

# 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

- [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).

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## Grants

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

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## 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

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## 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*.

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## Talks

- 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

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## Conferences Attended

- 23/10/2023-  
26/10/2023 **The 21st Symposium Stochastic Analysis on Large Scale Interacting Systems, RIMS,**  
Kyoto.
- 20/08/2023-  
24/08/2023 **8th Annual Conference on Probability, Fujian Normal University, Fuzhou.**
- 30/07/2023-  
02/08/2023 **The 18th Workshop on Markov Processes and Related Topics, Tianjin University, Tianjin.**
- 16/07/2023-  
28/07/2023 **The First International Congress of Basic Science, BIMSA, Huairou.**
- 31/03/2023 **Westlake Probability Day 2023, Westlake University, Hangzhou.**
- 17/03/2023-  
20/03/2023 **Renormalization Theory and Related Fields, Harbin Institute of Technology, Harbin.**
- 03/01/2023-  
07/01/2023 **Probability, Stochastic Analysis, and Related Topics, TSIMF, Sanya.**
- 22/12/2022-  
29/22/2022 **Frontiers in Mathematical Science, TSIMF, Sanya.**
- 29/08/2022 **7th Annual Conference on Probability, Weihai.**
- 31/07/2022-  
05/08/2022 **The 9th International Congress of Chinese Mathematicians, Nanjing.**
- 27/06/2022-  
01/07/2022 **The 42nd Conference on Stochastic Processes and their Applications, Wuhan, (Online).**
- 30/05/2022-  
03/06/2022 **100 Years of the Ising Model, IHES, Paris, (Online).**

- 16/05/2022-27/05/2022 **Unifying Concepts in PDEs with Randomness**, CRM, Montreal, (Online).
- 14/03/2022-25/03/2022 **Interacting Particle Systems and Hydrodynamic Limits**, CRM, Montreal, (Online).
- 13/01/2020-17/01/2020 **Spectra, Algorithms and Random Walks on Random Networks**, CIRM, Marseille.
- 02/12/2019-06/12/2019 **Particle Systems and PDE's VIII**, University of Lisbon, Lisbon.
- 03/06/2019-07/06/2019 **Workshop of harmonic analysis 2019**, Université Nantes, Saint-Nazaire.
- 03/06/2019-07/06/2019 **Walking through the Brownian zoo**, IMO, Orsay.  
A conference in honor of Jean-François Le Gall's 60th birthday
- 20/05/2019-22/05/2019 **Spectral Theory and probability in Mathematical physics**, IRMA, Strasbourg.
- 11/04/2018 **Journées Cartes**, IMO, Orsay.
- 10/12/2018-14/12/2018 **États de la recherche SMF: mécanique statistique**, IHP, Paris.
- 11/04/2018 **Journées Cartes**, IMO, Orsay.
- 15/10/2017-21/10/2017 **Oberwolfach Seminar: Scaling Limits of Random Planar Maps and Liouville Quantum Gravity**, MFO, Oberwolfach.
- 17/07/2017-28/07/2017 **Spectral properties of large random objects**, IHES, Bures-sur-Yvette.
- 15/05/2017-09/06/2017 **Trimester ProbabLyon**, ENS Lyon & Université de Lyon, Lyons.  
  - Mini-school on Random Maps and the Gaussian Free Field
  - Conference on Statistical Mechanics, random planar geometry and interacting random walks
- 11/05/2017 **Les probabilités de demain 2017**, IHES, Bures-sur-Yvette.
- 24/01/2017 **Systèmes Aléatoires Inhomogènes 2017**, IHP, Paris.  
Sujet de 2017: Random geometry
- 16/01/2017-20/01/2017 **Combinatorics and Interactions**, IHP, Paris.  
Workshop on Large Random Structures in Two Dimensions
- 13/10/2016 **6ème Séminaire Itzykson**, IHES, Bures-sur-Yvette.  
Physique statistique hors équilibre
- 07/09/2016 **Rentrée Masters IHES 2016**, IHES, Bures-sur-Yvette.
- 17/05/2016 **Les probabilités de demain 2016**, IHES, Bures-sur-Yvette.
- 09/05/2016-10/05/2016 **Journées mathématiques X-UPS 2016**, Ecole Polytechnique, Palaiseau.  
Sujet de 2016: Arbres et marches aléatoires
- 26/01/2016 **Systèmes Aléatoires Inhomogènes 2016**, IHP, Paris.  
Sujet de 2016: Phase transitions in percolation-type models

## 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”

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## 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

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## 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 Rongchan Zhu, Hao Wu, Yichao Huang) for Workshop on SPDEs and Related Fields, 2023, April 21-23.

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## Computer Skills

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

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## 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