

# Finn Vamosi

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## EDUCATION

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**Bachelor of Science in Computer Science** (*GPA: 3.90*)

University of Calgary; Canada

2021 – 2025

University of Texas at Austin; USA

Fall 2024

## PUBLICATIONS

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**Vamosi, F. G.**, & Forkert, N. D. (2025). CRAwDAD: Causal Reasoning Augmentation with Dual-Agent Debate. In *International Conference on Autonomous Agents and Multiagent Systems*. (**Under review**)

Stanley, E. A. M., Vigneshwaran, V., Ohara, E. Y., **Vamosi, F. G.**, Forkert, N. D., & Wilms, M. (2025). Synthetic Ground Truth Counterfactuals for Comprehensive Evaluation of Causal Generative Models in Medical Imaging. In *International Conference on Medical Image Computing and Computer-Assisted Intervention* (pp. 541–550). Springer Nature Switzerland Cham.

Ohara, E. Y., Vigneshwaran, V., Souza, R., **Vamosi, F. G.**, Wilms, M., & Forkert, N. D. (2025). Dimensionality reduction in 3D causal deep learning for neuroimage generation: an evaluation study. *Journal of Medical Imaging*, 12(2), 024506–024506.

Ohara, E. Y., **Vamosi, F.**, Patil, H., Vigneshwaran, V., Wilms, M., & Forkert, N. D. (2024). MACAW 3D: a masked causal normalizing flow method for counterfactual 3D brain image generation. In *Medical Imaging 2024: Imaging Informatics for Healthcare, Research, and Applications* (Vol. 12931, pp. 110–115). SPIE.

## SCHOLARSHIPS & AWARDS

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Data Processing Management Association Prize (\$400)

2025

**Killam Fellowship (USD\$6,750)**

**2024**

Jason Lang Scholarship (\$1,000)

2023 and 2024

Louise McKinney Scholarship (\$2,500)	2022
<b>Schulich Leader Scholarship (\$80,000)</b>	<b>2021</b>
President's Admission Scholarship (\$5,000)	2021
Alexander Rutherford Scholarship (\$2,500)	2021
Arts and Science Honours Academy Entrance Scholarship (\$1,000)	2021
Alberta Innovates Summer Research Studentship (\$7,500)	2023
NSERC Undergraduate Student Research Award (\$7,500)	2022, 2024, and 2025
Dean's List	4x Recipient, 2021-25

## RESEARCH EXPERIENCE

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### **Thesis Research, Dr. Tyler Bonnell** 2024 – 2025

University of Calgary, Faculty of Science

*Project title: One-Life Reinforcement Learning in Naturalistic Environments*

- Learned reinforcement learning theory from online courses and textbooks
- Compiled thorough literature review of associative learning as it relates to RL
- Implemented Gymnasium environment with environmental shaping and dynamism, making for a more naturalistic learning setup
- Adapted a novel associative learning formulation for continual learning
- Conducted several experiments of both standard and continual RL
- Wrote full research report and presentation, earning an A in the thesis course

### **Research Assistant, Dr. Nils Forkert** 2023 – 2025

University of Calgary, School of Medicine

*Project title: CRAWDAD: Causal Reasoning Augmentation with Dual-Agent Debate*

- Compiled thorough literature review of causality understanding in LLMs and multi-agent debate effectiveness across domains
- Set up DeepSeek-R1 and Qwen3 reasoning models using Ollama
- Constructed framework for both models to debate the answer to causal inference questions from the CLadder dataset
- Observed substantial increases in final answer accuracy after engaging in debate

*Project title: Evaluating Causal Counterfactual Generation in Medical Imaging*

- Developed an experimental pipeline to assess causal machine learning models, such as the recently proposed MACAW
- Utilized the novel SimBA synthetic dataset generation tool to systematically and empirically evaluate MACAW's attempts at bias removal

- Employed PCA dimensionality reduction and trained the model in several components to reduce memory usage and accelerate model convergence
- Conducted quantitative analysis through MSE comparisons between image sets
- Trained a specialized CNN to assess counterfactual image quality and determine if MACAW had successfully removed the target bias
- Explored visual debugging techniques for identifying failure modes in causal medical image generation models

*Project title: Deep Learning Age Prediction of Causally-Generated Brain Scans*

- Filtered datasets to remove subjects with conditions affecting brain physiology to normalize training data
- Trained a machine learning model to accurately predict the ages of individuals based on their 2D or 3D brain MRI scans
- Accelerated training by configuring code to run on a remote computing cluster
- Presented the basics of Stable Diffusion to colleagues to introduce them to the new deep learning technique

**Research Assistant, Dr. Christian Jacob**

2019 – 2022

University of Calgary, Faculty of Science

*Project title: Immersive Cell Biology Education in Virtual Reality*

- Developed an immersive virtual reality (VR) experience in Unreal Engine 4 for teaching cell biology in a memorable and approachable way
- Designed, edited, and animated unique 3D models in Blender for my project and those of other undergraduate students
- Developed an engaging VR game in which the player assumes the role of a Cytotoxic T cell in the bloodstream
- Implemented best practices of VR game development to reduce discomfort while playing and improve immersion

## **VOLUNTEER EXPERIENCE**

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**Food Bank Volunteer**

2022 – 2024

University of Calgary, Students' Union

- Interviewed clients about their personal details and food preferences
- Packed hampers according to the specific preferences of clients, and authenticated clients upon arrival
- Mentored new volunteers to accelerate the onboarding process

**Communications Team Member**

2021 – 2022

CalgaryToSpace (*Student team working to launch a satellite into space*)

- Developed the software framework for transmitting information back and forth between the satellite and our ground station
- Constructed web dashboard for displaying satellite telemetry in near real-time
- Applied for international clearance to operate within specific radio frequencies

**Robotics Team Lead**

2020 – 2021

William Aberhart High School

- Redesigned the team's outdated website with a focus on ease of use and accessibility
- Implemented control software to ensure robot executed automated tasks correctly, and responded accurately to human control
- Delegated tasks according to skill sets and interests, and coordinated meetings to keep development on track

**Volunteer Instructor**

2020

Under The GUI Academy (*Tutoring organization dedicated to Computer Science education*)

- Taught young children basic programming concepts

**SKILLS**

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**Languages:** English (Native), French (Fluent)**Programming:** Python, PyTorch, Java, R, HTML, CSS, JavaScript, Assembly, Haskell**Software:** Unreal Engine 4, Unity, Blender, LaTeX, Mathematica, Unix, Cluster Computing, Excel, Tableau**RESEARCH INTERESTS**

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AI alignment, safety, interpretability, explainability, fairness, and robustness

**MEMBERSHIPS**

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Artificial Intelligence Club

2023 – present

Data Science and Machine Learning Club

2022 – present

Computer Science Undergraduate Society

2021 – present