Khushi Srivastava
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Professional Summary

Analytical and hands-on engineering student with expertise in CAD modeling, thermodynamics, and fluid mechanics, specializing in liquid rocket propulsion systems.

Skills

CAD: Fusion 360, CATIA V5, SolidWorks
Software: STAR-CCM+, Blender, Simulink, ANSYS, C++, Python, MATLAB

Education

Toronto Metropolitan University **B.Eng in Aerospace Engineering** | Spacecraft Specialization *September 2021 – April 2026*
First Year Ambassador | *AIAA Communications Coordinator*

Experience

Computational Fluid Dynamics Intern | *Bombardier Recreational Products-Valcourt,QC* *September 2024 – April 2025*

- Optimized **ATV airbox** and **CVT system** geometries using **STAR-CCM+**, achieving **25%** pressure drop reduction while balancing acoustics, manufacturability, and performance.
- Automated simulation controls for **thermal models** and developed Excel-based heat soak comparison workflows, cutting manual processing time by **90%** and improving data clarity.
- Improved flow efficiency of **thermostat design** using CFD simulations of 3 variants; identified a large-diameter version that reduced pressure drop by **28%** at high flow and was selected for future development.

Propulsion Engineering | *MACH Rocket Propulsion Design Team* *January 2023 – Present*

- Built the GAR-E pressure-fed **liquid rocket engine** fuel delivery system, assembling and operating ethanol–nitrous oxide propellant systems, including feed lines, valves, and venturi assemblies rated up to **8.8 MPa** injection and **4.8 MPa** chamber pressure.
- Managed **cold-flow tests**, connecting pneumatic valves, cavitating venturis, and DAQ sensors to measure flow rate, pressure, and temperature. Performed leak checks, purge and venting operations, verifying stable flow and line integrity across more than **10** full-system test cycles.
- Analyzed post-test data using **Python**, generating pressure-time and flow-rate visualizations to identify performance losses and valve delays, leading to a **40%** improvement in flow-calibration efficiency and contributing to MACH's **2nd-place** national finish at the 2023 **Launch Canada**.

Projects

Satellite Thermal Model | *Spacecraft systems design course* *December 2025*

- Built a **Python**-based **6-node** thermal model for an SSTL-600 satellite at Sun–Earth L4, simulating solar, radiative, conductive, and internal heat loads.
- Optimized spacecraft thermal performance by introducing a passive rotation (2°/s), ensuring all spacecraft surfaces remain within a tight temperature range of **271.6 K to 273.6 K**, minimizing thermal gradients.

Drone Payload Analysis | *Systems engineering course* *February 2025*

- Used **SolidWorks CFD** to quantify aerodynamic loading on a UAV payload housing, extracting surface pressures and net drag (0.5 N).
- Applied **SolidWorks FEA** to verify mechanical integrity of the payload housing, combining aerodynamic load, gravity, and a 3G maneuver load with fixed mounting conditions.

AI-Integrated Walking Robot (TARS from Interstellar) | *Personal Project* *February 2025*

- Designed and modeled the TARS robot in **Fusion 360**, focusing on accurate proportions, servo placement, and smooth articulation for realistic movement.
- Developed **Python-based servo control** using Raspberry Pi and PCA9685, allowing responsive limb motion through gamepad input. Integrated **AI chatbot capability** using the ChatGPT API, allowing the user to converse with the robot verbally.
- **3D-printed** all components except for bearings and shafts, and verified the walking and turning capabilities.

Walking Robot Design | *Mechanics and vibrations course* *January 2024*

- Utilized **MATLAB** to model, simulate, and optimize a **4-bar linkage walking mechanism**. Animated and analyzed movement to ensure optimal performance before prototyping.
- Used MATLAB's optimization toolbox to refine design parameters, including joint angles and motor torques, ultimately selecting the most effective walking mechanism based on performance and ease of maintenance.
- Successfully built and tested the robot, meeting all design specifications, and placing **3rd** in the class competition.