Jared Crebo

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EDUCATION

University of Calgary **2019 – 2025**
Bachelor of Science, Mechanical Engineering, Minor in Astrophysics **Cum GPA: 3.51 / 4.00**

TECHNICAL COURSES

Technical Electives: Aerodynamics, Computational Fluid Dynamics, Propulsion, Renewable Energy Systems
Upper Year: Vibrations, Control Systems, Materials I, Thermo II, Fluids II, Solids II
Math: Calculus III, Linear Algebra II, Ordinary Differential Equations, Partial Differential Equations
Astrophysics: Computational Physics I, Astrophysics, Galactic Astrophysics, Stellar Structure and Evolution

TECHNICAL SKILLS

Coding Languages: MATLAB, Python, Java, HTML/CSS, Bash/Batch scripting
Software Programs: SolidWorks, Excel, Femap, Nastran, OpenFOAM, ANSA, Pointwise
Mechanical Skills: CAD, FEA/FEM, CFD, composite manufacturing, project management

EXTRACURRICULAR EXPERIENCE

Schulich Unmanned Aerial Vehicles, Calgary, AB **2019 – 2023**

President

- Spearheaded new sponsorships with Lockheed Martin, Textreme, Dassault Systemes, Hexagon, Siemens, resulting in funding, materials, and engineering software for the team worth over $30,000
- Initiated partnership with Airdrie Flying Club for a runway and legal airspace for flight testing
- Coordinated new marketing initiatives through social media and in-person events, resulting in team roster doubling over two years
- Led the team of 50 students to the AUVSI Student Unmanned Aerial Systems 2023 competition, placing 25th overall and 1st in Canada

Mechanical Team Lead

- Led 15 students to design and manufacture of our *Hammerhead UAV* for AUVSI Student Unmanned Aerial Systems 2023 competition, placing 25th overall and 1st in Canada
- Led the design of a VTOL-capable UAS for the SAE Aeroconnect Competition in 2022, placing 1st overall for the third consecutive year

Mechanical Team Member

- Participated in the designing of VTOL-capable UAS' for the SAE Aeroconnect Competitions in 2020 and 2021, placing 1st overall in both years consecutively
- Participated in the development of a UAV for the SAE Aerodesign West Advanced Class in 2020

PROFESSIONAL EXPERIENCE

Data Annotation, Remote (Freelance) **June 2024 - Present**

LLM Training Data Analyst

- Developed idealized code in Python as training data for training Large Language Models (LLMs) in data analysis using Pandas, NumPy, SciPy
- Developed training data in advanced mathematics and physics for training LLMs to solve complex problems in STEM
- Engineered targeted prompts to LLMs to coax responses with adverse or incorrect information

Canadian Armed Forces, Calgary, AB **2023 – Present**

41 Combat Engineer Regiment

- Successfully completed Basic Military Qualification course over 5 weeks, being one of 24 candidates to graduate out of 32 in my class and excelling in leadership roles under stress
- Successfully completed Cold Weather Operator course over 4 weeks, learning subfreezing survival skills that will aid my ability to participate in Canada's contribution to NORAD and Arctic defence
- Developed skills in leadership, decision-making under pressure, teamwork, and conflict resolution

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Wildland Firefighter

- Deployed to Jasper National Park as part of a 3 week wildfire response operation, working with fire crews from across Canada, to extinguish the 33,000ha wildfire that burned through the town of Jasper
- Deployed to John D'Or Prairie First Nation Reserve in northern Alberta to combat the 100,000ha wildfire threatening the homes of the Little Red River Cree Nation, a joint effort with 700+ firefighters from across Canada, Mexico, Costa Rica, and Australia.
- Specialized in identifying and extinguishing hotspots to prevent wildfire resurgence, resulting in successfully extinguishing both wildfires and allowing citizens to return to their homes

ExxonMobil, Calgary, AB **Jan 2022 – April 2023**

Kearl Mine Engineering Business Intern

- Managed the experimental use of renewable diesel on haul trucks and excavators at the Kearl Oil Sands Project, resulting in approval of a site-wide deployment of the fuel and therefore a 6% reduction in carbon emissions from the mine. Mine productivity impact was assessed through statistical analysis in JMP and Power BI
- Conducted comprehensive Weibull failure analysis on excavator parts in Python, extending equipment lifespan by up to 30% through data-driven insights
- Performed Root Cause Failure Analysis (RCFA) into a major crack found on an excavator, resulting in three similar cracks being found on the other excavators prior to their complete operational failure

TECHNICAL PROJECTS

Aero-Analysis for UAV Dynamics and Control Law Synthesis, Capstone ***OpenFOAM, MATLAB***

Investigated the efficacy of developing a dynamic model and control system using computational methods with a comparison to experimental flight tests, achieving 3rd place overall in the capstone fair

- Meshed five models of the UAV in Pointwise with varying control surface deflections to obtain the aerodynamic coefficients and control derivatives required to build a 6-DoF dynamic model
- Conducted 14 OpenFOAM simulations with the five meshes for various airspeeds, angles of attack, and sideslip angles on parallel nodes on the Advanced Research Computing cluster at the University of Calgary
- 6-DoF dynamic model of aircraft was developed and simulated in MATLAB Simulink based on the Research Civil Aircraft Model (RCAM) developed by GARTEUR
- Conducted autonomous flight testing to compare simulated and experimental control responses to changing altitude and banking turns

Hammerhead UAV, Schulich UAV ***Solidworks, Femap, Nastran, XFLR5, MATLAB***

Led a team of 50 students as President of Schulich UAV to develop and fly a UAV for the AUVSI Student Unmanned Aerial Systems competition in Maryland, USA in 2023, placing 25th overall and 1st in Canada

- Successfully met requirements to fly 12mi endurance with 2.5kg payload capable of airdrop on target
- Conducted aerodynamic analysis using XFLR5 to select airfoil based on desired cruise parameters
- Designed aerodynamic surfaces using Solidworks CAD, using principles of design for manufacturing
- Calculated flight load cases and used Femap and Nastran code to conduct finite element analysis on wing structure using composite material models developed through stress testing
- Cut molds out of XPS foam with a CNC hotwire for wing and tail composite manufacturing
- Manufactured fuselage, wings, and tail from carbon fiber composite using the wet layup method
- Coordinated flight testing and payload drop testing to meet competition requirements

SAE Aeroconnect, Schulich UAV ***Solidworks, Femap, Nastran, MATLAB, Excel***

Led a team of 15 students as Mechanical Lead to design an Urban Air Mobility system for a mass transit system from the LAX airport to various locations around the Los Angeles Metropolitan Area for the SAE Aeroconnect Competition 2022, achieving 1st place overall

- Designed eVTOL flight regime for maximum efficiency constrained by energy use requirements
- Led the mechanical design of eVTOL capable of carrying passengers in Solidworks CAD

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- Designed propeller geometry using blade element momentum theory and the vortex panel method
- Conducted CFD simulations in Solidworks Flow Simulation to optimize propeller geometry for reduced sound level requirements for passengers
- Designed and optimized battery configuration based on power and endurance requirements
- Analyzed both wing and fuselage structure using FEA in Femap and Nastran in accordance with FAA regulations for carrying passengers

2D CFD Solver Code, Self-Study ***Python***

- Programmed a CFD solver for the inviscid 2D Euler equations using the cell-centered finite volume method, the upwind differencing scheme for convection, and the SIMPLE solver algorithm

Von Karman Vortex Street CFD Simulation, CFD course ***OpenFOAM***

- Conducted a transient, incompressible OpenFOAM simulation of turbulent flow over a 2D cylinder with k-ω SST turbulence model, achieving a grade of 98%
- Oscillating flow mechanism characterized through the calculation of the Strouhal number

Finite Wing CFD and Wind Tunnel Experiment, Aerodynamics course ***OpenFOAM, MATLAB***

- Conducted OpenFOAM simulations to investigate the effects of downwash and wingtip vortices
- Simulations validated through wind tunnel experimentation with 3D printed finite wing

Vortex Panel Method, Aerodynamics course ***MATLAB***

- Developed the code to implement the vortex panel method in MATLAB to approximate aerodynamic coefficients of an arbitrary airfoil shape, achieving a grade of 100%

Personal Website, Self-Study ***HTML, CSS, JavaScript***

- Programmed a personal website from scratch using HTML/CSS and JavaScript, to be used as a resume website and a personal blog

Minesweeper, Computer Science 30-AP course ***Java***

- Programmed Minesweeper game in Java using Java Swing GUI, achieving a grade of 98%

FIRST Robotics Competition, Aberhart Robotics Club

- Designed and assembled a robotic arm for the Canadian Rockies Regional FIRST Robotics Competition

PUBLICATIONS

Noaeen, M., et. al. (2022). Reinforcement learning in urban network traffic signal control: A systematic literature review. *Expert Systems with Applications, 199,* 116830. https://doi.org/10.1016/j.eswa.2022.116830

SCHOLARSHIPS & AWARDS

Jason Lang Scholarship	**2020, 2021, 2024**
1st Place - SAE Aeroconnect Competition	**2020 - 2022**
Rutherford Scholarship	**2019**
Thorncliffe Community Scholarship	**2019**
Royal Conservatory of Music – Piano Level 5 Honours with Distinction	**2010**

PROFESSIONAL AFFILIATIONS

American Institute of Aeronautics and Astronautics (AIAA) – Student Member	**2022 – Present**
Society of Automotive Engineers (SAE) – Student Member	**2020 – Present**
Schulich UAV – President	**2019 – 2023**
Kappa Sigma Fraternity	**2019 – 2023**
UCalgary Ski and Board Club	**2019 - 2022**
UCalgary Firearms Association	**2019 - 2022**