

ANITA KRIZ

e-mail | website



Montreal, QC, Canada

OBJECTIVE

Seeking a PhD position focused on designing AI solutions to address clinical challenges in healthcare. I aim to contribute to the development of personalized medicine and see my research translated into practical solutions that improve patient outcomes and drive healthcare innovation.

EDUCATION

- **McGill University** [🌐] 2023 - 2025
Masters of Science – Electrical Engineering Montreal, QC, Canada
 - CGPA: 4.00/4.00
 - Supervisor: Professor Tal Arbel
- **McGill University** [🌐] 2018 - 2023
Bachelor of Bioengineering and Minor in Applied Artificial Intelligence Montreal, QC, Canada
 - CGPA: 3.95/4.00
 - Dean's Honour List

RESEARCH EXPERIENCE

- **Probabilistic Vision Group, McGill University** [🌐] September 2023 - Present
M.Sc. (Thesis) Student Montreal, QC, Canada
 - **Project:** Developing causally-aware generative models and examining their advantages over traditional conditional models with Professor Tal Arbel
 - Integrating structural causal models (SCMs) into generative models (incl. HVAEs, Diff-VAEs, and DDIM)
 - Investigating scenarios where causally-aware models are not just beneficial but essential for accurate generation.
- **Eli Health** [🌐] November 2022 - April 2023
Research Intern Montreal, QC, Canada
 - **Project:** Designing a non-invasive at-home hormonal monitoring device for daily tracking
 - Developed a fluorescent lateral flow assay (LFA) for detecting low levels of estradiol in saliva.
 - Verified a bottom-up competitive LFA using europium-chalate conjugate and optimized the limit of detection.
- **Stem Cell Bioprocessing Lab, McGill University** [🌐] May 2022 - December 2022
NSERC-USRA Research Intern Montreal, QC, Canada
 - **Project:** Developing a microcarrier for the specific capture and proliferation of endothelial colony forming cells (ECFCs) in order to improve prostheses and stents used in vascular surgeries with Professor Corinne Hoesli
 - Developed protocols for bi-functionalizing polystyrene beads for the capture and proliferation of endothelial colony-forming cells (ECFCs).
 - Utilized flow cytometry, fluorescence microscopy, and ELISAs to assess surface modification success.
- **Early Drug Discovery Unit (EDDU), The Neuro, McGill University** [🌐] August 2021 - April 2022
Research Intern Montreal, QC, Canada
 - **Project:** Comparing the phenotypes of Parkinson's disease patient derived cell lines and isogenic cell lines at different maturation points with Professor Thomas Durcan
 - Implemented tissue clearing and antibody tagging to fluorescently label cells in induced pluripotent stem cell (iPSC) mini-brains.
- **Bioengineering and Advanced Materials (BEAM) Lab** [🌐] June 2019 - August 2019
Research Intern Prague, Czech Republic
 - **Project:** Functionalization and aggregation of silica nanoparticles for enzyme immobilization with Professor Miroslav Šoós
 - Synthesized 400 nanometer silica nanoparticles and performed extensive data analysis.

ENTREPRENEURIAL EXPERIENCE

- **elleFA** [🌐] September 2022 - Present
CTO and Founder Montreal, QC, Canada
 - Developed a proof-of-concept lateral flow assay (LFA) for detecting inflammatory markers in urine for endometriosis diagnosis.
 - Recognized as the McGill ENGINE award winner in the 2023 Dobson Cup Finals
 - Secured \$17,500 in pre-seed funding through awards in the Dobson Cup and X1 Accelerator at McGill University.

TEACHING EXPERIENCE

Engineering Economy (FACC 300) McGill University

Student Mentor and TEAM recipient

- Mentored students throughout the Summer and Fall semesters
- Answered student questions before and after lectures
- Awarded the Tomlinson Engagement Award for Mentoring (TEAM) as part of my efforts

May - December 2022
Montreal, QC, Canada

Ordinary Differential Equations for Engineers (MATH 263) - McGill University

Teaching Assistant and TEACH recipient

- Organized and lectured 1-hour tutorials to a class of 150 undergraduates on ordinary differential equations (ODEs) after achieving a top-score in the previous semester.
- Awarded the Tomlinson Engagement Award for Teaching (TEACH) as part of my efforts





May 2020
Montreal, QC, Canada

PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PATENT, S=IN SUBMISSION, T=THESIS

- [C.1] Hugo Level, **Anita Kriz**, Marc-Antoine Campeau, Corinne Hoesli. (2022). **Design and in vitro validation of smart microcarriers for next generation cell culture**. In *Cell Culture Engineering XVIII*, Laura A. Palomares, Instituto de Biotecnología, UNAM, Mexico; Chetan Goudar, Amgen, USA; Tongtong Wang, Genentech, USA Eds, ECI Symposium Series, (2022).
- [J.1] Dan Trunov, František Muzika, **Anita Kriz**, Jiří Štětina, Ivona Sedlářová, Marcela Dendisová, Fatima Hassouna, Miroslav Šoóš, (2022). **Ambient-temperature porogen-free method for preparation of silica-based macroporous materials**. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, Vol. 634, DOI: 10.1016/j.colsurfa.2021.128033.
- [J.2] Marc-Antoine Campeau, Hugo Level, **Anita Kriz**, Corinne Hoesli. (2023). **Hematopoietic Stem/Progenitor Cells and Engineering: DESIGN AND IN VITRO VALIDATION OF MICROCARRIERS FOR THE ISOLATION AND EXPANSION OF ENDOTHELIAL COLONY-FORMING CELLS**. *Cytotherapy*, Vol. 25, Issue 6, pp. S125-S126. DOI: 10.1016/S1465-3249(23)00367-5

HONORS AND AWARDS

- **Excellence Scholarship - Women in AI** 2024 - 2025
Mila - Quebec AI Institute 
 - Awarded to support and encourage women pursuing advanced studies in AI, addressing the underrepresentation of women in the field
 - Valued at \$5000 per year.
- **FRQNT Masters Scholarship** 2023 - 2025
Fonds de recherche Nature et Technologies Quebec 
 - Support research excellence by providing financial assistance to the best students as they undertake or pursue a master's research program
 - Placed 3rd in category
 - Valued at \$20,000 a year
- **Undergraduate Student Research Award (USRA)** 2021, 2022
Natural Sciences and Engineering Research Council of Canada 
 - USRA are meant to nurture interest and fully develop potential for a research career in the natural sciences and engineering. Awarded based on academic excellence and research potential
 - Valued at \$6,000
- **Academic Supplement to NSERC-USRA** 2021, 2022
Fonds de recherche Nature et Technologies Quebec 
 - This program aims to generate interest in research in the natural sciences and engineering, encourage students to undertake graduate studies, and pursue a research career in these fields.
 - Valued at \$1,500

PROJECTS

• **High Fidelity Counterfactuals Paper Reproduction and Analysis**

Spring 2024

Causal Inference and ML Course Project and Presentation

- Analyzed Ribeiro et al.'s methodology for generating high-fidelity counterfactual images using Structural Causal Models, evaluating their model's performance on MNIST and a Chest X-ray dataset.
- Explored the model's four-part approach: mechanism learning between attributes, anti-causal image attribute prediction, training a hierarchical VAE, and refining counterfactual images via an additional mutual information approach.
- Produced a detailed report and presentation discussing model limitations and potential extensions for advancing image-based causal inference.

• **Towards a Conditional Generative Model for Trajectory Modeling in Medical Imaging**

Fall 2023

Machine Learning in Network Biology Course Project

- Employed a 2D StyleGAN for generating brain images, exploring the impact of the mapping network on latent space disentanglement.
- Assessed perceptual path length (PPL) and linear separability metrics to determine attribute disentanglement, finding comparable results between the StyleGAN and traditional GANs without the mapping network.
- Analyzed the trade-offs between disentanglement and image quality, highlighting the need for optimizing the generator architecture for effective conditional generation in medical imaging.

• **Rethinking Belief Propagation: Can Graph Neural Networks Take the Lead?**

Fall 2023

Probabilistic Graphical Models Course Project



- Investigated Graph Neural Networks (GNNs) as a scalable alternative to Belief Propagation for approximate inference in probabilistic graphical models.
- Analyzed accuracy and computational trade-offs on both tree and non-tree graphs, highlighting the strengths of GNNs for complex dependencies.
- Extended existing research by comparing GG-NN architectures with GRU, LSTM, and attention mechanisms to balance local and long-term node interactions.

RELEVANT COURSES

- **IFT 6135: Representation Learning** Aaron Courville, University of Montreal
- **IFT 6168: Causal Inference and ML** Dhanya Sridhar, University of Montreal
- **IFT 6269: Probabilistic Graphical Models** Simon Lacoste-Julien, University of Montreal
- **COMP 611: Mathematical Tools for Computer Science** David Rolnick, McGill University
- **ECSE 552: Deep Learning** Amin Emad, McGill University
- **ECSE 556: Machine Learning in Network Biology** Amin Emad, McGill University

ADDITIONAL INFORMATION

Languages: English (Native), Czech (Fluent)

Research Interests: Generative AI, Medical Imaging, AI in Healthcare, AI in Biology