Chen-Yang Su | M.Sc. Student

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Summary

- **Research Interests**: Applications of AI and Machine Learning to improve health care and clinical decision-making, Statistical Genetics, High-throughput genomics, Inverse reinforcement learning and imitation learning.
- **Programming Skills**: Python, C, Java, MATLAB, R, OCaml, Git, Shell, PyTorch, Scikit-Learn

Education

M.Sc., Computer Science, McGill University, Montreal, Canada — Sep 2020–Apr 2022
Advisors: **Brent Richards** (Departments of Medicine, Human Genetics, Epidemiology and Biostatistics) & **Joelle Pineau** (School of Computer Science / Facebook AI Research (FAIR) / Mila - Quebec AI Institute).

B.Sc., Joint Major in Computer Science & Biology, McGill University, Montreal, Canada — 2016–2020
Faculty of Science Dean's Multidisciplinary Undergraduate Research List

Research Experience

Research Assistant, Lady Davis Institute at the Jewish General Hospital, Montreal, Canada — Jun 2020–Aug 2020
Advisors: Dr. Sirui Zhou, Prof. Brent Richards (Faculty of Medicine, Departments of Medicine (Endocrinology), Human Genetics, and Epidemiology and Biostatistics).

Research Intern, Mila - Quebec Artificial Intelligence Institute, Montreal, Canada — Feb 2020–Aug 2020
Worked in Prof. Joelle Pineau's lab with Dr. Wonseok Jeon on research in Inverse Reinforcement Learning and imitation learning. Outcome: 1 conference paper (also accepted as a workshop paper).

Research Intern, McGill University, Montreal, Canada — Jan 2020–Apr 2020
Population genetics research combining high replicate genetic simulation with performant composite likelihood inference on admixture tract distributions to infer the history of admixed populations. Advisors: Dr. Ivan Kryukov, Prof. Simon Gravel. Outcome: semester project thesis

Research Volunteer, McGill University, Montreal, Canada — Aug 2019–Oct 2019
Supported a project on developing a polygenic risk score model to improve understanding of the role of genetics in complex diseases. Advisor: Prof. Yue Li

Research Intern, Kaohsiung Medical University, Kaohsiung, Taiwan — May 2019–Jun 2019
Investigated ligand-receptor binding relationships through molecular docking techniques and performed basic computer drug screening and computational analysis on novel drugs. Conducted modeling and simulation analysis on viral proteins with ChemOffice and Discovery Studio. Advisor: Prof. Ying-Ting Lin.

Research Assistant, McGill University, Montreal, Canada — May 2018–May 2020
Investigated the effect of cadherin isoforms on collective cell migration in endothelial cells. Combined wet lab experimental techniques (molecular cloning, time-lapse microscopy) & dry lab image analysis (edge detection, cell coordination) through MATLAB. Trained new lab members. Advisor: Prof. Arnold Hayer. Outcome: 2 semester project theses.

PROJECTS

XPRIZE Pandemic Response Challenge, Competition, Montreal, Canada Oct 2020–Mar 2021

$500K, four-month competition (link, news article) that focuses on the development of AI and data-driven systems to predict COVID-19 infection rates and prescribe intervention plans that regional governments, communities, and organizations can implement to minimize harm when reopening their cities and restarting their economies. Worked in a team of 12 (website, article) on model development to predict COVID cases and deaths in regions around the world. Rank 1/104 teams for Phase 1, Phase 2 Finalist.

PUBLICATIONS

☐ *Journal Articles* (* denotes equal contribution)

[J3] I. Paranjpe, P. Jayaraman, **C.-Y. Su**, . . ., G. N. Nadkarni, "Proteomic Characterization of Acute Kidney Injury in Patients Hospitalized with SARS-CoV2 Infection," **Nature Communications** (*Under Review*). (medRxiv)

[J2] G. Butler-Laporte, E. Gonzalez-Kozlova, **C.-Y. Su**, . . ., J. B. Richards, "The dynamic changes and sex differences of 147 immune-related proteins during acute COVID-19 in 595 individuals," **Clinical Proteomics** (*Under review*)

[J1] **C.-Y. Su***, S. Zhou*, E. Gonzalez-Kozlova*, . . ., J. B. Richards, "Circulating proteins to predict adverse COVID-19 outcomes," **Scientific Reports** (*Submitted*). (medRxiv)

☐ *Conference Papers*

[C1] W. Jeon, **C.-Y. Su**, P. Barde, T. Doan, D. Nowrouzezahrai, J. Pineau, "Regularized Inverse Reinforcement Learning," ICLR 2021 (Spotlight Presentation, (paper): 167/2977=5.57%)

☐ *Workshops*

[W1] W. Jeon, **C.-Y. Su**, P. Barde, T. Doan, D. Nowrouzezahrai, J. Pineau, "Regularized Inverse Reinforcement Learning," NeurIPS Deep Reinforcement Learning Workshop (DRLW) 2020

☐ *Abstracts*

[A4] **C.-Y. Su**, S. Zhou, E. Gonzalez-Kozlova, G. Butler-Laporte, E. Brunet-Ratnasingham, T. Nakanishi, W. Jeon, D. Morrison, L. Laurent, N. Kimchi, The Mount Sinai COVID-19 Biobank Team, J. Pineau, V. Mooser, N. D. Beckmann, E. Kenigsberg, E. Schadt, S. Kim-schulze, A. W. Charney, S. Gnjatic, D. E. Kaufmann, M. Merad, J. B. Richards, "Circulating proteins to predict adverse COVID-19 outcomes," American Society of Human Genetics 2021.

[A3] **C.-Y. Su**, S. Zhou, W. Jeon, V. Forgetta, J. Pineau, J. B. Richards, "Predicting COVID-19 Outcomes Using Proteomic Data," McGill Endocrine Retreat 2021.

[A2] **C.-Y. Su**, S. Zhou, W. Jeon, V. Forgetta, J. Pineau, J. B. Richards, "Predicting COVID-19 Outcomes Using Proteomic Data," 21st Annual McGill Biomedical Graduate Conference (AMBGC 2021). (Abstract Book pg. 55) (MJM Published Abstracts)

[A1] **C.-Y. Su**, S. Zhou, W. Jeon, V. Forgetta, J. Pineau, J. B. Richards, "Predicting COVID-19 Outcomes Using Proteomic Data," Rosalind and Morris Goodman Cancer Research Centre Annual Symposium 2021.

TECHNICAL REPORTS

[T4] **Su, C.-Y.** Inferring the History of Admixed Populations, COMP 401: Project in Biology and Computer Science, McGill University, Montreal, QC, Canada, April 2020. *Supervised by Dr. Ivan Kryukov and Prof. Simon Gravel*

[T3] **Su, C.-Y.** Regulation of Collective Endothelial Cell Migration by N-cadherin, BIOL 467: Independent Research Project 2, McGill University, Montreal, QC, Canada, April 2019. *Supervised by Prof. Arnold Hayer*

[T2] **Su, C.-Y.** Investigating the Role of Classical Cadherin Isoforms in the Control of Collective Cell Migration, BIOL 466: Independent Research Project 1, McGill University, Montreal, QC, Canada, December 2018. *Supervised by Prof. Arnold Hayer*

[T1] **Su, C.-Y.** Spatial Learning in Porcellio Scaber, the Common Sow Bug, International Baccalaureate: Extended Essay, July 2016. *Received 33 out of 36 possible points where 29 points is an A.*

Invited Talks and Presentations

[IT4] "Circulating proteins to predict adverse COVID-19 outcomes," American Society of Human Genetics, Oct 18-22, 2021. **Poster Presentation**.

[IT3] "Circulating proteins to predict adverse COVID-19 outcomes," CIFAR Deep Learning & Reinforcement Learning (DLRL) Summer School (Virtual), Jul 26-31, 2021. **Poster Presentation**.

[IT2] "Circulating proteins to predict adverse COVID-19 outcomes," Summer Reasoning and Learning (RL) Lab Mini Conference, McGill University (Virtual), Jun 17-18, 2021. **Lightning talk**.

[IT1] "Predicting COVID-19 outcomes using proteomic data," 21st Annual McGill Biomedical Graduate Conference (AMBGC 2021), Virtual, May 11, 2021. **Poster Presentation**. *Won 1st place under the "Genetics and Gene Expression" category* (poster).

Summer Schools and Programs

[S5] Oxford Machine Learning (OxML) Summer School (Virtual), Jul 19-21, Aug 9-20, 2021. *"...15x more [applicants] than the number of seats that the school could offer; from 118 countries."*

[S4] Neuromatch Academy - Deep Learning (NMA-Deep Learning) (Virtual), Aug 2-20, 2021 (Declined)

[S3] CIFAR Deep Learning & Reinforcement Learning (DLRL) Summer School (Virtual), Jul 26-31, 2021

[S2] STAQ Quantum Ideas Summer School, Duke University (Virtual), Jun 7-11, 2021. *Topics covered include: Fundamentals of Quantum Information, Quantum Algorithms, Trapped Ions, Superconductors, Spins in Semiconductors, Quantum Architecture, Quantum Error Correction.*

[S1] Quebec Scientific Entrepreneurship Program (QcSE), Online, May 19 - Sep 23, 2021

Honors and Awards

LOJIQ Fellowship ($700 CAD), Quebec Scientific Entrepreneurship (QcSE) Jun–Sep 2021
Awarded for participation in the Quebec Scientific Entrepreneurship Program. Project title: 77655, NA Quebec / Scientific Entrepreneurship Program (QcSE) / The Quebec Research Fund (FRQ) - Summer 2021.

1st Place, 21st Annual McGill Biomedical Graduate Conference ($250 CAD), McGill University May 2021
Best poster presentation (3 min presentation, 2 min Q&A) under the "Genetics and Gene Expression" category.

LDI / TD Bank Studentship Award ($18,000+ CAD), Lady Davis Institute, Montreal, Canada Apr 2021–Mar 2022
Competition awards a minimum of $18,000 CAD for 1 year with $10,000 CAD supported by TD Bank.

Research Scholarship ($7,125 CAD), Mila - Quebec Artificial Intelligence Institute, Montreal, Canada May–Aug 2020
Awarded for 16-weeks of full-time research. Supervised by Dr. Wonseok Jeon and Prof. Joelle Pineau.

Faculty of Science Dean's Multidisciplinary Undergraduate Research List, McGill University May 2020
Recognizes graduating *"students who have participated in substantial and broad undergraduate science research"*.

Science Undergraduate Research Award (SURA) ($7,000 CAD), McGill University (Declined) Mar 2020
Awarded for 16 weeks of full-time research and development activity under the supervision of a McGill Faculty of Science professor. Awarded by the Department of Biology.

Golden Key International Honour Society Jan 2017
By invite only to the top 15% in a program of study by GPA

Dean's Honour List, McGill University, Montreal, Canada 2017
Awarded to the top 10% in the Faculty of Science by GPA

Graduation Program Examinations Scholarship ($1,250 CAD), British Columbia, Canada 2016
Awarded to the top 5000 Grade 12 students in BC (based on their percentage score) on all five provincial exams.

Teaching

Tutor, Pathways to Education (Pointe-Saint-Charles), Montreal, Canada Jan 2022 - Present
3 hours a week of tutoring high school students from low-income communities (organization).

Teaching Assistant, COMP 202: Foundations of Programming, McGill University Sep 2021 - Dec 2021
Class size $\sim$ 500 students. Lead live sessions, graded and marked student presentations and assignments, hosted office hours and exam review tutorials.

McMedHacks, Hackathon Judge, McGill University Aug 2021
Invited as a judge for a 3-day Hackathon on deep learning in medical image analysis attended by 145 participants (30+ teams).

McMedHacks, Mentor, McGill University Jun–Jul 2021
Mentor for 356 participants (38 countries) attending the Medical Imaging Analysis and Deep Learning in Python Workshop (website). Tasks: created assignments, curated and answered student questions during workshops, and hosted TA sessions.

Service and Leadership

Homeless Shelter Volunteer, Resilience Montreal Feb 2022 - Present
5 hours a week of assisting with preparing and serving meals, organizing and distributing clothing/hygiene products and keeping the environment clean and safe (organization).

Clinic Volunteer and Shadowing, Jewish General Hospital, Endocrinology Sep 2021 - Present
3 hours a week of shadowing and assisting an endocrinologist in the clinic.

Mentor, Buddy Program, Mila - Quebec Artificial Intelligence Institute Aug 2021
Mentored new international graduate students joining Mila in Fall 2021. Showed students around campus and acted as a guide and first point of contact.

Babysitter, Montreal, Canada Aug 2021
In charge of taking care of two children aged 8 (female) and 6 (male). Responsibilities: feeding, changing clothes, monitoring and supervising closely while children play.

International Conference on Machine Learning (ICML), Volunteer (Virtual) 2020, 2021

Conference on Neural Information Processing Systems (NeurIPS), Volunteer (Virtual) 2020

19th Annual Re$earch Money (R$) Conference, Volunteer (Virtual) 2020

SKILLS21 Program Committee, SSMU Representative, McGill University, Montreal, Canada 2019–2020

Teaching & Learning Services Working Group Committee, SSMU Representative, McGill University, Montreal, Canada 2019–2020

Montreal AI Symposium (MAIS), Volunteer, Montreal, Canada 2018, 2020

Tzu Chi Foundation, Food Bank Volunteer, Vancouver, Canada 2014–2016

Leukemia and Lymphoma Society of Canada, Volunteer, Vancouver, Canada Sep 2015–2016

Marpole Community Centre, Volunteer (birthday parties & kids' open gym), Vancouver, Canada Dec 2014–Jun 2015

BMO Half Marathon, Volunteer, Vancouver, Canada Feb 2015

Girls Basketball City Championships, Team Ambassador, Vancouver, Canada Feb 2014–Mar 2014

VEX Robotics Competition, Volunteer, Vancouver, Canada Jan 2014–Jun 2014

Certifications

YMCA Child Protection Policy and Procedures Orientation, Online - certificate — Oct 2021

Oxford Machine Learning Summer School, Virtual - certificate — Aug 2021

ICML Volunteer Certificate of Appreciation, Virtual - certificate 2020, certificate 2021 — Aug 2020, Aug 2021

CIFAR Deep Learning and Reinforcement Learning Summer School, Virtual - certificate — Jul 2021

FRQ DIS-EN: QcSE Discovery, Quebec Scientific Entrepreneurship Program (QcSE), Montreal, Canada - certificate Jun 2021

Personal Finance Essentials, McGill University Desautels Faculty of Management, Montreal, Canada - certificate Aug 2020

Past Certifications

Safe Use of Biological Safety Cabinets, McGill University, Montreal, Canada — May 2018–May 2021

Introduction to Biosafety, McGill University, Montreal, Canada — May 2018–May 2021

Hazardous Waste Management & Disposal, McGill University, Montreal, Canada — Jun 2018–Jun 2021

WHMIS, McGill University, Montreal, Canada — Aug 2018–Aug 2021

Personal Information

Languages
English (native), Chinese Mandarin (native), Taiwanese (native), French (basic knowledge).

Hobbies
Table Tennis, Gymnastics, Running, Calisthenics, Swimming, Yoga, Poetry, Music Production.

Canadian Citizen