Tianyu Cheng

York University, LIAM, 267
Chimneystack Rd,
North York, ON M3J 3K1

E-mail:
tianyu45@yorku.ca
tchen454@gmail.com

Education

Ph.D. Applied Mathematics, Western University, London, ON, Canada, 2019-Oct 2023

- Supervisor: Xingfu Zou

M.Sc. Computing Mathematics, Shaanxi Normal University, China, 2016-2019

- Supervisor: Sanyi Tang

B.Sc. Mathematics and Applied Mathematics, South China Normal University, China, 2012-2016

Employment

Postdoctoral fellow, Laboratory for Industrial and Applied Mathematics, York University, Toronto, ON, Canada, Jan 2024-present

- Supervisor: Jianhong Wu
- Project: Epidemic modelling and dynamical systems

Publications

- **T. Cheng**, and X. Zou, On final and peak sizes of an epidemic with latency and effect of behaviour change, *Journal of Mathematical Biology*, 91(2), (2025), 1-45.
- **T. Cheng**, and J. Wu, Recurrent patterns of disease spread post the acute phase of a pandemic: insights from a coupled systems of differential equation for disease transmission and a delayed algebraic equation for behavioral adaptation, *Mathematical Biosciences*, 109480, (2025).
- **T. Cheng**, and X. Zou, Modelling the impact of society precaution on disease dynamics and its evolution, *Journal of Mathematical Biology*, 89(1), (2024), 1.
- **T. Cheng**, and X. Zou, A new perspective on infection forces with demonstration by a DDE infectious disease model. *Mathematical Biosciences and Engineering,* 19(5), (2022), 4856-4880.
- **T. Cheng**, and X. Zou, Modeling the impact of vaccination strategies dependent on epidemic severity and vaccine efficacy on disease dynamics, preprint, 2023.
- Q. Zhang, B. Tang, **T. Cheng** and S. Tang, Bifurcation Analysis of a Generalized Impulsive Kolmogorov Model With Applications to Pest and Disease Control, *SIAM Journal on Applied Mathematics,* 80(4), (2020), 1796–1819.
- **T. Cheng**, S. Tang and R. A. Cheke, Threshold Dynamics and Bifurcation of a State Dependent Feedback Nonlinear Control Susceptible Infected Recovered Model, *Journal of Computational and Nonlinear Dynamics,* 14(7), (2019), 1-14.
- Kim, S., S. Athar, Y. Li, Koumarianos, S., **T. Cheng**, ...& J. Wu. Assessing the epidemiological and economic impact of alternative vaccination strategies: a modelling study. *International Journal of Infectious Diseases*, 116, (2022), S60.

Presentations

Recent:

- Minisymposia Talk (Invited), The Third Joint SIAM/CAIMS Annual Meetings (AN25), Montréal, Québec, July 28-Aug 1, 2025.
- Poster, Workshop on Mathematical Ecology-2025 Theme: Phylodynamics, Queen's University, Kingston, July 24-25, 2025.
- Minisymposia Talk, Society for Mathematical Biology Annual Meeting-2025, Edmonton, Canada, July 13-18, 2025.
- Poster Session, *"Modelling and Theory in Population Biology,"* National Institute for Theory and Mathematics in Biology — Travel Award Recipient, Chicago, USA, June 2-6, 2025.
- Invited Talk, Workshop on Differential Equations and Mathematical Biology, University of Miami, Coral Gables, Nov 23-26, 2024.
- Talk, 2024 MfPH International Collaborative Summer Program in Nonlinear Differential Equations with Application, York University, Toronto, Aug 21, 2024.
- Minisymposia Talk, 2024 Canadian Applied and Industrial Mathematics Society Annual Meeting (CAIIMS), Queen's University, June 24-27, 2024.
- Invited Talk, UNL Mathbio seminar, Online, Nov 2, 2023.
- Minisymposia Talk, Society for Mathematical Biology Annual Meeting-2023, Ohio State University, July 16-21, 2023.
- Poster Session, Advance in Mathematical Ecology-2023, Pittsburgh University, June 1-3, 2023.
- Talk, Scientific Session, *"Topics in Mathematical Biology: Theory, Applications and Future Perspectives,"* 2022 Canadian Mathematical Society Meeting, Toronto, Canada, Dec 2-5, 2022.
- Poster Session, Fields Workshop on Mathematical Ecology: Modeling Epidemics, Queen's University, Canada, Aug 10-13, 2022.
- Group Presentation, Fields CQAM Thematic Program on Integrative Modeling of Emerging Infectious Disease Outbreaks, Canada, May-June 2021.
- Dynamical Systems Seminar, Western University, every academic term, Sept 2019-present.
- Organizer, Dynamical Systems Seminar, Western University, From 2022-Fall term to 2023-Winter term.

Teaching Experience

Research Assistant, Western University, Fall 2019-Summer 2023
Teaching Assistant, Western University, Fall 2019-Fall 2023

- Courses: Advanced Calculus I/II, Calculus and Probability with Biological Applications, Partial Differential Equation I/II, Special Topics in Mathematics (*Topic: Introduction to Mathematical Biology*).
- Job Duties: marking assignments and exams, lecturing, running tutorials, office hours and help center, and proctoring.

Honours and Awards

- Western Graduate Research Scholarships (2019-2023)
- Excellent Graduate Student Scholarships (2016-2019)

Research Experience

Conferences Attended

- Participant, 4th International Conference on Dynamics of Differential Equations, The Fields Institute, Toronto, August 14–17, 2023.

Skills

- Familiar with Matlab, Maple, Mathematica, Latex
- Programming ability in Mathematica, Python

Relevant background

- **Graduate courses**:

  Math Biology, Non-linear Dynamic Systems, Partial Differential Equations, Numerical Analysis, Computer Algebra, Impulsive Differential Equations, Stochastic Processes, Bayes Statistical Inference, Modern Analytics etc.

Research Interest

~~The dynamical system~~ (ODE, DDE, IDE, PDE etc.), biomathematics, epidemiology, virology and ecology.
During my Ph.D., I focus on modelling ~~the~~ epidemic disease, especially in non-pharmaceutical intervention impact and evolution from different perspectives. ~~Further,~~ I am trying to ~~learn and~~ apply different mathematical tools, like delay/impulsive differential systems, bifurcation theory, and renewal equations. ~~Mastering various mathematical tools will enable me to model biological problems more effectively.~~