

Mathematics Department

**Chairperson**

Robert Lazarsfeld, Mathematics Building 5-116 (631) 632-8290

**Graduate PhD Program Director**

Claude LeBrun, Mathematics Building 3-108 (631) 632-8254

**Graduate Professional Option Program Director**

Marco Martens, Math Tower Room 4-113 (631) 632-4893

**Graduate Secondary Teacher Option Program Director**

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

**Graduate Secretary**

Donna McWilliams, Mathematics Building P-143 (631) 632-8282

**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](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. Several surveys, including U.S. News and World Report's "America's Best Graduate Schools," have repeatedly ranked the department's Ph.D. program among the top 20 in the nation, with top-five rankings for sub-disciplines such as 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 selective. It is primarily aimed at students preparing for a career in mathematical research and university teaching. However, some of our graduates have instead opted for highly successful careers in industry or government.

Students admitted to the Ph.D. program may also choose to be considered for our Professional Option MA degree. Even alone, 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 bachelor's 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](http://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](http://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**

**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: 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.

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

##### Simons Center for Geometry and Physics

The Simons Center for Geometry and Physics was started in 2007 by a gift from the James and Marilyn Simons Foundation. This gift includes a new building for the Center, scheduled to be completed in September, 2010, on the campus of Stony Brook University. The building will be contiguous to and have direct connections to the Physics Building and the Mathematics Tower, the latter housing the Mathematics Department, the Institute for Mathematical Sciences, and the C.N. Yang Institute for Theoretical Physics. The Simons Foundation gift also provides an endowment to support the continuing operations of the center.

At full strength, the Center will have a faculty consisting of a director and six permanent members. As currently envisioned, the center will have 12 three-year postdoctoral type positions, called research assistant professorships, as well as a robust visitors' program with roughly 18 visitors in residence at any time. In addition, each year the Center will also host several workshops, which are concentrated activities in a specific area for shorter periods of time with outside invitees and speakers, as well as other special lectures and events.

As the name indicates, the intellectual focus of the Center is at the interface of mathematics, in particular geometry, and theoretical physics. The close proximity of the center building to the Physics Building and the Mathematics Tower is symbolic of the close intellectual and programmatic relationship of the Center to the Mathematics Department and Yang Institute for Theoretical Physics. The Center's activities will be coordinated with the activities in the other two units, and the Center's programs will typically involve significant participation by their faculty and students.

#### **Director**

Morgan, John, Ph.D. 1969, Rice University: Topology, algebraic geometry, three and four dimensional manifolds

#### **Faculty**

Douglas, Michael R., Ph.D. 1988, California Institute of Technology: String Theory, Conformal Field Theory

#### 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

#### **Faculty of the Mathematics Department**

##### **Professors**

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

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

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

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

Donaldson, Simon<sup>5</sup>, Ph.D., 1983 Oxford University: Differential Geometry, Gauge Theory, topology of Smooth Manifolds, Symplectic Geometry.

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

Fukaya, Kenji<sup>5</sup>, Ph.D, 1986 University of Tokyo: Symplectic Geometry, Riemannian Geometry.

Glimm, James<sup>3,6</sup>, Ph.D., 1959, Columbia University: Applied Mathematics, Numerical Analysis, Mathematical Physics.

Grushevsky, Samuel<sup>3,5</sup>, 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, 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.<sup>3</sup>, Ph.D., 1968, Stanford University: Differential Geometry, Topology, Algebraic Geometry.

Lazarsfeld, Robert<sup>3</sup>, *Chairperson*, Ph.D., 1980 Brown University: Algebraic Geometry, Commutative Algebra

LeBrun, Claude, *Graduate Program Director*, Ph.D., 1980, University of Oxford, England: Differential Geometry, Complex Analysis, Mathematical Physics, Algebraic Geometry.

Lyubich, Mikhail<sup>4</sup>, *Director of Institute for Mathematical Sciences*, Ph.D., 1983, Tashkent State University, Russia: Dynamical Systems, Kleinian Groups and their Deformation Spaces.

Martens, Marco, Ph.D., 1990, Delft University, The Netherlands: Dynamical Systems.

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

Milnor, John W.<sup>3,4</sup>, *Co-Director of Institute for Mathematical Sciences*, Ph.D., 1954, Princeton University: Dynamical Systems Topology, Geometry.

Morgan, John<sup>5</sup>, *Director of Simons Center for Geometry and Physics*, 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., 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<sup>3,4</sup>, Ph.D., 1965, Princeton University: Dynamical Systems, Topology, Geometry, Partial Differential Equations, Quantum Topology.

Takhtajan, Leon, 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, 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, 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, Ph.D., 2003, University of Pennsylvania: Differential Geometry, Partial Differential Equations, General Relativity.

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.

Sun, Song, Ph.D., 2010 University of Wisconsin-Madison: Differential and Algebraic Geometry.

Sutherland, Scott<sup>2,4</sup>, Ph.D., 1989, Boston University: Dynamical Systems, Computing.

#### **Assistant Professors**

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

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

#### **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.

Foscolo, Lorenzo, Ph.D., 2013 Imperial College, London: Differential Geometry, Geometric Analysis.

Guenancia, Henri, Ph.D., 2013 Université Paris VI-Pierre et Marie Curie: Complex Geometry.

Lombardi, Luigi, Ph.D., 2013 University of Illinois at Chicago: Algebraic Geometry.

Saccà, Giulia, Ph.D., 2013 Princeton University: Algebraic Geometry.

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

Zhang, Ruobing, Ph.D., 2016 Princeton University: Differential Geometry, Geometric Analysis.

#### **Research Training Group Postdoctoral Fellow**

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.

#### **Lecturers**

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

Flynn, Miriam, M.A., 1976 Stony Brook University: Math Education, Director of Field Experience and Clinical Practice.

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

#### **Institute for Mathematical Sciences**

Lyubich, Mikhail, *Director*, Ph.D., 1983, Tashkent State University, Russia: Dynamical Systems.

Milnor, John W.<sup>3</sup>, *Co-Director*, Ph.D., 1954, Princeton University: Dynamical Systems; Topology, Geometry.

#### **Institute for Mathematical Sciences, Lecturers**

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

Lodge, Russell, Ph.D., 2012 Indiana University: Dynamical Systems.

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

Radu, Remus, Ph.D., 2013 Cornell University: Complex Dynamics in One or Several Variables, Analysis.

Tanase, Raluca, Ph.D., 2013 Cornell University: Dynamical Systems, Computer Science.

#### **Visitors**

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

Winkler, Bjorn Ph.D., 2011 KTH Royal Institute of Technology: Dynamical Systems.

#### **Professors Emeriti**

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

Knapp, Anthony 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, Dusa Ph.D., 1971 Cambridge University, England: Geometry, Symplectic Topology.

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

1) Recipient of the State University President's and Chancellor's Award for Excellence in Teaching, 1990

2) Recipient of the State University President's and Chancellor's Award for Faculty Service, 2006

- 3) Distinguished Professor
- 4) Member, Institute for Mathematical Sciences
- 5) Member, Simons Center for Geometry and Physics
- 6) 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.*