Anja Kroon

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Education

MSc Electrical Engineering — Delft University of Technology
Track: Signals and Systems — Autumn 2023 (Start)

BEng Honours Electrical Engineering — McGill University
GPA: 3.7/4.0 — Sept 2019 - May 2023

- Thesis on Evaluation Methods for Categorical Generative Models.
- Varsity Alpine Ski Team Member 2019-2020 and 2020-2021.
- Research interests in communications and signal processing for edge devices utilizing machine learning.
- Three publications through summer research internship and bachelor's thesis.
- Coursework in machine learning, deep learning, signal processing, speech communications, statistics, probability, and linear algebra, and 6 graduate EE courses.
- Served for two years representing 1200 students as President and Vice President Academic of the Electrical, Computer, Software Engineering Student Society.

Publications

[1] Florence Regol, Anja Kroon, Mark Coates, "Evaluation of Categorical Generative Models: A Statistical Testing Framework for Very Large Sample Spaces ", Uncertainty in Artificial Intelligence **(UAI)**. July 2023. Preprint (soon): Link.

[2] Florence Regol, Anja Kroon, Mark Coates, "Evaluation of Categorical Generative Models – Bridging the Gap Between Real and Synthetic Data", IEEE 2023 International Conference on Acoustics, Speech, and Signal Processing **(ICASSP)**. June 2023. Preprint: Link.

[3] Anja Kroon, "Comparing Conventional Pitch Detection Algorithms with a Neural Network Approach", Research project in ECSE 523 Speech Communications. Preprint: Link.

[4] Yousef Safari, Anja Kroon, and Boris Vaisband, "Power Delivery for Ultra-Large-Scale Applications on Si-IF", Published, IEEE Intl. Symposium of Circuits and Systems **(ISCAS)** May 2022. Link.

Awards

Councilor of the Year — Spring 2023
Awarded by McGill University Engineering Undergraduate Society

Diane Ferguson Involvement Award — Summer 2022
Awarded by McGill University Engineering Undergraduate Society

Vice President of the Year — Spring 2022
Awarded by McGill University Engineering Undergraduate Society

Summer Undergraduate Research Award in Engineering — Summer 2021
Awarded by McGill University

Principal Student Athlete Honour Roll, Varsity Alpine Ski Racing — Spring 2021
Awarded by McGill University

Tomlinson Engagement Award for Team Mentoring — Fall 2020
Awarded by McGill University

Research and Work Experience

McGill University Networks Research Lab — May 2022 - May 2023
Bachelor's Thesis Researcher

- Supervision from Professor Mark Coates and PhD candidate Florence Regol
- Work on a new correct and interpretable evaluation metric for categorical generative models over very large sample spaces ($|\Omega| \geq 10^9$) with statistical guarantees which outperforms baselines with applications in protein sequence modeling

- Conduct literature review on comparison metrics. Perform algorithm experimentation and verification with Python, Numpy and Matplotlib
- Summarize and analyze findings in presentations, reports, bachelor's thesis and two publications
- Final Thesis: Link.

McGill University RAISE Lab Jan 2023 - April 2023
Research Assistant

- Supervision from Professor Ajung Moon and PhD candidate Lixiao Zhu at the Responsible Autonomous and Intelligent Systems Ethics (RAISE) Lab researching the entertainment effect in human-robot interactions
- Write participant scripts for human experiments, conducted literature review and experimental setup

McGill University Integrated Sys. for Information Processing Lab Sept 2022 - Dec 2022
Research Assistant

- Supervision from Professor Warren Gross and PhD candidate Marwan Jalaleddine researching error correction codes and emerging techniques for use in 6G
- Conducted literature review and delivered a tutorial on the new NVIDIA Sionna software

DUST Identity May 2022 - Aug 2022
Electrical Engineering Intern

- DUST Identity develops diamond uncloneable security tags to secure supply chains
- Delivered 30+ electrical, mechanical, and materials engineering solutions with four other engineers
- Flagship development of new ARM-microcontroller-based handheld tag scanner which rapidly focus stacked images at 9x lower cost and 2x faster scanning capabilities
- Created custom PCBs with KiCAD, wrote documentation, designed electrical control systems, redesigned and redid existing electrical setups with new components, and linked devices to the API with Python and bash scripting

McGill University Visual Motor Research Lab Jan 2022 - Apr 2022
Research Assistant

- Supervision from Professor James Clark and PhD candidate Fay Askari researching interaction classification with key actor detection in multi person sports videos
- Expanded the training set and conducted validation for a recurrent neural-network (RNN) model identifying penalties and players involved via recorded hockey game tapes
- Contributions improved model performance based on classification accuracy parameters

McGill University Photonics Systems Group Sept 2021 - Dec 2021
Research Assistant

- Supervision from Professor David Plant and PhD candidate Weijia Li researching silicon photonic switches
- Simulated a Mach–Zehnder interferometer for On/Off switching applications examining TE and TM waveguides with differing free spectral range values using MATLAB

McGill University Heterogeneous Integration Knowledge Team May 2021 - Aug 2021
Research Assistant

- Supervision from Professor Boris Vaisband and PhD candidate Yousef Safari researching silicon interconnect fabric (Si-IF), alternative to conventional printed circuit boards (PCBs) and ASIC employing wafer scale heterogeneous integration
- Analyzed the feasibility of proposed power delivery networks for Si-IF, simulating via ANSYS and MATLAB
- Conducted literature review, experimental setup, experimentation, and report writing
- Created 3D artistic renderings unifying current solutions into a single framework
- Poster: Link.

Volunteering

President May 2022 - Apr 2023
The Electrical, Computer, Software Engineering Student Society of McGill University

- Advocate for and represent 1200 ECSE students on issues relating to student rights, student safety, and future undergraduate program plans
- United 5 ECSE related committees under the single parent organization of ECSESS. Managed and empowered the new team of 60+ volunteers with 3+ levels of management and 5 subcommittees to deliver ∼25 technical, professional, and personal development events per semester for the students and faculty of the ECSE community teaching event planning to individuals, teaching mentorship and leadership to others, and recognized system bottlenecks and addressing them timely
- Managed relations with the larger Engineering Undergraduate Society (EUS) and served on the EUS Council raising student concerns, voting on initiatives and drafting legislation
- Regularly mentored peers in ECSESS and the ECSE community on undergraduate research opportunities, student involvement opportunities, and their academic studies
- Served on the ECE Search Committee for two new ECSE professors reviewing over 200 applicants, conducting interviews, and gathering student feedback
- Additionally a member of the Dept. Committee on Student Recruitment, Dept. Safety Committee, and Dept. Teaching Laboratory Advisory Committee
- Updated and rewrote 20+ pieces of legislation regarding the internal workings of ECSESS
- Work with the ECE Dept. to ensure students and faculty have an environment conducive to teaching and learning by ensuring concerns are addressed with respect and in a timely manner

Vice President Academic May 2021 - Apr 2022
The Electrical, Computer, Software Engineering Student Society of McGill University

- Advocate for 1200 ECSE students regarding improvements the curriculum, course offerings, assessment policies and student rights
- Regularly approached students in the community to gather concerns and addressed them with available resources. Raised awareness in the community for student rights
- Addressed ∼ 5 student academic concerns every week relating to student rights involving negotiation and conflict resolution and escalating to ECE Dept. if needed
- Organized the creation of an open letter to professors involving the opinions of over 30 students after perceived inequitable final grading in a design course. Students given opportunity to resubmit and pass
- Advocated for the student perspective to 20+ McGill-wide professors in novel assessment and feedback strategies as part of the McGill Assessment and Feedback Group
- Additionally a member of the Dept. Curriculum Committee, Dept. Continuous Program Evaluation and Improvement Committee

Vice President Academic May 2020 - Apr 2021
Sustainability in Engineering at McGill University

- Worked closely with the McGill Office of Sustainability and the McGill's Trottier Institute of Sustainability in Engineering and Design to integrate sustainability into the curriculum and student culture
- Worked to receive accreditation approval for technical sustainability courses in the engineering curriculum
- Organized sustainability related events to work being done by companies and professors in the field

Secretary Jan 2020 - Dec 2021
Kappa Kappa Gamma Women's Fraternity of McGill University

- Recorded and distributed weekly meeting minutes tracking attendance and coordinating presentations from external collaborators
- Led a subcommittee of three to plan two chapter events
- Managed organization and delivery of annual photos

Vice President Events Sept 2019 - Aug 2020
Junior Council of the Engineering Undergraduate Society

- Coordinated a team of 20 students planning events for 3,000 first-year engineering students

- Organized ∼5 events per semester to enrich the first-year engineering experience
- Directed marketing campaigns, supervised budgeting, managed external clients, and managed event planning teams to deliver timely events fostering personal development

Languages and Skills

Fluent	English, German, Dutch
Basic	French, Spanish, Latin
Proficient	Python, NumPy, Bash scripting, PyTorch
Familiarity	MATLAB, WireShark, Simulink, KiCad, Solidworks, Spice, Java, C, Assembly

Miscellaneous (fun facts)

My hobbies include skiing very fast, hiking, mountain biking, baking, and reading.

I used to be a semi-professional ski racer attending two schools simultaneously from Grade 6 until Grade 12 while traveling across the world for training and races. I was also a substitute teacher when on campus and responsible for my peers' academics for long-term trips of up to 2 months.

I organized the first and second-ever prom at a school with an average graduating class size of 10, writing contracts, delivering budgets, and managing a team of 6 organizers.

I love politics and world news and have read the New York Times every day for the last 9 years.

I play piano and enjoy transcribing popular songs by ear.