

Kevin Polanco

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EDUCATION

New York University, Tandon School of Engineering

Expected May 2028

Master of Science in Mechanical Engineering

Binghamton University, State University of New York, Thomas J. Watson College of Engineering and Applied Science

Bachelor of Science in Mechanical Engineering

May 2026

TECHNICAL SKILLS

Software: ANSYS Fluent, Mechanical & ACP | OpenFOAM | SOLIDWORKS | Inventor | Creo | MOOSE | ParaView | Gmsh | MS Office

Programming Languages: MATLAB, Python, C++

Relevant Coursework: CFD, Heat Transfer, Fluid Mechanics, Applied Fluids

RESEARCH EXPERIENCE

Modified Micromixer Design Based on Weaving Flow Motion for Increased Mixing Efficiency

Binghamton, NY

Research Assistant (Lead: Professor Jifu Tan)

June 2025 - August 2025

- Built a 3D transient multiphysics simulation in MOOSE (open source C++ finite element multiphysics framework) to model laminar microfluidic mixing through passive scalar transport, evaluating density, viscosity, diffusivity, and wall-temperature effects at low Reynolds numbers for lab on a chip systems.
- Automated mesh generation, boundary conditions, solver configuration, and post-processing across geometry revisions; benchmarked the model to published HVW literature and matched 89.9% mixing efficiency at $Re = 5$ within $450\text{ }\mu\text{m}$ for a 30° barrier angle.
- Presented methodology, validation, and modeling limitations to 300+ scholars and faculty at the University at Buffalo Summer Research Conference.

Desalination Utilizing Hydrokinetic Turbines with CRO Module

Binghamton, NY

Research Assistant (Lead: Professor Cosan Daskiran)

June 2024 - July 2024

- Modeled a hydrokinetic turbine and centrifugal reverse osmosis desalination concept using Blade Element Momentum (BEM) and Blade Element Theory (BET); quantified expected turbine performance to support feasibility analysis and design limitations.
- Validated blade profile selection using high-order CFD measured by BET/BEM; ran 15 turbulent ANSYS FLUENT cases to compare 3 NACA profiles. Presented results to 50+ faculty and research participants; documented constraints and tradeoffs in poster and technical briefings.

Drones paired with Hyperspectral Imaging and LiDAR to locate Unexploded Ordnances (UXO)

Binghamton, NY

Team Lead

August 2021 - December 2022

- Led a 6-person field campaign for UAS-based UXO detection across a $400\text{ m} \times 400\text{ m}$ site, integrating GPR, hyperspectral imaging, LiDAR, and ArcGIS analysis.
- Planned a controlled layout of 26 inert munitions (3 MBRL, 2 TM-62 Anti-tank, 3 VPMA-3, 18 PFM-1 Anti-personnel) and evaluated sensor specific detection strengths against the environment; presented findings at the European Geosciences Union conference attended by 14,000+ participants.

LEADERSHIP, PROJECTS & INVOLVEMENT

AeroBing Rocketry Research Group

Binghamton, NY

Simulations Team Lead

(Member: August 2022 - August 2025) | August 2025 - May 2026

- Owned end to end external aerodynamics analysis for student launch vehicles by leading 8 undergraduate engineers running parallel CFD/FEA studies on shared remote desktop server; evaluated compressible turbulent flow (RANS and LES) in ANSYS FLUENT to assess y^+ control, time step convergence, and aeroelastic deformation risk impacting design decisions before fabrication.
- Set team simulation standards (meshing convergence, simulation accuracy, and hand calc verifications), oversaw projects for future vehicles and major design decisions across multiple concurrent subteams.
- Designed carbon fiber fins for RED 2 - Mary: iterated geometry using low order calculations from RASAero II, AeroFinSim, high order from MATLAB and coupled FSI from ANSYS FLUENT to Mechanical to optimize stability margin (35% increase) /aerodynamic performance.

Senior Design Project: Insulation Characterization Apparatus

Binghamton, NY

Project Secretary | FEA, Instrumentation & Technical Coordination

August 2025 - May 2026

- Co-developed a heat flow meter apparatus for testing rocket motor insulation; performed ANSYS Mechanical FEA and hand calculations to verify support stress, deflection, buckling resistance, and manufacturability before fabrication.
- Resolved instrumentation and thermal control limitations by implementing PWM controllers and a 16 bit LabJack U6 DAQ for microvolt level thermopile signals; wired, soldered, troubleshot, and validated the Peltier sensor system using a phenolic reference amongst team members.
- Coordinated a \$1.5K build across AeroBing, faculty, and Watson Fabrication Lab by sourcing components, tracking orders, returns, schedules, and requirements, and authoring major portions of the 57-page report and design review presentations through prototype handoff.

Junior Design Project: Commercialization of Supersonic Flight: Turbofan CFD Simulations

Binghamton, NY

Individual Project

January 2025 - May 2025

- Developed baseline and chevron nacelle geometries for a Rolls-Royce Trent 1000 in SOLIDWORKS and constructed a 15 m farfield CFD domain with near-wall and shock-region mesh refinement.
- Ran compressible SST k- ω RANS simulations across inlet-angle sweeps at 35,000 ft, comparing drag and exit-plane pressure and velocity trends; documented methodology, verification, and fidelity limitations in a 21-page report; estimated acoustic performance using exit plane RMS pressure at 181.4 dB baseline and 181.5 dB chevron.

WORK EXPERIENCE

EOP & SSS Tutorial Center | Front Desk Supervisor | Binghamton, NY

August 2022 - May 2026