

# Andrew Zheng

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## SKILLS

**Languages:** C, C++, Python, Golang, Verilog, Java, HTML, CSS, JavaScript

**Libraries/Frameworks:** FastAPI, React, MongoDB, Streamlit, NoSQL, REST API, Tailwind CSS, Next.js

**DevOps/Tools:** AWS (Lambda, S3, SageMaker, IAM, CloudWatch), Docker, Git, Jupyter Notebook, Bash, Linux

**Hardware Design:** Altium Designer, KiCad, AutoCAD, Autodesk Fusion, SolidWorks, Bambu Studio

## EXPERIENCE

### Embedded Systems Designer | Waterloo Rocketry | Waterloo, ON

Sep 2025 – Present

- **RocketCAN Remote Arming System** ([GitHub](#)): Engineered a safety-critical **KiCad** PCB featuring dual-redundant power inputs and a discrete P-MOS high-side switching topology, implementing fail-safe logic to guarantee recovery system arming during critical MCU power-loss scenarios
- **Remote Arming Firmware** ([GitHub](#)): Implemented and debugged low-level **C** firmware for **PIC18** to aggregate UART altimeter telemetry onto the **CAN** bus, integrating ADC health monitoring via INA180 current sensing and pyro continuity validation to ensure launch readiness

### Hardware Designer | UW Biomechatronics Design Team | Waterloo, ON

Sep 2025 – Present

- **EMG Fabric Bionic Arm PCB** ([GitHub](#)): Spearheaded the migration of the Bionic Arm PCB from **KiCad** to **Altium Designer**, engineering an **ESP32**-based control system with **USB-C** connectivity
- Validated electro-mechanical integration by collaborating on design constraints in **SolidWorks** for seamless fit

### Case Competition Coach | Self-employed

Jun 2024 – Present

- Scaled self-founded coaching business from contract work to fully independent, achieving **5-figure revenue**
- Formulated training materials for 150+ secondary school students across 10+ schools, leading to 50+ international qualifiers, 30+ finalists, and 33% (4/12) of Team Ontario's **1st-place** finishes at ICDC 2024

## PROJECTS

### SageWall | ML Cloud Security System ([GitHub](#)) | AWS, Python, Streamlit, Machine Learning

Dec 2025

- Architected a serverless Intrusion Detection System (IDS) deployed as a **SageMaker** endpoint using an **XGBoost** classifier, analyzing network traffic with **99.9%** classification accuracy and **<100ms** inference latency
- Engineered and automated the ETL pipeline using Lambda to transform raw network logs in S3, processing **125,000+** records from the NSL-KDD dataset and provisioning infrastructure via AWS SDK (Boto3)
- Deployed a Streamlit web dashboard for real-time system observability, secured with AWS IAM policies, using CloudWatch to monitor system health and triggering SNS security threat alerts via email

### CrawlStars | Concurrent Search Engine ([GitHub](#)) | Golang, MongoDB, REST API, Concurrency

Dec 2025

- Engineered concurrent web crawler with custom HTTP client using scalable producer-consumer architecture with parallel goroutines and buffered channels, processing **2000+** pages/minute with **<15MB** memory usage
- Implemented thread-safe deduplication using sync.Map and atomic operations, enabling O(1) (constant-time) lookup for **50,000+** URLs and filtering **70%** of redundant crawls
- Developed a relevance ranking algorithm using MongoDB Atlas Search integration with aggregation pipelines and fuzzy query matching to map SEO relevance metrics to a 5-star rating system

### Mangaroo | PDF-to-Manga AI Illustrator ([GitHub](#)) | FastAPI, Python, REST API, Generative AI

Nov 2025

- Architected an asynchronous REST API orchestrating a dual-model pipeline (**Gemini 1.5 Pro + Imagen 3**) using **FastAPI**, batching concurrent requests from **1000+** sessions to process **250+** page novels and **50MB** input
- Engineered Story Bible context system with structured JSON prompting and session-scoped caching, reducing token usage by **92%** (1.4M to 100K per 100 pages) while maintaining O(1) memory complexity vs. O(n) alternatives

## EDUCATION

### University of Waterloo | Bachelor of Applied Science in Computer Engineering

Sep 2025 – Apr 2030

- GPA: 3.9

## AWARDS

### 1st Place World Champion (Marketing – Product Management) | DECA ICDC @ Los Angeles

Apr 2024

### 7x National Honour Roll | University of Waterloo CEMC Mathematics Contests

2020 – 2024