Pierre Arbaji

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EDUCATION

Bachelor of Engineering, Mechanical Engineering Co-Op | *McGill University* **September 2022 – April 2027**

Fourth-year Polyglot Mechanical Engineering student with a Minor in Aerospace Engineering, strong in mechanical design and structural analysis, and proven leadership in aerospace projects.

EXPERIENCE

Aerostructure Team Operational Support Intern | *Airbus* **September 2025 – December 2025**

- Supported the **A220 (A2X) convergence program** by structuring and consolidating engineering and operational data across multiple international sites (Germany, Canada, France, UK, Spain, China).
- Developed **engineering dashboards** to monitor key objectives in aerostructure projects, enabling improved visibility for design and manufacturing performance.
- Defined and tracked **KPIs linked to structural and production objectives**, ensuring alignment with program goals.
- Contributed to **process improvement roadmaps**, for global aerospace supply chains and large-scale aerostructure integration.

Aerostructures Subteam Lead | *McGill Rocket Team* **May 2025 – Present**

- **Lead a team** of approximately **50 students** in the Aerostructures subteam, overseeing all aerostructure projects and ensuring seamless integration within the subteam and across the team.
- **Manage key projects** including composites manufacturing, internal rocket structures, composite tank, aerodynamics, manufacturing and post processing of rocket components.
- **Optimizing internal structural components** and achieving up to a **30% weight reduction** while maintaining structural integrity, by performing topology optimization and finite element analysis using Siemens NX.
- **Coordinate with sponsors**, secure funding, and maintain industry partnerships to support project development.

Co-Founder & Mechanical Lead | *Polaris Flight* **September 2025 – Present**

- **Designed a rocket airframe** specifically to validate a **custom 3-axis PID flight controller**, optimized for **aerodynamic efficiency, structural integrity, and control authority**.
- Completed **CAD** modeling, **aerodynamic** shaping, and **FEA** verification of fuselage, fincan, control surfaces, and internal structures.
- Developed and integrated servo-actuated control surfaces with the controller to enable **yaw, pitch, and roll stabilization**.
- Currently transitioning from **finalized design to fabrication and ground/flight testing** scheduled for summer trials.

Undergraduate Researcher | *McGill EUS* **May 2025 – August 2025**

- **Initiated and secured $11,500 in funding** for the Active Flight Controls project, establishing scope and research direction.
- **Derived roll-axis dynamics** and developed a **PID-based closed-loop control algorithm**, validated through simulation.
- **Designed and fabricated** a test rocket and a **mechanically linked** single-servo actuation system, improving reliability and precision.
- **Validated prototype performance** through bench and ground testing, confirming roll-control effectiveness.

Process Engineering Intern| *SWS Boards Technologies* **May 2024 – July 2024**

- Conducted detailed **material analyses** on **PTEX sheets** experiencing **warping** during **high-temperature sublimation printing**, identifying key structural deformation mechanisms.
- Performed systematic **experimental evaluations** and **parameter optimization** to eliminate material defects, achieving a **80% reduction in substrate warping** defects and stable, structurally consistent PTEX substrates.
- Collaborated with equipment manufacturers to enhance substrate thermal stability.
- Presented comprehensive **technical reports and findings** to executive management, emphasizing **structural integrity improvements** and **material performance enhancements**.

Aerostructures Project Lead (general member the previous year) **|** *McGill Rocket Team* **September 2023 – April 2025**

- **Directed a team of 10 students** in the design and fabrication of aerospace structural components.
- **Led the design and structural analysis** of structural elements, such as the Avionics Bay, performing CAD and FEA to ensure reliability under extreme forces with safety factors.

SKILLS

Coursework: Machine design, product design, structural optimization, composites, aerospace structures, thermodynamics, heat transfer, fluid mechanics, turbomachinery, propulsion systems, system dynamics, control, composites processing, additive manufacturing, materials science.

Languages: English (Fluent), French (Fluent), Portuguese (Fluent), Spanish (Fluent), Arabic (Fluent).

Technologies: CAD, FEA, Python, MATLAB, C++, numerical methods, engineering computation, engineering dashboards, KPI tracking