ABYLAIKHAN MUKHAMEJANOV

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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 their hydrodynamic performance and 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 and stability.
  - Improved movement accuracy to 98.2%, 1.75x better than the previous design, by upgrading mechanisms and embedded systems.
  - Reduced noise by 32% by implementing a closed-loop velocity control system and dual-axis tuning using ClearCore (C++).

- **Structures System Lead** — 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 other sub-leads 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 the 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.