

EDUCATION

- University of California, Berkeley** Berkeley, USA
PhD Student, Department of Electrical Engineering and Computer Science *Aug 2021 - Present*
- University of Toronto** Toronto, Canada
Masters in Computer Science *Jan 2019 – May 2020*
– Thesis: *Contrastive Learning of Protein Representations by Mutual Information Maximization*
- University of Waterloo** Waterloo, Canada
Bachelors of Science, Honours Science, Bioinformatics Option *Sept 2014 – May 2018*
– Thesis: *Interpreting Convolutional Neural Networks for Discovering Regulatory Motifs of Femur Growth*

RESEARCH EXPERIENCE

- Prescient Design (Genentech)** New York / South San Francisco, USA
Data Scientist II *June 2023 – Present*
– Generative methods for antibody design with biological priors.
- UC Berkeley/Berkeley AI Research** Berkeley, USA
PhD Student — Advisor: Pieter Abbeel *July 2021 – Present*
– Developing methods for ML-guided protein design.
- Google Brain** Mountain View, USA
Student Researcher — Host: Andreea Gane *May 2022 – Dec 2022*
– Understanding protein functions using large language models.
- Insitro** South San Francisco, USA
Machine Learning Engineer III *July 2020 – July 2021*
– Representation learning for phenotype learning from microscopy images.
– Equivariant representation learning for small molecule design.
- University of Toronto/Vector Institute** Toronto, Canada
Masters Student — Advisors: Alan Moses, Marzyeh Ghassemi *Jan 2019 – May 2020*
– Self-supervised representations for proteins using contrastive mutual information maximization (*MLCB 2020, PLOS Computational Biology*).
– Benchmarking self-supervised computer vision methods for microscopy images to address generalization challenges to natural covariate shifts (*NeurIPS 2019*).
– Quantitative and qualitative evaluation of bias in contextual word embeddings of clinical notes (*Spotlight, ACM CHIL 2020*).
- Stanford University** Stanford, USA
Visiting Student Researcher *Sept 2019 – Jan 2020*
– Cross-cell transcription factor binding prediction via deep domain adaptation methods.
- Harvard Medical School/Boston Children’s Hospital** Boston, USA
Intern, Research Computing — Advisor: Piotr Sliz *Jun 2018 – Jan 2019*
– Understanding genotype-phenotype relationships in childhood epilepsy. Model interpretation for discovering novel disease-associated variants from whole exome (WES) data.
- University of Waterloo** Waterloo, Canada
Undergraduate Thesis Student — Advisor: Andrew Doxey *Sept 2017 – May 2018*
– Prediction of accessible chromatin regions for femur growth regulation. Reconstructed convolutional filters as a position-weighted matrix (PWM) with statistical matches in JASPAR, a database of known motifs.
- École polytechnique fédérale de Lausanne** Lausanne, Switzerland
Research Intern — Advisor: Matteo Dal Peraro *Jun 2017 - Sept 2017*
– Used molecular dynamics (MD) and GROMACS to simulate enzyme-membrane interaction mechanisms of NDM-1, an enzyme which confers antibiotic resistance.

AWARDS

D. E. Shaw Graduate & Postdoc Women's Fellowship – Fellowship program for graduate & postdoc women in computational drug discovery	2022
Paula Hawthorn Fellowship – UC Berkeley Computing, Data Science and Society departmental fellowship.	2021
NSERC Postgraduate Scholarships – Doctoral program (PGS D) Award – Federal doctoral scholarship tenurable abroad, selected in the Committee for Computing Sciences.	2020
NSERC Canada Graduate Scholarships – Doctoral (CGS D) Award – Federal doctoral scholarship tenurable only at a Canadian institution [DECLINED].	2020
NSERC Michael Smith Foreign Supplement – Supports high-calibre Canadian graduate students in pursuing research abroad.	2019
Alexander Graham Bell Canada Graduate Scholarships – Master's (CGS M) Award – Federal research scholarship for high-calibre Master's research students.	2018
EPFL Scholarship of Excellence in Research – Sponsors students for research internship at EPFL.	2017
President's Scholarship of Distinction, Arebi Family Science Scholarship – Entrance scholarships, University of Waterloo.	2014
Royal Conservatory of Music (RCM) – ARCT Performer's Diploma in Piano.	2013

PREPRINTS AND PUBLICATIONS

- R Boger*, **AX Lu***, S Chithrananda*, K Yang, P Skopintsev, B Adler, E Wallace, P Yoon, P Abbeel, J Doudna. TOPH: Adapting A Contrastive Question-Answering Framework for Protein Search. *ICML Workshop on Computational Biology*, 2023.
- AJ Reddy, MH Herschl, S Kolli, **AX Lu**, X Geng, A Kumar, PD Hsu, S Levine, NM Ioannidis. Pretraining strategies for effective promoter-driven gene expression prediction. *bioRxiv*, 2023.
- AX Lu**, **AX Lu**, I Pritisanac, T Zarin, JD Forman-Kay, AM Moses. Discovering molecular features of intrinsically disordered regions by using evolution for contrastive learning. *PLOS Computational Biology*, 2022
- S Kolli, **AX Lu**, X Geng, A Kumar, S Levine. Data-Driven Optimization for Protein Design: Workflows, Algorithms and Metrics. *ICLR Workshop on Machine Learning for Drug Discovery (MLDD)*, 2022.
- C Dallago, K Schütze, M Heinzinger, T Olenyi, M Littmann, **AX Lu**, KK Yang, S Min, S Yoon, JT Morton, B Rost. Using protein sequence representations from deep learning to visualize and predict protein sets. *Current Protocols*, 2021.
- AX Lu**, H Zhang, M Ghassemi, AM Moses. Self-supervised contrastive learning of protein representations by mutual information maximization. *Machine Learning for Computational Biology (MLCB)*, 2020.
- AX Lu**, AX Lu, AM Moses. Evolution Is All You Need: Phylogenetic Augmentation for Contrastive Learning. *Machine Learning for Computational Biology (MLCB)*, 2020.
- H Zhang*, **AX Lu***, M Abdalla, M McDermott, M Ghassemi. Hurtful Words: Quantifying Biases in Clinical Contextual Word Embeddings. *Spotlight, ACM Conference on Health, Inference, and Learning (CHIL)*, 2020.
- AX Lu**, **AX Lu**, W Schormann, M Ghassemi, DW Andrews, AM Moses. The Cells Out of Sample (COOS) dataset and benchmarks for measuring out-of-sample generalization of image classifiers. *Neural Information Processing Systems (NeurIPS)*, 2019.
- M Abdalla, H Zhang, **AX Lu**, I Chen, M Ghassemi. Quantifying Fairness in a Multi-Group Setting and its Impact in the Clinical Setting. *NeurIPS Workshop on Fair ML for Health*, 2019.
- AM Moses, **AX Lu**, **AX Lu**, M Ghassemi. Transfer Learning vs. Batch Effects: what can we expect from neural networks in computational biology? *Machine Learning for Computational Biology (MLCB)*, 2019.
- AX Lu**, **AX Lu**, AM Moses. Paired Cell Inpainting: A Multiple-Instance Extension of Self-Supervised Learning for Bioimage Analysis. *ICML Workshop on Self-Supervised Learning*, 2019.
- J Ban, M Tadrous, **AX Lu**, EA Cicinelli, SM Cadarette. Diffusion of indirect comparison meta-analytic methods to study drugs: a systematic review and co-authorship network analysis. *BMJ Open*, 2018.

SERVICE

Board Member, Berkeley Women in Computer Science and Engineering – Event and programming supporting Berkeley women in CS and engineering.	2023 – Present
Co-organizer, ML Protein Engineering Seminar Series – Biweekly research seminars for the broader ML for protein engineering community.	2022 – Present
Core Team, Research to the People – Non-profit connecting rare genomic disease patients to academic communities and industry sponsors for collaborative research.	2018 – 2020
Waterloo Residence Don – Residence manager for the Velocity Residence (spin-off program of the Velocity start-up incubator) and first-year residences.	2016 – 2018
Volunteer, Tosamaganga Hospital – Supported operations and shadowed physicians at a rural Tanzanian hospital	2016

REVIEWING

Nature	2023
Machine Learning for Health (ML4H)	2020, 2021, 2022, 2023
Machine Learning for Computational Biology (MLCB)	2021
ICLR Workshop on AI4Science	2022
ICML Workshop on AI4Science	2022
NeurIPS Workshop on ML for Structural Biology (MLSB)	2022, 2023
NeurIPS Workshop on Generative AI for Biology	2023
NeurIPS Workshop on AI for Science	2021, 2022, 2023
NeurIPS Workshop on Distribution Shifts	2021, 2022, 2023
NeurIPS Workshop on Robustness in Sequence Modelling	2022

TEACHING

Teaching Assistant, Genetics (BIOL 239)	2016
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MENTORSHIP

Sathvik Kolli	Undergrad, 5th year MS
Seyone Chithrananda	Undergrad