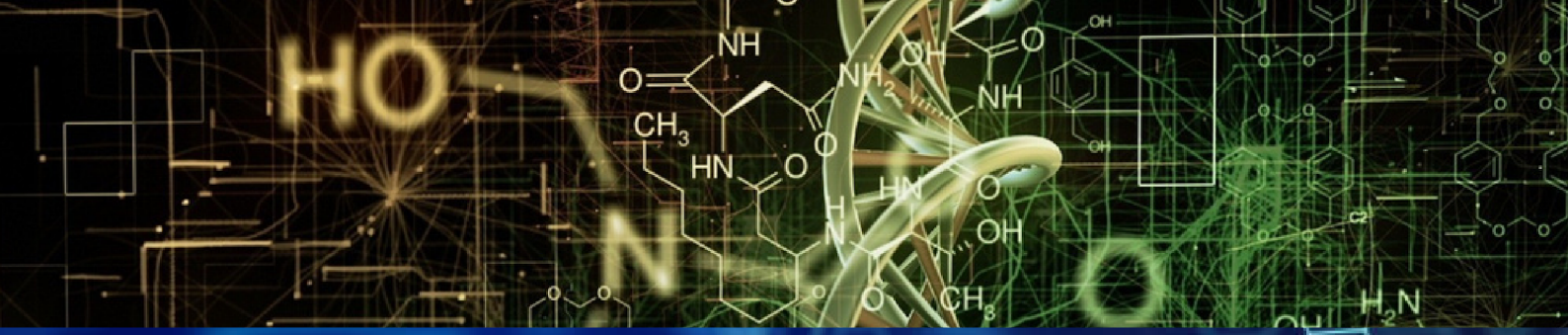
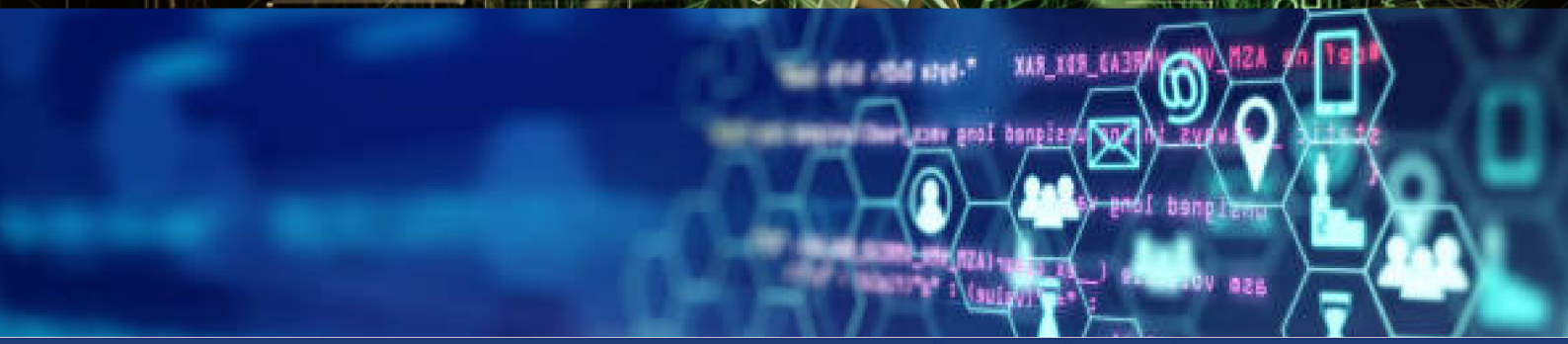
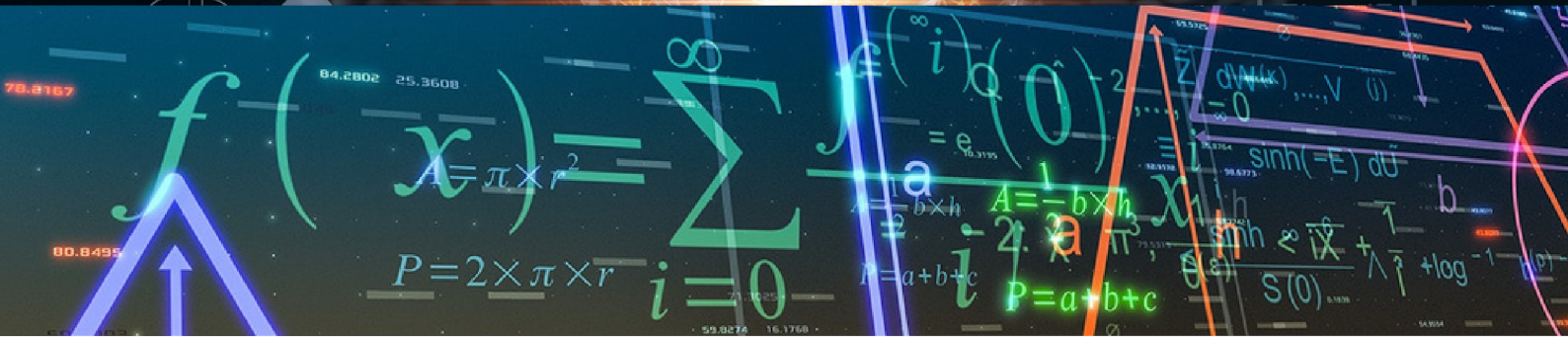




New Jersey Institute of Technology
2022 URI Summer Research & Innovation Symposium
McNair - NSF REU - NSF CI REU Programs
July 27-28, 2022







Summer Research Programs 2022

Ronald E. McNair Postbaccalaureate Achievement Program

NSF - REU Optics and Photonics (OP): Technologies, Systems, and Devices

NSF - REU Cancer Diagnosis and Therapeutic Intervention



NJIT
New Jersey's Science & Technology University

New Jersey Institute of Technology

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973.596.5590
973.596.5201 fax
McNair@njit.edu

Ronald E. McNair
Postbaccalaureate Achievement Program

July 28, 2022

Welcome to New Jersey Institute of Technology's 2022 URI Undergraduate Summer Research and Innovation Symposium. It is an honor and privilege to be part of this year's in-person Undergraduate Summer Research and Innovation Symposium. The participants of Ronald E. McNair Postbaccalaureate Achievement Program were able to attend their labs in-person this year for their research. Students from NSF REU Sites on "Optics and Photonics: Technologies, Systems, and Devices" and "Cancer Diagnosis and Therapeutic Intervention" participated this year as well. The Ronald E. McNair Program students and NSF REU students worked very hard to carry out their research projects with literature review, data analysis and simulation in addition to lab experiments. This year's success comes because of Ms. Zara Williams, Assistant Director, Prof. Ashish Borgaonkar, the Faculty Coordinator of the Ronald E. McNair Program, and Prof. Abdallah Khreishah and Dr. Nellone Reid of the NSF REU programs for their efforts in coordinating the overall program. Efforts of Mr. Marlon Rodriguez of the Ronald E. McNair Program is recognized for his valuable input in producing this program's brochure.

The students in the Ronald E. McNair Program along with the NSF REU students have the opportunity for in-person presentation of their research accomplishments that was completed under the supervision of dedicated NJIT faculty. Without the time and effort of NJIT faculty and graduate student mentors the outstanding achievement of the students would not have been possible.

We are extremely proud of the research efforts of all the students, the quality of the research presentations and grateful for the support of the NJIT administration, faculty, and staff in contributing to the success of today's event.

Sincerely,



Durgamahab Misra, PhD
Symposium Co-Chair and McNair Program Director
Professor and Chair
Department of Electrical and Computer Engineering

Dear CI REU Participants:

Thank you for agreeing to participate in the inaugural National Science Foundation (NSF) funded Undergraduate Research and Innovation Experience in Cancer Diagnosis and Therapeutic Intervention. It is our pleasure to host you in this new summer research experience for undergraduates (REU) that will include research, education, and training activities for nine talented students from across the United States! During the 10-week summer program, you will be carrying out individual research projects in areas such as biomedical engineering, materials science and photonics.

With increased cancer diagnoses and lack of affordable treatment, there is a need for seamless and inexpensive approaches to detect and treat various types of cancer. The development of sensitive and accurate methods for detection of cancer in the early stages is essential, as ninety percent of all cancer deaths are caused by metastasis of original tumors. The cohort of faculty mentors you will be working with will introduce you to dynamic research in physics, biochemistry, chemical and materials engineering related to diagnostic and therapeutic cancer research.

We encourage constant and meaningful communication with our team. Please do not hesitate to reach out to us with any questions, concerns or if you just want to chat! We truly look forward to working with you throughout and beyond the conclusion of this program. We hope you have a unique and enjoyable experience with us at the New Jersey Institute of Technology.

Welcome Aboard!

Sincerely,

Dr. Nellone Reid
Principal Investigator

Dr. Sagnik Basuray
Co-Principal Investigator



Ronald E. McNair Postbaccalaureate Achievement Program









Kojo Acquaisie - Computer Engineering, New Jersey Institute of Technology
Research: Studying amyloid fibril formation using computer simulations
Faculty Advisor: Cristiano Dias, Department of Physics

Maryam Ashraf - Mechanical Engineering, New Jersey Institute of Technology
Research: Mechanism Animation And Creation Of Innovative Mechanisms
Faculty Advisor: Balraj Mani, Department of Mechanical & Industrial Engineering

Adrian Cespedes - Mechanical Engineering, New Jersey Institute of Technology
Research: Computational Modeling of Nano- and Micro Materials: Applications in Energy Storage
Faculty Advisor: Dibakar Datta, Department of Mechanical & Industrial Engineering

Samy Dob - Biology, New Jersey Institute of Technology
Research: Determining The Role of Cerebellum (Cb) To Substantia Nigra Pars Compacta (SNc) Projections in Conveying Movement Vigor
Faculty Advisor: Farzan Nadim, Department of Biological Sciences

Jorge Duarte - Computer Engineering, New Jersey Institute of Technology
Research: Water quality parameters of Branch Brook Lake and Weequahic Lake
Faculty Advisors: Ashish Borgaokar, Department of Applied Engineering & Technologies
Michel Boufadel, Department of Civil & Environmental Engineering

Hugh Mai - Chemical Engineering, New Jersey Institute of Technology
Research: Experimental Investigation of Flow Within Dissolution Vessels using Particle Image Velocimetry
Faculty Advisor: Dr. Piero Armenante, Department of Chemical & Materials Engineering

Isaiah Rejouis - Biology, New Jersey Institute of Technology
Research: Investigating Rooting and Soil Depth's Role in Drought Response
Faculty Adviser: Xianon Tai, Department of Biological Sciences

Roberto Saenz - Mechanical Engineering, New Jersey Institute of Technology
Research: Data Management for Physical Machine Intelligence
Faculty Adviser: Cong Wang, Department of Electrical & Computer Engineering

Natalia Smith - Computer Science, New Jersey Institute of Technology
Research: Machine Learning to Detect Fake News
Faculty Adviser: James Geller, Department of Data Science

Eisha Syeda - Mechanical Engineering, New Jersey Institute of Technology
Research: Literature Review and Data Analysis for Effective Vaccine Distribution
Faculty Adviser: Esra Ismet Büyüktahtakin-Toy, Department of Mechanical & Industrial Engineering

Marcus Washington - Information Technology, New Jersey Institute of Technology
Research: Security Evaluation of IoT associated Medical Applications
Faculty Adviser: Shantanu Sharma, Department of Data Science





Kojo Acquaisie

Computer Engineering



Dr. Cristiano Dias

Department of Physics



Maryam Ashraf
Mechanical Engineering



Prof. Balraj Mani
Department of Mechanical & Industrial Engineering



Adrian Cespedes
Mechanical Engineering



Dr. Dibakar Datta
Department of Mechanical & Industrial Engineering



Samy Dob

Biology



Dr. Farzan Nadim

Department of

Biological Sciences



Jorge Duarte
Computer Engineering



Dr. Ashish Borgaonkar
Department of Applied Engineering & Technology



Dr. Michel Boufadel
Department of Civil & Environmental Engineering



Hugh Mai

Chemical Engineering



Dr. Piero Armanante

Department of Chemical & Material Engineering



Isaiah Rejouis

Biology



Dr. Xiaonan Tai

Department of Biological Science



Roberto Saenz
Mechanical Engineering



Dr. Cong Wang
Department of Electrical & Computer Engineering



Natalia Smith

Computer science



Dr. James Geller

Department of Data Science



Eisha Syeda
Industrial Engineering

Dr. Esra Ismet Büyüktahtakın-Toy
Department of Mechanical & Industrial Engineering





Marcus Washington

Data Science



Dr. Shantanu Sharma

Department of Data Science



NSF - REU Optics and Photonics (OP): Technologies, Systems, and Devices







Emily Lattanzio - Computer Engineering, High Point University
Research: Toward a Behavioral-Level End-to-End Framework for Silicon Photonic Neuromorphic Computing
Faculty Advisor: Shaahin Angizi, Department of Electrical & Computer Engineering

Asmitha Sathya - Biomedical Engineering, Johns Hopkins University
Research: Nanoparticle Tracking Analysis of Polymer Particles in Blood Plasma
Faculty Advisor: Kathleen McEnnis, Department of Chemical & Material Engineering

Corinne Frockowiak - Electrical Engineering, New Jersey Institute of Technology
Research: Quantitative Study of Cell Detachment using Optically Computed Cell Microscopy (OCPM)
Faculty Advisor: Xuan Liu, Department of Electrical & Computer Engineering

Beryl Sin - Computer Engineering, University of Pittsburgh
Research: Deep Learning Based Image Compression
Faculty Advisor: Gary Liu, Department of Electrical & Computer Engineering

Brianna Morillo - Electrical Engineering, Clemson University
Research: Enhancing Efficiency of AlGaN UV LEDS by Optimizing Electron Blocking Layer Structure
Faculty Advisors: Hieu Nguyen, Department of Electrical & Computer Engineering

Jacob Almanza - Electrical Engineering, University of Texas at El Paso
Research: Machine Learning Analysis of Turbidity Data from AguaClara Treatment Plants in Honduras and Nicaragua
Faculty Advisor: Philip Pong, Department of Electrical & Computer Engineering

Oscar Mahecha - Electrical & Computer Engineering, Rowan University
Research: Real time VLC: Indoor Angular and Euclidean Coordinate Localization using Machine Learning
Faculty Adviser: Abdallah Khreishah, Department of Electrical & Computer Engineering

Vishwam Shukla - Electrical Engineering, New Jersey Institute of Technology
Research: Process Optimization to Reduce Power in HFO2-Based RRAM Devices for In-Memory Computing
Faculty Adviser: Durga Misra, Department of Electrical & Computer Engineering

Alexandros Paliouras - Electrical Engineering, Northeastern University
Research: Impurity Removal from Nitrogen-Doped/Metal Organic Framework Graphene Catalyst for Electrochemical Energy Systems
Faculty Adviser: Eon Soo Lee, Department of Mechanical & Industrial Engineering

Jadhav Siddhant - Electrical Engineering, University of Illinois Urbana-Champaign
Research: Determination of the Threshold of Residue Hematocrit in Separated Blood Plasma Using Capacitance Measurements With Integrated Electrodes for Robust Biomarker Detection
Faculty Adviser: Eon Soo Lee, Department of Mechanical & Industrial Engineering

Aditi Sathe - Lehihg University, New Jersey Institute of Technology
Research: Electrochemical Impedance Based Biosensor to Detect Biomolecules
Faculty Adviser: Sagnik Basuray, Department of Chemical & Material Engineering



Emily Lattanzio
Computer Engineering

Dr. Shaahin Angizi
Department of Electrical & Computer Engineering

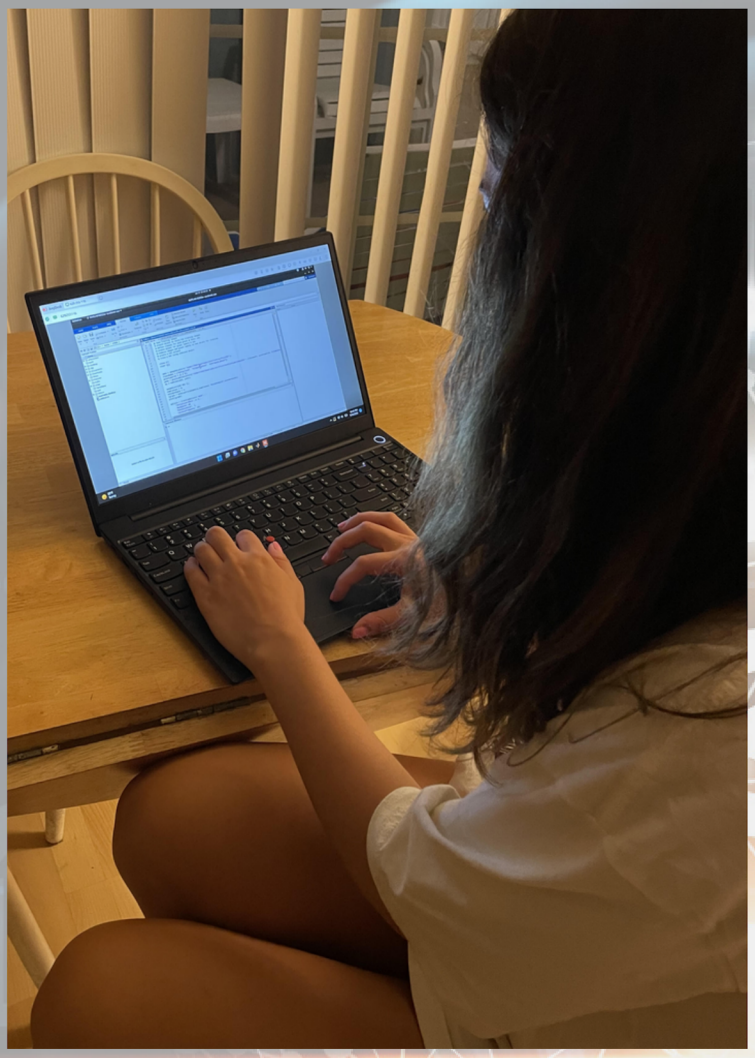




Asmitha Sathya
Biomedical Engineering



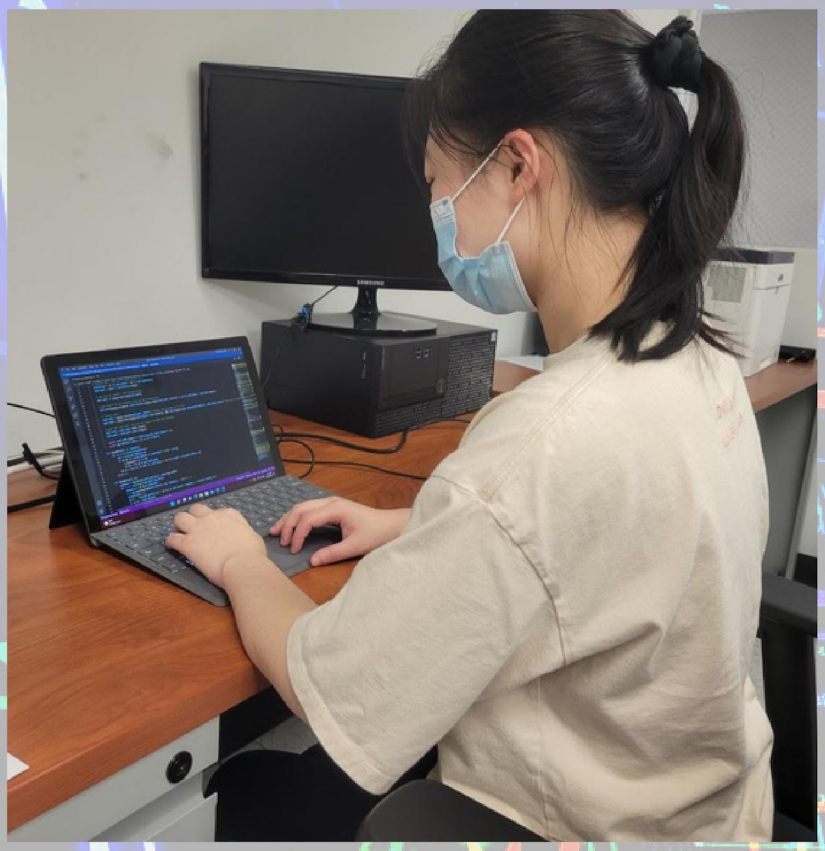
Dr. Kathleen McEnnis
Department of Chemical & Material Engineering



Corinne Frockowiak
Electrical Engineering

Dr. Xuan Liu
Department of Electrical & Computer Engineering





Beryl Sin
Computer Engineering

Dr. Gary Liu
Department of Electrical & Computer Engineering





Brianna Morillo

Electrical Engineering



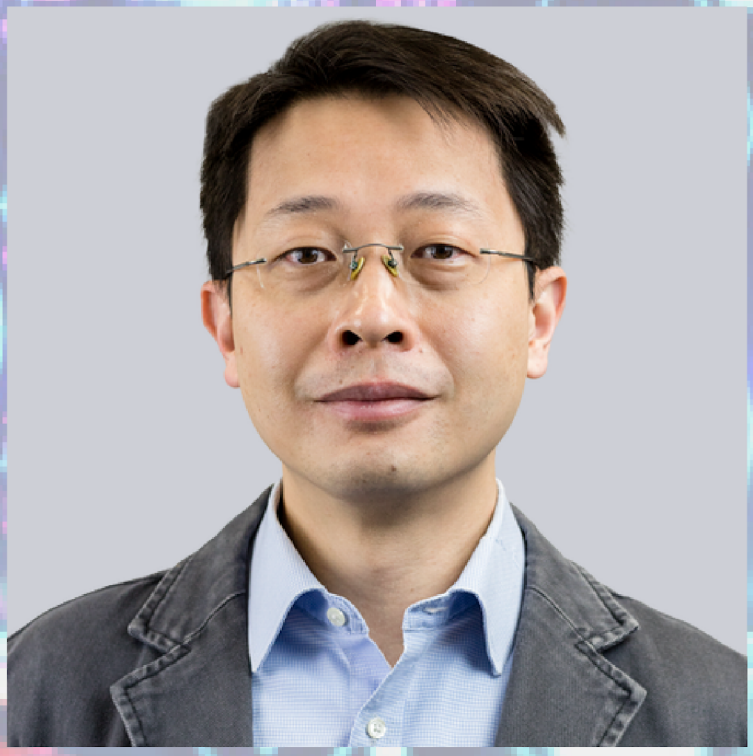
Dr. Hieu Nguyen

Department of Electrical & Computer Engineering



Jacob Almanza
Electrical Engineering

Dr. Philip Pong
Department of
Electrical & Computer
Engineering





Oscar Mahecha
Electrical & Computer Engineering



Dr. Abdallah Khreishah
Department of Electrical & Computer Engineering



Vishwan Shulka
Electrical Engineering



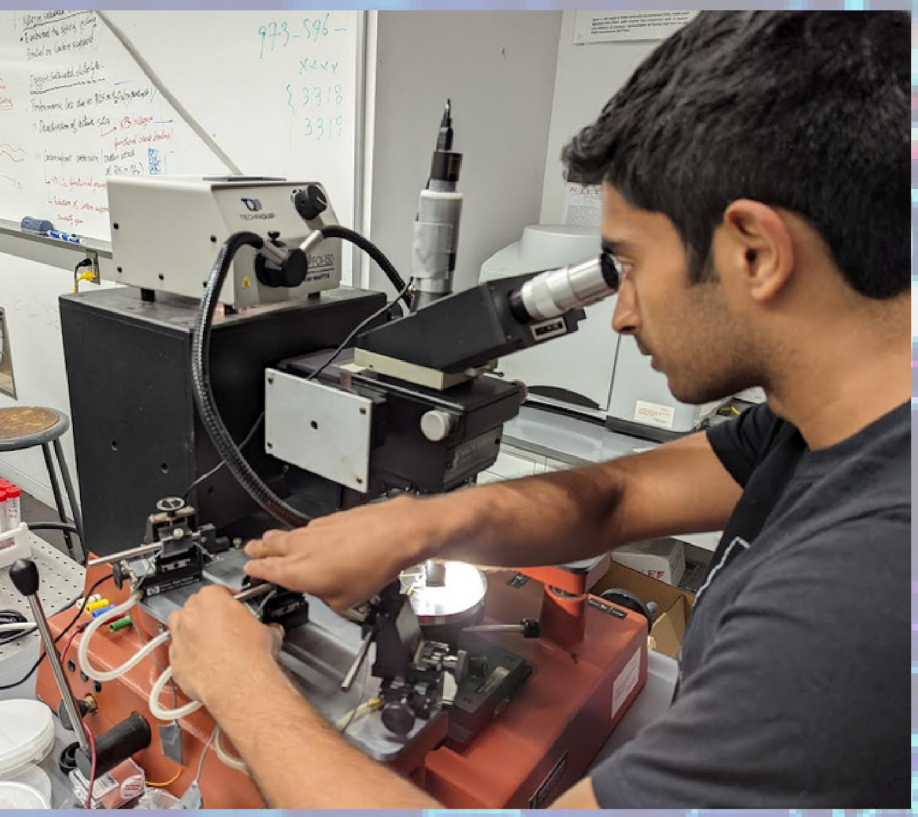
Dr. Durga Misra
Department of Electrical & Computer Engineering



Alexandros Paliouras
Electrical Engineering



Dr. Eon Soo Lee
Department of Mechanical & Industrial Engineering



Jadhav Siddhant
Electrical Engineering

Dr. Eon Soo Lee
Department of Mechanical & Industrial Engineering





Aditi Sathe
Chemical Engineering



Dr. Sagnik Basuray
Department of Chemical & Material Engineering



NSF - REU Cancer Diagnosis and Therapeutic Intervention







Yorquiria Maldonado - Chemical Engineering, New Jersey Institute of Technology
Research: 3D printed acoustofluidic device for rapid collection of cancer cell bioparticles
Faculty Advisor: Amir Miri, Department of Bio-Medical Engineering

Stella Makuza - Biology/Pre-Med, North Carolina Agricultural and Technical State University
Research: Detection of PFOA Through the ESSENCE Microfluidics Platform Using Impedance
Faculty Advisor: Dr. Nellone Reid, Department of Chemical & Material Engineering

Debbie-Ann Spence - Biology, New Jersey Institute of Technology
Research: Optimization of graph neural network for detection of cancerous cells in breast tomosynthesis images
Faculty Advisor: Joshua Young, Department of Chemical & Material Engineering

Halexandra Alvarenga - Chemical Engineering, California Baptist University
Research: “ASSURED" point-of-care screening tool for rapid detection of cancer
Faculty Advisor: Sagnik Basuray, Department of Chemical & Material Engineering

Noshin Siddiq - Chemical & Biomedical Engineering, New York University
Research: Protein corona formation and aggregation studies on targeted drug delivery nanoparticles for triple-negative breast cancer
Faculty Advisors: Kathleen McEnnis, Department of Chemical & Material Engineering

Anne Nong - Chemical Engineering, Rowan University
Research: Rational design of EGFr binding peptides
Faculty Advisor: Vivek Kumar, Department of Bio-Medical Engineering

Olivia Joy Dyke - Biomedical Engineering, California Baptist University
Research: Diagnosis of heart cancer by using nanomaterials
Faculty Adviser: Lin Dong, Department of Mechanical & Industrial Engineering

Luster Harris - Chemistry, Alcom State University
Research: A Modeling framework for simulating skin decontamination of chemical warfare agents
Faculty Adviser: Laurent Simon, Department of Chemical & Material Engineering

Raylynn Thompson - Biology/Pre-med and Biochemistry, Alcom State University
Research: 3D printed acoustofluidic device for rapid collection of cancer cell bioparticles
Faculty Adviser: Amir Miri, Department of Bio-Medical Engineering





Yorquiria Maldonado
Chemical Engineering

Dr. Amir Miri
Department of Bio-Medical Engineering





Stella Makuza
Biology/Pre-Med

Dr. Nellone Reid
Department of Chemical & Material Engineering





Debbie-Ann Spence
Biology

Dr. Joshua Young
Department of Chemical & Material Engineering





Halexandra Alvarenga
Chemical Engineering



Dr. Sagnik Basuray
Department of Chemical & Material Engineering



Noshin Siddiq
Chemical & Biomolecular Engineering

Dr. Kathleen McEnnis
Department of Chemical & Material Engineering





Anne Nong
Chemical Engineering

Dr. Vivek Kumar
Department of Bio-Medical Engineering





Olivia Joy Dyke
Biomedical Engineering

Dr. Lin Dong
Department of Mechanical & Industrial Engineering





Luster Harris
Chemistry



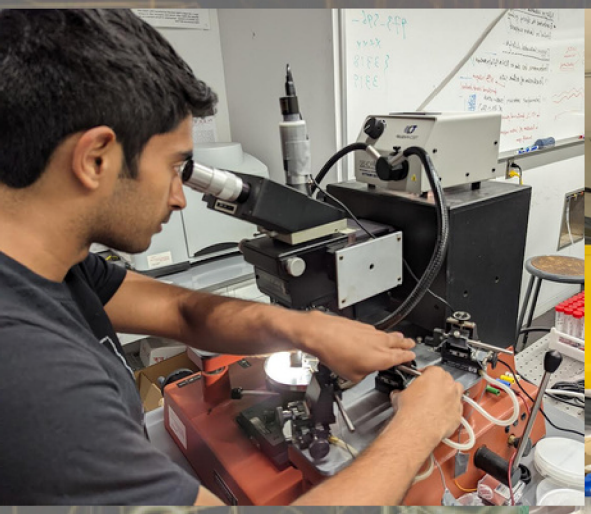
Dr. Laurent Simon
Department of Chemical & Material Engineering



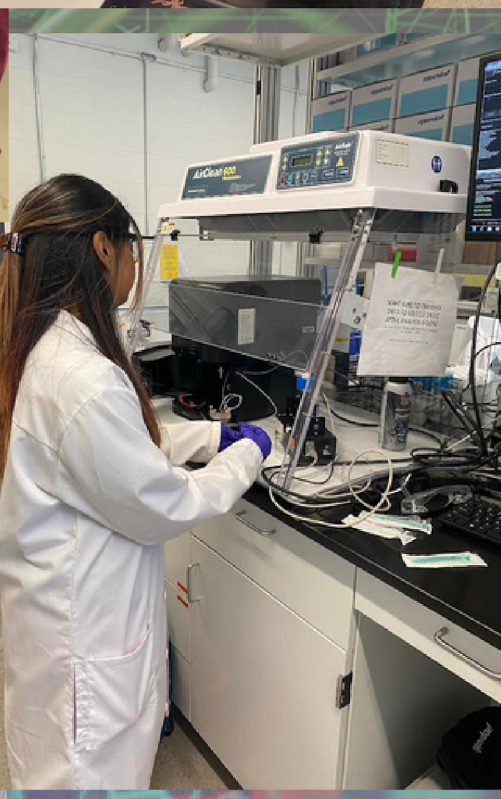
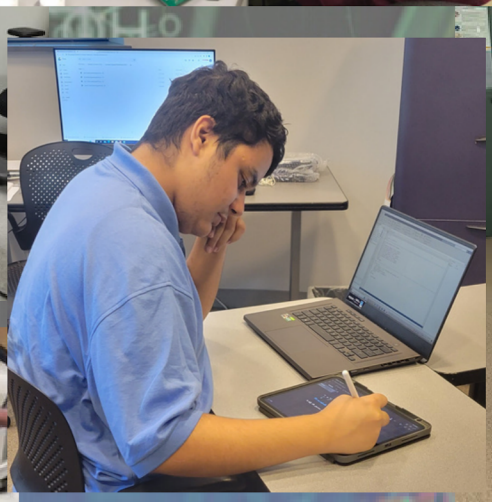
Raylynn Thompson
Biology/Pre-Med & Biochemistry

Dr. Amir Miri
Department of Bio-Medical Engineering

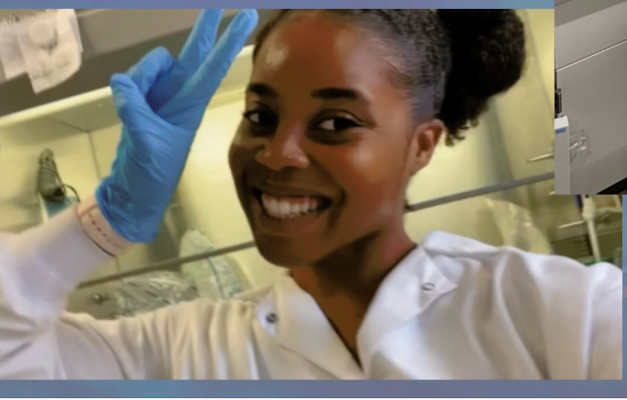


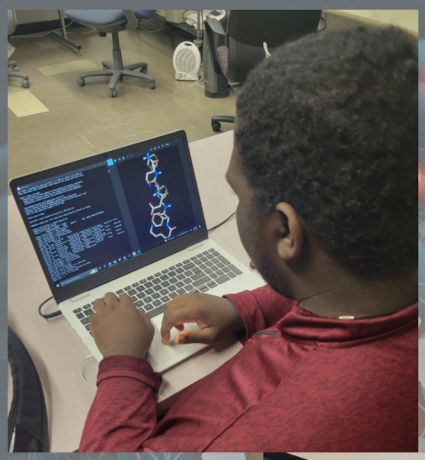
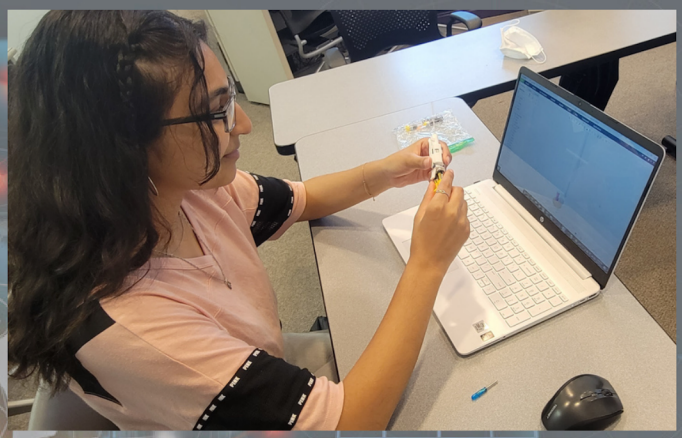
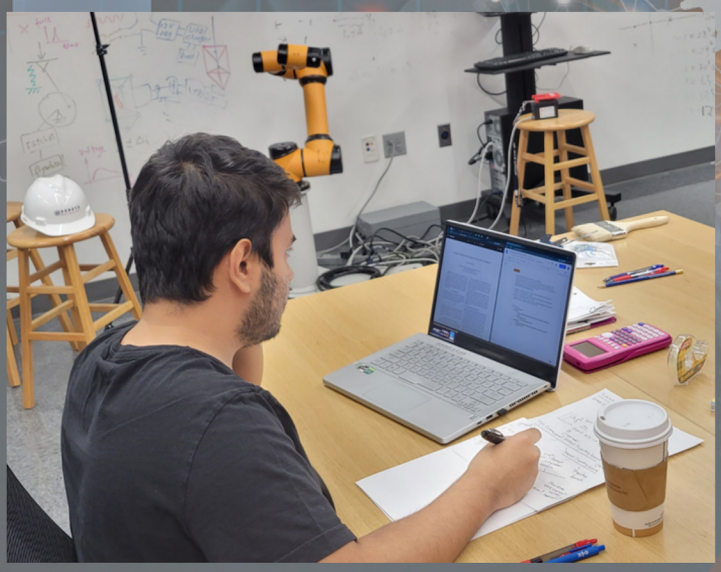


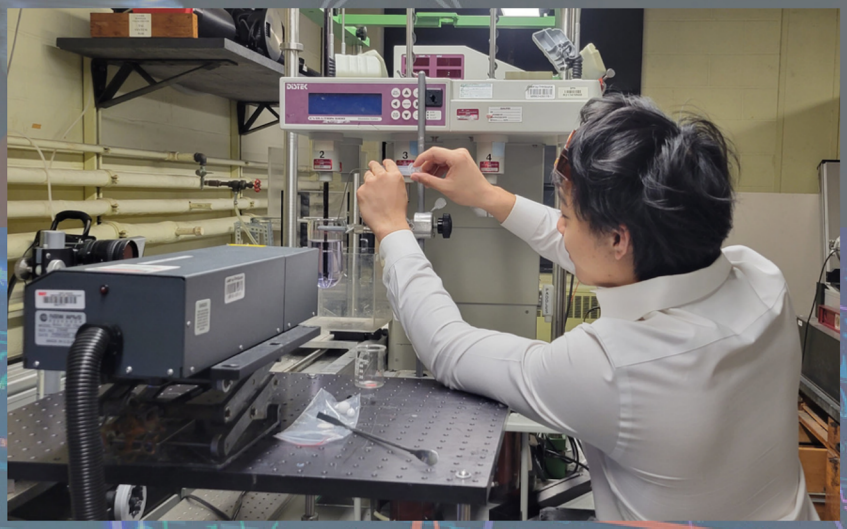
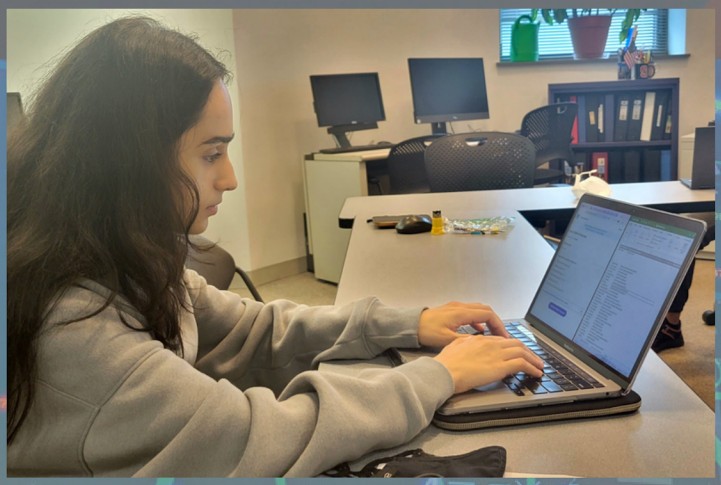


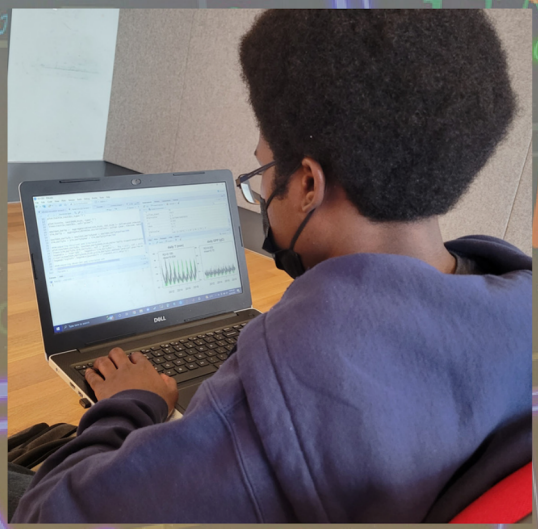








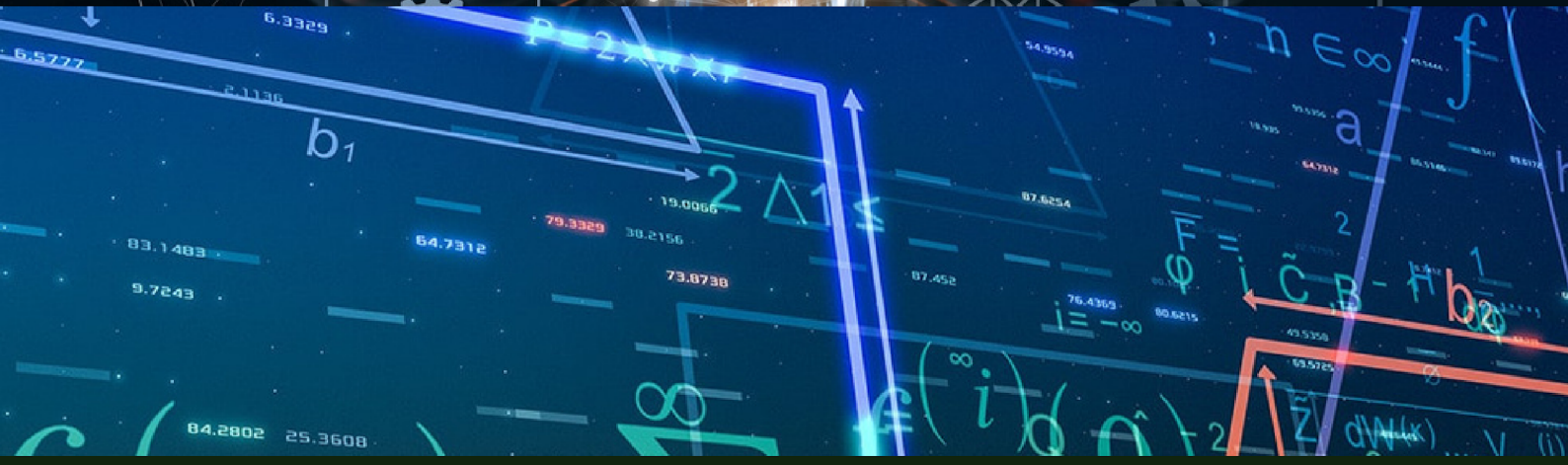











Booklet Created by:
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