# Kelvin Peng

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## Education

**University of Waterloo** Sept 2023 – Present
Bachelor of Mathematics – Double Major (Expected 2027)
Combinatorics & Optimization | Statistics

## Awards

**Euclid Contest:** School Champion (2x), Honour Roll, Top 1 in BC Province
**Canadian Senior Mathematics Contest:** School Champion, Honour Roll

## Technical Skills

**Programming:** C/C++, Python, Swift, Racket, Bash
**ML/AI:** PyTorch, HuggingFace, CoreML, Create ML, BitsAndBytes
**Math/Optimization:** Combinatorial Optimization, Probability, Statistics, Graph Theory

## Projects

**Supervised Fine-Tuning on Dream-7B with BitsAndBytes**

- Fine-tuned the `Dream-7B` model on the `S1k` dataset using 4-bit quantization with `bitsandbytes` and LoRA/QLoRA, enabling efficient training on a single 5070Ti (16GB VRAM).
- Optimized training pipeline with GPT-5 guidance on memory usage and debugging, achieving a **20% improvement in reasoning accuracy** while reducing training cost by over **60%**.
- Tools used: PyTorch, BitsAndBytes, LoRA/QLoRA.

**Instruction Fine-Tuning on GPT-OSS-20B**

- Trained `GPT-OSS-20B` on `OpenWebMath` and `The Stack v2` using RunPod's RTX Pro 6000 (96GB VRAM) with DeepSpeed and gradient checkpointing.
- Designed data pipelines and scaling strategies, resulting in a **15% increase in mathematical reasoning accuracy** and **12% improvement in code generation tasks**.
- Tools used: PyTorch, DeepSpeed, RunPod.

**Real-Time Translation App with FastVLM**

- Developed an iOS application for instant camera-based translation using Apple's `FastVLM`, OCR, and multilingual models.
- Achieved real-time text recognition and translation with sub-**1s latency**.
- Tools used: SwiftUI, CoreML, FastVLM.

**Tabular Classification Model**

- Collected datasets from Kaggle and built a machine learning model using Create ML to classify animal species based on their characteristics, then integrated the model into an iOS application.
- Tools used: Create ML, Xcode, SwiftUI.

**Game Engine Design**

- Implemented the DouDiZhu card game, managing game logic, player interactions, and scoring mechanics while ensuring efficient memory usage and real-time gameplay.
- Tools used: DrRacket.