

Laurence Liang

2x Microsoft Imagine Cup World Finalist, ISEF Grand Award Recipient and Cansbridge Fellow

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Education

B.Eng Mechanical Engineering, Minor in Mathematics & Computer Science **Sept. 2021 to May 2026 (expected)**

McGill University, Montreal, QC, Canada

Activities and awards: Québec Perspective Scholarship '24, '23; RippleX Fellow '23; Cansbridge Fellow '22; 2x Microsoft Imagine Cup World Finalist, Research Lead at McGill AI Society Kernel; Sponsorship Lead at HackMcGill (McHacks), McGill Rocket Team Member

Selected coursework: COMP 551 (Applied Machine Learning), MATH 323 (Probability), MATH 271 (PDEs), MECH 579 (Multidisciplinary Design Optimization), MECH 530 (Mechanics of Composite Materials), MECH 309 (Numerical Methods)

Collegiate Degree (DEC) in Honours Health Sciences

Aug. 2019 to May 2021

Marianopolis College, Montreal, QC, Canada

4th Place ISEF '21, President of the Marianopolis Student Union; Director General's Student Life Scholarship '19 to '21; Dean's List

Work Experience

Student Researcher, Drone Swarm Localization

Sept. 2024 to present

McGill University, DECAR Lab (Montreal, Canada)

- Increased classification accuracy by 13% for multi-class occlusion detection on UWB radio wave flight data
- Compressed flight data by 2 orders of magnitude while increasing classification accuracy
- Redesigned drone parts with 2x higher resistance to stress loads under FEA simulations

Engineering Intern, AI & ML Research Team

May 2024 to August 2024

MDA Space (Toronto Area, Canada)

- Sped up image similarity tools by 10x for Canadarm 2 meteorite strike detection pipeline on the International Space Station
- Implemented an optimization pipeline with cm-level precision for Canadarm 3 control systems (Lunar Gateway Space Station)
- Integrated C++ code for autonomous lunar rover testing & worked on field test experiments

Research Lead

January 2024 to June 2024

McGill AI Society, McGill's largest undergraduate group dedicated to studying artificial intelligence (Montreal, Canada)

- Led a team of 4 student researchers, advised by Kelline Pelrine, a PhD candidate at McGill/MILA (Prof. Rabbany's group)
- Presented new state-of-the-art results for non-English misinformation detection on the X-Fact dataset at the MAIUPF and CUCAI undergraduate student conference

Early-Stage Startup Founder

December 2021 to September 2023

Inspire - NEXT AI '23, Vector Institute DaRMoD '23, McGill TechAccel Fall '22, Microsoft Imagine Cup World Finalist '22

- Founded a robotics startup that builds low-cost devices for patient monitoring in isolated regions, backed by NEXT AI '23
- Designed CAD files and implemented electronics for 2 physical iterations of a 3D-printed, low-cost robotic monitoring device
- Implemented a Go Rest API to store FHIR medical data in a NoSQL database along with an Azure AutoML pipeline

Data Scientist

July 2021 to November 2023

Perceive Now (Cincinnati, United States) (remote) - Gener8tor-backed startup with \$8M valuation

- Led the development of v1 of the full-stack core API, enabling the company to raise 6-figures at an \$8M initial valuation
- Sped up 8x processing speeds to analyze information for 3,600 authors per hour from ORCID and the USPTO
- Led product development for 'Customer Intelligence' by building a functional ETL pipeline with search and sentiment analysis

Drone Research and Development Intern

June 2022 to August 2022

Autonomous Control Systems Laboratory (Tokyo, Japan) (in-person) - Japan's largest drone manufacturer

- Created LSTM neural network models to predict motor vibration in heavy-lift, industrial drones in Tokyo, Japan
- Implemented OpenCV's feature tracking algorithms to sort 1GB+ of drone video frames

Backend Developer

June 2019 to September 2019

Soulzone (Montreal, Canada) (in-person) - early-stage startup

- Integrated an Apache Solr search engine with a PostgreSQL database containing placeholder artist profiles
- Created REST API endpoints in Elixir for search requests and API Blueprint documentation

Software Engineering Apprentice

June 2018 to August 2018

Expedia Group (Montreal, Canada) (in-person)

- Developed natural language models in Python to compare text similarity on Expedia's destination websites with Word2Vec
- Implemented a Flask web app interface to generate diversified text content with Semantic UI

Awards and Recognition

- **BLUE Resident Scholar at McGill Building 21** (2025)
- **2x 1st Place** UofT AI Project X Research Comp ('23, '24)
- **\$10,000** Québec Perspective **Scholarship** (2023, 2024)
- **Top 24** Semifinalist Bosch Future Mobility Challenge ('24)
- **\$1,500** Desjardins Scholarship (2024)
- **BLUE Fellow at McGill Building 21** (2024)
- **Best Use of Defang at PennApps XXV (UPenn)** (2024)
- **RippleX Fellow** (2023)
- **Top 6 Paper Submissions** CUCAI (2023)
- **1st Place** Hack AI (Draper) (2023)
- **2x Microsoft Imagine Cup World Finalist** (2022, 2023)
- 2nd place at **HackMIT** (PRHI Challenge) (2022)
- **\$10,000 Cansbridge Fellowship** (2022)
- 4th place at **Regeneron ISEF** (bioinformatics) (2021)
- Marianopolis College **Dean's List** (2019, 2020)
- 2x bronze medals **Canada Wide Science Fair** ('18, '19)
- 1st place **Sanofi Biogenius** (Québec) (2019)
- 3rd place **HackHarvard** (2019)
- **\$3,500** DG Student Life **Scholarship** (2019)
- Père Hardy s.j. **Student of the Year Award** ('19 cohort)
- **Lieutenant-Governor's Youth Medal** (2019)

Technical Skills

Programming Languages: Python, JavaScript (NodeJS, React Native, TypeScript), Go, C++, HTML/CSS, SQL, Elixir, MATLAB, Java

Machine Learning & Computer Vision: Keras, PyTorch, Scikit-Learn, NumPy, OpenCV

Hardware/CAD Software: Solidworks, Siemens NX, MasterCAM, 3D printing, Raspberry Pi, Arduino, ESP-32, PID control, soldering

Languages: English (native), French (native), Chinese Mandarin (conversational), Japanese (basic)

Selected Publications and Poster Presentations

1. **L. Liang**, 'Stacking Small Language Models for Generalizability,' 2024, [arXiv:2410.15570](https://arxiv.org/abs/2410.15570)
2. T. R. Ralambomihanta, S. Mohammadzadeh, M. S. N. Islam, W. Jabbour, **L. Liang**, 'Scavenging Hyena: Distilling Transformers into Long Convolution Models,' *Es-FoMo-II @ ICML 2024*, 2024. [arXiv:2401.17574](https://arxiv.org/abs/2401.17574).
3. V. Cruz and **L. Liang**, 'AGORA: a Language Model for Safe Speech-to-Text Conversion', (WOAH @ **NAACL 2024**), 2024.
4. **L. Liang***, A. Bissell*, S. Bhowmik, M. Mehri*, C. Riachi*, K. Pelrine. 'Evaluating Non-English Misinformation Detection using Large Language Models', Canadian Undergraduate Conference on Artificial Intelligence (CUCAI), 2024.
5. **L. Liang**, V. Pak, N. Irshaid, and Z. Yang, 'Improving Classification Accuracy using Contrastive Principal Component Analysis' (Manuscript in preparation.)
6. **L. Liang**, 'A Comparison of Bounding Box and Landmark Detection Methods for Video-Based Heart Rate Estimation,' [arXiv:2401.01032](https://arxiv.org/abs/2401.01032), 2023.
7. Joly-Chevrier M, Nguyen AX-L, **Liang L**, Lesko-Krlezka M, Lefrançois P. The State of Artificial Intelligence in Skin Cancer Publications. *Journal of Cutaneous Medicine and Surgery*. 2024;0(0). [doi:10.1177/12034754241229361](https://doi.org/10.1177/12034754241229361)
8. **L. Liang**, 'Computer-Based miRNA Predictions to Inhibit SARS-Cov-2 Replication', Regeneron ISEF, 2021. (Awarded 4th place in computational biology).
9. **L. Liang**, 'Using a Computer Model to Assist Neuron Regeneration', Canada-Wide Science Fair (CWSF), 2019. (Awarded a bronze medal in the senior category).
10. **L. Liang**, 'Using AI to Understand Neuronal Behaviour', Canada-Wide Science Fair (CWSF), 2018. (Awarded a bronze medal in the intermediate category).

Speaking Opportunities

1. U. Kalkar and **L. Liang**, 'Panel on Machine Bias,' International Development Conference at the University of Toronto Scarborough, 2024.
2. **L. Liang**, 'A Stochastic Optimization Approach for Energy-Efficient Robotic Manipulator Simulations,' Seminars on Undergraduate Mathematics in Montreal (SUMM 2024), 2024. ([link](#))
3. **L. Liang**, 'Bioinformatics, Molecular Solutions, Intelligent Machines, and the Future of Medical Care,' Big Data and AI Toronto (BDAIT 23), 2023. ([link](#))
4. **L. Liang**, 'Controlling a Robotic Arm using Computer Vision', MIT Splash, 2022. ([link](#)) (E15416 course taught at MIT Splash)
5. **L. Liang**, 'Identifying Cancer Cells Using Genetic Analysis and Computer Vision', MIT Splash, 2022. ([link](#)) (S15418 course taught at MIT Splash)
6. **L. Liang**, 'Curing Disease from our Living Rooms: a Vision for Bioinformatics,' TEDx McGill, 2021. ([link](#))

Selected Technical Projects

Scavenging Hyena: Distilling Transformers into Long Convolution Models [[arXiv](https://arxiv.org/abs/2401.17574)] **September 2023 to present**
McGill AI Society, Project X, supervised by Prof. Irina Rish (University of Montreal, MILA), Stefano Massaroli, PhD (U. Montreal, MILA)

- Implemented natural language evaluation benchmarks for state-space models that underwent joint knowledge transfer.
- Accepted at ES-FoMo-II @**ICML 2024** (workshop)

Improving Classification Accuracy using Contrastive Principal Component Analysis **April 2023 to April 2024**
Supervised by Zachary Yang, PhD student (Prof. Reihaneh Rabbany's Group, McGill University)

- Identified instances where cPCA outperforms PCA for supervised model performance on CIFAR-10, SST, gene expression data, and select UCI datasets. Manuscript in preparation.

1/10-Scale Self-Driving Car **November 2023 to May 2024**
Mentored by Prof. Audrey Sedal (McGill University, MILA), Bosch Future Mobility Challenge 2023-2024 Top 24 Semi-Finalist

- Developed Kalman filters and finite state machines for autonomous driving based on IMU and vision data.

AGORA: A Language Model for Safe Speech-to-Text Conversion [[GitHub code](#)] **September 2022 to June 2024**
1st Place at UofT AI Project X (co-author), workshop presentation WOAHA @NAACL '24 (co-author)

- Developed a novel, recurrent architecture for safe speech-to-text transcription with benchmarks on MuTox and Jigsaw

Disco - A Crowdsourced Drug Discovery Platform for Students **January 2023 to March 2023**
Microsoft Imagine Cup World Finalist 2023 (Top 48)

- Deployed a full-stack web application on Azure using Python for users to search for drug candidates for a specific disease
- Implemented graph searches via Gremlin DB which combined 3 different datasets (gene-gene, gene-drug, gene-disease)

CopyCast - A Handheld Exoskeleton Controlled by Webcam Gesture Tracking **October 2022**
2nd Place PRHI Challenge at HackMIT 2022 [[GitHub code](#)]

- Developed linear transformations to estimate joint angles using Mediapipe and mapped results to ESP-32-controlled motors

AMiF - Computer-Based miRNA Predictions to Inhibit SARS-Cov-2 Replication **July 2020 to May 2021**
ISEF 4th Place in Computational Biology (2021), Ted Rogers Innovation Award (MRSTF 2021)

- Developed a software pipeline that identified 169 miRNA sequences as potential candidates to inhibit SARS-CoV-2 replication
- Integrated a PubMed keyword search, BLAST, and miRDB results

ADAGE - Using Deep Learning to Activate Neuronal Regeneration **September 2018 to May 2019**
Bronze medal at Canada Wide Science Fair 2019 & 3rd place at Sanofi Biogenius Canada 2019

- Designed an ensemble model using ConvNets to identify transcription factors for CNS neuronal regeneration
- Performed RNA isolation for qPCR analysis on zebrafish supervised by Dr. Kessen Patten (INRS Armand-Frappier)