

Michael Raba, MSc

Mechanical Engineering

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Education

University of Kentucky
MSc in Mechanical Engineering (GPA: 3.3)
University of Kentucky
BA in Mathematics (In-major GPA: 3.6)

December 2025
Lexington, KY
May 2019
Lexington, KY

Featured Projects

- Multichamber Muffler Design** **2023**
 - Designed a multichamber muffler system with internal components including chambers, baffles, perforates, and fiberglass absorbents.
 - Simulated acoustic performance using industry-standard tools: ANSYS 2023 (Acoustics Module) and SIDLAB 5.1 (1D approximation).
 - Modeled transmission and insertion loss across 0–1000 Hz using fluid approximations and validated against measured data.
 - Created CAD-style schematics and published downloadable simulation files for reproducibility and benchmarking.
- Viscoplastic Modeling** **2023**
 - Applied Anand's viscoplasticity model to simulate strain-rate and temperature-dependent behavior of solder alloys on microchip packages.
 - Developed a Forward Euler integration scheme in Python to solve constitutive equations and model stress evolution to verify ANSYS nonlinear models.
 - Performed material parameter fitting based on experimental data using Python NumPy.
- Electromagnetics Simulation: Finite Difference Time Domain** **2019**
 - Calculated 3D space location of a particle in a magnetized fluid flow using the Yee Scheme.
 - Implemented finite difference equations and staggered time-stepping for a Navier Stokes Simulation.
- MSc Project – POD Analysis of Turbulent Pipe Flow** **2023**
 - Developed a MATLAB-based framework to analyze turbulent rotating pipe flow using Proper Orthogonal Decomposition (POD).
 - Compared Classic and Snapshot POD methods to extract dominant energetic structures and reconstruct flow fields from 5 Terabytes of data.
 - Tools Used: MATLAB, Python, C++, fortran2020, linux.

Employment

- Research Assistant** **2020 -- 2023**
University of Kentucky *Lexington, KY*
 - Collaborated with 11 PhD students at University of Maryland, College Park and University of Oxford.
 - Attended AIAA Aviation and Aeronautics Forum in Chicago, IL (2022).
- Teaching Assistant** **Fall 2020 & Spring 2023**
University of Kentucky *Lexington, KY*
 - TA for ME311 Experimental Design II (DOE), a senior level course covering Heat Transfer, Fluid Mechanics, Statics, Engineering Statistics, and R.
 - Taught ME 330 Fluid Mechanics I as an undergraduate and ME 321 Thermodynamics II as recitation leader.
- Wayfinding Assistant** **2019 -- 2020, July 2023 -- Present**
Chandler Medical Center *Lexington, KY*
 - Developed custom wayfinding map app to assist hospital visitors using Flask, Python, and SQL.