

# Kevin Zhang

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Citizenship: Canada, New Zealand

## Research interests

Optimal transport, stochastic differential equations, machine learning, artificial intelligence, scRNA-seq, generative modelling, anomaly detection, game theory

## Education

- 2019 – 2024 **University of Toronto** – Toronto, Ontario, Canada  
PhD in Statistics  
Advisors: [Dr. Dehan Kong](#), [Dr. Zhaolei Zhang](#).
- 2015 – 2019 **University of Toronto** – Toronto, Ontario, Canada  
HBSc in pathobiology, statistics and mathematics. *major GPA: 4.0/4.0. GPA: 3.9/4.0.*

## Publications

- 2024 **Modeling Single Cell Trajectory Using Forward-Backward Stochastic Differential Equations**  
[K. Zhang](#), [J. Zhu](#), [D. Kong](#), and [Z. Zhang](#).  
*PLOS Computational Biology*. [[Link to article](#)][[Link to GitHub](#)]
- 2023 **Modeling Cell Type Development Trajectory using Multinomial Unbalanced Optimal Transport**  
[K. Zhang](#), [J. Zhu](#), [Z. Zhang](#), and [D. Kong](#).  
*Journal of the American Statistical Association* (under review). [[Link to GitHub](#)]
- 2023 **LLOT: application of Laplacian Linear Optimal Transport in spatial transcriptome reconstruction**  
[J. Zhu](#), [K. Zhang](#), [Z. Zhang](#), and [D. Kong](#).  
*Journal of the American Statistical Association* (under review).

2018 **Conserved *pbp1/ataxin-2* regulates retrotransposon activity and connects polyglutamine expansion-driven protein aggregation to lifespan-controlling rdna repeats.**

L. Ostrowski, A. Hall, K. Szafranski, R. Oshidari, K. Abraham, J. Chan, C. Krustev, K. Zhang, A. Wang, Y. Liu, R. Guo, and K. Mekhail.

*Nature: Communications Biology.*

## Teaching experience

Summer 2024 **University of Toronto (Sessional Instructor)** – Toronto, Ontario, Canada  
STA237: Probability, Statistics and Data Analysis I

Fall 2019-Present **University of Toronto (Teaching Assistant)** – Toronto, Ontario, Canada  
Courses include:

STA130: An Introduction to Statistical Reasoning and Data Science

STA220: The Practice of Statistics I

STA255: Statistical Theory

STA261: Probability and Statistics II

STA302: Methods of Data Analysis I

STA303: Methods of Data Analysis II

STA304: Surveys, Sampling and Observational Data

STA305: Design and Analysis of Experiments

STA347: Probability

STA414: Statistical Methods for Machine Learning II

STA437: Methods for Multivariate Data

STA442: Methods of Applied Statistics

## Review experience

2023 Canada Communicable Disease Report (2 times)

2023 Journal of the American Statistical Association (1 time)

2022 Journal of the Royal Statistical Society: Series C (1 time)

## Presentations

December 2022 Modelling Cellular Development Trajectory using Unbalanced Optimal Transport  
*Medicine by Design's 7th Annual Symposium*

July 2022 Modelling Single-Cell Type Trajectory Using Optimal Transport  
*The Fifth ICSA-Canada Chapter Symposium*

## Honors and scholarships

2015-2019 Dean's List (University of Toronto)  
2018 New College Council In-Course Scholarship (University of Toronto)  
2017 LMP Undergraduate Summer Research Program UROP Award (University of Toronto)  
2015 Undergraduate Entrance Award (University of Toronto)

## Technical skills

### Programming languages

Proficient in: Python, R, SQL

Familiar with: C++, Linux/UNIX environment, MATLAB, HTML

### Libraries/Packages

Python: NumPy, Pandas, matplotlib, PyTorch (including CUDA GPU Configuration), TensorFlow, scikit-learn, XGBoost

R: dplyr, ggplot2, tidyverse

### Software

Git, SLURM Workload Manager, Docker

## References

### Dr. Dehan Kong

University of Toronto

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### Dr. Zhaolei Zhang

University of Toronto

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### Dr. Piotr Zwiernik

University of Toronto

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