Mathematics

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Degree requirements: All entering graduate students must pass a comprehensive examination in calculus, differential equations and linear algebra during their first year of graduate work. For an M.S. in statistics, probability and statistics replaces differential equations in the comprehensive examination. The M.S. requires passing the comprehensive examination and 30 credit hours of graduate courses with at least 18 at the 400 level. Up to six of these credits may be earned from writing a master's thesis. To be admitted to candidacy for the Ph.D., a student must pass the comprehensive examination and in addition must pass a qualifying examination consisting of three parts chosen from different areas of mathematics. Doctoral students must take 18 hours of approved graduate level courses beyond the master's degree and must also take at least one graduate course during each year of residence. Including research credits, students entering with an M.S. degree from another institution must take 48 credits and students entering with a bachelor's degree must take 72 credits. Students must pass a language examination, and at least six months before completion, must pass a general examination on the thesis topic. Finally, students must complete and publicly defend a doctoral dissertation.

The Department of Mathematics offers a program of study leading to the M.S. and Ph.D. in mathematics, the M.S. and Ph.D. degrees in applied mathematics, and the M.S in statistics.

Department highlights:

The graduate program in mathematics at Lehigh University provides a supportive atmosphere in which students can pursue study and research in a broad spectrum of subjects, including algebra, analysis, differential equations, discrete mathematics, geometry, logic, mathematical biology, number theory, probability, set theory, statistics and topology. We have particularly active groups in geometry/topology and probability/statistics. With 20 faculty and 30 graduate students, classes are small and faculty are readily available to interact with students. Graduate students work together academically and play together socially. The department has a weekly colloquium and an annual Pitcher lecture series with a distinguished mathematician giving a series of three lectures. We currently have about 30 graduate students, approximately half of whom are women. Over the last 10 years, 29 Ph.D.s have been granted, half to women, an unusually high fraction for mathematics. Most of our students find positions teaching at colleges and universities. About 20 percent either take positions in industry or return to teach in their home country.

Facilities/Resources:

Mathematics graduate students have access to departmental and university computer facilities. Teaching assistants and fellows have large offices with at most two or three students per office. The library has more than 22,000 volumes in mathematical sciences with approximately 200 current journals readily accessible in a separate mathematics section. A growing number of journals are available electronically.

Number of M.S. and Ph.D. students: The department has approximately 30 full-time graduate students. Over the past 10 years, 29 Ph.D.s have been granted.

Examples of research projects by graduate students:
• t-split interval orders
• Limit theory for functionals on random bipartite sets
• Number of summands in v1-periodic homotopy groups of SU(n)
• Characterization of minimal submanifolds by total Gauss curvature
• Arithmetic on free abelian groups
• Mathematical analysis of oxygen and subtrate transport within a multicapillary system in skeletal muscle

• Orthonormal Expansions for Gaussian Processes
• Sum List Coloring and Choosability
• Limit Theorems for Random Euclidean Graphs
• Evolution of Curves by Curvature Flow

Length of typical graduate programs and types of jobs obtained by graduates:
M.S. students typically complete the program in two years (provided they have the proper background). Ph.D. students entering with a master's degree typically complete the program in three or four years. Students entering without a master's degree typically complete a Ph.D. in four to six years, obtaining a master's degree in the process.

Students who receive the master's degree typically enter another graduate program (in mathematics or another field), become a high school or junior college teacher or obtain a job in industry or government. In the last 10 years, about 85 percent of the Ph.D. graduates have taken positions in academia and about 15 percent have taken positions in industry.

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Additional department admission requirements: three letters of recommendation, GRE general and subject tests recommended, and adequate background in undergraduate mathematics including advanced calculus, linear and abstract algebra.

Financial support: Most students are supported as teaching assistants and a few receive fellowships. Teaching assistants and fellows receive tuition remission and a stipend of approximately $15,000. Students without this support may receive partial or full tuition remission.

Application deadline/mid-year admissions: January 15 for fall admission and December 1 for spring admission.

Faculty and their research interests:

Wei-Min Huang, Professor and Chair
Ph.D., University of Rochester, 1982
Statistics, probability

Huai-Dong Cao, A. Everett Pitcher Professor
Ph.D., Princeton, 1986
Differential geometry, differential equations

Donald M. Davis, Professor
Ph.D., Stanford University, 1972
Algebraic topology, homotopy theory

Vladimir Dobric, Professor
Ph.D., Zagreb, Croatia, 1985
Analysis, probability, financial mathematics

Bruce A. Dodson, Associate Professor
Ph.D., SUNY at Stony Brook, 1976
Algebra, computational number theory, geometry

Bennett Eisenberg, Professor
Ph.D., MIT, 1968
Probability, mathematical statistics

Garth Isaak, Professor
Ph.D., Rutgers University 1990
Discrete mathematics

David L. Johnson, Associate Professor
Ph.D., MIT, 1977
Differential geometry, algebraic geometry

Jerry P. King, Professor
Ph.D., University of Kentucky, 1962
Complex analysis, summability

Terrence J. Napier, Associate Professor
Ph.D., University of Chicago, 1989
Complex geometry, several complex variables

Clifford S. Queen, Associate Professor
Ph.D., Ohio State University, 1969
Algebra, number theory

Eric P. Salathe, Professor
Ph.D., Brown University, 1965
Applied mathematics, physiological transport phenomena

Mark Skandera, Assistant Professor
Ph.D. MIT, 2000
Algebraic combinatorics

Lee J. Stanley, Professor
Ph.D., UC at Berkeley, 1977
Set theory, mathematical logic

Xiaofeng Sun, Assistant Professor
Ph.D., Stanford University, 2001
Geometric Analysis

Susan Szczepanski, Associate Professor
Ph.D., Rutgers University, 1980
Algebraic topology, geometric topology

Ramamirthan Venkataraman, Associate Professor
Ph.D., Brown University, 1968
Applied mathematics, fluid mechanics

Steven H. Weintraub, Professor
Ph.D., Princeton, 1974
Geometry, topology

Ping-Shi Wu, Assistant Professor
Ph.D., U.C.-Davis, 2005
Statistics

Joseph E. Yukich, Professor
Ph.D., MIT, 1982
Probability, analysis

Linghai Zhang, Assistant Professor
Ph.D. Ohio State, 1999
Partial differential equations, mathematical biology

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