Turibius Rozario

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Objective

To pursue a PhD in Mechanical Engineering by exploring studies of performance optimization, process automation, energy conservation, and aeronautical systems.

Education

University of Maryland, Baltimore County (UMBC) — May 2025
BS in Mechanical Engineering (ME), Minor in Computer Science (CS) — 4.0 GPA

Skills

Languages	C++, HTML / CSS, LaTeX, MATLAB & Simulink, Python
Software	AutoCAD, Betaflight, Inkscape, Keras, MS Office Suite, PyTorch, SolidWorks, UNIX
Hardware	Arduino, BeagleBone, Flight Controllers, GPS Modules, Inertial Measurement Units (IMUs)
Technical abilities	3D Printing, Recreational Model Aircraft Pilot, Power Tools, Soldering

Awards & Honors

Vivien Thomas Scholars Initiative Sustained Research — October 2023 – Present
Meyerhoff Scholar — June 2021 – Present
President's List — July 2022, July 2023
S-STEM Scholar — June 2022 – June 2023
Certificate of Meritorious Service — June 2021
Certificate of Student Engagement — June 2021

Relevant Research Experience

Parameter Optimization for Autonomous Navigation — November 2021 – Present
ME Department, UMBC | Mentor: Dr. Ankit Goel (ankgoel@umbc.edu)

- Training neural networks using MATLAB, TensorFlow, and PyTorch by generating data, using gradient descent, and validating results to model real-world physics.
- Demonstrating finite-time convergence of novel Finite Time Estimation method by fine-tuning hyperparameters.
- Testing performance of regular, recursive, and recurrent models for dynamic systems modeling.

Design of a Hardware-in-the-Loop Test System for Wave Energy Harvesting — Summer 2023
ME Department, University of Minnesota (UMN) | Mentor: Dr. James Van de Ven (vandeven@umn.edu)

- Used equations for fluid flow and computations on system efficiency and size to scale down the full-scale system into lab space model validation purposes.
- Produced a bill of materials for the exact components needed to construct the system.
- Designed custom parts and fittings for hydraulic components, and drafted an overall assembly model.

Conferences

Summer Undergraduate Research Expo, UMN — August 10, 2023
Abstract title: 'Design of a Lab-Scale Ocean Wave-Powered Desalination System'.

Undergraduate Research and Career Advancement Day, UMBC — April 12, 2023
Abstract title: 'A Tutorial on Neural Networks and Gradient-free Training'.

STRiVE, Center for Democracy and Civic Life, UMBC — January 9, 2023 – January 13, 2023

Co-curricular Activities

Retriever Robotics, *Secretary* — February 2023 – Present

- Utilized lift, drag, kinematic, and other equations to produce a structural and propulsion system design for a vertical take-off and landing vehicle, capable of travelling 15 miles for 25 minutes while having a gross weight of 12.5 kg.

American Institute of Aeronautics and Astronautics (AIAA), *Project Lead* — September 2021 – Present

- Lead the Design, Build, Fly (DBF) team in producing various prototype aircrafts and a competition proposal.
- Conducted sensitivity studies to determine ideal parameters to maximize competition score.
- Utilized CAD and CFD to model and evaluate competition aircraft designs.
- Held numerous campus events where participants designed, built, and flew a drone for their very first time.