

GRADUATE STUDIES IN
MATHEMATICS

WHY STUDY AT VANDERBILT?

- The 2010 National Research Council (NRC) report on U.S. math graduate programs places our department in the top group of graduate programs surveyed.
- The Department of Mathematics has a distinguished international faculty, including Field Medalists and invited speakers at the International Congresses of Mathematicians, and a variety of research groups: universal algebra, group theory, approximation theory, noncommutative geometry, operator algebras, mathematical biology, partial differential equations, and graph theory.
- We have a stimulating research environment and an ongoing program that brings in visitors from institutions around the world. The department also hosts several major conferences a year.
- The department is large enough to support a wide range of courses, but small enough for students to receive individual attention from faculty members. The Department of Mathematics has approximately fifty research faculty and forty resident graduate students.
- Graduate students are given one to two years of training to teach at the college level. After that period, they generally serve as TAs and eventually instructors in calculus classes. This opportunity provides valuable experience in communication, even for students who do not pursue careers in academia.
- Our graduate students are very successful at securing jobs.
- Nashville offers the amenities of a large city and the friendliness of a small town.

PROGRAMS

The Department of Mathematics offers doctor of philosophy, master of science, and master of arts degrees in mathematics. Most of our students pursue the Ph.D.

The Ph.D. program requires 72 credit hours of course work, including dissertation research. Doctoral candidates complete a core curriculum in algebra, analysis, and topology. After passing preliminary exams in two of these three areas, students study in their area of concentration. For Ph.D. candidacy, students pass a qualifying examination, involving either an oral examination in their specialty or an expository paper. Once students have qualified for Ph.D. candidacy, they concentrate on dissertation research.

FINANCIAL SUPPORT

Most Ph.D. students in mathematics receive a teaching assistantship or fellowship that provides a tuition waiver, a stipend, and a health insurance plan. Support is usually provided for a five-year period.

Teaching assistants for 2011/12 receive a nine-month stipend of \$21,200. Stipends are expected to be increased for 2012/13. Some highly qualified applicants are awarded fellowships with an additional stipend: University Graduate Fellowships provide an additional \$10,000, Harold Stirling Vanderbilt Scholarships provide an additional \$6,000, and the Graduate School awards several Provost's Graduate Fellowships that provide an additional \$10,000 to highly qualified students from under-represented groups.

Students who do not have financial aid pay tuition of \$1,680 per credit hour.

GRADUATE STUDENT TEACHING

First-year graduate students participate in a weekly teaching seminar and conduct tutored study halls for calculus.

Second- and third-year students serve as TAs. Responsibilities include attending class meetings, conducting a weekly recitation section, holding office hours, and grading papers.

Fourth- and fifth-year students with good teaching evaluations and strong recommendations from their faculty mentors are assigned to teach a first-year calculus course.

FACILITIES

Vanderbilt has a research-level library with more than three million volumes. The mathematics collection is housed in the Science and Engineering Library, conveniently located in the math building. This collection is excellent, both in books and access to electronic resources including e-journals and online databases such as MathSciNet and Web of Science. Items not available locally can be borrowed through Interlibrary Loan, which is free of charge to graduate students.

Computational resources available to graduate students include access to the university's large cluster and desktop computers equipped with computer algebra software and LaTeX. Graduate students may use these facilities freely for research, writing, and teaching.

Furthermore, the graduate students' office suite is a newly renovated state-of-the-art facility.

HOUSING

Ample private housing is available within walking distance of the campus. The Office of Housing and Residential Education maintains an off-campus housing referral service. Visit their webpage at www.vanderbilt.edu/ResEd.

VANDERBILT AND NASHVILLE

Vanderbilt is a private university, founded in 1873. The university includes four undergraduate schools, the Graduate School, and eight professional schools.

Located approximately two miles from downtown Nashville, Vanderbilt is situated on 330 acres and is designated as an arboretum. A diverse student body of about 6,800 undergraduates and more than 5,800 graduate and professional students is taught by more than 3,300 full-time faculty members. Vanderbilt is the largest private employer in the region.

The metropolitan Nashville area, in the heart of Middle Tennessee, has a population of over one million. The city, a center for music of all kinds, has many other cultural and entertainment opportunities, including theatre, film, museums, symphony, recreation areas, and two major league sports teams.

INFORMATION AND APPLICATIONS

- Visit www.vanderbilt.edu/math for information about the Department of Mathematics (especially the “Graduate” link). Questions specifically concerning the mathematics graduate program should be emailed to mathgrad@vanderbilt.edu.
- Visit www.vanderbilt.edu/gradschool for general information about graduate studies at Vanderbilt. Online applications are sent directly to the Graduate School and can be accessed from the “Applications and Information” link. Application questions not addressed at the Graduate School website should be emailed to vandygrad@vanderbilt.edu.
- Applications, including all supporting materials, are due on January 1, 2012. Late applications may be considered if positions are still available. We require both the General and Mathematics Subject GREs (Graduate Record Examinations). The Subject Test result is especially important in evaluating applications. Applicants whose native language is not English and who have not been educated at an English-speaking university must also take the TOEFL (Test of English as a Foreign Language).

FURTHER INFORMATION

Director of Graduate Studies
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Vanderbilt University
Nashville, Tennessee 37240, U.S.A.
Email: mathgrad@vanderbilt.edu
Telephone: (615) 322-6672
Fax: (615) 343-0215

THE FACULTY AND THEIR RESEARCH

Departmental Administration

Chair: Dietmar Bisch

Vice Chair: John Ratcliffe

Director of Graduate Studies: Mike Neamtu

Director of Undergraduate Studies: Gieri Simonett

Director of Teaching: John Rafter

RESEARCH FACULTY AND THEIR AREAS

Algebra and Logic

Ralph McKenzie, Ph.D. (University of Colorado)

Algebra and Logic

Michael L. Mihalik, Ph.D. (SUNY, Binghamton)

Geometric Group Theory

Alexander Yu. Olshanskiy, Ph.D. (Moscow State University, Russia)

Group Theory

Denis Osin, Ph.D. (Moscow State University, Russia)

Geometric Group Theory

John G. Ratcliffe, Ph.D. (University of Michigan)

Geometric Group Theory

Mark V. Sapir, Ph.D. (Moscow Pedagogical Institute, Russia)

Group Theory, Algorithmic Problems in Algebra

Eric Schechter, Ph.D. (University of Chicago)

Set Theory and Nonclassical Logics

Steven T. Schantz, Ph.D. (University of California, Berkeley)

Logic, Universal Algebra, Computer Algebra

Constantine Tsinakis, Ph.D. (University of California, Berkeley)

Algebraic Logic, Order Algebra

Analysis and Applied Analysis

John F. Ahner, Ph.D. (University of Delaware)

Integral Equation Methods in Scattering and Potential Theory, Fractional Calculus and Mixed Boundary Value Problems, Elasticity Theory, Conservation Laws

Akram Aldroubi, Ph.D. (Carnegie Mellon University)

Harmonic Analysis, Sampling Theory, Mathematical Biology

Dietmar Bisch, Ph.D. (University of California, Los Angeles)

Operator Algebras, Quantum Physics, Quantum Information Theory

Alain Connes, Ph.D. (Ecole Normale Supérieure, France)

Noncommutative Geometry

Philip S. Croke III, Ph.D. (Cornell University)

Differential Equations, Mathematical Biology, Mathematics Education

Emmanuele DiBenedetto, Ph.D. (University of Texas, Austin)

Partial Differential Equations, Mathematical Biology

Yanqin Fan, Ph.D. (University of Western Ontario)

Nonparametric Statistics, Econometrics

Douglas P. Hardin, Ph.D. (Georgia Institute of Technology)

Harmonic Analysis, Fractal Geometry, Biomedical Informatics

Mary Ann Horn, Ph.D. (University of Virginia)

Partial Differential Equations, Control Theory, Nonlinear Analysis

Vaughan Jones, Ph.D. (University of Geneva, Switzerland)

Von Neumann Algebras

Jesse Peterson, Ph.D. (University of California, Los Angeles)

Operator Algebras, Ergodic Theory

Alexander M. Powell, Ph.D. (University of Maryland)

Harmonic Analysis, Wavelet Theory, Signal and Image Processing

Edward B. Saff, Ph.D. (University of Maryland)

Complex Analysis, Potential Theory

Eric Schechter, Ph.D. (University of Chicago)

Functional Analysis

Gieri Simonett, Ph.D. (University of Zürich, Switzerland)

Partial Differential Equations, Free Boundary Problems

Glenn F. Webb, Ph.D. (Emory University)

Mathematical Biology, Population Dynamics, Models of Tumor Growth, Differential Equations

Daoxing Xia, Ph.D. (Jijiang University, China)

Operator Theory and Its Applications

Dechao Zheng, Ph.D. (SUNY, Stony Brook)

Functional Analysis, Operator Theory, Complex Analysis, Harmonic Analysis

Computational Mathematics

Akram Aldroubi, Ph.D. (Carnegie Mellon University)

Wavelet Theory, Image and Signal Processing

Yanqin Fan, Ph.D. (University of Western Ontario)

Nonparametric Statistics, Econometrics

Douglas P. Hardin, Ph.D. (Georgia Institute of Technology)

Wavelet Theory, Image Processing

Mike Neamtu, Ph.D. (University of Twente, Netherlands)

Approximation Theory, Spline Theory, Numerical Analysis

Alexander M. Powell, Ph.D. (University of Maryland)

Harmonic Analysis, Wavelet Theory, Signal and Image Processing

Edward B. Saff, Ph.D. (University of Maryland)

Approximation Theory, Orthogonal Expansions

Larry L. Schumaker, Ph.D. (Stanford University)

Approximation Theory, Spline Theory, Computer-Aided Design

Geometry and Topology

Alain Connes, Ph.D. (Ecole Normale Supérieure, France)

Noncommutative Geometry

Zehra Basak Gürel, Ph.D. (University of California, Santa Cruz)

Symplectic Topology and Geometry, Hamiltonian Dynamical Systems, Differential Geometry

C. Bruce Hughes, Ph.D. (University of Kentucky)

Geometric and Algebraic Topology, Manifold Theory, Controlled Topology, Stratified Spaces

Gennadi Kasparov, Ph.D. (Moscow State University, Russia)

K-Theory, Noncommutative Geometry, Operator Algebras

Michael L. Mihalik, Ph.D. (SUNY, Binghamton)

Algebraic Topology, Low Dimensional Topology, Geometric Group Theory

Alexander Yu. Olshanskiy, Ph.D. (Moscow State University, Russia)

Geometric Group Theory

John G. Ratcliffe, Ph.D. (University of Michigan)

Low Dimensional Topology, Hyperbolic Geometry

Mark V. Sapir, Ph.D. (Moscow State Pedagogical Institute, Russia)

Geometric Group Theory, Algorithmic Problems in Algebra

Ioana Suvaina, Ph.D. (Stony Brook University)

Differential Geometry, Kähler Geometry, Seiberg-Witten Theory and Symplectic Topology

Steven T. Schantz, Ph.D. (University of California, Berkeley)

Group Theory, Hyperbolic Geometry

Guoliang Yu, Ph.D. (SUNY, Stony Brook)

K-Theory, Analysis on Manifolds, Noncommutative Geometry

Graph Theory and Combinatorics

Paul H. Edelman, Ph.D. (Massachusetts Institute of Technology)

Algebraic Combinatorics, Geometric Combinatorics, Cooperative Games

Mark N. Ellingham, Ph.D. (University of Waterloo, Canada)

Graph Theory, Paths and Cycles, Topological Graph Theory

2011/2012 POSTDOCTORAL FELLOWS

Simone Bova, Ph.D. (University of Siena)

Universal Algebra, Logic

Michael Brandenbursky, Ph.D. (Technion - Israel Institute of Technology)

Topology, Symplectic Geometry

Richard Burstein, Ph.D. (University of California, Berkeley)

Von Neumann Algebras, Subfactor Theory

Michael Chance, Ph.D. (SUNY, Stony Brook)

Symplectic Geometry

Ionut Chifan, Ph.D. (University of California, Los Angeles)

Von Neumann Algebras, Orbit Equivalence Ergodic Theory

Remi B.G. Coulon, Ph.D. (University of Strasbourg, France)

Group Theory

Darren Creutz, Ph.D. (University of California, Los Angeles)

Ergodic Theory

Timothy Ferguson, Ph.D. (University of Michigan)

Classical and Applied Analysis

Juraj Foldes, Ph.D. (University of Minnesota)

Partial Differential Equations

Michael Goff, Ph.D. (University of Washington)

Combinatorics

Stacy Hoehn, Ph.D. (University of Notre Dame)

Geometric Topology, Algebraic Topology, K-Theory

Baili Min, Ph.D. (Washington University in St. Louis)

Several Complex Variables, Complex Analysis

Rares Rasdeaconu, Ph.D. (SUNY, Stony Brook)

Differential and Symplectic Geometry

Jonathan Whitehouse, Ph.D. (University of Minnesota)

Approximation Theory, Harmonic Analysis

Zhizhang Xie, Ph.D. (Ohio State University)

Noncommutative Geometry, Index Theory

Ju-Yi Yen, Ph.D. (University of Maryland, College Park)

Stochastic Processes, Financial Mathematics

Dongpin Zhuang, Ph.D. (California Institute of Technology)

Geometric Group Theory