

EDUCATION

National University of Singapore

Ph.D. in Mathematics, Advisors: Prof. Weizhu Bao and Prof. Xuefeng Wang

Singapore

Aug 2018 –Apr 2024

Southern University of Science and Technology

B.S. in Mathematics

Shenzhen, China

Aug 2014 –Jul 2018

SKILLS

- **Technical skills:** Python, C/C++ (Basic), Java (Basic), MATLAB, Julia, FreeFEM++
- **Tools:** Pytorch, Numpy, Pandas, Matplotlib, Sklearn, Git

RESEARCH INTEREST

- Partial Differential Equations and Their Applications

My main interest here lies in the study of reaction-diffusion equations on domains with thin layers arising from diverse fields such as material science, biology, and ecology. To reveal the effects of these layers, “*effective boundary conditions*” (EBCs) are imposed by the limit of solutions of the original problem as the thickness of the layer decreases to zero. Moreover, the effects of EBCs are also studied.

- Numerical Analysis

My interest here is to study numerical methods for PDEs, including the bulk-surface finite element method (BSFEM) for systems of coupled bulk-surface PDEs and Neutral Galerkin schemes for solving reaction-diffusion equations through deep learning wherein training data samples were generated using active learning techniques.

SCHOLARSHIPS AND AWARDS

- Best paper award of Bachelor in **SUSTech**, Shenzhen, China Jul 2018
- Selected as secondary excelent student in **SUSTech**, Shenzhen, China Aug 2015 –Aug 2017
- Government Scholarship in Southern University of Science and Technology, Shenzhen, China Aug 2014 –Aug 2018

PUBLICATIONS

1. **X. Geng** and Y. Wang, *Fractional Laplacian boundary condition as a singular limit of problems degenerating at the boundary*, in preparation.
2. **X. Geng** and Y. Wang, *Effective interface arising from wave equation*, in preparation.
3. **X. Geng** and H. Huang, *Asymptotic spreading of competition diffusion systems with an effective boundary condition on a road*, in preparation.
4. **X. Geng**, *Effective boundary conditions for the Fisher-KPP equation with 3-dimensional optimally aligned coatings*, preprint, 2024.
5. **X. Geng**, *Effective boundary conditions for heat equation arising from anisotropic and optimally aligned coatings in three dimensions*, under review, 2023.
6. **X. Geng**, *Effective boundary conditions arising from the heat equation with three-dimensional interior inclusion*, Commum. Pure Appl. Anal. 2022.

CONFERENCES AND TALKS

- PhD Dissertation Defense Presentation, National University of Singapore, Singapore Apr 18, 2024
 - Title: *Effective Boundary Conditions for the Fisher-KPP Equations*
- 2023 Winter Conference on Partial Differential Equations, Nankai University, Tianjin, China Dec 1 - 3, 2023
 - Title: *Effective Boundary Conditions for 3-dimensional Optimally Aligned Coatings*
- PDE and Scientific Computing Seminar, University of Singapore, Singapore Nov 04, 2022
 - Title: *A Hamilton-Jacobi Approach for Asymptotic Propagation Shape of a Road-field Model*
- 2022 SciCADE, University of Iceland, Reykjavik, Iceland Jul 24 - 29, 2022
 - Title: *Effective Boundary Conditions for the Heat Equation with Three-dimensional Anisotropic and Optimally Aligned Coatings*
- PDE and Scientific Computing Seminar, University of Singapore, Singapore Nov 2, 2019
 - Title: *The Method of Moving Planes and Sliding Domains*

TEACHING EXPERIENCE

- Spring 2021 Ordinary Differential Equations (**TA**)
- Spring 2020 Ordinary Differential Equations (**TA**)
- Spring 2019 Math Clinic(**TA**)
- Fall 2018 Linear Algebra and Mathematical Analysis (**TA**)

INTERESTS

- **Swimming**
- **Running**
- **Boxing**
- **Tennis**

LANGUAGES

- **Chinese:** Native
- **English:** Fluent
- **German:** Basic
- **Japanese:** Basic