Jacob Lee

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EDUCATION

Honors Specialization BSc. Computer Science — London, ON

University of Western Ontario — *Expected Graduation May 2028*

- **Awards & Honors:** Admission Scholarship $2,500, Dean's Honor List (2024-2025), (2025-2026)
- **Relavant Courses:** Data Structures & Algorithms, Data Science, Databases, Reinforcement Learning, Intro to ML

RELEVANT EXPERIENCE

Undergraduate Summer Research Intern — London, ON

University of Western Ontario — *May 2026 - Aug 2026*

- Leading development of an **interpretable Machine Learning pipeline** (Kernel-OLS with adaptive sparse feature-kernel correction) that **audits classical scientific laws** across 7 domains (astrophysics, kinetics, biology, finance, behavior), implementing domain-specific notebooks and transport cross-validation to determine when laws require sparse, stable corrections.
- Authoring on a journal-targeted manuscript formalizing a sparse correction audit framework, covering transport CV methodology, a 6-label verdict taxonomy and empirical results across 7 heterogeneous domains, under advisement of a PhD researcher and professor.

Software Engineer — Mississauga, ON

Kingsbridge Rehab Centre — *Jun 2025 - Aug 2025*

- Designed and developed a **responsive clinic website** using React, Next.js, and TypeScript, deploying through Vercel with Figma-based high-fidelity UI prototypes.

PROJECTS

PongRL | *Python, PyTorch, Stable-Baselines3, Gymnasium/ALE*

- Designed and trained a **PPO agent** on Atari Pong using a CNN actor-critic policy with clipped objective optimization and GAE, running **25M timesteps** across 3 random seeds with 8 parallelized environments.
- Implemented a **4-stage threshold-based curriculum** that advanced difficulty only after consecutive reward evaluations, then benchmarked it against direct PPO across difficulty, game mode, and repeat-action-probability conditions — finding curriculum learning provided a stronger warm start and modest cross-difficulty generalization advantage, while direct PPO achieved slightly better learning-curve AUC and faster threshold convergence.

ROCSim | *C++, HIP SDK, ROCm, Qt, OpenGL, GoogleTest, JSON*

- Architected the **visualization and UI layer** of a GPU-accelerated physics simulation engine using Qt 6 and OpenGL, implementing Singleton, Factory, Façade, and Observer **design patterns** to manage real-time rendering of particle and spring-mass simulations.
- Built an interactive control panel supporting **10+ runtime-adjustable parameters** (mass, damping, gravity, collision toggles, simulation speed, particle count), with JSON-based save/load for reproducible simulation configurations and a spatial grid collision system achieving **O(n) detection**.

Reddit Sentiments | *Python, Jupyter, PRAW, HTTPS, OpenCV, Scikit-learn, HuggingFace, NLP, PyTorch*

- Built a **Reddit data pipeline** using PRAW that collected **40,000 posts and 1,000,000 comments** across 230 subreddits, incorporating rate-limit compliance and a multimodal preprocessing stage using BLIP for image-to-text captioning.
- Trained supervised sentiment classifiers using DistilRoBERTa-base and IBM Granite embeddings with TF-IDF and Reddit-specific metadata features, achieving **80% test accuracy** and **0.78 weighted F1** against human-labeled benchmarks.

TECHNICAL SKILLS & INTERESTS

Languages: Python, C/C++, Java, R, MySQL
Frameworks & Libraries: Pandas, NumPy, Matplotlib, Seaborn, Sklearn, React.js, Next.js, Tailwind CSS, Java Swing
Developer Tools: Git, Jupyter, VS Code, Unix/Linux, Figma, Godot, PyCharm, IntelliJ, Eclipse
Interests: Climbing, AGI/ASI, Applied ML, Research/Academia, Video Editor (5M+ views), Content Creation, YouTuber
Concepts: Natural Language Processing, Computer Vision, Data Structures & Algorithms, Databases, Operating Systems