

TABLE OF CONTENTS



Message from the Director	02
Organizational Structure	04
History	06
Overview of the Center	08
Distinguished Faculty	12
Research Team	12
Research Groups	16
Intellectual Exchange and Communication	20
Academic Resources	28
Study at YMSC	30
Math Talent Incubator	32
Related Institutions	36
International Cooperation	38



Message from the Director

“The growth of a nation's mathematics does not lie in its ability to adhere to the existing rules and methods of the field, or to marginally expand upon the work of renowned scholars from other countries. Instead, true growth lies in forging its own unique and significant paths of research. Such endeavors will attract the interest of scholars worldwide, inspiring them to follow and learn. Although mathematics in China has passed the first stage, it has yet to reach the next level.”



After more than two decades of dedicated effort, research in pure mathematics in China - especially in core fields like Number Theory, Algebraic Geometry, Differential Geometry, and Representation Theory - has caught up with contemporary developments. The same can be said for other disciplines such as Analysis, Differential Equations, and Mathematical Physics. However, areas such as Combinatorics, Probability, and Statistics still lag behind the standards set by our European and American counterparts and require immediate improvement.

In order to attract leading scholars to work in China, we must strive to create an exceptional academic environment. Such an environment should showcase cutting-edge research that stimulates scholars and instills in them a sense of immense potential for progress. It should provide them with the necessary support to pursue the novel directions required to solve significant long-standing open problems.

Evaluation criteria for academic achievements should be reformed so that young academics do not merely aspire to win government grants, awards, and titles, such as being inducted into a national academy or even receiving a Nobel Prize. The ultimate aim of pursuing knowledge should be to unravel the mysteries of

nature, to illuminate the essence of reality at its deepest level, and, in the process, unearth profound truth and beauty.

Cultivating a group of world-class scholars in the mathematical sciences in China will play a pivotal role in our collective pursuit of sustainable and enduring technological development into the future.

The upcoming years represent a critical period for the development of mathematics in this nation. With appropriate reform measures in place, I believe that the next five to ten years will see a new generation of world-leading, domestically nurtured scholars emerge, capable of addressing significant foundational mathematical problems.

David Hilbert famously said, "We must know, we will know!" This statement succinctly encapsulates the relentless and earnest pursuit of truth that is the essential spirit of science. We hope that the next generation will embrace this spirit. We must recognize the significance of our quest and the obstacles that lie ahead, and persist unwaveringly.

Organizational Structure

**Director**

Shing-Tung Yau

**Deputy Director**

Zuoqiang Shi

**Deputy Director**

Fan Yang

**Deputy Director**

Hao Zheng



Total
Researchers

130

Professors

22

Postdoctoral
Researchers

49

Faculty Members

81

Associate
Professors

13

Foreign
Faculty
Members

19

Assistant
Professors

46

Foreign
Postdoctoral
Researchers

10

Graduate
Students

173

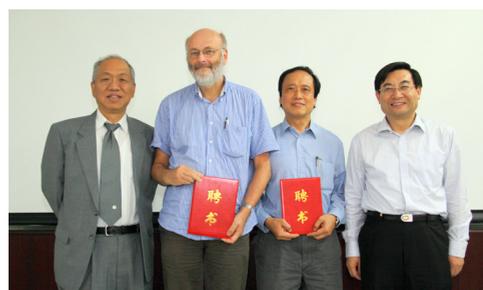
History

2009 ○ DEC 17, 2009
Mathematical Sciences Center (MSC) was established with Professor Shing-Tung Yau appointed as the Director.



2011 ○ SEP 05, 2011
Postdoctoral Station was established with the first two postdocs joining MSC.

2013 ○ SEP 01, 2013
Professor Shiu-Yuen Cheng, former Dean of the School of Science and Acting Vice-President for Academic Affairs at Hong Kong University of Science and Technology, joined YMSC as a full-time faculty member.



OCT 01, 2013

Professor Eduard Looijenga, Member of the Royal Netherlands Academy of Arts and Sciences and former Professor of Mathematics at Utrecht University, joined YMSC as a full-time faculty member.

DEC 18-22, 2013

The Tsinghua Sanya International Mathematics Forum (TSIMF) Facility was created.

2014 ○ DEC 12, 2014
The Ministry of Education officially approved the establishment of YMSC under Tsinghua University.



2015 ○ MAR 19, 2015
The YMSC Inauguration Ceremony was held.

- 2018** ○ FEB 24, 2018
The Doctoral Program in Mathematics for International Students was approved, with recruitment starting in October 2018.
- APR 1, 2018
Professor Akito Futaki, a world-class geometer and former Dean of the Department of Mathematics at the University of Tokyo, joined YMSC as a full-time faculty member.
- NOV 16, 2018
Professor Donald Rubin, a world-class statistician and former Dean of the Department of Statistics at Harvard University, joined YMSC as a full-time faculty member.
- 2020** ○ JUN 12, 2020
The Beijing Institute of Mathematical Sciences and Applications (BIMSA) was established at Yanqi Lake, accompanied by a signing ceremony of the Cooperation and Co-construction Agreement with Tsinghua University.
- 2021** ○ APR 20, 2021
The Inaugural Ceremony of Qiuzhen College was held at Tsinghua University, along with the Appointment Ceremony of the Dean of the College.
- JUN 25, 2021
Former Tsinghua President Yong Qiu presented Professor Birkar, a Fields Medalist, with a letter of appointment to YMSC, warmly welcoming him to Tsinghua and extending congratulations on his affiliation with the university.
- 2022** ○ NOV 18, 2021
Nicolai Reshetikhin, a world-class mathematical physicist, joined YMSC as a full-time faculty member.
- APR 20, 2022
A ceremony was held to mark the appointment of Shing-Tung Yau as a Chair Professor at Tsinghua University.
- 2023** ○ FEB 24, 2023
Professor Shing-Tung Yau met with former Chinese Premier Li Keqiang in Beijing.



Overview of the Center



In 2023, the QS World University Rankings put Tsinghua University Mathematics

26th

Previous ranking: 96th in 2009

In December 2009, Tsinghua University established the Mathematical Sciences Center, with internationally renowned mathematician Professor Shing-Tung Yau as director. In late 2014, the Ministry of Education officially approved the establishment of the Yau Mathematical Sciences Center (YMSC) at Tsinghua University.

Under the leadership of Professor Yau, YMSC has achieved remarkable progress over the past decade. The Center has excelled in recruiting exceptional faculty

members, nurturing promising young scholars, and spearheading cutting-edge research encompassing a wide range of disciplines within the Mathematical Sciences. As a result, YMSC has emerged as a world-class research institute. Embracing an ethos of openness, inclusiveness, and international cooperation, YMSC continues to attract top scholars from across the globe, while also serving as a hub for a growing cohort of talented young mathematicians and physicists.

Distinguished Faculty

Over the past decade, YMSC has assembled an exceptional team of mathematicians. Leading the Center is renowned mathematician and Fields Medalist, Shing-Tung Yau, known for his groundbreaking work on the Calabi conjecture and positive mass conjecture in general relativity. World-renowned algebraic geometer Eduard Looijenga has also contributed to the faculty for nearly a decade starting from 2013. In 2019, esteemed statistician Donald Rubin joined YMSC, followed by Fields Medalist Caucher Birkar and renowned mathematical physicist Nicolai Reshetikhin in 2021.



Emerging Mathematicians

YMSC's research team boasts a significant number of young mathematicians in their 30s, over 30 of whom have graduated from the world's top 20 universities in mathematics, including Harvard University, Yale University, and the University of Chicago. Several scholars have been selected for prestigious national support and funding programs, including three recipients of the Chang Jiang Scholars Program and three awardees of the National Science Fund for Distinguished Young Scholars. Additionally, 31 researchers have been chosen for the national high-level talent program.

Research Domains

YMSC's research endeavors encompass five major areas and three cross-disciplinary research fields. Of these, our research groups in Representation Theory, Number Theory, Mathematical Physics, Dynamical Systems, Random Analysis, and Geometry and Topology have achieved remarkable original results that have garnered international recognition. The establishment of the Beijing Institute of Mathematical Sciences and Applications (BIMSA) at Yanqi Lake has further bolstered the scope of our research in the Applied Mathematics.



Research Achievements

Research works of YMSC scholars cover both Pure and Applied Mathematics, including Representation Theory, Algebraic Geometry and Number Theory; Geometry and Topology; Analysis, Partial Differential Equations and Dynamical Systems; Mathematical physics; and Probability Theory and Applied Mathematics. More than 100 academic papers are published in SCI-indexed journals each year. In 2022, about 150 SCI-indexed papers were published, including those in top international journals.

International Academic Platform

YMSC has established Memoranda of Understandings with nearly 30 world-renowned universities and research institutes, including Harvard University, Stanford University, Caltech, and Oxford University. Each year, more than 300 scholars in mathematics and related fields visit YMSC for exchanges and cooperation, including winners of the Nobel Prize, the Fields Medal, and the Wolf Prize.

Mathematics Education

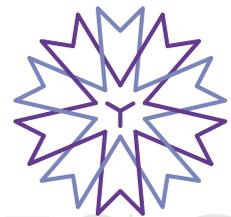
Talent cultivation holds a special place at YMSC. All faculty members and researchers actively engage in undergraduate and graduate education and regularly participate in programs such as the Yau Mathematical Sciences Leaders Program. They play a crucial role in training undergraduate students at Qiuzhen College and serve as advisors to graduate students, with the aim of nurturing the next generation of mathematical leaders in China.

Mathematics Talent Incubator

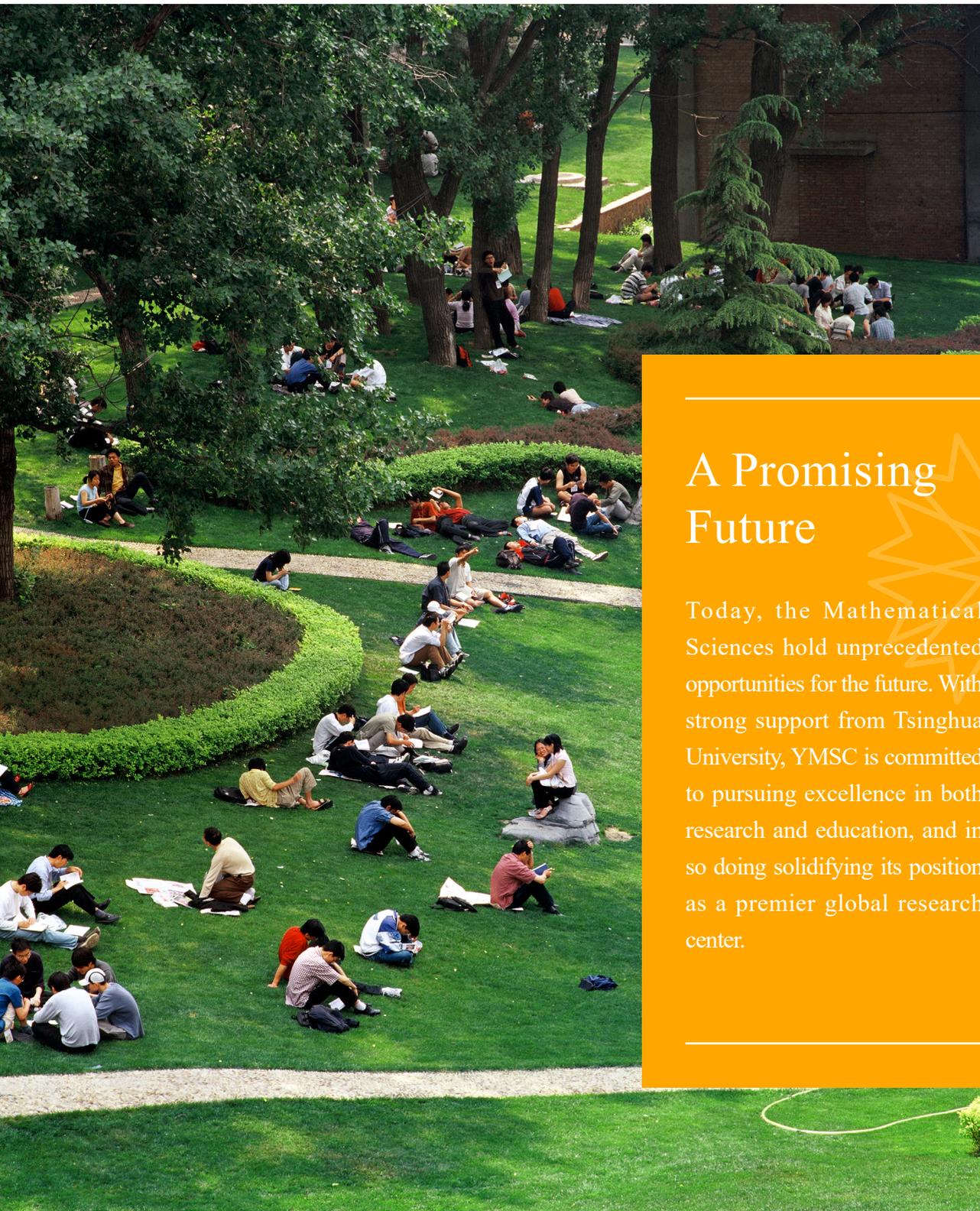
YMSC is dedicated to identifying and nurturing talented young mathematicians worldwide. Various mathematics competitions and awards, such as the S.-T. Yau High School Science Award, S.-T. Yau College Student Mathematics Contests, ICCM Best Thesis Award, and ICCM Medal of Mathematics attract talented youth at different stages of their mathematical journey.

About the YMSC Logo

On April 4, 2017, the official YMSC logo was released. The design concept was to combine the Letter Y with a graphical representation of a higher-dimensional Calabi-Yau manifold. This was then transformed into a two-dimensional picture that expands outward, symbolizing openness, inclusiveness, and international cooperation at YMSC. The logo incorporates two colors, with purple representing the longstanding tradition of Tsinghua University, and blue symbolizing the tranquility and rationality inherent in academic research.



YMSCO



A Promising Future

Today, the Mathematical Sciences hold unprecedented opportunities for the future. With strong support from Tsinghua University, YMSC is committed to pursuing excellence in both research and education, and in so doing solidifying its position as a premier global research center.

Distinguished Faculty



Professor Shing-Tung Yau

Professor Shing-Tung Yau is the Director of YMSC at Tsinghua University. He is a Member of the U.S. National Academy of Sciences, a Member of the American Academy of Arts and Sciences, and a Foreign Member of the Chinese Academy of Sciences. He is emeritus William Casper Graustein Professor of Mathematics and emeritus professor of physics at Harvard University. He has received the Fields Medal (1982), the Crafoord Prize (1994), the Wolf Prize (2010), the Marcel Grossmann Award (2018), and the Shaw Prize (2023).



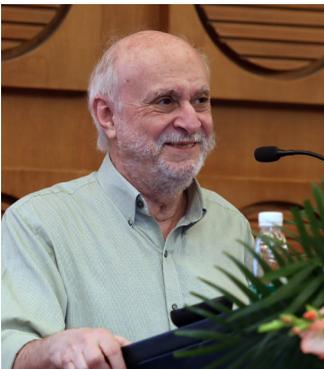
Professor Caucher Birkar

Professor Caucher Birkar is a Member of the Academia Europaea and Fellow of the Royal Society. He received the Fields Medal in 2018 for his proof of the boundedness of Fano varieties, together with contributions to the Minimal Model Problem. Professor Birkar was awarded the Leverhulme Prize in 2010 and the AMS Moore Prize in 2016.



Professor Nicolai Reshetikhin

Professor Nicolai Reshetikhin is a Fellow of the American Mathematical Society and Winner of the Weyl-Wigner Award. He was an invited speaker at the ICM in 1990 in Kyoto and a plenary speaker at the ICM in 2010 in Hyderabad. He has made major contributions to the theory of Quantum Integrable Systems, to the Representation Theory of Quantum Groups, and to Quantum Topology. He and Vladimir Turaev constructed invariants of 3-manifolds which are expected to describe the quantum Chern-Simons field theory introduced by Edward Witten.



Professor Donald Rubin

Professor Donald Rubin is a Member of the U.S. National Academy of Sciences and a Member of the American Academy of Arts and Sciences. He was John L. Loeb Professor of Statistics at Harvard University. Professor Rubin has received the Samuel S. Wilks Medal from the American Statistical Association, the Parzen Prize for Statistical Innovation, and the George W. Snedecor Award from the Committee of Presidents of Statistical Societies.

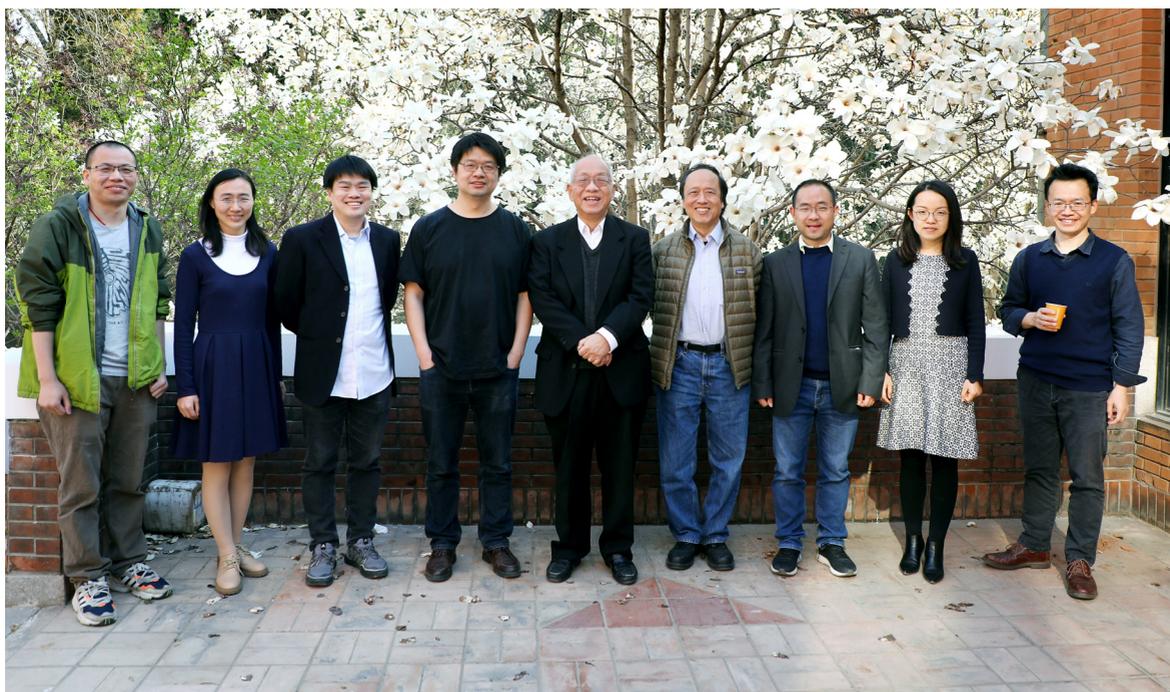
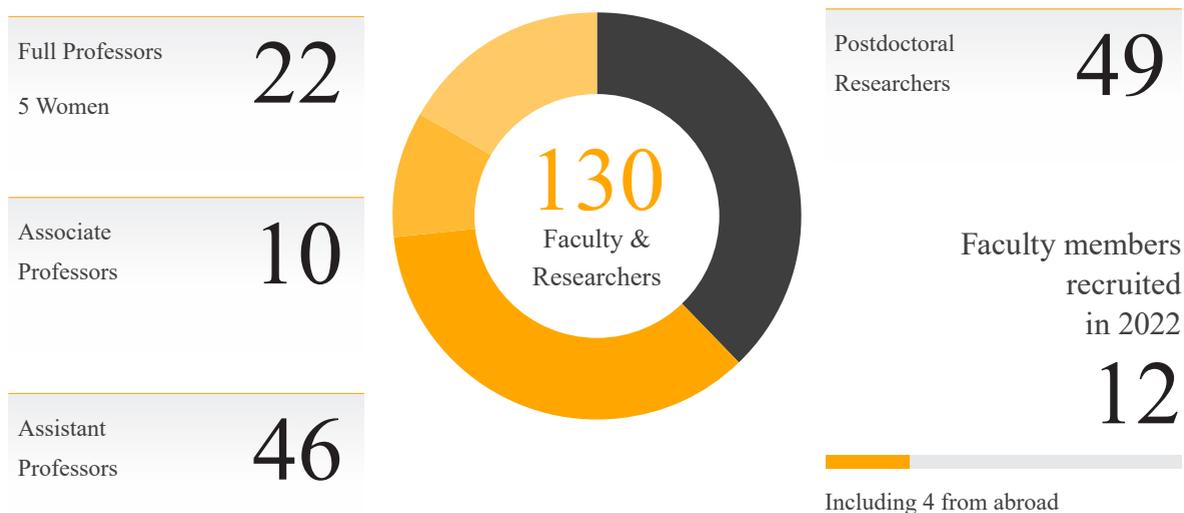


Professor Akito Futaki

Professor Akito Futaki has made seminal contributions to the field of Differential Geometry, in particular defining an obstruction to the existence of Einstein-Kähler metrics on Fano manifolds using equivariant cohomology. Professor Futaki has received the 1990 Geometry Prize and the 2011 Autumn Prize from the Mathematical Society of Japan.

Research Team

YMSC is home to a large group of outstanding young mathematicians. As of March 2023, it has a total of 81 faculty members.





Foreign
Faculty Members

19

23%



Foreign
Postdocs

10

20%

The international faculty at YMSC hail from the US, the UK, Germany, France, Japan, Australia, Chile, and beyond.

As of December 31, 2022, YMSC faculty are involved in a total of 42 ongoing government-funded research projects. Of these 32 obtained funding in 2022, with 29 receiving further talent-related support. Three of our researchers are part of the prestigious Chang Jiang Scholars Program, and three have received the National Science Fund for Distinguished Young Scholars; 31 of our researchers have been selected for the national high-level talent program.

- In 2022, Professor Peng Shan was invited to speak at the International Congress of Mathematicians (ICM).
- Professor Hao Wu was chosen as a Young Fellow of the Alibaba DAMO Academy.
- A number of YMSC scholars also received teaching awards from Tsinghua University.

Honors & Awards	Recipients
National Fund Recipients	Lei Fu, Hao Wu, Peng Shan, Wei Song, Huihui Zeng, Yao Yuan, Lin Wang, Zhijie Chen, Yi Zhu, and 31 other faculty members
ICM 2022 Invited Speaker	Peng Shan
Alibaba Damo Academy Young Fellow of 2022	Hao Wu
Teaching Awards in 2022	Long Jin, Yi Jiang, Yu Qiu, Haoran Wang, Yilong Yang, and Jie Du

Research Groups

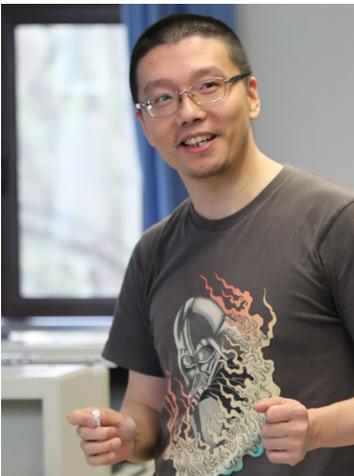
Scholars at YMSC tackle problems at the very frontiers of their fields of research. The Center provides generous resources and funding for researchers to keep up with the latest developments in every major area of Mathematics, both fundamental and applied, and freely pursue their ideas. Researchers are encouraged to collaborate and communicate, including on cross-disciplinary problems.

More than a decade since its inception, the research profile of YMSC now covers a wide array of mathematical areas, encompassing Pure, Applied, and Computational Mathematics.

In 2022 alone
the Center produced
approximately

150 SCI-indexed
publications

including many in the most
prestigious international journals.





**Members of YMSC
belong to at least one
of five research groups**

Representation Theory, Algebraic
Geometry and Number Theory

Geometry and Topology

Analysis, Partial Differential Equations
and Dynamical Systems

Probability Theory and Applied
Mathematics

Mathematical Physics

Representation Theory, Algebraic Geometry and Number Theory

This group conducts research in algebraic and geometric representation theory, category theory, l -adic cohomology and applications, moduli spaces, Hodge theory, singularity theory, and arithmetic geometry.

Professors	Caucher Birkar, Lei Fu, Yu Qiu, Peng Shan, Mao Sheng
Associate Professors	Hansheng Diao, Bin Xu, Emmanuel Lecouturier, Will Donovan
Assistant Professors	Jin Cao, Yu-Wei Fan, Xiang He, Yueke Hu, Penghui Li, Yongxiong Li, Yu Liu, Changjian Su, Haoran Wang, Yilong Yang, Chenglong Yu, Dingxin Zhang, Zhiwei Zheng, Yu Zhou, Dylan Aligretti, Koji Shimizu
Postdoctoral Researchers	Santai Qu, Bingyi Chen, Heng Du, Qi Wang, Pengcheng Li, Yu Zou, Junpeng Jiao, Boming Jia, Xucheng Zhang, Wei He, Dong Yan, Weijia Wang, Azzouz Amina, Elena Lukzen, Jianping Wang

Geometry and Topology

Researchers in this group cover a broad range of topics, including differential geometry, geometric analysis, Teichmüller theory, low-dimensional topology, high-dimensional manifold topology, and complex geometry.

Professors	Akito Futaki, Yong Lin, Xiaokui Yang
Associate Professors	Jianfeng Lin, Yunhui Wu, Jian Xiao
Assistant Professors	Weiyang Chen, Honghao Gao, Yi Huang, Yi Jiang, Yingying Zhang
Postdoctoral Researchers	Xiaolong Han, Han Hong, Zhifei Zhu, Supanat Kamtue, Jialong Deng, Shijie Shang, Mengda Lei

Analysis, Partial Differential Equation and Dynamical Systems

Members of this group study the evolution of phase spaces, both finite and infinite dimensional, of ordinary and partial differential equations, along with dynamical systems, including their interactions with areas of physics such as general relativity and hydrodynamics.

Professors	Zhijie Chen, Yitwah Cheung
Associate Professors	Long Jin
Assistant Professors	Guan Huang, Yang Lan, Xuecheng Wang, Cheng Zhang
Postdoctoral Researchers	Fei Wei, Han Zhang, Yanlin Wang, Carruth Nathan Thomas, Chuqi Cao, Lingda Xu



Mathematical Physics

This interdisciplinary group has broad interests in the relationship between mathematics and physics, together with their applications. Research in this group concerns topics as diverse as: superstring theory, gauge/gravity duality, supersymmetric theories and their applications in geometry; category theory and topological order in condensed matter physics; operator algebras and quantum computation; and machine learning in mathematical physics.

Professors	Nicolai Reshetikhin, Zhengwei Liu, Ling-Yan Hung, Wei Song, Hao Zheng
Associate Professors	Babak Haghighat
Assistant Professors	Bin Gui, Hao Guo, Qingrui Wang, Zhaohui Wei, Wenbin Yan, Chi-Ming Chang, Jie Zhou, Mauricio Romo, Robert McRae, Junya Yagi
Postdoctoral Researchers	Linzhe Huang, Pengxiang Hao, Ken Kikuchi, Ce Wang, Hao Li, Hao Wang, Simon Roby, Yuewen Chen, Han Liu, Leonardo Santilli, Yong Li, Rongvoram Nivesvivat, Lorenzo Ruggieri, Hamed Adami, Fengjun Xu, Bingnan Zhang

Probability Theory and Applied Mathematics

This group is concerned with mathematical problems arising from real-world phenomena. Current directions include probability and statistics, PDEs with random coefficients, modeling self-organization in biology, mathematical methods in imaging science, together with other numerical methods.

Professors	Jintai Ding, Zuoqiang Shi, Hao Wu, Fan Yang (F), Donald Rubin, Yannis Yatracos, Per Johansson
Associate Professors	Fan Yang (M), Yi Zhu, Yuan Zhou, Wenjia Jing
Assistant Professors	Chenglong Bao, Jie Du, Chenlin Gu, Jianping Jiang, Xin Liang, Shuang Liu, Lingyun Qiu, Chunmei Su, Jun Wang, Hui Yu
Postdoctoral	Jiebo Song, Senzhe Xu, Xiangyu Huang, Yun Li, Lishan Yu

Intellectual Exchange and Communication

Communication is essential to progress in any field of Mathematical Research.

YMSC seeks to provide a free and open research atmosphere for all scholars at the Center. Each year, YMSC organizes a wide variety of events, large and small, to facilitate the exchange of scientific ideas.

These include regular seminars, research-level courses, and international workshops. Top mathematicians regularly speak at the Modern Mathematics Lectures, Master Forums, and Special Reports.

Outside the campus, the TSIMF and BIMSA offer dynamic exchange platforms for mathematicians and scientists, often attracting Nobel Laureates, Wolf Prize Winners, and Fields Medalists.



YMSC Courses

YMSC offers advanced courses on topics belonging to a wide range of areas, including Algebra, Number Theory, Topology, Geometry and Geometric Analysis, Imaging Science, Computational Mathematics, Applied Mathematics, Mathematical Physics, and Statistics.

Visiting scholars to YMSC often offer various other minicourses in their areas of specialty. Recent minicourses include Topics in Number Theory, given by Ivan Fesenko, and Recent Developments around the Atiyah-Floer Conjecture, given by renowned geometer Kenji Fukaya.



A key part of YMSC's mission is to inspire the next generation of young mathematicians and scientists to take part in basic research. Since 2010, YMSC has offered more than 300 courses that are publicly accessible to students in China and abroad, with many being live-streamed online.

Seminars

YMSC faculty and postdocs host regular seminars in almost 20 mathematical fields, some of which include Geometry, Topology, Algebraic and Complex Dynamics, Number Theory, Probability, Microlocal Analysis and Applications, and Quantum Information.

Postdoc Workshops

The Center hosts at least one Postdoc Workshop each semester, with the goal of providing a platform for postdoctoral researchers to exchange ideas, report on their research results, and find new opportunities for collaboration.

Workshops

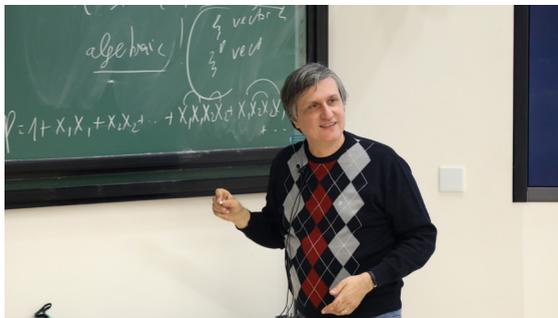


YMSC also hosts domestic and international workshops and specialised seminars, attracting experts both within China and abroad to discuss the latest developments in mathematics.

In 2022, Professor Caucher Birkar organized the Algebraic Geometry Seminar, the Birational Geometry Workshop, and a workshop on Moduli Spaces in Mathematics. Professor Hao Wu, in collaboration with Peking University, organized two workshops on Probability and Related Topics at BIMSA and TSIMF. The Center also held: a workshop on p-adic Number Theory; a Geometric Representation Seminar; a workshop on the Frontiers of Computational Science; a workshop on SPDEs and Related Fields; a seminar on Homological Algebra of the Infrared; and a seminar on Dynamics, Teichmüller Theory and Related Topics.

Modern Mathematics Lecture Series

Modern Mathematics Lecture Series was founded in March 2012. The series invites top international mathematicians to give one-hour lectures each Friday, aiming to introduce the latest research results and the frontiers of mathematics, and to build an important academic platform for Chinese scholars to communicate with their peers at home and abroad. In 2022, 35 distinguished scholars including Professor Alex Eskin, a Fellow of the U.S. National Academy of Sciences and the American Academy of Arts and Sciences; Professor Ronen Eldan, winner of the Breakthrough Prize; Chen Wei, Principal Researcher of Microsoft Research Asia, etc.. In April 2023, the Fields Medalist Maxim Kontsevich and renowned geometer Kenji Fukaya also gave lectures in this series.



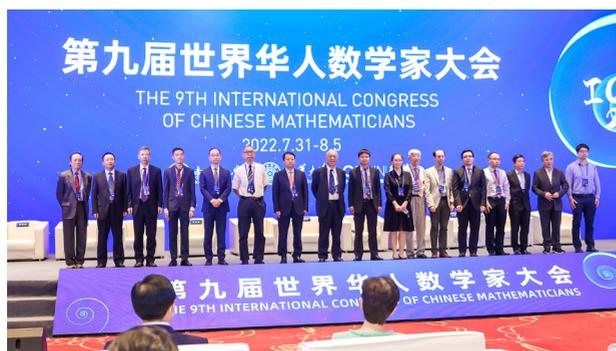
International Conferences

YMSC hosts multiple high-level international conferences each year, bringing academicians, winners of prestigious prizes, and eminent scholars from China and abroad to present their latest work. In 2022, the 9th International Congress of Chinese Mathematicians and the Frontiers in Mathematical Science Conference attracted the attention of scholars from around the world, making YMSC a hotspot for high-level scholarly activity.

International Congress of Chinese Mathematicians (ICCM)

Launched by Professor Shing-Tung Yau in 1998, the International Congress of Chinese Mathematicians (ICCM), aims to strengthen academic connections between Chinese mathematicians both within China and abroad. Participants discuss the latest research progress in the Mathematical Sciences, thereby promoting the development of mathematics in China and throughout the world.

ICCM 2022 was held in Nanjing, China from July 31 to August 5. It was jointly organized by Southeast University, Nanjing Chi-Lin Technology Innovation Park, and the YMSC at Tsinghua University. Fields Medalists Alessio Figalli



and Caucher Birkar, along with seven other top mathematicians, gave distinguished lectures. There were also 29 one-hour lectures and 210 45-minute and 20-minute lectures, covering a wide range of subjects in the Mathematical Sciences from Number Theory, Geometry, and Differential Equations to Statistics, Artificial Intelligence, and Mathematical Biology. More than 800 researchers and students attended the meeting, and over 100,000 took part in the online sessions.

Frontiers in Mathematical Science Conference



The Frontiers in Mathematical Science Conference was held from December 22 to 29 at the Tsinghua Sanya International Mathematics Forum (TSIMF) in Hainan Province. More than 100 experts in Pure and Applied Mathematics shared their most recent work. Fields Medalists Caucher Birkar, Andrei Okounkov, and Maxim Kontsevich presented academic reports during the conference.

Master Forums

The Master Forum was initiated by Professor Shing-Tung Yau in January 2013. So far about 1,650 celebrated scholars in mathematics and related academic fields have participated in the Master Forums, including three Nobel Prize Laureates, seven Fields Medalists, and five Wolf Prize Winners. They have presented about 900 lectures on cutting edge research in mathematics and related disciplines.

Distinguished Lectures

In 2011, YMSC launched the Master Memorial Lecture Series, dedicated to four Tsinghua University mathematicians: Shiing-Shen Chern, Loo-Keng Hua, Paolu Hsu and Chia-Chiao Lin.

Special Lectures

The Special Lecture Series was founded in 2018. Each year YMSC invites world-renowned scholars in mathematics to give Special Lectures.

Important Events



Strings 2016, the largest and most important conference in string theory, was held at Tsinghua University.



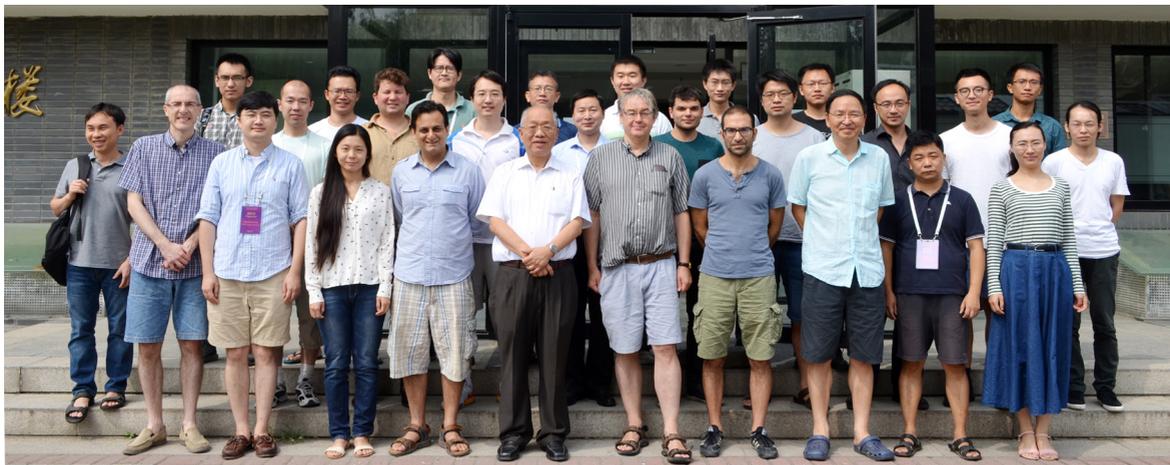
The 7th International Congress of Chinese Mathematicians (ICCM)



Tsinghua University awarded an honorary doctorate to French mathematician Jean-Pierre Serre and he gave a lecture to students at Tsinghua.



A conference was held to celebrate the 90th Anniversary of the Establishment of Mathematical Disciplines at Tsinghua University.



The Tsinghua Summer Workshop in Geometry and Physics.



International Conference on Forty Years of Calabi-Yau Theory



The 8th International Congress of Chinese Mathematicians (ICCM) and the Awards Ceremony for the ICCM Medal of Mathematics.



2021, 110th Anniversary of Birth of Professor Shing-Shen Chern

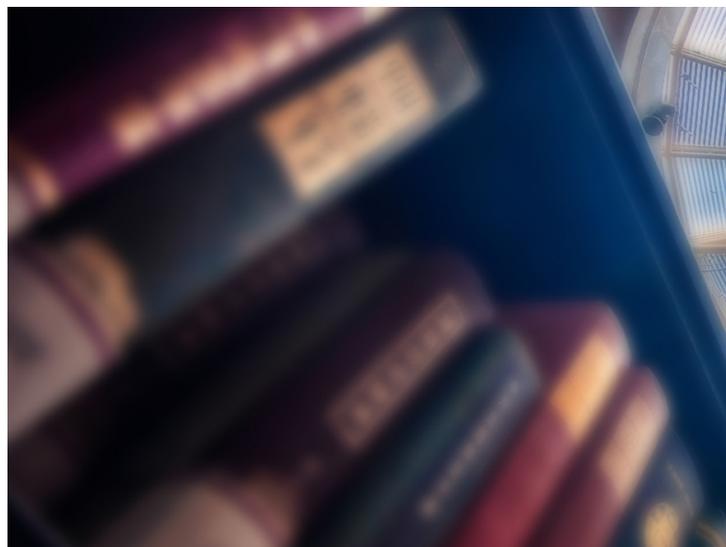


The Frontiers in Mathematical Science Conference at TSIMF

Academic Resources

Academic Journals Publication

In a bid to promote world class academic publishing, YMSC is currently responsible for editing and managing four mathematical journals: Pure and Applied Mathematics Quarterly, Advances in Theoretical Mathematical Physics, Algebraic Geometry and Physics, and Journal of Algebraic Geometry. In addition, YMSC assists in publishing of various expository publications, such as Mathematics, Science, History and Culture, and ICCM Notices.



Faculty serving in PAMQ

Editor-in-Chief: Shing-Tung Yau

Executive Editor-in-Chief: Yitwah Cheung

Editorial Board: Zhengwei Liu, Xiaokui Yang

Faculty serving in ATMP

Editor-in-Chief: Lars Andersson (BIMSA)

Executive Editors: Babak Haghighat, Junya Yagi, Hossein Yavartanoo (BIMSA)

Deputy Editors-in-Chief: Ling-Yan Hung, Zhengwei Liu

Advisor: Shing-Tung Yau

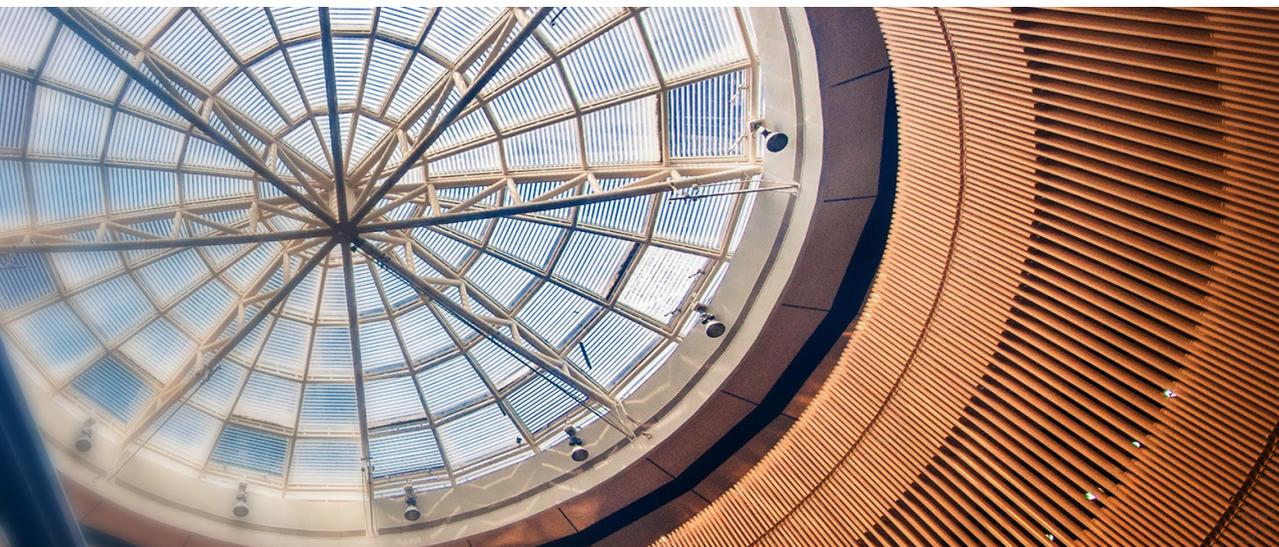
Faculty serving in AGP

Editor-in-Chief: Shing-Tung Yau

Editorial Board: Caucher Birkar, Babak Haghighat, Nicolai Reshetikhin

Faculty serving in JAG

Editorial Board: Caucher Birkar



MathSciDoc

YMSC continues to upload resources to MathSciDoc, a website that collects a large number of academic materials including publications, videos of courses, lectures, and reports, and provides these resources for free to students and researchers studying mathematics.

Study at YMSC



Nurturing the next generation of leading mathematicians is a top priority for YMSC. Fields Medalists Shing-Tung Yau and Caucher Birkar, top mathematical physicist Nicolai Reshetikhin, and other first-class mathematicians offer courses for undergraduate and graduate students.

YMSC scholars and postdoctoral fellows serve in the Teaching and Academic Degree Committee and the Curriculum Selection Steering Committee of Qizhen College. They also serve as teachers, dissertation advisors, mentors, and more. They are continually refining and enhancing curriculum design of core courses.

In 2022, YMSC faculty taught 52 undergraduate and 26 graduate courses in the Department of Mathematics, 51 undergraduate and 8 graduate courses in Qizhen College, and offered 27 public courses.

Qiuzhen College

Qiuzhen College was established in March 2021. It is designed to be the incubator of the next generation top mathematicians, under the Yau Mathematical Sciences Leaders Program. The Yau Mathematical Talents Undergraduate Program, established in 2018, was merged into Qiuzhen College. Professor Shing-Tung Yau strongly believes the nurturing of top mathematicians should start from an early age in the middle school. Qiuzhen College aims to cultivate the leading scientists in mathematics and physics for China and the world.



<https://qzc.tsinghua.edu.cn/>

Yau Mathematical Sciences Leaders Program

Tsinghua University launched the Yau Mathematical Sciences Leaders Program at the end of 2020. The scheme, aims to cultivate a new generation of top talents in basic science for China. Professor Yau hopes to assemble a team of first-class mathematicians as mentors, attract the best students from around the world and help them grow into leading mathematicians for China and the world in the next 10 years.

Yau Mathematical Talents Undergraduate Program

In February 2018, the Ministry of Education approved the Yau Mathematical Talents Programs at Tsinghua University. The program aims to improve young students' mathematical literacy, teach them the history of mathematics, as well as cutting-edge research, build a solid background in mathematics, enhance their ability to explore advanced mathematics while remaining innovative, and help them become outstanding mathematicians as early as possible.



Undergraduate Program



Yau Mathematical Sciences Leaders Program plans to recruit from around the world no more than 100 middle school students each year, who show great potential in mathematics in addition to being excellent students. The program includes a three-year undergraduate program, a two-year graduate program, plus a three-year post graduate program leading to a doctorate. It is open mainly to the first and second year Chinese high school students, with some exceptions for outstanding third-year junior high school students. The program also accepts overseas students from the 10th grade up, with exceptions for outstanding 9th graders. The freshmen at Tsinghua University can apply as well.

Yau Mathematical Sciences Leaders Program is open to high school seniors who are eligible to apply for the Unified College Entrance Examination in 2023, as well as students who are enrolled in their second year of high school. No more than 30 students will be admitted each year. Applicants are required to take a comprehensive test, and disciplinary competence test. Students in the program are required to complete a four-year undergraduate program in the Mathematical Sciences.



Graduate Program

Aiming to cultivate excellent mathematical research talents, YMSC started to recruit graduate students in the fields of Pure and Applied Mathematics in 2012. Since 2019, YMSC started to recruit outstanding international students. The Center aims to train international students with a solid theoretical foundation, innovative ideas, global vision, and the ability to conduct independent research and engage in cutting-edge research in mathematics.

Since 2013, YMSC has established a special scholarship for outstanding doctoral students. The selected candidates will receive a full scholarship for three years. In 2022, Qiuzhen College started to accept applications from international students worldwide for doctoral studies at Tsinghua University. It has set up the scholarship with a financial package comparable to the ones offered by other world-class universities, such as Harvard University and Princeton University. Outstanding students will be provided with additional support.

Starting in the fall semester of 2022
the enrolled students will be
registered under Qiuzhen College

🔗 Admissions Website: <https://yz.tsinghua.edu.cn/>



Math Talents Incubator

YMSC has developed a comprehensive mathematical talent nurturing system, with the aim of developing world-class mathematicians. The system focuses on cultivating interest at the middle school level, consolidating basic skills at the university level, and encouraging innovation at the graduate level. It has reshaped China's mathematics landscape and pushed forward the reform of China's mathematical education.

S.-T. Yau High School Science Award

The S.-T. Yau High School Science Award was initiated in 2008 by Professor Shing-Tung Yau. Hosted by Tsinghua University and organized by YMSC, it is also recognized by China's Ministry of Education.

The contest, available to global high school students, covers Mathematics, Physics, Chemistry, Biology, Computer Science, and Economic and Financial Modeling. Rather than complete test papers with standard answers, students are required to submit creative research reports and work in teams. In more than a decade, over 12,000 teams from 2,000 schools have taken part in the competition, from thirty Chinese provinces and regions, as well as overseas areas including North America and Singapore. Based on the careful reviews of over 450 international scientists, a total of 850 students from 461 teams have received awards. More than half of the award-winning high school students have received support to apply to world-famous universities, including Tsinghua University, Peking University, Harvard University, Massachusetts Institute of Technology (MIT), Yale University, and Princeton University. Many of them have continued in academic research after entering their preferred universities.





Tsinghua Yau Summer Mathcamp

The Tsinghua Yau Summer Mathcamp is held by the Department of Mathematical Sciences at Tsinghua University, the YMSC and the BIMSA. The Mathcamp is designed for secondary school students who are passionate about mathematics and have some basic competency in this subject. It aims to enable students to learn about modern mathematics, and to introduce them to modern mathematical research.

The Mathcamp offers four-week mathematical courses taught by an international team of professors and teaching assistants. These courses cover essential tools and applications for modern scientific research, and include Linear Algebra, Algebraic Combinatorics, Number Theory, Analysis and Topology, Physics, and Programming. Since the inaugural camp in July 2014, nine sessions have been held, teaching over one thousand excellent high school students from throughout the country.

S.-T. Yau High School Girls' Mathematics Contest

In order to nurture female mathematicians and encourage more girls to devote themselves to the study of mathematics, YMSC has organized the S.-T. Yau High School Girls' Mathematics Contest annually since 2021. The contest is open to female secondary school students worldwide. The prize of the contest is named after the female mathematician Emmy Noether for her outstanding contributions to the field of mathematics. In the past two years, the contest has attracted more than 1,300 students, and 46 of them have been awarded the Noether Prize.



S.-T. Yau College Student Mathematics Contest



The S.-T. Yau College Student Mathematics Contest was initiated by Professor Shing-Tung Yau in 2010. It comprehensively examines college students' basic knowledge and skills in mathematics and includes tests on six subjects: Geometry and Topology, Algebra and Number Theory, Probability and Statistics, Applied, and Computational Mathematics, Analysis and Partial Differential Equations, and Mathematical Physics. The exams are comparable in scope and difficulty to graduate qualifying examinations of the first-class international universities. Since its establishment, more than 19,000 college students in mainland China, Hong Kong, and Taiwan have taken part in the competition. It has played an important role in cultivating Chinese mathematical talents and has become an important reference for the discovery and selection of young mathematical talents and graduate students in mathematics and related disciplines at well-known universities throughout the world.



ICCM Creative Undergraduate Thesis Award

The ICCM Creative Undergraduate Thesis Award aims to encourage young students to undertake mathematical research during their undergraduate years, and at the same time discover outstanding undergraduates and creative papers. It was presented for the first time at the 9th International Congress of Chinese Mathematicians (ICCM) in 2022.

ICCM Best Thesis Award

The ICCM Best Thesis Award (formerly the New World Mathematics Award) was originally founded by Dr. Kar-Shun Cheng, Chairman and Executive Director of New World Development Company Limited, and Professor Shing-Tung Yau in 2007. The goal of the award is to encourage outstanding students of Chinese descent in their pursuit of mathematical truth.

The prize is awarded every three years to bachelor, master, and Ph.D. mathematics graduates of Chinese descent from around the world who have completed or defended their theses within the previous three years.



The prize has been awarded six times so far, leading to the discovery of outstanding young talents in the fields of Pure and Applied Mathematics, Probability and Statistics, and Biomathematics, among others. More than 1,200 students from a total of more than 250 universities in mainland China, Hong Kong, Taiwan, and overseas have participated in the competition, and 221 have received awards.

In 2022, YMSC Assistant Professors Yu-Wei Fan, Chenlin Gu, and Zhiwei Zheng, and postdoctoral fellow Bingyi Chen, won gold medals in the Ph.D. Thesis Awards; postdoctoral fellow Rui Dong won a silver medal. Qiuzhen College students Jiayu Ma and Hao Guo were awarded gold medals in the Bachelor's Thesis Awards.

ICCM Series Awards

The International Congress of Chinese Mathematicians (ICCM) established and presents the ICCM Medal of Mathematics (formerly the Morningside Medal of Mathematics), the Chern Prize, the John Coates International Cooperation Award (formerly the ICCM International Cooperation Award), the Mathematics Contribution Award (first presented in 2022), the ICCM Best Thesis Award (formerly the New World Mathematics Awards), and the ICCM Creative Undergraduate Thesis Award. These awards aim to recognize outstanding young mathematicians who have made major contributions to Pure and Applied Mathematics. Winners include well-known and influential Chinese mathematicians such as Jun Li, Sijue Wu, Ye Tian, Wei Zhang, Zhiwei Yun, Xinwen Zhu, and Jian Ding, among others. In 2022, YMSC Professor Hao Wu and Assistant Professor Yu-Wei Fan won the ICCM Silver Medal of Mathematics.

Related Institutions



Department of Mathematical Sciences, Tsinghua University

The Department of Mathematical Sciences at Tsinghua University was founded in

1927

Many of China's early mathematicians, such as Qinglai Xiong and Wuzhi Yang, once taught here. In its long history, it has cultivated many world-class mathematicians, including Pao-Lu Hsu, Luogeng Hua, and Shiing-Shen Chern. The department now covers a wide range of mathematical subjects, with comprehensive bachelor's, master's, doctoral, and postdoctoral programs. It has 89 faculty members currently.

Major research areas include

Algebraic Geometry, Number Theory, Representation Theory, Differential Geometry and Geometric Analysis, Dynamical Systems and Fractal Geometry, Nonlinear Analysis and Differential Equations, Mathematical Physics, Computational Mathematics, Operations Research, Probability Theory and Statistics, Financial Mathematics, and Interdisciplinary Mathematics.

Yanqi Lake Beijing Institute of Mathematical Sciences and Applications

Yanqi Lake Beijing Institute of Mathematical Sciences and Applications (BIMSA), established in June 2020, is a mathematics research institution co-sponsored by the Beijing Municipal Government and Tsinghua University. BIMSA is committed to strategic and fundamental research in all areas of mathematics, the frontiers of physics, computer science, finance, and other cross-disciplinary fields. Its research focus is 75% on Applied Mathematics and 25% on Pure Mathematics.

Through the Spring 2023 semester, BIMSA has held 180 courses, organized 42 seminars and conferences, and 930 lectures. Today, the Institute has a total of 152



scientific researchers and 17 research teams, working in areas such as Pure Mathematics, Theoretical Physics, Quantum Information and Computing, Blockchain and Cryptography, Computational Mathematics, and Digital Economy. Over twenty YMSC professors hold seminars at BIMSA regularly.

<https://www.bimsa.cn/>

Tsinghua Sanya International Mathematics Forum (TSIMF)

The Tsinghua Sanya International Mathematics Forum (TSIMF) was initiated and proposed by Professor Shing-Tung Yau. With support from Tsinghua University and the Sanya City Government, TSIMF aims to develop an exchange platform for mathematical talents from China, Asia, and around the world. It hopes to provide a favorable environment for creative research and scientific breakthroughs in mathematics and other disciplines. Located on Tsinghua Road, Tianya District of Sanya, Hainan Province, it is Asia's first high-level academic conference center.

After more than a decade of development, TSIMF has held more than 3,000 seminars and conferences, covering Pure Mathematics, Applied Mathematics,



Statistics, Theoretical Physics, Applied Physics, as well as other major cross-disciplinary fields. Many distinguished scholars from top international institutions have visited here, including three Nobel Prize Laureates and ten Fields Medalists.

<http://www.tsimf.cn/>

International Cooperation

YMSC has been actively developing various high-level cooperation and exchange programs with top universities and research institutes at home and abroad.

So far, YMSC has signed memoranda of understanding with departments from nearly thirty world top universities and research institutes, including Harvard University, Stanford University, Caltech, the University of Oxford, and the University of Cambridge.

In 2022, YMSC signed a memorandum of understanding with Caltech on an Exchange Program in Mathematics. Both sides agreed to support visiting scholars to each institution and to recruit jointly-funded postdoctoral fellows. The memorandum of understanding aims to promote academic exchanges and the cultivation of top mathematical talents at the two institutions.

