**EMORY**
LANEY
GRADUATE
SCHOOL

NATURAL SCIENCES

# MATHEMATICS

The Mathematics graduate program offers a vital intellectual community that combines cutting edge research with a friendly and supportive atmosphere. We have active research groups in several areas and support collaborations with faculty members from other programs and schools at Emory and with researchers at universities across the world.
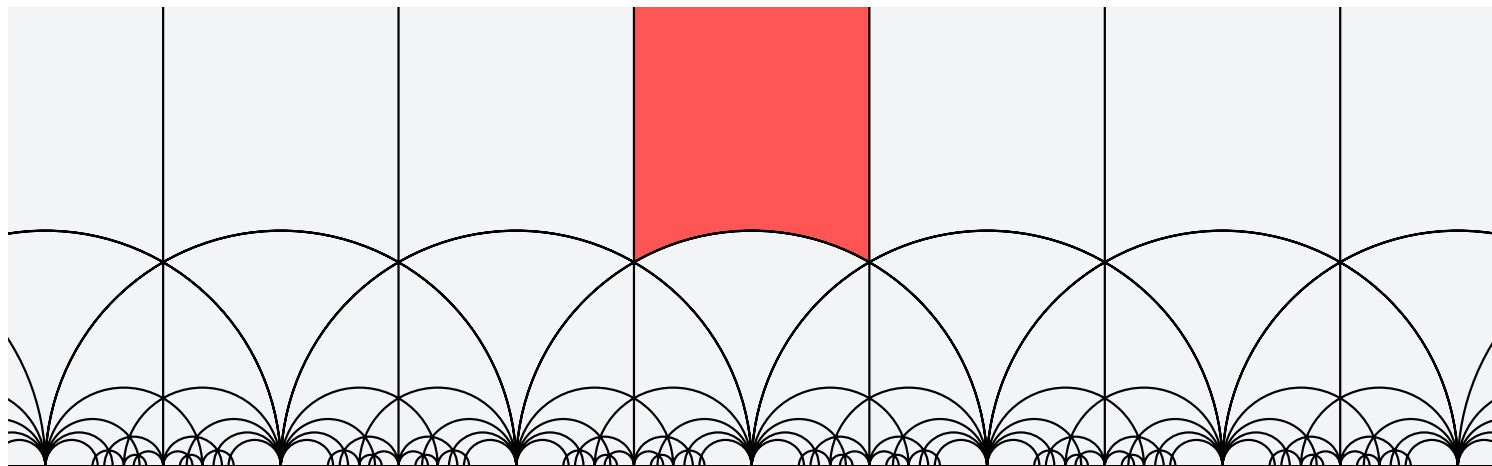
## FACULTY

Emory Mathematics has more than 18 regular faculty, as well as several research associates and visiting researchers. Many research projects in the department are funded through grants from the National Science Foundation, the U.S. Department of Energy, the U.S. Department of Defense and the National Institutes of Health. Research produced by our faculty and graduate students is published in the most respected mathematics and computer science journals and proceedings, and each year our faculty are invited to present research lectures at international conferences around the world. Our distinguished faculty have been recognized with honors including multiple invited ICM lectures, Fellows of the American Mathematical Society and Society for Industrial and Applied Mathematics, Guggenheim Fellowships, NSF CAREER Awards, NSF Director's Distinguished Teaching Scholar Award, Packard Fellowships, Presidential CAREER Awards.

## FACULTY

- **DAVID BORTHWICK, PHD**
  Harvard, 1993
  *Spectral Theory, Geometric Analysis*

- **DWIGHT DUFFUS, PHD**
  Calgary (Canada), 1978
  *Ordered Structures, Combinatorics*

- **JOHN DUNCAN, PHD**
  Yale University, 2006
  *Moonshine, Algebras, Number Theory*

- **MICHELANGELO GRIGNI, PHD**
  MIT, 1991
  *Complexity Theory, Approximation Algorithms*

- **HAO HUANG, PHD**
  UCLA, 2012
  *Extremal Combinatorics, Random Structures, Spectral Graph Theory*

- **JAMES NAGY, PHD**
  NC State, 1991
  *Scientific Computing, Inverse Problems, Image Processing*

- **VLADIMIR OLIKER, PHD**
  Leningrad (USSR), 1971
  *Nonlinear PDE, Differential Geometry, Optical Design*

- **KEN ONO, PHD**
  UCLA, 1993
  *Number Theory*

- **PARIMALA RAMAN, PHD**
  Tate Institute (India) 1976
  *Quadratic Forms, Galois Cohomology*

- **VICTORIA POWERS, PHD**
  Cornell, 1985
  *Real Algebraic Geometry, Polynomials, Symbolic Computation*

- **VOJTECH RODL, PHD**
  Charles (Czech), 1976
  *Discrete Mathematics, Combinatorics*

- **ROBERT ROTH, PHD**
  Ohio State, 1979
  *Combinatorics*

- **LARS RUTTHOTO, PHD**
  University of Munster (Germany), 2012
  *Computational methods, geophysical imaging*

- **VENAPALLY SURESH, PHD**
  University of Bombay, 1994
  *Quadratic Forms, Galois Cohomology*

- **ALESSANDRO VENEZIANI, PHD**
  Milan (Italy), 1998
  *Computational Mathematics, Fluid Dynamics*

- **YUANZHE XI, PHD**
  Purdue University, 2014
  *Scientific Computing, Numerical Linear Algebra*

- **SHANSHUANG YANG, PHD**
  University of Michigan, 1991
  *Quasiconformal Mappings, Complex Analysis*

- **DAVID ZUERICK-BROWN, PHD**
  UC Berkeley, 2010
  *Algebra*

## PROGRAMS OF STUDY

### MATHEMATICS PHD PROGRAM

The department offers a PhD in Mathematics intended for students with an undergraduate degree in Mathematics or equivalent experience. Possible areas of research specialization include:

- **ALGEBRA AND NUMBER THEORY:** algebraic groups, algebraic geometry, analytic number theory, arithmetic geometry.

- **ANALYSIS AND DIFFERENTIAL GEOMETRY:** geometric analysis, spectral theory, partial differential equations, geometric function theory.

- **COMPUTATIONAL MATHEMATICS:** computational fluid dynamics, image processing, inverse problems, numerical analysis (linear algebra, PDEs, optimization), high-performance computing.

- **DISCRETE MATHEMATICS:** graph theory, combinatorics, algorithms, theory of computation.

Students in the Mathematics Ph.D. program can follow either a pure or computational mathematics track, and typically complete the program within 5 years.
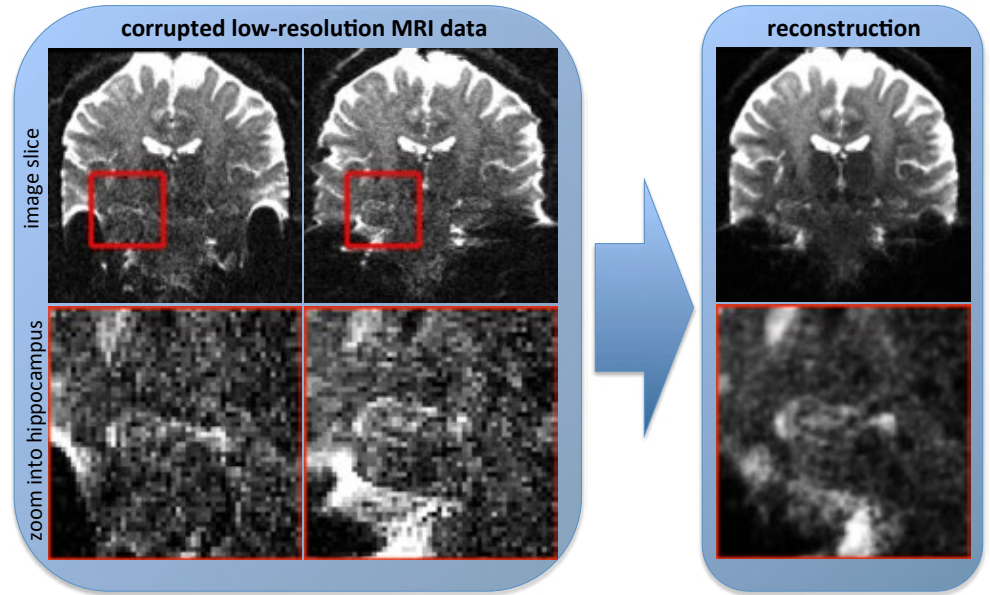
### MATHEMATICS MS PROGRAM

The masters program is designed for students wishing to pursue a career in industry or enter a PhD program in Mathematics. Students admitted to the MS program can follow a pure or computational mathematics track and may choose a thesis option or a course-only option.

## STUDENTS

Approximately 30 PhD students are enrolled at any one time, with 5 – 7 students entering the program each year. Students come from all parts of the world, including North America, Europe, Asia, and South America. Graduates of our programs pursue careers in academia, government, and the private sector. Our recent PhD graduates have been in demand, earning research postdocs at top institutions such as Max Planck, Princeton, Stanford, and tenure track positions at prestigious schools including Bucknell University, Tufts University, University of Tennessee (Knoxville). Recent graduates pursuing private sector careers have been hired by companies such as Microsoft, Standard and Poor's and Google.

The department offers extensive support programs for graduate students, including the following:

- Active research seminars provide students exposure to current developments in a broad spectrum of research fields.
- Graduate teaching seminar.
- Financial support for travel to research conferences.
- Student chapters of professional organizations.
- Assistance in finding summer research or internship opportunities.



corrupted low-resolution MRI data

reconstruction

image slice

zoom into hippocampus

## FACILITIES

The department is housed in the Emory Mathematics and Science Center, designed to be a "green" building. The building provides an abundance of windows allowing natural light into most of the classroom and office spaces — including graduate student offices. In addition to offices, classroom and laboratory space, the building houses an astronomy observatory and a planetarium.

Graduate students have access to computers and to our wireless network. Office spaces foster a sense of community, and include rooms for socializing, for seminars and colloquia receptions, and for research collaboration.

The department maintains its own shared computing resources and infrastructure, administered by the department's technical staff. Computing resources include shared memory, multi-processor compute servers, Linux clusters, and ample data storage capabilities. In addition, the department maintains a computing laboratory and state-of-the-art audio visual equipment in each classroom.

### LANEY GRADUATE SCHOOL DEGREE PROGRAMS

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|---|---|---|---|---|---|---|
| Anthropology | Biostatistics | Computer Science and Informatics | French | Immunology and Molecular Pathogenesis* | Molecular and Systems Pharmacology* | Philosophy |
| Art History | Business (PhD) | | Genetics and Molecular Biology* | | Neuroscience* | Physics |
| Behavioral Sciences and Health Education | Cancer Biology* | Development Practice | Health Services Research and Health Policy | Islamic Civilizations Studies | Neuroscience and Animal Behavior (Psychology) | Political Science |
| Biochemistry, Cell and Developmental Biology* | Chemistry | Economics | | Mathematics | | Population Biology, Ecology, and Evolution* |
| | Clinical Psychology | English | Hispanic Studies | MD/PhD | Nursing | Religion |
| Bioethics | Cognition and Development (Psychology) | Environmental Health Sciences | History | Microbiology and Molecular Genetics* | Nutrition and Health Sciences | Sociology |
| Biomedical Engineering | Comparative Literature | Environmental Sciences | | | | Women's, Gender, and Sexuality Studies |
| | | Epidemiology | | | | |

*The Graduate Division of Biological and Biomedical Sciences is home to eight interdisciplinary graduate programs.