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Aerospace and mechanical engineer (MEng UTIAS; BESc Western) with strengths in simulation, fluid mechanics, and disciplined engineering workflow. I approach technical work with a verification-minded, engineering-first mindset: objectives, assumptions, and failure modes are made explicit early, models and computations are built to be repeatable and inspectable, and conclusions are tested against interfaces, manufacturability, testability, and the physical system they are meant to support. My work spans graduate numerical-methods research, CFD and thermal-fluid studies, and aircraft and UAV design, and I am most useful where careful analysis has to connect cleanly to design choices, implementation constraints, and the next practical engineering decision. I am comfortable owning the loop from setup and technical execution through post-processing, documentation, and clear recommendations that can actually move work forward.

Education

MEng, Aerospace Science and Engineering 2023–2025

University of Toronto Institute for Aerospace Studies (UTIAS), Canada Reference: Prof. D.W. Zingg

Built rigour in analysis, modelling, and technical judgement through advanced research and coursework.

- MEng project: developed Summation-by-Parts (SBP) operators and generalized quadrature rules for high-order finite-difference schemes with provable discrete energy estimates and stable boundary closures.
- Built MATLAB tooling to assemble the systems and closure constructions, generating Gregory-rule-based H-norm operators at the desired order p for controlled verification of the accuracy and stability conditions.

BESc, Mechanical & Materials Engineering 2019–2023

Western University, Canada Reference: Prof. A.G. Straatman

Broad engineering foundation in mechanics, thermofluids, materials, and engineering design principles.

Engineering Experience

Aerospace Engineer, Sepal AI Nov 2025–Mar 2026

- Built and documented reproducible aerospace analysis workflows in Sepal AI's task-based engineering system, including repeatable fixed-wing UAV sizing outputs from constraint-based analysis workflows.

Aerodynamics Lead, University of Toronto Aerospace Team Aug 2023–Aug 2025

- Led aerodynamic design for SAE Aero competition aircraft and mentored junior members in analysis workflows, design reviews, and validation and interpretation of simulation results across design iterations.
- Built and iterated an analysis chain combining lifting-line methods, structural approximations, and multidisciplinary design optimization to improve payload under competition and manufacturing constraints.

CAD Engineer, Mountaineer Aircraft Ltd. Apr 2023–Aug 2023

- Designed structural components in SolidWorks for an experimental STOL aircraft and iterated with fabrication staff to improve manufacturability and support practical aircraft build requirements.

CAE Design Engineer, Sunstang Solar Car Project Sep 2022–Apr 2023

- Developed an early-stage tubular chassis redesign in SolidWorks, using extensive FEA and coordinating with aero and electrical sub-teams to support integration under packaging and competition constraints.

Simulation Lead, Sailboat Docking Capstone Sep 2022–Apr 2023

- Contributed to modelling and early-stage concept development for a docking-assist capstone, including static and dynamic analysis under wind and current and SolidWorks design of a basic docking mechanism.

Selected Projects

aeroAUTO – OpenFOAM External Aero Workflow Personal project

- Reusable OpenFOAM workflow for external-aero benchmarks such as Ahmed body, with scripted meshing, solver setup, and post-processing on private cluster infrastructure for benchmark and scaling runs.
- Automates force, C_p, and wake diagnostics to support controlled case-to-case comparisons, speeding up validation, sensitivity studies, and design iteration while improving repeatability and traceability.

SBPLab – SBP Testbed Personal project

- Verification-focused numerics testbed for constructing and validating SBP operators on canonical PDEs.
- Runs canonical PDE cases to check stability and convergence when SBP operator implementations change.

Research Experience

Graduate Research Projects UTIAS

- Worked through governing equations, boundary conditions, semidiscrete formulations, and discretization choices, and studied time-marching, stability, and multigrid behaviour on canonical CFD problems.
- Analyzed homogeneous isotropic turbulence data from JHTDB using vorticity, Q-criterion, and λ_2 diagnostics to identify and interpret vortical flow structure across DNS fields and derived quantities.
- Analyzed disturbance-rejection data from a full-motion flight simulator using crossover-frequency and pilot-model concepts to study combined pilot-aircraft control behaviour in controlled simulator experiments.

Impinging Jet Cooling in Porous Media Western University

- Simulated impinging-jet cooling through porous-media geometries in ANSYS CFX, using packed-sphere void representations to study pressure loss, jet penetration depth, and conjugate heat-transfer behaviour.
- Built meshes, defined boundary conditions, and extracted comparable cooling metrics from repeatable simulation runs across matched configurations, enabling comparison of cooling-performance tradeoffs.

NSERC USRA – CFD / Scientific Computing Western University

- Contributed to CFD research in a Fortran-based code environment, working with graduate students and building practical experience in scientific computing, simulation workflows, and research-style analysis.

Selected Coursework

Mechanics and materials; thermofluids and heat transfer; computational fluid dynamics, turbulence, combustion, and unsteady gasdynamics; aeroacoustics; flight dynamics and control; numerical methods for PDEs; scientific computing and algorithms; uncertainty quantification; topology and computational optimization.

Technical Skills

CFD, Thermal-Fluids & Modelling

- **OpenFOAM** — meshing, solver setup, turbulence-model selection, external-aero workflows, and automated force/C_p/wake post-processing for benchmark and applied cases, with scripted setup and traceable iteration.
- **ANSYS Fluent/CFX** — heat-transfer, internal-flow, and external-flow modelling in thesis, coursework, and comparative studies, with emphasis on thermal and flowfield interpretation, comparable setup, and repeatable extraction of useful engineering metrics for comparison and design decisions.
- **XFoil / XFLR5** — airfoil and wing analysis for aerodynamic design, stability checks, trade studies, and early-stage configuration decisions during iterative design loops and aerodynamic performance evaluation.

Numerical Methods & Scientific Computing

- **MATLAB** — PDE/ODE discretization, SBP/SAT tooling, convergence studies, optimisation/MDO, turbulence and CFD analysis, and technical plotting/report generation for repeatable numerical experiments.
- **Python** — workflow automation, post-processing, data handling, regression checks, and summaries for simulation and analysis pipelines, keeping studies rerunnable, organized, and traceable.
- **C++** — working familiarity with CFD-style codebases, including small extensions, debugging, build-system workflows, and reading/modifying solver-adjacent code within larger scientific computing environments.

Workflow & Engineering Tools

- **Linux/CLI & Git** — scripting, version control, reproducible workflows, experiment hygiene, and organized iteration across simulation projects, with traceable and scriptable experiment management.
- **SolidWorks & FEA** — CAD, structural analysis, manufacturable geometry, and design iteration for aerospace and mechanically integrated components through iterative CAD and analysis refinement.

Additional Context

Grew up on a farm in Alberta around machinery, which gave me a practical feel for how mechanical systems are built, used, worn, repaired, and kept working under real constraints. General aviation exposure and time around Oshkosh/EAA reinforced a lasting aircraft focus and a strong respect for engineering that has to survive fabrication, maintenance, and real operating conditions. That background left me with a practical engineering instinct and a lasting preference for work that stays physically grounded and useful beyond the classroom.