Karen Liu

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Education

University of Toronto, BSc

September 2019 – Present

- Bioinformatics and Computational Biology Specialist, Statistics Major and Computer Science Minor
- Received the Dean's List Scholar designation for both the 2020 and 2021 school year
- cGPA: 3.9

Research Experience

Research Student – Donnelly Centre

September 2021 – Present

Currently working in the Taipale lab to perform computational analysis of the secondary structures of transactivation domains. Highlights include:

- Extracting secondary sequences of transactivation domains using the DSSP algorithm based on AlphaFold2 predictions
- Wrote scripts using R to annotate sequences using datasets from various databases including BioGRID and Pfam
- Performed statistical analysis using a simulation-based hypothesis test to determine significance of trends seen using R

Summer Student Trainee – Donnelly Centre

May 2021 – September 2021

Worked in the Taipale lab investigating the chaperone-like properties of 14-3-3 proteins. Highlights include:

- Received an Undergraduate Research Opportunity Program (UROP) Award from the department of Molecular Genetics in order to participate in the summer student program
- Performed various wet lab procedures including western blots and cell culture work in order to quantify the chaperone-like abilities of 14-3-3 proteins
- Performed quantification of western blots using ImageJ
- Abstract was selected to be presented at the Donnelly Summer Student Symposium

Skills

Computer Skills

- Programming languages: Java, Python, R, C
- Operating Systems: Windows, Mac OS, Linux
- Software: GitHub, Microsoft Office Suite (PowerPoint, Word, Excel)

Statistical Analysis

Implementation using R:

- Exploratory data analysis
- Data cleaning
- Linear regression models and model validation
- Classification trees
- Confidence intervals and bootstrapping
- Hypothesis testing
- Goodness of fit test
- Maximum likelihood estimation

Laboratory Skills

- Cell culture and transfection
- Western Blot
- Bacterial transformation
- Plasmid miniprep
- Small and large-scale protein induction and purification
- Agarose gel electrophoresis

Relevant Coursework

Completed

- Methods of Data Analysis I (STA302)
- Probability, Statistics and Data Analysis I (STA237) & II (STA238)
- Introduction to the Theory of Computation (CSC236)
- Software Design (CSC207)
- General & Human Genetics (HMB265)
- Biochemistry I: Proteins, Lipids and Metabolism (BCH210)
- Bioinformatics (BCH441)

In Progress

- Design and Analysis of Experiments (STA305)
- Theory of Statistical Practice (STA355)
- Software Tools and Systems Programming (CSC209)
- Data Structures and Analysis (CSC263)

- Biochemistry II: Nucleic Acids and Biological Information Flow (BCH311)