

Kacper Bazan

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Academic Background

BOSTON UNIVERSITY (BU) COLLEGE OF ENGINEERING

Expected Graduation May 2025 · Boston, MA

Bachelor of Science in Mechanical Engineering, Concentration in Aerospace (Cumulative GPA - 3.91)

Technical Experience

BU ROCKET PROPULSION GROUP (BURPG) - Director

September 2021 - Present · Boston, MA

Liquid Bipropellant Flight Vehicle - Icarus

- Designed structural components of a bipropellant flight vehicle simulated to hit an apogee of 30,000 ft with an engine estimated to deliver an impulse of 12,500 lbf-s.
- Programmed a Python applet to simulate a 2,500 lbf thrust engine in flight, solving for autogenous pressurization of nitrous oxide, accounting for two-phase mass flow rates, and recursively interpolating through CEARUN data.
- Ran flight simulations in OpenRocket, RockSim, and RASAero to accurately determine drag coefficients of our vehicle and characterize the landing zone after a nominal recovery.
- Used CAD to model a fin can in Solidworks, verified aerodynamic forces using FEA, lowered the chance of fin flutter and prioritized machinability to reduce cost and turnaround time.
- Wrote standard operating procedures for the safe usage of a test stand conducting cold flows and static fires.
- Director of BURPG, created team timelines, assisted in design reviews, and produced new freshman projects to introduce interested students to rocketry, including a GOX/Paraffin hybrid engine test stand.

Liquid Bipropellant Test Stand - VEGAS

- Designed a mobile bipropellant test stand to inform system development efforts with empirical data.
- Performed propellant selection and mixture ratio optimization to refine engine cooling and engine performance.
- Designed a bipropellant feed system with a total mass flow rate of 1.25 kg/s.
- Drew and documented piping and instrumentation diagrams for all test stand versions.
- Programmed Python scripts to recursively collect data on different engine parameters from CEARUN.
- Sourced valves and ran pressure drop calculations to determine their validity and cost efficiency.
- Mounted valves on test stand, manufactured holds, and routed pipes to the main injector and igniter assembly.
- Finalized teamwide decisions for component testing, test stand assembly, and future test operations.

Nitrous Oxide/ Ethane 500 lbf Engine Development

- Designed a heat sink engine with ablatives with a nominal performance of 500 lbf utilizing liquid nitrous oxide and liquid ethane as propellants.
- Responsible for the team's concept development, engine sizing, and test stand integration.
- Managed and led engine, injector, and fluid system teams totaling twelve people.
- Designed a compact augmented spark igniter (torch igniter) to allow for reliable and rapid ignition of our engines, allowing the ability to recycle after aborts and run multiple tests back to back.
- Integrated igniter into a pintle injector and a coaxial swirl injector along with operational valves and instrumentation equipment.

Other Experience

BOSTON UNIVERSITY MECHANICAL ENGINEERING DEPARTMENT

December 2021 - Current · Boston, MA

Mechanical Engineering Teacher Assistant (Intro to Programming in C++ and MATLAB)

- Directed classroom lectures and discussions regarding programming topics.
- Orchestrated office hours where students could get one-on-one tutoring at any time.

GREATER RIDGEWOOD YOUTH COUNCIL PROGRAM

June 2022 - August 2023 · New York City, NY

Engineering Instructor

- Built a new engineering curriculum for students in grades K-5. Mentored other group leaders to tailor custom engineering lessons to different age ranges in order to stimulate an enthusiastic learning environment.

Skills

Programming Languages: Python, C and C++, MATLAB, Javascript, CSS, HTML

Frameworks/ Tools: Solidworks, OpenRocket, RockSim, RASAero, P&ID Writing, Part Drawings/GD&T, Python (Numpy, Matplotlib, Selenium), Full Adobe Suite

Spoken Languages: English (Fluent), Polish (Fluent), Spanish (Proficient)