

APPLIED MATHEMATICS





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The **DEPARTMENT OF ENGINEERING SCIENCES AND APPLIED MATHEMATICS (ESAM)** ranks as a world leader in the field. A close-knit academic community—faculty, postdocs, and graduate and undergraduate students—works together to apply mathematics to intriguing and challenging problems in the world around us. They **predict unexpected outcomes of experiments, bridge theories among disciplines**, and **test hypotheses not easily tested in a laboratory**.

Nearly every scientific and engineering field needs applied mathematicians to make scientific and technological advances. ESAM researchers often team up with experimentalists to see their research come to life. They also collaborate with counterparts in virtually all science and engineering departments within Northwestern, as well as in universities and laboratories throughout the world.

UNDERGRADUATE STUDY

PROGRAMS OF STUDY

- \ **BS in applied mathematics** \ Designed for students interested in becoming professional mathematicians or pursuing graduate study in applied mathematics, science, or engineering.
- \ **Dual degree option** \ Allows students to combine applied mathematics with another engineering or science degree. Also enables them to do industrial research in their discipline and provides a solid foundation for graduate school studies.
- \ **Kellogg Certificate for Undergraduates** \ Students interested in finance, consulting, or business management may pursue this certificate as a complement to their applied mathematics degree.
- \ **McCormick BS/MS Program** \ Allows students to pursue bachelor's and master's degrees simultaneously.

EXAMPLE COURSES

- ES_APPM 252 *Honors Calculus*
- ES_APPM 311 *Methods of Applied Mathematics*
- ES_APPM 322 *Applied Dynamical Systems*
- ES_APPM 346 *Modeling and Computation in Science and Engineering*
- ES_APPM 421 *Models in Applied Mathematics*



OUTSIDE THE CLASSROOM

- \ **INTERNSHIPS** \ Apply skills learned in the classroom at companies in Evanston, Chicago, and around the country.
- \ **RESEARCH** \ Work with top-tier faculty in the department on research in complex systems, fluids, mathematical biology, and social systems.

\ **SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS** \ Participate in the local student Chapter of SIAM, who builds cooperation between mathematics and the worlds of science and technology through publications, research, activities, and conferences.

GRADUATE STUDY

PROGRAMS OF STUDY

- \ **Master of science in engineering sciences and applied mathematics**
- \ **PhD in engineering sciences and applied mathematics**



RESEARCH AREAS

- Asymptotic analysis \ Combustion \ Complex systems \ Diffusive processes \ Fluid dynamics \ Materials science \ Mathematical biology \ Scientific computing \ Social systems \ Waves

"I ENJOY APPLIED MATH BECAUSE IT DEVELOPS CRITICAL THINKING AND PROBLEM-SOLVING SKILLS AS WELL AS AN ABILITY TO BREAK DOWN A COMPLEX SYSTEM INTO SIMPLE AND UNDERSTANDABLE MODELS."

REID JACKSON \ APPLIED MATHEMATICS

CAREERS IN APPLIED MATHEMATICS

WHAT'S NEXT?

- \ Many graduates become professional mathematicians, excel in graduate study, and work to advance the field.
- \ Others apply their knowledge in diverse areas, including business, finance, law, medicine, scientific and engineering research, software development, and management consulting.
- \ Cross-disciplinary flexibility of their mathematical tools allows graduates to adapt to emerging new industries and technologies.

Primary industries for applied science careers

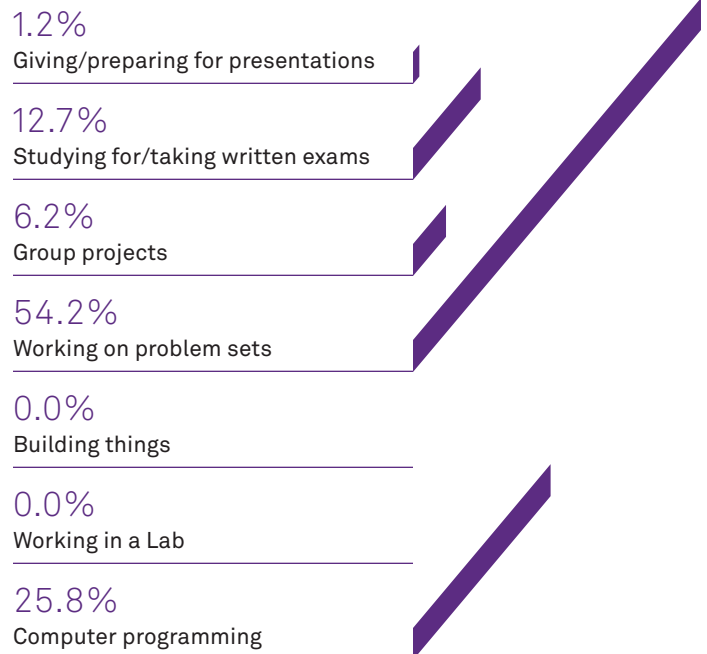
Bioinformatics \ Data mining \ Materials science \
 Computer animation \ Finance and economics \
 Ecology, epidemiology, and environmental Issues \ Climatology

RECENT GRADUATE PLACEMENTS

- \ Portfolio risk engineer at **Gladius Capital**
- \ Investment Banking Analyst with **William Blair**
- \ Technical services at **Epic Systems**
- \ Associate with **Boston Consulting**

HOW YOU SPEND YOUR TIME IN THIS PROGRAM

BASED ON A SURVEY OF CURRENT STUDENTS.



ENVISION WHAT'S POSSIBLE

NORTHWESTERN ENGINEERING STUDENTS
CONSTANTLY EXPLORE NEW PATHWAYS
IN APPLIED MATHEMATICS. IMAGINE YOURSELF:

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- \ Using math to solve real problems in physical, biological, and social sciences
 - \ Learning how stochastic differential equations can predict the price of financial instruments
 - \ Creating mathematical models to show how bacteria aggregate into biofilms, to elucidate brain functions, and to understand how organisms develop
 - \ Using computational modeling to predict properties of complex materials

FIND YOUR DIRECTION HERE

Northwestern | McCORMICK SCHOOL OF
ENGINEERING

www.esam.northwestern.edu