Adam Rozman

Ph.D. Candidate Specializing in Rotorcraft Aerodynamics and Aeroacoustics

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adrozman — arozman — Portfolio

Education

Boston University May 2027
Ph.D. in Mechanical Engineering

University of Central Florida May 2022
B.S. in Mechanical Engineering, Minor in Mathematics

Skills

Computational Fluid Dynamics (CFD), Aeroacoustics, High-Performance Computing (HPC), Turbulence Modeling, Grid Generation, Python, MATLAB, C++, Fortran, Shell Scripting

Project Experience

Graduate Research Assistant 2022 - Present
Boston University Boston, MA

- Modeled complex unsteady aerodynamics, including edgewise flight and atmospheric turbulence ingestion, using the **CREATE-AV™ Helios** high-fidelity CFD framework.
- Deployed and optimized engineering codes on **High-Performance Computing (HPC)** clusters at NASA (NAS), DoD (DSRC), and Boston University (SCC).
- Applied acoustic post-processing techniques to analyze deterministic and nondeterministic components in acoustic signals and validate against experimental measurements.
- Developed a **highly parallelized Python pipeline** to generate training datasets of loads, noise, and stability derivatives of a multirotor drone wrapping panel-method aerodynamic and acoustic propagation solvers. Achieved a throughput of **30 seconds per case per CPU core**.
- Developed memory-efficient scripts to extract surface pressure fluctuations and boundary layer characteristics from multi-gigabyte CFD solution files.

HIP Intern Summer 2024
DoD High Performance Modernization Program Aberdeen, MD

- Developed a parallelized Python pipeline using a panel-method solver to generate rotor performance training datasets; expanded sample size via parameterization and perturbation of baseline geometries.
- Implemented **Latin Hypercube** sampling to maximize design space coverage while minimizing computational cost.
- Conducted a comparative analysis of dimensionality reduction techniques for a 3D blade geometry, demonstrating lower reconstruction error using Principal Component Analysis compared to Bezier curve fits.

Research Associate Summers 2022 & 2023
DEVCOM Aviation and Missiles Center Moffett Field, CA

- Modeled wing-propeller interaction noise using **CREATE-AV™ Helios** and investigated sensitivity to turbulence and transition modeling.
- Developed a post-processing tool to extract permeable surface data from Helios and convert it for input into a **Ffowcs Williams-Hawkings (FW-H)** acoustic solver.
- Validated the new permeable FW-H framework by demonstrating close agreement with experimental measurements.

Undergraduate Thesis Research 2021 - 2022

University of Central Florida Orlando, FL

- Modeled aerodynamic forces and particle kickup (brownout) during takeoff and landing for the Dragonfly Rotorcraft Exploratory Vehicle using CFD with actuator disks.
- Computed the impact locations of brownout particles on propellers and shared findings with designers.

Publications

- Rozman, A., Macrae-Sadek, E., Cable, M., Gardner, D., and Grace., S. "Prediction of performance and noise of a small quadrotor using CHARM." AIAA Scitech Forum 2026, Orlando, FL, Jan 12-16, 2026.
- Rozman, A. and Grace, S. "Evaluation of Urban-Flow-Informed Gusts on eVTOL Vertiport Approach Acoustics." AIAA Aviation Forum and ASCEND 2025, Las Vegas, NV, Jul 21-25, 2025.
- Hess, C., Rozman, A., Anusonthi-Inthra, P., Healy, R. "A Machine Learning Model for Rotor Blade Efficiency Prediction," AIAA Aviation Forum and ASCEND 2025, Las Vegas, NV, Jul 21-25, 2025.
- Rozman, A., Zhongqi, J., Tran, S. A., Grace, S., "Evaluating the Permeable Surface Approach for Wing-Propeller Aeroacoustics using High-Fidelity CFD," Proceedings of the 6th Decennial Aeromechanics Specialists' Conference, Feb 6-8, 2024.
- Rozman, A., "Investigating Ground Interactions of a Rotorcraft Landing Vehicle on Titan" (2022). Honors Undergraduate Theses.
- Sang, L., Rozman, A., Grace, S., Tron, R. "Gradient-Enhanced Partitioned Gaussian Processes for Real-Time Quadrotor Dynamics Modeling." IEEE Transactions on Robotics (Pending).

Extra-Curricular Outreach & Leadership

The Calculus Project Nov 2025 & Feb 2026

- Mentored students from a math equity initiative designed to increase the enrollment of students of color and low-income students in advanced calculus and STEM courses.
- Instructed cohorts of **over 60 students** on fundamental aerodynamic theory.
- Designed and supervised drone flight experiments to reinforce concepts in a real-world context.

Virginia Tech Aerodynamics Workshop May 2024

- Mentored 19 undergraduate students from minority-serving institutions during a 5-day technical workshop.
- Guided students through fundamental aerodynamic theory and exercises using Xrotor and PSU-WOPWOP to model propeller performance and noise.
- Facilitated hands-on labs where students programmed **Tello quadrotor drones** to autonomously navigate an obstacle course.