Ricky Tang

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Education

University of Waterloo   Expected Apr. 2030
Honours Bachelor of Software Engineering (Co-op)

Experience

Waterloo Aerial Robotics Group (WARG) | *Python, OpenCV, MAVLink*   Oct. 2025 – Present
Autonomy Software Developer   *Waterloo, ON*
- Implemented computer vision algorithms using OpenCV for real-time object detection and tracking in aerial imagery
- Engineered MAVLink workers for heartbeat monitoring, telemetry streaming and command processing via IPC queues
- Orchestrated main thread coordinating worker processes, integration testing, and centralized logging across system

Brick Works Academy   Jun. 2024 – Jul. 2024
Co-op Camp Counselor   *Waterloo, ON*
- Led robotics programming instruction for 20+ campers, teaching Python integration with LEGO Mindstorms hardware
- Mentored 7-person collaborative robot development project resulting in functional writing automation robot
- Designed 10+ programming challenges for sensor control, motor optimization, and debugging techniques

Projects

 BrainLattice – AI Concept Networks from Any Textbook | *Next.js, FastAPI, GCP, Firebase, Docker, Gemini, ElevenLabs*
- Engineered full-stack application transforming 100+ page textbooks into interactive concept networks in <20 seconds using PyPDF extraction, Gemini API, and React Force Graph, replacing linear note-taking with network-based learning
- Architected Firebase schema with bidirectional relationships enabling real-time traversal of 200+ concepts with on-demand AI insights (e.g. overviews, formulas, connections) via click
- Constructed automated study pipeline generating cheat sheets and realistic audio digests from LLM scripts via ElevenLabs
- Deployed on GCP with Docker, integrating multiple AI APIs (Gemini, OpenRouter, ElevenLabs) for end-to-end workflow

 Post-It – AR Sticky Notes for Real World | *TypeScript, Snap Lens Studio*
- Engineered Spectacles lens enabling users to place 3D sticky notes in physical locations, transforming spaces into shared interactive canvases using World Query Module and Spatial Anchors API
- Constructed voice-to-3D pipeline: ASR module transcribes speech, Gemini optimizes prompts, Snap3D generates objects
- Integrated gesture-based interactions via SpectaclesInteractionKit for intuitive note placement and voice activation
- Shipped in 32 hours, achieving semi-finalist at Hack the North 2025 (top 32 out of 256 teams, 1000+ hackers)

 FitSage – AI Fitness Companion with Voice Logging | *Next.js, Supabase, Gemini, HuggingFace, Web Speech API*
- Engineered fitness app reducing workout logging time by 5-10x through voice/text input, consolidating logging, training plans, and AI advice from multiple apps into unified platform
- Developed AI pipeline: Web Speech API transcribes input, HuggingFace pre-processes text, Gemini extracts data from unstructured workout entries and generates personalized suggestions
- Implemented workout curation analyzing recent activities to detect gaps and dynamically generate 10+ tailored exercises
- Constructed dashboard displaying body metrics, intensity charts, and workout history with AI interpretations and advice

 CheFlow – Intelligent Recipe & Meal Planning App | *Processing, G4P (GUI Library)*
- Engineered recipe app suggesting meals from available ingredients and time constraints to reduce decision fatigue
- Developed ingredient-matching algorithm using set intersection and scoring to maximize pantry utilization
- Constructed data visualizations (scatter plots, regressions, heatmaps) analyzing cooking habits
- Designed interactive GUI with Processing's G4P library for streamlined recipe entry and meal planning workflows

Technical Skills

Languages: Python, TypeScript/JavaScript, C/C++, SQL, Processing, HTML/CSS, LaTeX
Technologies: React, Next.js, Node.js, Express, FastAPI, Firebase, Supabase, MongoDB, Gemini API, ElevenLabs, HuggingFace, Tailwind CSS, shadcn/ui, OpenCV, Pandas, Web Speech API, Qt, Motion Canvas
Development Tools: Git/GitHub/GitLab, GCP, Docker, Vercel, Bash, Lens Studio, CMake, Figma

Awards

2025 Canada Team Math Contest: **3rd Place** Nationally | 2025 Euclid Contest: **Top 5%** | 2024 Canada Sr. Math Contest: **Top 2%**