Cheng Ouyang *Curriculum Vitae*

Professor

Department of Math, Statistics, and Computer Science
University of Illinois at Chicago
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Employment

Professor, University of Illinois at Chicago Aug 2022 - present
Associate Professor, University of Illinois at Chicago Aug 2016 – Aug 2022
Assistant Professor, University of Illinois at Chicago Aug 2011 - Aug 2016
Golomb Assistant Professor, Purdue University Aug 2009 - Aug 2011

Education

Ph.D. in Mathematics, Northwestern University Jun 2009
Dissertation advisor: Elton P. Hsu

B. S. in Mathematics, Univ. of Sci. and Tech. of China Jun 2004

Research Interest

Probability Theory and Stochastic Analysis

Preprints and Publications

25. Parabolic Anderson model on Heisenberg groups: the Ito setting, (with F. Baudoin, S. Tindel and J. Wang), *submitted*, (2022).

24. Quasi-sure non self-intersection for differential equations driven by a fractional Brownian motion, (with W. Vickery), *Electron. Commun. Probab.*, Vol. 27, no. 15, 1-12 (2022).

23. Geometric deviation of Levy's occupation time arcsine law, (with E. P. Hsu), *submitted*, (2020).

22. Moment estimates for some renormalized parabolic Anderson models, (with X. Chen, A. Deya, and S. Tindel), *Annals of Probability*, Vol. 29, No. 5, 2599-2636 (2021)

21. A K-rough path above the space-time fractional Brownian motion, (with X. Chen, A. Deya and S. Tindel), to appear in *Stochastic and Partial Differential Equations: Analysis and Computations*, (2020).

20. Precise local estimate for differential equations driven by fractional Brownian motions: hypoelliptic case, (with X. Geng and S. Tindel), to appear in *Annal of Probability*, (2020).

19. Precise local estimate for differential equations driven by fractional Brownian motions: elliptic case, (with X. Geng and S. Tindel), *submitted*, (2020).

18. Density of the signature of a fractional Brownian motion, (with F. Baudoin and Q. Feng), *Trans. Amer. Math. Soc., **373*** (2020), 8583-8610.

17. Density bounds for solutions to differential equations driven by Gaussian rough paths, (with B. Gess and S. Tindel), *Journal of Theoretical Probability*, **33**, 611-648 (2020).

16.Mutual intersection for rough differential systems driven by fractional Brownian motions, (with Y. Shi and D. Wu), *Statistics & Probability Letters*, Vol 135, 83-91, (2018).

15. "Purposely misspecified" posterior inference on volatility of a jump diffusion process, (with R. Martin and F. Domagni), *Statistics & Probability Letters*, Vol 134, 106-113, (2018).

14. On the law of the iterated logarithm for Brownian motion on compact manifolds, (with J. Pajda-De La O), *Science China-Mathematics*, **62**, 1511-1518 (2019).

13. Local times of stochastic differential equations driven by fractional Brownian motions, (with S. Lou), *Stochastic Processes and Their Applications*, Vol. 127, Issue 11, 3643-3660, (2017).

12. Multiplicative functionals for the heat equation on manifolds with boundary, Stochastic Analysis and Related Topics, A Festschrift in Honor of Rodrigo Banuelos, Progress in Probability, Birkhauser, Vol 72, 67-83, 2017.

11.Fractal dimensions of rough differential equations driven by fractional Brownian motions, (with S. Lou), *Stochastic Processes and Their Applications,* Vol. 126, Issue 8, 2410-2429, (2016)

10. On small time asymptotics for rough differential equations driven by fractional Brownian motions, (with F. Baudoin), Large Deviations and Asymptotic Methods in Finance, *Springer Proceedings in Mathematics & Statistics, Vol 110,* (2015).

9. On probability laws of solutions to differential systems driven by a fractional Brownian motion, (with F. Baudoin, E. Nualart and S. Tindel), *Annals of Probability,*Vol. 44, No. 4, 2554-2590, (2016).

8. Varadhan asymptotics for SDEs driven by fractional Brownian motions, (with F. Baudoin and X. Zhang), *Stochastic Processes and Their Applications,*Vol. 125, Issue 2, 634-652, (2015).

7. Smoothing effect of rough differential equations driven by fractional Brownian motions, (with F. Baudoin and X. Zhang), *Annales de l'Institut Henri Poincaré*, Vol. 52, No. 1, 412-428, (2016).

6. Small-time expansion for local jump-diffusion models with infinite jump activity, (with J. E. Figueroa-Lopez and Y. Luo), *Bernoulli,***20** (3), 2014, 1165-1209.

5. Gradient bounds for solutions of stochastic differential equations driven by fractional Brownian motions, (with F. Baudoin), *Malliavin Calculus and Stochastic Analysis: A Festschrift in Honor of David Nualart,* Springer Proceedings in Mathematics & Statistics, Vol. 34, Springer Verlag, (2013).

4. Concentration property and Gaussian upper bound for density of solutions to SDEs driven by fractional Brownian motions, (with F. Baudoin and S. Tindel), *Annales de l'Institut Henri Poincaré,* **50** (1), 2014, 111-135.

3. Small-time kernel expansion for solutions of SDEs driven by fractional Brownian motions, (with F. Baudoin), *Stochastic Processes and their Applications,* 121 759-792, (2011).

2. Asymptotics of implied volatility in local volatility models, (with J. Gatheral, E. P. Hsu, P. Laurence and TH. Wang), *Mathematical Finance,* **22** 591-620, (2012).

1. Quasi-invariance of the Wiener measure on the path space over a complete Riemannian manifold, (with E. P. Hsu), *J. of Funct. Anal,* **257** (5), 2009, 1379-1395.

Grants

Simons Collaboration Grant for Mathematicians (#851792), PI, 2021-2026
Simons Collaboration Grant for Mathematicians (#355480), PI, 2015-2020 (extended to 2022)
AMS-Simons travel grant, PI, 2013-2015

Seminar Talks

Stochastic Webinar, Beijing Institute of Technology & Institute of Applied Math, Chinese Academy of Science, China, Nov 2020

Probability Seminar, Lehigh University, Bethlehem, PA, Nov 2019

Colloquium, University of Alabama in Huntsville, Huntsville, AL, Oct 2019

Probability and Math-Physics Seminar, Univ. of Sci. and Tech. of China, China, Jun 2019

Probability and Math-Physics Seminar, University of Chicago, Chicago, IL, Dec 2018

Probability and Math-Physics Seminar, University of Rochester, Rochester, NY, Oct 2018

Probability Seminar, University of Illinois at Urbana-Champaign, Urbana, IL, Mar 2018

Probability Seminar, Purdue University, West Lafayette, IN, Jan 2018

Probability Seminar, University of Connecticut, Storrs, CT, Oct 2017

Probability Seminar, Jiangsu Normal University, China, May 2017

Probability and Mathematical Physics Seminar, Univ. of Sci. and Tech. of China, China, May 2017

Probability Seminar, Carnegie Melon University, Pittsburg, PA, Mar 2017

Probability Seminar, University of California-Santa Barbara, Santa Barbara, CA, Mar 2017

Probability Seminar, University of Connecticut, Storrs, CT, Oct 2016

Probability Seminar, Purdue University, West Lafayette, IN, Sep 2016

Probability Seminar, Institute of Applied Math, Chinese Academy of Science, China, July 2016

Colloquium, Illinois Institute of Technology, Chicago, IL, Feb 2016

Probability Seminar, Northwestern University, Evanston, IL, Feb 2016

Applied Mathematics Seminar, University of Illinois at Chicago, Chicago, IL, Apr 2015

Probability Seminar, Michigan State University, East Lansing, MI, Dec 2014

Probability Seminar, Univ. of Sci. and Tech. of China, China, Jul 2014

Probability Seminar, Jiangsu Normal University, China, Jul 2014

Probability Seminar, University of Illinois at Urbana-Champaign, Urbana, IL, Oct 2013

Probability Seminar, Univ. of Sci and Tech of China, China, Jun 2013

Probability and Statistics Seminar, Wayne State University, Detroit, MI, Apr 2013

Probability Seminar, University of Kansas, Lawrence, KS, Mar 2013

Probability Seminar, Purdue University, West Lafayette, IN, Jan 2013

Analysis Seminar, Northwestern University, Evanston, IL, Feb 2012

Math and Applied Math Seminar, University of Illinois at Chicago, Chicago, IL, Feb 2012

Colloquium, Indiana Univ. Purdue Univ. Indianapolis, Indianapolis, IN, Jan 2012

Colloquium, Illinois Institute of Technology, Chicago, IL, Jan 2012

Probability Seminar, Purdue University, West Lafayette, IN, Dec 2011

Probability and Math-Physics Seminar, University of Rochester, Rochester, NY, Nov 2011

Statistics Seminar, University of Illinois at Chicago, Chicago, IL, Sep 2011

Special colloquium, University of Illinois at Chicago, Chicago, IL, Jan 2011

Probability Seminar, Purdue University, West Lafayette, IN, Sep 2010

Probability Seminar, Purdue University, West Lafayette, IN, Sep 2009

Applied Math Seminar, Purdue University, West Lafayette, Sep 2009

Probability Seminar, University of Illinois at Urbana-Champaign, Urbana, IL, May 2009

Probability Seminar, University of Minnesota-Twin Cities, Minneapolis, MN Apr 2009

Math Finance Seminar, Rutgers University, New Brunswick, NJ, Feb 2009

Probability Seminar, University of Kansas, Lawrence, KS, Jan 2009

Analysis and Probability Seminar, Northwestern University, Evanston, IL, Nov 2008

Conference/Workshop Talks

AMS Fall Central Sectional Meeting-Special session on “Stochastic Analysis and Applications” (invited), El Paso, TX, Sep 2022

AMS Fall Southeast Sectional Meeting-Special session on “Stochastic Analysis and Applications” (invited), Mobile, AL, Nov 2021

AMS Spring Central Sectional Meeting-Special session on “Probabilistic and diffusion methods in analysis and geometry” (invited), Virtual, Apr 2021

AMS Fall Central Virtual Sectional Meeting-Special session on “Theoretical and Computational Studies of PDEs Related to Fluid Mechanics” (invited), Virtual, Sep 2020

Bernoulli-IMS One World Symposium 2020 – Probability Channel: Session on “Stochastic Analysis including SPDEs” (contributed), Virtual, Aug 2020

JMM-SIAM Mini-symposium on Deterministic and Probabilistic Approaches for Nonlinear PDEs (invited), Denver, Jan 2020

HIM Workshop: Problems of Roughness, Geometry and Random Fluctuations (invited), Hausdorff Research Institute for Mathematics, University of Bonn, Germany, Dec 2019

AMS Fall Central Sectional Meeting-Special session on “Stochastic Partial Differential Equations and Related Fields III” (invited), Madison, WI, Sep 2019

International Conference on Stochastic Analysis and Related Fields (invited), Jiangsu Normal University, Xuzhou, China, Jun 2019

Zhejiang Workshop on Advanced Probability Theory (6 lectures, invited), Zhejiang University, Hangzhou, China, Jun 2019

AMS Spring Eastern Sectional Meeting-Special session on “Stochastic Analysis and Related Fields” (organizer), Hartford, CT, Apr 2019

The 40th conference on Stochastic Processes and Their Applications – Special Session on “Noisy systems in Gaussian environment” (invited), Sweden, Jun 2018

Oberwolfach Workshop on Mathematics of Quantitative Finance (invited), Germany, Feb 2017

USTC Probability Forum (invited), University of Science and Technology of China, Aug 2016

The 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications (invited), Orlando, July 2016

Seminar on Stochastic Processes 2016, University of Maryland-College Park, Mar 2016

AMS Central Fall Sectional Meeting-Special session on “Stochastic Analysis with Applications to Quantitative Finance”, Loyola University in Chicago, Oct 2015

Mini-Workshop on stochastic PDEs (invited), Univ. of Sci. and Tech. of China, China, Jul 2015
2015 IMS-China International Conference on Probability and Statistics-Special Session on "Topics on fractional Brownian motions and Gaussian fields" (invited), China, Jul 2015

Conference in Stochastic Analysis and Related Topics (invited), Purdue University, May 2015

The Dynamical Systems, Ergodic Theory and Probability Conference dedicated to the memory of Nikolai Chernov (invited), University of Alabama at Birmingham, May 2015

AMS Spring Western Sectional Meeting-Special Session on “Stochastic Analysis & Rough Path” (organizer), U. of Nevada-Las Vegas, Apr 2015

AMS Spring Southeastern Sectional Meeting-Special Session on “Stochastic Processes and Related Topics” (invited), U. of Alabama-Huntsville, Mar 2015

Oberwolfach Workshop on Dirichlet Form Theory and its Appl. (invited), Germany, Oct 2014

Cincinnati Symposium on Probability Theory and Appl. (invited), U. of Cincinnati, Sep 2014

Seminar on Stochastic Processes 2014, UCSD, Mar 2014

The 8th Workshop on Markov Processes and Related Topics, BNU-China (invited), Jul 2012

8th International Purdue Symposium on Statistics - Probability Session (invited), Jun 2012

8th International Purdue Symposium on Statistics - Math Finance Session (invited), Jun 2012

Seminar on Stochastic Processes 2012, University of Kansas, Mar 2012

Seminar on Stochastic Processes 2011, University of California - Irvine, Mar 2011

Seminar on Stochastic Processes 2010, University of Central Florida in Orlando, Mar 2010

AMS 2010 Southeastern Sectional Meeting-Math Finance, U. of Kentucky (invited), Mar 2010

1st Graduate Student Conference in Probability, U. of Wisconsin-Madison, Apr 2007

Undergraduate Research

In the Spring 2016, I supervised a project "Brownian motion on manifolds" in the Mathematical Computing Lab of UIC.

Graduate Student Advising

Past PhD Student: Jennifer Pajda-De La O (PhD 2016, currently Clinical Assistant Professor at UIC)

Current PhD Student: William Vickery, Hongyi Chen

Post-doc Mentoring

Past post-doc: Shuwen Lou (Fall 2014-Spring 2017, currently tenure-track Assistant Professor at Loyola University)

Additional Professional Activities

- Organizing (with F. Baudoin, P.A. Ruiz and S. Tindel) a 5-day CMO-BIRS workshop: New Trends in Stochastic Analysis.
- Organized (with F. Baudoin and A. Lejay) a Special Session on "Rough path and Malliavin calculus" at the AMS-SMF-EMS joint International Mathematics Meeting in Grenoble, France, July 2022.
- Organized (with T. Owada and S. Tindel) a Special Session of AMS conference in West Lafayette, IN on "Gaussian and Non-Gaussian Analysis", Apr 2020. (Cancelled due to Covid-19)
- Organized (with F. Baudoin) a Special Session of AMS Conference in Hartford, CT on "Stochastic Analysis and Related Fields", Apr 2019.
- Organized (with F. Baudoin and S Tindel) a 5-day CMO-BIRS workshop on "Theoretical and Applied Stochastic Analysis" at Casa Mathematica Oaxaca, Mexico, Sep 9-14, 2018.
- Organized (with F. Baudoin and D. Nualart) a Special Session of AMS Conference in Las Vegas, NV on "Stochastic Analysis & Rough Paths", Apr 2015.
- Scientific committee of the Thirty Sixth Midwest Probability Colloquium, Oct 2014.
- Organized (with I. Nenciu) the Summer School on Stochastic Analysis and Geometry, UIC, Aug 2014.
- Refereed for:
  Acta Mathematica Sinica

Annales de l'Institut Henri Poincaré
Annals of Applied Probability
Annals of Probability
Electronic Communications in Probability
Electronic Journal of Probability
Finance and Stochastics
Journal of Dynamical and Control Systems
Journal of the European Mathematical Society
Journal of Functional Analysis
Journal of Theoretical Probability
Quantitative Finance
Science China-Mathematics
SIAM Journal on Financial Mathematics
Statistics & Probability Letters
Stochastics and Dynamics
Stochastic Processes and Their Applications
Transactions of AMS