

ALAIN HALBOUNY

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Egyptian-French National — UAE Resident — Canada Post Graduate Work Permit

EDUCATION

McGill University - Faculty of Engineering

Montreal, Canada, Sep 2020 - Feb 2025

Bachelor of Engineering in Mechanical Engineering GPA: 3.6/4.0

Awarded the Professor Bill Williams Memorial and John Howard Ambrose Scholarships

Coursework: Thermodynamics, Mechanical Design, Fluid Mechanics, DFMA, GD&T, Numerical Methods, Dynamics, Conceptual Design, Mechanics of Deformable Solids, Electric Machinery, Heat Transfer, Subsonic Aerodynamics

SKILLS

Engineering Tools: CAD: SolidWorks, CAM: Mastercam, FEA: Abaqus

Manufacturing & Design: CNC Machining, 3D Printing, DFMA, GD&T

Data Analysis & Software: Python (PyTorch, Tensorflow), MATLAB, Microsoft Office (Excel, Word, Powerpoint)

Certificates: Machine Learning Specialization (Stanford), KDB+/q developer level 3 (Kx)

Languages: French, English, Arabic (Fluent); Spanish (Basic)

PROJECTS

Machine Learning - Personal Project

May 2025 Ongoing

Independently building and optimizing machine learning models for practical applications.

- Implemented a Multi-Layer Perceptron (MLP) from scratch in NumPy to classify handwritten digits using the MNIST dataset.
- Currently developing a small transformer-based language model to explore foundational NLP and attention mechanisms.

Laser Powered Rocket - Team Project

Sep 2023 - Apr 2024

Developed a fully functional laser thermal propulsion test apparatus for research applications.

- Designed an aluminum ionization chamber rated for 50 bars, operating with a 350w continuous laser for up to 30s.
- Conducted a first-principles heat transfer study to manage a 15000°k plasma core using heat sinks and regenerative cooling.
- Created production-ready DFMA CAD models, GD&T drawings and assemblies using SolidWorks.
- Led 3D printing, prototyping and high precision manufacturing in-house at McGill of main components.
- Managed project budget, timeline, and procurement of outsourced components.
- Successfully passed structural integrity tests and produced measurable thrust.

Auxiliary Transmission Box - Team Project

Mar - Apr 2022

Designed and optimized a double-reduction auxiliary AGMA standard spur gear transmission box for a small aircraft.

- Designed and sized compact set of gears achieving required reduction ratio under strict dimensional constraints.
- Conducted detailed AGMA force, stress, and fatigue analysis to ensure gear durability over lifecycle.
- Engineered shafts using FBD, shear/bending moment diagrams, and stress analysis.
- Selected and optimized bearings and keys for fit and load capacity over their lifecycle.
- Applied an iterative design optimization cycle using Python scripts and custom spreadsheets.

Structural Bracket Design - Team Project

Sep - Dec 2022

Designed a lightweight 2D acrylic structural bracket to maximize strength and achieve target stiffness.

- Conducted FEA analysis and design optimization in ABAQUS, calibrated with material test data.
- Optimized triangular element mesh (1000 nodes limit) by identifying critical stress areas.
- Produced bracket CAD models and DXF files in SolidWorks for laser cutting.
- Iteratively refined bracket geometry to minimize weight while maintaining structural integrity.

EXPERIENCE

Merchandise Sales Representative - V12 Trackside F1 Store, Formula 1 Grand Prix

Montreal, Canada, Jun 2023

Interacted with diverse audiences, enhanced brand promotion, and efficiently managed inventory in a fast-paced, high-energy sales environment. Successfully sold merchandise to attendees at the 2023 Montreal F1 Grand Prix.

GVI-Org - Supervised Voluntary Work Experience

Quepos, Costa Rica - Jul 2019

Contributed to building a recreation/learning center for underprivileged children on the island of El Cocal, emphasizing community development and infrastructure improvement. Teamwork and communication were key to achieve our goals.

Introductory Programs - ABB for Electrical Industries and GT Advanced Technologies

Cairo, Egypt, Jul 2019

ABB: Collaborated across departments, strengthened interpersonal skills, and gained hands-on exposure to electrical engineering projects, project management and supply chain operations.

GTAT: Completed intensive training on the fundamentals of solar energy and semiconductor materials.

Internship – GoPro at ABM

Dubai, United Arab Emirates, Feb 2017

Primarily collaborated with the tech department of the leading GoPro camera distributor in the MENA and GCC regions at the time. Gained foundational sales and marketing skills while integrating into a corporate team. Responsibilities included advertising, market research, technical product support, maintenance, and inventory management.

EXTRACURRICULAR | Basketball, Tennis, Padel tennis, Ski, Photography and Video editing, Stock Market, AI