Fei Cao

Arizona State University
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Born: January 13, 1995 in Hubei (China)
Nationality: Chinese

Current position

Ph.D Candidate, Arizona State University, Tempe, AZ, USA.

Research interests

- Interacting particle systems
- Derivation of macroscopic models (from kinetic to fluid models)
- Applications of ordinary and partial differential equations

Employment

2022-2025 Visiting Assistant Professor at the University of Massachusetts Amherst
2017-2022 Teaching Assistant at Arizona State University

Education

2017-2022 PH.D in Applied Mathematics, Arizona State University.
2013-2017 BACHELOR in Applied Mathematics, Southwestern University of Finance and Economics.

Publications

2020 F. Cao, S. Motsch, A. Reamy, R. Theisen, *Asymptotic flocking for the three-zone model*, Mathematical Biosciences and Engineering, AIMS Press, 17 (6) (**2020**) 7692-7707.
2021 F. Cao, *K-averaging agent-based model: propagation of chaos and convergence to equilibrium*, Journal of Statistical Physics, Springer, 184 (2) (**2021**) 1-19.

Pre-prints

2021 F. Cao, P-E. Jabin, S. Motsch, *Entropy dissipation and propagation of chaos for the uniform reshuffling model*, submitted (**2021**)

2021 F. Cao, S. Motsch, *Derivation of wealth distributions from biased exchange of money*, submitted (**2021**).

2021 F. Cao, *Explicit decay rate for the Gini index in the repeated averaging model*, submitted (**2021**)

Teaching experience

2018 **Teaching Assistant**, *Applied Probability and Stochastic Processes*, Arizona State University

2019 **Instructor**, *Precalculus* (Math 171), Arizona State University

2020 **Teaching Assistant**, *Introduction into Deep Neural Networks*, Arizona State University

2021 **Teaching Assistant**, *Ordinary Differential Equations*, Arizona State University

Miscellaneous

2022 **Visiting Scholar** in the Department of Mathematics at The Pennsylvania State University (02/02/2022 - 02/18/2022), hosted by Professor Pierre-Emmanuel Jabin.

2022 **Graduate Student Research Award** awarded by School of Mathematical and Statistical Sciences at Arizona State University.

Skills

- **Computer:** LaTeX
- **Programming:** Julia, Matlab, Python
- **Language:** English (fluent), Chinese (native language)

Conferences and Summer Schools

2022 PIMS-IFDS-NSF Summer School on Optimal Transport *Summer 2022*
Two weeks summer school on optimal transport at Seattle, Washington, USA.

2022 MRC Conference: Data Science at the Crossroads of Analysis, Geometry, and Topology *Summer 2022*
One week workshop on mathematics, statistics, and related fields at Beaver Hollow Conference Center, Java Center, NY, USA.

2022 Seminar on Stochastic Processes *Spring 2022*
Three days conference on stochastic processes at Lehigh University, Pennsylvania, USA.

2021 Frontier Probability Days *Fall 2021*
Three days conference on probability theory and related fields at University of Nevada (Las Vega), USA.

2021 Blackwell Tapia Conference *Fall 2021*
Three days conference focusing on diversity in mathematics at UCLA, California, USA.

2021 CRM-PIMS Summer School in Probability (Online) *Summer 2021*
Four weeks graduate summer school at the Mathematical Sciences Research Institute (MSRI),

Canada.

2021 Summer Program in Partial Differential Equations (Online) *Summer 2021*
Two weeks of concentrated study of topics in analysis at graduate level, USA.

2021 AMS Short Course on Mathematical and Computational Methods for Complex Social Systems (Online) *Spring 2021*
Three days short course at the American Mathematical Society (AMS), USA.

2020 Introduction to water waves graduate summer school (Online) *Summer 2020*
Two weeks graduate summer school at the Mathematical Sciences Research Institute (MSRI), Berkeley, USA.

2020 Summer School: Ergodic Theory via Continued Fractions (Online) *Summer 2020*
One week graduate summer school at the University of North Carolina Greensboro, North Carolina, USA.

2020 Hot Topics: Optimal transport and applications to machine learning and statistics (Online) *Summer 2020*
One week workshop at the Mathematical Sciences Research Institute (MSRI), Berkeley, USA.

2020 45-th Annual New York State Regional Graduate Mathematics Conference (Online) *Spring 2020*
Two days graduate student conference on mathematics at the Syracuse University, New York, USA.

2020 Seminar on Stochastic Processes *Spring 2020*
Three days seminar on stochastic processes at the Michigan State University, Michigan, USA.

2019 AARMS Summer School on Dynamical Systems, Differential Equations, and Special Functions *Summer 2019*
Four weeks summer school on dynamical systems, differential equations, and special functions at Charlottetown, Prince Edward Island, Canada.

2019 RMMC Summer School on Inverse Problems in Imaging *Summer 2019*
One week summer school on inverse problems at Laramie, Wyoming, USA.

2019 Interacting Particle Systems, Statistical Mechanics and Related Topics *Spring 2019*
Three days conference on interacting particle systems at UCLA, California, USA.

2018 Advances in Asymptotic Probability *Winter 2018*
One week conference on theory of Asymptotic Probability at Stanford, California, USA.

2018 Institute for Advanced Study *Summer 2018*
IAS/PCMI 2018: Harmonic Analysis, Park City, Utah, USA.

2018 Boston City Limits *Summer 2018*
Two weeks summer School on Mathematical General Relativity and the Geometric Analysis of Waves of Fluids at MIT, Boston, USA.

Short Course on Free Boundary Problems *Summer 2017*
Free boundary problems in mathematical finance, Cheng Du, China.

References

Professor Pierre-Emmanuel Jabin
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Professor Nicolas Lanchier
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Associate Professor Sebastien Motsch (Ph.D advisor)
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