

Chenlin Gu

Work

- 09/2022–present **Assistant Professor**, Yau Mathematical Sciences Center, Tsinghua University.
- 09/2021–08/2022 **Postdoctoral Instructor**, New York University Shanghai, Mentor: Wei Wu.

Education

- 09/2018–08/2021 **Ph.D.**, *École Normale Supérieure*, Paris, Supervisor: Jean-Christophe Mourrat.
Thesis: Quantitative homogenization on percolation clusters and interacting particle systems, defended at April 1st, 2021.
- 09/2017–08/2018 **Master**, *Université Paris-Sud*, Orsay, Grade: 17.53/20, Mention Très Bien.
M2 on probability and statistics
- 09/2014–08/2017 **Ingénieur**, *École Polytechnique*, Palaiseau, GPA: 3.90/4.0.
M1 on probability and statistics
- 09/2010–07/2014 **Bachelor of Mathematics**, *Fudan University*, Shanghai, GPA: 3.60/4.0.
Honor graduation

Research Interests

Stochastic homogenization, random walk in random environment, interacting particle systems, branching process, statistical mechanics.

Publications/Preprints

- [12] **Quantitative homogenization and hydrodynamic limit of non-gradient exclusion process**, with Tadahisa Funaki and Han Wang, *arXiv:2404.12234*.
- [11] **Quantitative equilibrium fluctuations for interacting particle systems**, with Jean-Christophe Mourrat and Maximilian Nitzschner, *arXiv:2401.10080*.
- [10] **Power law decay at criticality for the q-state antiferromagnetic Potts model on regular trees**, with Wei Wu and Kuan Yang, *arXiv:2112.00573*.
- [9] **Smoothness of the diffusion coefficients for particle systems in continuous space**, with Arianna Giunti, Jean-Christophe Mourrat, and Maximilian Nitzschner, *Communications in Contemporary Mathematics*, 25 (3), 2250027 (April 2023).
- [8] **A growth-fragmentation-isolation process on random recursive trees and contact tracing**, with Vincent Bansaye and Linglong Yuan, *Annals of Applied Probability*, 33 (6B), 5233 - 5278 (December 2023).
- [7] **Quantitative homogenization of interacting particle systems**, with Arianna Giunti and Jean-Christophe Mourrat, *Annals of Probability*, 50 (5), 1885-1946 (September 2022).
- [6] **Decay of semigroup for an infinite interacting particle system on continuum configuration spaces**, *arXiv:2007.04058*.
- [5] **Mathematical recommendations to fight against COVID-19**, with Wei Jiang, Tianyuan Zhao, Ban Zheng, *available at SSRN 3551006*. 2020 Mar 9.
- [4] **Quantitative homogenization of the parabolic and elliptic Green's functions on percolation clusters**, with Paul Dario, *Annals of Probability*, 49 (2), 556-636 (March 2021).

- [3] **An efficient algorithm for solving elliptic problems on percolation clusters**, *Annals of Applied Probability*, 32 (4), 2755-2810 (August 2022).
- [2] **Forbidden transactions and black markets**, with Qingyun Wu and Alvin E. Roth, *Mathematics of Operations Research*, 47 (4), 3084-3109 (November 2022).
- [1] **Uniform estimate of an iterative method for elliptic problems with rapidly oscillating coefficients**, *Stochastics and Partial Differential Equations: Analysis and Computations*, 8 (4), 787-818 (December 2020).

Grants

- 12/2023–11/2028 **National Key R&D Program of China (No. 2023YFA1010400)**, *co-PI*.
- 01/2022–12/2026 **National Natural Science Foundation of China (Youth Program, No. 12301166)**, *PI*.
- 12/2021–11/2026 **National Key R&D Program of China (No. 2021YFA1002700)**, *participant*.

Honors and Fellowships

- 07/2022 **6th ICCM Best Thesis Award**, *Nanjing*, China.
Doctor Thesis Award, Gold Prize
- 09/2021 **3rd Alibaba Global Mathematics Competition**, *Hangzhou*, China.
Excellence award (Major: probability and combinatorics. Minor: applied maths.)
- 03/2019 **1st Alibaba Global Mathematics Competition**, *Hangzhou*, China.
Excellence award for analysis and differential equations
- 06/2018 **Ph.D. Scholarship for Polytechniciens**, *Palaiseau*, France.
- 11/2017 **Prize for Research Internship**, *Palaiseau*, France.
- 05/2017 **Master Scholarship of Fondation mathématique Jacques Hadamard**, *Orsay*, France.
- 07/2013 **4th S.-T. Yau College Student Mathematics Contest**, *China*.
Mention of honors ranked 28th for analysis and PDE and 15th for applied mathematics
- 11/2011 **3rd National College Student Mathematics Contest**, *Shanghai*, China.
First prize
- 10/2009 **National Mathematics Olympiad Competition**, *Jiangsu*, China.
First prize

Visit/Exchange

- 06–07/2021 **Short academic visiting**, *Fudan University*, Shanghai.
- 01–06/2020 **Visiting scholar**, *Courant Institute*, NYU, New York.
- 09–12/2012 **Exchange student**, *Chinese University of Hong Kong*, Hong Kong.

Talks

- 03/06/2024 **Quantitative homogenization and hydrodynamic limit of non-gradient exclusion process**.
China-France Symposium on Probability Theory 2024, AMSS, Beijing
- 20/04/2024 **Quantitative homogenization and hydrodynamic limit of non-gradient exclusion process**.
1st Beijing-Tianjin-Hebei joint Conference on Maths, Hebei Normal University, Shijiazhuang
- 16/03/2024 **Quantitative equilibrium fluctuations for interacting particle systems**.
1st NYUSH-Peking-Westlake Joint Conference on Probability, Westlake University, Hangzhou
- 09/01/2024 **Quantitative equilibrium fluctuations for interacting particle systems**.
Beijing Institute of Technology, Beijing
- 02/01/2024 **Quantitative homogenization of interacting particle systems**.
Fudan University, Shanghai

- 30/10/2023 **Quantitative homogenization of interacting particle systems.**
Tokyo Probability Seminar, The University of Tokyo, Tokyo
- 22/08/2023 **Power law decay at criticality for the q -state antiferromagnetic Potts model on regular trees.**
8th Annual Conference on Probability, Fujian Normal University, Fuzhou
- 30/07/2023 **Quantitative homogenization of interacting particle systems.**
The 18th Workshop on Markov Processes and Related Topics, Tianjin University, Tianjin
- 20/05/2023 **Quantitative homogenization of interacting particle systems.**
Seminar of Probability and Statistics at Yangtze River Delta, Hangzhou Normal University, Hangzhou
- 19/03/2023 **Quantitative homogenization of interacting particle systems.**
Renormalization Theory and Related Fields, Harbin Institute of Technology, Harbin
- 08/03/2023 **Smoothness of the diffusion coefficients for particle systems in continuous space.**
Stochastic Webinar
- 04/01/2023 **Smoothness of the diffusion coefficients for particle systems in continuous space.**
Probability, Stochastic Analysis, and Related Topics, TSIMF, Sanya
- 28/12/2022 **Quantitative homogenization of interacting particle systems.**
Frontiers in Mathematical Science, TSIMF, Sanya
- 19/09/2022 **Quantitative homogenization of interacting particle systems.**
Probability and Statistics Seminar, Peking University, Beijing
- 29/08/2022 **Heat kernel on the infinite percolation cluster.**
7th Annual Conference on Probability, Weihai
- 19/08/2022 **Random recursive trees and contact tracing.**
8th Workshop on Branching Processes and Related Topics (Online)
- 28/06/2022 **Random recursive trees and contact tracing.**
The 42nd Conference on Stochastic Processes and their Applications, Wuhan
- 02/06/2022 **Heat kernel on the infinite percolation cluster.**
Lanzhou University (Online)
- 04/01/2022 **Heat kernel on the infinite percolation cluster.**
Shanghai Jiao Tong University (Online)
- 10/12/2021 **Heat kernel on the infinite percolation cluster.**
East China Normal University, Shanghai
- 24/11/2021 **A growth-fragmentation-isolation process on random recursive trees.**
Fudan University, Shanghai
- 18/11/2021 **An iterative algorithm for Dirichlet problem with random conductance.**
Shanghai University of Finance and Economics, Shanghai
- 21/10/2021 **A growth-fragmentation-isolation process on random recursive trees.**
THU-PKU-BNU Probability Webinar (Online)
- 18/10/2021 **A growth-fragmentation-isolation process on random recursive trees.**
Peking University (Online)
- 14/09/2021 **A growth-fragmentation-isolation process on random recursive trees.**
CRM-ISM Probability Seminar, McGill University (Online)
- 28/07/2021 **An iterative algorithm for Dirichlet problem with random conductance.**
University of Science and Technology of China, Hefei
- 20/07/2021 **An iterative algorithm for Dirichlet problem with random conductance.**
One Day Probability Event at BICMR, Peking University, Beijing
- 15/06/2021 **An iterative algorithm for Dirichlet problem with random conductance.**
Zhejiang University, Hangzhou
- 21/05/2021 **Heat kernel on the infinite percolation cluster.**
I2M, Aix-Marseille Université (Online)

- 06/05/2021 **Heat kernel on the infinite percolation cluster.**
IRMA, Université de Strasbourg (Online)
- 27/04/2021 **Heat kernel on the infinite percolation cluster.**
Fudan University (Online)
- 23/03/2021 **Heat kernel on the infinite percolation cluster.**
Student Probability Seminar, NYU Courant (Online)
- 28/12/2020 **An iterative algorithm for Dirichlet problem with random conductance.**
The 9th East Lake International Forum, Center for Mathematical Sciences, Huazhong University of Science and Technology (Online)
- 24/08/2020 **Decay of semigroup for an infinite interacting particle system on continuum configuration spaces.**
Bernoulli-IMS One World Symposium 2020 (Prerecorded talk and poster)
- 30/07/2020 **Decay of semigroup for an infinite interacting particle system on continuum configuration spaces.**
Academy of Mathematics and Systems Science, Chinese Academy of Science (Online)
- 15/05/2020 **Introduction on Wigner's semicircle law.**
Seminar of PhD students at IMO Université Paris-Saclay (Online)
- 11/05/2020 **An efficient algorithm for solving elliptic problems on percolation clusters.**
Les probabilités de demain 2020 (Online)
- 13/12/2019 **Heat kernel on the infinite percolation cluster.**
Seminar on the theory of Markov semigroups and Schrödinger operators at Wrocław University of Technology, Wrocław, Poland
- 04/11/2019 **Heat kernel on the infinite percolation cluster.**
Seminar of PhD students at LPSM Université Sorbonne, Paris, France
- 28/08/2019 **An introduction of Calderón-Zygmund decomposition on percolation clusters.**
◦ also with a presentation on the stochastic representation of Riesz transform after the work of R. Banuelos
Workshop of harmonic analysis 2019, Saint-Nazaire, France
- 13/07/2019 **A stochastic neural network approximates Derrida-Retaux model.**
49th Saint-Flour Probability Summer School, Saint-Flour, France
- 25/06/2019 **An iterative algorithm for Dirichlet problem with random conductance.**
Journées de Probabilités 2019, Dourdan, France
- 13/05/2019 **A mathematical model on black market.**
Seminar of PhD students at LPSM Université Sorbonne, Paris, France
- 01/04/2019 **An iterative algorithm for Dirichlet problem with random conductance.**
Fudan University, Shanghai, China
- 20/07/2018 **Uniform bound of an iterative algorithm for homogenization.**
48th Saint-Flour Probability Summer School, Saint-Flour, France
- 15/10/2017 **How to draw imaginary geometry ?**
Scaling Limits of Random Planar Maps and Liouville Quantum Gravity, Oberwolfach, Germany
- 17/11/2015 **Expander Graph.**
Seminar of students at Ecole Polytechnique, Palaiseau, France

Students Mentored

Ph.D.

- 03/2022–now **Baige Zhou**, *Tsinghua University*, co-supervised with Hui Yu.
Thesis titled "Some aspects on interacting particle systems"

Master

- 05–09/2022 **Eugène Ferragu**, *Ecole Normale Supérieure*, M2 internship, co-supervised with Linglong Yuan.
Thesis titled "A generalization for the growth-fragmentation-isolation model"

- 06/2021–05/2022 **Jinhao Dong**, *Fudan University*, Master thesis, co-supervised with Jiansheng Xie.
Thesis titled “Electronic network, circle packing, and local convergence”
- Undergraduate**
- 01–06/2023 **Yishan Zhang**, *Tsinghua University*, Bachelor thesis.
Thesis titled “Corruption in Glauber dynamics of Ising model”
- 01–06/2023 **Yang Xiang**, *Tsinghua University*, Bachelor thesis.
Thesis titled “Nesterov acceleration algorithm and its application in distributed optimization”
- 09–12/2021 **Yinyihong Liu, Yanxin Zhou**, *NYU Shanghai*, Internship, co-supervised with Wei Wu.
Project titled “Random forests”

Teaching Experience/Diffusion

- 02–06/2023 **Instructor**, *Analysis-0*, Tsinghua University.
64 hours
- 09–12/2022 **Instructor**, *Random Walks and Homogenization Theory*, Tsinghua University.
48 hours, topic course at YMSC
- 22/01/2022 **Tutor for ParisMaths**, *Coloring problem*, ENS, Online.
3 hours, maths activities for motivated high school students
- 09–12/2021 **Part-time teaching assistant**, *Honors probability theory*, Fudan University.
- 09–12/2021 **Teaching assistant**, *Probability limit theorems, Honors ODE*, NYU Shanghai.
12 hours every week including recitation, homework, quiz and office hours
- 09/2020–05/2021 **Remote grader**, *Calculus, Linear algebra*, NYU Shanghai, online.
12 hours every week
- 01–05/2020 **Adjunct instructor**, *Vector analysis*, NYU, New York.
42 hours and organization of course, including the teaching online during COVID-19 pandemic lockdowns
- 23/11/2019 **Tutor for ParisMaths**, *Introduction of number theory*, ENS, Paris.
4 hours, maths activities for motivated high school students
- 21/07/2019 **Tutorial**, *Some theoretical basis of probability for computer science*, Changzhou Senior High School of Jiangsu Province, Changzhou.
3 hours, for high school students preparing Olympiad in informatics
- 26/01/2019 **Tutor for ParisMaths**, *Simulation of random events*, ENS, Paris.
4 hours, maths activities for motivated high school students
- 2018–2019 **Teaching assistant**, *Probability, Numerical analysis*, Sorbonne Université, Paris.
60 hours, for undergraduate of the third year
- 2013–2014 **Teaching assistant**, *Real analysis and functional analysis*, Fudan University, Shanghai.
40 hours, for undergraduate of the second year

Academic Service

- Referee for the following journals: *Annals of Applied Probability*, *Communications in Mathematical Physics*, *Communications on Pure and Applied Mathematics*, *Frontiers of Mathematics*, *Operations Research Letters*, *Science China Mathematics*, *Stochastic Processes and their Applications*.
- Co-organiser (with Hao Wu, Fan Yang, Jianping Jiang) for YMSC Probability Seminar.
- Co-organiser (with Tadahisa Funaki, Guohuan Zhao) for Workshop on Interacting Particle Systems and Stochastic Analysis, 2023, BIMS, Mars 21–27, 2024.
- Co-organiser (with Yuval Peres, Zhan Shi, Quan Shi) for Workshop on Random Walks, 2024, TianYuan Mathematics Research Center, Mars 10–16, 2024.
- Co-organiser (with Jianping Jiang, Asaf Nachmias, Yuval Peres) for Conference on Probability and Statistical Physics, 2024, TSIMF, January 22–26, 2024.
- Co-organiser (with Rongchan Zhu, Hao Wu, Yichao Huang) for Workshop on SPDEs and Related Fields, April 21–23, 2023. Probability and Statistical Physics

Computer Skills

- Java, Matlab, Scilab, C, C++, Python

Languages

- Chinese(Mother tongue), English(Fluent), French(Fluent)

Interests

- Basketball(member of team l'X), Running(39th Paris-Versaille finisher, 16km in 1h26m)
- Founder of official page of Polytechnique on Wechat