Abylaikhan Mukhamejanov

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Education

Lehigh University — **Bethlehem, PA**
Bachelor of Science in Mechanical Engineering, Minor in Electrical Engineering | GPA: 3.81/4.00 — *Aug 2023 - May 2027*

Honors & Awards: Full-Ride Scholarship, Dean's List (2023, 2024), M. Levin Best Tech Startup Award ($5000), STEM-SI Research Scholarship ($5500), Baker Institute Startup Fellow ($4000), SpaceTech Battle Award by Forbes ($5000).

Relevant Coursework: CAD, Strength of Materials, Mechanics, Materials & Processes, Numerical Methods (MATLAB), Thermodynamics, Dynamics, Intro to Electrical Engineering, Complex Variables, ME Laboratory I, ECE Laboratory I.

Teaching Experience: ENGR010 - Applied Engineering Methods (Python, Embedded Systems, Robotics, Raspberry Pi).

Experience

Makerspace Coordinator — **Bethlehem, PA**
Design Labs, Lehigh University — *Aug 2024 – Present*

- Conduct **root cause analysis** to **troubleshoot** issues related to laser cutting, waterjet cutting, and **CNC machining**.
- Support 50+ students per week in **rapid prototyping**, guiding in additive and subtractive **manufacturing processes**.
- Assist in 40+ cross-disciplinary projects per semester, reducing **material waste** by 20% and **machine downtime** by 15%.

R&D Mechanical Engineer — **Bethlehem, PA**
Unsteady Flow Interactions Laboratory, Lehigh University — *Nov 2023 – Present*

- Design a setup to simulate movements of bio-inspired **robotic swimmers** in water channel, leading investigations into the development of quiet underwater vehicles as part of a **$7.5 million** U.S. DOD-funded project. [Research Poster]
- Built setup from **concept to deployment** using **SolidWorks**, for all parts to be manufactured using hand-held power tools, waterjet cutting, CNC machining, and 3D printing following **DFM/DFA** guidelines.
- Integrated a belt and pulley system and **gears** for two high-torque motors, ensuring **geometrical tolerance** and **compatibility** with water channel, force sensors, linear/angular encoders, laser sensors, and actuators.
- Performed **reliability testing** ensuring 32% vibrational noise reduction using **MATLAB**, **LabView** for data analysis.
- Developed a **C++** closed-loop control program for Arduino-based controller increasing movement accuracy to **98.2%**.
- Completed **FEA** of hydrofoils using **SolidWorks Simulation** to improve hydrodynamic characteristics.

Lead Mechanical Engineer — **Bethlehem, PA**
NASA CubeSat Student Launch Initiative, Lehigh University — *Sep 2023 – Present*

- Lead the **mechanical design** of Lehigh's first nanosatellite using VS/SWIR **optics** to monitor ocean plastic pollution.
- Manage a 10-person structures team and closely collaborate with **cross-functional teams**, including Communication and Electrical teams to ensure **seamless integration** of a deployable antenna and solar panels.
- Raised **$180K** in 6 months for the space launch-ready design from alumni, sponsors, and crowdfunding.
- Designed full assembly using **3D CAD** and **statistical tolerance analysis**, reducing volume by 33% and mass by 23%.
- Produced **2D CAD drawings** using SolidWorks, **GD&T** following the **ASME Y14.5 standard** and NASA compliance.

R&D Mechanical Engineer Intern — **Kingston, PA**
Aerotargets International — *May 2024 – Aug 2024*

- Built a 4-bar linkage structure from **Aluminium 6061** that allows changing to all angles of drone in the **wind tunnel**.
- Used **SolidWorks** to **scale down** the military drone and alter model for **compatibility** with force sensor, wind tunnel.
- Utilized an **NI Data Acquisition card**, **MATLAB**, and **Excel** to acquire and process 100+ datasets from testings.
- Validated lift, drag, and stability performance results at Reynolds numbers **20% higher than expected.**
- Communicated with the design team to recommend fuselage **design modifications**, achieving **10% drag reduction**.

Projects

Bio-Inspired Riverine Power Generator | *C++, MATLAB, FEA, Simulink, Electromechanics* — **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.
- Boosted power generation by 57% by designing a pitch movement closed-loop control using **MATLAB** and **Simulink**.

SkillSat Startup | *DFM, DFA, Cost Reduction, Product Design, Project Managment* — **May 2021 – Sep 2024**

- Founded SkillSat, an EdTech startup focused on manufacturing STEM kits that teach students basic of robotics.
- Raised **$15K** in funding as a Top-3 SpaceTech, Top-15 EdTech Startup by Forbes Kazakhstan.
- Directed the entire **product design** lifecycle, designing 25+ prototypes using **DFMA** principles, leading to 44% **cost reductions**, with 80+ kits manufactured and distributed to 240+ users across 25+ schools.

Technical Skills

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