Ryan Tomich

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Education

Massachusetts Institute of Technology **Sep 2023 - May 2027**
Bachelor of Science in Computer Science and Engineering; GPA: 4.8/5.0 *Cambridge MA*
Relevant Courses: Software Construction, Computation Structures, Introduction to Algorithms, Intro to Machine Learning, Linear Algebra, ML with Light **Relevant Activities**: MIT Motorsports, MIT Undergraduate Practice Opportunities Program(UPOP), Gordon-MIT Engineering Leadership Program (GEL).

Skills

Programming Languages: Python, typescript, C/C++, RISC-V Assembly, Minispec HDL **ML & AI:** PyTorch, Hugging Face, ONNX, TVM, LLM optimization **Compilers:** LLVM/Clang, Relay IR, static analysis, multi-target codegen **Systems & Hardware:** TVM, ONNX Runtime, hardware–software co-design **Tools:** Git, VSCode, LaTeX, Matplotlib, Conda

Professional Experience

MIT-IBM Watson AI Lab **Jun 2025 - Present**
AI Research Intern *Cambridge MA*
- Advancing Code LLMs for runtime optimization through AI-driven analysis, multi-agent collaboration, and automated profiling.

MIT EECS **Feb 2025 - May 2025**
Fundamentals of Programming Lab Assistant *Cambridge MA*
- Held 24 office hour shifts totaling 72 hours, assisting 297 students in mastering introductory programming concepts. Assisted in debugging/grading lab assignments.

MIT Research Laboratory of Electronics: Quantum Photonics & AI Group **Feb 2024 - Feb 2025**
Undergraduate Researcher *Cambridge MA*
- Developed RyanTomich/LightCode : a compiler optimization framework and hardware-aware simulator for hybrid photonic–electronic LLM inference.
- Designed the Stacked Graph IR, a novel multi-target intermediate representation enabling hardware-specific operation selection and scheduling across heterogeneous devices.
- Built a modular arithmetic hardware simulator and compiler backend to model latency, energy, and data transfer costs for GPUs and photonic hardware.
- Formulated hardware mapping as a constrained subgraph selection problem, applying graph partitioning and heuristic traversal strategies to optimize inference efficiency.
- Evaluated LightCode on GPT-2 and LLaMA-7B, demonstrating energy savings through selective photonic offloading and validating models against published baselines.
- Created RyanTomich/np_GPT2 : a replica GPT2 and transformer architecture from the ground up using NumPy.

Town Pump **Jun 2023 - Aug 2023**
Information Technology Technician Intern *Butte MT*
- Facilitated a state-wide transition to Windows 11 and integrated phone systems by configuring, installing, and scheduling the installation of 73 computers and 100 phones and for 23 stores.

Butte School District **Aug 2021 - Aug 2022**
Information Technology Intern *Butte MT*
- Configured Wi-Fi access points and the Virtual Desktop Infrastructure (VDI) of over 1500 devices for a school district of 4000 students and staff.

Leadership and Project Experience

MIT Motorsports **May 2023 - present**
Controls Software Engineer *Cambridge, MA*
- Built a design query and CAD drawing database for the DeCoDe LLM benchmark; co-authored DesignQA, published in ASME JCISE and presented at IDETC CIE 2024.
- Integrated control algorithms into IPGCar digital twin, enabling pre-assembly testing, validation, and driver training.
- Developed torque vectoring and traction control algorithms for a 4WD electric race car.
- Designed launch control strategies by modeling tire slip dynamics to enhance acceleration and cornering performance.
- Created efficiency maps from torque–speed data for power-limiting compliance; placed 1st in Design at Formula Hybrid 2024 with a perfect controls score.

Speech and Debate **Jun 2023 - Aug 2023**
Captain; Policy Debater *Butte, MT*
- Coached/mentored 12 debaters by conducting mock debates and guiding research and literature reviews.
- Over 50 hours of competition speaking experience, Cut over 1200 pieces of evidence, Wrote 15 technical cases, contributed to 23 briefs.