

KAIXIN ZHENG

Email: k59zheng@uwaterloo.ca Website: <https://sites.google.com/view/kaixin-zheng>

EDUCATION

Doctor of Philosophy in Computer Science

University of Waterloo, Waterloo, ON, Canada | Sept. 2025-June 2029(expected)

Supervisor: Dr. Anita Layton

Master of Mathematics in Applied Mathematics (Thesis-based)

University of Waterloo, Waterloo, ON, Canada | Jan. 2023-Jan. 2025

Supervisor: Dr. Anita Layton

GPA: 92.5/100 (equivalent to 4.0/4.0)

Thesis: “*Mathematical Models of Kidney Function: Effects of Hypertension and Circadian Rhythm*”

Bachelor of Science in Honors Mathematics; Minor in Computer Science

New York University, New York, NY, United States | Sept. 2019-May 2022

GPA: 3.89/4.0 (summa cum laude, top 5% across all majors)

Bachelor of Science in Physics (Transferred to New York University)

University of California, Irvine, Irvine, CA, United States | Sept. 2018-Jun. 2019

GPA: 4.0/4.0

HONORS AND AWARDS

Women in Mathematics Mentorship Award, University of Waterloo Apr. 2029

Graduate Research Studentship, University of Waterloo Sept. 2025- June 2029

- Departmental research funding covering tuition and stipend for PhD studies.

International Doctoral Student Award, University of Waterloo Sept. 2025- June 2029

- Multi-year award (~CAD 15420/year) for international PhD students.

Graduate Research Studentship, University of Waterloo Jan. 2023-Jan. 2025

- Departmental research funding covering full tuition and partial stipend for research-based Master of Mathematics studies.

Dean's List, New York University Fall 2019-Spring 2022

Dean's Honor List, University of California, Irvine Fall 2018-Spring 2019

RESEARCH EXPERIENCE

Graduate Researcher

David R. Cheriton School of Computer Science, University of Waterloo

Waterloo, ON, Canada | Jan. 2025-present

Supervisor: Dr. Anita Layton

- Working on discovering governing equations in biological systems with machine learning.

Graduate Researcher

Applied Mathematics Department, University of Waterloo

Waterloo, ON, Canada | Jan. 2023-Jan. 2025

Supervisor: Dr. Anita Layton

- Utilized numerical PDE method to simulate mammalian kidney function.
- Focused on sex differences and circadian regulation on drug administration efficacy.
- Developed a flow-dependent nephron model to predict solute and water reabsorption in the rat kidney under AngII-induced hypertension ([link](#)).
- Developed a mathematical model of circadian rhythms in the kidney to analyze the impact of drug timing and circadian regulation in hypertension ([link](#)).

Undergraduate Research Assistant

Courant Institute of Mathematics, New York University

New York, NY, United States | Jun. 2021-Dec. 2021

Advisor: Dr. David McLaughlin

- Reviewed papers on calcium diffusion and PDE-based modeling in dendritic spines.
- Investigated calcium distribution in the spine head with analytic PDE methods.

PUBLICATIONS

Peer-reviewed:

Zheng, K., & Layton, A. T. (2024). Predicting sex differences in the effects of diuretics in renal epithelial transport during angiotensin II-induced hypertension. American Journal of Physiology-Renal Physiology, 326(5), F737-F750. <https://doi.org/10.1152/ajprenal.00398.2023>

Book Review:

Abo, S., Cheung, C. C., Dasgupta, R., Dutta, P., Hakimi, S., Kaur, A., ... & **Zheng, K.** (2023). Featured Review: Mathematical Modeling for Epidemiology and Ecology.

COURSE PROJECTS

A Comprehensive Model to Differentiate Spontaneous, Drug-induced, and CSCs-related Drug Resistance ([link](#))

Course: AMATH 881-Introduction to Mathematical Oncology

University of Waterloo | Winter 2024

- Modeled spontaneous, drug-induced, and CSCs-related drug resistance in bladder cancer.
- Quantitatively compared dosage strategies under the same cumulative dosage.

Lab Book on Asymptotic Analysis and Perturbation Theory ([link](#))

Course: AMATH 732-Asymptotic Analysis and Perturbation Theory

University of Waterloo | Fall 2023

- Created a lab book summarizing course concepts like asymptotic expansions, perturbation methods, and signal processing.
- Provided detailed proofs and MATLAB visualizations of normal modes in N-coupled oscillators.

TEACHING

Graduate Teaching Assistant

Applied Mathematics Department, University of Waterloo
Waterloo, ON, Canada | Jan. 2023-Dec. 2024

- Courses taught:
 - SYDE 211: Calculus 3 (2023 Winter)
 - MATH 137: Honor Calculus 1 (2023 Fall)
 - MATH 237: Advanced Calculus 3 (2023 Fall)
 - AMATH 331: Applied Real Analysis (2024 Winter)
 - AMATH 382: Computational Modelling of Cellular System (2024 Winter)
- Responsibilities:
 - Evaluated assignments, quizzes, and exams with detailed feedback.
 - Facilitated weekly tutorial sessions and office hours.

Grader

Courant Institute of Mathematical Sciences, New York University
New York, NY, United States | Sep. 2021-Dec. 2021

- Courses graded:
 - MATH-UA.251 Introduction to Mathematical Modeling (2021 Fall)
 - MA-UY.4414 Applied Partial Differential Equations (2021 Fall)
- Responsibilities: Graded assignments, quizzes, and exams.

MENTORSHIP

Undergraduate Research Mentor

Faculty of Mathematics, University of Waterloo
Waterloo, ON, Canada | Jan. 2025-Apr. 2025

- Mentored underrepresented undergraduate students as part of the Women in Mathematics Directed Reading Program.
- Supported two mentees in a research project focused on circadian rhythm modeling.
- Provided guidance in independent study and preparation for a final presentation.

VOLUNTEER

Student representative at Math Grad Visit Day

Applied Mathematics Department, University of Waterloo
Waterloo, ON, Canada | Mar. 2024

- Participated in the prospective graduate student welcome event for the Applied Mathematics Department.
- Delivered a presentation as the student representative on the department and its programs.