

# Department of Mathematics

<http://math.sjtu.edu.cn/>

## I . An Introduction to Disciplines and Main Research Fields

The Department of Mathematics is a prestigious department with a long history but vibrant momentum. The mathematical science at SJTU was ranked as No. 69 globally based on the latest ESI ranking for mathematical science. In 2014, the Department of Mathematics was successfully selected into the project entitled “Network of International Centers of Education in China”, which will help SJTU Math to develop by following international tracks.

The Department of Mathematics is authorized to provide the following degree programs in both mathematics and statistics;

- Ph. D. programs in mathematics/statistics;
- Master programs in mathematics/statistics;
- Professional master in programs in applied statistics.

In addition, the Department of Mathematics also provides postdoctoral programs in both mathematics and statistics, whose purposes are to incubate high-level academic researchers.

**The main research areas include:**

Subject fields	Concrete research contents
Algebra	Representation Theory, Triangulated Category, Lie Algebra, and Vertex Operator Algebra, etc.
Geometry & Analysis	Geometry Analysis, Lower-dimensional Topology, Partial Differential Equations and Complex Dynamics of Several Variables, etc.
Number Theory	Analytic Number Theory, Algebraic Numbertheory, and Cryptology, etc.
Partial Differential Equations and Their Applications	Hyperbolic Partial Differential Equations (PDEs), Mathematical Theory of PDEs in Fluid Dynamics, and Regularity Theory and Qualitative Behavior for Elliptic Equations, etc.
Ordinary Differential Equations and Dynamical Systems	Qualitative Theory, Bifurcation Theory, and Integrable Theory, etc.

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Subject fields	Concrete research contents
Mathematical Physics	Continuous and Discrete Integrable Systems, Theory of Nonlinear Waves, Nonintegrable Systems, and Integrable Systems and Orthogonal Polynomials, etc.
Combinatorics	Algebraic Combinatorics, Graph Theory, and Complex Network, etc.
Optimization	Nonlinear Least-squares, Polynomial Optimization, Convex Optimization, and Image Processing, etc.
Scientific Computation	Numerical Solutions of Differential Equations, Mathematical Modeling and Computation for Multi-scale Problems, Fast Solvers for Physical and Mechanical Problems, and Numerical Algebra, etc.
Applied Mathematics in Biology	Physics Process in Biological System, Theoretical and Computational Neuroscience, etc.
Statistics, Probability & Financial Mathematics	Stochastic Analysis, Credit Risk Analysis, and Financial Mathematics, etc.

## II. Faculty

### 1. Overview of Faculty

In the past five years, the department has hired more than two dozen senior and young mathematicians from leading institutions overseas to join the faculty, which makes SJTU Math one of the leading centers of mathematical research and education with strong international impact. Currently, the Department of Mathematics has 105 full-time faculty members, including 33 full professors, 21 special researchers, 43 associate professors, and eight assistant professors, which form a strong-competitive academic team including three academicians of Chinese Academy of Sciences, four experts of the Thousand Talents Plan of China and many other members of various talents plans at state or province/ministry level.

### 2. Renowned Professors

No.	Name	Title	Research Interests
1	CAI David	Thousand Talents Plan expert; Changjiang Scholar; SJTU Chair Professor	Applied Mathematics
2	E Weinan	Academician of Chinese Academy of Sciences; Chang Jiang Scholar	Applied mathematics
3	HAN Dong	SJTU senior professor	Probability and Statistics
4	HUANG Jianguo	New Century Talents	Computational Mathematics

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No.	Name	Title	Research Interests
5	JIANG Cuipo	SJTU Distinguished Professor	Algebra
6	JIN Shi	Thousand Talents Plan expert; Chang Jiang Scholar; SJTU Chair Professor	Computational Mathematics
7	LI Congming	Thousand Talents Plan expert; SJTU Chair Professor	Geometry Analysis & Partial Differential Equations
8	LI Hongze	Shanghai Shuguang Scholar	Number Theory
9	LI Jianshu	Member of Chinese Academy of Sciences; Chang Jiang Scholar	Algebra
10	LI Yachun	New Century Talents; Shanghai Shuguang Scholar	Partial Differential Equations
11	LIANG Jin	New Century Talents;	Analysis
12	LIU Weidong	Oriental scholar; Recipient of National Science Fund for Distinguished Young Scholars	Probability and Statistics
13	PENG Shige	Member of Chinese Academy of Sciences; Chang Jiang Scholar	Financial Mathematics
14	WANG Weike	SJTU Distinguished Professor	Partial Differential Equations
15	WANG Ya-Guang	SJTU Distinguished Professor	Partial Differential Equations
16	WU Yaokun	Recipient of Morning Star Talents	Combinatorics
17	XIAO Dongmei	Outstanding NSFC Investigator; SJTU Distinguished Professor	ODE & Dynamical Systems
18	ZHANG Pu	Outstanding NSFC Investigator; SJTU Distinguished Professor	Algebra
19	ZHANG Xiang	Shanghai Shuguang Scholar; SJTU Distinguished Professor	ODE & Dynamical Systems

### III. Achievements

In the last five years from 2009 to 2014, the Department has achieved rapid growth in research funds, especially for 110 new projects, including one key project of NSFC (the National Natural Science Foundation of China), one major project of NSFC, one project of the National Science Fund for Distinguished Scholars and two projects of the National Science Fund for Outstanding Youths.

In addition, the Department has got 735 SCI papers published in many leading journals enjoying world recognition, including *Journal of American Mathematical Society*, *SIAM Review*, *Proceedings of the National Academy of Sciences of the USA*, *Advances in Mathematics*, and *Annals of Statistics*, etc. Many academic honors and awards were achieved, including two First Prizes and one Second Prize of Shanghai Natural Science Award, etc.

Department of Mathematics of SJTU is one of the network nodes of American NSF, which now has 3 nodes altogether, including Cambridge University, Université Paris VI, and SJTU. Besides, the scientific research memos with international top institutes like Université Paris VI J. L. Lions lab and mathematical institute of Oxford University have been signed, further cooperating in establishment of labs and research centers. *Communications on Pure and Applied Analysis*, an international mathematical journal, is jointly issued by the Department of Mathematics, SJTU, and the American Institute of Mathematical Sciences. It was selected as SCI journal since 2009.

#### **IV. International Collaboration**

The Department of Mathematics is consistently striving for enhancing exchange and collaboration with top universities overseas. Currently, it has already established substantial relationships with many world renowned universities, namely, University of Oxford, Université Paris VI, University of Wisconsin-Madison, Northwestern University, The Penn State University, University of Konstanz, and Hong Kong University of Science and Technology, etc. The Department of Mathematics has done explorations in various areas via many kinds of cooperative ways, including the establishment of dual master degree programs, joint training programs, and cooperative undergraduate-graduate continuing programs, etc. Moreover, the department has also made great endeavors to foster the talents with international horizon and critical thinking. It draws great attention to build international curricula for undergraduates, reform graduate education system and grow the number of international students, etc. In 2014, the Department was successfully selected into the project entitled “Network of International Centers of Education in China”, which will enable it to take the opportunity to establish a brand-new department administration pattern by following the international standards within the next 5-10 years. The new administration model will be established in respect of organization structure, decision-making mechanism, faculty hiring policy, compensation system, tenure-track system, faculty career development, and student training, etc.

##### **1. Joint Education Programs**

- VISP Program between the Department of Mathematics at SJTU and University of Wisconsin-Madison, USA

- Dual Master Degree Program between the Department of Mathematics at SJTU and Northwestern University, USA
- Dual Master Degree Program between the Department of Mathematics at SJTU and the Department of Mathematics & Statistics at the University of Konstanz, Germany

## **2. Student Exchange Programs**

- Master Students Mobility Program between the Department of Mathematics at SJTU and Université Pierre et Marie CURIE, France
- Doctoral Students Mobility Program between the Department of Mathematics at SJTU and University of Connecticut, USA
- Doctoral Students Training Program between the Department of Mathematics at SJTU and University of Oxford, USA
- Research and Education Exchange Program between the Department of Mathematics at SJTU and The Hong Kong University of Science and Technology, Hong Kong, China
- Research and Education Exchange Program between the Department of Mathematics at SJTU and City University of Hong Kong, Hong Kong, China
- Research and Education Exchange Program between the Department of Mathematics at SJTU and The Chinese University of Hong Kong, Hong Kong, China

## **V. Platforms for Scientific Innovation**

Ministry of Education Key Laboratory of Scientific & Engineering Computing

- Shanghai Key Lab in Mathematical Modeling, Analysis, and Computation for Multi-Physical Processes
- Institute of Natural Sciences
- Interdisciplinary Platform—The Zhiyuan Center for Mathematical Sciences
- Interdisciplinary Platform in Statistics

## **VI. Distinguished Alumni**

- WU Wenjun, Member of Chinese Academy of Sciences and the recipient of China's Top Science and Technology Award and the Shaw Prize
- HU Hesheng, Member of Chinese Academy of Sciences and the professor at Fudan University
- GONG Sheng, Professor at University of Science & Technology of China
- CAI Tony, Professor at the Wharton School of the University of Pennsylvania, USA, and the winner of 2008 COPSS President's Award
- LING Wen, CEO of Shenhua Group