AVIRAJ NEWATIA

projectavi.work@gmail.com | projectavi.net

EDUCATION

PhD in Computer Science University of Cambridge - Cambridge, UK *Present*

- Dynamics-Preserving Adaptation of Simulators, Solvers, Learned Policies - supervised by Professor Rika Antonova.

B.Sc. (Hons) University of Toronto - Toronto, ON, Canada *Graduated:* June 2025

- **Computer Science Specialist** (Focus in Artificial Intelligence and Computer Systems) and **Mathematics Major**.

RESEARCH AND PROFESSIONAL EXPERIENCE

Computer Systems Researcher - *Python, PyTorch, PennyLane* September 2024 – April 2026
Middleware Systems Research Group, Dept. of ECE, University of Toronto *Toronto, ON, Canada*

- Exploring evolutionary algorithms for architecture search of application-specific quantum machine learning circuits.
- Studying the impact of quantum error mitigation strategies on quantum machine learning models.

Machine Learning Researcher - *Python, PyTorch, CUDA, SLURM* January 2024 – April 2026
Dr Rahul G. Krishnan, Dept. of Computer Science, University of Toronto and Vector Institute *Toronto, ON, Canada*

- Developed an algorithm to remove data from machine learning models without access to data being forgotten.
- Extended unlearning algorithms to adapt models to arbitrary transformations in training data (eg. correcting labels).

Machine Learning Researcher - *Python, Pytorch, C++* September 2022 – April 2024
Director David Rokeby, BMO Lab, CDTPS, University of Toronto *Toronto, ON, Canada*

- Fine-tuned a custom QLoRA fine-tuned Llama-2 on play scripts and implemented an interface for mid-inference model checkpoint switching and context editing.
- Upgraded a VQGAN and CLIP generative model, enabling it to generate and manipulate prompted artwork on a selected area of a canvas in real-time, at 60 frames per second with voice control through OpenAI Whisper.

SELECTED PUBLICATIONS

A. Newatia,..., R. Antonova - "Exploiting the Structural Affinity of Cage-Based Deformation for Computational Shape Design" *(Und*
G. Jones & A. Newatia,.... - "Prob. Design of Parametrized Quantum Circuits through Local Gate Modifications " *(Arxiv 2026)*
A. Newatia, M. Cooper, ..., RG. Krishnan. - "Mitigating Privacy Risk via Forget Set-Free Unlearning" *(ICLR 2026)*
V. Balazadeh, ..., **A. Newatia**, ..., RG. Krishnan. - "Red Teaming Large Language Models for Healthcare" *(Arxiv 2025)*
A. Newatia, M. Cooper, RG. Krishnan. - "Unlearning Tabular Data without a 'Forget Set'" (*TRL @ NeurIPS 2024*)

GRANTS

Vector Institute Research Grant

· Awarded this research grant for my work into Machine Unlearning supervised by Professor Rahul Krishnan.

University of Toronto Excellence Award (Did Not Accept) - Funded by the NSERC Grant under Dr Artem Babaian

· Granted for my research into using embedding models for novel RNA Virus discovery at the RNA Lab.

TECHNICAL SKILLS

Languages & Frameworks: C, C++, Python, Rust, C#, Java, Haskell, MIPS Assembly, MATLAB, Tensorflow, PyTorch
Developer Tools: Git, Github, Google Cloud Platform, VS Code, Jetbrains Suite, SLURM

SELECTED RESEARCH PROJECTS

Parameterized Activation Functions in Deep Learning for Physics (Python)

· Investigated the impact of using different parameterized activation functions in modeling PDEs.

Self-Supervised Test-Time Adaptation of Pretrained Vision Transformers (Python)

· Explored self-supervised fine-tuning methods to mitigate distribution shift in pretrained Vision Transformers.

Interesting State Learning (Python, Rust) - Built on a custom NES emulator in Rust running Super Mario Bros.

· Developed a framework for Reinforcement Learning to learn a distribution over potential start states for trajectories.

SELECTED TECHNICAL PROJECTS

Mini-C Compiler (C++)

· A compiler for a subset of the C language using ANTLR4 and targeting LLVM IR with custom optimizations.

Turing Machine Simulator (C++)

· A generalized simulator for a single-tape, configurable, Turing Machine.