

Turibius Rozario

turibiusrozario@umbc.edu · Silver Spring, MD 20903

Objective

To pursue a PhD in Mechanical Engineering with a focus in renewable energy, improving energy efficiency, and mitigating environmental effects.

Education

University of Maryland, Baltimore County (UMBC) May 2025
BS in Mechanical Engineering (ME), Minor in Computer Science (CS) 3.94 GPA
Audited Courses: Energy Within Environmental Constraints (HarvardX, EdX), Fundamentals of Fluid Power (University of Minnesota, Coursera)

Skills

Languages C++, HTML / CSS, L^AT_EX, MATLAB & Simulink, Python
Software AutoCAD, Betaflight, Inkscape, Keras, PHREEQC, PyTorch, SolidWorks, GNU/Linux
Hardware Arduino, BeagleBone, Raspberry Pi, Sensor Modules
Technical abilities 3D Printing, Hand Lamination, Model Aircraft Pilot, Power Tools, Soldering

Awards & Honors

Meyerhoff Scholar June 2021 – Present
Vivien Thomas Scholars Initiative Sustained Research President’s List October 2023 – May 2024
S-STEM Scholar January 2022 – January 2024
Certificate of Meritorious Service June 2022 – June 2023
Certificate of Student Engagement June 2021

Relevant Research Experience

Integration of Controls and Neural Networks 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.
- Developing and utilizing parameter optimization techniques such as FSolve and random search method.
- Demonstrating finite-time convergence of novel Finite Time Estimation method by fine-tuning hyperparameters.
- Merging extended kalman filtering with neural network models to accurately estimate long-term behavior of dynamic systems.

Sustainable Seawater Mining of Magnesium Summer 2024
ME Department, University of Wisconsin, Madison (UW) | Mentor: Dr. Michael Wagner (mjwagner2@wisc.edu)

- Compiled existing and novel methods of magnesium salt precipitation and magnesium metal extraction to produce several start-to-finish methods for extracting magnesium from seawater.
- Determined costs, energy demands, concentrations, temperature, pressure, and other factors associated with each reaction in the extraction process.

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 Experience Poster Session, UW July 31, 2024
Poster title: ‘Magnesium Extraction Methods from Seawater’.

Undergraduate Research and Career Advancement Day, UMBC April 10, 2024
Abstract title: ‘Modelling Dynamic Systems Using Neural Networks’.

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, *Team Captain, Treasurer*

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 (VTOL) vehicle, capable of travelling 15 miles for 25 minutes while having a gross weight of 12.5 kg.
- Managed administrative duties for the organization related to obtaining funding, event reservations, and amenities attainment.

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

- Led the Design, Build, Fly (DBF) team to the international DBF competition, and for the first time in UMBC history, successfully complete a flight mission.
- 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.

Student Government Association, *First Year Ambassador*

September 2021 – May 2022

- Hosted campus-wide wellness events and initiated proposals with university stakeholders.