

# XIAOMING SONG'S CURRICULUM VITAE

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PERSONAL  
INFORMATION      Department of Mathematics, Drexel University  
32nd and Market Streets, Philadelphia, PA 19104

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EDUCATION      **Ph.D.** in Mathematics, May 2011  
University of Kansas, Lawrence, Kansas, USA  
Advisors: Yaozhong Hu and David Nualart

**B.S.** in Mathematics, June 2003  
Shandong University, Jinan, China

## EXPERIENCE

- **Assistant Professor**  
Department of Mathematics  
Drexel University  
December 2014 - present
- **Post-doctoral Senior Researcher**  
Department of Mathematical Sciences  
Ritsumeikan University, Japan  
September 2013 - June 2014
- **Post-doctoral Research Associate**  
Department of Statistics and Operations Research  
University of North Carolina at Chapel Hill  
July 2011 - June 2013
- **Graduate Teaching Assistant/ Graduate Research Assistant**  
Department of Mathematics  
University of Kansas  
August 2006 - May 2011
- **Graduate Teaching Assistant**  
School of Mathematics and System Sciences  
Shandong University, China  
September 2005 - June 2006

## RESEARCH INTEREST

- Probability theory and stochastic analysis
- Numerical methods for stochastic differential equations
- Mathematical finance
- Stochastic partial differential equations
- Data network modeling
- Large deviation theory
- Rough path analysis

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## HONORS AND AWARDS

- International Student Award for Excellence in International Education  
The Phi Beta Delta Honor Society for International Scholars, Alpha Pi Chapter at the University of Kansas, 2011
- Summer scholarship and John Bunce Award  
Department of Mathematics, University of Kansas, 2009
- Summer scholarship  
Department of Mathematics, University of Kansas, 2008

## EXTERNAL FUNDINGS

- Co-PI for NSF Grant DMS-1613965, 2016 SIAM Gene Golub Summer School at Drexel University. \$25,500. July 1, 2016 - June 30, 2018.
- Co-PI for 2016 SIAM Gene Golub Summer School, Stochastic Differential Equations and Wave Propagation. \$95,000. May 1, 2016 - October 5, 2016.

## CONFERENCE ORGANIZATION

1. Co-organizer of Session IP23 on Gaussian functionals and application to finance at the 7th IMS-China International Conference on Statistics and Probability, July 6-10, Dalian, China, 2019.
2. Co-organizer of the Workshop on Stochastic Analysis and Related Topics. The University of Hong Kong, July 3-5, 2018.
3. Co-organizer of the 2016 SIAM Gene Golub Summer School, Stochastic Differential Equations and Wave Propagation, July 25-August 5, 2016.

## PUBLICATIONS AND PREPRINTS

1. J. Song, X. Song and F. Xu. Fractional stochastic wave equation driven by a Gaussian noise rough in space (submitted). arXiv:1904.09905.
2. A. Budhiraja, V. Pipiras and X. Song. Large deviations for stochastic differential equations and stochastic partial differential equations driven by fractional Gaussian noise (preprint).
3. Y. Hu, D. Nualart and X. Song. An optimal rate of convergence of the Euler approximations for stochastic differential equations driven by fractional Brownian motion (preprint).
4. J. Akahori, X. Song and T.-H. Wang. Probability density of the lognormal fractional SABR model. arXiv:1702.08081.
5. Y. Hu, D. Nualart and X. Song. An implicit numerical scheme for a class of backward doubly stochastic differential equations (submitted). arXiv: 1702.00910.
6. X. Song. Large deviations for functionals of Gaussian processes (submitted). arXiv:1802.04224.
7. J. Song, X. Song and Q. Zhang. Nonlinear Feynman-Kac formulae for SPDEs with space-time noise. *SIAM Journal on Mathematical Analysis*, 51 (2019), no.2, 955-990.
8. J. Akahori, X. Song and T.-H. Wang. Bridge representation and modal-path approximation. *Stochastic processes and their applications*, 129 (2019), 174-204.
9. X. Chen, Y. Hu, J. Song and X. Song. Temporal Asymptotics for fractional parabolic Anderson model. *Electronic Journal of Probability*, 23 (2018), no. 14, 39pp.

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10. A. Budhiraja, V. Pipiras and X. Song. Admission Control for Multidimensional Workload Input with Heavy Tails and Fractional Ornstein-Uhlenbeck Process. *Advances in Applied Probability*, 47 (2015), no. 2, 476-505.
11. Y. Hu, D. Nualart and X. Song. Malliavin calculus for backward stochastic differential equations and application to numerical solutions. *The Annals of Applied Probability*, 21 (2011), no. 6, 2379-2423.
12. Y. Hu, D. Nualart and X. Song. A singular stochastic differential equation driven by fractional Brownian motion. *Statistics and Probability Letters*, 78 (2008), no. 14, 2075-2085.

### PROFESSIONAL SERVICES AND COMMUNITY ACTIVITIES

- **Technical referee for Journals:**

Bernoulli

Stochastic Processes and Their Applications

Stochastic Analysis and Applications, Stochastics: an International Journal of Probability and Stochastic Processes

Brazilian Journal of Probability and Statistics

Acta Mathematicae Applicatae Sinica

- Member of Association for Women in Mathematics

### CONFERENCES AND PRESENTATIONS

1. *Stochastic Processes and Stochastic Modeling*. Seminar at the Department of Automation, Shanghai Jiao Tong University, Shanghai, China, July 25, 2019. Invited talk.
2. *Nonlinear Feynman-Kac formulae for SPDEs with space-time noise*. International Workshop on Probability, Uncertainty and Quantitative Risk. Shandong University, Weihai, China, July 11-14, 2019. Invited talk.
3. *Fractional stochastic wave equation driven by a Gaussian noise rough in space*. Invited Session IP07 (Stochastic partial differential equations) of the 7th IMS-China International Conference on Statistics and Probability. Dalian, China, July 6-10, 2019. Invited talk.
4. *Fractional stochastic wave equation driven by a Gaussian noise rough in space*. Workshop on the Theory and Applications of Stochastic Partial Differential Equations. The Fields Institute, Canada, June 10-14, 2019. Invited talk.
5. *Fractional stochastic wave equation driven by a Gaussian noise rough in space*. Seminar at the Department of Mathematical Sciences, University of Nevada at Las Vegas, March 29, 2019. Invited talk.
6. *Large deviations for functionals of Gaussian processes*, joint probability seminar, University of Pennsylvania, March 26, 2019. Invited talk.
7. *Large deviations for functionals of Gaussian processes*. Seminar on Stochastic Processes. University of Utah, March 13-16, 2019. Poster presentation.
8. *Backward stochastic differential equations, fractional Brownian motion and their applications in finance*. Finance & Financial Engineering Seminar Series. Stevens Institute of technology. October 25, 2018. Invited talk.

9. *Large deviations for functionals of Gaussian processes*. International conference on stochastic partial differential equations, University of Alberta, September 28-October 2, 2018, Canada. Invited talk.
10. *Large deviations for functionals of Gaussian processes*. Workshop on Stochastic Analysis and their Applications, Jilin University, July 8-10, 2018. Invited talk.
11. *Probability density of lognormal fractional SABR model*. Workshop on Stochastic Analysis and Related Topics. The University of Hong Kong, July 3-5, 2018. Invited talk.
12. *Nonlinear Feynman-Kac formulae for SPDEs with space-time noise*. The 5th IMS-APRM. Singapore National University. June 26-29, 2018. Invited talk.
13. *An implicit numerical scheme for a class of BDSDEs*. SIAM Conference on Control and Its Applications, Pittsburg, July 10 - 12, 2017. Contributed talk.
14. Lecturer and topic speaker at the 2016 Gene Golub SIAM Summer School. Drexel University, July 25 - August 5, 2016.
15. *A mathematical model of file uploads and downloads*. Dean's seminar in the College of Arts and Sciences. Drexel University, April 6, 2016.
16. *Admission Control for Multidimensional Workload Input with Heavy Tails and Fractional Ornstein-Uhlenbeck Process*. Seminar on Stochastic Processes. University of Maryland, March 16 - 19, 2016. Poster presentation.
17. *Some topics on my current research, my career, and how to balance my career and family as a female researcher*. Association for Women in Mathematics. Department Seminars & Colloquia, University of Kansas, August 25, 2015. Invited talk.
18. *Admission Control for Multidimensional Workload Input with Heavy Tails and Fractional Ornstein-Uhlenbeck Process*. 2015 IMS-China International Conference on Statistics and Probability, Yunnan University, China, July 1 - 7, 2015. Invited talk.
19. Seminar on Stochastic Processes. University of Delaware, April 1 - 4, 2015.
20. *Backward stochastic differential equations and Malliavin calculus*. PDE and Applied Math Seminar, Department of Mathematics, Drexel University, March 12, 2014.
21. Stochastic Processes and Their Statistics in Finance. Okinawa, Japan, October 26 - November 1, 2013.
22. *Malliavin calculus for backward stochastic differential equations and application to numerical solutions*. Probability Seminar, Jilin University, China, August 2, 2013.
23. *Admission Control for Multidimensional Workload with Heavy Tails and Fractional Ornstein-Uhlenbeck Process*. Workshop for Women in Probability, Duke University in Durham, North Carolina, October 14 - 16, 2012. Poster presentation.
24. *Convergence of workload process in the infinite source Poisson model with heavy tails and admission control*. International Conference on Long-Range Dependence, Self-Similarity and Heavy Tails in Honor of Professor Murad S. Taqqu, Research Triangle Park, North Carolina, April 19 - 21, 2012. Poster presentation.
25. *Approximation schemes of the solution to a stochastic differential equation driven by fractional Brownian motion*. Special Session on Stochastic Analysis, 2012 Spring Central Section Meeting, University of Kansas, March 30 - April 1, 2012.

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26. *Convergence of workload process in the infinite source Poisson model with heavy tails and admission control.* Seminar on Stochastic Processes, University of Kansas, March 22 - 24, 2012.
27. *Approximation schemes of the solution of a stochastic differential equation driven by fractional Brownian motion.* Probability Seminar, University of North Carolina at Chapel Hill, April 5, 2012.
28. *Malliavin calculus for backward stochastic differential equations and application to numerical solutions.* Mathematical Finance and Probability Seminars, Rutgers University, December 13, 2011. Invited talk.
29. *Malliavin calculus for backward stochastic differential equations and application to numerical solutions.* The 6th International Symposium on Backward Stochastic Differential Equations, University of Southern California, June 8 - June 10, 2011.
30. *Malliavin calculus for backward stochastic differential equations and application to numerical solutions.* International Conference on Malliavin Calculus and Stochastic Analysis in Honor of David Nualart, University of Kansas, March 19 - 21, 2011. Poster presentation.
31. *A singular stochastic differential equation driven by fractional Brownian motion.* Malliavin Calculus and Its Applications (NSF-CBMS Research Conference), Kent State University, August 7 - 12, 2008.
32. *A singular stochastic differential equation driven by fractional Brownian motion.* Kansas-Missouri Winter School of Applied Probability, University of Missouri in Columbia, February 14 - 15, 2008.

### COURSES TEACHING/TAUGHT AS INSTRUCTORS

- **Courses at Drexel University**

- **Math 611, Math 612 and Math 613** (probability theory and stochastic processes, graduate courses), Fall, Winter and Spring Quarters, 18-19.
- **Math 633** (Real analysis, a graduate course), Spring Quarter 16 - 17.
- **Math 504** (Matrix analysis, a graduate qualifying exam course), Winter Quarter 16 - 17 and Fall Quarter 17-18.
- **Math 121** (Functions, limits and continuity, derivatives, transcendental functions, and applications), Fall Quarter 18-19, Fall Quarter 17-18, Fall Quarter 16 - 17 and Winter Quarter 15 - 16.
- **Math 122** (Integrals, techniques for integrals and applications), Spring 17-18.
- **Math 200** (Vectors, curves, partial derivatives, gradient, constrained optimization, coordinate system, multiple integrals, and applications), Fall Quarter 15 - 16.
- **Math 123** (Differential equations and the study of infinite sequences and series), Winter Quarter 14 - 15.

- **Course at UNC at Chapel Hill:** STOR 155 (Introduction to the Practice of Statistics: data analysis, correlation and regression, sampling and experimental design, basic probability, hypothesis testing, confidence intervals and use of spreadsheet software), University of North Carolina at Chapel Hill, fall 2011 - Spring 2013

- Large class sessions: there were about 100 students in each class session.

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- **Courses at the University of Kansas:** From spring 2007 to spring 2011 at the University of Kansas, I taught one of the following courses each semester when I was a Teaching Assistant
  - **Math 115** (Differentiation, integration with applications in management and the biological sciences)
  - **Math 121** (Differentiation and integration of algebraic and trigonometric functions. Applications to physical sciences and engineering)
  - **Math 122** (Continuation of Math 121. Series, partial differentiation and multi-integrals. Applications to physical sciences and engineering)

### EXTRA CURRICULUM

- President for the Association for Women in Mathematics Student Chapter at KU for 2010 academic year
- Membership of Phi Beta Delta Honor Society, KU Chapter, 2008-2011
- Representative for the Graduate Student Organization in the Department of Mathematics at KU for 2008 academic year