

Mathematics Department

Chairperson

Robert Lazarsfeld, Mathematics Building 5-116 (631) 632-8290
Lucille Meci (ATC), (631) 632-8260

Graduate PhD Program Director

Samuel Grushevsky, Mathematics Building 3-109 (631) 632-8255

MA Masters Program Director

Marco Martens, Mathematics Building Room 4-113 (631) 632-4893

Mathematics Education Program Director

Lisa Berger, Mathematics Building 4-100A (631) 632-8278

Graduate Administrator

Christine Gathman Mathematics Building P-143 (631)632-8250

Degrees Awarded

M.A. in Mathematics 7-12; M.A. in Mathematics; Ph.D. in Mathematics

Application

https://app.applyyourself.com/AYApplicantLogin/fl_ApplicantLogin.asp?id=sunysb-gs

Description of the Mathematics Department

The Department of Mathematics, in the College of Arts and Sciences, offers degree programs leading to the M.A. in Mathematics (Secondary Teacher Option), the M.A. in Mathematics, and the Ph.D. in Mathematics. The mathematics graduate program is currently ranked 15th in the world by Shanghai Rankings, ranked 26th in the US by the U.S. News, while U.S. News ranks the department 10th in the US in Topology and 5th in the US in Geometry.

The Department's research and educational missions are considerably enhanced by its close collaboration with the Simons Center for Geometry and Physics and the Institute for Mathematical Sciences. While these two research institutes function as independent entities, their faculty members may, when appropriate, teach courses or supervise students under the department's auspices.

Ph.D. Program (with Professional-Option M.A. Track)

The Mathematics Ph.D. program is internationally prominent and highly reputed, with a very selective admission process. The program prepares the students for a career in mathematical research and university teaching, while the skills learned enable many of the graduates to pursue highly successful careers in financial, software, and other industries.

Students admitted to the Ph.D. program may also choose to be considered for our Professional Option MA degree. By itself, a Master's degree of this type qualifies the recipient for many careers, including teaching at the community-college level.

Master of Arts in Teaching Mathematics 7-12

This is a 42-credit master's program, administered by the School of Professional Development, designed for students who already have a bachelors degree in mathematics or the equivalent, and who wish to teach mathematics in grades 7-12. Individuals interested in this program should refer to the School of Professional Development (SPD) online Bulletin: www.stonybrook.edu/spd/graduate/matmath

Combined Bachelors/Masters (BS/MAT) in Teaching Mathematics 7-12

Individuals interested in this program should refer to the School of Professional Development (SPD) online Bulletin: www.stonybrook.edu/spd/graduate/matmath

The M.A. Program: Secondary Teacher Option

The Secondary Teacher Option is a 30 credit two-year, part-time program designed for secondary school mathematics teachers who are seeking permanent certification. The nine required courses in the program are given in the evenings and in the summer on a rotating basis; each required course is offered at least once every two and a half years.

Admission Requirements of the Mathematics Department of the Ph.D. Program (with Professional-Option M.A. Track)

In addition to the Graduate School requirements, the minimum requirements for admission to this program are:

- A. A bachelor's degree with a major in mathematics, or the equivalent.
- B. Evidence that the student is likely to succeed. This must include three letters of recommendation from mathematicians (usually from present or former teachers). Other evidence submitted should include GRE scores and a personal background essay. The breadth and depth of mathematics courses taken, and performance, in these courses will also be carefully considered.
- C. Non-native speakers of English must demonstrate an adequate command of the English language, as evidenced by an acceptable score on the TOEFL examination. A paper-based score of 550, computer-based score of 213, or an iBT-based score of 90 would be considered minimally satisfactory for this purpose. The TOEFL exam will be waived only for native speakers of English or, in rare cases, for students whose previous education was conducted almost entirely in English.

D. Acceptance by both the Department of Mathematics and the Graduate School.

The M.A. Program of the M.A. Program: Secondary Teaching Option

In addition to the Graduate School requirements, the minimum requirements for admission to this program are:

- A. A bachelor's degree.
- B. Two years of college-level mathematics, including one year of single variable calculus, one semester of linear algebra, and one additional semester of mathematics beyond single variable calculus.
- C. Provisional New York State Certification for Teaching Mathematics, Grades 7-12.
- D. A grade point average of at least 3.0 in all calculus and post-calculus mathematics courses.
- E. Evidence that the student is likely to succeed: this usually consists of three letters of recommendation from former teachers or supervisors.
- F. Acceptance by both the Department of Mathematics and the Graduate School.

Facilities of the Mathematics Department

Since the beginning of the modern department under the leadership of Jim Simons, Stony Brook has been world-renowned as a center of research in geometry broadly interpreted. With the opening of the Institute for Mathematical Sciences, headed by its inaugural director John Milnor, dynamics emerged as an additional area of excellence. In more recent times, these traditional strengths have broadened, and the department now has multiple active research groups, numerous weekly seminars, and regularly organizes conferences, graduate schools, and other events.

The distinguished faculty of the mathematics department include 1 Abel prize winner, 2 Fields Medal laureates, 7 members of the National Academy of Science (Mathematics), 16 past speakers of International Congresses of Mathematicians, and recipients of multiple international awards. The current active research areas include algebra, dynamics, representation theory, complex analysis, algebraic geometry, geometric function theory, differential geometry, topology, geometric analysis, mathematical physics, symplectic geometry.

There are weekly research seminars in differential geometry, dynamics, algebraic geometry, topology, and a departmental colloquium, as well as a professional development seminar and graduate student seminar. The department currently has a research and training (RTG) grant in geometry, interpreted in the broadest possible sense.

Simons Center for Geometry and Physics

The Simons Center for Geometry and Physics (SCGP), a major international research center located next door to the department has greatly enhanced the scientific life of the department since its opening in 2007. The mathematics faculty of the center also hold appointments and they supervise PhD students in the mathematics department. The center hosts 12 post-docs divided between mathematics and physics. It runs many international workshops in mathematics (not just geometry) and theoretical physics every year, attracting leading researchers from around the world: over 1000 scientists visit each year. In addition, the SCGP and the Math Department run a collaborative research and training program funded by the NSF. The abundant activities of the center are open to the community, the mathematics department, and graduate students are encouraged to attend the talks that are of relevance for their research.

Requirements of the MA Degree in Mathematics

In addition to the requirements of the Graduate School, the following are required:

- A. Completion of 30 credits in graduate courses approved by the department with a 3.0 overall grade point average.
- B. Passing the comprehensive examination.
- C. A nine-credit minor.

For students in the Secondary Teacher Option, the 30-credit requirement is ordinarily satisfied by the following courses: MAT 511 Fundamental Concepts of Mathematics, MAT 512 Algebra for Teachers, MAT 513/MAT 514 Analysis for Teachers I-II, MAT 515 Geometry for Teachers, MAT 516 Probability and Statistics for Teachers, MAT 517 Calculators and Computers for Teachers, MAT 518 Seminar in the Uses of Mathematics, MAT 519 Seminar in Mathematics Teaching; and a three-credit elective with a significant mathematical or pedagogical component. The comprehensive examination consists of the final examinations in MAT 512, MAT 513, MAT 514, and MAT 515. The minor requirement is met by the three courses MAT 516, MAT 517, and MAT 518.

For students in the Professional Option, the courses that satisfy the 30-credit requirement are MAT 530/MAT 531 Topology/Geometry I-II, MAT 534/MAT 535 Algebra I-II, MAT 536 Complex Analysis I, MAT 532 Real Analysis I, MAT 533 Real Analysis II, and MAT 598 Teaching Practicum. Unless specifically exempted by the Director of Graduate Studies, all first year graduate students are required to take the core courses, MAT 530, MAT 531, MAT 534, MAT 535, MAT 536, MAT 532, and MAT 533 during their first-year; this requirement is automatically waived for students who have passed the comprehensive examination.

In addition, students preparing for the doctoral program ordinarily take MAT 590 Problem Seminar. The comprehensive examination consists of the final examinations in MAT 530, MAT 531, MAT 534, MAT 535, MAT 542, MAT 544, and MAT 550, or the equivalent. The minor program consists of three courses in an allied area such as applied mathematics, statistics, computer science, or theoretical physics.

Requirements for the Ph.D. Degree

In addition to the requirements of the Graduate School, the following are required:

- A. Passing the doctoral comprehensive examination.
- B. Passing the doctoral preliminary examination.
- C. Demonstrating proficiency in reading mathematics in two relevant foreign languages, usually French, German or Russian. Non-English-speaking international students can demonstrate their proficiency in one of these languages, in addition to their native language.
- D. Advancement to candidacy.
- E. Writing an acceptable dissertation.
- F. Two consecutive semesters of full-time study.

Doctoral Comprehensive Examination

This examination, which is offered twice a year (just before the start of each semester), is designed to test mastery of the fundamentals of mathematics. This exam is based on the syllabi of the core courses; MAT 530, MAT 531, MAT 534, MAT 535, MAT 542, MAT 544, MAT 550. Students who transfer from graduate programs at other universities may, in some cases, be granted exemption from this requirement.

Doctoral Preliminary Examination

This examination is oral. Each student must take this examination no later than 1 ½ years after passing the comprehensive examination or receiving an exemption therefrom. The chairperson and one additional member of the examining committee are chosen by the student; one additional member is chosen by the program.

Professional Academic Training Program

All full-time graduate students are required to participate in this program, consisting of supervised teaching/tutoring at the lower undergraduate levels.

Faculty of the Mathematics Department

Professors

Anderson, Michael ⁴, Ph.D., 1981, University of California, Berkeley: Differential Geometry, Geometric Analysis, Mathematical Physics.

Bishop, Christopher ⁴, Ph.D., 1987, University of Chicago: Geometric Function Theory, Complex Analysis, Applied Math, Riemann Surfaces, Dynamical Systems, Geometric Analysis.

Chen, Xiuxiong ⁴ 1994, University of Pennsylvania: Differential geometry, Complex Differential Geometry.

De Cataldo, Mark, Ph.D., 1995, University of Notre Dame: High-Dimensional Algebraic Geometry.

Donaldson, Simon ^{2,3,4,9}, Ph.D., 1983 Oxford University: Differential Geometry, Gauge Theory, topology of Smooth Manifolds, Symplectic Geometry.

Ebin, David ⁴, Ph.D., 1967, Massachusetts Institute of Technology: Global analysis, Continuum Mechanics, Partial Differential Equations.

Fukaya, Kenji ^{4,9}, Ph.D, 1986 University of Tokyo: Symplectic Geometry, Riemannian Geometry.

Grushevsky, Samuel ^{7,9}, *Graduate Program Director*, Ph.D. 2002 Harvard University: Complex Geometry, Several Complex Variables.

Hill, C. Denson, Ph.D., 1966, New York University: Partial Differential Equations, Several Complex Variables.

Jones, Lowell ⁴, Ph.D., 1970, Yale University: Topology of Manifolds, Differential Geometry.

Kirillov Jr., Alexander, *Undergraduate Program Director*, Ph.D., 1995, Yale University: Representation Theory, Low Dimensional Topology, Mathematical Physics.

Lawson, H. Blaine, Jr. ^{3,4,7}, Ph.D., 1968, Stanford University: Differential Geometry, Topology, Algebraic Geometry.

Lazarsfeld, Robert ^{4,7}, *Chairperson*, Ph.D., 1980 Brown University: Algebraic Geometry, Commutative Algebra.

LeBrun, Claude ⁴, Ph.D., 1980, University of Oxford, England: Differential Geometry, Complex Analysis, Mathematical Physics, Algebraic Geometry.

Lyubich, Mikhail^{4,8}, *Director of Institute for Mathematical Sciences*, Ph.D., 1983, Tashkent State University, Russia: Dynamical Systems, Kleinian Groups and their Deformation Spaces.

Martens, Marco, *MA Masters Mathematics Program* Ph.D., 1990, Delft University, The Netherlands: Dynamical Systems.

Michelsohn, Marie-Louise, Ph.D., 1974, University of Chicago: Differential Geometry.

Milnor, John W. ^{1,2,3,4,7,8}, *Co-Director of Institute for Mathematical Sciences*, Ph.D., 1954, Princeton University: Dynamical Systems Topology, Geometry.

Morgan, John ^{3,9}, Ph.D., 1969, Rice University: Topology of Manifolds, Algebraic Geometry, Three and Four Dimensional Manifolds.

Phillips, Anthony V., Ph.D., 1966, Princeton University: Differential Topology and Applications to Mathematical Physics.

Schul, Raanan, *Associate Undergraduate Chair*, Ph.D., 2004 Harvard University: Real Analysis, Geometric Measure Theory.

Simons, James H. ^{3,4}, Ph.D., 1962, University of California, Berkeley: Differential Geometry, Functionals of Riemannian Metrics and Connections.

Starr, Jason, *Associate Graduate Chair*, Ph.D., 2000 Harvard University: Algebraic Geometry.

Sullivan, Dennis ^{3,4,7,8}, Ph.D., 1965, Princeton University: Dynamical Systems, Topology, Geometry, Partial Differential Equations, Quantum Topology.

Takhtajan, Leon, ⁴, Ph.D., 1975, Leningrad Branch of the Steklov Mathematical Institute, Russia: Mathematical Physics and Applications to Complex and Algebraic Analysis.

Varolin, Dror, *Associate Chair*, Ph.D., 1997, University of Wisconsin-Madison: Complex Analysis and Geometry. Viro, Oleg ⁴, Ph.D., 1974, Leningrad University: Geometry and Topology.

Zinger, Aleksey. Ph.D., 2002, Massachusetts Institute of Technology: Symplectic Topology, Enumerative Algebraic Geometry.

Associate Professors

Berger, Lisa, *Mathematics Education Program Director*, Ph.D., 2007, University of Arizona: Number Theory, Mathematics Education of Teachers.

Chas, Moira, Ph.D., 1998, Universidad Autónoma de Barcelona: Geometric Topology, Dynamical Systems.

Khuri, Marcus, *Associate Graduate Director*, Ph.D., 2003, University of Pennsylvania: Differential Geometry, Partial Differential Equations, General Relativity.

McLean, Mark, Ph.D., 2008 Cambridge University: Algebraic Geometry; Differential Geometry, Symplectic Topology.

Laza, Radu, Ph.D., 2006, Columbia University: Algebraic geometry, Several Complex Variables.

Movshev, Michael, Ph.D., 1997, University of Pennsylvania: Algebra

Plamenevskaya, Olga, *Undergraduate Program Associate Director*, Ph.D., 2004, Harvard University: Contact and Symplectic Geometry, Low-Dimensional Topology.

Schnell, Christian, Ph.D., 2008 Ohio State University: Algebraic Geometry.

Sutherland, Scott ^{6,8}, Ph.D., 1989, Boston University: Dynamical Systems, Computing.

Assistant Professors

Hough, Robert, Ph.D., 2012 Stanford University: Probability, Analytic Number Theory.

Research Assistant Professor

Kamenova, Ljudmila, Ph.D., 2006: Massachusetts Institute of Technology: Complex Geometry.

James H. Simons Instructors

Bodnár, Józef, Ph.D., 2013 Eötvös Loránd University: Algebraic Geometry, Low Dimensional Topology.

Dozier, Benjamin, Ph.D, 2018 Standford University: Translation Surfaces

Li, Yu, Ph.D., 2007 Massachusetts Institute of Technology: Game theory, economics, social and behavioral sciences

Oganesyan, Vardan, Ph.D., 2017 Lomonosov Moscow State University: Geometry and Topology

Wei, Chuanhao, Ph.D., 2018 University of Utah: Geometry, topology and classification of Higher-dimensional complex algebraic varieties

RTG Postdoctoral Fellow

Greer, Francois, Ph.D., 2017 Stanford University: Algebraic Geometry

Kazaras, Demetre, Ph.D., 2017 University of Oregon: Differential Geometry

McMillan, Benjamin, Ph.D., 2016 University of California, Berkeley: Differential Geometry, Geometry of PDE.

Ryan, Timothy, Ph.D., 2016 University of Illinois at Chicago: Algebraic Geometry.

National Science Foundation Postdoctoral Fellow

Brunyate, Adrian, Ph.D., 2015 University of Georgia: Algebraic Geometry.

Zhang, Letao, Ph.D., 2014 Rice University: Algebraic Geometry.

Lecturers

Abd-el-hafez, Alaa, Ed.D., 2015 LIU Brookville, NY: Interdisciplinary Educational Studies, Director of Field Experience and Clinical Practice

Chen, Holly, M.S., 1996 SUNY Buffalo: Mathematics and Computation.

Christiane Stidham, Ph.D., 1999 University of California: Tectonic and Structural modeling and simulations of earthquake wave propagation.

Viro, Julia, Ph.D., 1991 Leningrad University: Low-Dimensional Topology.

Wertz, Debra, MA., 2009 Teaching Mathematics 7-12

Institute for Mathematical Sciences

Lyubich, Mikhail,^{4,8} *Director*, Ph.D., 1983, Tashkent State University, Russia: Dynamical Systems.

Milnor, John W.^{1,2,3,4,7}, *Co-Director*, Ph.D., 1954, Princeton University: Dynamical Systems; Topology, Geometry.

Institute for Mathematical Sciences, Lecturers

Dang, Nguyen-Bac, Ph.D. CMLS, 2018 Ecole Polytechnique, Palaiseau: Algebraic geometry, Dynamical systems

Ntalampikos, Dimitrios, Ph.D., 2018 University of California Los Angeles: Analysis on metric spaces, Quasiconformal mappings, Complex Analysis, Metric geometry

Li, Zhiqiang, Ph.D., 2015 University of California, Los Angeles: Dynamical Systems.

Modami, Babek, Ph.D., 2013 Yale University: Geometry

Mukherjee, Sabayasachi, Ph.D., 2015 Jacobs University, Bremen: Dynamical Systems, Parameter Spaces of Holomorphic Dynamical Systems.

Visitors

Bedford, Eric Ph.D., 1974 University of Michigan: Several Complex Variables, Dynamical Systems, Geometric Function Theory, Geometric Analysis.

Professors Emeriti

Barcus, William Ph.D., 1955 University of Oxford, England: Algebraic Topology.

Knapp, Anthony⁴, Ph.D., 1965 Princeton University: Lie Groups, Representation Theory.

Kra, Irwin Ph.D., 1966 Columbia University: Complex Analysis, Kleinian Groups.

Maskit, Bernard Ph.D., 1964 New York University: Complex analysis, Riemann surfaces, Kleinian Groups and Deformation spaces, Computational Psycholinguistics.

McDuff, Dusa³, Ph.D., 1971 Cambridge University, England: Geometry, Symplectic Topology.

Pincus, Joel Ph.D., 1959 New York University: Operator Theory, Integral Equation

1. Abel Prize Winner

2. Fields Medal laureates
3. Member of the National Academy of Science (Mathematics)
4. Speaker of the International Congress of Mathematicians
5. Recipient of the State University President's and Chancellor's Award for Excellence in Teaching, 1990
6. Recipient of the State University President's and Chancellor's Award for Faculty Service, 2006
7. Distinguished Professor
8. Member, Institute for Mathematical Sciences
9. Member, Simons Center for Geometry and Physics
10. Joint appointment, Applied Mathematics and Statistics

NOTE: The course descriptions for this program can be found in the corresponding program PDF or at COURSE SEARCH.