Sebastian Czyrny

Sebastian Czyrny | eResume (sebastian-czyrny.github.io)
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Skills

Programming	C, C++, C#, Java, Python, Javascript, Typescript, Matlab
Web & Database	HTML & CSS, Bootstrap, SQL, MS SQL Management Studio, MongoDB, Amazon Web Services, Microsoft Azure, Google Cloud
Frameworks	ASP.NET MVC Core (IIS), RESTful Interfaces, Entity Framework, Identity Framework, Git, AngularJS, React, ExpressJS, PyTorch, SciKit learn, Numpy, Springboot, Langchain, Streamlit, LlamaIndex, Intel VTune
Environments	Microsoft Visual Studio, Visual Studio Code, Netbeans, Eclipse, Windows, Linux
Hardware & Digital Systems	Verilog, Intel Quartus Prime for FPGA Development, ModelSim, De1-SoC FPGA board, Keil uVision5, STM32 Nucleo-F446ZE Microcontroller, STM32 Cube IDE

Education & Interests

University of Toronto

Bachelor of Applied Science: Computer Engineering — **CGPA: 3.96**

Master of Applied Science: Electrical and Computer Engineering — *Expected Completion: Sept. 2026*

Interests

Reconfigurable systems, CAD for reconfigurable systems, FPGAs, CGRAs, front- & back-end web development, collaborative software/hardware projects, large-scale software systems, digital and embedded systems

Research

CGRA-ME, *University of Toronto* — Fall 2024 - Present

Graduate Research Assistant

- **Research Focus:** Modeling and Exploration of coarse-grained reconfigurable array (CGRA) architectures and algorithms for mapping applications onto them

"RAAP-CGRA: Placement for CGRAs with Restricted Routing Architectures", *Co-author*

- **Modeled** three increasingly restrictive CGRA architectures within CGRA-ME's C++ framework
- **Demonstrated** that CGRA mapping algorithms that are made aware of the routability of the architecture can significantly improve application mappability for restricted routing architectures over algorithms that are indifferent to it.
- *Accepted to the CGRA4HPC'25 workshop*

"Scalable CGRA Mapping via Parallelization and Memoization", *Author*

- **Developed** an enhanced CGRA mapper that significantly improves runtime performance without degrading mapping quality.
- **Explored** various parallel programming strategies—both coarse and fine-grained—and demonstrated that a memoization-based approach yielded the most substantial runtime gains. Results showed further speedup with increased CGRA size through deterministic fine-grained parallelization.
- **Employed** Intel VTune to profile performance and identify computational hotspots for targeted optimization.
- **Achieved** a runtime reduction proportional to the size of the dataflow graph (DFG), maintaining full functionality across diverse CGRA architectures.
- *Under review for ASP-DAC'26*

Work Experience

University of Toronto, Digital Systems, Computer Organization – *Teaching Assistant* — *Sep 2024 – Apr 2025*

- **Facilitated** lab sessions for second-year computer engineering courses on Digital Systems and Computer Organization, providing hands-on guidance and support to students.
- Graded assignments, midterms, and lab reports, ensuring **timely** and **constructive** feedback to enhance student learning.
- **Collaborated** with other teaching assistants and faculty members in regular meetings to discuss student progress and course improvements.

Sunnybrook Health Sciences Center, MyChart™ Program – *Student Web Application Developer* — *2022-2025*

- **Learned** about computer programming (writing software applications in a multitude of programming languages), computer security (how to make websites secure), computer networks (making HTTP requests and handling HTTP responses), and software architecture (designing scalable and responsive software applications).
- **Developed** and managed the front-end of a health care information services provider using Javascript, HTML & CSS, and AngularJS, as well as a back-end using the Java Springboot framework, ColdFusion Web Development Suite, and connected with a Microsoft SQL Server
- **Collaborated** alongside a small team of senior software engineers and business anaylsts to design and integrate web pages into the MyChart application
- **Improved** usability through intuitive table filters and pagination, PDF viewing, and data load indicators
- **Communicated** progress on software development through daily meetings and Scrums

Design Teams

Blue Sky Solar Racing Team – *Array and Electromechanical Sub-Teams* — *Oct 2021- July 2022*

***Array*: Light curve tracing, Electroluminescent image rating algorithm** (Python). Designed a Python script to analyze and compare the brightness of solar cells. Images of solar cell electroluminescence were analyzed using the Python Image Library and run & tested in Visual Studio Code. The analysis allowed optimize placement of solar cells on a solar car such that the car receives a maximum power input.

Collaborative Experience

Team Leader, *LLM Agent For Shareholder Report Generation,* Capstone Project U of T — *Sep 2023 – Apr 2024*

"A Large Language Model Agent for quick & efficient analysis of shareholder reports"

Source Code Demo Video

- **Collaborated** with a team of 4 to produce an application that utilizes LLMs (both OSS and API Inference) to chat with shareholder reports.
- **Concluded** that no prompting strategy dominates over any other and each has its own use case. The Re-Ranker retrieval strategy performs almost identically to OpenAI's ADA Embeddings Model©
- Underwent rigorous **Testing** of the LLM Agent accuracy through the comparison of human-generated responses with those of the LLM Agent under different prompting and retrieval strategies.
- **Innovated** current state-of-the-art prompting strategies with our very own Multi-Stage Prompting.
- **Researched** the Natural Language Processing pipeline and incorporated workflow into application.
- **Prepared** meetings by organizing an agenda beforehand, and completed each task for the meetings
- **Coordinated** meetings by following pre-planned agenda, ensuring the participation of all team members, and initiating discussions, through the inquiry of team members' work status

Team Leader, *Occasional (Web Application),* Software Engineering U of T — *Fall 2023*

"Web Application for UofT Event discovery"

Source Code Demo Video Website

- **Collaborated** with a team of 6 to produce a responsive web app using Python Flask and MongoDB.
- **Performed** Unit, Performance, Regression, and End-To-End Tests to benchmark the application
- Design was **determined** through structured brainstorming and creating wireframes in Figma
- **Researched** UI/UX design principles and incorporated them into app.
- **Administered** MongoDB Cloud Database for data persistency.
- Implemented web **Security** via Bcrypt for password hashing.