Guanyang Wang

Curriculum Vitae

110 Frelinghuysen Road
Piscataway, NJ, 08854
(650) 422 8730
guanyang1994@gmail.com
guanyangwang.github.io/

Positions

2020–Present **Assistant Professor**, *Department of Statistics, Rutgers University*
- Affiliated Faculty: Theory of Computing Group, Rutgers Computer Science
- Elected Member: Command, Control, and Interoperability Center for Advanced Data Analysis (CCICADA)
- Member: the Center for Discrete Mathematics and Theoretical Computer Science (DIMACS)

Research Interest

Monte Carlo methods, data science, applied probability, quantum computing

Education

2015–2020 **Ph.D.**, *Department of Mathematics, Stanford University*
- Advisor: Professor Persi Diaconis.
- Ph.D. Minor in Statistics.
- Thesis Topic: *Topics in Markov chain Monte Carlo Methods, with applications in statistics.*

2011–2015 **B.S.**, *School of Mathematical Sciences, University of Science and Technology of China*
- Summa Cum Laude.
- Guo Moruo Scholarship (Highest Honor for USTC students).

Awards and Honors

2023 Blackwell-Rosenbluth Award, *The junior section of the International Society for Bayesian Analysis (j-ISBA)* one of six recipients

2022 Adobe Data Science Research Award, *Adobe Research,* with Peng Zhang, one of four recipients

2022 Ralph E. Powe Junior Faculty Enhancement Award, *Oak Ridge Associated Universities,* one of 37 nationwide awards across multiple disciplines, one of the two awarded statisticians

2022 IMS New Researcher Travel Award, *Institute of Mathematical Statistics (IMS)*

2016 The Halsey L. Royden, Jr. Fellowship, *Stanford University*.

2014 Guo Moruo Scholarship, top 1%, *University of Science and Technology of China*.

2013 National Scholarship, top 1%, *University of Science and Technology of China*.

Papers in Revision

- **Spectral gap bounds for reversible hybrid Gibbs chains**
  - Qian Qin, Nianqiao Ju, Guanyang Wang.
  - Under Revision at Annals of Statistics.

Accepted Papers

($\star$ indicates alphabetical ordering authorship, † indicates equal contribution, $\star\star$ indicates student first author)

AoAP24+ **Repeated Averages on Graphs**

- Ramis Movassagh, Mario Szegedy, Guanyang Wang*. *to appear at the Annals of Applied Probability*.

AoAP24 **Spectral Telescope: Convergence Rate Bounds for Random-Scan Gibbs Samplers Based on a Hierarchical Structure**

- Qian Qin, Guanyang Wang*. *The Annals of Applied Probability 34 (1B), 1319-1349*.

JMLR23 **Unbiased Multilevel Monte Carlo estimators for intractable distributions: MLMC meets MCMC**

- Tianze Wang**, Guanyang Wang. *Journal of Machine Learning Research* 24(249):1–40.

ICML23 **Optimal randomized multilevel Monte Carlo for repeatedly nested expectations**

- Yasa Syed**, Guanyang Wang. *short version accepted by International Conference of Machine Learning* PMLR 202:33343-33364.

- journal version to be submitted.

PNAS23 **Prediction of Enzyme Specificity using Protein Graph Convolutional Neural Networks**

- Changpeng Lu, Joseph H. Lubin, Samuel Z. Stentz, Guanyang Wang, Sijian Wang, Sagar D. Khare. *Proceedings of the National Academy of Sciences*120 (39):e2303590120

AIHP23 **Metropolis-Hastings transition kernel couplings**

- John O'Leary, Guanyang Wang*. to appear at Annales de l'Institut Henri Poincaré (B) Probabilités et Statistiques.

RS&A22 **On the Minimax Spherical Designs**

- Weibo Fu, Guanyang Wang*, Jun Yan, *Random Structures & Algorithms* 62(1):131-154.

SPA22 **Unbiased Optimal Stopping via the MUSE**

- Zhengqing Zhou†, Guanyang Wang†, Jose Blanchet, Peter Glynn, to appear at *Stochastic Processes and their Applications*.

BEJ22 **Exact convergence rate analysis of the Independent Metropolis-Hastings algorithms**

- Guanyang Wang, *Bernoulli* 28(3):2012-2033.

BEJ22 **On the theoretical properties of the exchange algorithm**

- Guanyang Wang, *Bernoulli* 28(3):1935-1960..

JASA21 **Discussion of 'A Gibbs sampler for a class of random convex polytopes'**

(invited discussion) - Persi Diaconis, Guanyang Wang*, *Journal of American Statistical Association* 116(535):1193-1195..

Nat.Comm.21 **Integrated cooling (i-Cool) textile of heat conduction and sweat transportation for personal perspiration management**

- with Yucan Peng and 16 others, *Nature Communications* 12(1):6122.

AISTAT21 **Maximal couplings of the Metropolis-Hastings algorithm**

- Guanyang Wang†, John O'Leary†, Pierre Jacob,*International Conference on Artificial Intelligence and Statistics 2021 PMLR 130:1225-1233, (***Oral presentation***, top 3% of submissions)*.

EJS20 **A Fast MCMC algorithm for the uniform sampling of binary matrices with fixed margins**

- Guanyang Wang, *Electronic Journal of Statistics*. 14(1): 1690 - 1706

ECP19 **Expectation of the largest betting size in Labouchere system**

- Yanjun Han, Guanyang Wang*,*Electronic Communications in Probability* 24: 1-10.

AMSA18 **Bayesian Goodness of Fit Test: A Conversation for David Mumford**

- Persi Diaconis, Guanyang Wang*,*Annals of Mathematical Sciences and Applications (AMSA)* 3(1):287-308.

Submitted and to be submitted

- **When are Unbiased Monte Carlo Estimators More Preferable than Biased Ones?**
  - Guanyang Wang, Jose Blanchet, Peter Glynn.
- **Quantum Monte Carlo with quadratic speedup under infinite variance**
  - Jose Blanchet, Mario Szegedy, Guanyang Wang*.
- **Pattern detection in bipartite networks: a review of terminology, applications, and methods**
  - with Zachary Neal, Giovanni Strona and 8 others.
- **Differentiate Private noise design via coupled Gaussians for range queries**
  - Prathamesh Dharangutte, Ruobin Gong, Jie Gao, Guanyang Wang*.
- **A phase transition in sampling from Restrict Boltzmann Machines**
  - Qian Qin, Guanyang Wang*, Yuchen Wei.
- **Universality for extreme order statistics of random walk**
  - Guanyang Wang*, Jun Yan.
- **When to put all the Eggs in One Basket? Insights from the FKG Inequality**
  - Pradeep Dubey, Siddhartha Sahi, Guanyang Wang*.

Grants Awarded

NSF National Science Foundation DMS-2210849 (2022-2025) on Scalable Algorithm Design for Unbiased Estimation via Couplings of Markov Chain Monte Carlo Methods. Role: **PI.** Total: $200,000

Adobe Adobe Data Science Research Awards, with Peng Zhang. Role: **PI.** Total: $50,000

ORAU Ralph E. Powe Junior Faculty Enhancement Award (2022). Role: **PI.** Total: $10,000

Rutgers Provost's COVID Impact Faculty Grant (2021). Role: **PI.** Total: $5,000

Students Advising

2021–Present **Yasa Syed**: Fourth year Ph.D. student at Rutgers statistics department.

2021–Present **Tianze Wang**: Second year Ph.D. student at Rutgers statistics department.

2022–Present **Wei Yuan**: Third year Ph.D. student at Rutgers statistics department.

2022–Present **Yuchen Wei**: Fifth year Ph.D. student at Rutgers math department.

2023–Present **Budhaditya Halder**: Third year Ph.D. student at Rutgers statistics department.

2022–Present **Qiru Pan**: Second year Master student at Rutgers statistics department.

2022 **Yingshi Chen**: Undergraduate student at Rutgers statistics department.

Ph.D. thesis committee

Zexi Song (statistics)

Ph.D. qualify exam committee

Zhe Zhang (statistics), **Yuze Zhou** (statistics), **Daniel Shidi Wu** (Plant Biology), **Ryumei Nakada** (statistics), **Xiangrui Kong** (statistics)

Talks

2025.1 Invited Talk, Workshop "Computational Methods in Bayesian Statistics: Markov Chain Monte Carlo, Variational Bayes, and Sequential Monte Carlo", University of Florida

2024.12 Invited Talk, International Conference on Statistics and Data Science (ICSDS), Nice, France

2024.8 Invited Talk, Joint Statistical Meeting (JSM), Portland

2024.7 Invited Talk, Conference "7th International Conference on Econometrics and Statistics", Beijing

2024.6 Invited Talk, Conference "EAC-ISBA", Hong Kong

2024.4 Invited Talk, Mostly Monte Carlo and All About That Bayes joint seminar, PariSanté Campus, France

2024.4 Invited Tutorial Talk, Diffusion Model Reading Group, Department of Electrical and Computer Engineering , University of Michigan

2024.2 Invited Talk, Department Seminar, Department of Statistics, Rutgers University

2024.2 Invited Talk, Econometrics and Statistics Colloquium, The University of Chicago Booth School of Business

2024.2 Invited Talk, Department Seminar, Department of Statistical Science, Duke University

2024.1 Invited Talk, Department Seminar, Department of Statistics, Rice University

2024.1 Invited Talk, Department Seminar, Department of Statistics, University of Michigan

2023.12 Invited Talk, Conference "IMS International Conference on Statistics and Data Science (ICSDS)", Lisbon

2023.11 Invited Talk, Conference "The Bayesian Young Statisticians Meeting (BAYSM 2023)", Online

2023.10 Invited Talk, Department Seminar, School of Management Sciences and Information Systems, Rutgers Business School.

2023.7 Invited Talk, Conference "The 9th International Forum on Statistics", Beijing

2023.6 Invited Lecture on Coupling methods for Markov chains, Department of Mathematical Sciences, University of Science and Technology of China

2023.6 Invited Talk, New England Statistics Symposium (NESS)

2023.5 Invited Talk, Conference "The Fast and the Curious: Modern Markov chain Monte Carlo", University of Minnesota

2023.5 Invited Discussant, Conference "Recent Advances in Statistics and Data Science", Rutgers University

2023.3 Invited Talk, Department Seminar, Department of Statistics, University of Iowa

2022.11 Invited Talk, Department Seminar, Department of Statistics, Colorado State University.

2022.9 Invited Talk, Hon Hai (Foxconn) Quantum Computing Research Center, Taipei.

2022.5 Invited Talk, The Alan Turing Institute, U.K.

2022.5 Invited Talk, New England Statistics Symposium (NESS)

2022.4 Invited Talk, Department Seminar, Department of Statistics, Texas A&M University

2022.4 Invited Discussant, Conference on Advances in Bayesian and Frequentist Statistics: Celebration of the 80th Birthday of Professor William E. Strawderman, Rutgers University

2022.3 Invited Talk, Department Seminar, Department of Statistics, the Wharton School, University of Pennsylvania

2022.2 Invited Talk, Department Seminar, Department of Mathematics, Rutgers University-Camden Campus

2021.10 Invited Talk, Department Seminar, Department of Statistics, University of Minnesota

2021.8 Contributed Talk, The 13th International Conference on Monte Carlo Methods and Applications

2021.8 Invited Discussant on paper 'A Gibbs sampler for a class of random convex polytopes', Joint Statistical Meeting

2021.8 Invited Talk, Session: Advances in MCMC Theory and Practice, Joint Statistical Meeting

2021.4 Invited Talk, The 23rd International Conference on Artificial Intelligence and Statistics 2021

2020.8 Contributed Talk, Bernoulli-IMS One World Symposium

2020.7 Invited Talk, Mozi Forum, Department of Computer Science, University of Science and Technology of China

2020.1 Invited Talk, Department Seminar, Department of Statistics, Rutgers University

2020.1 Invited Talk, Department Seminar, Department of Statistics, University of Florida

2019.5 Guest Lecture for Modern Markov Chains, Stanford University

2018.9 Invited Talk, Probability Research Seminar, Department of Mathematics, University of Science and Technology of China

Teaching Experience

At Rutgers (as instructor)

Stat 486 Applied Statistical Learning (Fall 2023).

Stat 681 Advanced Probability Theory II (Spring 2023).

Stat 680 Advanced Probability Theory I (Fall 2022).

Stat 654 Stochastic Processes (Spring 2022).

Stat 680 Advanced Probability Theory I (Fall 2021).

Stat 654 Stochastic Processes (Spring 2021).

Stat 582 Introduction to Methods and Theory of Probability (Fall 2020).

At Stanford (as teaching assistant).

Math 21 Calculus (multiple times).

Math 51 Linear Algebra and Multivariate Calculus (multiple times).

Math 52 Multivariate Integral and Calculus (Spring 2016).

Math 104 Applied Matrix Theory (Spring 2019).

Math 113 Linear Algebra and Matrix Theory (multiple times).

Math 131P Partial Differential Equations (Winter 2017).

At University of Science and Technology of China (as teaching assistant)

- Probability Theory and Applications (Spring 2014).

Professional Activities

Organizer

2021 JSM invited session "Inference, optimization, and computation on discrete structures".

Session Chair

2023 EAC-ISBA invited session "Recent Developments in Markov Chain Monte Carlo".

2023 Conference "The Fast and the Curious: Modern Markov chain Monte Carlo"

2021 JSM invited session "Inference, optimization, and computation on discrete structures".

Committee Member outside Rutgers

2024 Scientific committee for the Blackwell-Rosenbluth Award (International Society for Bayesian Analysis)

2023-2024 Applied Probability Society (APS) Best Student Paper competition (Informs)

2023 Student Poster Competition committee (Conference "Recent Advances in Statistics and Data Science")

2022 Student Poster Selection committee (New England Statistics Symposium)

Committee Member at Rutgers

2022 Internal Reviewer for Powe Jr. Faculty Enhancement Awards (2023)

2020-2023 Ph.D. admission committee.

2020-2023 Ph.D. qualifying exam committee.

2020-2023 Master's exam committee.

2022 Conference organization committee

Reviewing for the research community:

Journal: Referee for Annals of Applied Probability, Journal of the Royal Statistical Society: Series B (2), Journal of the American Statistical Association, Journal of Machine Learning Research, the Bernoulli Journal (2), Mathematics of Operations Research (2), SIAM Journal on Scientific Computing, Journal of Computational Physics, Electronic Journal of Probability (2), Statistics and Computing (4), Journal of Computational and Graphical Statistics (2), Stochastic Processes and their Applications, Proceedings of the Royal Society A, Statistica Sinica, Advances in Applied Probability (2), Statistics and Probability Letters, Environmental and Ecological Statistics.

Conference: STOC 2024 (2), Theory of Quantum Computation (TQC) 2024 , AISTATS 2021 (4), Pacific Symposium on Biocomputing 2022.

- Reviewer for MathSciNet