Lance Yan

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Education

University of Waterloo — Waterloo, ON
Bachelor of Computer Science, Honours, Co-op — *September 2025 – April 2030 (Expected)*

Technical Skills

Languages: Java, Python, JavaScript, HTML, CSS, TypeScript
Tools/Frameworks: React, Next.js, Tailwind CSS, PyTorch, TensorFlow/Keras, NumPy, Matplotlib, Git, Vercel

Projects

Chess Neural Network | *TensorFlow, Python, Matplotlib, Git*

- Developed a Python-based chess application featuring a **Neural Network AI opponent**, leveraging TensorFlow/Keras for move evaluation and Pygame for the graphical user interface.
- Implemented a robust PGN parsing module to process large chess game databases, extracting **74 million** unique board positions for model training.
- Managed the end-to-end **machine learning workflow**, including data preprocessing, iterative model training (e.g., using up to **10000 games**, **5 epochs**, batch size **256**), and weight serialization, significantly improving AI decision-making by addressing overfitting and underfitting.

Website Portfolio | *TypeScript, Git, React, Next.js, JavaScript, Tailwind CSS*

- Launched my own dynamic personal website leveraging **Next.js, React, and TypeScript**.
- Engineered **a** custom **TypeScript React hook** to resolve **critical rendering anomalies** in an HTML5 Canvas-based particle animation, ensuring flawless visual stability during browser inspection and dynamic viewport resizing.

Experience

ThermoGen Design Project Engineering Lead — June 2024 - July 2024
Toronto Metropolitan University — *Toronto, ON*

- Spearheaded a **team of 8** in collaboration with professors from the **University of Toronto, Toronto Metropolitan University, and Yale University** in the conceptualization, design, and strategic planning of ThermoGen, an innovative energy recovery system. Leveraged the Organic Rankine Cycle (ORC) to convert waste heat from residential HVAC units into electricity, boosting energy efficiency by **30%** over traditional HVAC units.
- Engineered the core ThermoGen system, utilizing pentafluoropropane within a custom ORC architecture, including a heat exchanger, turbine, pump, and condenser, projected to reduce homeowner AC energy bills by **60% annually** (approx. **$1,100 per household**).
- Researched and integrated advanced **thermodynamic principles**, calculating potential energy generation of approximately **269,440 kWh over 40,000 operating hours**.

Advanced Mathematics Tutor — September 2023 - June 2025
Math Challengers Program — *Burnaby, BC*

- Developed and implemented an advanced mathematics curriculum to **150 gifted elementary students** across **three schools**: Inman, Cascade Heights, and Marlborough Elementary. Taught Advanced Algebra, Combinatorics, and Geometry (including topics such as factors, primes, prime factorization, LCM/GCF, factoring quadratics, areas, volumes, surface area, shapes, proportional constant k, similar triangles, and congruent triangles). Resulted in **92%** of the class passing the high school honours entrance exam.
- Developed impactful strategies that improved student performance in mathematics contests, with the average student placing in the **top 25% of contest takers**, enhancing their problem-solving skills and success in honors courses.

STEM Workshop Facilitator & Youth Mentor — July 2023 - August 2023
Simon Fraser University — *Vancouver, BC*

- Directed a **record-setting volume** of STEM educational workshops for youth (ages 7-12), by systematically deconstructing complex chemical principles into accessible, engaging modules.
- Dedicated **82 intensive volunteer hours** (within a 200+ hour total commitment) to a flagship STEM summer program, demonstrably elevating youth enthusiasm and scientific curiosity through innovative strategies and consistent leadership in program delivery.