Shihao(Rex) Ma

CONTACT INFORMATION
108 College St
Toronto, ON M5G 0C6
rex.ma@mail.utoronto.ca
google scholar, personal website

EDUCATION

University of Toronto, Ontario, Canada
Ph.D. in Computer Sciences — Sept. 2020 - present

- Supervisory Commitee: Bo Wang, Anna Goldenberg, Benjamin Haibe-Kains
- Research Focus: Multimodal integration, genomic foundational model, LLM in biology

University of Toronto, Ontario, Canada
B.A.Sc in Computer Engineering, GPA: 3.87/4.00 — Sept. 2015 - June 2020

EXPERIENCE

Xaira Therapeutics, South San Francisco, United State
AI Scientist Intern — Sept. 2025 - present

Vector Institute for Artificial Intelligence, Toronto, Canada
Machine Learning Researcher — Sept. 2020 - present

Fable Therapeutics, Toronto, Canada
Research Scientist Intern — May 2022 - Aug. 2022

- De novo antibody protein design, 3D geometric deep learning, protein structure generation.

University Health Network, Toronto, Canada
Machine Learning Engineering Intern — May 2019 - Aug. 2019

- Prognosis prediction of patients with heart failure, deep learning for single-cell RNA-seq data.

IBM - DB2 Availability & Recovery Domain, Toronto, Canada
Software Engineering Intern — May 2017 - May 2018

- Created a prototype for Goldman Sachs to improve exclusive database access for Db2 offline utility commands.
- Addressed over 60 recovery defects in the DB2 code base.

PUBLICATIONS

Ma, S. et al. Moving towards genome-wide data integration for patient stratification with Integrate Any Omics. *Nature Machine Intelligence, 7, p29-42* (2025). [Paper]

Chen, X.*, Ma, S.* et al. Ctrl-DNA: Controllable Cell-Type-Specific Regulatory DNA Design via Constrained RL. *NeurIPS Spotlight Presentation (top 3.2%)* (2025). [Paper]

Fallahpour, A.*, Magnuson, A.*, Gupta, P.*, Ma, S. et al. BioReason: Incentivizing Multimodal Biological Reasoning within a DNA-LLM Model. *NeurIPS Poster Presentation* (2025). [Paper]

Xu, Y.*, Ma, S.*, Cui, H*. et al. AGILE platform: a deep learning powered approach to accelerate LNP development for mRNA delivery. *Nature Communication, 15, 6305* (2024). [Paper]

Douglas L.*, Ma, S.* et al. Predictors of mortality among long-term care residents with SARS-CoV-2 infection. *Journal of the American Geriatrics Society, 69, p3377-3388* (2021).[Paper]

Abdul, K., Ma, S. et al. Comparison of machine learning and conventional statistical modeling for predicting readmission following acute heart failure hospitalization *American Heart Journal, 277, p93–103* (2024). [Paper]

Austin, D., Douglas L., Wang C., Ma, S. et al. Comparison of machine learning and the regression-based EHMRG model for predicting early mortality in acute heart failure *International Journal of Cardiology, 65, p78–84* (2022). [Paper]

Douglas L., Wang C., McAlister F. Ma, S. et al. Factors associated with SARS-CoV-2 test positivity in long-term care homes: a population-based cohort analysis using machine learning *The Lancet Regional Health–Americas, 6, 100146* (2022). [Paper]

Ma, J., Zhang Y., Gu S., Ge Cheng., Ma, S. et al. Unleashing the strengths of unlabelled data in deep learning-assisted pan-cancer abdominal organ quantification: the FLARE22 challenge *The Lancet Digital Health, Volume 6, Issue 11, e815 - e826* (2024). [Paper]

Nitski, O., Azhie A., Qazi F., Wang X., Ma, S. et al. Long-term mortality risk stratification of liver transplant recipients: real-time application of deep learning algorithms on longitudinal data. *The Lancet Digital Health, Volume 3, Issue 5, e295 - e305* (2021). [Paper]

Patents

Systems and Methods for AI-Based Ionizable Lipid Development for Lipid Nanoparticle (LNP)-Based Cargo Molecule Delivery (PCT/CA2024/050644).

Honors and Awards

University of Toronto Computer Science Departmental Fellowship	2023-2024
University of Toronto Computer Science Departmental Fellowship	2022-2023
Undergraduate Research Opportunity Program (UROP) Awards	2018

Teaching Experience

University of Toronto, Toronto, Canada

Teaching Assistant

CSC413/CSC2516 - Neural Networks and Deep Learning	Fall 2024
CSC108 - Introduction to Computer Programming	Winter 2024
CSC413/CSC2516 - Neural Networks and Deep Learning (Head TA)	Winter 2023
CSC413/CSC2516 - Neural Networks and Deep Learning	Winter 2022
CSC110 - Foundations of Computer Science	Fall 2021
CSC413/CSC2516 - Neural Networks and Deep Learning	Winter 2021
CSC108 - Introduction to Computer Programming	Fall 2020

Computer Skills

- Proficient with: Python, C++, R, Git, Linus, Agile (Scrum)
- Familiar with: HTML5, SQL, CSS, Java, Matlab
- Soft skills: Public Speaker, Motivator, Collaborator, Leader