Hamza Dugmag *Electrical and Computer Engineering Student*

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SKILLS

Hardware
Soldering, Oscilloscope, LTspice, KiCad, ModelSim, Raspberry Pi, Arduino, Vector Network Analyzer, Fusion 360, 3D Printing

Software
Python (NumPy, Pandas, PyPlot, SciPy, PyTorch), C, C++, ROS, SystemVerilog, MATLAB, Assembly, Git, Docker, Unreal Engine

PROFESSIONAL EXPERIENCE

RTL Design Engineer — PEY Intern, *Intel Corporation*
May 2023 – present
San Jose, CA, United States

- Engaged in microarchitectural logic design, timing analysis, verification, and benchmarking of *Nios V*, *Intel*'s next-generation *RISC-V* embedded processor family for FPGAs.
- Optimized instruction pipelining via register balancing, control-based logic reuse, and FPGA primitive instantiation, improving area by 19%, maximum frequency by 16%, and instructions per cycle by 2%.

Robot Navigation Research Intern, *UTIAS Autonomous Space Robotics Laboratory*
May 2022 – Aug 2022
Mississauga, ON, Canada

- Conducted field tests at various lakes to validate mapping, localization, and stochastic navigation of a *Clearpath Heron* autonomous surface vehicle.
- Generated satellite-informed water masks of Canadian lakes using GISs to create a *Python*-based simulation platform for evaluating different route-planning algorithms.
- Developed a graphical user interface using *ROS* and *ReactJS* to track the robot and visualize its navigation policy in real time.

Engineering Academic Review Mentor, *U of T Faculty of Applied Science and Engineering*
Aug 2021 – Apr 2022
Toronto, ON, Canada

- Hosted drop-in sessions to advise and support first-year Engineering Science students with their academic, professional, and personal development goals as they adjust to university.

Machine Learning Research Intern, *U of T Forcolab Group*
May 2021 – Aug 2021
Toronto, ON, Canada

- Conducted a literature review analyzing the potential of collaborative *Stack Overflow* posts to organize knowledge for improved searching and learning experiences.
- Investigated code clone detection models to compare educational code snippets to programming language documentation.
- Optimized parameters for hierarchical density-based clustering of *Stack Overflow* posts using *Python*, increasing precision by 11%.

RESEARCH

Yizhou Huang, **Hamza Dugmag**, Timothy D. Barfoot, and Florian Shkurti, "Stochastic Planning for ASV Navigation Using Satellite Images", *2023 IEEE International Conference on Robotics and Automation (ICRA 2023)* [paper] [website]
Jul 2023

Hamza Dugmag, Arjun Sridharkumar, Iftekhar Ahmed, and Shurui Zhou, "Analyzing *Stack Overflow* Community Posts to Automate Knowledge Organization", *2021 University of Toronto Undergraduate Engineering Research Day Conference (UnERD 2021)* [presentation]
Aug 2021

EDUCATION

BASc in Engineering Science (Major in Electrical and Computer Engineering, PEY Co-op), Certificate in Engineering Business, *University of Toronto (St. George)*
Sep 2020 – Jun 2025
Toronto, ON, Canada

- 3.96/4.00 cGPA, 92% average, Dean's Honours List in all semesters.
- Courses: Electronic Circuits, Semiconductor Physics, Electromagnetic Waves, Computer Organization, Systems Software, Systems Control, Energy Systems, Design and Ethics.

PROJECTS

University of Toronto Aerospace Team — Rocketry Division

Liquid Rocket Chief Engineer
Jun 2022 – Sep 2023

- Coordinated the design, analysis, fabrication, and testing of a high-altitude liquid-propellant rocket with 19.25 kNs of total impulse.
- Created the design requirements, concept of operations, and mass budget.

- Organized a preliminary design review with advisors and communicated the project at onboarding sessions and team meetings to 50+ members.

Avionics Subsystem Lead Jun 2021 – May 2022

- Managed a team to integrate flight and ground systems for wireless communication, power, sensors, actuators, and control in an award-winning hybrid-propellant rocket.
- Designed surge-protected relay circuits to control DC motors with a *Raspberry Pi*, increasing power rating by a factor of 20.
- Formalized data acquisition methods to calibrate load cells and pressure transducers from a custom graphical user interface with 95% accuracy.

Electric Guitar Pedals Dec 2022 – Jan 2023

- Designed a guitar distortion pedal based on a common-emitter NPN Darlington pair.
- Built a guitar tremolo pedal with true bypass switching using a phase shift oscillator.
- Soldered the electronics and packaged the boards in custom 3D-printed enclosures.

AWARDS

(C$4984) Christina and Logan Martin Scholarship in Engineering, Aug 2023
U of T Faculty of Applied Science and Engineering
Awarded on the basis of academic merit.

(C$8942) Kenneth Carless Smith Award in Engineering Science, Aug 2023
U of T Faculty of Applied Science and Engineering
Awarded by the chair on the basis of interest and aptitude in the area of electronics.

(C$2676) Peter Sands Award in Engineering Science, Aug 2022
U of T Faculty of Applied Science and Engineering
Awarded by the chair on the basis of academic merit, qualities of character, leadership, and commitment to the engineering profession.

(C$9000) Undergraduate Student Research Award, Mar 2022
Natural Sciences and Engineering Research Council of Canada
Awarded on the basis of academic merit and research potential.

(C$27000) Fessenden-Trott Scholarship, *Universities Canada* Sep 2021
Selected among nominees across Ontario universities on the basis of academic merit, leadership, extracurricular involvement, and reference letters.

(C$5000) Dean's Summer Undergraduate Research Pivot Award, Sep 2021
U of T Faculty of Applied Science and Engineering
Participated in the *Undergraduate Summer Research Program*.

Amateur Radio Operator Certificate (Basic with Honours), Jul 2021
Innovation, Science, and Economic Development Canada
VA3UFT call sign, 100% exam score.

(C$2000) May Court Education Award, *May Court Club of Oakville* Jun 2020
Awarded on the basis of extracurricular involvement and reference letter.

(C$2000) Rotary Education Award, *Rotary Club of Oakville* Jun 2020
Awarded on the basis of academic merit and community service.

(C$2000) Faculty of Applied Science and Engineering Award, May 2020
U of T Faculty of Applied Science and Engineering
Awarded on the basis of academic merit.

(C$5000) Faculty of Applied Science and Engineering Admission Scholarship, May 2020
U of T Faculty of Applied Science and Engineering
Awarded on the basis of academic merit and extracurricular involvement.