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, React, Flask, OpenCV, MAVLink*   Oct. 2025 – Present
Autonomy Software Developer   *Waterloo, ON*
- Built ground station UI enabling **one-click pause/resume** of drone missions, eliminating manual mode switching for **30+ team 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

PROJECTS

Tark – Google Earth for Game Devs | *TypeScript, Next.js, Python, FastAPI, Leaflet, SciPy*
- Built web app converting real-world locations into game-ready **3D meshes**, reducing weeks of traditional 3D game scene modeling to **<15 seconds**
- Engineered pipeline integrating **Mapbox** elevation data, **OpenStreetMap** building footprints, and satellite imagery for texture mapping to generate textured .obj files optimized for **Unity/Blender**
- Implemented terrain mesh generation with **NumPy/SciPy** smoothing and building extrusion with all buildings support
- Developed coordinate system using **PyProj** for geographic-to-metric conversion and terrain-building elevation matching

Post-It – AR Sticky Notes for Real World | *TypeScript, Snap Lens Studio*
- Engineered **Spectacles lens** enabling users to place and view **shared 3D notes** in physical locations with spatial persistence
- Constructed **voice-to-3D pipeline**: **ASR** module transcribes speech, **Gemini** optimizes prompts, **Snap3D** generates objects, eliminating text input in AR
- 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** using **PyPDF** extraction, **Gemini** API, and **React Force Graph**
- 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**
- Deployed on **GCP** with **Docker**, integrating multiple AI APIs for end-to-end workflow

FitSage – AI Fitness Companion with Voice Logging | *TypeScript, Next.js, Supabase, HuggingFace, Gemini API*
- Engineered fitness app reducing workout logging time by **5-10x** through **voice/text input**, consolidating logging, training plans, and AI advice into unified platform
- Developed AI pipeline using **Web Speech API**, **HuggingFace** preprocessing, and **Gemini** for data extraction & advice
- Implemented workout curation analyzing past activities to detect gaps and dynamically generate **10+ tailored exercises**
- Constructed dashboard showing body metrics, intensity charts, and workout history with AI insights and guidance

TECHNICAL SKILLS

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

AWARDS

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