

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–Present

Advisors: **Brent Richards** (Departments of Medicine, Human Genetics, Epidemiology and Biostatistics) & **Joelle Pineau** (School of Computer Science / Facebook AI Research (FAIR)).

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–Feb 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)

[J1] C.-Y. Su*, S. Zhou*, E. Gonzalez-Kozlova*, . . . , J. B. Richards, "Circulating proteins to predict adverse COVID-19 outcomes," **Nature Medicine** [IF: 36.13] (*submitted*)

□ *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*

[A3] 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 (*submitted*).

[A2] 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.

[A1] 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](#))

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

[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 3, 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 April 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.
- 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.

SERVICE AND LEADERSHIP

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

Conference on Neural Information Processing Systems (NeurIPS) , Volunteer (Virtual)	2020
19th Annual ReSearch Money (R\$) Conference , Volunteer (Virtual)	2020
International Conference on Machine Learning (ICML) , 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, 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

FRQ DIS-EN: QcSE Discovery , Quebec Scientific Entrepreneurship Program (QcSE), Montreal, Canada	Jun 2021
Personal Finance Essentials , McGill University Desautels Faculty of Management, Montreal, Canada	Aug 2020
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