

Turibius Rozario

turibiusrozario@umbc.edu · Silver Spring, MD 20903

Objective

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

Education

University of Maryland, Baltimore County (UMBC) Expected May 2025
BS in Mechanical Engineering (ME), Minor in Computer Science (CS) 3.94/4.00 GPA

Audited Courses: Energy Within Environmental Constraints (HarvardX, EdX), Fundamentals of Fluid Power (University of Minnesota, Coursera)

Skills

Programming	C++, HTML / CSS, L ^A T _E X, MATLAB & Simulink, Python
Software	Ardupilot, 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 , UMBC	June 2021 – Present
VTSI Sustained Research Award , UMBC	October 2023 – May 2024
President's List , UMBC	January 2022 – January 2024
S-STEM Scholar , UMBC	June 2022 – June 2023

Research Experience

Integration of Controls and Neural Networks November 2021 – Present
ME Department, UMBC
Mentor: Dr. Ankit Goel (ankgoel@umbc.edu)

- Develop novel neural network training methods such as finite time estimation and FSolve, and improve their long-term approximation by integrating extended kalman filters.
- Manufacture 2D simultaneous localization and mapping platform for future research and coursework.

Magnesium Extraction Methods from Seawater 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, Twin Cities (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.
- Designed custom parts and fittings for hydraulic components, drafted an overall assembly model, and produced a bill of materials for test system.

Publications & Presentations

T. Rozario, P. Oveissi, A. Goel. “Matrix-Based Representations and Gradient-Free Algorithms for Neural Network Training”. Submitted to: 2024 International Conference on Machine Learning and Applications (ICMLA). Status: **Accepted**.

P. Oveissi, **T. Rozario**, A. Goel. “Neural filtering for Neural Network-based Models of Dynamic Systems”. Submitted to: 2025 American Control Conference. Status: **Under Review**.

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”.

Co-curricular Activities

American Institute of Aeronautics and Astronautics (AIAA),
Design, Build, Fly (DBF) Project Lead September 2021 – Present
Student Unmanned Aerial Systems (SUAS) Captain 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 for the SUAS Competition.
- Led the DBF team to the international DBF competition, and for the first time in UMBC history, successfully complete a flight mission.
- Simultaneously managed a team of 17 members in DBF and 15 members in SUAS, and hosted general events for the UMBC community with 12 to 35 participants in all events.

Student Government Association, *First Year Ambassador* September 2021 – May 2022

- Hosted campus-wide wellness events for over 200 people and initiated proposals with university stakeholders.