

Mathematics is both a science and a tool for many other disciplines, including the physical and life sciences, engineering, economics and sociology. Mathematicians use logic, functional relationships, equations, graphs, networks, number theory and other mathematical structures to solve problems in a broad range of fields.

The University of Delaware's M.S. and Ph.D. Programs in Mathematics and Applied Mathematics immerse students in rigorous degree programs that will quickly move them to the frontiers of contemporary mathematical challenges.

Through these programs, our faculty support and train the next leaders in the world of mathematics for academia, the private or public sector, industry and government. The wide variety of research and graduate classes, ranging from combinatorics to scattering theory, offer opportunities to work and solve interesting mathematical and scientifically challenging problems that impact the broader mathematical community and the world.

#### EXCEPTIONAL LEARNING OPPORTUNITIES

- Some of our work strengthens mathematical sciences as a discipline, but our department is unique in our outward focus. Many of our faculty are actively engaged with scientists and engineers, discovering and solving new and exciting mathematical problems that arise from outside traditional mathematical domains and are affiliated with multidisciplinary research centers including the Delaware Biotechnology Institute, the Center for Applications of Mathematics in Medicine and the College of Earth, Ocean, and Environment.
- Funding for research is abundant and first-year students are guaranteed funding for research over the summer through the GEMS-UNIDEL programs. Active graduate student chapters of the Society of Industrial and Applied Mathematics and the Association of Women in Mathematics allow students to grow outside the classroom.
- UD is centrally located along the nation's northeast corridor between New York and Washington, D.C., with major cities of Philadelphia and Baltimore and government research laboratories, such as the U.S. Army Research Laboratory at Aberdeen Proving Ground and the U.S. Naval Research Laboratory, just a short drive away. Convenient access to transportation puts the cultural, economic and political centers of the world within your reach.

# CORE RESEARCH AREAS

## ANALYSIS

Analysis is a wide research area that constitutes the backbone of rigorous modern mathematical thinking, providing solid foundations to external areas such as partial differential equations or quantum mechanics, in addition to exploring abstract constructions that generalize classical ideas of the theory of functions and their connections with geometry, topology or combinatorics.

## DISCRETE MATHEMATICS

Topics in discrete mathematics include combinatorics, graph theory, coding theory, projective geometry and finite fields. Current research in the department focuses on extremal graph theory, polynomials over finite fields, graph eigenvalue interlacing and probabilistic information theory. The field intertwines with many other disciplines including analysis, probability and topology.

## FLUIDS & MATERIALS SCIENCE

The fluid mechanics and materials science faculty members are interested in a wide range of modern problems that originate from or have applications in industry. In fluid mechanics, many are interested in viscoelastic fluids, thin film flows and transonic aerodynamics. In materials science, our faculty members strive to understand the mathematics of phase transformations and to develop novel descriptions of composite materials.

## INDUSTRIAL AND APPLIED MATH

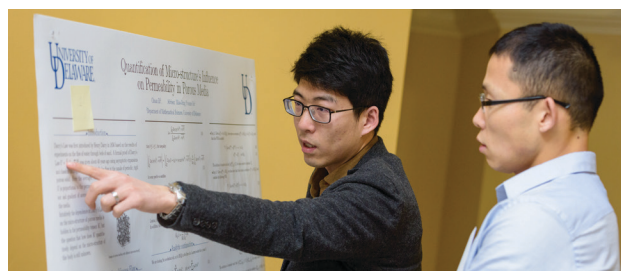
Research ranges from basic numerical analysis (finite element, boundary element and finite difference convergence theory) and fast methods (multigrid) to applications in materials science (foam evolution, phase transformations in crystalline alloys, approximation of microstructure and visco-elastic phenomena) and electromagnetism (scattering, inverse scattering and ferromagnetism).

## MATHEMATICAL BIOLOGY

Research in mathematical biology is extremely diverse in the Department of Mathematical Sciences as faculty members work on a wide variety of modern problems ranging from the molecular scale to the organism level. Ongoing research projects include the fluid mechanics of tear films and the effect of the blink cycle, models of atherosclerotic plaque, transport in bone and osteoporosis, imaging of bone marrow and the collective dynamics of plankton.

## NUMERICAL ANALYSIS AND SCIENTIFIC COMPUTING

This is one of the largest groups within the department that explores a wide range of topics, including the study of fundamental, theoretical issues in numerical methods, algorithm development, numerical solutions of large-scale problems in fluid mechanics, solid mechanics, electromagnetism and materials science.



## PROBABILITY AND STOCHASTIC METHODS

In probability theory, a stochastic or sometimes random process is a collection of random variables that is often used to represent the evolution of some random value or system over time. Ongoing research in the department deals with problems in statistical physics and electrical engineering, information theory, convex geometry, development of next-generation Markov Chain Monte Carlo and analysis on stochastic particle dynamics.

## TOPOLOGY

Topology is a major area of mathematics concerned with the most basic properties of space, such as connectedness. More precisely, topology studies properties that are preserved under continuous deformations, including stretching and bending, but not tearing or gluing.

## TO APPLY

For more information about graduate admission and to apply online, visit the Graduate College at [www.grad.udel.edu](http://www.grad.udel.edu). The department offers both M.S. and Ph.D. degrees in mathematics and applied mathematics. Applicants must have a bachelor's degree in mathematics or a closely related field of science.

## FUNDING

Five-year financial aid packages combining teaching, research and fellowship opportunities, which include graduate tuition and a competitive stipend, are available. Students who complete applications by January 15 are given preference.

## ADMISSION DEADLINES

**January 15:** Priority consideration for admission and to be considered for departmental funding.

**July 31:** Final deadline to apply.

## CONTACT

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