

Areg Kostanyan

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Work Experience

Engineering Intern, Aston Dynamics – Toronto, ON

May 2026 – Present

- Established an optimized Bluetooth Low Energy protocol layer targeting firmware and mobile devices that models schemas, services, characteristics, permissions, and deterministic Universally Unique Identifier hashes, resulting in standardized communication across all products and increasing throughput 9.5 times.
- Engineered a log-to-flash system with ring buffer partitioning, consistent overhead byte stuffing for framing, and automatic boot recovery/analysis, focused on creating persistent logging for offline devices. Refined log times to under an average of 150 microseconds per log.

Engineering Intern, Gastronomous Technologies – Oakville, ON

Mar 2022 – April 2026

- Wrote embedded software for a bidirectional serialization/deserialization layer for real-time communication of over 1Mbps of data at over 30Hz through WebSockets between constrained hardware and a user interface.
- Developed live cloud-based machine monitoring infrastructure with Amazon Web Services with log and metric aggregation, event alert pipelines, and video streaming, resulting in a 75% improvement in incident counting.
- Built an internal tool for quickly processing, cleaning, and modifying small computer-generated bill-of-materials lists of over ten thousand entries with Python and Pandas, eliminating around three hours of manual spreadsheet entry labor per week.

Personal Projects

Zenith: a processor and tile-based tensor accelerator

github.com/kostareg/zenith

- Designed a central processing unit and tensor accelerator architecture. Implemented an emulator, assembler, C-like compiler, kernel, runtime, and a custom PCB with a Kintex-7 FPGA. Created MMIO for a VGA controller, two PS/2 ports, and an SD card as persistent storage.
- Simulated and tested digital logic on the AMD Vivado platform, with throughput in simulation averaging around 25ns per instruction.

Tachyon: a just-in-time compiler for high computational loads

github.com/kostareg/tachyon

- Created a programming language in C++ with a just-in-time virtual machine, specialized to detect hot bytecode paths and compile performance enhanced versions to machine code.
- Implemented basic neural network data classification algorithms with Tachyon, performing up to 13x faster than equivalent pure Python versions.
- Identified and optimized the lexer with Linux Perf and Google Bench by removing unnecessary locales, using an external library for parsing numbers, and generating keyword hash tables, resulting in a 6.19x performance improvement.

Other Experiences

- University of Toronto Formula Racing (Sept 2024 - Present): implements and tunes driving control systems such as Pure Pursuit, trains deep learning perception algorithms such as YOLOv8 for a driverless car.
- STEM Minds (July 2023 - April 2026): authored seven curricula for teaching computer science subjects such as Natural Language Processing, Machine Learning, and Programming Fundamentals to high school students.
- MaxTech First Robotics Team (Sept 2020 - June 2024): led the programming team for three years, migrated the team to Java, raised \$4000 of funding for a swerve drivetrain, applied an omnidirectional autonomous path following algorithm for the self-driving mode.

Education

University of Toronto, Bachelor of Applied Science

Sept 2024 – May 2028

- **Program:** Electrical and Computer Engineering + Professional Experience Year Co-op
- **Specializations:** Control, Communications and Signal Processing / Photonics and Semiconductor Physics

Skills

Programming Languages: C++, Rust, TypeScript, Python, SystemVerilog

Tools: Perf, Pandas, Numpy, MySQL, Prisma, Amazon Web Services, Vivado, KiCad