

# ABYLAIKHAN MUKHAMEJANOV

Bethlehem, PA | [abylaikhan.mukhamejanov@gmail.com](mailto:abylaikhan.mukhamejanov@gmail.com) | (484) 353-9865 | [in/abylaikhan-m/](https://github.com/abylaikhan-m/) | [Portfolio: abylaikhanm.github.io](https://abylaikhanm.github.io)

## EDUCATION

- **Lehigh University** Bethlehem, PA  
*Bachelor of Science in Mechanical Engineering | GPA: 3.81/4.00 | Full-Ride Scholarship* Aug 2023 - May 2027
  - **Honors & Awards:** Dean's List (2023, 2024), M. Levin Award for the Best Tech Startup at Lehigh, STEM-SI Summer Research Scholarship, Baker Institute Startup Fellow (\$5000 grant), SpaceTech Battle Most Innovative Startup by Forbes (\$5000 grant).
  - **Relevant Coursework:** Computer-aided design (CAD), Fundamentals of Engineering Mechanics, Materials & Processes, Numerical Methods (MATLAB), Thermodynamics I, Electrical Laboratory I, Introduction to Electrical Engineering.

## SKILLS

- **Software:** Python, C, C++, MATLAB, Simulink, LabVIEW, SolidWorks, Excel, Microsoft Office Suite
- **Hardware & Electronics:** NI DAQ, Arduino, Raspberry Pi, Embedded Systems, Microcontrollers, Closed-Loop Control
- **Manufacturing & Testing:** GD&T, DFM, DFA, 3D Printing, CNC Machining, Waterjet & Laser Cutting, PCB Design

## EXPERIENCE

- **Undergraduate Researcher, Underwater Vehicle Design and Control** Bethlehem, PA  
*Unsteady Flow Interactions Laboratory, Lehigh University* Nov 2023 – Present
  - Design a bio-inspired setup to mimic pitch and heave movements in robotic swimmers, leading investigations into the development of quiet underwater vehicles, a part of a \$7.5M U.S. DOD-funded MURI project.
  - Integrated, debugged, and calibrated new particle image velocimetry system, high-torque step motors, 6-axis force sensor.
  - Designed, built and tested a setup from concept to deployment, utilizing SolidWorks, CNC milling, waterjet cutting, 3D printing.
  - Conducted 35 water channel experiments using NI DAQ (MATLAB) to study hydrodynamic performance.
  - Improved movement accuracy to 98.2%, 1.75x better than the previous design, by upgrading 40% of mechanical parts.
  - Reduced noise by 32% by implementing a closed-loop velocity control program in C++ for ClearCore Controller.
- **Lead Mechanical Engineer, Osprey Nanosatellite** Bethlehem, PA  
*NASA CubeSat Student Launch Initiative, Lehigh University* Sep 2023 – Present
  - Lead the Structures and CAD design of OSPREY, Lehigh University's first nanosatellite, a 3U CubeSat featuring a VS/SWIR camera system to monitor ocean plastic within a 1-square-meter area.
  - Manage a team of 6 students, communicate with cross-functional teams to integrate deployable solar cells and antenna systems.
  - Secured \$150,000 in funding for design implementation and submitted a proposal for the NASA CubeSat Launch Initiative.
  - Optimized mass budget by 23% and increased payload volume by 33%, ensuring compliance with NASA's design specifications.
- **Research Intern, Aerodynamics and Mechanical Design** Bethlehem, PA  
*Aerospace Systems Control Laboratory, Lehigh University* May 2024 – Aug 2024
  - Led wind tunnel tests on AeroTargets' 33% scale LOCOST UAV, focusing on lift, drag, and stability performance.
  - Collected and analyzed 100+ experimental data sets using LabVIEW, MATLAB, NI DAQ for data acquisition and analysis.
  - Used a 6-axis forces sensor to measure aerodynamic forces, validating results at Reynolds numbers 20% higher than expected.
  - Communicated with AeroTargets engineers to recommend fuselage design modifications, achieving a 10% drag reduction.

## PROJECTS

- **Bio-Inspired Riverine Power Generation** Bethlehem, PA  
*C, G-code, UDP, Wireless Communication, Embedded Systems, Closed-Loop Control, Mechatronics* Aug 2024 – Present
  - Contribute to the design of a \$7.5M U.S. DOD, DOE-funded project to develop a hydrokinetic turbine, which uses bio-inspired hydrofoils oscillating in water flow to convert motion into electricity, suitable for remote villages and large cities.
  - Boosted power generation output by 57% by designing and implementing a wireless communication system for closed-loop control and data acquisition that utilizes real-time data analysis to optimize energy extraction efficiency.
- **SkillSat Startup** Astana, Kazakhstan  
*Arduino, C++, Python, SolidWorks, Project Management, Cost Reduction, DFM, DFA, Troubleshooting* May 2021 – Sep 2024
  - Founded SkillSat, an EdTech startup focused on manufacturing STEM kits that teach students to build stratospheric satellites, raising \$15K in funding and being a Top-3 SpaceTech, Top-15 EdTech Startup by Forbes Kazakhstan.
  - Directed the entire product design lifecycle from concept to delivery, designing 25+ prototypes using DFMA principles, leading to 44% cost reductions, with 80+ kits manufactured and distributed to 240+ users across 25+ schools.

## CAMPUS INVOLVEMENT

- **Makerspace Coordinator (Aug 2024 - Present):** Manage 30 3D printers, 2 CNC routers, waterjet and laser cutters, PCB milling machine, assisting in rapid prototyping for 30 students and 10 clubs weekly, supporting 60 cross-disciplinary projects per semester.
- **Senior Teaching Assistant (Dec 2023 - Present):** Teach 500+ students Python programming and hardware integration improving their problem-solving skills through weekly lab sessions and hands-on projects with Raspberry Pi and Arduino.