

Summary of Qualification

- Aerospace Engineering postgraduate with understanding and experience in designing, simulating, and engineering analysis of aircraft components and control surfaces.
- Accumulated over 150 hours of hands-on experience through custom-developing CFD solvers in C++ as well as using CFD software (ANSYS Fluent) to model and analyze complex 2D heat transfer and fluid flow problems, including transient natural convection, laminar and turbulent flow through structured, semi-structured, and multi-block meshes.
- Demonstrated expertise in first-principles analyses and aircraft performance methods, with working knowledge of FAR Part 23 and 25 airworthiness regulations.
- Gained 5+ years of experience using engineering tools including MATLAB for numerical modeling and data analysis, SolidWorks and CATIA V5 for 3D CAD design, and ANSYS Workbench for structural, thermal, and flow simulations.
- Recognized team player with adaptive nature and proven ability to multitask in a fast-paced environment showcased through academic course work and Projects.
- Developed excellent interpersonal, time management, and administrative skills through leading projects, managing tasks, and executing assignments through extra-curricular activities (TMU Met Rocketry, TMU Hyperloop) & Aerospace Capstone Project.

Technical Skills

- Design Tools: Solidworks, CATIA V5, OpenFOAM, Ansys Workbench (Fluent, structural, acoustics CFD, CFX), HyperMesh, Unity, FE Map (Nastran), Ansys Mechanical APDL, FEHT, XFOIL, XFLR5, X-Plane 11, Tensor Flow.
- Programming Tools: MATLAB, Simulink, C++/C, HTML/CSS, CNC Programming, Visual Basic.

Education

Master of Engineering – Aerospace Engineering | Toronto Metropolitan University. *Sept. 2023 – June 2025*

- GPA: 4.26/4.33.
- Relevant courses: Computational Methods in Aerodynamic Analysis, High Speed Aerodynamics, Computational Fluid Dynamics and Heat Transfer, Computational Dynamics, Special Topics: Airfoils Design, Aircraft Turbine Engines, Aerospace Thermal Engineering, Aeroelasticity and Gas Dynamics, Vibrational Analysis, Aircraft Structural Design.

Bachelor of Engineering – Aerospace Engineering | Toronto Metropolitan University. *Sept. 2018 – June 2023*

- GPA: 3.5/4.33, *graduated with Distinction.*

Awards and Accolades

- Bombardier's 2023 Aerospace Capstone Design Project Winner – Best Cargo Aircraft Design.
- FEAS 2023 TMU Engineering Day Best Project Award in Aerospace Engineering.
- Bachelor of Engineering: Dean's Honors List in 2nd, 3rd and 4th years.

Professional Experience

Web and Social Media Manager – Queer South Asians (QSA), Toronto, ON. *Sept 2024 – Present*

- Developed and maintained QSA's official website, enhancing digital visibility by 95% within 5 months and improving community access to events and resources ensuring accessibility and relevance for queer South Asians in Toronto.
- Co-developed and executed social media content that gained 1k+ views across Instagram, TikTok and Facebook, driving engagement and attendance at events while amplifying community voices.
- Collaborated with organizers to plan outreach strategies and executed fundraising campaigns raising \$5000+ to support QSA's mission of creating free, safe, and affirming spaces for queer South Asians.

Teaching Assistant – Toronto Metropolitan University, Toronto, ON. *May 2024 – Dec. 2024*

- Assisted in teaching mathematics courses from 1st, 2nd, and 3rd year engineering program. Collaborated with the course instructor to improve instructional materials and teaching strategies.
- Conducted weekly tutorials to solve course-related questions and facilitate understanding of complex mathematical concepts. Provided detailed and timely answers to student questions during office hours and via email.
- Designed and administered quizzes at the end of each tutorial session to assess student comprehension. Graded quizzes and exam papers, ensuring fair and accurate assessment of student performance.

Experimental CFD Research Assistant, Toronto Metropolitan University.

Sept. 2024 – Dec. 2024

- **Performed** transient CFD simulations to analyze natural convection heat transfer over a vertical hollow cylinder with circular fins, focusing on the effects of grid topology on solution accuracy and efficiency.
- **Developed** and **analyzed** structured, semi-structured, and multi-block meshes, and **implemented** a pressure-based solver with a RANS turbulence model in ANSYS Fluent.
- **Conducted** grid convergence studies and **validated** results against established benchmark data to ensure numerical accuracy.
- **Determined** that fine structured grids yielded the most accurate Nusselt number predictions but incurred higher computational costs; **learned** that non-linear grids enhanced boundary layer resolution but introduced mild numerical oscillations; **demonstrated** that multi-block grids provided a balanced trade-off between accuracy and computational performance.

Transonic Airfoil Design Research Assistant, Toronto Metropolitan University.

Sept. 2024 – Dec. 2024

- **Designed** a transonic airfoil by writing a custom MATLAB script to reduce lift degradation caused by normal shock waves at high tip Mach numbers in propeller-driven applications.
- **Applied** conformal mapping techniques (Joukowski and Karman-Trefftz transformations) to generate airfoil geometries with optimized camber and thickness distributions.
- **Analyzed** both compressible and incompressible flow behavior using Prandtl-Glauert corrections and thin airfoil theory to assess performance across subsonic and transonic regimes.
- **Redesigned** lower surface profiles to offset shock-induced lift losses while maintaining a manufacturable trailing edge geometry.
- **Achieved** full lift recovery post-shock, with the final design producing a compressible lift coefficient of 1.0842 at Mach 0.6353. **Validated** the final airfoil as a thin-profile geometry with optimal camber and angle of attack, confirming its aerodynamic efficiency for high-speed propeller use.

FEA & Aircraft Structural Research Assistant, Toronto Metropolitan University.

May 2024 – Aug. 2024

- **Designed** and **modeled** the internal wing structure of a Cessna 152, integrating ribs, spars, and stringers using SolidWorks for high-fidelity structural representation.
- **Conducted** Finite Element Analysis (FEA) in ANSYS Static Structural using both linear and quadratic tetrahedral elements to evaluate stress and deformation under aerodynamic and static loads.
- **Simulated** critical load cases, including wing loading, fuel weight distribution, and flight envelope extremes.
- **Performed** grid-independence studies with various mesh sizes and to ensure numerical reliability and eliminate mesh-sensitive errors. **Calculated** stress distributions and maximum deformation, verifying that all values remained within material limits.
- **Confirmed** that structural failure loads significantly exceeded operational loads, validating the wing design's robustness.

Computational Dynamics Research Assistant, Toronto Metropolitan University.

Jan. 2024 – April 2024

- **Designed** and analyzed a dynamic parallel linkage mechanism to control the morphing winglet cant angle for improved aerodynamic performance and structural efficiency during flight.
- **Applied** inverse kinematics and wrote a custom script in MATLAB to compute joint positions, velocities, and accelerations, enabling precise actuator control.
- **Performed** dynamic motion analysis using the Euler-Newton Recursive method to calculate joint forces and actuator loads under varying flight conditions.
- **Developed** CAD models in SolidWorks for both static and dynamic configurations to **visualize, simulate, and validate** system behavior.
- **Demonstrated** linear actuator stroke-to-winglet rotation proportionality, achieving smooth motion with high stiffness and structural integrity. **Validated** system strength by computing joint forces and torques, thus, confirming its capability to withstand aerodynamic and payload-induced loads during the flight envelope.