Justin Zhang

hi@justinjzhang.com +1 (613) 252-6128 justinjzhang.com justinzhang17 justinzhang17

Education

Master of Computer Science - Specialization in Data Science *Sep 2024 - Aug 2026*
Carleton University, Ottawa, Ontario, Canada

- GPA: 4.0/4.0
- **Coursework:** Machine Learning Fundamentals, Natural Language Processing, Reinforcement Learning

Bachelor of Computer Science (Honours) - Minor in Business *Sep 2018 - Dec 2023*
Carleton University, Ottawa, Ontario, Canada

- GPA: 3.9/4.0
- **Coursework:** Programming Paradigms, Data Structures and Algorithms, Database Management
- **Awards/Scholarships:** Pivotree Scholarship, Harry S. Southam Scholarship, Lester B Pearson Scholarship, Dean's Honour List

Technologies

Programming Languages: Python, Java, Typescript/Javascript, SQL, C, Bash

Libraries, Frameworks, and Databases: NextJS, NodeJS, Git/Github/Bitbucket, Linux (Headless Ubuntu, Arch) Docker, Numpy, Pandas, Keras/Tensorflow, Pytorch, Langchain, InfluxDB, PostgreSQL, Nginx, Express

Skills: RESTful APIs, Amazon Web Services, CI/CD, Design Patterns, Data Structures and Algorithms

Professional Experience

Cloud Engineer Intern *Ottawa, ON*
Statistics Canada *May 2025 - Aug 2025*

- Designed and developed a **Kubernetes volume management microservice** that automatically cleans up stale PVCs and Azure Disks for 250+ users, implementing controller and CronJob patterns via **Golang** scripts with real-time monitoring and scheduled cleanup operations.
- Published **an open-source project** under AGPL-3.0 license with comprehensive documentation, following Go standard project layouts and contributing guidelines for community collaboration.
- Identified **$6,000 CAD/year** cost savings in **Azure Container Registry (ACR)** usage through analysis of CI pipelines; recommended image retention and dev/prod registry separation to optimize storage.
- Engineered GitHub Actions CI workflows with **path-based filtering, matrix builds, and automated container deployment** to Azure Container Registry.
- Developed and deployed a Kubernetes **microservice cronjob**, deployed with **Helm charts**, to detect and clean up pods stuck in terminating states, optimizing cluster resource utilization across a large-scale data science platform.
- Optimized fraud detection workflows for T1 Tax return analysis, **reducing program runtime by 63%** by migrating from pandas to **PyArrow columnar formats and DuckDB queries**.
- Developed **Grafana dashboards** by querying **Prometheus and Kubecost data** from production Kubernetes clusters, delivering insights on CPU/memory usage, workload distribution across nodes/namespaces, and data scientist adoption of the **open-source platform**.

Computer Science Teaching Assistant *Ottawa, ON*
Carleton University *Sep 2022 - Apr 2025*

- Educated **C programming concepts to 90 students** in an office hours setting which led to a letter grade increase for 50% of students. **(Bit Manipulation, Pointers, Structs/Typedef)**
- Instructed 40 students in 2 workshops on important midterm and final topics.
- Coordinated 12 tutorials on systems tooling **(GDB, Valgrind, Bash)** thus improving student assignment completion rate.
- Improved assignment marking for 4 teaching assistants by designing 5 markdown grading templates/rubrics, thus preventing late marking deadlines.

Infrastructure Software Developer Intern *Ottawa, ON*
Ciena *Sep 2023 - Nov 2023*

- Composed **Ansible playbooks** to setup high-availability **dockerized PostgreSQL clusters in a primary-standby architecture** across multiple cloud nodes, significantly reducing the company's setup time for spinning up HA databases.
- Assembled monitoring and alerting of **High Availability postgreSQL** servers via the time-series database **InfluxDB** and a **Grafana** dashboard which allows for quick debugging of database issues.

Software Developer Intern *Halifax, NS*
The Rounds *Sep 2021 - Dec 2021*

- Reduced internal page image loading by lazy-loading images progressively from AWS S3.
- Developed 20+ Unit Tests with **Jest/RTL** to check for component rendering along with acceptance testing on the staging site.
- Converted elements from Angular 1.5 into **React components following atomic design**.
- Collaborated in a development team of 8 following the **Scrum Framework** within Agile philosophy. (Daily Stand-ups, Retrospectives)

Front-End Developer Intern *Ottawa, ON*
Canada Super Spelling Bee *Apr 2019 - Sep 2019*

- Updated customer registration form using HTML5/CSS3 in Atom IDE, enabling 100+ visitors to successfully register for events.
- Developed RESTful routes in an Express.js backend to support user authentication and integrate Stripe payment processing.

Community Involvement

Carleton Blueprint *Carleton University*
Vice President of Projects *Sep 2024 - Sep 2025*

Carleton Cyber Security Club *Carleton University*
President *Dec 2020 - Dec 2021*

- Hosted online presentations for security professionals to an audience of 30 club members.
- Managed the events and competitions in the 200+ member club.
- Ran online club member meet-ups to collaboratively tackle cryptography & rev eng challenges

Carleton Creator's Corner Club *Carleton University*
Web Developer *Sep 2020 - Apr 2021*

- Developed a static website for Rainbow Kidschool using the React Framework while using a Git/Github version control with other club developers.
- Adjusted site routing using react-router to allow for static routing instead of dynamic, which enabled for more secure redirects.
- Simplified workflow using tagged template literals from styled-components to clean up redundant code.

TEDx *Carleton University*
Speaker *Sep 2019 - Feb 2019*

- Presented a 15 minute talk to an audience of 150+ on good habits and self-help.

Personal Projects

Hangout Invitation Organizer - Heaples Project Website
Contributed to the Development/Design of the Heaples Landing Page, Invitation platform, Component library, and Blog/Press Vertical

- Optimized the start-up's verticals into three separate applications (landing page, invitation platform, blog) on three subdomains to decouple and shrink each application's learning curve for each member of our team of 4.
- Overhauled the landing page (SPA) for easier user navigation, color, and design consistency.
- **Environment: Nextjs, TypeScript, PM2, Storybook/Chromatic, Styled-components, AWS EC2/S3/ DynamoDB, Git/Github, MUI**

Ottawa - Local Entertainment Visualization Project Repo
Analyzing Ottawa's Entertainment Landscape to Combat the "Boring City" Stereotype

- Developed a React/TypeScript app visualizing Ottawa's urban entertainment landscape, processing 2.1M transit points, Google Maps venues, and Census data with client-side CSV ingestion and filtering.
- Implemented H3 hexagonal spatial analytics for cross-dataset difference computations and identification of significant urban areas.
- Built interactive WebGL visualizations (deck.gl + MapLibre) with configurable resolution, scaling, and top-K selection, optimizing performance with throttled state updates and modern tooling (Vite, TailwindCSS, h3-js).
- **Environment: React, Vite, Typescript, DeckGL, MapLibre, h3Js, TailwindCSS, HyperUI**

Crash Casino Game - Mathematical Simulator Project Repo
Simulates the game Crash and simulates the expected value of winning/losing the game

- Engineered a Flask backend with a mathematical engine (Python) that simulates crash multipliers using Pareto distributions and modular arithmetic, supporting configurable parameters and real-time statistical analysis of expected values and cumulative distributions.

- Built a responsive Tailwind/JavaScript frontend with real-time game simulation, parameter tuning panels, and animated graphics.
- **Environment: Python, NodeJS, Flask, TailwindCSS, Vercel**

Wordlist Creator Project Repo

Created a Wordlist generator (Python, FastAPI, TailwindCSS) via 17000 pages of data web scrapped using Beautiful Soup

- Developed a full-stack spelling bee prep app with React/TypeScript and FastAPI, scraping Merriam-Webster data to generate customizable Excel wordlists (1–600 words), with secure API authentication and serverless deployment on Vercel.
- **Environment: Python, FastAPI, React, Typescript, Chakra UI, Framer Motion, Axios, Jest, Beautiful Soup**

LLM Code Coverage Pilot Study Project Repo

Collaborated in a group of 2 for a Machine Learning for Software Engineering course.

- Developed a web application to test a chain-of-thought prompting technique for LLM code coverage across 5 programming paradigms from a research paper called Codepilot.
- **Environment: Render, Python, Poetry, FastAPI, Langchain, HTML/CSS/JS**

MRI Brain Tumor Detection Project Repo

Bootstrapped a solo project for a Computer Vision course.

- Implemented an image classifier for MRI scans of brain images along with a study to pre-process the feature set using Computer Vision filtering methods (K-Means, Harris, Hough, Canny).
- **Environment: Python, OpenCV, Typescript, NextJS, Keras/TF, TailwindCSS, Matplotlib**

Scavenger Hunt Organizer Web App Project Website

Design and Implemented a web app to run competitive Scavenger Hunts

- Developed a full-stack web app for competitive scavenger hunts, managing teams, challenges, and real-time game state for 15+ participants.
- Designed a custom Supabase schema with 6 tables for players, rooms, challenges, and live feeds, leveraging Realtime and file storage for synchronized updates and media submissions.
- Implemented client-side state with Zustand and local storage, built the frontend with Next.js and shadcn UI, and deployed serverlessly on Vercel.
- **Environment: NextJS, Zustand, Supabase (Tables, Storage, RealTime), Vercel, Vite, Shadcn, Axios**

Profile Picture Background CLI Tool Project Repo

Created a CLI tool to transform profile picture into a grayscale, blueprint-style portrait

- Developed Bluepaw, a Python CLI tool that leverages AI-powered background removal (rembg) and PIL image processing to automatically transform profile pictures into blueprint-styled images with custom streak pattern overlays
- **Environment: Python, Rembg, Github Action Workflows**