Jake Feldman Starosta

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Education

BEng in Applied Mathematics and Computer Engineering – *Queen's University* Sept 2023 – Apr 2027

3.95/4.3 GPA

Research Experience

Undergraduate Thesis – *Queen's University* Sept 2026 – Present

- Modeling antibiotic resistance as a stochastic control problem, supervised by Serdar Yüksel.
- Generalizing existing models by treating bacterial populations as evolving distributions over genotypes under sequential drug treatment.

Undergraduate Research Assistant – *Queen's University* May 2026 – Sept 2026

- Researched stochastic control theory and its application to transformers under Serdar Yüksel.
- Helped extend the group's prior theoretical framework to next-token prediction and trained a model from scratch to test it experimentally.

Machine Learning Research Project Lead – *QMIND, Queen's AI Hub* May 2024 – Apr 2025

- Led a team of students to research machine learning applications in symbolic music genre transfer.
- Developed a novel adversarial VAE for genre transfer that leverages instrument-specific features.

Publications and Presentations

K. Akman, **J. Feldman Starosta**, N. Saldi, S. Yüksel. "When can Optimally Trained Transformers Achieve Near-Lossless Token Prediction for non-Markovian Data?" arXiv preprint arXiv:2610.41038, 2026.

J. Feldman Starosta, S. Fong, B. Arseneau, C. Wang, B. Roytblat, M. Kelly, A. Glasford. "Symbolic Music Genre Transfer." In *Proceedings of the Canadian Undergraduate Conference on Artificial Intelligence (CUCAI)*, pp. 207–211, 2025. [PDF]

J. Feldman Starosta. "Control-Theoretic Approach to Token Prediction via Transformers." Summer Undergraduate Research Projects Colloquium, Department of Mathematics and Statistics, Queen's University, Kingston, ON, September 2026.

K. Akman, **J. Feldman Starosta**. "How Well can an Optimally Trained Transformer Predict the Next Token for Non-Markovian Sources?" Stochastic Control (and Related Fields) Seminar, Queen's University, Kingston, ON, September 2026.

Leadership and Extracurriculars

Founder and Executive Producer – *Under the Hood: Engineering Out Loud* Sept 2026 – Present

- Conceived and pitched Queen's Smith Engineering's first podcast directly to the Dean, securing his participation as co-host and the Faculty's official backing.
- Interviewing faculty members on their research and translating technical work for a general audience.

Co-Chair – *Canadian Undergraduate Conference on AI* May 2025 – Apr 2026

- Hosted the largest ever national undergraduate AI conference: over 400 attendees, with partners including NVIDIA, Shopify, KPMG, Botpress, CIFAR, and Anthropic.
- Led a team of 12 volunteers across 4 universities, managing a $60k operating budget.
- Delivered a speech on AI safety to delegates and sponsors.

Director of Design – *QMIND, Queen's AI Hub* May 2025 – Apr 2026

- Directly supervised 3 of 20 AI research projects as part of Canada's largest undergraduate organization on AI, consisting of over 200 students.
- Trained project managers through machine learning workshops and provided technical guidance to teams.

Professional Experience

Computer Engineering Intern – *Corecurrent Solutions* May 2025 – Aug 2025

- Reverse-engineered PCBs via wire tracing, chip identification, and patent analysis to detect IP infringement.
- Produced litigation-quality technical reports.
- Pitched and implemented a tool that reduced IC identification time by 60% using vectorized search and a classification model achieving 94% manufacturer prediction accuracy.

Full-Stack Developer – *EduTutor* Jan 2025 – Apr 2025

- Helped design an LLM-powered platform that builds personalized tutor curricula from course material.
- Shipped a quiz editor that lets students customize auto-generated practice questions.

Nursing Assistant and Medical Secretary – *Kanata North Medical Centre* Jan 2023 – Aug 2023

- Operated diagnostic equipment and conducted intake assessments to build patient histories and support physician diagnosis.
- Handled patient inquiries, scheduling and records, developing working knowledge of common clinical conditions and procedures.

Teaching Experience

Help Desk Assistant – *iCons, Queen's Smith Engineering* Sept 2025 – Apr 2026

- Ran the engineering building's walk-in help desk, providing one-on-one support for first- and second-year students in math, programming, and engineering courses.

Workshop Tutor – *EngLinks, Queen's Smith Engineering* Sept 2024 – Apr 2025

- Delivered calculus lectures and exam-preparation workshops to over 250 first-year engineering students.
- Ran high-volume drop-in sessions before tests, answering students' last-minute questions one-on-one.

Awards and Honours

- NSERC Undergraduate Student Research Award 2026 ($6,000).
- Dean's Scholar, Queen's University 2024, 2025, 2026.
- Annie Bentley Lillie Book Prize in First-Year Calculus, Queen's University 2024.
- 1st Place, Consulting Project Award, Camp QMIND 2026 (across 20 teams).
- 1st Place, ElevenLabs Award Track, QHacks 2026 (across 60+ teams).
- 1st Place, Senior Design Launch, Queen's Engineering Competition 2025 (across 10+ teams).

Technical Skills

Languages: Python, C/C++, Java, MATLAB, JavaScript, HTML/CSS, SQL

Tools: PyTorch, NumPy, Simulink, LaTeX, Git