Nicholas Karantakis

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Education

University of Toronto | Cumulative GPA 3.91/4.0 — Sept. 2023 – Apr.2028
Bachelor of Applied Science and Engineering (B.A.Sc.) in Mechanical Engineering + PEY Co-op — *Toronto ON*
Intended Minors: Robotics and Engineering Business

Experience

Airframe Member — Jan. 2024 – Present
University of Toronto Aerospace Team UAS AEAC Drone Team — *Toronto ON*

- Facilitated in the **design**, **building**, and **testing** components of the airframe for the Aerial Evolution Association of Canada UAS competition.
- Crafted and enhanced CAD models for inner and outer wings of preliminary vertical takeoff and landing (VTOL) drone design.
- Fabricated inner wings, utilizing foam, fiberglass, and epoxy resin to ensure optimal **weight reduction** and **structural integrity**.

Lung Airway and Vasculature Researcher — May. 2024 – Aug. 2024
Latner Thoracic Research Laboratories and Bazylak Group — *Toronto ON*

- Optimized MATLAB vessel network extraction pipeline using MATLAB Profiler tools and memory allocation techniques to achieve **47% reduction in process time** for extracting the geometric characteristics of lung vasculature and airways from image stacks.
- Developed **imaging techniques** for mouse lung airways based on casting procedures from literature using MICROFIL and silicone rubber casting material to produce micro-computed tomography images with **over 1000 branch** segments up to **~30 generations**.
- Constructed **simplified airway geometries** for **Computational Fluid Dynamics analysis** from image data using Python and Blender.

Production Support — July. 2022 – Aug. 2022
Mitsubishi Heavy Industries Canadian Aerospace — *Mississauga ON*

- Contributed to the production of **Bombardier Global Express/5000 wings** and **center fuselage**, ensuring adherence to quality standards.
- Supported various tasks, including **painting touchups**, **cleaning**, **sandblasting**, operating **pneumatic tools**, **preparing wings** for **leak tests**.
- Enhanced soft skills such as **adaptability** and **communication** by assuming various roles as needed at all stages of production including the spar shop, final inspection, and preparation for shipping, demonstrating **flexibility** and **collaboration** in a dynamic work environment.

Projects

CNC Router Design | SolidWorks, Teamwork, Communication — Sept. 2024 – Dec. 2024
Mechanical Engineering Design (MIE243), University of Toronto

- Collaborated in a team of four to research and design a **DIY hobbyist CNC router** setup with a **2 ft by 3 ft bed space**.
- Developed engineering specifications, budgeted costs, and conducted component research to create CAD models and assemblies in SolidWorks, including static load simulations which found **factor of safety of over 73** for major structural components.
- Designed a gantry with both a belt drive and lead screw systems, and a **2.2kW spindle motor** capable of cutting wood, acrylic, and soft metals.

Journey Mapping Project | Python, JavaScript, Flask, Network X, Mapbox, OpenStreetMap — Jan.2024 – Apr. 2024
APS112 - Engineering Strategies and Practices II

- Collaborated with a team of six engineering students to develop a **mapping tool** that visualizes the impact of one-way conversions and traffic restrictions on driving routes for our client, the **City of Toronto Cyclists and Pedestrians Team** who frequently make road changes.
- Designed a **user-friendly system** for the client to **modify traffic restrictions** including one-way roads, turn restrictions and diverters using **OpenStreetMap editor** and an **application** powered by **PyQt5** for filtering out non-drivable roads from the editable dataset.
- Built a **webpage** allowing users to input start and destination points to compare optimal driving routes before and after road changes, leveraging the **Mapbox Navigation API** and a **Python backend** that employs the **NetworkX** shortest path algorithm to calculate the fastest route.

Skills

Programming: MATLAB, Python, JavaScript, HTML/CSS
Frameworks: React, Node.js, Flask
Libraries: Git, Pandas, NumPy, Matplotlib, Network X, Media Pipe, Open CV, PyQt5, Mapbox
CAD / 3D Modelling: SolidWorks CSWA, Blender, 3D Slicer
Machining: Lathe, Mill, Drill Press
Office Tools: Excel, Word, PowerPoint
Personal: Public Speaking, Adaptability, Problem-Solving, Teamwork