Mingtao Xia

University of California, Department of Mathematics
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Education

University of California, Los Angeles, USA 09/2019 – Present
PhD candidate, Applied Mathematics

- Advisor: Prof. Tom Chou; Expected: 06/2024

Peking University, Beijing, China 09/2015 – 07/2019
Bachelor of Science, Applied and Computational Mathematics

Research Experience

University of California, Los Angeles 09/2019 – Present
PhD candidate; Advisor: Prof. Tom Chou
Developing numerical methods for solving PDEs and mathematical models for describing COVID-19 spread

- Studied the effect of testing, quarantining, and vaccination in slowing down the spread of COVID-19
- Investigated optimal control measures for containing spreading of COVID-19 in heterogeneous networks
- Developed a novel adaptive spectral method that could efficiently solve PDEs in unbounded domains
- Formulated scaling, moving, and p-adaptive techniques for spectral methods

University of California, Los Angeles 07/2018 – 12/2018
Undergraduate researcher funded by UCLA CSST Program; Advisor: Prof. Tom Chou
Research on constructing mathematical models for describing cellular proliferation

- Built and analyzed a partial differential equation model to describe adder mechanisms in cellular division
- Analyzed the effect of intercorrelated growth rates across generations

Peking University, Beijing 07/2017 – 10/2018
Undergraduate researcher funded by Huabao Foundation; Advisor: Prof. Huazhong Tang
Research on numerical approaches to solve kinetic equations

- Implemented an efficient spectral method for numerically solving the Vicsek swarming model

Teaching Experience

University of California, Los Angeles Los Angeles, CA

- Teaching Associate, Math 151B: Applied Numerical Methods Summer 2021
- Teaching Associate, Math 170E: Introduction to Probability and Statistics 1 Spring 2021
- Teaching Associate, Math 151B: Applied Numerical Methods Winter 2021
- Teaching Assistant, Math 156: Machine Learning Fall 2020
- Teaching Assistant, Math 151A: Applied Numerical Methods Spring 2020
- Teaching Assistant, Math 151B: Applied Numerical Methods Winter 2020

Publications

- Mingtao Xia, Lucas Böttcher, Tom Chou, *Controlling epidemics through optimal allocation of test kits and vaccine doses across networks*, Submitted to: IEEE Transactions on Network Science and Engineering, arXiv:2107:13709, (2021)
- Renaud Dessalles, Yunbei Pan, Mingtao Xia, Davide Maestrini, Maria R. D'Orsogna, Tom Chou, *How heterogeneous thymic output and homeostatic proliferation shape naive T cell receptor clone abundance distributions*, Submitted to: Frontiers in Immunology, arXiv:1906:07463, (2021)
- Mingtao Xia, Sihong Shao, Tom Chou, *A frequency-dependent p-adaptive technique for spectral methods*, In Press: Journal of Computational Physics, arXiv:2010.02008, (2021)
- Mingtao Xia, Tom Chou, *Kinetic theory for structured populations*, In Press: Journal of Physics: A, arXiv:2101.03470, (2020)
- Mingtao Xia, Sihong Shao, Tom Chou, *Efficient scaling and moving techniques for spectral methods in unbounded domains*, In Press: SIAM Journal on Scientific Computing, arXiv:2009.13170, (2020)
- Lucas Böttcher, Mingtao Xia, Tom Chou, *Why case fatality ratios can be misleading: individual- and population-based mortality estimates and factors influencing them*, Physical Biology, **17**, 065003, (2020)
- Mingtao Xia, Chris D. Greenman, Tom Chou, *PDE Models of adder mechanisms in cellular proliferation*, SIAM Journal on Applied Mathematics, **80**, 1307-1335, (2020)

Recent Intived Talks

- *Strategies for testing an infected population to mitigate the spread of a pandemic*, APS March Meeting, online, March 15-19, 2021
- *Efficient scaling and moving techniques for spectral methods in unbounded domains*, 2021 SIAM Conference on Computational Science and Engineering, online, March 1-5, 2021

Awards

- **FGSA Award for Excellence in Graduate Research**, APS March Meeting 2021
- **SIAM Student Travel Award**, SIAM Conference on Comp. Sci. and Engr. 2021
- **Bronze Medal**, 2nd Alibaba Global Mathematics Competition 2020
- **Horn-Moez Prize**, UCLA Mathematics Department 2020
- **Graduate Dean's Scholar Award**, UCLA Mathematics Deparment 2019
- **Outstanding Graduates of Beijing**, Beijing Municipal Commission of Education 2019
- **China National Scholarship**, China's Ministry of Education 2017 & 2018
- **Merit Student Pacesetter**, Peking University 2017 & 2018
- **First Prize**, (No.7) Chinese College Students Mathematics Competition 2018
- **Meritorious Winner**, Comap's Interdisciplinary Contest in Modeling 2017 & 2018
- **Silver Medal in Probability and Statistics**, the Eighth S.T. Yau College Student Mathematical Contest 2017
- **First Prize**, "Capital Challenge Cup" of Beijing City 2017
- **Second Prize of Beijing**, National Mathematical Modeling Contest 2016 & 2017
- **First Prize**, National Physical Competition for College Students in China 2016

Research Interests

- Computational mathematics, Mathematical biology, Spectral method, Kinetic theory, Network modeling