BOSTON COLLEGE

GRADUATE SCHOOL OF ARTS AND SCIENCES

MATHEMATICS

GRADUATE STUDY IN MATHEMATICS

The Department of Mathematics at Boston College now offers a selective and focused graduate program leading to the Degree of Doctor of Philosophy (Ph.D), specializing in two broad research areas:

- Geometry/Topology
- Number Theory/Representation Theory

and also emphasizing excellence in teaching.

The research areas of our faculty in Geometry/Topology include:

- 3-dimensional manifolds and their geometry
- Heegaard-Floer and Khovanov homology
- Hyperbolic geometry
- Kleinian groups
- Knot theory

The research areas of our faculty in Number Theory/Representation Theory include:

- Automorphic forms
- The cohomology of arithmetic groups
- The geometry of Shimura varieties
- The local Langlands correspondence
- Multiple Dirichlet series
- Representation theory

Our graduate students are part of a close-knit departmental community, and benefit not only from individual collaboration with their research advisors, but also from the experience of the entire faculty and fellow students.

Boston College is one of the Boston area's premier institutions, which includes over 50 area universities and colleges. Boston is a world-renowned center for Mathematics and provides a vibrant intellectual climate in which graduate students thrive, with many outdoor and cultural opportunities in the beautiful New England area.

INFORMATION

Financial Aid

All applicants will be considered for teaching assistantships, which provide full tuition remission, health insurance coverage, and a stipend (currently $19,000 for the academic year; there is the possibility of summer support).

Lecture Series and Seminars

The Boston College Math Department hosts a yearly Distinguished Lecturer series. The Distinguished Lecturer gives three lectures and ample time is incorporated into the schedule to allow for interaction with students. Previous Distinguished Lecturers were John Conway and Ravi Vakil.

Boston College runs a Number Theory seminar jointly with MIT, alternating between the two schools, in which outstanding researchers from all over the country present their work in a wide range of areas of Number Theory.

We also have our own active research seminars in Geometry/Topology and Number Theory.

Graduate Consortium

Boston College has a reciprocity agreement with Boston University, Brandeis, and Tufts, that allows graduate students in Mathematics to cross register for one course each semester at one of these institutions. Students may also take courses in cognate departments at Boston College.

Teaching

Excellence in teaching is an important part of the Boston College tradition, in which we take pride. The Math Department runs a Teaching Seminar each year to mentor and support new Graduate student teachers.

Our Students

The enrollment at Boston College is roughly 14,500, including more than 4,000 graduate students. The Math Department will have a small graduate class: the first-year class will likely be either six or seven students, ensuring individual attention from faculty.

Socializing

The Math Department looks for opportunities to enhance interaction between faculty and graduate students, through lunch at orientation, cookies and tea after the Teaching Seminar, the yearly TA appreciation luncheon, the beginning-of-term brunch, and other activities.

Location

Boston College is located in a beautiful residential section of Newton which is about six miles from the heart of Boston. There is easy access to the city by public transportation. The Boston area offers countless outstanding seminars, lectures, colloquia, and concerts throughout the year.

Housing

The Housing Office at Boston College provides an extensive list of off-campus housing options. Most graduate students rent rooms or apartments near the campus.

Application Requirements

Applications received by Jan. 2, 2010 will receive full consideration, including consideration for Teaching Assistantships. Applications include application forms, official transcripts, GRE scores (including Math subject test), 3 letters of recommendation, a statement of purpose, and TOEFL (for international students). Information on how to apply can be found at www.bc.edu/gsas.

DEGREE REQUIREMENTS

Requirements for the PhD will be finalized this fall, and posted on the math department website at that time (see www.bc.edu/math). We expect that the requirements will be roughly as follows:

Coursework

Students take first-year courses in Algebra, Topology, Real and Complex Analysis, second year courses such as Number Theory, Representation Theory, and Geometry, and topics courses in subsequent years. Very-well-prepared students may be allowed to skip the first-year graduate courses (for example, if they have already taken them elsewhere) and proceed directly to advanced study.

Exams

There are three types of exams: Qualifying, Language and General.

Qualifying Exams

After the first year, students take two of the three qualifying exams in Real and Complex Analysis, Algebra, and Topology. Well-prepared students may take these exams earlier, upon consultation with the Graduate Program Director.

Language Exam

This exam consists in translating mathematics from French or German into English.

General Exam

During the third year the student chooses a research advisor and forms a doctoral committee, consisting of the research advisor and two other department members.

The general exam consists of a research topic and one secondary topic, chosen by the student in consultation with the doctoral committee. Typically these are based on topics courses or independent study completed by the student in the second and third years.

Teaching

In addition to their responsibilities as teaching assistants and teaching fellows, students participate in the Teaching Seminar in the fall semester of their first two years.

Dissertation

Upon satisfactory performance in exams, the student is admitted to candidacy for the Ph.D and begins research for the doctoral dissertation. The dissertation must consist of original scholarly work. The doctoral committee will read and evaluate the completed dissertation and conduct an oral examination, at which the dissertation is defended in a public meeting.

FACULTY AND FIELDS

AVNER ASH
Ph.D., Harvard University

Number Theory, Algebraic Geometry

JENNY A. BAGLIVO
Ph.D., Syracuse University

Statistics, Applied Mathematics

ROBERT J. BOND
Ph.D., Brown University

Algebra, Number Theory

MARTIN BRIDGEMAN
Ph.D., Princeton University

Geometry, Topology

DANIEL W. CHAMBERS
Ph.D., University of Maryland

Probability, Stochastic Processes, Statistics

CHI-KEUNG CHEUNG
Ph.D., University of California, Berkeley

Complex Differential Geometry, Several Complex Variables

SOLOMON FRIEDBERG
Ph.D., University of Chicago

Number Theory, Representation Theory

ELISENDA GRIGSBY
Ph.D., University of California at Berkeley

Low-dimensional Topology

ROBERT H. GROSS
Ph.D., Massachusetts Institute of Technology

Algebra, Number Theory, History of Mathematics

BENJAMIN HOWARD
Ph.D., Stanford University

Number Theory, Arithmetic Geometry

RICHARD A. JENSON
Ph.D., University of Illinois

Algebraic Coding Theory, Combinatorics

WILLIAM J. KEANE
Ph.D., University of Notre Dame

Abelian Group Theory

MARGARET J. KENNEY
Ph.D., Boston University

Algebraic Coding Theory, Mathematics Education

CHARLES K. LANDRAITIS
Ph.D., Dartmouth University

Combinatorics, Mathematical Logic

TAO LI
Ph.D., California Institute of Technology

Geometry, Topology, Knot Theory

ROBERT MEYERHOFF
Ph.D., Princeton University

Geometry, Topology

RENNIE MIROLLO
Ph.D., Harvard University

Dynamical Systems

NANCY E. RALLIS
Ph.D., University of Indiana

Algebraic Topology, Fixed Point Theory, Probability and Statistics

MARK REEDER
Ph.D., Ohio State University

Lie Groups, Representation Theory

NED I. ROSEN
Ph.D., University of Michigan

Logic, Combinatorics, Dynamical Systems

SELECTED FACULTY PUBLICATIONS

✤ Avner Ash and Robert Gross: Fearless Symmetry: Exposing the Hidden Patterns of Numbers, Princeton University Press 2006, new paperback edition 2008.

✤ Robert Meyerhoff, Geometric invariants for 3-manifolds, *The Mathematical Intelligencer*, **14** (1992), pp. 37-52.

✤ Mark Reeder, From Laplace to Langlands via representations of orthogonal groups, with B. Gross, *Bull. Amer. Math Soc.*, **43** (2006), pp. 163-205.

✤ Avner Ash, Rigidity of p-adic cohomology classes of congruence subgroups of GL(n,Z), with D. Pollack and G. Stevens, *Proc. London Math. Soc.* (3) **96** (2008), pp. 367-388.

✤ Martin Bridgeman, An extension of the Weil-Petersson metric to quasi-fuchsian space, with E.Taylor, *Math. Annalen*, **341**, No. 4, (2008), pp. 927-943.

✤ Martin Bridgeman, Distribution of intersection lengths of a random geodesic with a geodesic lamination, with D. Dumas, *Ergodic Theory and Dynamical Systems*, **27**, No. 4, (2007), pp. 1055-1072.

✤ Sol Friedberg, Gauss sum combinatorics and metaplectic Eisenstein series, with B. Brubaker, D. Bump, Contemporary Mathematics **488**, Amer. Math. Soc., (2009), pp. 61-81.

✤ Sol Friedberg, Weyl group multiple Dirichlet series III: Eisenstein series and twisted unstable A_r, with B. Brubaker, D. Bump, J. Hoffstein, *Annals of Mathematics* **166** (2007), pp. 293-316.

✤ Sol Friedberg, Teaching mathematics graduate students how to teach, *Notices of the American Mathematical Society* **52** (2005), pp. 842-847.

✤ Elisenda Grigsby, On the colored Jones polynomial, sutured Floer homology, and knot Floer homology, with S. Wehrli, *Advances in Mathematics*, to appear.

✤ Elisenda Grigsby, Knot concordance and Heegaard Floer homology invariants in branched covers, with D. Ruberman and S. Strle, *Geometry and Topology* **12**, (2008), pp. 2249-2275.

✤ Robert Gross, Prime Specialization in Genus 0, with B. Conrad and K. Conrad, *Transactions of the American Mathematical Society*, **360**, (2008), pp. 2867-2908.

✤ Ben Howard, Intersection theory on Shimura surfaces, *Compos. Math.* **145**, No. 2 (2009), pp. 423-475.

✤ Ben Howard, Variation of Heegner points in Hida families, *Invent. math.* **167,** No. 1 (2007), pp. 91-128.

✤ Tao Li, Heegaard surfaces and measured laminations, I: the Waldhausen conjecture, *Invent. math.* **167**, (2007), pp. 135-177.

✤ Tao Li, Heegaard surfaces and measured laminations, II: non-Haken 3-manifolds, *J. Amer. Math. Soc.*, **19** (2006), pp. 625-657.

✤ Robert Meyerhoff , Minimum volume cusped hyperbolic three-manifolds, with D. Gabai and P. Milley, *J. Amer. Math. Soc.* **22** (2009), pp. 1157-1215.

✤ Mark Reeder, Depth-zero supercuspidal L-packets and their stability,, with S. DeBacker, *Annals of Mathematics*, **169**, No. 3, (2009), pp. 795-901.

BOSTON COLLEGE
Graduate School of Arts and Sciences
Department of Mathematics
Carney Hall 301
140 Commonwealth Avenue
Chestnut Hill, MA 02467
617-552-1201
E-Mail: gsasinfo@bc.edu
www.bc.edu/math