Ricky Tang

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Education

University of Waterloo — Sep. 2025 – Apr. 2030
Honours Bachelor of Software Engineering (Co-op)

Technical Skills

Languages: Python, TypeScript/JavaScript, C/C++, SQL, HTML/CSS
Technologies: React, Next.js, FastAPI, Flask, Node.js, Express, PyTorch, HuggingFace, OpenCV, Tailwind CSS, Pandas
Development Tools: Git, Docker, Bash, Firebase, Supabase, PostgreSQL, MongoDB, GCP, Cloudflare, Railway, Lens Studio

Projects

Tark – Google Earth for Game Devs | *TypeScript, Next.js, Python, FastAPI, Leaflet, SciPy*
- Built web app turning real-world places into game-ready **3D meshes** in **<15 seconds**, replacing weeks of manual modeling
- Processed **Mapbox** elevation and satellite imagery to generate terrain meshes with **260K-520K** triangulated faces
- Extracted **2000+** building footprints from **OpenStreetMap** and generated textured **.obj** files for **Unity/Blender**
- Implemented terrain mesh generation with **NumPy/SciPy** smoothing and building extrusion for all complex shapes
- Developed coordinate system using **PyProj** for geographic-to-metric conversion and terrain-building elevation matching

Auralis – AI Doctor with Real-Time Video & Emotion Detection | *TypeScript, Next.js, Python, FastAPI, Cloudflare, Railway*
- Built real-time video consultation platform with **3D avatar** doctor analyzing patient emotions and speech patterns
- Developed emotion detection via **face-api.js** and **VADER sentiment analysis** with **Gemini** generating adaptive responses
- Integrated **lip-synced** 3D avatar using **Web Audio API** with **ElevenLabs** speech and age-specific medical diagnostics
- Deployed on **Cloudflare Pages** and **Railway**, winning **Best AI Application Built with Cloudflare** at **HackWestern 2025**

Post-It – AR Sticky Notes for Real World | *TypeScript, Snap Lens Studio*
- Engineered **Spectacles lens** enabling users to place **shared 3D notes** in physical locations with spatial persistence
- Built voice input pipeline using **ASR** to transcribe user speech and **Gemini** to optimize prompts from verbal descriptions
- Generated spatial objects via **Snap3D API** from voice commands, eliminating manual text input in AR environments
- 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)

BrainLattice – AI Concept Networks from Any Textbook | *Python, FastAPI, TypeScript, Next.js, Firebase, GCP, Docker*
- Engineered full-stack application transforming **100+ page** textbooks into interactive concept networks in **<20 seconds**
- Built processing pipeline using **PyPDF** extraction, **Gemini** for concept mapping, and **React Force Graph** for visualization
- Architected **Firebase** schema enabling real-time traversal of **200+ concepts** with on-demand AI insights via click
- Constructed automated study pipeline generating cheatsheets and realistic audio digests from LLM scripts via **ElevenLabs**
- Containerized with **Docker** and deployed on **GCP**, orchestrating Gemini/ElevenLabs APIs for scalable concurrent requests

Experience

Waterloo Aerial Robotics Group (WARG) | *Python, React, Flask, OpenCV, MAVLink* — Oct. 2025 – Present
Autonomy Software Developer — *Waterloo, ON*
- Built ground station UI with **one-click pause/resume**, eliminating manual drone mission switching for **30+ members**
- Engineered full-stack control pipeline: **React** frontend, **Flask-SocketIO** backend, **MAVLink** protocol for flight commands
- Implemented **OpenCV** object detection in aerial imagery and **MAVLink** workers for telemetry streaming via IPC queues

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** team through collaborative robotics project, resulting in functional writing automation robot

Awards

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