YI CAI

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EDUCATION

Ph.D. in Computational Mathematics *Sep. 2021 - Jun. 2026*
School of Mathematical Sciences, Xiamen University, Xiamen, Fujian 361005, P.R. China
Advisor: Prof. Tao Xiong

B.S. in Mathematics and Applied Mathematics *Sep. 2017 - Jun. 2021*
School of Mathematics, Southwest Jiaotong University, Chengdu, Sichuan 611756, P.R. China

EXPERIENCE

Visiting Ph.D. *Jul. 2025 - May 2026*
Institut de Mathématiques de Toulouse, Université Toulouse III, Toulouse 31062, France
Advisor: Prof. Francis Filbet

Visiting Ph.D. *Mar. 2025 - May 2025*
Department of Mathematics, Southern University of Science and Technology, Shenzhen, Guangdong 518055, P.R. China
Advisor: Assoc. Prof. Zhen Zhang

RESEARCH INTERESTS

- Numerical simulation and analysis for kinetic equations in radiative transfer, plasma, and chemotaxis.
- Dimensionality reduction techniques, including sparse grid and low-rank methods.
- Machine learning methods for differential equations.

PUBLICATIONS

Refereed journal papers

1. Y. Cai, Y. Hong, T. Xiong. *Efficient asymptotic-preserving method based on characteristics for kinetic equations.* Chinese Journal of Computational Physics, 2025, accepted.
2. Y. Cai, G. Zhang, H. Zhu, and T. Xiong. *Asymptotic preserving semi-Lagrangian discontinuous Galerkin methods for multiscale kinetic transport equations.* Journal of Computational Physics, 2024, 513: 113190.

Preprints

1. Y. Cai, A. Blaustein, T. Xiong, F. Filbet. *On the long-time behavior of discontinuous Galerkin/Hermite spectral method for the Vlasov-Poisson-Fokker-Planck model*, in preparation.
2. Y. Hong, Y. Shi, Y. Cai, T. Xiong. *An efficient asymptotic preserving Monte Carlo method for frequency-dependent radiative transfer equations*, submitted.
3. Q. Wang, Y. Cai, T. Xiong. *Neural network based dynamic domain decomposition for multiscale kinetic equations*, submitted.

ACADEMIC ACTIVITIES

Talks

1. Journée d'équipe EDP, Université de Toulouse, Toulouse, France, Jan. 2026.
2. Workshop on high-order algorithms and applications for complex flows under extreme conditions, Xiamen, P.R. China, Sep. 2024.
3. The 7th workshop on modeling and numerical methods for nonequilibrium transport problems, Beijing, P.R. China, Jun. 2024.

Posters

1. International symposium on AI for electrochemistry, Xiamen, P.R. China, Dec. 2023.

Services

1. Co-organize "Workshop on Advanced Computation and Theory of Fluid Dynamics" at Xiamen University, Fujian, P.R. China, Dec. 2024.

TEACHING

1. Spring 2023, Teaching Assistant, Ordinary Differential Equation, Xiamen University.
2. Fall 2022, Teaching Assistant, Calculus I, Xiamen University.
3. Spring 2022, Teaching Assistant, Mathematics in Natural Sciences II, Xiamen University.