Ian Wang

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Education

University of Waterloo Sep 2025 – May 2030
Bachelor of Applied Science, Computer Engineering, GPA: 3.95 *Waterloo, ON*

Technical Skills

Programming Languages: Python, Java, C/C++, C#, JavaScript, TypeScript, HTML, CSS, SQL, LaTeX
Frameworks/Libraries: React.js, Tailwind CSS, Node.js, Express.js, PostgreSQL, NumPy, Matplotlib
Tools: Git, Vite, VS Code, Vercel, Render, Unity

Projects

PRISM: Hospital Delirium Detector | *HTML, CSS, JavaScript, Node.js, Express.js* Oct 2025 – Nov 2025
- Co-developed PRISM, a real-time wearable system for continuous delirium monitoring in clinical environments
- Developed an IoT data pipeline to ingest, process, and store live ESP32 sensor data with 100% data integrity
- Architected robust async live and playback systems, enabling seamless real-time and historical data visualization
- Constructed a dashboard for real-time data visualization and hardware control, guiding informed decision-making

Continent Procedural Generator | *Python, NumPy, Matplotlib, Tkinter* Oct 2025
- Built a procedural continent generator in Python using Simplex noise, producing diverse, coherent 2D worlds
- Implemented biome classification, artifact removal, heuristic town placement, and D8 flow to enhance realism
- Designed a GUI for customizing generation parameters and dynamic display of labelled maps with Matplotlib

LyX Previewer | *Python, Tkinter* July 2025 – Sep 2025
- Partnered to build LyX Previewer, a Python GUI application that retrieves LyX files from Google Drive, converts them to HTML, and seamlessly renders output to a web browser, eliminating manual conversion for file previewing
- Created user-friendly UI and engineered a LyX-to-HTML converter, ensuring a stable and reliable application

Java Swing Roguelike Game | *Java, Swing (Java)* Apr 2024 – Jan 2025
- Created a dynamic, procedurally generated game in Java Swing, authoring 10,000+ lines of object-oriented code
- Optimized performance using cached pathfinding, shadowcasting, and particle systems, enabling smooth gameplay
- Engineered procedural generation with visually applied simplex noise, creating dynamic environments and textures

Experience

Firmware Team Member Sep 2025 – Present
Waterloo Midnight Sun Group *Waterloo, ON*
- Designed embedded C firmware on STM32 for a high-voltage battery charger, ensuring reliable system operation
- Implemented multi-state LED driver, button manager, and rotary encoder driver to facilitate user interaction
- Built, tested, and optimized embedded systems for solar-powered vehicle applications in a multidisciplinary team

Teaching Assistant Sep 2024 – Jun 2025
TTmath *Markham, ON*
- Communicated complex math concepts clearly to 15+ students, fostering understanding and engagement

Awards

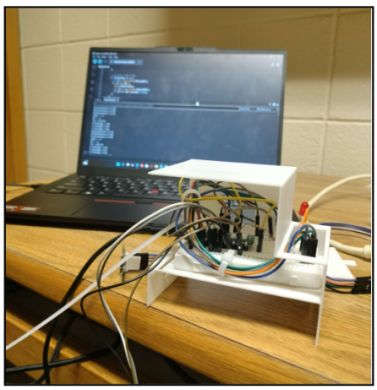
Canadian Computing Olympiad (CCO) | *Bronze Medalist* May 2024
- Ranked top 0.7% nationally (27/3,947) for advanced problem-solving in algorithms and data structures

Canadian Mathematical Olympiad (CMO) | *National Qualifier* Mar 2025
- Ranked top 1.1% nationally (70/6,300) for exceptional mathematical reasoning and quick problem-solving skills

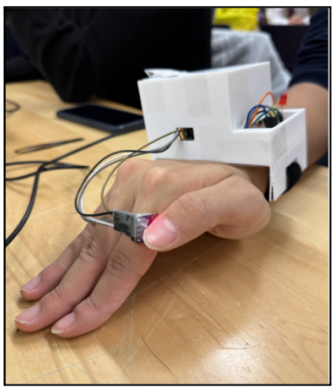
Portfolio

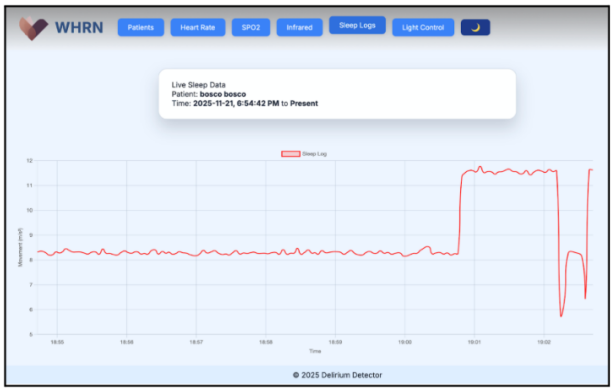
PRISM: Hospital Delirium Detector | *HTML, CSS, JavaScript, Node.js, Express.js* Oct 2025 – Nov 2025

- Collaborated to build a real-time patient monitoring system with an ESP32 wearable and responsive web interface using JavaScript, Express.js, and Chart.js to visualize SpO_2, heart rate, infrared, and accelerometer signals.
- Architected a robust REST API to ingest sensor data with session-based persistence and time-series JSON storage, ensuring complete retention of both live snapshots and historical patient sessions.
- Developed a modular data model to normalize sensor inputs, calculate metrics (e.g., acceleration magnitude, response accuracy, average response times), eliminate duplicates, and maintain comprehensive historical records.
- Built a front-end dashboard with historical playback, patient session management, and control of ESP32's LEDs.



Wearable Photos



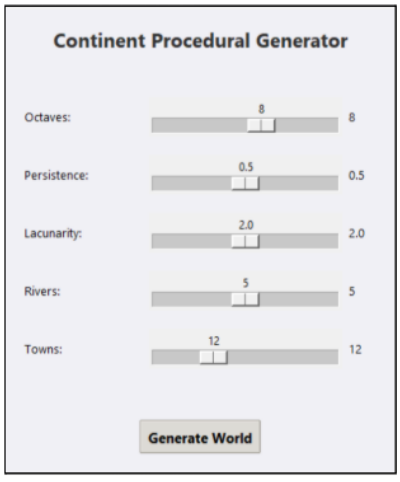


Web Dashboard

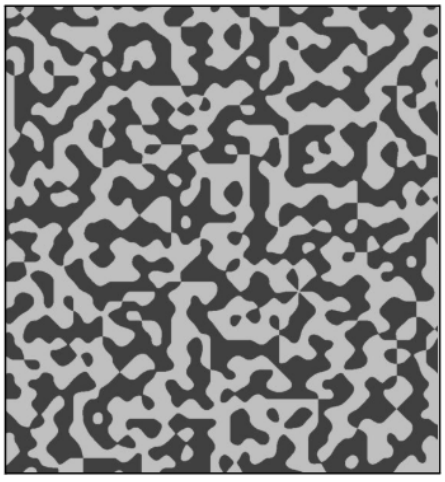
Continent Procedural Generator | *Python, NumPy, Matplotlib, Tkinter* Oct 2025

- Developed a procedural continent generator with user-configurable multi-octave Simplex noise, enhanced by domain warping, radial distance falloff, and BFS-based artifact removal to produce coherent large-scale landforms.
- Designed a biome classification system by quantizing continuous elevation and moisture fields into a 2D phase space, mapping indices to categorical biomes through custom colour tables for deterministic visualization.
- Implemented hydrology using D8 flow-direction computation with slope normalization, selecting spatially separated high-elevation sources and iteratively tracing river paths to carve variable-width rivers.
- Built an automated settlement-generation module combining elevation and moisture scoring, Euclidean distance-to-water transforms, and minimum-distance constraints, integrated with syllable-based procedural naming.

Example Generation



Generation GUI



Simplex Noise