Lance Yan

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Education

University of Waterloo — Waterloo, ON
Bachelor of Computer Science, Honours, Co-op — *September 2025 – June 2030*

Technical Skills

Languages: Java, Python, JavaScript, HTML, CSS, TypeScript
Frameworks: React, Node.js, Tailwind CSS, Next.js
Developer Tools: Git, VS Code, Visual Studio, PyCharm
Libraries: PyTorch, TensorFlow, NumPy, Matplotlib

Projects

Chess Neural Network | *TensorFlow, Python, Matplotlib, Git* — September 2024 – Present

- 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 (**79 PGN files**), extracting **thousands** of 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, React, Next.js, JavaScript, Tailwind CSS* — April 2025 – Present

- **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 leveraging the Organic Rankine Cycle (ORC) to convert waste heat from residential HVAC units into electricity.
- 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**, assuming **10% ORC system efficiency.**

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

- Developed and delivered an **advanced mathematics curriculum** encompassing **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) to **gifted elementary students** across **three schools**: Inman, Cascade Heights, and Marlborough Elementary.
- Engineered **pedagogical strategies** to foster advanced **quantitative reasoning** and **problem-solving skills**, preparing students for **advanced mathematics contests** and **accelerated high school honors**.

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 outreach initiative, demonstrably elevating youth enthusiasm and scientific curiosity through innovative pedagogical strategies and consistent leadership in program delivery.