

ANJA KROON

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EDUCATION

B.Eng. Honours Electrical Engineering, McGill University, Montreal, QC

Sept 2019 to May 2023

GPA 3.6

Varsity Alpine Ski Team, 2019-2021

Research interest areas include signal processing applied to biology, chemistry, and communications systems using ML frameworks.

Advised by Professors Boris Vaisband, James Clark, Douglas O'Shaugnessy, Warren Gross, and Mark Coates.

Coursework in machine learning, statistics, probability, algorithms, signal processing, and linear algebra including 6 graduate EE courses.

EXPERIENCE

McGill University Machine Learning and Signal Processing Lab

Bachelor's Thesis Researcher — May 2022 to Present

Research under the supervision of Prof. Mark Coates with PhD student Florence Regol. Objective to improve evaluation methods for categorical generative models, a type of unsupervised machine learning. Proposed algorithm uses a statistical testing framework for very large sample spaces utilizing both synthetic and real data from generative models. Conducted algorithmic experiments and generated results with Python, Numpy, and SciPy. Summarized and analyzed findings in a paper submitted to IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2023). Further work will focus on test improvements and continued algorithmic development.

McGill University Integrated Systems for Information Processing Lab

Research Assistant — Sept 2022 to Present

Research under the supervision of Professor Warren Gross and PhD student Marwan Jalaeddine. Literature review on error correcting codes (ECC). Deliver tutorials to the research group on the new NVIDIA Sionna software implementing forward ECC to specifically aid the development of 6G research.

DUST Identity, Boston, MA

Electrical Engineering Intern — May to Aug 2022

Developed the new version a handheld tag scanner with a mechanical engineering team. Created an ARM microcontroller-based system rapidly focus-stacking images for high-security tags. Development included engineering a custom PCB with KiCAD, control system, connection to the API with python and scripting, and documentation. Delivered a product with 9 times lower cost with 2x faster tag scanning capabilities.

McGill University Center for Intelligent Machines

Research Assistant — Jan to Apr 2022

Research under the supervision of Professor James Clark and PhD student Fay Askari. Using Python, 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

Research Assistant — Sept to Dec 2021

Research under the supervision of Professor David Plant and PhD student Weijia Li. Using MATLAB, simulated a Mach-Zehnder interferometer for On/Off switching applications examining TE and TM waveguides with differing free spectral range values.

McGill University Heterogeneous Integration Knowledge Team

Research Assistant — May to Aug 2021

Research under the supervision of Professor Boris Vaisband and PhD student Yousef Safari. Simulated power delivery networks with ANSYS and Simulink for an ASIC employing wafer scale heterogeneous integration. Compared results based on established figures of merit. Created 3D artistic renderings unifying current solutions into a single framework. Paper accepted to IEEE International Symposium for Circuits and Systems (ISCAS May 2022).

PUBLICATIONS

Florence Regol, Anja Kroon, Mark Coates, “Evaluation of Categorical Generative Models -- Bridging the Gap Between Real and Synthetic Data”,

Paper submitted to IEEE 2023 International Conference on Acoustics, Speech, and Signal Processing (ICASSP). June 2023. <https://arxiv.org/abs/2210.16405v1>

Anja Kroon, “Comparing Conventional Pitch Detection Algorithms with a Neural Network Approach”,

Research project in ECSE 523: Speech Communications with Prof. Douglas O’Shaughnessy. Presented to course attendees. <https://arxiv.org/abs/2206.14357>

Yousef Safari, Anja Kroon, and Boris Vaisband, “Power Delivery for Ultra-Large-Scale Applications on Si-IF”,

Paper published and poster presented at the IEEE International Symposium of Circuits and Systems (ISCAS) May 2022. <https://ieeexplore.ieee.org/document/9937455>

AWARDS

Diane Ferguson Involvement Award

Summer 2022. Awarded by McGill University.

Engineering Undergraduate Society Departmental Vice President of the Year

Spring 2022. Awarded by Engineering Undergraduate Society of McGill Uni.

Summer Undergraduate Research Award in Engineering

Summer 2021. Awarded by McGill University.

Principal's Student-Athlete Honour Roll

Spring 2021. Awarded by McGill University.

Tomlinson Engagement Award for Team Mentoring

Fall 2020. Awarded by McGill University.

VOLUNTEERING**President of the Electrical, Computer, Software Engineering (ECSE) Student Society of McGill University, May 2022 to Apr 2023**

Advocate and representative for 1200 ECSE students on issues relating to student rights, student safety, and future undergraduate program plans. Member of the Departmental (Dept.) Search Committee, Dept. Committee on Student Recruitment, Dept. Safety Committee, and Dept. Teaching Laboratory Advisory Committee. Attended Dept. Meetings and reported updates to the ECSE Dept. Chair. Managed a team of 60 members with 4 subcommittees to deliver approx. 25 technical, professional, and personal development events per semester for the students and faculty of the ECSE community.

Vice President Academic of the Electrical, Computer, Software Engineering (ECSE) Student Society of McGill University, May 2021 to Apr 2022

Advocate for 1200 ECSE students regarding improvements the curriculum, course offerings, assessment policies and student rights. Member of the Dept. Curriculum Committee, Dept. Continuous Program Evaluation and Improvement Committee, and McGill Assessment and Feedback Group. 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. Resulted in professors allowing resubmission and ultimately no course failures. Addressed ~5 student academic concerns every week relating to student rights via negotiation with course instructors. Raised awareness in the community for student rights.

Vice President Academic of the Sustainability in Engineering at McGill University, May 2020 to Apr 2021

Worked with the McGill Office of Sustainability to receive accreditation approval for technical sustainability courses in the engineering curriculum. Worked with McGill's Trottier Institute of Sustainability in Engineering and Design to raise awareness for engineering opportunities in sustainability.

Chapter Secretary of the Kappa Kappa Gamma Women's Fraternity at McGill University, Jan 2021 to Dec 2021

Recorded and distributed weekly meeting minutes. Tracked attendance. Managed the organization and delivery of the composite. Managed alumni and headquarter relations via email.

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

Coordinated a team of 20 students to plan events for up to 3,000 first year engineering students collaborating. Directed marketing campaigns, supervised budgeting, managed external clients and managed event planning teams to deliver timely events fostering personal development.

MENTORSHIP

EmPOWER Mentorship Program, Promoting Opportunities for Women in Engineering of McGill University, July 2020 to Present

ECSplore Mentorship Program, Electrical, Computer, Software Engineering Student Society of McGill University, July 2020 to Present

LANGUAGES

Fluent: English, German, Dutch

Basic: French, Spanish, Latin

SKILLS

Proficient in: Python, NumPy, Bash scripting

Familiar with: Tensorflow, WireShark, Simulink, KiCad, Solidworks, Spice, Java

HOBBIES

Skiing very fast, hiking, mountain biking, and paddle boarding

FUN & RANDOM TIDBITS

I used to be a semi-professional ski racer and attended two schools at the same time while traveling the world for ski races.

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 8 years.

I play piano and have learned to play "Firework" by Katy Perry and "Diamonds" by Rihanna entirely by ear.