Tianyu Lu

University of Toronto
Computer Science and
Computational Biology

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Courses

Mathematical Statistics, Molecular Biology, Machine Learning, Biochemistry

Work Experience

Research Intern
Barua Lab – Toronto General Hospital

- Integrating histology, genomics and proteomics datasets to predict steroid sensitivity in patients with kidney disease
- Found 30 differentially expressed genes associated with kidney disease

iOS Developer
Schlichting Lab – University of Toronto

- Vectorized code to save data processing time of dissimilarity matrices by over 95%
- Learned Swift and MATLAB on the job to develop three iPad apps used for neuro-science research

Instructor – ML and Algorithms
Canadian Synthetic Biology Education Research Group – University of Toronto

- Create machine learning workshops and lectures for SYNB1 course

Awards

iGEM – Gold Medal, nominated for best manufacturing project
Hack the North 2019 Finalist – Top 12 team out of 1500 participants
National Biology Competition – Top 1%
University of Toronto Scholarship

Projects

Drylab Lead – Protein Design
International Genetically Engineered Machines – University of Toronto

- Designed novel Rosetta-RNN pipeline to generate plastic-degrading proteins
- Combined transfer learning with variational autoencoders and importance sampling to design mutations with two times higher activity than wildtype

Transcription Factor Inhibitor Design
Kim Lab – Donnelly Centre for Cellular and Biomolecular Research

- Use GROMACS to perform molecular dynamics simulations on DNA binding proteins
- Use Rosetta and Graph Neural Networks to sample candidate protein designs

Innovape

- Used Gaussian Processes to model Juul users' nicotine dependence

Talks

- Optimization of IsPETase – iGEM Jamboree, Boston, MA
- Machine Learning for Protein Design – University of Guelph

Interests

Reinforcement Learning, Biological Computation, Differential Geometry, Genetic Circuits