITIES

Boston University Consulting Group, *Director of Casing Program,* Boston, MA / Jan 2023 - Present

- Teach case interview prep-course to 70 student cohort each semester on casing basics and tips.
- Wrote 7-class curriculum for new Advanced Casing program, specializing on different case types, and an in-depth analysis of each section of the case interview.
- Hold 4 to 5 hours of Office Hours a week spending time casing and interacting with students.

- London Study Abroad and Internship Program at BU

BENJAMIN FANG

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EDUCATION

Boston University, College of Engineering Boston, MA
Bachelor of Science in Biomedical Engineering, Minor in Mechanical Engineering May 2024

- **Dean's List**
- **Relevant Coursework:** Transport Phenomenon, Fluid Mechanics, Developmental Biology, Thermodynamics, Product Design, Medical Device Design, Software Design

WORK EXPERIENCE

Bradham Lab, *Boston University* September 23 - Present
Researcher

- Learned and perfected laboratory techniques, including, PCR, qPCR, HCR-FISH, microinjections of mRNA and morpholinos into embryos, gel electrophoresis, and confocal imaging
- Assisted lab members with research projects by providing scientific insight and wet lab data
- Brainstormed and initiated independent research projects based upon exposure to previous research and scientific publications on novel discoveries in developmental biology
- Developed proficient scientific writing skills and presented research findings to relevant scientists in the field

PROJECTS

P-Bodies and DNA Expression Project June 2023 - Present

- Collaborated with lab members and worked on earlier steps of the project to establish steps going forward
- Microinjected sea urchin embryos with lSM-14A and DDX6 constructs and used confocal imaging to visualize change in PBody levels over a time course from 4-8 hpf

Cytochalasin-D and Nocotosal Project June 2023 - Present

- Researched chemotherapy drugs and their biological mechanics which disrupt cytoskeleton patterning
- Conducted dose response experiments on sea urchin embryos to establish a phenotypic dose
- Conducted a time course experiment by fixing embryos at 12, 18, 24, and 48 hpf
- Applied HCR-FISH and Immuno-Stain Protocols to visualize migration patterns of PMC cells which depend on the cytoskeleton as well as other important embryonic structures

Robotic Arm Stacker Project June 2022 - July 2022

- Brainstormed ideas based upon physical and financial constraints
- Designed a prototype in Solidworks and tested its functionality in Math Illustrations
- Built and troubleshooted the design before presenting a working prototype to an engineering audience

Drug Preservation Device Project September 2021 - December 2021

- Interviewed drug users to identify needs and researched pre-existing methods
- Designed a prototype both on paper and SOLIDWORKS that meets the needs of the target population
- Utilized a workshop facility to build and test the prototype
- Pitched the final device to both an audience of engineers and to potential stakeholders

SKILLS AND INTERESTS

- Solidworks, AutoCAD, 3d Printing, Laser Cutting, CNC machining, MATLAB, Python, C, C++, Photoshop, PCR, qPCR, Microinjection of Embryos, HCR-FISH, Gel Electrophoresis, Confocal Imaging, Semi-Fluent in Chinese, Russian, and French
- Theta Tau Professional Engineering Fraternity, Club Volleyball Captain, EBoard Christians on Campus, BU Asian Students Association

Natalia Feced Garcia

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Education

Boston University College of Engineering — **Boston, MA**
Bachelor of Science, Biomedical Engineering, Technology Innovation Concentration — Expected May 2024

Relevant Coursework

- Computational Biology, Thermodynamics and Statistical Mechanics, Device Diagnostics and Design, Biomechanics, Systems Physiology, Biomedical Signals and Controls, Biomedical Measurements, Strategy for Technology-Based Firms

Professional Experience

Boston University School of Medicine – Heaphy Lab — **Boston, MA**
Undergraduate Researcher — May 2023 – Dec 2023

- Performed spatial transcriptomic profiling on in situ prostate cancer tissues to map the tumor environment enabling the identification of specific gene expression patterns within the tumor cells as well as surrounding cells
- Conducted data-mining, cross-correlation analysis, and clustering of databases using R in order to evaluate racial disparities in gene expressions and prostate cancer outcomes
- Executed in vitro cell cultivation to explore stromal senescence in prostate cancer cells to explore their potential as a novel target for prognosis and therapy.

Airtificial — **Barcelona, Spain**
Robotic Engineering Assistant — Jun – Jul 2022

- Advised on strategies to expand company's presence in the biomedicine field, focusing on product inspection and automation.
- Presented project proposals to upper management for the development of new production lines in the Robotic and Vision department.
- Utilized Cognex cameras to program and evaluate motor parts assembly accuracy, ensuring quality control.
- Collaborated in a team of three to streamline company document templates, automating essential processes.
- Fostered strong client and supplier relations, ensuring precise production line structuring and accuracy specifications.

Projects

Stretcher-Ventilator System for Mechanotransduction Studies of Mice Tracheas

- Collaborated in a team of three to design and 3D-print a static stretcher for mouse tracheas to replicate physiological forces, enabling accurate mechanical stimulation.
- Programmed and integrated an Arduino-controlled ventilator to simulate airflow variations, enhancing the accuracy of mechanical force simulations.
- Focused on optimizing manufacturing processes to boost device profitability without compromising quality. Conducted customer and market studies, quantified the device's value, and initiated discussions with potential customers.

Refinement of H3K27me3 Histone Modification Identification using Enhanced Hidden Markov Models

- Developed a robust method for identifying histone H3K27me3 modifications within genomic sequences using Hidden Markov Models, involving the construction of a profile HMM based on known histone modifications.
- Implemented the Baum-Welch algorithm to optimize transition probabilities within the profile HMM, enhancing the model's ability to discriminate histone modifications from non-modified regions.
- Evaluated the performance of the optimized model on validation datasets, demonstrating improved accuracy in histone modification identification, with a focus on sensitivity, specificity, and accuracy metrics.

Automatic Medical Prescription Tracker

- Collaborated in a team of four to design, program, and 3D-print device that fully automates medical prescription intake and organization for geriatric individuals
- Conducted extensive market research to evaluate the potential of the product and appraise its ethics and functionality
- Presented final product and marketing pitch in front of an audience of 40, professors, and industry professionals to elicit interest in investing in the device and receive feedback

Skills

Software: MATLAB, Python, C, C++, R, Arduino. ImageJ, Visual Studio, Solidworks CAD, GitHub, Microsoft Office, Brainstorm,
Laboratory: FISH, Cell Culture, IHC, Fluorescence Microscopy, NMR Spectroscopy, ELISA, RT-PCR, Gel Electrophoresis
Languages: Spanish, English, French

Leadership and Other Experiences

New Member Educator Chair, Theta Tau Professional Engineering Fraternity — Sep – Dec 2022

- Guided and mentored new members throughout the initiation process, helping them strike a balance between fraternity requirements and academic commitments.
- Organized and led events for 60 members, fostering camaraderie and community between current and new members.
- Collaborated with a partner to budget and plan various events, including professional, community service, and team-building activities, ensuring alignment with the fraternity's mission.

RICARDO FERNANDEZ

ricardofernandez1230@gmail.com | 401-470-0790 | linkedin.com/in/ricardo--fernandez | M. | | | Providence, RI

EDUCATION

Boston University Boston, MA

Bachelor of Science, Biomedical Engineering - Concentration in Nanotechnology Expected May 2024

- Relevant Coursework: Tissue Engineering, Solid-State Biomechanics, Polymers and Soft Materials

EXPERIENCE

Lab Assistant Sep 2022 - Present

Klapperich Laboratory Boston, MA

- Led projects involving manual culturing of three-dimensional breast cancer cell models known as spheroids and decreasing variability. Work detailed in projects.
- Designed and 3D-printed a cartridge to increase lateral flow strip storage for a ESEQuant Flex Reader by 200%. Conducted preliminary work for in-house lateral flow strips. Detailed in projects.
- Troubleshooted issues with equipment including an Epilog Zing Laser Cutter and uPrint SE 3-D Printer.

Technical Lab Assistant Sep 2021 - May 2022

Precision Diagnostic Center Boston, MA

- Performed preventative maintenance on equipment including sciFLEXARRAYER S3 bio array system and coordinated with graduate students to train new users on instrumentation within core facility.

PROJECTS

Incorporation of Magnetic Nanoparticles in MCF-7 Spheroid Culturing Aug 2023 - Feb 2024

- Conducted a literature review and subsequently created a protocol employing magnetic nanoparticles and a coupled microplate and neodymium magnets system to motivate uniformity in spheroids.
- Designed microplate experiments to qualitatively examine cell uptake and measure cell viability via MTT assay. Examined spheroid morphology through analysis of confocal images with a custom macro.
- Created project timeline, trained team members on corresponding equipment and protocols, and presented findings in a weekly meeting to project advisor.

High-Throughput MCF-7 Spheroid Culturing and Analysis May 2023 - Jul 2023

- Adapted protocols for culturing MCF7 spheroids in a 96-well plate format and iterated on workflows to decrease variability within spheroid structure.
- Operated an Olympus FV3000 microscope to acquire confocal images of samples. Developed a macro in FIJI for bulk processing of images for aspect ratio and circularity to describe sample morphology.
- Shared findings at the 2023 BMES annual conference in presentation titled "Automating a Uterine Fibroid Organoid Culturing System: A Preliminary Study with MCF7 Spheroids.".

Lateral Flow Strip Production Aug 2022 - Nov 2022

- Spearheaded production of paper membrane components of lateral flow strip using materials such as glass fiber sample, conjugate, and wicking pads using laser cutting and SolidWorks.
- Performed manual spotting experiments with gold nanoparticles onto glass fiber to develop an in-house lateral flow strip. Tested success rate of capture of gold nanoparticles.

SKILLS

Wet Lab Skills: Confocal Imaging, Fluorescent Staining, 2D/3D Cell Culturing, Protein Purification
Dry Lab / Computational Skills: ImageJ/FIJI, MATLAB, 3D printing, Laser Cutting, Onshape, SolidWorks, Quartzy Inventory Management.
Personal Interests: Nanotechnology, volleyball, video games, anime.

NOELLE C. FLANAGAN

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EDUCATION

Boston University, College of Engineering Boston, MA

B.S, Biomedical Engineering with concentration in Technology Innovation Expected May 2024

- Relevant Courses: Clinical Applications of Biomedical Design, Device Diagnostics, Signals & Controls, Biomedical Measurements, Clinical Applications of Biomedical Design, Transport in Living Systems,
- Activities: Society of Women Engineers, Kappa Delta Sorority, Boston University Figure Skating Club

EXPERIENCE

Warrior Ice Arena Boston, MA

Skating Coach Jul 2020 - Present

- Obtained Learn-to-Skate USA Instructor Certification, US SafeSport Certification, and CDC HEADS UP Concussion Training for Youth Sports Coach
- Instructing skaters of various ages and abilities on fundamental figure skating and hockey maneuvers to prepare students for annual skills tests

Aurimod Gmbh Vienna, Austria

Research & Development Intern Summer 2023

- Utilized SolidWorks to design and fabricate battery and laser holders through 3D printing
- Conducted market research on biomedical stimulation devices to develop a competitive landscape portfolio to develop insights for product development

Insulet Corporation R&D Laboratory Acton, MA

Engineering Summer Intern May 2021 - Aug 2022

- Implemented process improvements and equipment upgrades for radio frequency devices deployed in clinical trials for diabetes management to improve device manufacturing by 20%
- Performed Factory Acceptance Testing and recorded oscilloscope outputs to validate machinery
- Trained in safety procedures of an FDA-compliant cleanroom and R&D laboratory

PROJECTS

Device Design and Diagnostics Jan 2023 - May 2023

- Designed and built a table-top lancing device stabilizer to increase patient independence and safety
- Collaborated with researchers, physicians, and patients to identify an unmet need and produce an ergonomic medical device using SolidWorks

Senior Design Sep 2023 - May 2024

- Created a new method for minimizing venous blood collection from dorsal vein on top of hand
- Prototyped and tested device to reduce amount of blood collected from a patient

SKILLS

- Software: Google Suites, Microsoft Office (Word, Powerpoint, Excel, Teams), Zoom
- Programming languages: Matlab, C, and JavaScript
- Computer-aided design: Onshape and Solidworks
- Interests: Athletics, Health, Design, Medical Devices

LEADERSHIP

Boston University Figure Skating Club (BUFSC), President & Team Member May 2023 - May 2024

- Elected President after gaining experience as Secretary (2022-23) and Social Media Manager (2021-22)
- Oversee E-Board, handle club membership and registration, organize team bonding events
- Accomplishments: Won the US Intercollegiate Team Final (First place, 2022 & 2023) and US Collegiate Championship Novice Ladies individual (Gold medalist 2022), awarded BUFSC Rookie of the Year 2021

Maya Frazier

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EDUCATION Boston University, College of Engineering, B.S. in Biomedical Engineering

PROJECTS September 2023 – Present

Brigham and Women's Hospital, Pulse Oximeter Redesign Boston, MA

- Implemented a portable oximeter for accurate measurement of oxygen saturation across a wide range of skin pigmentation
- Designed silicone phantoms to simulate tissue optical properties using scatterers and dyes by varying concentrations of a third dye to mimic melanin absorption
- Developed an algorithm made to account for the third wavelength calibration
- Corrected oxygen saturation values compared against elastic scattering spectroscopy from healthy subjects as a reference

January 2023

Collapsible Inhaler Spacer Boston, MA

- Facilitated clinical testing and biocompatibility measurements, while reviewing biomaterials to build, design, and 3D print deliverables on AutoCAD
- Interviewed and gathered user perspectives among sample groups to identify needs
- Increased drug delivery by over 80% and portability by over 90%

October 2021

Automated Wheelchair Headlights Boston, MA

- Prototyped a light attachment and built an enclosure to improve visibility for wheelchair users at specified beam angles with visible luminescence
- Constructed a failsafe and manual overrides, by incorporating circuitry, Arduino, breadboards, and relays

RELEVANT PROFESSIONAL EXPERIENCE

May – August 2022

Pfizer, Automation Reliability and Standards Andover, MA

- Oversaw manufacturing operations, quality control, and quality compliance to increase accuracy in automation engineering
- Examined automatic control of various systems to reduce human intervention and error
- Awarded 1000 excellence points within one month of employment

September 2019 – March 2020

Emory Healthcare, Primary Medical Engineer and Data Analyst Snellville, GA

- Documented and analyzed over 30 sets of data points and error margins to collect data on clinic systems
- Planned and conducted trials on the timing of medical equipment and created data analysis methods to time bottlenecks and stop gaps
- Developed strategies to measure clinic functionality via Gantt chart to project ideal patient and employee movement

SKILLS On Shape; AutoCAD and Inventor CAD; Tinker CAD; MATLAB; Ubuntu (C, C++); Arduino.exe; SolidWorks, Spanish (Professional Proficiency)

LEADERSHIP National Society of Black Engineers Executive Board Member; Technology Innovation Scholars Program Ambassador, Boston University Admissions Ambassador

Jeffrey H. Gao
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EDUCATION

Boston University **September 2020 - May 2024**
College of Engineering - *B.S in Biomedical Engineering*
Questrom School of Business - *Minor in Business Administration and Management*

- Relevant Coursework: Differential Equations, Medical Device and Diagnostic Design, Quantitative Neuroscience*, Principles of Molecular Cell Biology & Biotechnology, Signals and Controls, Fluid Mechanics, Thermodynamics, Transport Phenomena in Living Systems* (* indicates Spring 2024)

TECHNICAL SKILLS

Computer-based: Microsoft Office, MATLAB, C, Adobe Suite (Photoshop, After Effects)
Design / 3D Printing: Autodesk Maya, Blender, SolidWorks, Simplify3D, CNC, GibbsCAM
Lab: PCR, Mini-prep, Gel Electrophoresis, Electroporation, Western Blot, ELISA, LDH, Digestion, FACS, Mice Dissection, Hanging Drop Tissue Culture, Cell Culture, Protein Purification, Transfection, Microscopy

WORK EXPERIENCE

Outer Biosciences, Inc. - Malden, MA **July 2023 - December 2023**
Research Associate Intern

- Implemented workflow for production of specialized resin inserts with a Formlabs 3D printer, playing a critical role in maintaining vitality of human skin samples submerged in media.
- Conducted LDH assays vital to our HT model, and optimized SOP for consistent data collection.
- Performed data analysis on LDH assay results using Python-based Watershed notebooks to extract valuable insights and trends.

Boston University - Boston. MA **October 2021 - May 2023**
Late Nite Cafe Student Manager

- Assigned tasks to 20 student workers, documented shift reports, and analyzed revenue data
- Trained new employees to ensure compliance with kitchen standards and protocols
- Expedited 150-250 custom orders per night in a fast-paced environment

Antagen Pharmaceuticals - Boston, MA **Summer 2019, Winter 2022**
Lab Technician Intern

- Received lab training in molecular biology and tissue culture
- Constructed vectors for gene expression in green algae for oral medicine development
- Conducted development of COVID-19 IgG/IgM Rapid-Test Kits (Spring 2020)
- Attended to mice in a laboratory setting, performing tasks such as handling mice and collecting data

Boston University School of Medicine Evans Biomedical Research Lab - Boston, MA **Summer 2018**
Summer Intern

- Received lab training in immuno-oncology
- Grew hybridoma cells for cancer-cell targeting antibodies and conducted 3D tumor culture using hanging drop technique
- Co-authored publication: "L2pB1 Cells Contribute to Tumor Growth Inhibition" published in Frontiers in Immunology 2021 *https://www.frontiersin.org/articles/10.3389/fimmu.2021.722451/full*

PROJECTS / ACTIVITIES

Interactive Speech Therapy App **2023 - Present**

- Utilized Whisper (OpenAI) to analyze speech patterns in Unity to improve pronunciation for children with Autism Spectrum Disorder with real-time feedback

Cell Counter Program **2023**

- Developed script in MATLAB able to distinguish cell type and count from microscope images

Boston University Global Engineering Brigades, E - Board **2022 - 2023**

- Organized trips to Honduras/Guatemala to assist local communities in improving water networks

Sharon High School Engineering Club, Co-President **2019 - 2020**

- Taught introductory SolidWorks, Onshape skills to interested students, received and created classroom improvement requests from teachers

INTERESTS

Archery, Climbing, Robotics, 3D Animation, Computer Hobbyist, Stock Market/Finance, Gaming

William Gardner

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610-717-2193 | gardner4@bu.edu

Education

Boston University **Boston, Massachusetts**
Bachelor of Science in Biomedical Engineering *January 2025*

- **Relevant Coursework:** Cell Biology | Systems Physiology | Clinical Biomedical Design | Probability Statistics and Data Science | Engineered Drug Delivery | Transport Phenomena in Living Systems | Global Health | Biomedical Measurements | Thermodynamics | Business of Technology Innovation |
- National Merit Scholar and Boston University Presidential Scholarship Recipient

Projects and Skills

Senior Design Project

- Working with an advisor and ImagiRation LLC to implement a positive feedback system into their existing application to provide speech therapy support to children with autism spectrum disorder
- Creating an LSTM machine learning model within the python framework and training the model on existing children's speech datasets to test pronunciation accuracy in user input
- Export model to Unity for integration in the app and creating a feedback system to either re-prompt user input and provide feedback or congratulate and prompt next word for user

Biomedical Measurements

- Proficient with various devices for biomedical and other uses such as an ECG/EOG, spectrometer, brightfield microscope with imaging, iWorx biopotential recorder, and an oscilloscope/function generator
- Novel project demonstrating the use of the ImageXpress Pico Automated Cell Imaging System by live imaging living 3T3 fibroblast cells across a 16 hour period to observe cell death over time

MATLAB

- Introduced to MATLAB language in Spring 2020 during Intro to Programming, and subsequently used it as a primary language for coding projects and assignments in all targeted engineering courses since
- Projects and assignments completed using MATLAB include data analysis, machine learning, image processing, and data visualization

Drug Design and Delivery

- Used Stella Architect to model various standard drug delivery methods of existing drugs in the forms of pills, injections, patches, and intravenous delivery to study pharmacology and pharmacokinetics
- Created an individual project surrounding the modeling of two new delivery methods for an existing medicine Fluvoxamine; an SSRI emphasizing the treatment of OCD, social anxiety, and depression

Lab Experience

- Seven semesters of experience in various labs; including but not limited to gel electrophoresis, plasmid genomic editing, titration, chromatography, oxidation reactions, spectrophotometry, GCMS, and PCR
- Completed an experimental proposal and design for a novel physiological experiment on the effects of music on cardiovascular systems, complete with data collection and statistical analysis

Arduino

- Used the Arduino Nano hardware to wire and program the device to measure blood oxygen saturation during the COVID pandemic to learn the functionality of a standard pulse oximetry device

Other Computer Proficiency

- Microsoft Suite (Excel, Powerpoint, Word), Google Suite (Docs, Slides, Sheets)

Work Experience

Boston Valet INC **Boston, Massachusetts**
Valet Attendant and Site Manager *January 2021 – Present*

- Worked part time at multiple locations between 3-5 nights a week for over 3 years
- Assisted between 10 and 50 customers each night, often managing locations single handedly while keeping track of cars, cost, and payments
- Facilitated communication between location and valet company to ensure maintenance of relationships and confirmation of transactions

Certifications and Interests

Certifications: Laboratory Safety Training, Chemical Safety Training, Biosafety Level 1 and 2 Training
Interests: Artificial tissue and organ development, Medical Devices, Pharmacology, Gene Therapy, Snowboarding, Boxing/Weight lifting, Poker

Gary Gega

186 Kelton St. Apt. 3, Boston, MA 02134 ◆ 203-558-0778 ◆ ggega@bu.edu

Education

Bachelor of Science: Biomedical Engineering Start Date 09/2020, Expected in 05/2024
Boston University College of Engineering - Boston, MA
- Technology Innovation Concentration : GPA: 3.5/4.00
- Richard D Cohen Scholarship Recipient- Awarded to students with outstanding academic achievements.

Relevant Coursework:
Strategy for Technology-Based Firms | The Business of Technology Innovation | Device Diagnostics and Design | Clinical Applications of Biomedical Design | Biomechanics | Data Science for Engineers | Programming for Engineers

Professional Experience

Biomedical Engineering Product Lead, 09/2023 - Current
Mindful Solutions – Boston, MA
- Designing and developing a portable light therapy solution, integrating 40Hz flickering light technology into a mobile device enclosure to aid Alzheimer patients.
- Conducted comprehensive market analysis and devised product development strategies for scalable manufacturing and adoption in clinical and consumer markets.

Biomedical Engineering Intern Marketing Division, 05/2022 - 08/2022
ConMed – Largo, FL
- Utilized data analytics to interpret results from medical device benchmark tests to identify key insights and provide actionable recommendations based on data-driven findings.
- Created excel-based implant database and developed New Hire Hip Training slide decks, which enhanced internal data management and streamlined onboarding processes.

Project Manager, 05/2023 - 09/2023
FK Masonry – Cheshire, CT
- Implemented data-driven strategies contributing to a 20% reduction in overall project expenses resulting in approximately $200,000 in annual savings for FK Masonry.
- Accelerated project cycles by 30% through streamlined processes and efficient resource allocation.

Founder of NGO, 09/2021 - Current
Partners Of World Health Boston University Chapter – Boston, MA
- Led and collaborated with the board of directors and senior executives to drive strategic business initiatives and ensure effective organizational management.
- Executed a series of impactful fundraising events leading to a significant surge in financial resources.

Casing Analyst, 02/2023 - 06/2023
Boston University Consulting Group – Boston, MA
- Applied knowledge of data modeling and statistical analysis to note trends and draw conclusions.
- Performed system analysis, documentation, testing, implementation and user support for platform transitions.

Projects

Cell Incubator | 01/2022 - 05/2022
- Engineered a self sustaining cell incubator to aid researchers in maintaining optimal cell conditions such as humidity and temperature while transferring cells to a microscope.

Machine Learning: Benign vs. Malignant Mammogram Classification | 09/2022 - 12/2022
- Performed extensive data preprocessing and advanced analysis on a comprehensive dataset of mammogram images to create a mammogram classifier.

Skills

Software: Excel, C/C++, Matlab, Python, Solidworks, Word, Powerpoint

Language: English & Albanian

VICTORIA GONZALEZ-CANALLE

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EDUCATION

Boston University College of Engineering
B.S. in Biomedical Engineering, Concentration in Machine Learning **Expected May 2024**
Boston University Study Abroad, Universidad Pontificia Comillas | Madrid, Spain Spring 2022

RELEVANT EXPERIENCE

The Tearney Laboratory, **Massachusetts General Hospital |** Research Assistant Boston, MA **|** Jun 2019 - May 2023
Cystic Fibrosis - Nasal Potential Difference Probe Project

- Manufactured 10+ Nasal Potential Difference and Intra-Nasal Introduction Tube probes for clinical study use.
- Standardized manufacturing processes by creating SOPs, fabrication forms, and FMEA documents for probes.
- Engineered product design documentation through SolidWorks to set manufacturing blueprint (SolidWorks).

Pancreatic Cancer Screening Capsule Project

- Spearheaded machine learning algorithm implementation to detect ampulla of Vater in-vivo (MATLAB, Python).
- Led development of optical fluid collection mechanism for early pancreatic cancer detection (micro-OCT).
- Authored prototyping and animal testing procedures of pancreatic fluid collection mechanism.
- Awarded 2019 Yao Su Student Research Prize; First ever non-college student to receive research recognition.

Pfizer | Clinical Trial Data Sharing Intern Groton, CT | Jun 2022 - Sep 2022

- Accelerated build-out of pioneering project to return clinical trial data to patients.
- Drove updated design of clinical trial patient pre-launch data visualization strategies (R, LaTeX, PDF).
- Collaborated with team members to build effective solutions to data visualization complications.
- Led team meetings for project, establishing agenda and updating team members on updates and deadlines.

Foundation Medicine | Clinical Bioinformatics Internship Cambridge, MA | Jun 2021 - Aug 2021

- Conducted analysis of pancreatic cancer genes to discern correlations between tumor grade and gene modules.
- Recognized potentially actionable targets in insulin secretion and regulation markers (WGCNA, cbioportal).
- Identified amplifications and losses in certain chromosomes of 37 wild-type gastrointestinal tumor cases.
- Created visual repository of FDA-approved drug information (disease ontology, genetic target, clinical trials).
- Constructed new website incorporating information and process-analysis of internal lab procedures.
- Quantified number of affected samples of mismatched DNA and RNA for smoother workflow and pipeline.

OTHER EXPERIENCE

medikana | Business Development Associate Cambridge, MA **|** Jun 2023 - Present

- Selected as part of start up for MIT delta v accelerator 2023 Cohort.
- Lead PMR (Product Market Research) initiatives and drive customer acquisition strategies.
- Steer service pilots and oversee development of Concierge MVP (Minimum Viable Product).
- Develop and refine business model and pricing framework to align with competitive landscape and market.
- Drive marketing and communication efforts to enhance brand visibility and convey value proposition audience.
- Establish and manage client relationships, signing up 20+ medical device distributors to medikana platform.

SKILLS

Languages: English (fluent), Spanish (fluent), French (conversational).
Software/Design/Tools: R, Python, MATLAB, SQL, C, Java, SolidWorks, STELLA Architect, Arduino IDE, Arduino boards, 3D Printers, Mills, Lathes, Optical Polishers, CNC machines.

PROJECTS

INNOVATIVE STRATEGIES IN VENOUS BLOOD COLLECTION Boston, MA **|** Sep 2023 - Present
Coalesenz Inc. | BE465 & BE466 Biomedical Engineering Senior Design Project
Develop minimally invasive system for collecting small volumes of venous blood for coagulation tests.

- Design and assemble minimally invasive top-of-hand venous blood collection system.

BELOW THE BELT Cambridge, MA | Aug 2022 - Sep 2022
Film Screening and Panel, MIT
A film event and panel focusing on endometriosis care challenges and healthcare system advocacy.

YOUSSEF HAIDER

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EDUCATION

B.S. Biomedical Engineering
Pre-Medical Track
Boston University, Boston, MA
05/24

GPA: 3.73/4.0
Dean's list (four semesters)
Pre-Medical Society • Student Government • BU Egyptian Club

H.S. Diploma
GCE Curriculum
Sharjah English School, Sharjah, UAE
05/20

GPA: 4.0/4.0
Sports Leader • JV Swim Captain • Student Council

RELEVANT COURSEWORK

Programming for Engineering | Engineering Design | Computational Linear Algebra | Hands-On Engineering | Biomedical Measurements | Biomedical Signals and Controls | Engineering Mechanics | Electric Circuits | Probability, Statistics, and Data Science | Cell Biology and Biotechnology | Biomaterial Science | Thermodynamics and Statistical Mechanics | Device Diagnostics and Design | Organic Chemistry | Psychology | Sociology

WORK EXPERIENCE

Beth-Israel Lahey Health Urgent Care, Quincy
Medical Shadowing, Quincy, MA
05/22 – 07/22

- Shadowed Dr. El Tomi at BILH – Quincy specializing in primary care seeing between 10-15 patients per day
- Observed various medical check-up techniques ranging from face-to-face interactions to telemedicine to therapeutic group meetings, exploring various components of medical histories and software used for recording (athenaHealth)
- Researched encountered conditions, clarifying misconceptions with Dr. El Tomi, and applying findings to understand incoming patients with similar diagnoses

Department of Pharmaceutics & Pharmaceutical Technologies, College of Pharmacy, University of Sharjah
Research Assistant, Sharjah, UAE
06/19 – Present

- Formulated colloidal systems composed of anticancer drug-carrying nanoparticle solution and operated a Malvern Zetasizer to measure size and polydispersity of systems
- Facilitated data collection through MATLAB's curve fitting toolbox to determine best model for measuring colloidal systems' drug-release kinetics
- Developed healthy and cancerous cell cultures for administering colloidal systems to investigate efficacy and safety of drug delivery through nanoparticles with MTT assays

Mugar Memorial Library, Boston University
Student Security Supervisor, Boston, MA
01/21 – Present

- Selected out of 50 candidates as leading student supervisor at Mugar Memorial Library
- Overseeing student entry into BU's largest undergraduate library, ensuring each person is compliant with COVID-19 guidelines
- Hosted three training sessions, teaching a total of 11 student employees about protocols and policies of Mugar security
- Touring other facilities on campus (Howard Thurman Center & George Sherman Union), reporting any prohibited activities

PROJECTS

Engineering Design: Mass Spectrometer Attachment, 10/21 – 12/21

- Prototyped an attachable device for gas spectrometers for vaporizing samples before analysis
- Optimized circuitry to ensure device heated samples safely, alerting users of dangerous temperatures within <2% error
- Developed Arduino code to convert analog inputs (temperature) into digital information for user's convenience

Programming for Engineers (MATLAB): "Predicting the Spread of COVID-19 in the USA", 11/20 – 12/20

- Extracted and analyzed datasets from the USGS database (city population size) and the COVID-19 Data Repository (USA)
- Plotted data to emphasize lethality of different viral strains across states, calling for emergency resources in certain states
- Utilized the Machine-Learning Toolbox to predict COVID-19's spread over a five-year period

Hands-On Engineering: Drug Storage Device, 03/20 – 05/20

- Designed and 3D-print an enclosure for an incubating device primarily used for drug storage through Onshape
- Built a circuit within for measuring internal temperature with a buzzer alerting users of any fluctuations

EXTRACURRICULARS

***Secretary*, Boston University Egyptian Club,** 08/23 – Present
***Co-founder,* North African Student Organization,** 08/23 – Present
***Student Advisor*, Boston University Engineering Department,** 08/23 – Present
***Director of Data Analytics*, Expect More Committee, Boston University Student Government,** 08/22 – 05/23
***Chair*, Boston University's Model United Nations, Boston University International Affairs Association,** 08/21 – 05/23
***Volunteer*, Student Program, Boston Big Brothers and Sisters of Eastern Massachusetts (BBBS),** 08/22 – Present

SKILLS

Technical: MATLAB, C, Google Suite, Microsoft Office, Adobe Creative Cloud
Laboratory: Cell/Tissue Culture, PCR, ELISA, Gel Electrophoresis
Engineering: Arduino, CAD, Electronics, Mechanical Drawings
Personal: Communication, Collaboration, Organization, Group Leadership

INTERESTS

Video Editing
Stand-Up
Volunteering
Travel

LANGUAGES

Arabic: Fluent
French: Conversational

Veronica W. Hui

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EDUCATION

Boston University College of Engineering | Boston, MA — Expected May 2024
Bachelors of Science in Biomedical Engineering — GPA: 3.97/4.00

- **Awards:** Dean Elsbeth Melville Scholarship, Scarlet Key Honors Society, Provost's Scholars Award, Tau Beta Pi Engineering Honors Society, Dean's List, DoD STEM Pathways Research Scholar, UROP Research Scholar

EXPERIENCE

Chen Lab - Tissue Microfabrication Lab | *Undergraduate Researcher* | Boston, MA — Feb 2021 - Present

- Investigated role of PI3K signaling on migration, morphology, and epithelial to mesenchymal (EMT) behavior of breast cancer mutations using 2D morphological assays and 3D engineered *in vitro* microfluidic devices.
- Quantified PI3K signaling dynamics using an engineered optogenetic cell line by manipulating LED duration and intensity to stimulate and phenocopy breast cancer mutant behaviors in non-cancerous cells.
- Fabricated iPSC-derived alveolar lung-on-a-chip microfluidic device to study paracrine crosstalk.

Medtronic | *R&D Engineering Intern* | Santa Rosa, CA — Jun - Aug 2023

- Designed and manufactured fixtures to evaluate effects of manufacturing defects on performance of a delivery catheter system for a transcatheter mitral valve replacement. Created database of catheter defects.
- Displayed and communicated data using MATLAB, ImageJ, and Minitab to validate previous Finite Element Analysis (FEA) and recommend catheter build criteria to project team and senior leadership.

Moderna | *Infectious Diseases Research Co-Op* | Cambridge, MA — Jan - Jun 2023

- Developed early-stage flow cytometry-based bacterial agglutination assay to test antibody functional response and specificity. Characterized bacterial and mammalian cell lines via antigen expression.
- Optimized flow-based opsonophagocytic assay with microspheres and differentiated macrophages to evaluate complement-mediated immune response to various bacterial vaccines.

Gilead Sciences | *Discovery Sciences & Technologies Intern* | Foster City, CA — May - Aug 2022

- Developed and optimized immunoassays using an automated Opera Phenix confocal imaging system to screen for lead molecules. Studied colocalization, internalization, and functional response of drugs.
- Mastered high-throughput screening using lab automation including liquid handlers and plate stackers.

PROJECTS

Engineering Functional Recovery of Hyperproliferative Hepatocytes for Implantable Liver Grafts

- Modulating Yes-associated protein (YAP) and Hepatocyte Nuclear Factor 4 alpha (HNF4a) signaling response to control functional phenotype of hepatocytes using a synthetic biology toolkit.
- Characterized protein kinetics and functional recovery using western blots, ELISA, and functional assays.

PUBLICATIONS & PRESENTATIONS

Gagnon KA, **Hui VW**, Koh E, Khalil AS, Chen CS, "Mutation-specific alterations in PI3K dynamics underscore behavioral differences in breast cancer progression." (in preparation)

Gagnon KA, Huang J, Hix O, **Hui VW**, Hinds A, Bullitt E, Eyckmans J, Kotton DN, Chen CS, "Multicompartment duct platform to study epithelial-endothelial crosstalk associated with lung adenocarcinoma." APL Bioengineering.

Hui VW, Gagnon KA, Chen CS, "Exploring the role of Akt isoforms on the morphologic and migratory behavior of breast cancer mutants." UROP University-wide Research Symposium; Oct 2021, Boston, MA (poster/oral presentation)

LEADERSHIP & AFFILIATIONS

BU College of Engineering | Dean's Host / Engineering Ambassador / TISP Ambassador / EK200 Student Coordinator
BU Office of the Provost | 2024 Provost's Faculty Teaching Awards Committee Member
BU Undergraduate Chemistry Association (Chemia) | Treasurer / Chemistry Tutor / Peer Mentor
FIRST Robotics Team FRC 246 | FRC Technical Mentor / 2024 Woodie Flowers Finalist Award Nominee
Massachusetts Eye and Ear Infirmary | Post-Anesthesia Care Unit, Surgery Center Volunteer
STEM Pathways | Synthetic Biology Outreach Member / SynBio Shark Tank Competition Mentor

SKILLS

Laboratory: 3D Microfluidic Devices, Assay Development, Bacteria & Mammalian Cell Culture, DNA/RNA Extraction, ELISA (Luminex/MSD), Flow Cytometry, Gel Electrophoresis, Gibson Assembly, Image Analysis (FIJI/ImageJ, CellProfiler, Imaris), Liquid Handlers, Microscopy, PCR/RT-qPCR, Western Blot
Software: Autodesk Inventor, Benchling, FlowJo, GraphPad Prism, MATLAB, Minitab, NUPACK, SOLIDWORKS
Mechanical: 3D Printing, CNC Machining, Laser Cutting, Laser Welding, Lathe, Mill, Metallography, Tensile Testing

Sungmin Hwang

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EDUCATION

Boston University College of Engineering Boston, MA

Bachelor of Science in Biomedical Engineering Expected May 2024

GPA: 3.69/4.00 – Dean's List (four semesters)

Relevant Coursework: Device and Diagnostic Design | Nanometer Processes in Living Systems | Engineering Design | Biomedical Signals and Controls | Probability, Stats, and Data Science | Cell Biology and Biotechnology

WORK EXPERIENCE

Innovation and Engineering Operations Intern, L'Oréal June 2023 - August 2023

- Created warehouse zone maps for senior engineers and mechanics so work orders could be completed efficiently and match the pace at which new ones were being submitted.
- Researched and designed proper workflow of managing safety validations for operations team with newly introduced KPA software.
- Identified shortcomings of neighboring warehouse to suggest future projects that could be done to improve employee working environment.

Research Intern, Gordon Center for Medical Imaging/MGH and Harvard July 2022 – August 2023

- Designed graphical user interfaces (GUI) on MATLAB App Designer to model and visualize the variability of various patients' tongue motion during speech.
- Developed MATLAB code to perform singular value decomposition (SVD) and principal component analysis (PCA) on patient data for dimensionality reduction before producing 3D plots.

IT Support Specialist, Boston University IS&T Help Center September 2022 - Present

- Respond to requests for technical assistance in person, via email or phone and document problems.
- Investigate and resolve issues with classroom technology, including projectors and network infrastructure, to maintain effective classroom environment.

PROJECTS

Senior Design: Development of High Throughput Geometric Viability Assay September 2023 - Present

- Contributed to development of High Throughput Geometric Viability Assay (GVA), reducing cell viability testing time by up to 36x compared to traditional methods.
- Programmed a CNN in PyTorch, delivering 95% accuracy in CFU detection and improving assay reliability

Engineering Design Project: Flood Detection Monitor October - December 2021

- Prototyped and optimized flood detection monitor to detect humidity, temperature, and water level of basement and immediately alert user if dangerous conditions were detected with < 3% error.
- Collaborated with team of four to develop Arduino code to produce readable output from distance and temperature/humidity sensors.

SKILLS

Laboratory: Cell and tissue culture, bacterial transformation, cell staining, gel electrophoresis, media preparation, pipetting, aseptic technique, PCR

Technical: MATLAB, C, Python, Google Suite, Microsoft Suite

Languages: Korean, Spanish

LEADERSHIP & ACTIVITIES

President, Korean Student Association May 2023 - Present

Fundraising Chair, Society of Asian Scientists and Engineers September 2022 - May 2023

Public Relations/Marketing Chair, Korean Students Association May 2021 - January 2022

Anika Joglekar

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EDUCATION

Boston University College of Engineering
Bachelor of Science, Major: Biomedical Engineering **Expected August 2024**

- Coursework: Biomedical Measurements, Signals and Control, Probability Statistics and Data Science for Engineers, Molecular Cell Biology & Biotechnology, Sociology of Healthcare

WORK EXPERIENCE

Intern, K2B Therapeutics https://www.linkedin.com/company/k2b-therapeutics Summer 2023

- Produced data using laboratory techniques, including: qPCR assays, cell maintenance and passaging, and running gel electrophoresis, for Protein-siRNA conjugate development
- Communicated at weekly meetings, through biweekly written reports
- Produced tables and graphs for all experiments run, enabling lab members to adapt future experiment designs

Research Assistant, Joyce Wong Lab https://people.bu.edu/wonglab/ September 2022

- Conducted literature reviews and information compilations regarding previous uterine mechanical research
- Undertook weekly experimental design and laboratory work, such as cell culturing (i.e. changing growth media and passaging) and microscopy

Intern, Bola AI https://www.bola.ai June 2022

- Engaged with Voice/AI assisted biomedical to organize and solve bugs reported by dentists and to improve workflow, liaised between customer success and engineering teams, and assisted both
- Transferred entire data log of company from Salesforce to the new platform, designed and optimized a new workflow, and trained employees on its use
- Organized and solved bugs, interfaced directly with customers, and liaised between customer success and engineering teams

Intern, Radiation Monitoring Devices, Inc. https://www.rmdinc.com/ August 2019

- Conducted laboratory and organizational work on radiation sensing devices

Volunteer, Perkins School for the Blind, Watertown, MA Fall 2018

- Volunteered weekly with children in a maker space to help with design activities

SKILLS

- Programming/Platforms: Python and MATLAB proficiency
- Fresh Desk proficiency
- Salesforce Associate status
- Pharmaceutical Skills: **ISPE GMP Fundamentals** Course

LEADERSHIP & ACTIVITIES

- Student Member, ISPE (**International Society for Pharmaceutical Engineering**), #1106854
- New England Chapter of Our Climate - Field Advisor / Volunteer
- BU Student Government - DEI IMPACT Committee
- BU Comedy Club Treasurer
- BU Biomedical Engineering Society

Emre Karabay

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Boston, Massachusetts

EDUCATION

Boston University, Boston, Massachusetts — Expected May 2024
B.S. in Biomedical Engineering
Relevant Coursework:
- Intro to Programming for Engineers | Computational Linear Algebra | Intro to Engineering | Physics | Multivariable Calculus

Robert College High School, Istanbul, Turkey — Sep 2016 - Jun 2020
Relevant Coursework:
- Electronics and Circuits | Human Diseases | AP Statistics

EXPERIENCE

Biomedical Devices Research Assistant, Boston University, Massachusetts — Sep 2020 - Present
- Research affordable biomolecule sample spotting on microarray chips using readily available robotics.
- Develop a user interface using python and the PyQt5 library.
- Test the repeatability of spotting experiments.
- Assess possible calibration methods.

Biomedical Devices Research Assistant, Bogazici University, Istanbul, Turkey — Dec 2018 - Mar 2019
- Conducted extensive research in use and development of Shape Memory Alloy actuators in minimally invasive operational devices.
- Created prototype Shape Memory Alloy actuated catheters.

Volunteer Tutor at Community Involvement Project, Robert College High School, Istanbul, Turkey — Aug 2018 - Sep 2018
- Lead a simplified conceptual physics tutoring schedule for children, 6 to 12 year olds, as a part of the high school outreach program.

Engineering Innovation Program Participant, Johns Hopkins University, Baltimore, Maryland — Jul 2018 - Aug 2018
- Attended summer courses for Materials Science and Engineering, Statics and Structures.
- Designed a spaghetti bridge based on skills acquired in summer courses.

SKILLS

- **Computer:** MATLAB, Python (Pillow, Tesseract, OpenCV, Pygame) , SOLIDWORKS, Onshape, Ultimaker Cura, Autodesk Fusion 360, Microsoft Office Suite, Google Suite
- **Laboratory:** Scientific Reading, Micropipetting, Titration, Data Analysis, Microscopy, Lab Report
- **Language:** English, Turkish
- **Math:** Statistical Analysis, Linear Algebra, Multivariable Calculus
- **Emergency:** Emergency First Response Certification, CPR Certification

PROJECTS

- Noise Filter Guitar pedal utilising high pass and low pass filter circuits.
- Face detection, search and contact sheet output in digitally scanned newspaper pages using OpenCV, Pillow and Tesseract python libraries.

ANNA K. KAWAI GAONA

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EDUCATION

Boston University, College of Engineering — Boston, MA
Bachelor of Science, Biomedical Engineering — Expected Dec 2024
Dean's List Fall 2022, Spring 2023, Fall 2023

Anoka-Ramsey Community College — Coon Rapids, MN
Associate of Science, Engineering — May 2022 - May 2022
Relevant Coursework: Molecular and Cellular Biology, Fundamentals of Computer Science (Python), Statistics and Data Science (MATLAB), Signals and Controls, Heat and Mass Transfer in Living Systems

INTERNSHIP EXPERIENCE

IFReC, Osaka University — Japan
Computational Biology Internship — Jun 2023 - Jul 2023

- Investigated T-cell developmental pathways in thymus of mice.
- Preprocessed, integrated, and analyzed single-cell transcriptomics and proteomics datasets with Python tools including Pandas, Scanpy, scVI, and muon, for multi-omics analysis.
- Applied deep learning models, neural networks, dimensionality reduction, and clustering to identify differential gene/protein expression.

PROFESSIONAL EXPERIENCE

BOAS Lab, Boston University — Boston, MA
Undergraduate Intern — Sep 2022 - Present

- Preparing experiments and SOPs for functional near-infrared spectroscopy (fNIRS) and electroencephalogram (EEG) neuroscience studies, and analyzing data using MATLAB.

Anoka-Ramsey Community College — Coon Rapids, MN
Laboratory Assistant — Nov 2021 - May 2022

- Prepared and cleaned experiments and demonstrations in compliance with chemical hygiene plan.
- Documented and carried out quality control and chemical inventory inspections.

PROJECTS

Senior Design Project: High-Frequency and -Intensity TENS — Sep 2023 - May 2024

- Engineered circuit using KiCAD for transcutaneous nerve stimulation treatment with a 1kHz and 140 Vp-p output signal to achieve analgesic effects for pain management.
- Ideated procedure and assessed skin impedance and effects of different frequencies on *ex vivo* model.
- Designed Solidworks model for adjustable finger clamp to fit electrodes and anesthetize digital nerve.
- Designed and simulated skin impedance circuit model using LTSpice to identify optimal frequency.

Acid-Base Treatment of Mycelium Biomaterials — Jan 2022 - May 2022

- Led sustainability project entailing chemical modification of mycelium to attain properties analogous to petroleum-based super absorbent polymers.

SKILLS

Software: Python, MATLAB, Microsoft Office, CAD, Arduino, Jupyter Notebooks, Linux, GPU environments
Laboratory: qPCR, gel electrophoresis, CRISPR, cell culturing, automated digital microscopy
Communication: Member of Toastmasters International (public-speaking club)
Languages: Spanish (Fluent) and Japanese (Basic)

LEADERSHIP

Phi Theta Kappa Honor Society, Vice President of Scholarship & Chapter Leader (Sep 2021 - May 2022)
Society of Women Engineers (SWE), Member (Sep 2023 - Present)
Biomedical Engineering Society, Member (Jan 2023 - Present)

MADELYN KELLER

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EDUCATION

Boston University, College of Engineering — Boston, MA
Bachelor of Science in Biomedical Engineering — Expected May 2024
GPA: 3.77/4.00, Dean's List

RELEVANT COURSEWORK:

Engineering Design | Circuits | Biomaterials | Systems Physiology | Fluid Mechanics | Thermodynamics | Solid Mechanics | Cell Biotechnology | Signals & Controls

EXPERIENCE:

BU Connizzo Tendon Mechanobiology Laboratory — Boston, MA
Undergrad Researcher — Sep 2021 – May 2024

- Developed experimental designs from research gaps and executed experiments including tissue and cell culture to induce senescence in murine tendon explants from treated cells
- Performed biochemistry assays on human keloid cell lines in response to drug treatments
- Trained new undergraduate students on completing assays and other laboratory techniques
- Produced and analyzed data and images using MATLAB and ImageJ for two publications in progress
- Wrote four grant applications and received funding from Undergraduate Research Opportunities Program and Distinguished Scholars Research Fellowship

PROJECTS:

Novartis Senior Design Capstone Project — Sep 2023 – May 2024

- Managed a team of three through research process including establishing goals, hitting deadlines, and running meetings
- Collaborating with Novartis to create project on computational protein prediction assessment
- Utilizing Python packages to interpret public datasets and program machine learning modules

Improved Mobility Nebulizer — Jan - May 2023

- Conducted interviews with shareholders to determine mobility-based issues about nebulizer device for target population of elderly COPD patients
- Worked in group of four to SLA 3D print prototypes and assessed functionality and presented findings to class and professors

Rainwater Catchment System — Feb - Dec 2021

- Researched local community in Kenya to address water shortages and local materials options as member of Engineers Without Borders BU chapter
- Examined various potential rainwater catchment systems based on target location and sustainability

Additional Projects: Portable Cell Incubator, Sanitation systems, MATLAB Machine Learning, Truss Design Project, Cellink 3D Bioprinter Technical Review

SKILLS:

Computer: MATLAB, C, Python, Machine Learning, CAD (Onshape), Arduino, Data Processing, ImageJ, GraphPad
Laboratory: Mammalian cell and tissue culture, qPCR, Radioisotopic labeling, Immunocytochemistry, fluorescence microscopy imaging

PUBLICATIONS/CONFERENCES:

Stowe, E. J., Keller, M. R., & Connizzo, B. K. (2023). Cellular Senescence Impairs Tendon Extracellular Matrix Remodeling in Response to Mechanical Unloading. BioRxiv. https://doi.org/10.1101/2023.12.22.572594
Keller, M. R., Stowe, E. J., & Connizzo, B. K. (2023). Comparing senescence induction methods in primary murine tenocytes. Biomedical Engineering Society Annual Meeting; 2023 Oct. 11-14, Seattle, WA.

HyoJoo Kim (Claire)

clhjkim@bu.edu • (857) 423-4036 • linkedin.com/in/clairehjkim • Boston, MA 02215

EDUCATION

Boston University, **Boston, MA** May 2024
Bachelor of Science in Biomedical Engineering
Dean's List – 4 semesters

SKILLS

Operating Systems: Mac OSX, Microsoft Windows, Linux
Software: Python, MATLAB, HTML, C++, Anaconda, Docker, VSCode, Git, SPSS
DeepLearning: Image Classification (CNN, ViT, CAM), Natural Language Processing (RNN, LSTM), Python (Tensorflow, Keras, PyTorch)
Brain Image Processing: FSL, Freesurfer, AFNI, SPM, ImageJ, fMRIPrep, AtlasViewer, MCXStudio
Others: MS Office (MOS Master), Adobe CS (Photoshop, Illustrator, Premier Pro)
Language: Korean (Native), English (Advanced), French (Intermediate)

RELEVANT EXPERIENCE

Undergraduate Team Leader: Data Science Team Sep 2023 – May 2024
Novartis Institutes for Biomedical Research, San Diego, CA

- Spearheaded the development of weakly-supervised microscopic image classifier that reliably predicts protein localization in subcellular compartments for early drug discovery.
- Developed automated preprocessing pipeline to segment single cells from 50,000+ microscopic images.

Undergraduate Researcher: Batman Lab Sep 2023 – May 2024
Boston University, Boston, MA

- Led the development of a graph neural network model that can enhance the spatial resolution of functional near-infrared spectroscopy (fNIRS) images using functional magnetic resonance imaging (fMRI) images.
- Designed a preprocessing pipeline to simulate fNIRS data based on anatomical MRI images.

Research Assistant: Computational Neuroimage Analysis (CNA) Lab Mar – Aug 2023
Hanyang University, Seoul, South Korea

- Performed the detection and removal of facial features in anatomical MRI images of 470 subjects using a pre-trained attention-gated 3D U-net model.
- Analyzed the correlation between cognitive impairment and the cortical dispersion of a neuronal protein in Parkinson's Disease (PD) using fMRI data of 238 subjects.

Research Intern: Clinical Cognitive Neuroscience Center (CCNC) Jan – Feb 2023
Seoul National University Hospital, Seoul, South Korea

- Executed neurocognitive test sessions (EEG, MRI, and NCFT) on individuals affected by cognitive disorders within the clinical settings.
- Collaborated with two research engineers in analyzing neuroimaging datasets (EEG, fMRI) and identifying potential biomarkers of Schizophrenia.

Abdulrahman Kobayter

Boston, MA | www.linkedin.com/in/abdkobayter | (857) 206-3995 | arkob@bu.edu

EDUCATION

Boston University **Boston, MA**
B.S. in Biomedical Engineering | Concentration in Machine Learning *May 2024*

- Major GPA: 3.87 | Dean's List | UROP Research Scholar | UNHCR Innovation Fellow
- Relevant Coursework: Computational Biology, Reinforcement Learning, AI and Systems Biology, Deep Learning for Biomedical Images and Signals, Advanced Data Structures and Algorithms, Modern Signals and Controllers, Biomedical Measurements.

WORK EXPERIENCE

IDEXX **Boston, MA**
Machine Learning Engineering Intern *Jan 2024 – Present*

- Architect and deploy end-to-end machine learning pipelines on Google Cloud Platform (GCP), by designing efficient data storage solutions and training scalable models. Achieved a 35% reduction in training time and 22% improvement in inference latency.
- Develop real-time monitoring dashboards for machine learning metrics using GCP Stackdriver and Data Studio. Provided actionable insights that enabled data-driven decision-making and improved model performance by 18% on key business KPIs.
- Apply advanced deep learning algorithms, including physics-informed neural networks, to execute complex optimization strategies for department-wide systems. Computational simulations demonstrated up to 19% enhancement in system efficiency.

Computational Neurophysiology Lab **Boston, MA**
Machine Learning Research Assistant *Aug 2023 – Present*

- Establish computational models in MATLAB to simulate egocentric boundary cells and grid cell neural responses supporting spatial navigation and memory in rodents.
- Reinforce dynamic simulations of rat movement in open field environments by manipulating boundary positions and inserted barriers, using allocentric coordinates and avoidance trajectories resulting in a 29% increase in accuracy of simulations.
- Upgrade grid cell firing algorithms involving sensory transformations, cosine representations, and mismatch computations to investigate remapping of spatial firing patterns anchored to egocentric boundary cells.

IDEXX **Portland, ME**
Systems Engineering Intern *May 2023 – Aug 2023*

- Leveraged process automation techniques to streamline data collection and analysis in JMP, reducing data processing time by 40% and enabling faster decision-making in product development.
- Designed and executed validation tests for critical product components, ensuring a 95% success rate in identifying and resolving potential issues before launch, contributing to delivery of high-quality veterinary diagnostic solutions.
- Collaborated with a diverse team of engineers, veterinarians, and business stakeholders to incorporate customer feedback into product enhancements, resulting in a 60% increase in user satisfaction and driving iterative product improvements.

Bradham Lab **Boston, MA**
Automation Research Assistant *Dec 2022 – May 2023*

- Constructed Python-based convolutional neural net to compile over 300 sample representations through image registration into a 3D model to be evaluated by biostatistical model with 96% spatial accuracy.
- Systemized and documented a automated Python interface in Snakemake to allow multi-user inputs to increase efficiency.

Taylor Lab **Brookline, MA**
Research Assistant *Sep 2022 – Jan 2023*

- Built MATLAB-based machine learning classifier optimized for cell counting in fluorescence microscopy images with a 93% accuracy rate that analyzes samples under multiple exposures and returns treatment efficacy rate.

PROJECT EXPERIENCE

Profile Hidden Markov Model Histone Identification

- Enhanced HMM for H3K27me3 histone modification detection, integrating known sequences and employing Baum-Welch algorithm for improved discrimination. Tested on chromosome 7 data, capturing EZH2 dynamics for gene silencing.

Other Projects: *Portable Ultrasound Device for EMTs, Novel Alzheimer's Therapy, Vital Sign EMS Headset*

SKILLS

Programming Skills: Python, MATLAB, C, C++, SQL, Tableau, Snakemake, Kubernetes, R, Bash Scripting, Julia, Docker
Tools: JMP, SolidWorks, PyTorch, cGMP, Seaborn, AWS, TensorFlow, Napari, Pandas, ImageJ, SciPy, Django, Flask, OpenCV

LEADERSHIP EXPERIENCE

BU College of Engineering **Boston, MA**
Machine Learning for Engineers Teaching Fellow *September 2023 – Present*
Emergency and Rescue Corps **Tripoli, Lebanon**
Emergency Medical Technician, Emergency Shift Leader *April 2019 – January 2024*

Evan Kwong

evankw@bu.edu | (917) 557-1514 | linkedin.com/in/evan-kw/

Education

Boston University, Boston, MA — B. S. in Biomedical Engineering, May 2024

Concentration in Technology Innovation. Relevant coursework: Device and Diagnostic Design, Systems Physiology, Business of Technology Innovation, Computer Networking

Cumulative GPA: 3.44 (Dean's List Fall 2021, Fall 2023)

Hunter College High School, New York, NY — June 2020

Cumulative GPA: 3.9, ACT 36/36, SAT 1550/1600, National Merit Scholar

Projects

Assistive Technology Device — April 2023

- Identified need for affordable communication device for children with disabilities and led team of four engineers to design and build a functional prototype with $100 budget
- Consulted with stakeholders to identify pain points and requirements, developed Python software for Adafruit PyPortal to improve accessibility and increase customizability

Work Experience

Questrom School of Business, Boston University, Boston, MA — September 2023-December 2023

Teaching Assistant, SI480: Business of Technology Innovation

- Advised and mentored student project groups to complete technology innovation project
- Reinforced understanding of key concepts by engaging and answering student questions

Resonantia Diagnostics, Remote — June 2023-August 2023

Product Development Intern

- Developed C++ software for novel diagnostic platform using an acoustic biosensor
- Conducted market research and competitive analysis. Participated in product development meetings and collaborated with product manager to evaluate and assign tasks

Chess.com, Remote — May 2022-August 2022

Backend Engineering Intern

- Built and optimized new features in PHP for a global top 200 website
- Collaborated with senior developers to build and unit test backend foundation improving the experience of up to 2 million daily puzzles users
- Identified and developed a solution for Verified project issue affecting over 7,000 users

Betel Lab at Weill Cornell School of Medicine, New York, NY — May 2021-March 2022

Research Intern

- Performed computational analysis and data visualization using SQL with the goal of improving genome sequencing efficiency

Morishita Lab at Mount Sinai School of Medicine, New York, NY — June 2019-November 2019

Research Intern

- Sectioned, stained, imaged, and analyzed mouse visual cortex with immunohistochemistry
- Identified genes associated with nAch receptors in mouse visual cortex and suitable secondary antibodies for immunohistochemistry study

Skills

Programming: PHP, MATLAB, Java, SQL, Python, C, C++, HTML

Technical: Jira, SolidWorks, Git, Linux, Figma, Vagrant VMware, MS Office, MS Excel

Laboratory: Experience with immunohistochemistry, sectioning, and confocal microscopy

Activities

BU Chess Club: Vice President (2022-2024), Chess.com College Ambassador

- Organized events to promote chess on campus, increasing regular attendance by 40%
- Developed connections with Boston-area universities to host intercollegiate tournaments

Boston University Engineering Ambassador and Dean's Host

BU Board Game Club, Creative Writing Club, Engineers Without Borders

KELLY LAM

Chicago, IL • 123kelly.lam@gmail.com • 773.526.2336

EDUCATION

Boston University College of Engineering Boston, MA
Bachelor of Science in Biomedical Engineering 05/24

Coursework: Into to Machine Learning, Biomedical Measurements, Clinical Applications, Biomedical Signals and Controls, Molecular Bioengineering, Organic Chemistry, Systems Physiology

CERTIFICATIONS

Chicago School of Phlebotomy Naperville, IL
Phlebotomy Certification (CPT) 08/23

American Red Cross Boston, MA
Basic Life Support Certification 11/23

EXPERIENCE

LabCorp | Phlebotomy Intern 08/23

- Conducted over 100 successful venipuncture and capillary blood collections under the supervision of experienced phlebotomists
- Explained purpose and procedures of test to patients, addressing concerns
- Labeled and processed specimens for laboratory analysis to meet scheduled times

PROJECTS

Intensive Transcutaneous Electrical Nerve Stimulator (TENS) 09/23 – 05/24

- Programed and strategized circuitry for high-frequency (1,000Hz) and high-amplitude (140V) device to numb afferent nerves
- Customized a durable, reusable electrode to reduces skin impedance by 20 kiloohm for patient comfort and enhancing device efficiency
- Integrated phantom models simulating finger and forearm anatomy, optimizing skin impedance with an accuracy of +/- 600 ohm and facilitate device safety testing
- Collaborated with doctors and professors in weekly meetings to seek guidance on development of device ensuring alignment with medical standards

Navigational Aid for Visual Obstructions 01/23 – 05/23

- Designed 3D tracking system using OPT101 sensors for surgical applications in visually blocked environments, achieving an accuracy within +/- 2.3 centimeters
- Developed user-friendly interface with visual LED panel display enhancing real time feedback
- Employed laser cutting technology creating clear acrylic housing for device durability and data precision
- Led circuitry and housing development achieving team project goals
- Produced detailed technical report encompassing entire design process enabling replication

SKILLS

Technical: MATLAB, C, Python, CAD, Arduino, PCB, LabView, 3D Printing, Oscilloscope, Bioprinting
Laboratory: GC/MS, LC/MS, NMR, IR, ImageXpress Pico, Spectroscopy, PCR
Language: Cantonese (conversational)

LEADERSHIP

Instructor Hebrew Senior Life balance clinic 09/22 – 05/24
Child Life Assistant Boston Children's Hospital oncology unit 09/22 – 05/23
Team Leader Jumpstart AmeriCorps early childhood development program 09/20 – 05/22

Grace Lange

glange@bu.edu | 203-731-1177
Boston MA, 02215

EDUCATION

Boston University, College of Engineering — Boston, MA
B.S. in Biomedical Engineering — Expected January 2025
GPA: 3.2

RELEVANT COURSEWORK

Systems Physiology	Device Diagnostics and Design	Thermodynamics
Biomedical Measurements	Signals, Systems, and Controls	Ideas to Impact
Engineering Mechanics	Principles of Molecular and Cell Biology	

PROJECTS

Pulse Oximeter

- Re-designed pulse oximeter for reduced racial bias in a team of 6, as current standard device neglects to take melanin's light absorbance into account in calculations
- Contacted and interviewed medical professionals and BME professors about experiences with current standard device and discovered additional issue with patient device removal
- Calculated light absorbance using C++ and an Arduino to run and process code for LEDs and photodiodes
- 3D printed prototype with an ear stabilizer and clothing clip using CAD and tested for stability during movement, finding it stayed on while shaking and walking 100% of the time
- Presented re-designed device to a panel of design experts using a pugh chart to compare accuracy and stability testing to current standard as fit for user need specifications

Motivation and Exercise Lab

- Developed a lab experiment to test effect of motivational stimuli on heart rate while performing cardiovascular exercise
- Researched and studied literature on effect of oral and visual stimuli on heart rate while exercising
- Devised a testing procedure in a team of 3 for hypothesis claiming oral and visual motivational stimuli will cause an overall greater increase in heart rate while exercising then without
- Experimented using an EKG and excel to record heart rate of 2 groups performing jumping jacks for 2 minutes: a testing group who received stimuli and a control group who did not
- Calculated significance ($p>0.05$) and wrote a lab report with literature supporting testing conclusion

Faucet Cover

- Led a team of 4, as primary designer, in developing a way to conserve water while washing dishes in Boston University housing by creating a faucet cover fit for the specifications of dorm buildings
- Tested effectiveness of different materials and shapes by creating prototypes built to attach to University faucets making its output circumference smaller while also increasing pressure
- Designed final device on Solidworks and 3D printed using a waterproof medium
- Conducted testing on random apartments to find an increase in pressure by a factor of 6.4, a building net water reduction of 2037.9 cups a day, and 76.5% of users reported an increased wash experience

SKILLS

Matlab	Excel	EKG	Solidworks
Arduino	Microscopy	CAD	Data Analysis

Alexa Lara

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EDUCATION

Boston University College of Engineering **Boston, MA**

BS in Biomedical Engineering *Expected May 2024*

Selected Coursework: BME Signals & Controls, Quantitative Optics, Business of Tech. Innovation, Intro to Nanotechnology, Statistics & Data Science, Device Diagnostics & Design

Organizations: Society of Hispanic Engineers, Theta Tau Psi Delta Chapter Fraternity of Boston University

EXPERIENCE

The Gabel Lab **Boston, MA**

Imaging Researcher *Sep 2023 - Present*

- Identified optimal imaging system and software for the analysis of C. elegans images/videos.
- Generated an automated analysis process through MATLAB to streamline imaging process.
- Implemented automated system to analyze and record C. elegans behavior in response to ketamine exposure.

Society of Hispanic Professional Engineers **Boston, MA**

Director of Fundraising *May 2022 - Present*

- Organized weekly events, a National Convention trip, and sponsorship collaborations by having scheduled 1-to-2-hour meetings with 9 E-board members.
- Fundraised $26k to fund 27 members' National Convention trips.

U- Design and FIRE Programs **Boston, MA**

STEM Summer Program Coordinator *Jul 2023 - Aug 2023*

- Coordinated day-to-day operations of 2 summer programs with over 65 students in attendance.
- Integrated and tested engineering curriculum for course material application.
- Instructed 27 students in principles of electrical and mechanical engineering as part of the Gadgets & Gizmos class.

Technology Innovation Scholars Program **Boston, MA**

Student Ambassador *Sep 2021 - May 2022*

- Mentored 5 elementary students through the FIRST® LEGO® League and FIRST® Robotics Competition that took place in June 2022, by advising through block coding and structural robot builds.
- Engaged students and stimulated block coding (Spike Prime) and problem-solving skills by presenting obstacle courses for their robots to navigate.

PROJECTS

Heart Rate Research *(Clinical Project)* **Boston, MA**

- Formulated a study examining changes in heart rate with subjects exposed to positive/negative audio and visual stimuli.
- Coordinated with a group of 3 to draft study, collect data, and write result papers, consisting of using finger plethysmograph and audio compiler.
- Arranged 15 min sessions with 21 participants for data collection.

Eldera *(Co-Founder and CMO)* **Boston, MA**

- Collaboratively crafted a business plan and model alongside a team of 3, pioneering a mobile platform designed to empower seniors with cost-effective, readily available assistance, increasing their independence.
- Compiled market research insights to create user-friendly solutions enabling elderly population to easily engage on-demand service providers, catering to caregivers' needs.
- Devised superior market strategies capitalizing on competitors' shortcomings, optimizing market reach and impact.

Detecting Toxic Substances Vaporizer Attachment *(Hands-On Project)* **Boston, MA**

- Created a device in collaboration with a team of 5, developing an Arduino program and wiring system to operate the main heating coil, converting explosives and chemical hazards into vapor.
- Built a prototype through machining a multi-compartment thermos, involving drilling holes, inserting components (on/off switch, switch valve, LEDs), and insulating any openings.
- Collected vapor from device to transport it to the MX908 mass spectrometer in under 90 seconds, so first responders could conduct hazardous operations in a fast and safe manner.

SKILLS

Technical: MATLAB, Arduino, AmScope, Onshape, Microsoft Office, WordPress

Language: Spanish, English

Maks Levin

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EDUCATION

Boston University, College of Engineering Expected May 2024
Bachelor of Science in Biomedical Engineering Boston, MA

COURSEWORK

The Business of Technology Innovation
Clinical Applications of Biomedical Design
Probability, Statistics, and Data Science
Device Diagnostics and Design

RESEARCH PROJECTS AND PROPOSALS

Elastic Scattering Spectroscopy: A Promising Approach to Diagnose Restless Legs Syndrome Sep 2023 - Present
- Create phantoms to mimic various tissues to emulate similar optical properties of melanin.
- Fine-tune optical fibers to emit ultraviolet light for the surface of solid phantoms.

Phage Therapy: A Promising Approach to Target HER2 Breast Cancer Feb 2023 - May 2023
- Gathered and compared 14 resources to develop a proposal to contain breast cancer using Phage Therapy.
- Identified how phage therapy can be tested in vitro and how irradiation affects a patient's immune system.

UPACK Jan 2023 - May 2023
- Designed and 3D printed four molds of an IUD based care package for OBGYN Clinics.
- Thermoformed Polyethylene terephthalate glycol plastic (PETG) for eight enclosures.
- Measured UV resistance of product using UV activated powder for eight trials.
- Interviewed gynecologists from four different clinics regarding IUD insertion procedures with three other group members.

Drug Preservation Device Oct 2021 - Dec 2021
- Implemented five indicator fail/safe systems to notify users when medicine was exposed to dangerous conditions.
- Machined a copper capsule to hold medication using a water jet cutter.
- Designed three different enclosures to fit in a cup holder and house a copper capsule with another group member.

EXPERIENCE

Teaching Assistant Jan 2022 - Present
Boston University, Boston, MA
- Troubleshooted projects in courses such as Hands on Engineering (EK 131), and Electric Circuits (EK 307).
- Repair and maintain 16 3D printers.
- Incorporated 3D visualization, circuitry, and instrumentation to help construct substructures for over 100 student projects.
- Conducted office hours twice a week and stayed after lab sections to clarify questions regarding projects and assignments.
- Part-time (4 - 8 hours per week).

SKILLS

Training: AT&T Summer Learning Academy Extern
Tools: MATLAB, Adobe, OnShape, Cura, Arduino, Oscilloscopes, Function Generator, Spectrometer, Digital Microscope
Languages: English (Fluent), Russian (Limited)

LEADERSHIP

Student Advisor: EK 100: Freshman Advising Seminar Aug 2022 - Present
- Advised 26 students in all Engineering majors to gain a better understanding of an engineer's ethical responsibilities.
- Volunteered an hour or two every Friday afternoon to help out with lectures, group discussions, and general questions.

President: HackHardware Aug 2022 - Jan 2023
- Collaborated with sponsors, companies, and club officers to create a hardware-focused hackathon for more than 100 signups.

ACTIVITIES

Mentor: Biomedical Engineering Society Sep 2023 - Present
Member: Engineers Without Borders Sep 2020 - Jan 2022

Chi Li

cfli@bu.edu | 978-306-0339 | linkedin.com/in/chifli | Boston, MA

Education

Boston University College of Engineering **Boston, MA**
B.S. in Biomedical Engineering, Concentration in Technology Innovation May 2024

Relevant Coursework

- Principles of Molecular Cell Biology & Biotechnology | Nanometer Scale Processes in Living Systems | Biomolecular Architecture | Biomedical Signals & Controls | Transport Phenomena in Living Systems
- Introduction to Machine Learning | Device Diagnostic & Design

Projects

Engineering Functional Recovery of Hyperproliferative Hepatocytes May 2024

- Utilize recombinant DNA to engineer functional recovery in hyperproliferative hepatocytes by modifying the yes-associated protein's (YAP) interaction with transcriptional regulators for implantable liver grafts
- Validate functional recovery of hyperproliferative hepatocytes using western blots, qPRC, and ELISA
- Characterize effects of YAP in cell proliferation for different cell types and media conditions in order to optimize future experiments using immunofluorescence

Blood Pressure Cuff Clamp, Device Diagnostic & Design May 2023

- Designed a clamp to be installed on blood pressure cuffs to allow adult cuffs to work on children
- Created to improve detection of hypertension in children, where early detection can prevent long term cardiovascular morbidity
- Built prototype with HDPE plastic and bolts, created with a low profile for user comfort
- Designed an aluminum alternative to reduce 10x more flex with half the thickness

Genetically Engineered Lymphatic Cells, Research Assistant August 2022

- Explore alternate sources of lymphatic cells to reduce supply chain impacts on lymphatic cell research
- Engineered human umbilical vein endothelial cells to display characteristics and functions of lymphatic cells using lentivirus transduction for in vitro experimentations
- Validated results with immunohistochemistry staining and characterization of protein expression

Additional Projects: Characterization of Lymphatic cells, Innovation in Tape-Based Microfluidic Devices

Experience

Research Assistant, Chen Lab (Tissue Microfabrication) June 2022 - Present

- Teach new members on the construction of tape-based microfluidic devices for experiments with hydrophobic signaling molecules
- Construct polymer and tape-based 3D microfluidic devices for use in experiments
- Design and construct a stepper motor control system to continuously drive flow in microfluidics experiments in a sterile environment

Team Lead, Terrier Motorsport (Formula SAE team) May 2021 - Present

- Oversee design and development of chassis and suspension subsystems of an electric F1 style racecar
- Teach new members on chassis and suspension subsystems and manage team meetings and projects
- Ensure safety code and protocols are met

Skills

Laboratory: cell culture, bright-field/ confocal microscopy, PCR/RT-qPCR, western blots, immunofluorescence staining, ELISA, plasmid preparation, 3D microfluidics devices, electrophoresis, spectrometer, Gibson assembly, image analysis fiji/ image-J
Programs: GraphPad Prism, Matlab, C, Python, Solidworks, fusion360 generative design, Onshape, Microsoft Office Suite, Google Suite

Siyuan (Sue) Li

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EDUCATION

Boston University (BU), Boston, MA — Expected May 2024

Bachelor of Science, Biomedical Engineering; Concentration: Nanotechnology

GPA: 3.98/4.00, Engineering Dean's List: Fall 2020 – Fall 2023

Harold C. Case Scholarship, highest honor for academic and extracurricular achievements: 2023-2024

Tau Beta Pi Engineering Honor Society: 2022-Present

RESEARCH

Undergraduate Researcher — January 2022 - Present

BU Grinstaff Group, Advisor: Mark W. Grinstaff, Ph.D. — Boston, MA

Ketamine Drug Delivery Project

- Investigated novel ketamine drug delivery system for improving post-traumatic stress disorder and severe depression treatments with controlled ketamine-releasing dosage.
- Optimized nitrile-amine coupling reaction and applied strategy to conjugate ketamine to Aminated mucoadhesive Poly-Amino-Saccharides (AmPAS) in water.
- Cultivated mammalian epithelial cell culture and performed half maximal inhibitory concentration (IC_{50}) assay for modified ketamine and polymer-ketamine conjugate.
- Applied organic chemistry synthesis, chromatography, cell proliferation, and cell assay knowledge; performed NMR and LCMS analysis, and optimized AmPAS synthesis.

Paclitaxel Drug Delivery Project

- Synthesized paclitaxel-loaded mucoadhesive nanoparticles (NP) for drug delivery to the esophagus.
- Applied sonification and dialysis knowledge for NP synthesis, and conducted DLS and zeta potential measurements for NP characterization.

SENIOR DESIGN PROJECT

Aptamer Nanostructures as Adenocarcinoma Immunotherapeutics

BU Teplensky lab, Advisor: Michelle Teplensky, Ph.D. — September 2023 - Present

- Designed and synthesized PD-1/PD-L1 targeting DNA aptamers in unique nanostructures.
- Co-cultured human T lymphocytes cells (Jurkat) and human non-small cell lung carcinoma cells (A549) to identify the aptamer-facilitated T-cell activation by cancer cell viability.
- Measured binding affinity of by flow cytometry and surface plasmon resonance.
- Conducted RP-HPLC, MALDI-TOF, flow cytometry measurements.

CONFERENCE

"Conjugation of Ketamine to a Novel Mucoadhesive Polymer for Improved PTSD and Severe Depression Treatments", *24th Annual Northeast Student Chemistry Research Conference (NSCRC)*. Boston University, Boston, MA, April 22nd, 2023. (Poster)

LEADERSHIP&COMMUNICATION

BU, Technology Innovation Scholars Program (K-12 outreaches) Ambassador — August 2022 - Present

- Designed and presented cellular biology and genetics workshop in the BU Biology & Machine Learning hackathon events held for Massachusetts high school students.
- Tutored female high school students on Python at Massachusetts Robotics.
- Mentored 2nd-4th grade youth in the FIRST Lego League in Boston area primary schools.

XINGXIAO LI

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EDUCATION

Boston University, College of Engineering Boston, MA
B.S, Biomedical Engineering, Minor in Public Health May 2024

- Relevant Coursework: Cell Biology, Human Physiology, Molecular Bioengineering, Nanometer Scale Processes in Living Systems

EXPERIENCE

The Hao Laboratory | Boston University Boston, MA
Undergraduate Researcher Feb 2023 - Present

- Constructed nanobodies library capable of responding to protease activity, allowing for precise sensing of targeted sites within body and facilitating delivery of diagnostic tools to specific locations
- Pioneered development and testing of a programmable, DNA-barcoded nanobody platform for accurate targeting of metastatic sites, utilizing CRISPR technology for disease classification
- Utilized CRISPR technology for disease classification, with demonstrated success in non-invasive urine tests and paper-based detection
- Set up newly established lab

The Selkoe Laboratory | Brigham and Women's Hospital Boston, MA
Research Trainee Jun 2022 - Feb 2023

- Developed and validated fluid (CSF, plasma) biomarkers to improve the diagnosis and monitoring of patients with Alzheimer's disease (AD) by using the SMCxPRO system

PROJECTS

Cell Tissue Chamber for Microscopy Sep 2021 - Dec 2021

- Developed a portable cell transfer chamber capable of maintaining a consistent temperature and relative humidity for a minimum of 90 minutes to facilitate the transfer of cells to microscopes

Senior Design Oct 2021 - Dec 2021

- Designed and executed experiments involving healthy college students to evaluate feasibility of fNIRS hyper scanning in capturing inter-brain synchrony (IBS) within a therapeutic communication context
- Examined the potential of fNIRS hyperscanning as a diagnostic tool for IBS, offering insights into its applicability in clinical settings for aphasia patients
- Investigated the effectiveness of an existing individualized therapy for aphasia by measuring IBS with the fNIRS hyper scanning system

AWARDS

- ENG Dean List: Fall 2022; Spring 2022, 2023
- BU Undergraduate Research Opportunities Program (UROP): Fall 2023

SKILLS

Laboratory: molecular cloning, protein engineering, CRISPR, immunoassay, chromatography
Computation: MATLAB

Ariel Lin

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EDUCATION

Boston University College of Engineering Boston, MA
Bachelor of Science in Biomedical Engineering; Minor in Business Administration Expected May 2024
GPA 3.90/4.00 | Dean's List all semesters

Relevant Coursework: Machine Learning, Computational Biology, Medical Image with Artificial Intelligence, Probability Statistics and Data Science, Programming, Modeling Business Outcome with Statistical Programming

SKILLS: Python (NumPy, Pandas, Scikit-learn, PyTorch, Matplotlib, Seaborn), MATLAB, C, R, Power BI, Machine Learning (Linear and Logistic Regressions, K-Nearest Neighbors, K-means, Decision Tree, AdaBoost, Support Vector Machine), Deep Learning, Dynamic Programming, Feature Engineering, Cross Validation, PCA

PROFESSIONAL EXPERIENCES

Undergraduate Research Assistant, Boston University Biomicroscopy Lab Sep 2023 – Present

- Engineered an image processing algorithm that leverages **convolutional techniques** to analyze image speckle dynamics, providing visualizations and quantification of microvasculature in superficial tissues
- Enhanced algorithm to offer blood flow metric with up to 95% accuracy for cardiovascular assessment

Automation Engineer Intern, Foundation Medicine Jun 2023 – Aug 2023

- Employed machine learning to construct predictive models to forecast future outcomes
- Managed **data integration** with **Power BI** and conducted **statistical analysis** to identify patterns, key trends, and actionable insights to improve business operations
- Completed **data cleaning, processing, and merging** on 15+ large datasets to ensure data integrity
- Created 10+ **data visualizations** weekly with **Python (Matplotlib and Seaborn)** to communicate findings from data to help in formulating strategic recommendations to business decisions

SELECTED PROJECTS

Generalizable AI for Brain MRI Segmentation, Boston University Feb 2024 – Present

- Generated synthetic brain MRIs by applying **affine transforms, bias field addition, and conditioned Gaussian Mixture Modeling** on real data to stimulate diversity in real brain MRIs
- Built a **CNN (U-net)** with **PyTorch** using synthetic data, targeting to achieve a DICE score of over 70%

Enhanced Cell Type Identification in RNA sequencing Data, Boston University Sep 2023 – Dec 2023

- Implemented **exploratory data analysis,** and used **autoencoders** and **fast independent component analysis** to process and refine single cell RNA sequencing datasets
- Integrated **mixture discriminant analysis** into every iteration of **Gaussian Mixture Model** training for enhanced clustering performance from an overall 88% to 94% in averaged homogeneity
- Employed **t-SNE** for **dimensionality reduction** to accurately visualize differentiated cell clusters

NLP – Report Type Classification, Foundation Medicine Jun 2023 – Aug 2023

- Built machine learning models (**Random Forest, Support Vector Machine, Deep Neural Networks**) achieving up to 81% accuracy to classify company laboratory non-conformance report types
- Performed **hyperparameter tuning** on **learning rates and regularization parameters**, and experimented with diverse **word embeddings (Word2Vec, GloVe)** to enhance model performance
- Developed a desktop **GUI library (Tkinter)** to integrate a trained machine learning model into a user-friendly interface, allowing users to input report information and receive predicted labels instantly

LEADERSHIPS

Undergraduate Machine Learning Teaching Assistant, Boston University ECE Department Jan 2024 – Present
Physics Coach, Syracuse University Physics Department Aug 2020 – May 2021
Engineering Ambassador, Syracuse University Engineering Department Sep 2019 – May 2021

Sunni Chinjo Lin

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EDUCATION

Boston University | Boston, MA — Expected May 2024

B.S. Double Major in Computer Engineering and Biomedical Engineering

- GPA: 3.87 / 4.00, Dean's List (all semesters)

Relevant Coursework: Computational Biology Machine Learning, Reinforcement Learning (RL), Biomedical Device Diagnostics & Design, Computer Architecture & Organization, Operating Systems, Signals and Controls, Statistics

SKILLS

Computational: C, C++, Python, PyTorch, GDB, Verilog, Tensorflow, MATLAB, Make, HTML, CSS, Java, Arduino
Wet Lab Techniques: Immunohistochemistry (IHC), confocal immunofluorescence microscopy, cell culturing, PCR

INDUSTRY & RESEARCH EXPERIENCE

Computational Imaging Systems Lab | *BU Dept of Electrical & Computer Engineering* — Aug 2022 – present

- Build a Fourier Imager Network (FIN) for Fourier ptychography (FPM) as a computational imaging system
- Prototyped a contrastive unpaired translation (CUT) deep-learning (DL) model for virtual staining, leveraging unsupervised training to transform label-free imaging (OCT) to histology-like images (Gallyas & Nissl stain)

Drug Discovery Machine Learning Engineer | *Novartis* — Sep 2022 – present

- Investigate microscopy image transformer-based autoencoders in drug discovery with Human Protein Atlas to predict protein localization in subcellular compartments as Senior Design project

Cardiac Mapping System Software Engineer Intern | *Boston Scientific* — May – Aug 2023

- Developed a Pytorch-based deep learning model for whole heart segmentation using CT images, enabling advanced electrophysiology processing and 3D heart map generation, marking product's entry into AI use

Hamilton Lab | *BU School of Medicine Dept. of Physiology & Biophysics* — Aug 2021 – Dec 2022

- Developed diffusion-weighted MRI method using GQI with tractography to visualize vessel wall architecture

RT Department Software Engineer Intern | *Heron Neutron Medical Corp., Taiwan* — May – Aug 2022

- Created simulation of AB-BNCT cancer therapy with patient positioning, collision detection system in C++

PROJECTS

Computational Model for Single-cell RNA-Seq (Language: Python) | *Boston University* — Sep – Dec 2023

- Prototyped the addition of mixture discriminant analysis (MDA) to k-means in a Gaussian mixture model, for clustering single-cell RNA-sequencing data, based on a deep autoencoder model

MIPS Pipeline Processor implementation (Language: HDL) | *Boston University* — Feb – May 2023

- Implemented 5-stage pipelined MIPS processor in Verilog Vivado with hazard detection, ALU optimization

Linux Operating System Project (Language: C) | *Boston University* — Jan – May 2023

- Implemented POSIX-Compliant Threading Library with multi-threading support; scheduler; synchronization
- Established File System on Linux file system with 4096 KB blocks, supporting up to 1MiB of file storage

SuperTuxKart RL Self-Driving Implementation (Language: Python) | *Boston University* — Oct – Dec 2022

- Developed RL self-driving of SuperTuxKart using double deep Q-Learning and Deterministic Policy-Gradient

PUBLICATIONS

- Enhancing Multiscale Human Brain Imaging: Integrating Semi-supervised Learning Digital Staining with Serial Sectioning Optical Coherence Tomography. *eLight* (2024) *[in submission process]*
- Lipid and smooth muscle architectural pathology in the rabbit atherosclerotic vessel wall using Q-space cardiovascular magnetic resonance. *J Cardiovasc Magn Reson* 24, 74 (2022)

LEADERSHIP & AWARDS

Computer Architecture and Organization (EC413) | *Teaching Assistant* | Boston University — Jan 2024 – Present
Applied Algorithms and Data Structures (EC330) | *Teaching Assistant* | Boston University — Aug – Dec 2023
Undergraduate Research Opportunities Program Award | Boston University — Sep 2022 – Dec 2023
BU College of Engineering | *Sophomore Mentor & Freshmen Seminar Host* — Aug 2021 – Dec 2022
Full Tuition Trustee Scholarship | Boston University — Aug 2020
British Biology Olympiad Gold Medal | Britain Royal Society of Biology — March 2019

Jenna Ludvigsen

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EDUCATION

Boston University | Boston, MA **Expected May 2024**
Bachelor of Science: Biomedical Engineering, Minor in Mechanical Engineering
Semester Abroad | **University of Sydney** | Sydney, Australia **Spring 2022**

Relevant Coursework | Medical Device Design and Diagnostics, Clinical Applications of Biomedical Design, Invention: Technology, Creation, Protection, and Commercialization, Introduction to Engineering Design, and Introduction to Robotics

EXPERIENCE

Mechanical Inspector Intern | Primo Medical Group | Stoughton, MA **May 2023 - August 2023**
- Conducted quality inspections in strict accordance with ISO 13485:2016 standards, ensuring products met regulatory and quality requirements.
- Inspected an average of twenty-five parts per week, including orthopedic implants, catheters, cancer ports, and various other medical devices.

Undergraduate Intern | Novalith | Sydney, NSW, Australia **March 2022 - June 2022**
- Designed a data acquisition system using Novus FieldLogger hardware.
- Configured pressure transmitters and thermocouples to the Novus system.
- Ran lithium extraction experiments with the Lead Research Scientist.

SELECTED PROJECTS

Improved Pulse Oximeter | Boston University **Fall 2023 - Ongoing**
- Enhanced pulse oximeter accuracy for individuals with darker skin tones by integrating an additional wavelength of light, resulting in more precise oxygen saturation measurements.
- Researched, developed, and tested the enhanced pulse oximeter with team members.

Robot | Boston University **Spring 2023**
- Programmed a Python and ROS robot to detect and navigate around obstacles with precision.
- Utilized image processing and machine learning techniques to detect objects.

Nebulizer Redesign | Boston University **Spring 2023**
- Collaborated with team members to make nebulizers accessible for people with mobility issues.
- Met with stakeholders to define client requirements prior to prototype development.
- Utilized CAD and 3D printing technology to create physical prototypes of the product.

SKILLS

Languages | MATLAB, Java, Python, and C++/C

Applications | Onshape, Arduino, LabView, Visual Studio, FieldChart, and Libre Computer Board

LEADERSHIP

Hands on Engineering, **Teaching Assistant** **Spring 2024**
Supply Chain Engineering, **Grader** **Fall 2023**
Boston University, **Engineering Ambassador** **Fall 2021 - Ongoing**
Girls who Code, **Member** **Fall 2020 – Ongoing**

NICHOLAS LYRENMANN

nicolaco1020@gmail.com | 443-949-4377 | linkedin.com/ NLyren | Boston, MA

EDUCATION

Boston University Boston, MA
Bachelor of Science, Biomedical Engineering Expected May 2024

- GPA: 3.22

Relevant Coursework: Device & Diagnostics Design | Transport Phenomenon in Living Systems | Intro to Medical Imaging | Engineering Tissue Injury, Repair, and Foreign Body Responses | Intro to Neuroengineering |

EXPERIENCE/RESEARCH

Brewster Ambulance Company Boston, Massachusetts
Emergency Medical Technician Oct 2022 – Mar 2024

- Responsible for assessing patient condition, conducting physical examinations, and administering necessary medical interventions in accordance with Massachusetts EMS Protocols.
- Collaborated with local medical professionals through effective communications to ensure seamless patient care.
- Maintained accurate and detailed patient records in compliance with company, state, and national standards.

NEUROMOTOR RECOVERY LAB Boston, Massachusetts
Research Assistant Jan 2024 – Mar 2024

- Collected biomechanical data for development of devices designed to augment motor functions of individuals with neuromotor deficits.
- Aided in setup, testing, and clean up for study participant visits.

UNIVERSITY OF MARYLAND TRAUMA CENTER Baltimore, Maryland
Operating Room Volunteer Summer 2021

- Supported staff in keeping trauma operating rooms stocked and ready, ensuring a well-organized and efficient operation.
- Served as interface between trauma operating rooms and hospital blood bank a critical link for patient survival.
- Assisted with patient transport to and from trauma operating rooms.

PROJECTS

INTERDISCIPLINARY SENIOR DESIGN PROJECT Sep 2023 – Mar 2024

- Created a novel device that facilitates removal of blood clots from the bladder.
- Worked jointly with a senior design team while maintaining proper documentation.
- Enacted client goals through clear communication and implementing feedback.

Device & Diagnostics Design Class Project Spring 2023

- Collaborated with team to design a stability device for cuffless blood pressure monitors in high movement environments.
- Applied principles of shear-thinning non-Newtonian fluids to decrease vibrations and movement via a fluid imbued ball and socket design.

SKILLS

Digital: Matlab, Python, C, Solidworks, Snapgene, NMR Analysis, Microsoft Word/Excel/PowerPoint
Equipment: 3D Printing, Soldering, Manual Mills, Gel Electrophoresis, Fume Hood, Laser Optics

DILEK AYLIN MANAV
damanav@bu.edu | (857) 262-2091 | Boston, MA

EDUCATION

Boston University College of Engineering **Boston, MA**
- Bachelor of Science in Biomedical Engineering **May 2024**
- Dean's List Recipient (Fall 2022, Spring 2023, Fall 2023), GPA 3.71

Relevant coursework: Biomedical Optics, Nanometer Scale Processes in Living Systems, Quantitative Neuroscience, Biomedical Materials Science, Fluid Mechanics

PROJECTS

Cancer Immunotherapy Manufacturing Platform **Sep 2023 - Present**
DRAPER *Boston, MA*
- **Culturing** carcinoma cells, and shaping them into spheroids for testing nanoparticle therapy
- Programming MATLAB image analysis software to decode images taken from microfluidic experiments
- Providing proposals and progress reports for supervisors, including detailed specific aims, research strategies, and Gantt charts

EXPERIENCE

Research Assistant, Plant Genetics **May 2023 - Aug 2023**
Koç University *Istanbul, Turkey*
- Synthesized and evaluated plasmid vectors using **CRISPR**, **PCR**, **gel electrophoresis,** and **confocal imaging** on 50+ samples
- Designed 2 plasmids for blue fluorescent protein expression in alfalfa plant to check nitrogen fixating symbiotic development, and wrote an academic paper

Undergraduate Researcher, Neuroscience **Sep 2021 - Aug 2022**
Boston University *Boston, MA*
- Conducted neuroscience wet lab research using viral vectors and fluorescent signal proteins to quantify synapse activity using calcium-sensitive GFP protein probes
- Performed **wide-field microscopy** and **confocal imaging** and processed images using ImageJ software to check colocalization of engineered protein probes and synapses

LEADERSHIP DNA

Student Advisor, Engineering Seminar **Sep 2021 - Dec 2023**
Boston University *Boston, MA*
- Guided students by offering academic and career advice to help them navigate their educational journey.
- Organized informational sessions and workshops to address academic challenges.

Vice President, BU Kendo Association **Sep 2021 - Aug 2023**
Competitive martial arts club, Boston University *Boston, MA*
- Coordinated competitions, created budgets, and directed money flow to satisfy club needs, showcasing business acumen.
- Raised $9000 through three fundraising events and connected with donors by hosting social events

SKILLS

Software: MATLAB, ImageJ, Microsoft Suite
Laboratory: PCR, CRISPR, Tissue and protein engineering, Perfusion, Microtome sectioning, Gel electrophoresis, Immunohistochemistry, Confocal microscopy, Two-photon microscopy, Literature review

Angelina Marrero

Boston, MA | angmarr@bu.edu | (407) 446–4880 | Linkedin

EDUCATION

Boston University College of Engineering | Boston, MA Boston, MA

B.S in Biomedical Engineering, Concentration in Business Technology Innovation Expected May 2024

- Achievements: Dean's List, 1st Place Design-a-Thon in Tissue Engineering & Regenerative Medicine
- Relevant Classwork: Business Strategy, Linear Algebra, Statistics and Data Science, Engineering Mechanics

Higher Technical School of Engineering (ICAI) Study Abroad | Madrid, Spain Spring 2022

PROJECTS

Strategies for Technology-Based Firms | Consultant January 2023 – May 2023

- Collaborated with 5 person team to develop a strategic framework, improving business model and operations of "Expedia"
- Conducted market analysis highlighting target specific market segmentation, driving new client growth and market expansion
- Formulated innovative solutions enhancing customer acquisition, diversifying revenue streams, and marketing initiatives

Technology Innovation in Business | Founder of "Kanvi" September 2022 – December 2022

- Led team of 3 to prototype a water bottle, yielded societal change that produced accessible energy from renewable resource
- Conducted cost-benefit analysis leveraging market data and financial modeling techniques, forecasting potential profits
- Managed allocated budgets focusing on investments, assets, and liabilities with projected 162% increase in profits
- Presented product strategy and business case to venture capitalist, delivering product vision, roadmap, and forecasted revenue

USA Homelessness Population Data Analysis | Head Developer May 2021 – July 2021

- Created MATLAB program analyzed and searched databases identifying trends in homeless population in the United States from 2007–2015
- Produced comprehensive report summarizing findings, analysis methodology, statistical models, and algorithms
- Proposed solutions aimed at allocating additional funds and resources to states with minimal changes in homelessness

EXPERIENCE

Alternative Home Health Agency | Payroll Systems Specialist | Orlando, FL May 2020 – August 2020

- Coordinated financial reconciliation processes, vendor, and general ledger accounts ensuring accurate financial records
- Implemented effective corrective measures on audit findings, optimizing financial processes, and reducing potential risks
- Oversaw accounts payable and receivable ensuring timely and accurate processing of invoices, payments, and collections

So Sweet Boutique | Sales Associate | Orlando, FL January 2020 – July 2020

- Analyzed metrics measuring success of marketing campaigns, improving performance and increase return on investment
- Created purchasing system driven by customers and market demand data analytics, streamlining 100% inventory purchases
- Improved operational efficiency with inventory optimization strategies minimizing stock out and maintaining ideal inventory
- Fostered strong relationships with clients through proactive communication, increasing client satisfaction and retention rates

ENTREPRENEURSHIP & LEADERSHIP

Prosthetics for Canines Startup | Project Manager October 2023 – Present

- Lead weekly meetings with stakeholders presenting deliverables, roadmap product release, and optimizing resource allocation
- Conduct market research on existing products and competitor analysis optimizing product novelty and market entry strategies
- Achieved client satisfaction by integrating user needs and survey feedback into design process ensuring a user-centric approach
- Developed pricing models for specific market solutions and executed detailed cost-benefit evaluations for product profitability

Boston University Puerto Rican Student Association | Head of Marketing Mar 2021 – May 2022

- Planned and executed marketing campaigns across multiple channels, driving 133% increase in member attendance
- Designed marketing content for social media and email campaigns, enhancing awareness and engagement with members

Boston University Food Pantry | Research and Administration Coordinator Mar 2021 – May 2022

- Managed projects through stakeholder engagement, tracking milestones, and ensuring deliverables were completed on time

Member: Student Occupational Therapy Association (Treasurer), Society of Hispanic Engineers, Society of Women Engineers

SKILLS & CERTIFICATIONS

Technical: OnShape (CAD), MATLAB, C++, Microsoft Office Certified

Language: Fluent in English, Advanced in Spanish

ZOE MCCARTHY

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EDUCATION

Boston University, College of Engineering — Boston, MA
Bachelor of Science, Biomedical Engineering — Graduation: May 2024

- Technology Innovation Concentration, GPA 3.8, Dean's List

ICAI - Universidad Pontificia Comillas — Madrid, Spain
Semester Abroad in Madrid, Spain — Jan 2022 - May 2022
Relevant Coursework: Device Design & Diagnostics, Business Innovation and Technology, Electric Circuits, Cell Biology & Biotechnology, Systems Physiology, Thermodynamics, Statistics & Data Science, Biomechanics

EXPERIENCE

Werfen North America — Bedford, MA
Systems Hardware Engineering Intern — Jun 2022 - Aug 2022

- Execute verification testing at the systems level on the ACL TOP x70 line of blood coagulation analyzers
- Update verification protocols and compose verification reports
- Analyze and organize data in Minitab and Microsoft Excel collected from trace files and present relevant results
- Collaborate with team members on troubleshooting verification errors, relay verification status to management
- Work with marketing team on the HemoCell hemostasis automation solution line to conduct investigations and pinpoint areas of improvement
- Write Design Change Request Analyses to review risk associated with post-pilot design changes

PROJECTS

Innovative Strategies in Venous Blood Collection, Senior Design Project — Sep 2023 - Present

- Design a procedure to minimize amount of venous blood drawn from patients for Coalesenz's iCoagLAB Hemostasis Analyzer
- Conduct experiments to ensure specifications are met for minimal blood volume collection

"Steady Draw" Finger Prick Blood Test Stabilizer — Jan 2023 - May 2023

- Prototyped a device to stabilize the hand during at-home finger prick blood tests for patients with hand tremors
- Utilized the Engineering Design Process to ideate, interview stakeholders, prototype, and improve our design in a collaborative environment

Drug Preservation Device — Sep 2021 - Dec 2021

- Designed and constructed a device that will preserve medication for at least 48 hours and stay within a desired temperature and humidity range using the Engineering Design Process
- Collaborated with a group of five students to create a report and programmed electronic components using Arduino Uno software, writing original code
- Managed the timeline of the project and kept team on track for necessary design deadlines

SKILLS

Technical: MATLAB, Python, Microsoft Office Suite, Onshape, SolidWorks CAD, Arduino, Minitab
Language: German, Greek, Spanish
Laboratory & Manufacturing: Oscilloscopes, Spectroscopy, Microscopy, Gel Electrophoresis, Laser Cutting, 3D Printing

LEADERSHIP

Editor-in-Chief & **Makeup Artist**, Off the Cuff Magazine at Boston University
Student Advisor Coordinator, BU College of Engineering
Study Abroad Ambassador, BU Abroad
Parliamentarian, Gamma Phi Beta Sorority Delta Chapter
Member, Tau Beta Pi Engineering Honor Society

ISHIKA MEHTA

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EDUCATION

Boston University, College of Engineering **May 2024**

Degree: B.S. Biomedical Engineering

Relevant Coursework: Intro to Programming | Probability, Statistics and Data Science | Signals and Control | Biomechanics | Engineering Design | Biomedical Instruments | Computational Biology | Principles of Molecular Cell Biology and Biotechnology | Device Diagnostic and Design

PROJECTS

Diabetes Predictor **August 2023 – December 2023**

- Developed a Naive Bayes classifier model to accurately predict diabetes in individuals, enhancing predictive analytics in healthcare
- Leveraged statistical analysis and machine learning techniques in a Naive Bayes framework to identify key indicators of diabetes with high accuracy of 94.2%

Smart Intubation Device **January 2023 – May 2023**

- Constructed a removable silicon device that attaches onto laryngoscope preventing oral injuries during intubation
- Directed stakeholder interviews and executed killer experiments improving design and efficacy of device
- Collaborated with a team of 4 to develop a functional prototype reducing force exerted by laryngoscope on patients teeth

Light Tracker **August 2022 – December 2022**

- Mapped 28 head movements to mouse tracker using 4 sensors to assist people with limited arm dexterity
- Designed the prototype via Onshape and TinkerCad to create the enclosure for the 16x16 LED matrix

MATLAB **August 2021 – December 2021**

- Created a program to scan through a database of over 100,000 data points which then infuse data into a compatible spreadsheet, therefore, creating a readable output
- Operated regression analysis and machine learning to find out that men were 57% more outspoken than women working in the same tech company while talking about mental health issues

EXPERIENCE

N. SUNDERLAL & CO. Mumbai, India

Intern **May 2023 – August 2023**

- Shadowed the lead engineer to research and saw the process of brainstorming new equipment and the criteria that must be met for production
- Presented the reconstructed economies of scale model in the consumer products sector, and found it would reduce production costs by 1.3%

NATIONAL FACILITY FOR BIOPHARMACEUTICALS, Mumbai, India

Intern **June 2019 – August 2019**

- Executed an experiment by streaking plates and separating DNA and protein molecules using methods of gel electrophoresis
- Trained junior students basic techniques such as pipetting and titration
- Studied relevant research papers and found the experiments conducted in the lab had 92% accuracy

LEADERSHIP

BU Society of Sci-Fi Horror, Boston, MA **March 2022 – March 2023**

Secretary

- Founded a club at Boston University where students have the opportunity to connect with peers who are interested in science fiction and horror in any form
- Responsible for making a plan for weekly meetings and implementing ideas for various activities to carry out throughout the semester

SKILLS & INTERESTS

- **Computer:** MATLAB, HTML, Arduino, Microsoft Office, Onshape
- **Lab skills:** PCR, micro-pipetting, gel electrophoresis, control of gene expression, chromatography
- **Languages:** English, Hindi, Gujrati
- BU Chankaar- All female fusion dance team
- BU BME club, Society of women engineers

Joshua Josue Mendoza Limon

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EDUCATION

Boston University, College of Engineering Boston, MA
B.S., Biomedical Engineering, Minor in Mechanical Engineering May 2024
Relevant Coursework: Engineering Mechanics || Systems Physiology || Electric Circuits || Business of Technology

EXPERIENCE

BOSTON SCIENTIFIC Marlborough, MA
Global Quality Systems Engineer Intern May 2023 - Aug 2023

- Engaged in investigative work operating SAP for Corrective Action Preventative Action (CAPA) processes, reviewing product design changes, and change notices.
- Designed and developed SharePoint sites for teams working on Medical Electrical Equipment and Global Quality, to automate business processes and improve data management.
- Collaborated with Product teams to propose a Real-Time Aging project to transfer products from 3rd party storage to on-site, demonstrating an understanding of Product Lifecycle Management (PLM).
- Collaborated in ensuring product compliance with international and federal regulations, including IEC 60601, ISO 13485, and FDA guidelines for medical devices.

CHIPOTLE MEXICAN GRILL Boston, MA
Certified Service Manager Sep 2019 - Present

- Oversaw daily operational management of restaurant, ensuring customer service excellence, and led comprehensive training programs for new staff to uphold brand standards and operational efficiency.
- Controlled food inventory and supervised food quality daily to ensure it is up to standards.

BOSTON UNIVERSITY SCHOOL OF MEDICINE Boston, MA
Research Assistant Jul 2022 - Jan 2023

- Communicated with and scheduled over 100 research participants for study data collection.
- Served as Research Coordinator and Program Manager to organize, report data, and conduct data analysis weekly.

UT SOUTHWESTERN MEDICAL CENTER Dallas, TX
Pathology/Cytology Lab Assistant May 2019 - Sep 2019

- Received and identified samples of over 1,000 hospital patients and prepared reports with reliable data for lab directors to review on a weekly basis.
- Performed laboratory tests on patient samples and interpreted results based on findings, daily.

PROJECTS

SENIOR DESIGN PROJECT, BU Medical Center Sep 2023 - Present

- Identified optimal imaging system and software for analysis of C.elegans images/videos.
- Implemented computerized system to analyze C.elegans behavior in response to Ketamine exposure.

WIRELESS RODENT TRAP, Engineering Product Innovation Center Aug 2022 - Nov 2022

- Engineered detailed hardware prototypes from conceptual sketches utilizing advanced 3D modeling software such as SolidWorks precise fabrication and assembly.

SKILLS

Computer: MATLAB, Python, 3D Modeling (Solidworks), Google Workspace, Microsoft Office 365.
Language: English (Fluent), Spanish (Fluent).
Laboratory: Chemistry/Biology Wet Lab Experience, BioRAFT Safety Certified, CITI Research Certified.
Sales: Strategic Account Management, Customer Relationship Management (CRM), Market Analysis.

LEADERSHIP

Society of Hispanic Professional Engineers, Vice President of External Affairs May 2023 - Present

- Spearheaded fundraising initiatives secured over $7000 in sponsorship, bolstering chapter's resources for professional development events.

Co-Recreational League, Co-Recreational Soccer Captain Aug 2022 - May 2023

- Led a diverse team of 10 players in fall season, fostering a culture of teamwork and resilience.

Christian Montoya Jimenez

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EDUCATION

Boston University
Boston, MA
Bachelor of Science, Biomedical Engineering — Sep 2020 - May 2024

PRODUCT DEVELOPMENT EXPERIENCE

Device Design Project
Boston, MA
Team Member, Sep 2023 – December 2023

- Researched potential markets and established an unmet need target
- Performed necessary background research to write a proposal
- Prepared a preliminary design review with value proposition for mock investors
- Interviewed 5 potential stakeholders (real users and medical professionals)
- Integrated feedback into 3 rounds of prototyping with 2 more design reviews
- Manufactured working prototype for under $50
- Performed killer experiments, proving the device could support over 200lbs and maintain stability on 6 different surfaces

ACADEMIC PROJECTS

languagedelay.org, Oct 2023 (Ongoing), Boston MA

- Consolidated information from Andrey Vishedskiy's *This Way to Language: Four Things to Do at the First Sign of Autism* into a free crowd-sourced wiki page
- Wrote and presented project proposal establishing target market, specific aims, and impact on users to over 50 people
- Created procedures for general use and moderation by users
- Collected user feedback and updated design with added graphics and adjusted navigation features

Truss Design, Aug 2022 - Nov 2022, Boston, MA

- Designed and virtually tested various truss configurations within specifications
- Created CAD drawings of potential designs and optimized member lengths and angles to maximize strength while keeping load-cost-ratio low
- Assembled and tested acrylic model the truss capable of holding 2000 grams

Flood Detector, Feb 2022 - Apr 2022, Boston, MA

- Designed/produced a working prototype of a lamppost-mountable flood detector capable of detecting flooding 3 inches above street level and sending out email alerts
- Utilized Arduino, sonic sensors, and ESP8266 for measurements and wifi communication
- Made and utilized models to test detector at various steps of the process
- Employed iterative design strategies to identify strengths/weaknesses in prototypes

AFFILIATIONS

Boston University Fencing Club, Men's Sabre Captain/Armorer, Sep 2023 (Ongoing), Boston, MA

- Planned and lead drills for groups of 6-10 people twice a week
- Collaborated with coach and e-board to plan/run practices, social events, and fundraisers
- Ensured all 24 competing members had working equipment for competition dates
- Diagnosed and fixed broken equipment
    - Tested conductivity, replaced/tightened parts, soldered circuits, cut/replaced wires, straightened blades, checked/reassembled connectors, cleaned contacts

SKILLS

Arduino, MATLAB, NUPACK, Design, Prototyping, Spectroscopy, Teamwork, Microsoft Excel

Sharani S. Nasankar

20 Swan Street Malden, MA 02148

sharani@bu.edu | 857-505-6191

EDUCATION

Boston University, College of Engineering **Expected May 2024**

Bachelor of Science in Biomedical Engineering (Pre-Dental) *GPA: 3.86*

LEADERSHIP AND WORK EXPERIENCE

Draper **Cambridge, MA**

Undergraduate Research Assistant *September 2023 - Present*

- Modify and assist in the design of a 3D-printed microfluidics device used to stimulate the tumor microenvironment for detection of various cancers and
- Conduct cell culture incubation and cancer therapy validation

Boston University Engineers Without Borders **Boston, MA**

Co-president *January 2023 - January 2024*

- Assessed the needs and living conditions of residents in Tinet, Kenya alongside club members, resulting in the design and implementation of a clean water system tailored to the community
- Ensured all EWB-BU projects align with the EWB-USA mission statement
- Mediated any issues that arise during the club meetings ensuring that all members were heard and that decisions were made collaboratively

Treasurer *January 2021 - December 2022*

- Proposed projects to perspective sponsor and donors to increase funding
- Created budgets and manage funding allocations to different groups within the club
- Raised over $10,000 dollars for the club's international projects through various events

Boston University Artemis Project **Boston, MA**

Artemis Project Coordinator *June 2022 - August 2022*

- Organized and implemented a 5-week structured circuit to teach incoming high school freshman to code using Scratch, HTML with CSS, Appinventor, Python and Micro:bits
- Designed hands-on, experiential learning activities, lesson plans, & multifaceted coding projects involving concepts of AI, cryptography, and graph theory

PROJECTS

Cell Tissue Incubator, Boston University *September 2021 - December 2021*

- Built a portable incubator to monitor cells at optimal temperature and humidity conditions indicated by the user for 90 minutes and notify the user if conditions go outside the range
- Wired circuit powered by 10V battery and coded the respective program for the system using Arduino IDE

Hanhminh Nguyen

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EDUCATION

Boston University, College of Engineering — **Boston, MA**
B.S. in Biomedical Engineering, Minor in Electrical Engineering — Expected May 2024
Higher Technical School of Engineering — **Madrid, Spain**
Semester Abroad — Spring 2022

Relevant Coursework:

- Biomedical Measurements | Systems Physiology | Thermodynamics & Statistical Mechanics
- Device & Diagnostics Design | Biomedical Material Science | Intro Biomedical Optics

EXPERIENCE

Undergraduate Researcher, B.U. Pratt Lab — March 2023 – Present

- Examine intricacies of DNA in relation to tumors and pancreatic cancer using digital droplet PCR technology for liquid biopsy samples.
- Investigate the impact of incorporating PCR enhancers into existing pre-amplification protocol.

PROJECTS

Structural and Compositional Kinetics of α-Synuclein and its Pathological Mutants in Living Cells by Fluorescence Guided Mid-Infrared Photothermal Spectroscopy — Sep 2023 – Present

- Characterize changes in secondary structure of α-synuclein's mutants *in vivo* to better understand Parkinson's disease pathology.
- Examine lipid interaction with α-synuclein's mutants *in vivo*.

Technical Review of Live Cell Imager — May 2023

- Curated a cell culture to demo how instrument works and functions.

At-Home Fetal Monitoring Device — Jan 2023 – May 2023

- Collaborated with team of 4 engineers to design a prototype for detecting fetal health signs and relaying that information back to the user.
- Consulted with stakeholders and interviewed experts to create value proposition and receive feedback on design prototype.

Cardiovascular Response to Music Tempo — Sep 2022 – Dec 2022

- Worked with 3 other students to explore the impact of music tempo on test subjects' heart rates.
- Summarized our findings in a final report and discussed whether our results had statistical significance.

SKILLS

Laboratory: Data Analysis, Experiment Planning, ddPCR, qPCR optimization, Droplet Generator
Software: MATLAB, NUPACK, C, QX Manager, Microsoft Office, Google G Suite
Language: Spanish (conversational), Vietnamese (conversational)

LEADERSHIP

Treasurer, New England Intercollegiate Vietnamese Student Association — Sep 2021 – Aug 2022
Shift Supervisor, J.P. Licks Assembly Row — May 2021 – Nov 2021

Isabelle Nguyen

978-868-4804 || izzyknguyen@gmail.com || linkedin.com/in/izzy-nguyen
Engineering Portfolio: https://izzyknguyen.wixsite.com/design-portfolio/

EDUCATION

Boston University, College of Engineering Boston, MA | **May 2024**
Bachelor of Science in Biomedical Engineering & Mechanical Engineering

PROFESSIONAL EXPERIENCE

DropGenie Cambridge, MA
R&D Engineering Intern November 2023 – Present
- Designed prototype to house hardware for low-volume, high-throughput microfluidic genomic editing system
- Increased operational efficiency of PCB fabrication via the design and implementation of an automated dip coater
- Prototyped rack to securely hold consumables throughout the production, testing, and shipping process
- Manufactured PCBs within a controlled cleanroom environment ensuring reliability for further biological testing
- Assembled and serviced interface docks to ensure proper electrical connections for digital microfluidic testing
- Imaged surfaces of 30+ PCBs to troubleshoot points of failure and enhance quality control efforts

ThermoFisher Scientific Asheville, NC
New Product Development Engineering Intern May – August 2023
- Introduced temperature sensor storage design for UI display to decrease temperature fluctuation by ~400%
- Designed and implemented 8 engineering test plans to evaluate cold storage units for longevity and quality issues
- Preformed gauge R&R on 50+ Ultra-Low Temperature units to quantify warping & inform product deviation
- Conducted QFD and VAVE cost analysis to support new project scoping that decreased cost of units by 30%
- Produced and organized device master records for an onsite ISO13485 audit

StataDX Boston, MA
R&D Engineering Intern May 2022 – May 2023
- Analyzed performance of 5+ microfluidic cartridge designs for future integration with electrochemical biosensors
- Prototyped 15+ microfluidic designs with a laser cutter to determine most efficient inlet and outlet geometries
- Designed & fabricated fixture to increase sensor production capacity by 250% and production efficiency by 17%
- Created potentiostat fixture to use custom cyclic voltammetry protocol to test biosensors for reliability
- Customized prototype testing protocol to showcase device microfluidic capabilities for board meeting
- Preformed testing on 10+ materials for assay and reagent compatibility for cartridge construction

Terrier Motorsport Boston, MA
President November 2021 – Present
- Managed 200+ students on a 4-year engineering project to design, build, and test a fully electric race car
- Increased club engagement and participation by ~130% by introducing CAD workshops to onboard members
- Secured over $10,000 a year by setting up and leading fundraising meetings with potential sponsors

Suspension-Chassis & Electrical Engineer September 2020 – 2021
- Designed double-wishbone suspension in Solidworks to lower center of gravity and improve serviceability
- Validated 4+ mounting bracket designs with FEA for safety according to Formula Hybrid & Electric rule book
- Developed a power distribution board in KiCAD to safely power low-voltage safety system

SELECTED PROJECTS

Application of Microstructured Tissue Fastener to Pre-Clinical Medical Device Cambridge, MA
Draper Laboratory & Boston University September 2023 – Present
- Identified and validated application of Draper's mechanical adhesion to tissue (MANTIS) technology to a pre-clinical medical device through series of tests to identify mechanical adhesion and drug delivery capabilities

Cartesian Motion System: Lite-Bright Device Boston, MA
Boston University Product Design February – April 2023
- Designed and manufactured cartesian motion system to pick and place lite-brite pegs into a predetermined pattern

LEADERSHIP & ACTIVITIES

ViUSFSS || Project Manager August 2023 – Present
Boston University Synchronized Swimming || Vice President September 2022 – Present

ADDITIONAL SKILLS

Design Software: SOLIDWORKS, Fusion 360 Generative Design, Onshape, Ansys, KiCAD, Altium, SnapGene
Manufacturing Software: GibbsCam, Ultimaker Cura, Prusaslicer, GrabCAD Print (Stratys)
Fabrication: Soldering, Lathe, Manual Milling Machine, CNC Mill, Laser Cutting, Water Jet, MIG & TIG Welding, FDM & SLA 3D Printing, BIO x 3D Bioprinting, Clean Room PCB Fabrication
Laboratory Skills: Sandwich ELISA, Sanger Sequencing, Gel Electrophoresis, DNA Extraction, Restriction Enzyme Digestion, qPCR, Chromatography
Programing Language: MATLAB, Arduino IDE, C, Java, Python

JIAHE NIU

jniu@bu.edu | 216-544-2367 | Cambridge, MA

EDUCATION

Boston University, College of Engineering Boston, MA
Bachelor of Science, Biomedical Engineering and Computer Engineering Aug 2024

- 3.53/4.00 GPA

EXPERIENCE

Han Lab, Boston University Boston, MA
Research Assistant Jun 2022 - Present

- Established an innovative method for choosing current utilized in chronic deep brain stimulation experiments in mice based on a transient current mapping
- Demonstrated expertise in data analysis by creating efficient MATLAB code to enhance an existing pipeline process, resulting in improved calcium imaging data processing and analysis capabilities
- Generated comprehensive reports and visualizations to communicate findings and insights to research team, facilitating data-driven decision-making processes

Probability, Statistics, and Data Science, Boston University Boston, MA
Teaching Fellow (Undergraduate) Sep 2022 - Present

- Facilitated student learning and academic success by grading and providing comprehensive feedback on homework assignments for a diverse cohort of 240+ students on a weekly basis
- Lead engaging and productive office hours, offering guidance and support to up to 50 students in addressing code-related challenges and clarifying conceptual knowledge gaps

PROJECTS

Classifying Human Gait Features with Machine Learning Aug 2023 - Present

- Developed a comprehensive protocol and MATLAB/Python codebase for collecting and analyzing gait data using wearable inertial sensors
- Implemented Dynamic Time Warping algorithms to accurately detect gait phases (swing/stance) by aligning data to annotated step cycle templates
- Constructed Long Short-Term Memory (LSTM) neural network models using Keras API within the TensorFlow framework for regression-based prediction of key gait events like swing and stance
- Applied findings towards enhancing gait analysis for auditory/tactile interventions in neurological rehabilitation

CIFAR-10 CNN Classification Project Dec 2023

- Developed a convolutional neural network (CNN) to classify images in the CIFAR-10 dataset
- Utilized the PyTorch framework for data management and implementation of the neural network
- Implemented the neural network and managed data with the PyTorch framework
- Achieved over 85% test accuracy with the model

Analyzing Reasoning Behavior Using Brain Network Atlases Jan 2019 - May 2021

- Developed individualized brain network atlases for 27 participants by iteratively reassigning brain regions to optimize alignment with each individual's functional connectivity patterns
- Compared the standard Schaefer 400 brain atlas to the personalized atlases, finding that sensory networks (visual, somatomotor) were highly consistent across subjects, while associative networks (cognitive control, attention, default mode) showed substantial individual variability
- Observed that nodes originally assigned to the cognitive control network in the standard atlas were most likely to be reassigned to other associative networks (dorsal/ventral attention, default mode) in the individualized atlases

PUBLICATION

Conference abstract: "Prolonged Hippocampal Deep Brain Stimulation Leads to Heterogeneous Cellular Responses in CA1 Neurons", 3rd author, International Neuromodulation Society (INS) May 2024, Vancouver, accepted

OWEN O'BRIEN

Boston, MA, 02110 Cell. 978-818-0664
owenobo@outlook.com

EDUCATION

Boston University, Boston, MA **GPA:** 3.23/4.00
Bachelor of Science (B.S.) Biomedical Engineering Candidate *May 2024*
Sub-concentration in Nanotechnology

- **Relevant Coursework:** Biomedical Measurements I/II, Probability/Data Science, Intro to Nanotechnology, Molecular Bioengineering, Signals & Controls, Physics I-III, Device and Diagnostics
- **Extracurricular Activities:** Biomedical Engineering Society, BU Arabs, BU World Languages and Literatures Association

George Washington University, Washington D.C. **GPA:** 3.68/4.00
Completed coursework towards Bachelor of Arts (B.A.) Undeclared (May 2021)

EXPERIENCE

IMEP-LAHC Lab Université Savoie Mont Blanc **Chambéry, France**
Research Intern for Terahertz Imaging *May 2023 – July 2023*

- Tested terahertz (THz) time domain imaging techniques on dopamine pellets
- Synthesized raw data collected into a graphical representation of absorption coefficient based on Beer's Law through use of computer programming developed at lab
- Concluded a significant absorption peak of terahertz waves by dopamine at certain ranges
- Practiced steps to conducting independent research
- Learned basics of terahertz imaging and its biomedical applications

PROJECTS

Improved Carbon Monoxide Oximeter: *Spring 2023*

- Researched a pulse oximeter accounting for light crosstalk with varying melanin levels
- Theorized improvements to implement based on biological background research
- Presented findings in an investor-pitch style to professors and advisors
- Received feedback on how to enhance proposed design

Plant Grow Lamp: *Spring 2022*

- Constructed a windowsill grow lamp based on specifications outlined by clientele
- Simulated real life product design process and procedures
- Soldered and wired electrical components based on circuit analysis calculations
- Collaborated as a conglomerate of engineers (Biomedical, Mechanical, and Electrical/Computer)

Temperature Regulating Box: *Fall 2021*

- Created a box to detect ambient temperature and to alert user when out of specified range
- Programmed an Arduino Uno to incorporate temperature regulating characteristic
- Planned device layout using CAD modeling
- 3D Printed intricate structural components

ADDITIONAL SKILLS

Technical: Python Programming, MATLAB Programming, CAD, Java, Soldering, 3D Printing, Gel Electrophoresis, DNA Extraction, Restriction Enzyme Digestion, qPCR, Chromotogprahy
Language: English (Native), German (Intermediate)

FERNANDO ORTIZ

fjortiz@bu.edu | (787) 568-7786 | 860 Beacon Street | Boston, MA 02215

EDUCATION

Boston University Boston, MA
Bachelor of Science, Biomedical Engineering Expected May 2024

- Relevant Coursework: Thermodynamics, Signals and Controls, Principle of Molecular Cell Biology, Biomedical Measurements 1 and 2, Device and Diagnostic Design, Transports, Intro to Nanotechnology, Intro to Materials Science.

EXPERIENCE

Aegis Protection Group Boston, Massachusetts
Security Guard Oct 2021 - Present

- Coordinated and ensured safety of thousands of people at crowded entertainment venues around the Boston area.
- Cooperated closely with Boston Police Department and Boston Medical Services to make sure a venue with capacity of 5000 people is following Massachusetts laws and safety regulations.

Warren Dining Hall Boston, Massachusetts
Student F.O.H. Worker Jan 2021 - Oct 2021

- Served with people in a busy and fast paced environment to provide efficient customer service at BU and the 32,000 students with access to the dining hall.
- Communicated efficiently with Back of House staff through 6 hour shift to be able to satisfy guests in a timely manner.

Vicenty Heres y Asociados San Juan, Puerto Rico
Engineering Intern May 2021 - Aug 2021

- Developed a Start up and Commissioning plan to effectively expand business from Puerto Rico into select Florida distilleries over a one year period.
- Sorted through documentation of water treatment data and cross-referenced the data to current E.P.A. guidelines.

PROJECTS

Klapperich Laboratory Sep 2023 - May 2024

- Modeled Uterine Fibroids, through a preliminary study with MCF-7 cells by conducting cell culturing and growing spheroids using cancer cells.
- Incorporated carbon encapsulated nanoparticles into spheroid culturing to aid in the creation of the spheroids and increase circularity ratio of spheroids closer to one.
- Conducted MTT Assay to test viability of the spheroids after the cell culture process by comparing cells to a standard curve and striving for as close to 100 percent viability.

Concussion Helmet Prototype Sep 2023 - Dec 2023

- Designed and prototyped a device to show hit location and force in 360 radius around the head while players are on field.
- Interviewed six stakeholders to gather data on market need and human factors.

Cell Microscopy Chamber Sep 2021 - Dec 2021

- Collaborated to Designed Chamber capable of maintaining 95 percent relative humidity and 36 C through 37 C temperature for a period of 90 minutes.

SKILLS

Programming Languages: MATLAB, C.
Hardware: Arduino Uno, Soldering, Laser Printing.
Software/Tools: Onshape, Microsoft Excel, Google Drive, Google Spreadsheet, Outlook.
Languages: English, Spanish.
Lab: Autoclave, Cell Culture, Lab Safety, Microscope Use.

LOGAN PACKARD
logan02@bu.edu | (781) 541-0068 | Needham, MA

EDUCATION

Boston University — Boston, MA
BS Biomedical Engineering, GPA 3.41 — Expected May 2024
Biology Minor, Nanotechnology Concentration

Instituto Católico de Artes e Industrias — Madrid, Spain
Study Abroad — Spring 2022

Relevant Coursework

Cellular and Molecular Biology	Thermodynamics	Biomedical Optics
Programming for Engineers	Modern Physics	Electrical Circuits

RESEARCH EXPERIENCE

Undergraduate Researcher- Boston University Bigio Lab — November 2022 - Present

- Imaged myelin in brain samples using birefringence microscopy and analyzed for damage manually, with circular statistics, and with a deep learning model
- Wrote code in MATLAB for GUI for viewing images, image processing, and deep learning systems
- Designed diffuse illumination device for microscope in Solidworks and machined using GibbsCam on a CNC mill and with a manual lathe

Undergraduate Researcher- Boston University Cheng Lab — September 2023 - Present

- Cultured genetically-modified yeast samples and induced them to produce Parkinson's-related proteins in wet lab
- Imaged protein samples in-vitro with mid-infrared spectroscopy system
- Coded and performed analysis of the spectra in MATLAB, Origin, and R to isolate relevant data and compared protein mutants using ANOVA statistical test

PROJECTS

Fetal ECG — Spring 2023

- Worked collaboratively with a team to design and build a device to measure a fetal ECG easily and cheaply outside of clinical settings
- Consulted with stakeholders and conducted interviews to determine the requirements for the device
- Tested fetal ECG with a TENS device to model the electric signal of a fetal heartbeat

SKILLS

- Programming in MATLAB, Python, and HTML
- Spanish speaking, reading, and writing

AWARDS AND PUBLICATIONS

- Distinguished Summer Research Fellowship summer 2023
- Paper “Quantifying Myelin Degradation Using Quantitative Birefringence Microscopy and Deep Learning” presented at Optica conference March 2024

ARYA PADALKAR

arya.padalkar@gmail.com | 732-890-8158 | linkedin.com/in/arya-padalkar/ | Boston, MA

EDUCATION

Boston University College of Engineering Boston, MA
Bachelor of Science, Biomedical Engineering Expected May 2024

Relevant Coursework: Biomaterials | Biomechanics | Business Innovation & Technology | Computational Programing (MATLAB & C) | Device Design & Diagnostics | Electrical Circuits | Nanotechnology & Nanomaterials | Tissue Engineering | Thermodynamics |

EXPERIENCE

Amneal Pharmaceuticals Quality Management Intern Piscataway, NJ
Quality Management Intern June 2023 - August 2023

- Digitized records of laboratory data, batch records, and other quality documents to streamline record keeping.
- Investigated quality issues and deviations; Debugged server errors with the IT team to resolve issues.
- Conducted internal audits to ensure compliance with cGMP regulations and company policies and procedures.
- Performed manufacturing practices up to FDA regulation using SOPs and other quality documents.

Summit Medical Group Woodland Park, NJ
Molecular Lab Intern June 2022 - July 2022

- Performed laboratory duties handling COVID-19, blood panels, urine samples, procedures, and specimen issues.
- Loaded PCR samples into a processing machine, completed bio fire respiratory and gastrointestinal processing procedures.
- Maintained patient records with Copia, Athena, and OEL.
- Studied equipment validation processes for FDA approved internal devices at Summit Health.

Waksman Student Scholars Program Edison, NJ
Student Researcher September 2019 - June 2020

- Examined, identified, and sequenced the DNA of a Landoltia Punctata clone through DNA purification, PCR analysis, and gel electrophoresis to identify the purpose and interference of the system.
- Published research and results of DNA sequencing with BLAST in the NCBI database.

PROJECTS

Melanin Based Pulse Oximeter
Associated with Apnimed, Inc and Sleep Disordered Breathing Lab at Brigham & Women's Hospital

- Design portable oximeter for accurate measurement of oxygen saturation across a wide range of skin tones.
- Measure and simulate melanin using Elastic Scattering Spectroscopy (ESS) and silicone optical phantoms to determine algorithm parameters to correct oxygen saturation values according to melanin absorption.

UPACK IUD Kit

- Designed prototype kit as a method for medical professionals to reduce pain of insertion of an intrauterine device to prevent potential user discomfort.
- Applied device design, 3D printing, thermoforming and conducted failure assessments and risk assays.

Temperature Sensing Monitor

- Designed temperature sensor prototype alerting users with a blinking red LED and buzzer when temperature was out of a user-defined temperature range.
- Build after thorough planning through CAD, circuiting, hands-on engineering, soldering, and Arduino Uno programming.

Machine Learning COVID-19 Data

- Applied MATLAB and machine learning to analyze external data for states.
- Organized data by risk according to numerical COVID-19 cases in team of 3.

SKILLS

Computer: CAD, Canva, C, Google Drive, MATLAB, Microsoft Office
Laboratory Skills: Device Validation, PCR analysis, Biomedical Optics, Elastic Scattering Spectroscopy (ESS), Optical Phantoms
Other: Risk Analysis, GMP & SOP, Prototyping, FDA Regulations, Quality Management, Social Media Management

LEADERSHIP

Boston University Biomedical Engineering Society, Public Relations Chair September 2021 - May 2024

- Advertised by creating social media posts and managing social media accounts to encourage involvement.
- Advised 14 young undergraduate students on academic and professional development.

Marianne Palmieri

914-830-7630 | mpalm@bu.edu | Boston, MA | www.linkedin.com/in/mariannepalmieri

EDUCATION

Boston University Boston, MA
B.S. Biomedical Engineering Expected May 2024
Concentrations: Technology Innovation and Machine Learning

Relevant Coursework: Human Brain Mapping, Biomechanics, Signals & Control Systems, Probability, Statistics, & Data Science, Machine Learning from Data, Technology Innovation, Device & Diagnostics Design

SKILLS

Computer: MATLAB, C/C++, R, Python, KLayout, CNST Nanolithography Toolbox, Microsoft Office, Overleaf
Lab: Electron Microscopes, Experimental Design, Pipetting
Manufacturing: Electronic Circuit Design, Soldering, Prototyping, Nanofabrication, PCB Design, Computational Modeling, CAD, 3D Printing, Electrode Design, Microelectronics

EXPERIENCE

Undergraduate Laboratory Researcher December 2022 – Present
BU Przytycki Laboratory Boston, MA

- Predict cell malignancy using R programming, Python, and machine learning techniques by analyzing single-cell RNA sequencing and chromatin accessibility data.
- Employ statistical methods, including exploratory analysis, to initiate prediction of cancerous cells via gene expression and chromatin accessibility patterns.

Computational Engineering Intern May – August 2023
Neural Dynamics Technologies, Inc. Boston, MA

- Created Python-based automated CAD software using CNST Nanolithography Toolbox, enhancing precision, efficiency, and scalability of custom electrode design for customers and medical professionals.
- Harnessed interdisciplinary knowledge of neuroscience, nanofabrication, and PCB design for electrode manufacturing.
- Applied computational modeling and microelectronics expertise to instigate the transition from animal models to deep brain stimulation electrodes for Parkinson's and epilepsy patients.

SELECTED PROJECTS

Novel Microstructure Tissue Fastener, Draper Laboratory, Senior Design Project

- Apply MANTIS tissue fastening technology to address clinical requirements and produce a medical device.
- Lead student team in research of clinically relevant application of MANTIS and biomechanical tissue adherence testing.
- Collaborated in NIH SBIR/STTR report writing, prototype microfabrication and drug coating testing.

Innovated Speculum Device, Device & Diagnostics Design Class, Group Project

- Developed a gynecological speculum to improve patient care and comfort in full product development cycle, involving CAD design, 3D printing, data acquisition, and mechanical testing.
- Spearheaded research within female medical device industry to generate 3D model on Onshape, leading prototyping through 3D printing.

Drug Preservation Device, Engineering Product Design Class, Group Project

- Designed, programmed, and built a device prototype to preserve drugs in a controlled environment by maintaining product within 20-25°C and <60% humidity.

Additional Projects: Crime Rates and First Response Correlation and Analysis, Truss Mechanical Project, Perceptron vs. Winnow, Cats vs. Dogs Binary Classification, Business Innovation Identification and Analysis.

LEADERSHIP, HONORS, and AFFILIATIONS

President, HackHardware Club, Boston University
Richard D. Cohen Scholarship Recipient, Boston University
Personal interests include hiking, cooking, and travel.

Jung Won Park

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Education:

Bachelor of Science in Biomedical Engineering *Expected,* May 2024
Boston University College of Engineering | Dean's List Boston, MA

Relevant Coursework
Fluid Mechanics | Transport Phenomena | Signals & Controls | Materials Science Engineering and Biomaterials
Biomedical Measurements | Dynamics | Statics | Engineering Design | Systems Physiology | Organic Chemistry I

Research Experience:

Undergraduate Research Assistant (Mentor: Dr. Hadi Nia) April 2023 – Present
Department of Biomedical Engineering, Boston University Boston, MA

- Assisting lab members with fabrication of the Crystal Ribcage platform–a biocompatible rib cage that allows real-time imaging of functioning lung down to cellular resolution– and its custom hardware
- Granted *Student Research Award* by Boston University Undergraduate Research Opportunities Program

Projects:

Developing the Human Crystal Ribcage, Senior Capstone Project at Nia Lab Fall 2023 – Present

- Analyzing National Lung Screening Trial (NLST) database to design human chest cavity molds
- Developing and fabricating a prototype Crystal Ribcage that can withhold -30 cm H_2O pressure difference

Fabrication of the Murine Crystal Ribcage and Custom Hardware, Nia Lab Summer 2023 – Present

- Fabricated various components of the murine Crystal Ribcage and its custom supporting hardware
- Trained in fabrication process from mold printing/sanding to building custom hardware connecting microcontroller, sensors, functioning lung, and ventilator

Teaching Experience:

Boston University Boston, MA

- **Grader,** Transport Phenomena (ENG BE435) Spring 2024
- **Teaching Assistant,** Engineering Design (ENG EK210) Summer, Fall 2023
  - Assisting 2 instructors with advising a class of ~25 students on various steps of their design project
  - Hosting 6 hours/week of office hours with another TA without direct faculty supervision (up to ~100 students)
- **Grader,** Signals and Controls (ENG BE403) Fall 2023
  - Setting rubric, grading submissions, and leaving individual learning feedback for ~125 students
- **Grader,** Computational Linear Algebra (ENG EK103) Spring 2023

Mentoring/Tutoring Experience:

Private Tutor, Freelance September 2018 – Present

- Leading a network of tutors to introduce each prospective student to the tutor with similar schedule and interests
- Tutoring AP courses to high school students aspiring to study abroad in U.S. colleges (5.0/5.0 rating on 2 websites)
- Mentoring at least 2 students per year to various engineering schools in the U.S.

Mentor, Boston University College of Engineering Sophomore Mentoring Program September 2022 – Present
Mentor, Biomedical Engineering Society at Boston University September 2023 – Present

Skills:

SolidWorks, Custom Printed Circuit Board Design, Laser Cutting, CNC Milling, 3D Printing, Thermoforming, MATLAB, Arduino IDE/C++, ImageJ/Fiji, Korean (Native), Mandarin (Proficient)

Marin Perez

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maripere@bu.edu

Education

Boston University College of Engineering Boston, MA
Bachelor of Science Biomedical Engineering May 2024
Double minor in Public Health and Human Physiology
GPA: 3.62 - Dean's List
Relevant Coursework: Signals & Controls, Systems Physiology, Device Diagnostics & Design, Gross Human Anatomy, Biomechanics of Human Movement, Global Environmental Public Health, Epidemiology, Engineering Design, Organization & Delivery of Healthcare in the US, Thermodynamics & Statistical Mechanics, Biomedical Measurements

Experience

Engineering Intern
Galaxy Therapeutics Milpitas, CA May - Aug. 2023

- Worked with the engineering team on mid-stage development of the SEAL (Saccular Endovascular Aneurysm Lattice) System, an intrasaccular flow diverter
- Executed Design Control activities for product development including updating and creating product specifications, risk analyses (dFMEA, pFMEA), solid models, and device drawings
- Drafted and carried out test protocols for Design Verification and Life/Reliability tests
- Assisted manufacturing team on incoming inspections, device packaging, and inventory management

Research Intern
UCSF Physical Therapy School of Medicine San Francisco, CA Jun. - Aug. 2022

- Conducted research regarding foot health in diabetic neuropathy and chronic kidney disease through biomechanics (3D motion capture) data collection and processing
- Performed retrospective study on UCSF outpatients to assess relationships between demographics, health status, and healthcare utilization in chronic low back pain patients using PROMIS global health scores
- Researched the prevalence and influence of diabetes in healthcare utilization and health status through a retrospective study on UCSF physical therapy outpatients
- Attended and presented abstracts at UCSF Health Equity and Anti-Racism Symposium 2022 and APTA Combined Sections Meeting in San Diego 2023 (abstracts available upon request)

Projects

Progressive Carbon Dioxide Emissions Tax Calculator

- Developed a MATLAB app to calculate a proposed tax rate based on carbon emissions and the country's wealth
- Analyzed 23,000 data points of CO2 emissions and GDP from different countries between 2000 and 2016 to assess the relationship between their wealth and CO2 emissions

Adaptive Guide Light System

- Prototyped a scalable pathway lighting system to aid visually impaired populations in navigating indoor and outdoor environments based on research of light intensity and wavelength optimizing for target population
- Coded for multiple settings using Arduino Uno, programmed with C++: illumination mode catered to the consumer market; and museum mode for venues that control the flow of people for COVID-19

Temperature Monitor Prototype

- Developed a thermostat to monitor outside temperature to assist with transporting substances at constant temperature, alerting users with a melody when the temperature is outside the range of 20-25 degrees Celsius

Skills

Software: MATLAB, C, CAD Onshape, Figma, Solidworks, Ultimaker Cura, SPSS, JMP Studio, Procreate, Office 365
Lab: cell culture, UV-Vis, gel electrophoresis, PCR, NMR spectroscopy, oscilloscope, titration, SEM, product identification
Mechanical: soldering, mechanical drawings, wire Arduino to analog and digital I/O, laser cutter

Leadership & Outreach

Engineering Tutor
Boston University Boston, MA, Jan. - May 2023
Emergency Medical Technician
Magen David Adom Petach Tikva, Israel, Oct. - Dec. 2019

Raghavan Ramaswamy

Cupertino, CA | LinkedIn | (669) 237-8916 | raghu@bu.edu

EDUCATION

Boston University | College of Engineering — **Boston, MA**
Bachelor of Engineering In Biomedical Engineering — *May 2024*

Cupertino High School — **Cupertino, CA**
High School Diploma — *June 2021*

Relevant Coursework: Differential Equations, Static & Dynamic Mechanics, Electric Circuits, Advanced Computer Science, Systems Physiology, Engineering Design, Computer Aided Design, Fluid Dynamics, Device Diagnostics, Continuum Mechanics*, Thermodynamics* (*Courses currently being taken)

EXPERIENCE

Nia Laboratories — **Boston, MA**
Lab Assistant — *March 2023 - Present*

- Developed a pioneering ventilation system that facilitates the lung's inherent relaxation to air pressure. This groundbreaking approach provides valuable insights into the lung's natural behaviors and responses to various conditions, including diseases like cancer and physical injuries.
- Designing and creating of a six degrees of freedom (6-DoF) robotic arm, specifically tailored to hold and manipulate pig lungs. This innovation enables precise observation and study under optical microscopes, enhancing our understanding of lung morphology and function.
- Transitioning current investigations from mouse lungs to pig lungs, achieving a more representative model and gaining insights into human lung responses more accurately.

Naval Sea Systems Commands — **Keyport, WA**
Biomedical and Mechanical Engineering Intern — *May 2023 - July 2023*

- Utilized SolidWorks to engineer an ergonomic mount for neck-support exoskeletons, aiming to alleviate physical strain on pilots and crane operators. This innovative solution contributed to a marked reduction in Musculoskeletal Disorders (MSDs).
- Successfully diagnosed and rectified issues with a malfunctioning 3D printer through meticulous dismantling. Established a comprehensive repair procedure guide to streamline future maintenance and repairs, ensuring continuity and minimal downtime.
- Spearheaded the design and creation of a scaled-down model of a UUV, effectively showcasing the division's product capabilities to potential clients and stakeholders.

Engineering Mechanics: Statics — **Boston, MA**
Teaching Assistant — *September 2022 - May 2023*

- Instructed college students in resolving complex static and dynamic challenges within 3-D environments, enhancing their proficiency in spatial problem-solving.
- Bolstered students' comprehension during office hours by breaking down intricate problems and elucidating concepts through diverse perspectives, ensuring a deep-rooted understanding of core principles.

PROJECTS

Terrier Therapeutics: Assistive Glove — **Boston , MA**
Project Manager — *Jan 2023 - May 2023*

- Spearheaded the ideation, blueprinting, and execution of pioneering prototypes for assistive gloves. These gloves were meticulously designed to support those with arm weaknesses, making daily tasks more manageable and fostering self-reliance.
- Utilized advanced Solidworks techniques to generate detailed 3D visualizations, highlighting the product's features and guiding iterative refinements.
- Innovated in the design of soft pneumatic actuators, fusing balloons with precision 3D-printed components. This integration was pivotal in aiding individuals with Neurodegenerative disorders, thereby uplifting their day-to-day life and offering increased mobility.
- Developed and presented highly accurate aesthetic ("looks like") and operational ("works like") prototypes to potential investors. Effectively communicated the product's distinct advantages and its transformative potential for the target demographic, securing significant interest and backing for future endeavors.

Izant Projects: Using robotics to assist quadriplegic Veterans — **Cupertino, CA**
Project Manager — *May 2019- June 2021*

- *Robotics Easel to help veterans paint*
  - Design 3 axis mechanical easel to help veterans paint without the use of their hands.
  - Adapted to constraints like sizing, materials allowed and built efficient and simplistic design.
- *Mechanical Dog feeder to feed service dogs*
  - Worked in a 3 member team that prototyped and designed non-electrical devices to assist quadriplegic veterans feeding their guide dogs.
  - Designed a 3D model of ratcheting system to help drop singular treats for guide dogs.
- *Mechanical Waste Management System*
  - Prototyped and Designed a mechanism that assisted quadraplegic patients to pick up their pet's waste without outside assistance.

SKILLS & INTERESTS

Design Tools: SolidWorks, Onshape Programming Languages: Java,, Matlab Software: Microsoft Office, Google Suite	Operating System: Windows, MacOS Spoken Languages: English, Tamil, Hindi

Rahul Rangarajan

+1 (603) 952-0626 • rsrangarajan01@gmail.com • Salem, New Hampshire
LinkedIn: www.linkedin.com/in/rrahul02/

Education:

Boston University, College of Engineering

Bachelor of Science, Major in Biomedical Engineering, Minor in Computer Engineering **Expected May 2024**

- Coursework: Organic Chemistry, Circuits, Probability & Statistics, Cell Biology, Thermodynamics, Solid Biomechanics, Neuroengineering, Clinical Applications, Medical Ethics, Psychology, Sociology, Logic Design & Verilog, Intro to Computer Networking, Software Design, Cybersecurity

Projects:

EEG-fMRI compatible Audio Stimuli System **September 2023 - May 2024**

Biomedical Engineering Senior Design Project

- Collaborated with Lewis Lab at MIT to redesign audio stimuli delivery system to EEG-fMRI scans
- Researched materials and methods to transmit clear and audible sounds at least 4 meters to the subject via an acoustic tube
- Prototyped ear-tip with the use of CAD and 3D printing technology to achieve improved comfortability ratings in subjects
- Designed earbuds to attenuate noise intrusion produced by MRI scanner by at least 30dB

EEG Artifact Removal **August 2023**

- Identified noise produced in EEG frequency raw data by ballistocardiographic (BCG) artifacts
- Implemented a MATLAB script to correct the EEG scan with data collected from the Carbon Wire Loops (CWL) used in EEG caps

Flappy Bird Remake **June 2023**

- Recreated a working rendition of the revolutionary game of Flappy Bird with C++ and SFML
- Utilized memory allocation for scorekeeping and collision detection logic for gameplay

Personal Web Portfolio **October 2023**

- Created HTML/CSS/JavaScript based web portfolio to showcase academic projects and exhibit photography works to enhance knowledge of front-end development

Key Skills:

Technical: C, C++, Python, MATLAB, R, Verilog, HTML5, CSS, Command Line, CAD, GitHub, Writing
Laboratory: Cellular Assays, Microscopy, Gel Electrophoresis, Chromatography, PCR, General Protocols
Business & Leadership: Project Management, Delegation, Microsoft Office Suite, Google Office Suite

Highlights of Experience:

Mathematics Tutor **February 2020 - Present**

GoPeer - Remote

- Tutored 20 high school students in subjects such as Geometry, Algebra II, Pre-Calculus, and AP Calculus
- Tailored worksheets and study guides every week to meet individual learning needs, resulting in significant improvements in students' academic performances
- Received positive feedback, demonstrating strong communication and mentoring skills

High School/Undergraduate Intern **June 2019 - August 2023**

Lawrence General Hospital - In Person

- Collaborated with pathologist to prepare and analyze biological samples
- Interacted with patients in pediatrics, emergency center, and post-op area
- Shadowed plastic surgeon in over 15 rhytidectomy and facial plastic surgery corrections
- Observed use of Stryker robot in assisted-partial knee replacement with orthopedic surgeon

Mario Rodriguez Santana

mars02@bu.edu | (603) 820-4508

EDUCATION

Boston University, Boston, MA — *Expected May 2024*
B.S. Biomedical Engineering
GPA: 3.20

SENIOR DESIGN CAPSTONE

"Development and Integration of a Lensometer Attachment for QuickSee Free"

Developing an attachment for an autorefractor that will extend its capabilities to serve as a portable lensometer. The initiative involves comprehensive market and patent analysis, 3D design and prototyping, regulatory navigation, and cross-functional collaboration with industry specialists. The goal is to streamline vision exams to improve the accessibility to eye care.

PROFESSIONAL EXPERIENCE

PlenOptika Inc. — Boston, MA
Quality/QMS Technician — *May 2022 - Present*

- Oversee quality control on a demo pool of 50 autorefractors that are sent to customers for clinical use.
- Adhere to a quality management system, ensuring compliance with FDA Class 1 and CE technical standards.
- Conduct servicing and refurbishing of non-conforming units to meet necessary specifications, interfacing with eye care doctors to resolve both technical and software issues.
- Participate in weekly meetings with the CTO and VP of Sales to assist in fulfilling orders and maintenance complaints.

Business Development Intern — *January 2023 - Present*

- Collaborate with the VP of Strategy to develop a detailed market segmentation strategy, identifying target customer segments, and specific needs for the product launch of a new medical device.
- Constructed a survey of over 700 FQHC directors alongside the VP of Communications, to conduct a comprehensive analysis of affordable eye care markets in the United States.
- Contacted distributors worldwide to submit regulatory documents to assist with local regulatory requirements.

Boston University — Boston, MA
Teaching Assistant: Engineering Mechanics I — *September 2022 - May 2023*

- Lectured alongside Professor Emma Lejeune and Professor Caleb Farny to answer questions, deliver additional instruction, and clarify complex concepts during lectures.
- Hosted office hours, alongside the teaching staff, for over 300 students to provide one-on-one support and better understand material outside lectures.
- Planned weekly meetings with professors to organize lesson plans for each course section.

PROJECTS

CO2 Growth Analysis: Global and Local Trends

- Graphed CO2 concentration levels over time for Mauna Loa and global data utilizing MATLAB's Classification Learner, ensuring data accuracy and precision.
- Utilized MATLAB's Regression Learner to accurately predict future trends, highlighting a rise in CO2 levels, ocean acidification, and potential ecological repercussions by January 1, 2070.

Lamp-Post Flood Detector

- Developed and deployed a flood detection device prototype using an ultrasonic sensor, Arduino Uno Wifi Rev-2, and PVC/ABS enclosures, promptly alerting city officials within 5 seconds of detecting rising water levels.
- Implemented a robust solution integrating a durable 9-volt battery, withstanding forces up to 1000 N, and delivering accurate readings within a ± 0.5-inch range for reliable operation in extreme weather conditions.

LEADERSHIP

Relay for Life — Boston, MA
Captain — *April 2022*

Led a 30-member Relay for Life team, spearheading fundraising initiatives that amassed $3,500 to support cancer survivors and honor those affected by cancer. Demonstrated exceptional leadership in community engagement, fostering team cohesion, and inspiring participation in the event centered on walking to raise awareness and funds for cancer research.

Relevant Courses: Molecular Cell Biology, Business and Technology Innovation, Signals and Controls, Materials Science, Instruments and Measurements, Introduction to Programming, Systems and Physiology, Engineering Design, Biomechanics

SKILLS

Computer: MATLAB, SolidWorks, C++, Microsoft Programs, Arduino/ Raspberry Pi, Safety Level 2 Lab Certified
Bilingual: Spanish, English

Victoria Rodriguez

victorialarissarodriguez@gmail.com • (201) 321-6492 • https://www.linkedin.com/in/victoria-rodriguez-bu2024/ Boston, MA

EDUCATION

Boston University, College of Engineering — Boston, MA
B.S. in Biomedical Engineering , Concentration in Technology Innovation — Exp May 2024
Semester Abroad, **Universidad Pontificia Comillas**, Madrid, Spain — Spring 2022
GPA: 3.50/4.00

RELEVANT COURSEWORK

Device Diagnostic & Design, Neurotechnology Devices, Systems Physiology, Biomedical Measurements, Probability & Statistics, Thermodynamics, Electrical Circuits, Fluid Dynamics, Business of Technology Innovations

WORK EXPERIENCE

Lab Technician — May - Aug 2023
Lyndra Therapeutics — Watertown, MA

- Down-selected reliable materials for a long-acting medication delivery system using three point bending, mass loss & media uptake, adhesion testing, and other chemical and mechanical property characterization testing
- Informed polymer mass production processes by measuring mass flow index and cataloging rheological properties
- Trialed initial hot melt extrusion processes to produce experimental materials and identify process parameters
- Assembled 15+ polymer configurations using optical laser techniques
- Communicated experimental data and conclusions to larger groups to refine product development strategies
- Maintained organized and descriptive records of experimental procedures and results within electronic notebooks

Undergraduate Research Assistant — Sep 2022 - May 2023
The Green Lab — Boston, MA

- Engineered plasmids via DNA sequencing & PCR amplification to encode for molecule-selective protein channels
- Integrated plasmids into E. Coli cells and employed intricate laboratory protocols including DpnI Digestion and Gibson Assembly & Transformation to produce desired proteins
- Explored protein functionality by designing and executing laboratory experiments based on prior research insights
- Assessed protein expression efficiencies using techniques such as Flow Cytometry and Gel Electrophoresis
- Communicated daily with mentor, ensuring alignment on experiment progress and rectification of any design anomalies

SKILLS

Instruments: Instron, Rheometer, Karl Fischer Titrando (by Metrohm), Laser Cutter, Laser Welder, Extruder
Computer : Data Collection, MATLAB, Python, CAD (Solid Works, AutoCAD), FlowJo, Prism, Microsoft Suite
Laboratory: Mechanical Testing (adhesion, strength testing), KF Titration, HPLC, Cell Growth (bacterial, mammalian), Sequence (Sanger, NGS), Staining, Cloning (Gibson), Protein Assays (size function)

SPECIAL PROJECTS

Business of Technology Innovations

- Developed a business model for an enterprise centered on personalizing health and nutrition via an app interface
- Researched prevailing and anticipated user engagement rates, as well as market valuation for potential competitors
- Generated lean business model and minimal viable product by examining current & future market competitors, identifying strengths & weaknesses and implementing said findings
- Proposed a projected financial report spanning company's first 5 years to ensure business stability

Device Diagnostic & Design

- Collaborated with team of 3 engineers to identify current market needs for medical devices, leading to the design of a new vaginal speculum to address patient comfort
- Recognized and interviewed key stakeholders, gaining insight into how the device is currently used and perceived
- Utilized insights from interviews and research, exercised technical judgment of current products to target dissatisfactions, correcting for flaws in new design
- Completed three design reviews for product, presenting on improvements of design and function of product

VOLUNTEER & EXTRACURRICULAR

Technology Innovation Scholars Program (TISP), Society of Women Engineers (SWE), Society of Hispanic Professional Engineers (SHPE), StemPathways, Kappa Delta Sorority, Off The Cuff (On Campus Magazine)

Mark E. Ruta

markenzoruta@gmail.com | 917-580-0107 | https://www.linkedin.com/in/mark-ruta-b66281156/

EDUCATION

Boston University May 2024
Bachelor of Science in Biomedical Engineering
Member of the Kilachand Honors College

Dublin City University Study Abroad, Dublin, Ireland January - May 2023
Relevant Coursework: Surgical Device Technology, Biomechanics of Human Movement (Gait Analysis), Rehabilitation Engineering, and Biomaterials and Processing Technology

PROFESSIONAL EXPERIENCE

BioTech Intern, *Tevogen Bio***,** Warren NJ June - August 2023
- Conducted competitive research analysis on potential competitors for Tevogen's indications
- Collaborated with the manufacturing team to assess materials for GMP compliance
- Initiated FMEA process, qualifying batch records and quantifying risk with the research team
- Transformed raw data into precise information, empowering leadership with necessary knowledge for future decisions

Clinical Engineering Intern, *JFK University Medical Center*, Edison NJ May - June 2022
- Repaired and installed medical equipment across the hospital system including ventilators, vital monitors, and defibrillators from companies such as GE Healthcare, Stryker, Welch Allyn, and Zoll
- Tested medical equipment to assure accurate performance and standards for medical use on patients
- Worked to quickly resolve complications with medical devices alongside medical staff
- Documented over 500 medical devices throughout the hospital to aid in a recent hospital acquisition

PROJECTS

MANTIS Project, *Draper Laboratory*, Cambridge MA September - May 2024
- Currently working with a BU Senior Design Team identify a new clinical need for Draper's novel biological tissue fastening technology using microstructured surfaces
- Collaborating in clinical research, problem solving, modeling in SolidWorks, and testing in BSL2 laboratory to finalize a functional product for testing

Structural Bridge Design, *Boston University*, Boston MA January - May 2022
- Modeled and tested a truss structure under predetermined conditions for failure
- Used MATLAB coding to predict points of failure in the truss structure

Natural Disaster Basement Monitor, *Boston University*, Boston MA September - December 2021
- Designed a device to alert users of unseen emergencies including high humidity, fires, and flooding
- Coded in C++ and an Arduino to allow for wireless communication with users

VOLUNTEER

Student Apostolic Leadership Team- *Navigators*, Boston University, MA January - May 2022
- Organized events in collaboration with other members to create a student environment that promotes interaction and fellowship
- Developed new student initiatives to plan extensive events including Fall Retreat

SKILLS

Software: Adobe Premiere Pro, AutoCAD, SolidWorks, MS Office
Coding: MatLab, C++, and Python
Hobbies: Videography, Hiking, Skiing, and Traveling

Tyler Sanabria

631-459-7959 · tylersanabria725@gmail.com · Boston, MA

EDUCATION

Boston University College of Engineering — Boston, MA
Bachelors of Science in Biomedical Engineering — Expected May 2024

- Dean's list: Fall 2022, Spring 2023, Fall 2023
- GPA: 3.70

RELEVANT COURSEWORK

Biomedical Measurements and Analysis, Biomedical Signals and Controls, Thermodynamics, Fluid Mechanics, Systems Physiology, Molecular and Cellular Biology, Electric Circuits, Static Mechanics, Genetics

SKILLS

Computer: Excel, PowerPoint, Word, MATLAB, Onshape, Cura
Lab: Light spectroscopy, fluorescent microscopy, gel electrophoresis, gel imaging, phantom construction, optical probe construction

PROJECTS

Senior Design Project — Spring 2024

- Constructed optical probes that utilize Elastic Scattering Spectroscopy to record melanin intensity
- Algorithm construction that stratify melanin intensities on premade scale
- Created phantoms to test for optical properties and to determine effectiveness of probe and algorithm

Multimodal Flashlight Design Project — Fall 2022

- Assembled a multimodal flashlight for those with limited dexterity
- Partook in design process, established proper wiring using soldering techniques
- Coded device to switch intensity of lights depending on distance of hand
- Presented working design to client

Temperature Sensor Design Project — Spring 2022

- Manufactured device to read temperature and alert user if temperature exceeds 80°F
- Optimized production in CAD process, 3D modeling and printing, code writing, wiring
- Designed enclosure with aid from milling machine
- Presented finished product to client

Truss Design Project — Fall 2021

- Built and conducted process of creating a truss to withstand a load of 1.5 kilograms
- Analyzed material during preliminary truss design; used MATLAB to evaluate potential buckling points

CAMPUS AND COMMUNITY INVOLVEMENT

Boston University Puerto Rican Student Association, Member — Fall 2021 - Present
Boston University Run Club, Member — Fall 2021 - Spring 2023
Boston University Brazilian Jiu Jitsu, Member — Fall 2022 - Spring 2023

Teluck Sharma

954-850-1211 | teluckshama@gmail.com | linkedin.com/in/teluck-sharma-9ba137196/

Result driven biomedical engineering student looking to enhance learning through real world experience.

- Expert in MS Office and Google Workspace technologies; Proficient in MATLAB, Python, R, SQL, Tableau, and C++.
- Experienced in engineering data collection, processing, and analysis tools such as ImageJ, LabVIEW, and Fusion360.
- Flexible, result-oriented individual with an aptitude to think deep, learn, and adapt.
- Team player and a leader with a focus to drive outcomes through relationship building, communication, and accountability.

Education and Certifications

Biomedical Engineering	Boston University	Class of 2024
High School	North Broward Preparatory School	2016-2020
Certificate - Project Management	Google Professional Certificate	2022
Certificate - Data Analytics	Google Professional Certificate	2022

Work Experience

Assistant Program Manager Boston University (09/2022 – Present)

Provide administrative support to implement projects related to Technology Innovation Scholars Program, including leading meetings to discuss current practices and opportunities of improvement in current methods of reaching out to lower income schools.

- Served as a liaison between upper-level administration and student ambassadors; to help improve organizational moral, communication, efficiency of task completion, and guidance to student ambassadors.
- As the "student face', attended meetings with Board of Engineers and other donors of the organization, speaking on the positive impact the program has had on BU students and lower income middle and high schoolers.

Clinical Research Intern Massachusetts General Hospital (5/2023 -- 8/2023)

Assisted the Neuroendocrine Research Unit - responsible for studying the effects of neurotransmitters on different health issues like obesity, eating disorders, postpartum depression. Responsibilities included prepping patient lab kits, maintaining essential documents.

- Created and updated RedCap surveys; Maintained patient records, clinical data, and compliance logs.

Student Ambassador Boston University (09/2021 – 08/2022)

As a student ambassador to Technology Innovation Scholars Program, collaborated with professors to turn their research projects into condensed, intriguing 45-minute activities for high school students.

- Spoke to middle and high schoolers about the possibility of college, engineering, and a career in STEM; including my own personal academic journey to Biomedical Engineering.

Physician Shadow NW Broward Orthopedic Associates (07/2021 – 08/2021)

Shadowed physicians to observe patient management, examination, and treatment of orthopedic patient in an outpatient setting.

- Observed and learned patient document management, record keeping, and patient care techniques. Guided and assisted patients through non-clinical tasks and formalities.

Key Accomplishments & Associations

Technology Innovation Scholar Program; University Honors at UT Austin; Google Certified Project Manager; Google Certified Data Analyst

Navya Shetty

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EDUCATION

Boston University College of Engineering, Boston, MA **Jan 2021 - May 2024**
Bachelor of Science in Biomedical Engineering
Relevant Coursework: Biomedical Measurement 1&2| Systems Physiology| Statistics and Data Science| Intro to Biomedical Material Science| Device Diagnostics and Design| Biomechanics| Computational Biology | Organic Chemistry| Polymers and Soft materials
HarvardX certified in Fundamentals of Neuroscience, Part 3: The Brain
London Academy of Music and Dramatic Arts awarded a distinction in bronze medal for public speaking.

EXPERIENCE/EXTRACURRICULARS

AtlantiCare Regional Medical Center, *intern* **June 2023 – July 2023**

- Overlooked multiple ablations, insertion/replacement of cardiac devices in EP and CATH labs, and participated in cardioversions.
- Observed and analyzed atrial/ventricular amplitude threshold tests for patients with pacemakers while working with device representatives from Medtronic and Boston Scientific in EP labs.

Theta Tau Professional Engineering Fraternity, *Risk Chair* **Sep 2022 – May 2023**

- Uphold risk management policies of the fraternity and organizational skills to schedule the Judicial Board

Lancet Laboratories, *intern* **July 2019 – Aug 2019**

- Shadowed lab clinicians and participated in HIV and blood type testing and gained a practical understanding of the maintenance and use of diagnostic laboratory machinery.

Other: *President* of Interact Rotary Club (Sep 2019 – May 2020)

SELECTED PROJECTS

Quantifying Uptake of Nanoplastics in edible plants **Sep 2023 – Present**

- Leveraged a top-down synthesis approach, utilizing sonication with various solubilizers and solvents and using sendimentation theory to spin down large particles to create nanoplastics and confirming size with DLS
- Innovation of PET NPs using TFA and surfactants such as Tween 20, PVA, and SDS and found proof of concept using DLS analysis.
- Demonstrated proof of concept of store-bought PS beads dyed with Nile red to tomato and romaine lettuce, and subsequent analysis of digested leaf samples via fluorescence microscopy, my team and I demonstrated the plants' absorption of these particles.

Naïve Bayes's Classifier for Diabetic patients **Nov 2023 – Dec 2023**

- Demonstrated expertise in data preprocessing, model training, and evaluation, with a focus on interpretability and real-world applicability with an high accuracy and precision rate on the training and testing set, ensuring highly reliable predictions in a healthcare context.
- Leveraged expertise in interpreting 10 physiological features, including critical indicators such as plasma glucose concentration, body mass index (BMI), and creatine levels to successfully predict diabetes risk.

Finger prosthetic - Design project **Jan 2023 – May 2023**

- Design and development of a finger prosthetic tailored to address the unique challenges encountered in physically demanding roles, improving grip strength, dexterity, and functionality within a $100 budget.
- Performed comprehensive analysis to select durable materials followed by failure analysis to ensure regulatory compliance and enhance user safety.

Red light therapy - Design project **Sep 2022 – Dec 2022**

- Designed and developed a portable red-light device to treat muscle and joint pain with controllable light intensity, a sensor that detects if the patient is in range, and includes a user interface.
- Coded for sensor, LCD, and LED and wired the components into a gun-shaped device for an ergonomic design.

Truss Mechanical Analysis project **Jan 2022 – Dec 2021**

- Performed experimental testing and material analysis, employing MATLAB for data processing in 35 iterations and collaborated with a colleague to devise and code a truss design.
- Resulting in the successful assembly and determination of its predicted load capacity of 32 oz, surpassing expectations with an actual maximum load of 34 oz of load.

MATLAB – Regression Analysis Project **Nov 2021 – Dec 2021**

- Devised a program to search a database of over 100,000 data points, infuse data into compatible spreadsheets, and create readable output in a table format transferable to Microsoft Excel.

TECHNICAL SKILLS & CERTIFICATIONS

Software: MATLAB, Java, C, Arduino, Onshape, Python, Visual Studios, Microsoft Office
Laboratory: NMR Spectroscopy, RT-PCR, Gel electrophoresis, Fluorescence Microscopy, chemical handling, particle analysis

ABBIGALE SHI

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EDUCATION

Boston University — Boston, MA
Bachelor of Science, Biomedical Engineering — Expected May 2024
Minor in Visual Arts
GPA: 3.82/4.00 (Dean's List 5 semesters)

EXPERIENCE

Morphable Biorobotics Lab — Boston, MA
Undergraduate Researcher — May 2023 - Present

- Conducting independent research on alternative masking materials and methods for optimized fabrication and irregular kinematic designs of thermoplastic polyurethane (TPU) stacked balloon actuators (SBAs).
- Fabricating SBAs for in vitro, ex vivo, and in vivo testing of a soft robotic platform built for cardiac intervention.

PROJECTS

Tissue Culture Constructs for the Study of Uterine Pathologies — Sep 2023 - Present

- Developing and optimizing a protocol to culture MCF-7 spheroids with carbon-encapsulated cobalt magnetic nanoparticles.

ACCU-Insert: Reducing IUD Insertion Complications — Jan 2023 - May 2023

- Updated design of an IUD inserter based on Bayer state of art models to increase physician visibility of uterine depth and decrease IUD insertion perforations.
- Synthesized CAD models and manufactured looks-like and works-like prototypes.
- Presented final product, testing, and analyses in the BTEC Design-A-Thon competition.

Grip Strength Study — Oct 2022 - Nov 2022

- Created an experiment with two independent variables to test maximal grip strength based on methodology and findings of previous academic studies.
- Tested grip strength of 18 subjects with dynamometer; conducted two-way ANOVA ($p < 0.01$).

Smart Rodent Trap — Oct 2021 - Dec 2021

- Engineered and wrote an Arduino program for a humane rodent trap prototype; incorporated Bluetooth, Wi-Fi, and GPS modules for remote release, notification, and locating features.

SKILLS

Computer: MATLAB, C, Arduino, Photoshop, Illustrator, InDesign, LabScribe 4, EAGLE, AutoCAD, Onshape
Wet lab: Cell culture, PCR, qPCR, gel electrophoresis, microscopy, MTT assay, bioprinter
Dry lab: Soldering, lathe, drill press, 3D printer, laser cutter, heat press, plasma asher

LEADERSHIP & AFFILIATIONS

Senior Advisor, Treasurer, Mentor, Biomedical Engineering Society — Jan 2021 - Present
Member, Tau Beta Pi Engineering Honors Society (MA Eta Chapter) — Oct 2023 - Present
Volunteer, Brookline Food Pantry — Jan 2022 - Present
Member, Epsilon Eta Fraternity (Pi Chapter) — Jan 2022 - Present
PR and Career Development Chair, Opinion Editor, The Daily Free Press — Jan 2021 - Present
Mentor, College of Engineering EK200 Program — Fall 2022, Fall 2023

HONORS AND AWARDS

Undergraduate Research Opportunity Program Scholarship
2021 SPJ National Finalist in Editorial Writing Mark of Excellence Awards

Vatsal Shrivastava

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EDUCATION

Boston University College of Engineering September 2020 – May 2024
Bachelor of Science in Biomedical Engineering
Activities: Phi Kappa Tau Fraternity, BU Khatarnak, BU India Club, Terrier Motorsport
Awards: National Merit Scholar (Spring 2020) | Presidential Scholarship Recipient, Boston University (Fall 2020 – Spring 2024) | STARS Grant Recipient, Boston University (May 2022)
Relevant Courses: Introduction to Nanotechnology, Thermodynamics and Statistical Mechanics, Neurotechnology Devices, Computational Biology: Machine Learning Fundamentals, Transport Phenomena in Living Systems

RESEARCH

Wilson Wong Lab | *Boston University* January 2022 – January 2023
- Worked on an optogenetics study to develop a library of working red-light inducible split recombinases
- Gained experience in molecular cloning, cellular assays, and designing and testing custom plasmids
- Developed cell stocks to ensure results are accurately duplicable
- Worked with multiple cell lines such as HEK and Jurkat cells

Michael McMurray Lab | *University of Colorado Anschutz Medical Campus* May 2019 – August 2019
- Conducted research on mutations in the HO gene of *S. cerevisiae* using basic lab techniques such as PCR and DNA sequencing
- Designed an algorithm identifying similarities in genotypes and locating where the sample was originally collected

PROJECTS

Blood Brain Barrier Assay September 2023 – May 2024
- Assessed permeability of multiple neurological drugs through a blood brain barrier assay and compared to *in vivo* study data to validate its accuracy
- Enhanced the assay by incorporating surface transport proteins not previously part of the assay to more accurately emulate the blood brain barrier
- Designed a computational model to imitate the behavior of the assay

Improved Bayesian Network Classifier for EEG Data November 2023
- Wrote a grant proposal for a mock grant review
- Processed data from 4,000 participants to isolate specific time points from EEG data
- Devised an improved BNC in Python and MATLAB to enhance data interpretation from the previously reported 60% with LDA to ~85%

Pet Identifier April 2022
- Developed a machine learning algorithm in MATLAB to classify images as either dogs or cats
- Applied machine learning principles to ensure training accuracy and test accuracy matched expectations based on ML protocols such as nearest neighbor approximation and quadratic discriminant analysis

EXPERIENCE

C4 Therapeutics September 2023 – May 2024
DMPK Intern *Watertown, MA*
- Assessed viability and adjusted the protocols of permeability assays in a team of 3 engineers
- Utilized LC/MS to gather data on drug permeability through assays
- Presented findings for Senior Capstone project

Fedorka Enterprises LLC May 2023 – November 2023
Mechanical Engineering Intern *Danvers, MA*
- Collaborated with a team of 4 engineers in prototyping for appliance design
- Applied the fail fast method to model prototypes with a focus on agile, continuous improvement
- Developed various CAD models and prototyped them using 3D printers for accurate testing

LEADERSHIP EXPERIENCE

President/Captain | *BU Khatarnak* August 2020 – December 2023
- Appointed captain and president of nationally competing and intercollegiate dance team

Chaplain, Scholarship Chair | *Phi Kappa Tau Fraternity* January 2022 – December 2023
- Organized events honoring the traditions and culture upon which the fraternity was founded on
- Attended the National Convention and had a major role in representing undergraduate chapters and advocating for reform within the national organization
- Executed inter-organizational philanthropy events to raise funds for the SeriousFun Children's Network, raising over $5000 in donations

ADDITIONAL INFORMATION

Languages: Native in English, Hindi, Urdu | Proficient in Spanish
Technical: Proficient in Microsoft Office, MATLAB, Solidworks, Java, LaTeX, C, Benchling, Machine Learning, PCR, Assays, Gel Electrophoresis | Intermediate in Visual Basic, SQL, HTML, Virtualization, Python, Flow Cytometry
Interests: Automobiles, guitar, soccer, photography, snowboarding

Massimo Siracusano

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Education

Boston University — Boston, MA
Bachelor of Science in Biomedical Engineering, Minor in Business Administration — *Expected May 2024*

Professional Experience

Beth Israel Deaconess Medical Center — Sep. 2023 – Present
Undergraduate Research Assistant (Center for Advanced Orthopedic Studies) — *Boston, MA*

- Developed an optical measurement approach and data acquisition strategy to continually measure the deformation of metastatic spine segments under applied load.
- Conducted extensive data analysis to model the load-bearing capacity and failure of metastatic spine segments by testing and cross-referencing simulations of compressions using MATLAB.
- Reduced development cost and increased data integrity by identifying and resolving issues with existing measurement technique by minimizing data noises caused by obstructions.

Aetna Fine Art Logistics — Sep. 2019 – Aug. 2023
Operations and Marketing Lead — *Valley Stream, NY*

- Managed a team of 30+ employees to quote, process, and fulfill global shipment orders while coordinating with multi-national art markets.
- Increased brand awareness by over 200% by generating social media presence on multiple platforms (Instagram, LinkedIn, Google Business, etc.) and soliciting client feedback.
- Reduced operating costs by 10% while improving client outcomes through optimization of the inventory management system.

BU Hearing Research Lab — May 2022 – Dec. 2022
Undergraduate Research Assistant — *Boston, MA*

- Researched ossicular chain vibrational characteristics to study cetacean auditory processing.
- Experimented with bone samples using piezoelectric stacks for vibration generation and laser surface velocimeter for data collection. Simulated in COMSOL for data corroboration and expansion of possible test configurations.
- Integrated simulation models of individual ossicular bones to capture full system dynamics and signal filtering capabilities.

Engineering Projects

Machine Learning Algorithm | *MATLAB* — Sep. 2022 – Dec. 2022

- Developed a machine learning algorithm in MATLAB to produce several classifiers to partition large data sets.
- Utilized dimensionality reduction, linear, and quadratic discriminant analysis or precision and effectiveness.
- Coordinated with a small team in order to fine-tune algorithm and minimize error rates.

Hazardous Materials Vaporizer | *COMSOL Metaphysics, CorelDRAW, Arduino* — Sep. 2021 – Dec. 2021

- Prototyped vaporizer attachment for use with handheld mass spectrometer to identify hazardous substances.
- Developed enclosure to isolate sample while allowing adequate gas flow into spectrometer with a mechanical failsafe to prevent toxic gas release.
- Implemented thermal control system on Arduino microcontroller to regulate sample temperature and maximize reading accuracy.

Truss Design Project | *MATLAB* — Sep. 2021 – Dec. 2021

- Constructed truss bridge to bear sustained loading without deformation.
- Performed finite element analysis in MATLAB to verify structural integrity and minimize excess weight.
- Conducted trade studies in order to select ideal bridge material based on buckling strength, axial and cross-sectional elasticity, cost, and other properties.

Technical Skills

Language: English, Italian, Spanish
Software: MATLAB, COMSOL Metaphysics, CorelDRAW, Arduino
Mechanical: CNC Mill, Drill Press, Lathe

SYDNEY SORBELLO

sorbello@bu.edu | 518-925-6920 | linkedin.com/in/sydneysorbello | Boston, Massachusetts

EDUCATION

Boston University, College of Engineering Boston, Massachusetts
Bachelor of Science, Biomedical Engineering Expected May 2024
Relevant Coursework: Biomedical Signals and Controls, Biomedical Material Science, Intro to Neuroscience Engineering, Systems Physiology, Differential Equations, Biomedical Measurements, Senior Design Capstone, Clinical Application of Biomedical Design

PROJECTS

Novartis Senior Design Project in Computational Biology Sep 2023 - May 2024

- Developed a Python module to integrate extracellular domain predictive tools and compare characteristic information.
- Trained and tested machine learning models to integrate protein characteristics and predict probability of therapeutic modulation.

Nootropics on Heart Rate and Reaction Time Jun 2023 - Jul 2023

- Hypothesized effects of L-Theanine and Caffeine on heart rate (bpm) and visual reaction time (ms) on 20 trial participants within a Systems Physiology course.
- Conducted a one-way ANOVA test to conclude a significant difference in heart rate after caffeine consumption with a p-value of 0.018.

3D Bioprinted IVD Scaffold Materials Research Mar 2023 - Apr 2023

- Researched alternative bio-inks for 3D bioprinting to construct an IVD scaffold and address degenerative disc disorders.
- Printed a prototype scaffold using a CAD STL file and an alginate-based bio-ink to better understand 3D bioprinting technology and compatible materials.

SKILLS

Computer: Python, Bitbucket, MATAB, C++, ImageJ, Microsoft Office Suite, Random Forest

EXPERIENCE

Summer Volunteer Research Intern May 2023 - Aug 2023
Albany Medical College Albany, New York

- Shadowed treatment procedures in rats under mentorship of a PH.D. student to investigate the effects of LIPUS and YAP/TAZ ablation in peripheral nerve regeneration.
- Obtained G-ratio for myelinated axons and remak bundle measurements using imageJ on EM images to better understand remyelination in the sciatic nerve post injury.

Administrative Assistant Nov 2020 - Jul 2023
RKB Construction Company Glenmont, New York

- Worked part time in a construction firm and performed office and job site duties.
- Performed on-site duties such as pouring concrete alongside in-office assistance including review of fiscal financial documents.

LEADERSHIP & ACTIVITIES

BU Varsity Swimming, Team Captain Sep 2020 - Feb 2024

- Balanced a 20 hour athletic work week with studies to strengthen work ethic and time management skills by coordinating with a team of 30 women.
- Exhibited strong leadership skills allowing for two-time peer-voted captainship (2022-2024) and recipient of the Jack Wallace Scholarship (2023, 2024).
- Communicated and exemplified team expectations to help create a culture valuing excellence and respect.

Bloom Family Leadership Academy, Student Representative Sep 2022 - Present

- Gained key leadership skills pertaining to the individual, the athlete, and the professional.
- Grew confidence in handling difficult situations and public speaking by attending monthly meetings.

JESSICA SPADA

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EDUCATION

Boston University Boston, MA
Bachelor's Degree, Biomedical Engineering, Concentration in Technology and Innovation Jan 2024 - Dec 2024
Dean's List
Relevant Coursework: Biomechanics, Clinical Applications of Biomedical Design, Signals and Controls, Programming, Engineering Design, Device Diagnostics, Systems Physiology, Neuroscience, Business Technology

EXPERIENCE

Cognito Therapeutics Cambridge MA
Electrical Engineering Intern May 2023 - Present

- Collaborate alongside engineers and scientists on a medical device targeted towards slowing progression of Alzheimer's Disease (AD)
- Perform protocol testing to identify bugs and write reports for new software release to QA
- Create CAD models to allow engineers to measure light output of clinical devices from various pupillary distances using a camera and light meter
- Led a research discussion with the Science and Engineering teams on RNA editing and how it can benefit AD research in future
- Gathered feedback in internal studies to assess product design, comfortability, and user experience of device

Boston University Neuromotor Recovery Lab Boston MA
Research Intern Sep 2022 - May 2023

- Met with participants with Multiple Sclerosis, Parkinson's Disease, or stroke to study ground reaction forces while walking
- Co-authored on a forthcoming article titled "High-accuracy estimation of spatial gait parameters using a single inertial sensor worn on the thigh"
- Assessed participant's gait with biomechanical conditions and interventions including musical rhythms and tempos
- Analyzed data to accurately estimate an algorithm of propulsion used to determine propulsion for other neurological disorders

Lonza Biologics Portsmouth NH
Manufacturing Intern Jun 2022 - Aug 2022

- Partnered with Subject Matter Experts in labeling port connections for equipment in SOPs
- Analyzed design solutions to unsafe conditions for equipment operators along side Product Engineer

PROJECTS

Innovative Strategies in Venous Blood Collection, Senior Design Project Aug 2023 - Present

- Designing a procedure to minimize amount of venous blood drawn from patients for Coalesenz's iCoagLab Hemostasis Analyzer

Blood Test for Hand Tremors Feb 2023 - Apr 2023

- Designed a device to stabilize a hand during finger prick blood test for patients with tremors to decrease time spent taking blood and enhance patient independence
- Interviewed Parkinson's patients through each Design Review to better understand challenges

Park Pal - Parking Application for Feb 2023 - Apr 2023

- Served as CEO of a team of four engineers to develop a mobile application for affordable parking
- Optimized business models and financial projections based on trends and market size

Wearable Orthopedic Knee Sleeve with Infrared Light Prototype May 2021 - Jul 2021

- Developed a cost-effective wearable orthopedic sleeve with infrared lighting to promote bone healing for underdeveloped communities

SKILLS

Computer: MATLAB, C, Python, SOLIDWORKS, OnShape, Cura, Arduino, Microsoft Office
Laboratory: Oscilloscopes, Light Meter, Spectroscopy, PCR, EVOS Digital Microscope, Laser Cutting, 3D printing

Ismail Sufi

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Education

Boston University, College of Engineering *Expected May 2024*
Bachelor of Science in Biomedical Engineering
Relevant course work: Machine Learning, Cybersecurity, Principles of Biotechnology, Transport Phenomena in Living Systems

Projects

Vertebral Stress Testing *September 2023 – Present*
- Developing a computational framework integrating PID controls, force and displacement feedback to apply controlled loads to cancerous vertebrae specimens.
- Enhancing accuracy of FEA models by integrating data from next generation CT scanners.

Early Bird *June 2022 – Present*
- Secure funding by presenting research findings to BU Campus Climate Lab, resulting in a grant to conduct environmental research.
- Investigate existing literature on mealworm based plastic degradation.

Wrist Mounted Pulse Oximeter *June 2021 – September 2021*
- Managed team of four in creation of robust pulse oximeter mounted on user's wrist.
- Eliminated failure points through testing on circuitry, applying Fourier analysis to achieve 96% sensor accuracy.

Relevant Experience

Biofourmis Inc. *Boston, MA*
Biomedical Data Science Intern *May 2023 – September 2023*
- Developed dynamic python based multimedia tool for sensor data visualization, streamlining sensor data annotation pipeline, reducing training set creation times for algorithm creation.
- Conducted research on existing Non-Invasive Glucose Monitor technologies, and designed an optimal creation path for the development of a functioning NIGM.

Beth Israel Deaconess Medical Hospital *Boston, MA*
AI Team Research Student *October 2022 – May 2023*
- Processed more than 300 tumorous MRI slices, performing brain contour maps for use in Tumor Treating Field studies.
- Created self-contouring algorithm in team of two, decreasing contour times for TTField research.

Medtronic Diabetes *Northridge, CA*
R&D Software Intern *June 2022 – August 2022*
- Constructed in-vivo sensor data parsing and analysis software tool, increasing test measurement flexibility, shortening data-processing timeline for late-stage in-vivo testing.
- Performed statistical correlation analysis studies to assess equivalency between in-vitro testing systems.
- Developed efficient model translating result from short-term studies into long term predictions.

Leadership Experience

UPACK Boston, MA
Head of Team, Product Designer, Presenter January 2023 – May 2023
- Managed a team of four to design a cost-effective pain free method of IUD insertion.
- Met nurses and OBGYN stakeholders to determine best possible design processes, and formulate several methods for IUD insertion pain reduction, creating final thermoformed high fidelity IUD kit.

Skills

Programming Languages: C, C++, MATLAB, Python, Java, JS, HTML, CSS, R, Verilog(HDL)
Design: CAD Design(Solidworks, Fusion 360), Machine tools, Advanced Circuit Design
Laboratory: Cell Culturing, Gel Electrophoresis, Spectroscopy, DNA analysis, Plant Studies, Phytoplankton Studies

Vrishin Sundaram

vrishin@bu.edu || (845)-671-9706 || https://www.linkedin.com/in/vrishin-sundaram/

EDUCATION

Boston University, Questrom School of Business, College of Engineering *May 2024*
Degree: B.S Biomedical Engineering: Concentration in Technology & Innovation
Minor: Business Administration
Activities: Sapphire Finance Group, Alpha Kappa Psi, Biomedical Engineering Society, Engineers Without Borders, Medical Ethics Club, Helping Hearts BU, BU India Club, BU Fencing Club

PROFESSIONAL EXPERIENCE

J.P Morgan Chase & Co. *June 2023 – August 2023*
Private Bank Summer Analyst – Life Sciences Team

- Gained an in-depth understanding of markets and investments and was able to assist bankers in investing clients' assets in portfolios guaranteeing a large percentage growth year over year.
- Analyzed clients' portfolio growth and was able to build overviews allowing clients to understand their portfolios' performance in a comprehensible manner.

Immunogen Inc. *June 2022 – August 2023*
Financial Analyst Intern

- Analyzed and aided in creating long-range plans and quarterly forecasts to predict future revenue streams for the company.
- Worked with numerous external analysts and the investor relations division to analyze business valuations and find the sources of numerous discrepancies between external and internal revenue valuations.

Bronx-Lebanon Hospital *January 2021 – March 2021*
Data Analyst Intern

- Scrubbed and organized thousands of data points regarding hospital patients who were admitted for testing positive for COVID-19 using Excel.
- Analyzed data to find correlations between patients who passed away due to COVID and any prior health deficiencies they may have had including testing positive for HIV. These correlations were then presented to a panel representing the hospital.

New York Medical College *June 2019 – August 2019*
Summer Intern

- Executed research dedicated to creating vaccines from the Influenza Virus that was reviewed by the CDC and distributed to the public utilizing principles in microbiology and immunology.

LEADERSHIP EXPERIENCE

Eye2Eye Organization *September 2022 – Present*
Vice President of Operations

- Organized an annual conference where industry leaders came and spoke on a panel about how they have worked to combat the issue of implicit bias in their respective workplaces.

Boy Scouts of America *September 2008 – May 2020*
Eagle Scout

- Received the highest honor in Boy Scouts Association. Achieved by receiving many medical and leadership certifications.

ACADEMIC PROJECTS

Programming for Engineers
Final Project

- Organized and sorted through millions of data points related to air pollution rates over the past 20 years using MATLAB to find irregularities and whether they correlated with specific historical events.

Human Brain Mapping
Final Project

- Created a neurological assessment using MATLAB taking in data related to color identification and recognition in the brain.
- Recorded, scrubbed, and organized data using MATLAB later presented to peers comprehensibly, highlighting standard human neurological tendencies.

Business Society and Ethics
Mid-Year Presentation

- Compared two major technological companies under the subsets of finance, marketing, operations, governance, and ethics. This comparison was presented in a cohesive manner to a group of mock socially conscious investors.
- Concluded the presentation with a final decision for these investors as to which company was a better investment because it aligned with their financial and ethical values.

SKILLS/INTERESTS

Skills: MATLAB (*Intermediate);* **Microsoft Suite (***Intermediate);* **Financial Analytics (***Intermediate)*
Interests: Finance, Consulting/Strategy, Biochemical Research, Gene Therapy Innovation

Nik Swanson

nswans808@gmail.com | (808) 428-5176 | linkedin.com/in/nik-Swanson | Boston, MA

EDUCATION

Boston University, College of Engineering Boston, MA
Bachelor of Science, Biomedical Engineering May 2024

- Relevant Coursework: Molecular & Cell Biology, Circuits, Transport Phenomena in Living Systems, Signals and Controls
- GPA: 3.42/4.0

SKILLS

- MATLAB, Arduino, C Programming, Python, Microsoft Office Suite, Computer-Aided Design, Soldering (through-hole and surface mount)
- Pipetting, Agarose Gel Electrophoresis, Blotting Techniques, Polymerase Chain Reactions
- Mandarin Chinese (Conversational)

EXPERIENCE

Technology Innovation Student Program Boston, MA
TISP INSPIRATION AMBASSADOR Aug 2023 - Present

- Mentor middle school students in the Technology Innovation Student Program in hands-on engineering projects
- Perform outreach for under-served and historically under-represented students to encourage interest in engineering

Boston University Residence Life Boston, MA
Resident Assistant Aug 2022 - Present

- Supervised and facilitated community building for a floor of 40+ undergraduate residents with a focus on safety, personal development, and overcoming differences
- Responded to resident complaints, reports, infractions, and emergencies

PROJECTS

IN-TENS PAIN TREATMENT DEVICE, SENIOR DESIGN PROJECT

- Developing a modified Transcutaneous Electrical Nerve Simulation device capable of delivering high frequency, high voltage electric impulses to address pain quickly
- Developed an in vitro model for simulating a human finger's response to electrical impulses

HEAD TRACKER PROJECT, ENGINEERING DESIGN

- Built a head tracker system with end goal of assisting individuals with limited hand dexterity control a computer cursor with head movement
- Led circuitry for system, managed coding for data processing, and created CAD model for device housing

TRUSS DESIGN PROJECT, MECHANICS

- Collaborated in a team of 3 to build a truss and code a MATLAB algorithm to analyze trusses

ROOM TEMPERATURE MONITOR, HANDS-ON ENGINEERING

- Constructed a temperature monitor for real-time temperature regulation with an LCD temperature display and alarm system
- Created a custom CAD model for battery holding to demonstrate 3D printing techniques

LEADERSHIP & ACTIVITIES

- Society of American Military Engineers Honolulu Post 2023 Scholarship Awardee
- Member of Boston University Brazilian Jiu Jitsu and Muay Thai Club

MELINA TEGUIS

mteguis@bu.edu | 774-757-8517 | Boston, MA

EDUCATION

Boston University, College of Engineering Boston, MA
Bachelor of Science, Biomedical Engineering Expected May 2024

The University of Sydney, Study Abroad Spring 2023
Relevant Coursework
Biomedical Signals and Controls, Probability, Statistics, and Data Science for Engineers, Pharmacology, Biomanufacturing, Transport Phenomena in Living Systems, Biomedical Measurements, Engineering Light, Quantitative Neuroscience

PROJECTS

Wayfinder for Blind Individuals Jan 2024 - Present
- Designing device to assist blind and visually impaired individuals with navigating urban environments using machine learning
- Progressing through multiple design iterations, incorporating user feedback to refine device usability

Innovative Strategies in Venous Blood Collection Aug 2023 - Present
- Developing procedure to minimize amount of venous blood required from patients for Coalesenz's iCoagLab Hemostasis Analyzer
- Prototyping and validating with dual syringe pump to reduce collected blood volume to 100 microliters within 5% margin

Truss Design Project Jun 2022 - Aug 2022
- Engineered and stress-tested an acrylic truss structure with load-bearing capacity of 2-pounds
- Evaluated buckling load tolerance and idealized position using MATLAB

Smart Guide Illumination System Jan 2022 - May 2022
- Programmed LED-based guidance system with integrated motion sensors to illuminate 2x15 foot hallway for visually impaired and flash if user deviated from path
- Collaborated with team of three for design and assembly of an interactive illumination system

Engineering Design Class Sep 2021 - Dec 2021
- Programmed and assembled ambient temperature sensing device utilizing Arduino, drill press, 3D printer, and circuitry components

MATLAB COVID-19 Project Apr 2021 - May 2021
- Created a MATLAB program to visualize significant relationships regarding vaccine rollout from thousands of COVID-19 data points

SKILLS

Computer: MATLAB, C, OnShape, Arduino, Microsoft Office, Cura
Laboratory: Spectrophotometer, MicroPlate Reader, Syringe Pump, 3D Printing, Oscilloscopes, PCR, Soldering

LEADERSHIP & AFFILIATIONS

Kappa Delta Sorority, Eta Phi Chapter, Merchandise Chair May 2021 - Present

Shantanu Vaid

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EDUCATION

Boston University College of Engineering, Boston, MA **Expected May 2024**
Bachelor of Science in Biomedical engineering
GPA: 3.05/4.00

Relevant Coursework: Cell Biology | Probability, Statistics and Data Science | Engineering Design | Engineering Mechanics | Signals and Systems | Thermodynamics and Statistical Mechanics | Fundamentals of Biomaterials | Molecular Bioengineering | Computational Biology

SKILLS

Software: Microsoft Office, C, MATLAB, Arduino, Java
Languages: English, Hindi (Native), French (Elementary)

EXPERIENCE AND INTERNSHIPS

Biomedical Intern at Yantram Medtech **June 2023 – July 2023**

- Coordinated development of a novel diagnostic device that utilizes heat signature of breasts to enable early detection of breast cancer and aims to impact 6.7 million women in India.
- Proposed a feasible design for a portable ECG monitoring patch with integrated temperature, heart rate, and oxygen saturation measurements capable of detecting over 6 different arrhythmias.
- Analyzed over 10000 temperature data points using Fast Fourier Transforms in MATLAB to locate underlying fever patterns in diseases such as malaria and dengue.

Research Assistant at Boston University **September 2021 – December 2021**

- Researched at the Galagan Lab on devising underlying architecture to find a functional screening vector from a metagenomic library to be used to monitor biologically relevant analytes such as melatonin.
- Shadowed an engineer to learn more complex lab procedures such as FACS (Fluorescence-activated cell sorting).

Business Development Intern at Wear@Work **May 2021 – August 2021**

- Implemented necessary policies and regulations to be socially compliant and attain a BSCI certificate allowing sale of clothing products in European Countries.
- Conducted multiple meetings with over 30 employees in 5 different committees such as anti-sexual harassment committee to teach fire and equipment safety.

PROJECTS

U-Drink – Final Project **August 2022 – December 2022**

- Developed and presented a business plan for "U-drink," a drink kit delivery service that allows users to create custom drinks at home using fresh ingredients and unique flavor combinations.
- Performed market research and financial analysis to determine pricing, target market, and potential revenue streams for "U-drink" service.

Automatic Grow Light – Final Project **January 2022 – May 2022**

- Explored design concepts for an inexpensive automatic grow light for amateur plant growers in a team of 5.
- Constructed a functional prototype capable of automatically adjusting brightness in response to environmental light using Arduino, MOSFETs, regulators and light sensor.
- Composed a final report consisting of all necessary detail required to recreate the product and showcased product to potential clients.

INTERESTS

- *Soccer, basketball, hiking, cooking, science-fiction*

Celeste Vega

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EDUCATION

Boston University **Boston, MA**
BS in Biomedical Engineering *May 2024*
Selected Coursework: Molecular Cell Bio & Biotech, BME Signals & Controls, BME Optics, Statistics & Data Science
Organizations: Society of Hispanic Professional Engineers

EXPERIENCE

Vertex Pharmaceuticals **Boston, MA**
Supply Chain Coordinator Intern *May 2023 - Aug 2023*
- Developed product distribution report for Vertex Supply Chain and Quality organization.
- Analyzed the Supply Chain business process and developed process flows in BusinessOptix.
- Built a PowerBI dashboards to visualize product distribution report.
- Documented business process, user business requirements, and collaborated in application design.

Initiative Literary Development (BUILD) **Boston, MA**
Lead Tutor *Oct 2020 - Present*
- Supervised 10 tutors in weekly meetings, checked off timesheets, and implemented behavioral rules at work site.
- Served as a liaison between site contact and BUILD Graduate Coordinators.
- Planned spring Mid-Semester Workshops, curated lesson plans, and led weekly meetings for tutors.

The Gabel Lab **Boston, MA**
Imaging Researcher *Sep 2023 - Present*
- Identified an optical imaging system and software for analysis of C. Elegans images/videos.
- Cultivated an automated analysis process through MATLAB to streamline image processing.
- Implemented the automated system to monitor and record C. Elegans behavior response to ketamine exposure.

PROJECTS

Device & Diagnostic Design **Boston, MA**
Ideation Project
- Conceptualized and prototyped an everyday object, a clip, to address the difficult assembly of a nebulizer.
- Researched user demographic and the nebulizer market to improve the mobility experience.

Smart Rodent Trap **Boston, MA**
Hands-on Project
- Created a smart and humane device that will trap mice and chipmunks and release them automatically to prevent harm to the animal and user.
- Partnered with a group of 3 to program and build an enclosure; consisted of Arduino code, circuit wiring, laser printing, and soldering.

Heart Rate Research **Boston, MA**
Physiology project
- Curated a study to compare the phycological effect of exposure to positive and negative auditory/visual stimuli.
- Collected heart rate of 21 examinees through a plethysmography and LabSribe4 software.

Room Thermostat **Boston, MA**
Mechanical Project
- Constructed a device that took and displayed the temperature (F° & C°) of the environment surrounding it on a liquid crystal display. If outside of the desired temperature range, then it would buzz and flash a red LED.
- Established a start to finish program and device, that consisted of Arduino code, ran on an Arduino Uno, a cardboard enclosure, jumper wires, and a 3-D printed battery holder.

Data Analysis **Boston, MA**
Programming Project
- Dissected large data sets of over 10,000 points of pollution, population, and waste material to demonstrate a correlation of population and waste directly.
- Collaborated in a group of 3 to scrub down data using MATLAB to help identify the growth rate of pollution people are leaving on the earth.

SKILLS

Skills: Microsoft Office, MATLAB, fluent in English and Spanish, Arduino, Onshape, AmScope

ARJAVI VYAS

ajvyas@bu.edu | 732-910-1069 | www.linkedin.com/in/arjavi-vyas | Boston, MA

EDUCATION

Boston University Expected May 2024
B.S. in Biomedical Engineering | Concentration in Machine Learning

SKILLS

Hardware Tools: Arduino, Raspberry Pi, Laser Cutting, Injection Molding, Photolithography, Spectroscopy, CNC Mill
Software Tools: SOLIDWORKS, Autodesk Fusion, On Shape, CURA, Adobe, Tinker CAD, Minitab, LabView
Programming Languages: MATLAB, Python, Java, C/C++

RELEVANT PROJECTS

Melanin ESS Probe for Restless Legs Syndrome Sep 2023 - Present
R & D | Biomedical Optics Lab BU

- Built optical fibers to construct ESS probe that stratified melanin levels with novel k-means clustering algorithm.
- Testing for hormonal correlations to non-curable restless leg syndrome using ESS probe to develop remedies.
- Compiled results and presented findings at 2024 University of Minnesota Medical Devices Conference.

NovaSpec | Medical Grade Speculum Sep – Dec 2023
R & D | BU & BUMC

- Designed and manufactured novel medical grade speculum to optimize screening exams and vaginal surgeries with minimal discomfort using SOLIDWORKS CAD, 3D printing, and manufacturing processes.
- Tested prototypes using quality regulation principles including FDA approval, FMEA charts, BOMs, and SOPs.

RESEARCH EXPERIENCE

Automated Plug-&-Playable Microfluidic System for Cell Communication (APUS) - iGEM May – Nov 2023
Microfluidics R & D Engineer | Oliveira Lab

- Developed a microfluidic motherboard integrated with a dual-syringe continuous pump to control flow of media to bacteria strains housed in PDMS chips, developing a hands-off experimental device for 24+ hour experiments.
- Consulted Ginkgo Bioworks, Arcaea, and Harvard Apparatus to better customize our device to the biotech market.
- Competed in the 2023 iGEM Conference in Paris and received Best Software Nomination.

3-Gene Gillespie Algorithm & Shiny App Oct 2022 – May 2023
Computational Biologist | Algorithmic Lens on Experimental Biology Lab

- Conducted research under Dr. Brian Cleary on the inference of gene regulation from stochastic transcriptional variation across single cells at steady state.
- Developed web app via Shiny Python to display results from multi-gene inputs in constructed Gillespie Algorithm.

ADDITIONAL WORK EXPERIENCE

Malaria Medical Testing Device Jun – Aug 2021
Engineering R & D Intern | Worcester Polytechnic Institute VIBE

- Designed an affordable medical testing device for malaria to be used in Sub-Saharan countries via SOLIDWORKS.
- Prototyped various screening devices that can accomplish accurate malaria detection and successfully built medical device using sensory imaging, Arduino, 3D printing, circuit construction, and various medical device regulations.

Medical Assistant & App Development May – Aug 2021; May – Aug 2022
Colonia Pediatrics | Avenel, NJ

- Facilitated all areas of patient care such as triaging, taking vitals, secretarial work, and assisting doctors.
- Cooperated on Dr. Chaudhary's child health app, Jiguar, a tool for parents to track child development.

ACTIVITIES

Recording Spotify Artist Feb 2020 – Present
Hear Your Voice Volunteer Producer Sep 2022 – Present

Alex Wagner

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Education:

Boston University, Boston, MA — *Expected May 2024*
B.S. Biomedical Engineering — **Cumulative GPA: 3.99/4.00**

Recognitions: College of Engineering Dean's List (All Semesters), 2023
Distinguished Summer Research Fellowship

Projects:

Room Temperature Monitor:

- Designed an enclosure to measure the ambient temperature of a room in real time, alerting users if the temperature deviated from the predefined range
- Utilized an Arduino Uno, Piezo buzzers, several LEDs, and an LCD to facilitate user notification

Drug Preservation Device

- Problem Statement: Consumers taking medication need a device that can store medicine at a safe temperature in a car for an extended period of time, and notify consumers when the temperature leaves the specified range
- Returned the device to a safe temperature within 5 minutes, satisfying design criteria

Truss Design

- Designed a simple truss capable of supporting a given load for at least one minute
- Created a complementary MATLAB script taking in joint locations to calculate compression and tension forces on each member to predict the buckling member of the truss
- Successfully held the live load of 32 ounces, meeting design criteria

Professional Experience:

Guest Service Agent — *May 2021 – August 2021*
Millennium Hotels Buffalo

- Gained valuable customer service experience by greeting guests, organizing check-in and departure processes, and accommodating requests as needed
- Facilitated check-in of 300 guest rooms by pre-assigning arrivals to specific rooms
- Coordinated and operated a scheduled shuttle service for guests
- Accommodated large groups including bands, tour groups, weddings, and banquets, often exceeding 300 guests
- Supervised daily arrivals and departures of airlines under contract with the hotel
- Analyzed basic financial documents, including credit limit reports, cash-paying guest reports, and routing information for prepaid guests

S.A.S.S. Student Tutoring — *January 2022 – Present*

- Lead tutoring sessions with NCAA Division 1 athletes at Boston University
- Assisted students in developing study habits and problem-solving skills, logging progress through appointment reports, which highlight content covered in the appointment, study skills used, and an outline for future appointments

Undergraduate Research Assistant — *November 2022 – Present*
Albro Lab, Boston University

- Studied the contribution of endogenous, cell-secreted TGF-β to neocartilage survival by measuring the levels of LTGF-β deposited by seeded chondrocytes over the engineered cartilage maturation period, then quantifying TGF-β activation in response to mechanical stimulation
- Examined mechanical properties of cell-seeded constructs using a custom mechanical tester, measuring sulfated glycosaminoglycan (sGAG) content using the DMMB assay, and performed histology analysis by staining tissue sections and imaging with a laser scanning confocal microscope

Skills:

Technical: 3D Printing, Soldering, Data Collection & Analysis, Prototype Design & Testing, Technical Writing
Laboratory: Gel Electrophoresis, Chromatography, DNA Extraction, Microscope, Restriction Enzyme Digestion, PCR, ELISA
Computer: SnapGene, OnShape, Ultimaker Cura, MS Office, MATLAB

ATHENA WANG
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EDUCATION

Boston University, College of Engineering Boston, MA
B.S., Biomedical Engineering May 2024
Dean's List Fall 2021, Spring 2022, Fall 2022, Spring 2023, Fall 2023

EXPERIENCE

BU Wilson Wong Lab Boston, MA
Undergraduate Student Researcher January 2022 – present

- Performed qPCR, bacterial DNA extractions, and gel electrophoresis analysis to introduce foreign plasmids into bacteria under guidance of a graduate student
- Discussed DNA recombinase applications in weekly lab meetings, alongside potential troubleshooting for DNA amplification processes

Argospect Technologies Inc. Concord, MA
Computational Modeling Intern June 2023 – August 2023

- Modeled a parallel-hole collimator SPECT imaging system using opensource software GATE to reconstruct preexisting systems and model cardiac SPECT scan results over 8 weeks
- Compared and discussed multiple CT systems and potential ways to augment existing image modalities to yield more information for physicians, as well as improve image quality

Massachusetts General Brigham Boston, MA
Clinical Data Intern June 2022 – August 2022

- Reviewed CT colonoscopy data and identified colonic polyps on a training set of 41 cases previously analyzed and validated by trained radiologists
- Performed anonymization of patient data to generate a dataset of CT colonoscopy and OC colonoscopy results for later review by radiologists and researchers

Massachusetts General Brigham Boston, MA
Research Design Intern June 2021 – August 2021

- Designed and modified a chronic spinal window in OnShape in to enable spinal cord imaging for further studies on how tumors affect sensory nerves; designed 9 prototypes
- Collected data on laboratory mice to track physical effects of malignant tumors on motor and sensory function in mice over 2 days, analyzed impacts on locomotion with supervisor

PROJECTS

Draper Boston, MA
Microfluidics Model for Cancer Immunotherapy September 2023 – May 2024

- Modified and continued development of a 3D printed microfluidic tumor microenvironment device in order to test tumor fragment experiments and validation of chemotherapy techniques
- Cultured and processed mouse carcinoma cells every 3 to 5 days to develop spheroids in order to test efficacy of paclitaxel delivery using polydopamine nanoparticles

Society for Asian Scientists and Engineers Boston, MA
Powergrid Model Design January 2023 – May 2023

- Designed and constructed a diorama to model microgrid design and function of solar energy to power underserved communities in Boston's Chinatown in a team of 9 engineering students
- Met with and received feedback from clients over the course of 4 months to alter and improve model, as well as update on smaller deliverables

SKILLS

Wet lab: learned NMR, IR, GC-MS, PCR, DNA extraction, bacterial and mammalian cell culturing in lab and class
Computer: utilized MATLAB, Python, C++, PostgreSQL, and R in a series of projects
Technical: Explored fluorescent and confocal microscopy in lab; designed webpages with Canva and Squarespace

HONORS, ADDITIONAL INFORMATION

Member, Tau Beta Pi
Volunteer (Emergency Department/Activity Cart), Massachusetts Eye and Ear
Engineering Tutor, Boston University Engineering Undergraduate Tutoring Center

Yu Wang

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EDUCATION

Boston University College of Engineering Boston, MA
Bachelor of Science in Biomedical Engineering Expected January 2025
GPA: 3.62/4.00
Relevant Coursework

- Computational Programming (MATLAB) • BioMechanics • Fluid Mechanic • Signal • Systems Physio • Thermo • Physics • Chemistry • Calculus • Linear Algebra • Statistic • Eng Design

SKILLS

- Language: Native in Mandarin, English
- Experienced in CAD using On Shape
- Proficient wet lab skills
- Intermediate level of programming with C++ and Matlab
- Great model-building skills

INTERNSHIP

Undergraduate Research Assistant in Wunderlich Lab, since January 2024

- Preparing microscopic sections of Drosophila embryos
- Using laser microscope to observe development of enhancers in Drosophila embryos
- Extract Drosophila DNA and perform PCR

Phamacovigilance assistant in GCP ClinPlus Co., Ltd. May - July 2023

- Conduct an introduction training with a theme on several cancer treatments as a keynote speaker
- Participating in pharmacovigilance process and in writing drug master files and development safety update report
- Translate pharmacovigilance glossary issued by Council for International Organizations of Medical Sciences to Chinese and publish it on company's media platform

PROJECTS

Vision Block Hand Detector Project January - May 2023

- Cooperation worked with a team of three, detecting and displaying position of inside hand in a vision block 1*1*1 inch box through 6 sensors placed in box
- Mainly responsible for most of programming and circuit design work

Predicting Future Climate Change MATLAB Project December 2022

- Cooperation worked with a team of three, using data analyzed machine in MATLAB to predict possible development direction of future climate based on previous 50 years' data
- Mainly responsible for finding data and Matlab data analysis

Truss Design Project September - December 2022

- Cooperation worked with a team of three as a team leader, using acrylic bars to design a truss and making it capable to supporting a load greater than 1.7 lb
- Mainly responsible for design and construction

EXPERIENCE & ACTIVITIES

Screenwriter from BU Hongxing Drama Club, October 2022
Volunteer at Beijing Zoo July 2019

- Gave speech to promote knowledge of protection rare animals and endangered animals and earth; also organized activities and games to help audience better understand knowledge

Sabrina N. Wilderotter

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EDUCATION

Boston University, College of Engineering | Boston, MA *Expected May 2024*
Bachelor of Science, Biomedical Engineering- Technology Innovation Concentration
Study Abroad Spring 2022: Madrid, Spain
GPA: 3.97/4.0, Dean's List (7 semesters), Tau Beta Pi Engineering Honor Society

INTERNSHIP EXPERIENCE

Joseph-McCarthy Group | Boston, MA May 2022 - Feb 2024
Research Assistant
Publication: Li, R., Wilderotter, S., Stoddard, M., Van Egeren, D., Chakravarty, A., & Joseph-McCarthy, D. (2024). Computational identification of antibody-binding epitopes from mimotope datasets. *Frontiers in Bioinformatics*, *4*. https://doi.org/10.3389/fbinf.2024.1295972

- Collected data on published mimotopes and methods to test a novel mimotope-to-epitope mapping algorithm
- Assessed findings with statistics and protein modeling in Chimera to confirm epitope mapping sensitivity
- Debugged algorithm in Python to improve performance and help decrease prediction density below 20%

GlaxoSmithKline (GSK) | Rockville, MD Jun - Aug 2023
Structural Biology Intern

- Computationally refined an X-ray crystallography design using Coot and Phenix to ensure molecular favorability in vaccine development
- Collected gel electrophoresis and size-exclusion chromatography (SEC) data to characterize viral proteins
- Performed mutagenesis, plasmid preparations, and transfections to amplify and isolate DNA in antigen designs

WORK EXPERIENCE

GoPeer, Inc. | Remote Mar 2021 - Present
Chemistry, Math, and Spanish Tutor

- Apply 1:1 online teaching strategies such as practice assignments and Quizlet to educate children aged 11-18
- Investigate and elaborate challenging concepts in a digital classroom with visual demonstrations and a 100% satisfaction standing on GoPeer from clients

PROJECTS

The Brainy Beanie (EEG Beanie) Jan - May 2023

- Coordinated with a team of 5 to design a novel solution to overstimulation due to EEG testing in autistic children
- Constructed a functional EEG beanie prototype able to detect brain stimulation and wave changes with one dry electrode by applying a Neurosky chip and Arduino Nano

Lamppost Flood Detector Sep - Dec 2021

- Designed an outdoor device to mount to lamp posts, measure water levels with an ultrasonic sensor, detect potential flooding when water levels hit 4 cm, and alert city officials with SMS communication
- Collaborated with 3 engineering students to design and develop a functioning prototype using SolidWorks, Arduino, a laser cutting machine, an ultrasonic sensor, and a float switch

Truss Project Oct - Dec 2021

- Organized a team of engineers to write code to determine the strength of 3 different truss designs
- Built optimal design based on MATLAB output analyzing member buckling strength and critical member

SKILLS

Dry Lab: MATLAB, Python, Arduino, UCSF Chimera, Coot, Phenix, C++, Onshape
Wet Lab: Bioprinting, Cell Culture, Gel Electrophoresis, Mutagenesis (PCR), Plasmid Preparation
Languages: Spanish (Professional)

LEADERSHIP

President of Tau Beta Pi Engineering Honor Society, Study Abroad Ambassador, Intramural Volleyball Team Captain, Former Fundraising Chair of Theta Tau Psi Delta Chapter Professional Engineering Fraternity

Natalie K. Will

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EDUCATION

Boston University College of Engineering — Boston, MA
Bachelor of Science in Biomedical Engineering — Expected May 2024

RELEVANT COURSEWORK

Device and Diagnostic Design, Biomedical Signals and Controls, Thermodynamics, Electrical Circuits, Programming, Engineering Mechanics, Materials Science for Biomedical Engineers, Engineering Design, Statistics, Family Business Management

SKILLS

MATLAB, C, Python, Microsoft Office, CAD, Arduino, ECG, Pipetting, Spectrometer, Oscilloscope, Centrifuge, Drill Press, CNC Mill, Soldering, Laser Cutter, 3D Printing

TECHNICAL EXPERIENCE

Boston University Department of Biology — Boston, MA
Systems Physiology Lab Assistant, under Professor Angela Seliga — Sep 2023 – present

- Assisted and supervised undergraduate students in physiology labs

Thrombodyne, an early-stage interventional medical device and material science company — Salt Lake City, UT
Research Laboratory Intern — May – Dec 2021

- Tested medical devices and calculated durability and anti-bacterial resistance
- Wrote technology grants and presented to senior leadership for private equity funding
- Consistency and accuracy progressed class III medical device closer to FDA approval

Rolston Laboratory, University of Utah Medical Center — Salt Lake City, UT
Clinical Research Intern — May – Aug 2021

- Analyzed epilepsy patients brain wave data, integrated insights, and presented to post docs
- Completed training in HIPPA requirements and patient interaction guidelines

INTERPERSONAL EXPERIENCE

Lee & Rivers, family and divorce law — Boston, MA
Legal Clerk Internship — Jun – Aug 2023

- Spearheaded three project workstreams including document disposition and file organization
- Earned partner trust through accurate results, timeliness, and a 25% increase in efficiency

At Your Service Events, Fenway Park and various Boston venues — Boston, MA
Customer Service — May – Oct 2022

- Rotated across multiple customer locations and adapted to daily changes in roles and staff
- Served and managed large crowds of people throughout dynamic environments

PROJECTS AND LEADERSHIP

Senior Design Capstone Project: Studying how Bone Cancer Affects Spine Strength

- Designed software to actuate a medical device to mechanically tests fracture rates of human spines from bone cancer patients to increase device accuracy, efficiency, and user safety
- Assessed progress and ability to predict spinal failure in relation to bone cancer

Medical Device Design Project: Collapsible Inhaler for Children

- Led a team of 5 engineers to machine a functional prototype on a strict budget and timeline. Conducted market research and tested prototype across metrics to meet stakeholder needs and predicted product's future success

Diversity, Equity, and Inclusion Project

- Collaborated with students, staff, and local social workers over a one-year period to devise and publish a plan to increase diversity of University's Honors College. Led a focus group and conducted market research to investigate pain points
- Presented and received approval from University's Dean of Students on a 5-year plan, now implemented by University

Vice-President of Standards, Sigma Delta Tau sorority, Alpha Xi Chapter

- Oversaw 3 different boards of peers and guided decision making towards inclusivity and fairness to benefit entire chapter
- Responsible for ensuring safety of members and upholding chapter policies while maintaining positive relations

HOBBIES

Playing piano and cello, attending university sports games, volunteering with middle schoolers

Sarah Wolf

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EDUCATION

Boston University — Boston, MA
Bachelor of Science in Biomedical Engineering, Concentration in Nanotechnology — Expected May 2024
GPA: 3.65/4.00 Dean's List: Fall 2020, Fall 2021, Fall 2022, Spring 2023, Fall 2023

University of Sydney — Sydney, NSW, AUS
Study Abroad Student — February – June 2022

TECHNICAL SKILLS

Computer: MATLAB, C/C++, LabView, Python, CAD, Linux, Excel, Visio, PowerPoint
Laboratory: UV-Vis Spectroscopy, PAC Annealing, Soldering, Experimental Design, PCR, ELISA, Protein Handling, Plasma Asher, 3D Printing, Device Characterization, Laser Cutters, Ellipsometry, SEM, Ball Bonder

EXPERIENCE

Raj Mohanty Research Group — September 2022 – Present
Undergraduate Researcher

- Studied biotin-streptavidin interactions on point-of-care, nano-electronic biomolecular diagnostic device
- Measured differential conductance of nanowire channels using LabView to increase surface charge sensitivity
- Enhanced biomarker detection by optimizing DC frequency for nanoscale antibody-antigen interaction tracking

Johnson and Johnson Surgical Vision — May – August 2023
Customer Experience Engineering Intern

- Designed anatomically driven human eye model to test 12,500 patient interfaces for root-cause investigation
- Accelerated timeline by 67% of rework procedure for recalled phaco packs in support of internal and FDA audits
- Defined LabView software changes and future implementation schedule for device screening system critical to business needs in support of corrective preventive actions

University of Sydney Engineering Internship Program — February – June 2022
Research Assistant

- Investigated laser-annealed PAC film bio-chip engineering Ph.D project in applied biophysics laboratory
- Observed redox/metal corrosion reactions with cyclic voltammetry to simulate human safety testing

PROJECTS

Senior Design Project: Optical Fibers for Restless Legs Syndrome (RLS) Diagnosis — October 2023 – Present

- Developing elastic scattering spectroscopy (ESS) optical fiber system to quantify melanin levels in human skin
- Collaborating with Yale University scientist in discovering potential correlation between melanin and RLS risks
- Attending University of Minnesota Student Medical Device Design competition alongside 4 team members

ClipIt: Novel Ultrasound Probe Cover Prototype — October – December 2023

- Identified unmet need with 4 co-members to create easier installation sterile ultrasound probe covers for the OR
- Generated looks-like and works-like prototypes to present for stakeholders and technical/design reviews
- Integrated necessary human factors into 3D-printed designs using FMEA and risk mitigation techniques

ELMA Blood Alcohol Concentration Assay Design — April – May 2022

- Designed assay to distinguish samples above/below the legal driving limit for blood alcohol concentration (BAC)
- Utilized data-generator to determine ethanol in blood samples among ten individuals for real-life application
- Calculated BAC % using standard curves, baseline approximations, and repeated experiments for accurate results

LEADERSHIP/ACTIVITIES

Treasurer, LIME (Women's Mentorship Program) — September 2020 – Present
Member, Boston University Admission Ambassador (Tour Guide) — September 2021 – Present
Advisor, Freshmen Engineering Student Advisor — September 2022 – Present
Volunteer, Squam Lakes Natural Science Center — June 2016 – August 2021

CHRISTOPHER WU

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EDUCATION

Boston University, College of Engineering — **Boston, MA**
Bachelor of Science in Biomedical Engineering, Concentration in Technology Innovation — Expected May 2024
- **GPA:** 3.69/4.00, Dean's List Fall 2021/2022, Spring 2022

Relevant Coursework: Medical Robotics, Medical Imaging, Biomechanics, Business of Technology Innovation, Device Diagnostic and Design, System Physiology

WORK EXPERIENCE

Material Robotics Lab — **Boston, MA**
Undergraduate Research Assistant — Nov 2023 – Present
- Developing 2.5 mm continuum body using Dragon Skin for bronchoscopy navigation
- Testing designs, analyzing DOFs, and integrating based on assembly compatibility

Kidney and Medical Engineering Program (BU-KIDMEP) — **Boston, MA**
Clinical Immersion Intern — Jun – Oct 2023
- Shadowed doctors at Boston Medical Center; engaged in clinical rounds, procedures, and surgeries
- Visited NxStage Medical Inc. enhancing understanding of advanced dialysis technologies

Undergraduate Research Assistant at Biomedical Optical Technologies Lab (BOTLab)
- Developed solid silicone phantom in shortwave infrared wavelength range for calibration of Frequency Domain Shortwave Infrared Spectroscopy (FD-SWIRS) device for kidney dialysis
- Analyzed and scrubbed data in MATLAB to present prototype outcomes in graph format
- Conducted literature review and wrote article on end-organ ischemia

PROJECTS

Wrist Rehabilitation Robot, Coding Lead
- Created McKibben actuated exoskeleton and designed circuit using EMG sensors, air pump, and solenoid
- Programmed Arduino to interpret EMG signals and trigger activation of exoskeleton with EMG readings
- Evaluated performance based on flexion angle, compared with range of motion needed for activities of daily living

Finger Rehabilitation Robot, Coding Lead
- Designed a bidirectional cable-driven robot using LEDs, photodiodes, stepper motor, and 3D-printed exoskeletons
- Coded Arduino code to mirror changes in photodiode in master glove and replicate in slave glove
- Tested accuracy of mirror therapy; calculated 90.4% accuracy in angle replication

Cost-effective Prosthetic Finger, Team Lead
- Engineered finger prosthetic for construction workers in low-income communities with cost under $15
- Conducted market research to evaluate potential of product, ethics, and market viability
- Modeled prototype using CAD, 3D printed, assembled system and tested weight resistance to optimize mechanism

TEACHING EXPERIENCE

Boston University — **Boston, MA**
EK131: Hands-on Engineering Teaching Assistant — Jan 2023 – Present
- Diagnose student errors and provide feedback in CAD design, Arduino coding, and circuit wiring
- Demonstrate and oversee use of drill press, laser cutter, and 3D printer for project

EK301: Mechanics Grader — Sep 2022 – Dec 2023

SKILLS

Skills: MATLAB, C, Python, SolidWorks, Arduino, 3D Printing, qPCR, Microscopy, Drop casting
Languages: Spanish, English, Cantonese (conversational)

ACTIVITIES

Judicial Board Chair of Theta Tau, professional fraternity — Jan 2022 – Present
- Record attendance of 60 members and communicate with e-board to ensure member accountability for requirements

Member of Boston University Men's Rugby Club — Sep 2021 – Present
- Dedicate 7.5+ hours of training per week and practice strong work ethic to achieve personal and team goals

Hang Yang

Brighton, MA, 02135
617-319-5278 • hangyang@bu.edu

EDUCATION

Boston University, Boston, MA May 2024
Bachelor of Science
Biomedical Engineering
[3.09] Cumulative GPA

WORK EXPERIENCE

Boston University, Prof. Zeldich's lab, Boston, MA, USA Jun 2023 - Sep 2023
Intern

- Studied basic information about Down Syndrome related neurodevelopmental disease
- Accumulated valuable two photons Microscope knowledge through working in lab
- Gained hands-on experience in various software programs, increasing proficiency and expanding techniques

YangGuang Jade INC, Yangzhou, JiangSu, China Dec 2019 - Mar 2021
Intern

- Undertook design and execution of traditional Chinese jade engraving with carving machines, collaborating with 25 experienced workers
- Acquainted with more than 5 different types big carving-type machinery
- Improved manipulative ability and Cultivated patience through 1.5 year experience

Bombardier INC, Suzhou, JiangSu, China Jun 2017 - Sep 2017
Intern

- Conducted follow up interviews, investigations, and designed corresponding reports with 100% accuracy
- Developed team working skills and work ethics through collaboration with 10 colleagues in department

ACADEMIC PROJECTS

Automatic Analysis in Down Syndrome Calcium imaging process Sep 2023 - Present

- Developed in building analysis pipeline in MATLAB based script
- Designed fixed 6 parameters for automatical regions of interest selection on Calcium imaging videos

Develop Pulse Oximeter which won't be affected by skill tone Jan 2023 - May 2023

- Employed 2 light intensity sensors to receive skin reflection rate and determine users' skin tones
- Examined Pulse Oximeter's Infrared intensity according to skin tones feedback to make sure accuracy of Pulse Oximeter is above 95% for all skin tones users

LEADERSHIP EXPERIENCE

Assemble a pingpong game, Newton, MA Jan 2023
Propaganda team leader

- Hired more than 20 local Chinese from diverse communities to help us widely advertise
- Contacted at least 30 Chinese students from local colleges, universities, and high schools to relay publicity
- Created 5 different posters and 1 leaflets for game to be given out in different streets and areas

Established a online shopping group during COVID-19, Yangzhou, JiangSU, China Jan 2020 - Jun 2020
Group creater and leader

- Organized young people from local community to help those elders buy daily supplies and food
- Communicated with 2 local markets to prepare food and supplies

ACCOMPLISHMENTS

Dean's List [2023 Fall semester]

SKILLS

Technical: MATLAB experience, Microsoft Office suite, Computer-Aided Design(Solidworks, CAD)

Jane Yoo

917-613-7127 jyoo0823@bu.edu

EDUCATION

New York City, NY **Pace University** **Sep 2024 - Aug 2025**
- Accelerated Bachelor of Science in Nursing

Boston, MA **Boston University** **Expected May 2024**
- Majoring in Biomedical Engineering on the Pre-Physician's Assistant track, Dean's List
- Current Cumulative GPA: 3.50
- Relevant courses: Principles of Molecular Cell Biology and Biotechnology, Systems Physiology, Biomedical Signals and Controls, Device Diagnostics and Design, Gross Human Anatomy, Microbiology

WORK EXPERIENCE

Phlebotomy Technician **Boston Medical Center** **June 2023 - Present**
- Serve patients by identifying best methods for retrieving blood samples and other specimens, preparing specimens for laboratory testing, and performing screening procedures
- Resolve unusual test orders by contacting physicians, pathologists, nursing station, or reference laboratory, referring unresolved orders back for further clarification, and notifying supervisors
- Verify patient identification, taught sampling procedures and reassure patients nervous about venipuncture

Pharmacy Technician **CVS Pharmacy** **Jan 2023 - Present**
- Interfaced with health care providers and patients by phone/in person, answering questions and refill/prescription requests, processing third party billing claims and assist with prior authorization
- Maintain pharmacy inventory by checking pharmaceutical stock to determine inventory level, placing and expediting orders, verifying receipt, and removing outdated drugs
- Protect patients and employees by adhering to infection-control policies and HIPAA protocols
- Maintain records by recording, counting, and filing prescriptions and orders of physicians

Office Assistant **Boston University Student Employment Office** **Sep 2022 - Present**
- Assured customer service in-person, over phone, and via email to students, Payroll Coordinators, and on- and off-campus employers
- Monitored general email inbox, including sorting, responding to, sending, and forwarding emails
- Assured Student Payroll assistance, such as check distribution and pay and troubleshoot direct deposit

Health Center Assistant/Counselor **Project Morry** **June 2022 - Aug 2022**
- Distributed medicine and communicating specific camper/staff health needs (allergies, dietary restrictions) to relevant staff
- Provided first aid and care to campers (dehydration, splinters, sprains, insect bites)
- Communicated and followed up with parents regarding accident/incidents with campers
- Lead and taught small and large group activities and supervised campers' participation in structured and unstructured activities

CAMPUS AND COMMUNITY INVOLVEMENT

Volunteer **Franciscan Children's Hospital** **Sep 2022 - Sep 2023**
- Entertain children by playing games with children or reading to/with children
- Cuddle infants in medical rehabilitation programs and provide TLC

TRAINING AND CERTIFICATIONS

- Certified Phlebotomy Technician | National Health career Association | May 2023 – May 2025 | Active
- New York State Emergency Medical Technician-Basic Certification | Aug 2021 – Sep 2024 | Active

SKILLS

Languages and Technology
- Proficient in English and Korean, Conversational in Chinese
- Proficient in Google Slides, Google Docs, Google Sheets, Microsoft Word, Microsoft Excel

XIANG YUAN

blusey@bu.edu | 857-268-9863 | Shanghai,China | He/ Him

EDUCATION

Boston University, College of Engineering Boston, MA
Biomedical Engineering, GPA 3.12 2020 - 2024

- Dean's list Fall 2021.

Brown University Providence, Rhode Island
Master of Innovation Management, Entrepreneurship 2024 - 2025

SKILLS

Software Development: Proficient in Python, Java, and C#. competent with the Spring and Django frameworks.
Data Analysis: Qualified in using SQL and Python for complex data manipulation and visualization using Tableau.
Communication Skills: Proficient in leading meetings and presenting project results to stakeholders.

EXPERIENCE

Boston University Cross Country / Track and Field Boston, MA
Team Manager Jan 2021 - Present

- Managed timing and media coverage for 15+ events; improved team?s media engagement by 30% through effective content strategies.

Boston University Senior Project, Han's Lab Boston, MA
Senior Design student May 2022 - Present

- Led design of a wearable auditory-gait device, piloted with 10+ participants, enhancing data accuracy on gait analysis by 40%.

John Hopkins Medical Baltimore, Maryland
John Hopkins Yu Lab Research Assistant Jun 2023 - Aug 2023

- Cooperated 3 graduate-level research projects, enhancing experiment efficiency by 20% through optimized PBMC extraction techniques.

Boston University Boston ,MA
Boston University ICL lab Research Assistant Feb 2023 - May 2023

- Developed motion coding algorithms for 2 new-born studies, improving data collection accuracy.

Zhuo Medical Company Shanghai, China
Market Coordinator Jun 2022 - Aug 2022

- Conducted market analysis on Fluorescence laparoscopy, gathering data from over 100 clinical sources to inform product development strategies.

EXTRACURRICULAR ACTIVITIES

Volunteer, Local Community Health Clinic.
Volunteered 100+ hours annually, assisting in patient intake and data management, often communicating complex health information to diverse audiences.

Michelle Yung

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EDUCATION

Boston University (BU), College of Engineering — Boston, MA
Bachelor of Science in Biomedical Engineering, Pre-Medicine — May 2024

EXPERIENCE

Research Trainee — Boston, MA | Sep 2023 – Present
Harvard Medical School + Brigham and Women's Hospital

- Researched under Dr. Fei Liu, PhD on projects investigating exosome disease biomarkers in clinical plasma + urine samples, and exosomes in river/waterways of Boston as part of fulfilling senior project degree requirements

Undergraduate Researcher — Boston, MA | Jun 2022 – Present
Boston University School of Medicine

- Researched under Dr. Haiyan Gong, MD, PhD in ophthalmology glaucoma research projects investigating aqueous humor outflow pathways of the eye
- Processed eyes by cutting, staining, embedding, and microtome sectioning eye samples and imaged eyes by operating light, confocal, and transmission electron microscopes
- Conducted an independent project "Morphologic Changes in the Distal Aqueous Outflow Pathway Responsible for Thrombospondin-1-Induced Outflow Facility Decrease in Porcine Eyes" for UROP Summer 2023

Medical Assistant, Per Diem — Quincy, MA | May 2022 – Present
Beth Israel Deaconess HealthCare

- Cares for patients and manages intake prior to primary care provider consultation: determines and scribes chief complaints, updates social/family history and medications utilizing the EMR AthenaOne
- Performs vital signs, height and weight, injections, phlebotomy, EKGs, and specimen collections

PROJECTS

"AirwayPro" — Sep 2023 – Dec 2023

- Designed and built 'looks-like' and 'works-like' prototypes of a single-hand operated, motorized, joystick controlled endotracheal intubation laryngoscope instrument to ease intubation procedures with 4 groupmates
- Evaluated stakeholders, ideations/iterations, materials, risks, and presented design review pitches to the class

"MyEMR" – Personal Health Tracker — Nov 2022

- Recruited a team of 4 members to compete in the Boston University hackathon BostonHacks; inventing and prototyping a patient-orientated health tracking web-app
- Created the website layout using Figma for UI/UX design and implemented design using front-end HTML and CSS with back-end Python Flask Framework

Portable Cell Incubator — Oct 2021 – Dec 2021

- Engineered a functioning prototype of an Arduino controlled cell incubator with temperature and humidity control systems, 6-well plate storage, and handles for portability with 3 teammates
- Designed circuitry and implemented C/C++ code to power components; operated band saws and drilling machines to create plastic enclosure

SKILLS

Laboratory: Gel Electrophoresis, UV-Vis Spectroscopy, PCR, Micro-pipetting, Microscopy
Computer: MATLAB, C++, Python, Arduino, SolidWorks, Microsoft Office
Languages: English (Fluent), Cantonese (Fluent), Mandarin (Conversational)
Certifications: Certified Medical Assistant, Basic Life Support (BLS)/CPR and AED, Medical Scribing, Stop the Bleed

CO-CURRICULARS

Soprano, BU Symphonic Chorus — Sep 2021 – Present
Mentor (Volunteer), BU Premedical Society — Oct 2022 – Present
Personal Interests: Singing, Guitar, Piano, Learning languages

Claudia Zaglewski

Boston, MA 02215
(201) 919-4097 claudiazag1@gmail.com

Education

Boston University *May 2024*
B.S. Biomedical Engineering

Projects

Canine Partial Limb Prosthetic Engineer *Sep 2023 - May 2024*

- Co-inventing a novel prosthetic for canines with partial limb amputations to closely mimic the biomechanics of carpal rotation
- Designing digital prototypes to test in SOLIDWORKS motion studies and COMSOL software

ML Program Developer *Feb 2023 - May 2023*

- Developed a system for an anonymous business to predict probability of successful transactions on different days
- Created four different models using Python and tested on provided data (included support vector machine, logistic regression, k-nearest neighbors, and random forest classifier)

Automated Blue-Light Lamp Engineer *Sep 2022 - Dec 2022*

- Collaborated with a team of four to engineer an innovative desk lamp for individuals with limited fine motor skills capable of adjusting concentration of blue light based on time of day
- Soldered complete circuit as well as set up code and tests for RTC component associated with light sensitivity settings

AQI Program Developer *Mar 2021 - May 2021*

- Co-led development of a program using MATLAB which allows users to navigate through current AQI levels across all U.S. counties to assess risks based on specific health conditions

Experience

Blended Bowls Crew Member *Jun 2020 - Apr 2022*

- Managed transactions between customers and local bank
- Supervised training of new crew members
- Prepared orders and regularly cleaned facilities

Extracurriculars

- Society of Women Engineers (SWE)
- New England Aquarium Sea Turtle Rescue Volunteer
- Outing Club: Troop Leader (passed initial training in order to organize and guide outdoors trips)

Skills

- Programming Languages (C, Python, MATLAB)
- CAD
- Microsoft Office (Excel, Word, Powerpoint)
- Google Workspace (Docs, Sheets, Slides, Forms)
- Wet and Dry Lab Techniques and Safety Procedures
- Bilingual (Polish, English)

Nicole A. Zajac

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EDUCATION

Boston University College of Engineering || Boston, MA — Expected May 2024
B.S. in Biomedical Engineering; Concentration in Nanotechnology

Dublin City University || Dublin, IE — January – May 2023
Study Abroad Student

RELEVANT COURSES

Surgical Device Technology, Biomechanics of Human Movement, Clinical App. of Biomedical Design, Biomedical Measurement & Analysis Lab, and Systems Physiology.

PROFESSIONAL EXPERIENCE

R&D Co-op || Olympus Corporation || Westborough, MA — January – May 2024

- Contributed to urology device development through collaborative multi-site discussions with the Project Engineer and cross-functional team, integrating principles of Design of Experiments (DOE).
- Independently performed lab tasks, including data collection, SolidWorks design modifications, and SOP preparations, while actively participating in technical reporting, and team meetings.

R&D Intern || Nicolaus Copernicus University || Torun, Poland — July – August 2023

- Developed laser-induced photochemical deposition to fabricate printed nano structures, resulting in enhanced fluorescence detection for applications in biosensors.
- Led development of a low-cost smartphone attachment, including optical components, through CAD software enabling smartphones to function as fluorescence microscopes.

July – August 2022

- Synthesized silver nanowires for high-sensitivity fluorescence imaging and improved project efficiency by 20% through effective collaboration in a research team.

Talent Access Intelligence Intern || Johnson and Johnson || New Brunswick, NJ — June – July 2023

- Automated data collection and analysis using Google Alerts, Power Automate, Excel, and SharePoint, leading to an increase in data-driven decision making for BUHR leaders.
- Presented to over 25 employees, including the Chief Human Resources Officer and managers.

PROJECTS

MANTIS Project || Draper Laboratory || Cambridge, MA — September – May 2024

- Actively involved in research and development for a new medical device with a focus of advancing the MANTIS microstructure tissue fastening technology for clinical applications.
- Currently contributing to prototyping phase using SOLIDWORKS, FEA, among other tools.

Drug Preservation Device || Boston University || Boston, MA — October – December 2021

- Designed a device using CAD software, Arduino, DHT sensors, TEC, and an LCD display.
- Implemented handwritten C++ code to operate device, resulting in accurate temperature control within 0.5 degrees Celsius and humidity within +/- 2% of target range.

SKILLS

Software: AutoCAD, MATLAB, LabVIEW, MS Office, 3D Printing, Power Automate, C++, Arduino
Laboratory: Wide-field fluorescence microscopy, Optical Systems, PCR, UV-visible spectroscopy
Certifications: Abbott Online Electrophysiology Course, AutoCAD Certification, Polish Proficiency

EXTRACURRICULARS

Ambassador, BU Technology Inspiration Scholars Program — September – December 2023

Peng Zhai (Billy)

pzhai@bu.edu | 541-606-7705 | Boston, MA | **linkedin.com/in/pzhai**

EDUCATION

Boston University Boston, MA

B.S. in Biomedical Engineering & B.S. in Human Physiology Expected May 2024

Related Coursework: Molecular Bioengineering, Transport in Living Systems, Clinical Applications of Biomedical Design, Signals & Controls, Biomedical Optics, Human Anatomy, Cardiovascular / Pulmonary Pathophysiology

CLASS PROJECT

Biomedical Engineering Senior Project Boston, MA

Computational Investigation of PFAS Molecules Binding to Biomolecules Sep 2023 — Present

- Developed a computational model of a set of PFAS molecules binding to endogenous proteins relevant to pathophysiology of placenta. Aim to design improved PFAS molecules with limited toxicities and engineer proteins for remediation of PFAS-protein binding.

RESEARCH EXPERIENCE

University of Science and Technology of China, Cancer Research Center Hefei, China

Undergraduate Research Assistant May — Aug 2023

- Performed cellular experiments, including isolation and culture of NK cells from peripheral blood, Western blot, plasmid transfection, and Seahorse XF analysis for cell metabolism.
- Ran computational analysis to identify key molecules and pathways mediating co-occurrence of CAD and T2DM; methods include differential analysis, weighted gene co-expression network analysis, and gene ontology.
- Drafted introduction and part of discussion for manuscript "$CD8^+$ T and NK cells characterized by upregulation of NPEPPS and ABHD17A are associated with the co-occurrence of type 2 diabetes and coronary artery disease". Manuscript under review.

Boston University Human Adaptation Lab Boston, MA

Undergraduate Research Assistant Feb — May 2023

- Utilized Visual 3D to clean and compile raw data of lower extremity movement for future project.
- Attended weekly meetings and demonstrated motion capture in National Biomechanics Day to local students.

WORK EXPERIENCE

BSG Auto Glass Co., Ltd., U.S. Branch Las Vegas, NV & Indianapolis, IN

Part Time Associate Oct 2021 – March 2023

- Orchestrated the company exhibition space at AAPEX 2021, SEMA 2022 and Work Truck Week 2023, effectively showcasing products to a diverse clientele including OEMs, aftermarket brokers, modification facilities.
- Visited ATV manufacturer clients with the project manager and participated in contract re-negotiation; formulated negotiation strategies by analyzing potential competitors and winning over orders of other product lines from the client, and successfully reached letters of intent.

LEADERSHIP EXPERIENCE

Boston University Cycling Club Boston, MA

President Sep 2022 — Present

- Led e-board meetings to discuss activities, training plans, and competition logistics.
- Enhanced the retention rate of members through a series of measures such as changing coaches, organizing winter training camps, dynamically adjusting club registration fees and team uniform prices, and inviting alumni in the cycling industry to share lectures; the income was increased by approximately $1,000 per year (+13%).
- Secured new sponsorship while maintaining the original ones; organized hot coco ride for the sponsors.

SKILLS

- CAD Software: SolidWorks, Creo, Onshape.
- Programming: Matlab, Java, Python.
- Experienced in Microsoft Office Suite, Adobe XD, Photoshop.

Susan Zhang

West Caldwell, NJ 07006 | (646) 620-1553 | szha@bu.edu | linkedin.com/in/susan-zhang2002/

Education

Boston University, Boston, MA *Expected May 2024*

Bachelor of Science

Major in Electrical Engineering; Minor in Systems Engineering; Concentration in Machine Learning

Honors Society: IEEE-Eta Kappa Nu

Work Experience

Verizon

IT Portfolio Management Intern *Jun 2023 – Aug 2023*

- Designed comprehensive microsite/hub for CSG Demand, Portfolio, and PMO, enhancing transparency into budget allocation, funding, and organizational processes while fostering sense of team culture and connectedness.
- Led critical high-visibility project, mapping product-app-people relationships to identify app-product dependencies and associated POCs — unlocking potential opportunities to optimize operational costs for upcoming year.

Data Analytics / Machine Learning Intern *Jun 2023 – Aug 2023*

- Gathered valuable data insights into Verizon's 5G fixed wireless access (FWA) service disconnects through creation of informative dashboards and real-time anomaly detection to flag irregularities in data using **Kibana**.
- Collaborated closely with cross-functional team to analyze trends and patterns, providing crucial inputs for process optimization and service enhancement.

Software Development Intern *Jun 2022 – Aug 2022*

- Implemented mechanism towards optimizing operational efficiency across Verizon's reverse supply chain network.
- Developed API interfaces to integrate client/app with backend 1ERP system using **APIGEE** as middleware.
- Created dashboards on **Splunk** to hold analytics details for API monitoring.
- Engaged in strategic discussions on emerging technologies at the Corporate Systems Group (CSG) Leadership Offsite Session with the SVP & CIO of Verizon and leadership team to explore innovative solutions for organizational growth.

Electromagnetic Technologies Industries Inc. *May 2021 – Aug 2021*

Engineering Intern

- Computed estimate of cost and expected material distribution to install devices for telecommunication purposes within 3 underdeveloped cities.
- Graphed radiation patterns of potential antenna arrays according to specified number of elements and tapers in **MATLAB**.
- Assembled and utilized **vector network analyzers** (VNA) to test directional couplers and power dividers based on customer specifications.
- Performed calculations for potential patent by leveraging Euler's formula(s) and antenna theory.

Projects

Laser Cavity Simulation *Jan 2022 – Present*

- Executed particle swarm optimization technique to obtain specific target cavity spectrum(s) in **MATLAB** under guidance of research professor and PhD student.

Pet Classification Challenge *Sep 2022 – Dec 2022*

- Built image classifier to distinguish between cats and dogs through machine learning algorithm in **MATLAB**. By partitioning dataset into training and test sets in folds, error rates of less than 15% were achieved.

Leadership Experience

Laboratory Teaching Assistant, Power Electronics *Jan 2024 – Present*

Teaching Assistant, Deep Learning *Jan 2024 – Present*

Secretary, BU China Care Fund *May 2022 – Present*

Laboratory Teaching Assistant, Introduction to Electronics *Sep 2023 – Dec 2023*

Skills

Languages: English, Mandarin, Spanish

Technical: Adobe Photoshop, Google Applications, MATLAB, Microsoft Office Products, Python, SolidWorks, Verilog

Wuyi Zhang

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EDUCATION

Boston University (BU), Boston, MA Sept. 2020–May 2024 (expected)

Bachelor of Engineering in Biomedical Engineering, Minor in Computer Science

- Relevant courses: Biomedical Signal and Controls, Biomedical Material Science, Fluid Mechanics, Biomedical Measurement, and Principle of Molecular Cell Biology and Biotechnology

PUBLICATIONS

- Lin Q, Li Z, Lu L, Xu H, Lou E, Chen A, Sun D, **Zhang W,** Zhu W, Yee EU, Sears PS, Chen X, Kelly CP. Budesonide, an anti-inflammatory drug, exacerbate clostridioides difficile colitis in mice. Biomed Pharmacother. 2023 Sep 13; 167:115489. PMID: 37713991.

RESEARCH EXPERIENCE

Imaging Analysis of Neuronal Activity in IPSC-derived Cortical Organdies

Research Assistant May 2023 – present

- Employed Ca imaging with specific calcium sensors to discern oscillation patterns of networks and understand how their dysregulation results in intellectual deficits and AD pathology in DS
- Implemented MATLAB and deep learning models for improving analysis efficiency.

Therapeutics Potential of Magnetic Particles on MSC Stem Cells

Research Assistant June 2023 – Aug. 2023

- Extracted exosomes from MSC cultures with multi-stage centrifugation techniques.
- Conducted comprehensive analysis to identify magnetic particles within exosomes and led the analysis phase to understand potential therapeutic applications.
- Used QPCR to study gene expression changes post treatment and studied protein profiles.
- Cultured Mesenchymal Stem Cell with magnetic particles for therapeutic implications.

Effect of Anti-inflammatory Drugs on Clostridioides Dfficile Infection (CDI) that Leads to Colonic Inflammation Using a Mouse Model

Research Analyst June 2018 – May 2023

- Explored the efficacy of anti-inflammatory drugs budesonide and mesalamine in CDI treatment, especially when combined with the antibiotic fidaxomicin, through a murine model.
- Addressed gaps from clinical trials on the drug combination and potential complications.
- Indicated an 80% CDI-induced mortality rate in mice.

INTERNSHIPS

Tainti Biotherapeutics, Woburn, MA, USA May 2022 – Aug. 2022

Student Intern

- Performed HPLC assays for quantifying molecular components in antibody solutions.
- Managed sterilization of lab equipment and ensured contamination-free environment.
- Organized and labeled sample inventory; streamlined sample retrieval, resulting in a 30%-time reduction.
- Conducted SDS-page and protein purification tasks.

SKILLS

Computer: Proficient in MATLAB, C, Python, Java, SolidWorks, and Onshape.
Laboratory: Micropipette, PCR sequencing, Microscope, Agarose Gel Electrophoresis, HPLC, Cell Culture, Western Blot Gel Electrophoresis, and QPCR.

Yiwen Zhang

yiwzhang26@gmail.com • (617) 784-5715 • http://www.linkedin.com/in/yiwen-zhang- • Boston, MA

EDUCATION

Boston University College of Engineering — **Boston, MA**
BS in Biomedical Engineering, BS in Electrical Engineering — Expected May 2024

AWARDS

American Society of Nephrology (ASN) Kidney Star, Top 10 poster presenter (undergraduate) — Fall 2023
NIH NIDDK KUH Summer Undergraduate Research Symposium poster presenter — Summer 2023
Nephrology and Urology Summer Undergraduate Research Fellowship (nuSURF) — Summer 2023
Undergraduate Research Opportunities Program (UROP) — Fall 2022, Spring 2024
IEEE MIT Undergraduate Research Technology Conference (URTC) poster presenter — Fall 2022
Undergraduate Research Travel Award — Fall 2022
Distinguished Summer Research Fellowship — Summer 2022

EXPERIENCE

Research Assistant in Bio Optical & Acoustic Spectroscopy Lab | Boston, MA — Sep 2022 - Present

- Investigate inter-brain synchrony of 20 pairs of verbally interactive volunteers using functional Near-Infrared Spectroscopy. Established experimental and IRB protocol for hyperscanning fNIRS, studying language disorders
- Expedited co-location of electroencephalogram (EEG) and fNIRS project by programming processing pipelines for EEG data analysis based on FieldTrip. Mastered EEG gel electrodes data collection on human subjects

Clinical Intern in MGH Center for Women's Mental Health | Boston, MA — May 2023 - Present

- Overhaul questions on Massachusetts General Hospital Psychiatry Academy courses, virtual Grand Rounds, and conferences to effectuate center's educational programs for 1000+ psychiatrists and mental health workers
- Organized and assembled mailings to medical providers and centers to increase efficiency by 20% in support of National Pregnancy Registry Study. Supported data entry on 30+ variables for clinical research projects

Summer Fellow in Mayo Clinic College of Medicine and Science | Rochester, MN — May 2023 - Aug 2023

- Inspected the efficiency of neoadjuvant chemotherapy and monitored progression of cancerous tissue for breast cancer patients by quantifying 3D microvascular biomarkers on non-contrast ultrasound using Amira software
- Established a spline-based Machine Learning algorithm for motion correction in renal ultrasound microvascular imaging, leading to 30% increase in signal-to-noise ratio, through improving temporal coherency

Research Assistant in Ultrafast Optics Lab | Boston, MA — Dec 2021 - Dec 2022

- Operated Photothermal spectroscopic imaging to quantify biochemical properties of PNIPAm smart materials. Led independent research project to monitor volumetric and phase changes of drug-delivery agents in nanoscale

Clinical Assistant in Neuroimmunology Center in Xuanwu Hospital | Beijing, China — Apr 2021 - Aug 2021

- Initiated testing strips for diagnosing neurological paraneoplastic syndrome (PNS). Innovated surfactants, stabilizers, protein concentration, and purification to lower 50% cost of PNS strips with improved sensitivity

PROJECTS

Human Brian Mappings — Jan 2021 - May 2021

- Designed a medical device to monitor and record arterial oxygen saturation, heart rate, and muscle movement detectors to detect seizures. Optimized and implemented MATLAB code to test working memories with images

LEADERSHIP

Communication Chair, BU Biomedical Engineering Society (BMES) — May 2022 - Present
Chemo Infusion Volunteer, Patient Transport Volunteer, Massachusetts General Hospital — Jun 2022 - Present
Ambassador Leader, Teach As You Learn (TAYL) — Feb 2024 - Present
Communication staffer, Boston University Student Government — Mar 2023 - Present
Student Advisor, BU College of Engineering — May 2021 - May 2023

SKILLS

Laboratory: fNIRS, EEG, PCR, western blot, immunohistochemistry staining, gel electrophoresis, immunoblot, MATLAB, Python, FieldTrip, Origin, FreeSurfer, LabView, C, Microsoft Office, Arduino
Relevant Coursework: Neurotechnology, Machine Learning, Waves and Modern Physics, Signals and Controls
Interest: health and nutrition, neurotechnology, community service, photography, running, hiking, baking, reading

YILIN ZHOU

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EDUCATION

Boston University, College of Engineering — Boston, MA
Bachelor of Engineering, Biomedical Engineering — Jan 2022 - Dec 2024

Stonybrook University College of Arts and Sciences — Stony Brook, NY
Bachelor of Science, Biology — Jan 2020 - Dec 2021

RESEARCH EXPERIENCE

Researcher, Biomedical Engineering Lab — Boston, MA
Harvard Medical School, Brigham and Women's Hospital — Sep 2023 - Present

- Executed mass spectrometry analysis for pancreatic cancer biomarker identification, analyzing hundreds of exosome protein species, contributing to development of potential diagnostic tools.

Researcher, OCT Lab — Worcester, MA
UMass Chan Medical School — Jul 2023 - Sep 2023

- Administered anesthesia and managed drug protocols for mouse models; performed corneal extractions and analyzed samples using fluorescence microscopy.

Researcher, Cell & Tissue Mechanics Lab — Boston, MA
Boston University — Jul 2022 - Aug 2022

- Investigated smoking effects on lung tissue, studying fiber tension changes via Matlab to contribute to broader lung health research.

Researcher, OCT Lab — Shenzhen, Guangdong
Peking University Shenzhen Graduate School — Jun 2021 - Jul 2021

- Optimized OCT optical devices for enhanced imaging quality; collected and examined clinical data for over 30 fundus health cases.

ACADEMIC PROJECTS

Hepatocellular Carcinoma Classification

- Co-authored article in Molecular Therapy Nucleic Acids on hepatocellular carcinoma, contributing to genomics knowledge as fourth author.

Brain Lesion Segmentation via MTANS

- Third author on a Neuro-image publication about an innovative semi-supervised brain lesion segmentation method.

Microcirculation Hemodynamics Imaging Study

- Collaborated on a Photonics Research paper, under review, assessing microcirculation imaging techniques as sixth author.

LEADERSHIP

B-Box Community Club & Tennis Club, President — Aug 2017 - Sep 2018

- Led 8 themed projects, garnered sponsorships, and boosted member involvement by events.

Charity Event for Underprivileged Students, Initiator — Jul 2019

- Orchestrated a charity event impacting 2,500 students, leading a 6-person team in event planning and execution.

SKILLS

Techniques: Matlab,C++,EndNote,Photoshop PCR, DNA/RNA analysis, centrifugation, UV spectrophotometry.
Interests: Beatboxing, Vocal, Swimming,Tennis, Cooking.

CHUNLIN ZHU

clzhu@bu.com | 781-333-9712 | Boston, MA

EDUCATION

Boston University Boston, MA
B.S., Biomedical Engineering May 2024

- GPA: 3.92

Core Coursework

Molecular Bioengineering, Genetics, Signals and Control, Electrical Circuit, Engineering Design

RESEARCH EXPERIENCE

Undergraduate Summer Researcher Boston, MA
Grinstaff's Lab at Boston University Nov 2022 - Jul 2023

- Conducted a research project on Antibody-polyethylenimine-conjugate
- Investigated whether the conjugate can deliver genes to various mammalian cells effectively and specifically
- Produced antibodies, genes, and polymers to assemble the conjugate prototype
- Characterized the conjugate assembled using dynamic and electrophoretic light scattering
- Designed and performed transfection cell tests to validate the efficiency and specificity of the conjugate
- This project was awarded the Distinguished Summer Research Fellowship in 2023
- This project was awarded the Undergraduate Research Opportunities Program funding in 2023

Undergraduate Researcher Boston, MA
Grinstaff's Lab at Boston University Oct 2022 - Present

- Engaged in the research project and helped a graduate student with some chemical preparation, DNA and protein production and purification, and cell passaging
- This project has now advanced to the animal testing phase, and I help with weighting the mice, measuring tumor size, and conducting bioluminescent Imaging (BLI)

PROJECTS

Computational Investigation of PFAS Molecules Binding to Biomolecules Sep 2023 - Present

- Mined about 30 research papers on per- and polyfluoroalkyl substances and their interactions with different biological components to understand the mechanisms of binding between them
- Developed a computational model of human liver fatty acid binding protein (l-FABP) binding to different PFAS molecules using protein structures provided in Protein Data Bank and software modules such as Maestro and Glide
- Designed novel PFAS molecules with lower binding affinity to l-FABP using the model developed

SKILLS

Biology: Mastered mammalian cell cultures handling (HEK 293T, Expi293T, SKBR-3), luciferase gene expression testing, cell plasmid transfection, bacteria transformation, gel electrophoresis, Mini-Prep DNA purification, his-tagged protein purification, polymerase chain reaction (PCR), SDS- PAGE, western blotting, recombinant DNA assembly, ELISA, flow cytometry, cell proliferation assays, cytotoxicity assays
Chemistry: Mastered titration, sample and reagent preparation, purification (microfiltration, ultrafiltration, dialysis), lyophilization, thin layer chromatography (TLC), solvent extraction
Programming and computer literacy: Utilized MATLAB, Word, Excel, PowerPoint
Biomedical Measurement: Mastered circular dichroism (CD), dynamic light scattering (DLS), electrophoretic light scattering (ELS), NanoDrop

AWARDS

Distinguished Summer Research Fellowship from Boston University College of Engineering
UROP (Undergraduate Research Opportunities Program) research award from Boston University

Boston University College of Engineering
Department of Biomedical Engineering