Xin Lei Lin

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Education

University of Toronto – St-George (Trinity College) Toronto, Ontario, CA

Bachelor of Science – Computer Science Specialist (COOP), and Molecular Genetics Major *Aug. 2023 – May 2027*

- **Entrance awards**: C. David Naylor Scholar for Leadership ($20k) & Arts and Science Scholar ($7.5k)
- **Leadership**: Student Council President, Publication Director of *Le Manifeste* and *The Last Word* (total 160+ pages), BrébeufHx Vice-President & MariHacks Organizer (800+ participants), & programming tutor [YouTube]

Experience

Machine Learning Researcher September 2024 – Present

With Prof. Pascal N. Tyrrell at the Medical Imaging Department (University of Toronto) *Toronto, Ontario, CA*

- Using **Latent Conditional Diffusion (LCD)** to generate labeled data points (image and segmentation mask) to improve generated tissue fidelity & diversity, and segmentation performance for datasets with limited labels.

Computer Vision Researcher February 2024 – Present

With Prof. Babak Taati at KITE Computer Vision Lab (University of Toronto) *Toronto, Ontario, CA*

- From **image-by-image** to **video** 2D human pose detection through **VideoMamba and InfiniAttention**.
- Experimented with VideoMamba and Vision Transformers **encoders** for **SMPL mesh recovery** and **keypoints coordinates regression** from heatmaps. Added an InfiniAttention **backbone** for videos (32 frames).
- **Pretrained** the image backbone on MS-COCO pose (136K frames) & **trained** the Infini-Attention video backone on JHMDB (10K frames) and FreeMan (11M frames) resulting in SOTA accuracy for noisy videos.

Machine Learning Engineer July 2024 – Present

Kadist *(Remote) – San Francisco, California, US*

- Deployed rsonart.com, an art gallery chat web application with vision and audio capacities for **Kadist**.
- Implemented Retrieval-Augmented Generation (RAG) with history-aware & ensemble retrieval, rerank and FAISS.
- Generated embeddings of **308768 artists** and **80 590 artworks** webscraped from ArtFacts, Kadist and E-flux.
- Hosted a Flask (Gunicorn/Nginx) backend, a NEXT.JS frontend and GCP + Firebase for user data.

Dry Lab Machine Learning Team Member April 2024 – Present

PlasmidAI - Internationally Genetically Engineering Machine (UToronto Team) *Toronto, Ontario, CA*

- **Awards**: **Top 10 of 500+ teams globally** & **Winner of Best Model**. [IGEM Wiki]
- Worked on plasmidai (largest open-source ML toolkit for plasmid foundation models) with Prof. Michael Garton
- Fine-tuned Evo (a Striped-Hyena genome model) to generate plasmid sequences with antibacterial resistance.

Machine Learning Researcher October 2022 – September 2023

With Prof. Houari Sahraoui at DIRO (University of Montreal) *Dallas, Texas and Montreal, Quebec*

- Represented **Team Canada (top 12 projects nationally)** at **ISEF** 2023 (**10 awards combined - $15k+**).
- Developed and benchmarked **computer vision architectures** to translate American Sign Language to English.
- Model architectures trained include Fine-tuned Resnet + CNNs / LSTM + MLP, to translate **25 gestures**.

Projects

Awards: National Science Fairs ($16k+ won in 3 years), Hack The North (Top 12 of 264 Projects), UofTHacks (Cohere 1^{st} Prize - $1.5k), UTRA Hacks (Starknet & Flow - $1k), and MakeUofT (Qualcomm 2^{nd} & Flow - $1.2k).

Spydle – A real-time multiplayer word game September 2024 – December 2024

- Game servers on GCP managed w/ Kubernetes, Docker & Agones. Java Swing & Springboot Frontend [Github]

Re.Live – UofTHacks 11 (Cohere 1^{rst} Prize ($1500)) January 2024

- Integrated a **diffusion model – DDPM** model to produce videos of people from static images dancing!
- Integrated **Cohere RAG** to search a database of 100 songs with the user's mood. Frontend in **React**. [Devpost]

DriveSense – HackTheNorth (Winning Finalist Project) September 2023

- Mobile app to assist drivers with **vision models** for car plates, traffic lights and road signs (PyTorch). [Devpost]

Technical Skills

Lanuguages Spoken: French (Native), English (Native), Mandarin (Fluent), Spanish (Proficient)
Programming Languages: C/C++, Python, R, Shell (Bash), Java, SQL, Dart (Flutter), JavaScript, HTML/CSS
ML/DS Tools: Torch, CUDA, DDP, Lightning, Tensorflow, OpenCV, Pandas, Numpy, Google Cloud, SciNet (slurm)
Other: Linux/Unix, Docker, Kubernetes, Tmux/Vim/VSCode, Git/GitHub, Flask/DJango, React, MongoDB/Postgres