Tianyu Lu

University of Toronto
Computer Science and
Computational Biology

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Courses

Enriched Data Structures and Algorithms, Machine Learning, Biochemistry, Mathematical Statistics, Molecular Biology

Work Experience

Research Intern
Barua Lab – Toronto General Hospital

- Found 30 differentially expressed genes associated with kidney disease (Focal Segmental Glomerular Sclerosis)
- Discovered and resolved RNA sequencing pipeline bugs in shell scripts
- Designing integrative pathology, transcriptome and proteome approaches to predict steroid sensitivity in patients 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 Objective-C on the job to develop three iPad apps used for neuroscience research
- Worked with all lab members to resolve technical issues

Awards

Hack the North 2019 Finalist – Top 12 team out of 1500 participants
National Biology Competition Top 1% ($3000)
University of Toronto Scholarship ($10000)

Projects

Machine Learning for 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 Gaussian Processes to design mutations with 18 times higher activity than wildtype

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

- Found optimal solution of protein docking using HADDOCK, currently verifying stability with Molecular Dynamics

Innovape

- Hack the North Finalist
- Used Gaussian Processes to model Juul users' nicotine dependence and provide a personalized nicotine reduction algorithm

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