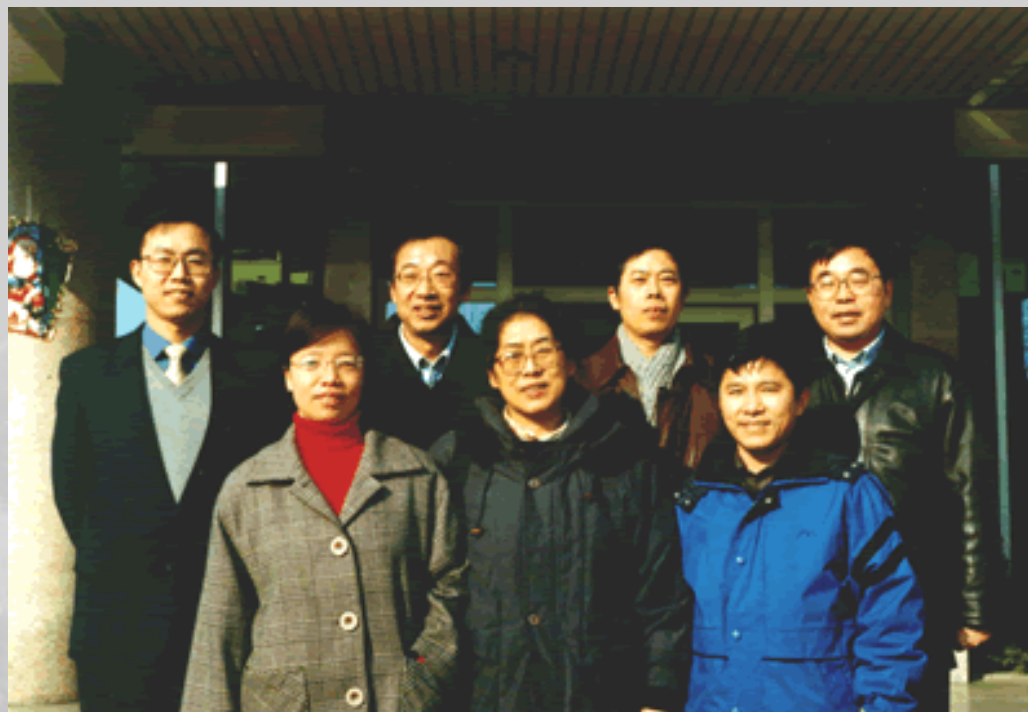




北京大學  
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# Probability Group at PKU





## Brief History

1940s early practices

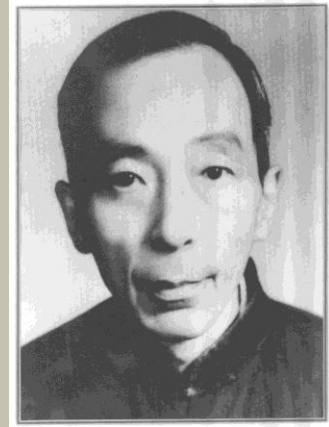
1951 first graduate student

1956 Division of Prob. & Stat (P.L. Hsu)

1985 Dept of Prob. & Stat.

**Division of Probability** (M-P Qian)

1987 First Ph.D., about 40 Ph.D. so far





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Professor

Dayue CHEN, Yanxia REN, Yong LIU,

Associate Professor

Daquan JIANG, Fuxi ZHANG, Hao GE,

Post-doctoral Fellow

Xian CHEN,

Professor Emeritus

Min-ping QIAN





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## Research Fields

### Stochastic Analysis

Yanxia REN, Yong LIU, Xian CHEN,

Random walks, Markov Chains (Discrete)

Dayue CHEN, Fuxi ZHANG,

Applications in Physics & Biology,

Daquan JIANG, Hao GE, Min-ping QIAN,

Limit Theory Jingping Yang



# Ren, Yanxia

Professor (Ph.D. 1998, Nankai University)



- Post-doctor at Tsinghua Univ(98-00)
- visited Toronto University
- Univ. of British Columbia, Canada,
- Univ. of Illinois,
- University of Oregon,
- University of Washington, USA.
- *Research Interests:* Measure-valued Markov processes, branching particle systems



# Ren, Yanxia

- 46 papers are published, cited 53 times by 37 authors
- 1. [An almost sure scaling limit theorem for Dawson-Watanabe super-processes](#). *J. Funct. Anal.* 159(2008), 267-294. (with Z.-Q. Chen and H. Wang)
- 2. [Small value probabilities for supercritical branching processes with immigration](#), *Bernoulli*, 20(1)(2014): 377-393. (with W. Chu & W. V. Li)
- 3. [A strong law of large numbers for super-stable processes](#), *Stoch. Proc . Appl.* 121(1)(2014): 505-521. (with Michael A. Kouritzin)
- 4. [Central limit theorems for supercritical branching Markov processes](#), *J. Funct. Anal.* 266(2014): 1716-1756. (with R. Song and R. Zhang).
- 5. Central limit theorems for supercritical branching nonsymmetric Markov processes, To appear in *Ann. Probab.* (with R. Song and R. Zhang).



# Ren, Yanxia

- Head of the Probability Group
- National Award of the Best 100 Dissertations (2000)
- supervised 5+2 Ph.D. students and 13+2 MS students
- continuously supported by NSFC,  
in particular her oversea cooperation  
project with Chen Zhen-qing







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# Liu, Yong, Professor (Ph.D. 1999, Peking Univ.)



- Post-doc at AMSS (1999-2002)
- Visited Loughborough Univ., UK, Weierstrass Institute, Germany and Kansas Univ., USA.
- *Research Interests:* Stochastic Analysis on infinite dimensional spaces, SPDEs and interacting diffusions and their applications to mathematical physics



# Liu, Yong

15 papers, cited 15 times by 26 authors

1. Gong Guanglu, **Liu Yong**, Qian Minping, Simulated annealing with a potential function with discontinuous gradient on  $R^d$ , *Science in China* (Series A), 2001, vol 44. No. 5, 571-578.
2. Gong Guanglu, **Liu Yong**, Qian Minping, An adaptive simulated annealing algorithm, *Stochastic Proc. Appl.*, 2001, vol 94, 95-103
3. **Liu Yong**, Zhao Huaizhong, Representation of pathwise stationary solutions of stochastic Burgers' equations, *Stochastics and Dynamics*, 2009, vol 9 No. 4 613-634
4. Deng Xiaoxue, Feng Jin, **Liu Yong**, A Singular 1-D Hamilton-Jacobi Equation, with application to large deviation of diffusions, *Comm. Math. Sci.* 2011, vol.9 No.1, pp289-300
5. **Liu Yong**, Zhai Jianliang, A note on time regularity of generalized Ornstein-Uhlenbeck processes with cylindrical stable noise. *C. R. Math. Acad. Sci. Paris* 350 (2012), no. 1-2, 97–100



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# Liu, Yong



- Organizer of Probability seminars
- Supported by grants from the Ministry of Sci. &Tech. and NSFC
- Participated Beijing Marathon 6 times



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# Jiang, Daquan

Associate Prof (Ph.D. 2001, Peking U.)



- visited Universität Bonn for one year as a Humboldt scholar.
- *Research Interests:* Probability theory and stochastic processes, Dynamical systems and ergodic theory, Non-equilibrium statistical physics, Biophysics and physical biology, Systems biology





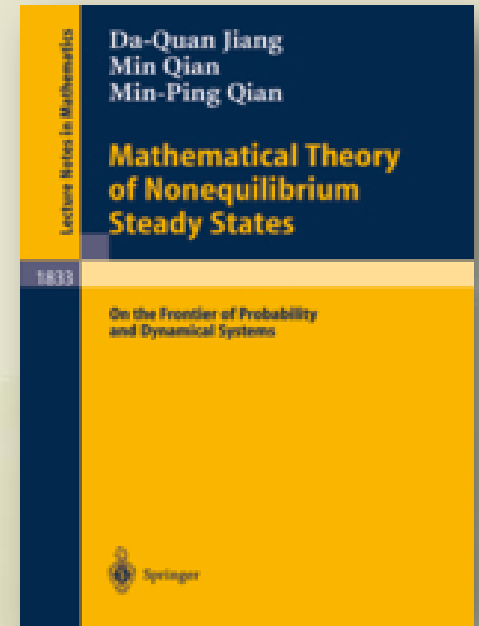
# Jiang, Daquan

- 12 papers, cited 74 times by 64 authors
- 1. An allosteric model of the inositol trisphosphate receptor with nonequilibrium binding, *Phys. Biol.* 11, 2014 (with C. Jia & M.P. Qian)
- 2. Overshoot in biological systems modelled by Markov chains: a non-equilibrium dynamic phenomenon, *IET Syst. Biol.* 8, 2014 (with C. Jia & M.P. Qian)
- 3. Generalized Jarzynski's equality of inhomogeneous multidimensional diffusion processes, *J. Statist. Phys.* 131, 2008 (with Hao Ge)
- 4. The transient fluctuation theorem of sample entropy production for general stochastic processes, *J. Phys. A: Math. Theor.* 40, 2007, (with Hao Ge)
- 5. *Mathematical Theory of Nonequilibrium Steady States* - On the Frontier of Probability and Dynamical Systems, Springer Lect. Notes Math. 1833, 2004 (with M. Qian & M.P. Qian)



# Jiang, Daquan

- co-author of monograph '*Mathematical Theory of Nonequilibrium Steady States*' in the Springer LNM series.
- Being awarded the Young Mathematician Award by CMS





# Zhang, Fuxi, Associate Prof (Ph.D. 2004, Peking Univ.)



- Visited the University of Melbourne (2005-2006), and UCLA (2011-2012).
- *Research Interests:* Markov processes, random walk, interacting particle systems, probability approximation theory, non-equilibrium theory.



# Zhang, Fuxi, Associate Prof (Ph.D. 2004, Peking Univ.)

- 20 papers, cited 29 times by 33 authors
- [Jiang, Da-Quan](#); [Qian, Min](#); [Zhang, Fu-Xi](#) Entropy production fluctuations of finite Markov chains. [J. Math. Phys. 44 \(2003\), no. 9](#), 4176–4188.
- [Jiang, Da-Quan](#); [Zhang, Fu-Xi](#) The Green-Kubo formula and power spectrum of reversible Markov processes. [J. Math. Phys. 44 \(2003\), no. 10](#), 4681–4689.
- [Xia, Aihua](#); [Zhang, Fuxi](#) A polynomial birth-death point process approximation to the Bernoulli process. [Stochastic Process. Appl. 118 \(2008\), no. 7](#), 1254–1263.
- [Chen, Dayue](#); [Wei, Bei](#); [Zhang, Fuxi](#) A note on the finite collision property of random walks. [Statist. Probab. Lett. 78 \(2008\), no. 13](#), 1742–1747.
- [Zhang, Fuxi](#) Exclusion processes on groups: entropy production density and reversibility. [Phys. A 348 \(2005\), no. 1-4](#), 131–139





# Zhang, Fuxi

- National Award of the Best 100 Dissertations (2006)
- Supported by NSF of China.
- Vice chairperson of the Dept. of Probab. & Stat.





# GE, Hao

Associate Professor (Ph.D. 2008, Peking Univ.)



- Fudan University (2008-2011)
- Visited Harvard Univ. (2010-2011)
- *Research Interests:* Interface of stochastic processes and biophysics; Nonequilibrium thermodynamics and statistical mechanics; Computational systems biology-stochastic modeling; Biophysical chemistry; Statistical analysis of biological big data.



# GE, Hao

Published 14 papers, cited 18 times by 18 authors

1. **Ge, H.**, Qian, H. and Xie, X.S.: [Stochastic phenotype transition of a single cell in an intermediate region of gene state switching](#). *Phys. Rev. Lett.* 114, 078101 (2015)
2. Chong, S.S., Chen, C.Y., **Ge, H.** and Xie, X.S.: [Mechanism of transcriptional bursting in bacteria](#). *Cell* 158, 314–326 (2014)
3. **Ge, H.**, Qian, M. and Qian, H.: [Stochastic theory of nonequilibrium steady states. Part II: Applications in chemical biophysics](#). *Phys. Rep.* 510, 87-118 (2012)
4. **Ge, H.** and Qian, H.: [The physical origins of entropy production, free energy dissipation and their mathematical representations](#). *Phys. Rev. E* **81** 051133 (2010)
5. **Ge, H.** and Qian, H.: Thermodynamic limit of a nonequilibrium steady state: Maxwell-type construction for a bistable biochemical system. *Phys. Rev. Lett.* 103, 148103 (2009)



# GE, Hao

- National Award of the Best 100 Dissertations (2006)
- Young Mathematician Award by CMS
- Close cooperation with Sunny Xie of Harvard, to answer several fundamental questions in sciences, such as cell biology and statistical mechanics, through carefully studying their related stochastic models.
- An interdisciplinary field involves mathematics, physics, chemistry, biology and even engineering.
- A member of BICMR and BioPic







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# Chen, Dayue

Professor (Ph.D. 1989, UCLA, USA)



- Visiting assistant professor, Northwestern Univ. (1989-1991)
- Visited UC Berkeley (97-98) and MSRI (2005)
- *Research Interests:* Markov processes, Interacting particle systems, Percolation



# Chen, Dayue

- 34 papers, cited 37 times by 56 authors
- 1 Anchored expansion, percolation and speed, (with Y. Peres), ***Ann. of Probability***, (2004), Vol.32, No.4, 2978-2995
- 2 The reversible nearest particle system on a finite set (with J. Liu and F Zhang), ***Bernoulli***, (2006), Vol. 12, No. 1, 101-111.
- 3 Average properties of random walks on Galton-Watson trees, ***Ann. Inst. H. Poincare***, Vol.33, No.3, (1997), 359-369.
- 4 The loop erased exit path and the metastability of the biased majority vote process, (with O. Catoni and J. Xie), ***Stochastic Processes and Their Applications***, Vol.86, No.2, (2000) 231-261.
- 5 On the infinite cluster of the Bernoulli bond percolation in the Scherk's graph, ***J. Applied Probab.***, Vol.38, No.4, (2001) 828--840



# Chen, Dayue

- National Funds for Distinguished Young Scientists (2006)
- Supervised 7+1 Ph.D. students and 22+2 MS students.
- Vice President of the Chinese Math. Society,
- Editor-in-Chief of the Journal of *Advance in Math.*
- continuously supported by NSFC, MOST
- an oversea cooperation project with Yueyun Hu (2016+)



# Qian, Min-Ping

Professor Emeritus

- 68 papers with 50 Co-authors, cited 154 times by 115 authors
- Visited USA and Germany
- Head of the Probability group until retirement
- Supervised 14+ Ph.D. students and numerous MS students
- **very active** in supervising students, running students' seminars



钱敏教授获奖后与中国数学会理事长王诗成院士合影





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# Yang, Jingping

Professor

- Trained as a probabilist
- Limit theorems and extreme value theory
- Financial mathematics, actuarial science
- 31 papers cited 30 times by 55 authors
- Author of several textbooks
- Many students





## Graduate Program

- 8 Ph.D. students  
(courses + dissertation, publish paper, 3-5 years)  
many spend time *abroad* for a long period
- 17 graduate students for MS degree  
(courses + thesis, 2-3 years)  
some continue their study abroad.





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# Where the graduates went

- Fudan University
- Nanjing Univ.
- Xiamen Univ.
- East China Normal U.
- CAS University
- Beijing Jiaotong Univ.
- Beijing Institute of Tech
- Nanjing Normal Univ.
- Financial Industry
- CAS
- Post-doc abroad





# Post-doctors

- HUANG, Xin (1993-1995, [Erasmus University Rotterdam](#) . )
- ZHANG, Bo (1995-1997, [Moscow State Univ.](#) Peking Univ)
- LIANG, Zongxia (1996-1998 HUST, Tsinghua)
- XIANG, Kainan (1999-2001, CAS, Nankai Univ.)
- DAI, Jie ( 2003-2005, [McMaster](#), )
- ZHENG, Shuicao (2004-2006, Wuhan Univ. , Jiemei Univ)
- ZHANG, Rongmao (2004-2006 Zhejiang Univ. Zhejiang Univ
- CHEN, Xinxing (2007-2009, Fudan U., Shanghai Jiaotong U)
- WANG, Jiazheng (2009-2010, Shanghai U., Beijing Univ. I & C)
- [KONG Tielong](#) (2009-2011, BNU, [North Korea](#))
- ZHAI, Jiangliang (2010-2012, CAS, CUST)
- YAO, Changlong (2011-2013, CAS, CAS)
- CHEN, Xian (2014-2016, CAS )



# Courses

- Probability Theory (2) 180
- Applied Stochastic Processes (2) 110
- Measure Theory 80
- Advanced Theory of Probability 50
- Theory of Stochastic Processes 30
- *Applied Stochastic Analysis (1/2)*
- *Stochastic Analysis (1/2)*
- *Selected Topics in Probability (1/2)*



## Probability Seminars (usually on Monday)

8.10 Xue-Mei Li (Univ. of Warwick) Stochastic Interpolation Equation

8.10 **Martin Hairer** (Univ. of Warwick) Motion of a Random String

7.13 Yimin Xiao (MSU) Discrete Fractal Dimensions and Large Scale Multifractals

6.1 & 6.5 Piotr Garbaczewski (U Opole)

- Lévy flights and Lévy-Schrödinger semigroups
- Cauchy semigroups: Nonlocally induced bound states

5.25 Yongsheng Song (AMSS) An introduction to G-expectation

5.13 **David Aldous** (UC Berkeley) Spatial Networks and Probability

4.20 Hao Ge (PKU) Fluctuating-rate model and stochastic phenotype transition of a single cell

3.20 **Wei-an Zheng** (ECNU) Programmed trading and big data analysis in finance

3.9 Jian Ding (U. Chicago) An additive structure for level sets of Gaussian fields





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Guanghua School of Management 1985-2015  
百年北大 而立光华  
Celebrating 30 Years of Excellence





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# Events, Grants

Summer courses  
Workshop  
Conferences

NSFC  
MOST  
MOE  
PKU



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## 2015 年北京大学青年概率论坛

### 2015 Peking University Youth Probability Forum



为了更好的推动概率论的发展,促进国内外青年概率学者之间的学术交流和人才培养,北京大学数学科学学院将于2015年7月6日至8日举办“北京大学青年概率论坛”。

本次论坛得到了北京大学统计科学中心,高等学校数学研究与高等人才培养中心,国家自然科学基金,科技部973计划的大力支持与资助。

#### 邀请报告人:

薄立军	中国科技大学	龚若汀	Illinois Institute of Technology
陈新兴	上海交通大学	胡文清	University of Minnesota
何辉	北京师范大学	李欣意	Swiss Federal Institute of Technology
刘源	中科院数学学院	李钟洋	University of Connecticut
王健	福建师范大学	沈一	University of Waterloo
宋健	香港大学	申皓	The University of Warwick
孙嵘枫	新加坡国立大学	孙鑫	Massachusetts Institute of Technology
姚强	华东师范大学	汪哲楠	Northwestern University
王东	新加坡国立大学	王若度	University of Waterloo
谢宾	日本信州大学	叶子纯	University of British Columbia
徐礼虎	澳门大学	翟建梁	中国科技大学

#### 组织者:

北京大学数学科学学院: 陈大岳

任艳霞 刘勇

#### 时间安排:

日期: 2015年7月6日-7月8日

地点: 北京大学理科一号楼1114

#### 联系方式:

陈娴 博士

北京大学数学科学学院

Email: [chenxian@math.pku.edu.cn](mailto:chenxian@math.pku.edu.cn)

邮政编码: 100871

#### 网站:

<http://www.math.pku.edu.cn/teachers/liuyong/2015forum/admin/html/default.php>





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School of Mathematical Sciences  
Center for Statistical Science

## Lectures on Stochastic Fluid Mechanics

Dr. Wenqing Hu will give a short course about stochastic fluid mechanics and the following topics will be covered: basic existence and uniqueness results for deterministic and stochastic 2-d and 3-d Navier–Stokes equations; existence and uniqueness of invariant measures for 2-d hydrodynamical systems subject to degenerate random forcing; inviscid limit and related problems in turbulence; the 2-d deterministic and stochastic Euler equations and related problems; motion of incompressible ideal fluids from group theoretic and Hamiltonian dynamical point of view.

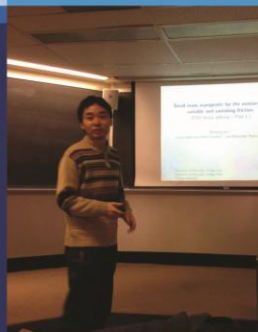
Dr. Hu currently is a postdoc at the School of Mathematics, University of Minnesota, Twin Cities, working under the supervision of Professor Vladimir Sverak. Dr. Hu completed a Ph.D. in Mathematics at the Department of mathematics, University of Maryland, College Park, under the supervision of Professor Mark Freidlin.

### Schedule:

Lecture 1:	7.9 (Thu)	8:30-10:30 a.m.
Lecture 2:	7.10 (Fri)	8:30-10:30 a.m.
Lecture 3:	7.13 (Mon)	8:30-10:30 a.m.
Lecture 4:	7.15 (Wed)	8:30-10:30 a.m.
Lecture 5:	7.17 (Fri)	8:30-11:30 a.m.

### Venue:

Room 1114, No.1 Science Building, Peking University



### Contact:

Prof. Yong Liu  
School of Mathematical Sciences,  
Peking University,  
Beijing, China 100871  
**Email:**  
liuyong@math.pku.edu.cn  
**Website:**  
<http://www.math.pku.edu.cn/teachers/liuyong/2015forum/admin/html/default.php>



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School of Mathematical Sciences  
Center for Statistical Science

## Lévy processes and self-similar Markov processes

Prof. Andreas E. Kyprianou will give a short course on the topic of self-similar Markov processes. During the course he will introduce the definition and examples of self-similar Markov processes, and its relation with Lévy processes. Some interesting topics about stable processes will also be covered.

Prof. Andreas E. Kyprianou currently is a professor of probability in department of mathematical sciences, university of bath.



### Schedule:

Lecture 1:	7.21 (Tue)	8:30-10:30 a.m.
Lecture 2:	7.22 (Wed)	8:30-10:30 a.m.
Lecture 3:	7.23 (Thu)	8:30-10:30 a.m.
Lecture 4:	7.24 (Fri)	8:30-10:30 a.m.

### Venue:

Room 1114, No.1 Science Building, Peking University

### Contact:

Prof. Yanxia Ren  
School of Mathematical Sciences,  
Peking University,  
Beijing, China 100871

### Email:

yxren@math.pku.edu.cn

### Website:

<http://www.math.pku.edu.cn/teachers/liuyong/2015forum/admin/html/default.php>





北京大學

英杰交流中心

# Workshop on Interacting Particle Systems



2009.6.15



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# Thank You!