The University of Notre Dame
Applied and Computational Mathematics and Statistics (ACMS) Doctoral Program

About ACMS

The Department of ACMS is one of the fastest growing programs at Notre Dame. The department has about 40 doctoral students working with approximately 20 faculty members on a a variety of cutting-edge research topics. All of our doctoral students have been successfully placed with jobs in industry, academia, and government upon graduation.

For more information on our specific areas of study, please visit: acms.nd.edu/people/faculty

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The ACMS program collaborates with many different areas across the academic spectrum using mathematical and statistical models and computer simulation to measure and examine data. Graduate students in the ACMS program work with others in a variety of fields, ranging from science and engineering to finance. They carry out detailed steps and integrate input to create a wide array of mathematical models and simulations, and develop innovative statistical methodologies for data analysis.

Research Areas

Faculty and students in ACMS work closely with their colleagues at Notre Dame, and researchers from other universities and research institutes on a wide range of projects, including:

- Applied Partial Differential Equations
- Computational Neuroscience
- Mathematical and Computational Biology
- Numerical Differential Equations
- Scientific Computing
- Big Data and Statistical Learning
- Network Analysis
- Bayesian Modeling and Methodology
- Biostatistics and Bioinformatics
- Methodological and Applied Statistics

Ongoing Projects

Within the research areas that ACMS faculty and graduate students collaborate across campus, groundbreaking work is being conducted. Some of the current projects taking place within ACMS include:

- Bayesian Asymptotics modeling and methodology, stochastic approximation of the Hamiltonian Monte Carlo method, statistical analysis of next generation sequencing data, data privacy protection methods.
- Theoretical and methodological foundations for big data analysis, statistical learning of big data, Gaussian graphical models, social network analysis, statistical application to climate and efficient algorithms for fitting very large data set, both in the context of Gaussian Processes and of Spatial Extremes.
- Modeling blood flow and clotting, bruising, cell differentiation, myxobacteria dynamics, tumor growth, neural circuits, disease transmission, diffusion in heterogeneous and dynamic environments.
- Developing numerical methods (especially high-order methods) to solve systems of differential equations and polynomials. Numerical solution and convergence of free boundary problems.
- Statistical analysis of cancer data, development of tests for breast cancer.

Applied and Computational Mathematics and Statistics

Research and Computation Facilities

The ACMS program receives considerable support from Notre Dame Research through use of the Center for Research Computing (CRC). The department has access to several major computer cluster resources, including:

- Priority access to 720 cores in the CRC cluster, which are configured to handle diverse ACMS requirements, ranging from solving multiscale models to molecular dynamics simulations to constructing genome databases. The cluster consists of over 7032 available cores, with a minimum of 1GB of RAM per core. Access to the cluster is granted to users through stringent security protocols.
- Priority access to Dr. Hauenstein's and Dr. Sommese's clusters consisting of 1600+ cores (3+ TB RAM).
- An ACMS GPU cluster consisting of 4 Dell® PowerEdge T620 servers, each equipped with dual 8 core Intel® Xeon® E5-2660 2.20GHz processors, 8GB Ram and a 3TB SATA Hard Drive.

Recent Ph.D. Placements

- Tenure-track faculty in the Department of Mathematics at Penn State University
- Tenure-track faculty in the Department of Mathematics at Bryant University
- Tenure-track faculty in the Department of Mathematics at University of Nebraska–Lincoln
- Quantitative Associate, Wells Fargo Securities
- Quantitative Associate, BMO Financial Group
- Associate at Credit Suisse
- Software Development Engineer, Amazon
- Research Scientist, Amazon
- Data Scientist at eBay
- Applied Statistics Research Scientist at the Pacific Northwest National Laboratory

"The best part is the department's encouragement to graduate students to take on internships, workshops and teaching experiences over the summer. It really helped me personally decide between a career in academia or industry, and gave me the experience to successfully acquire a job upon graduating."

—Alicia Specht, graduated May 2017, currently Tenure-track faculty, Department of Mathematics at Bryant University

About the Notre Dame Graduate School

The Graduate School at the University of Notre Dame is home to more than 2,400 students in over 47 programs of study, from disciplines ranging from science and engineering to humanities and the social sciences.

Financial Support

University-wide, about 97 percent of all graduate students receive full-tuition scholarships that include all fees except a small student activity fee.

Fellowships and Scholarships

In addition to the tuition scholarships, 94 percent of all doctoral students receive multi-year fellowships or assistantships that provide stipends for living expenses. For the ACMS program, the base stipend level is $22,279 for nine months (for the 2017–18 academic year) though select fellowships provide higher levels of support up to $37,500.

Additional Support

ACMS students who receive the base stipend are also eligible for full-coverage of their medical insurance premiums. In addition, the Graduate School provides additional funding for students for professional development activities. Students may apply for these additional funds several times throughout the year to pay expenses related to traveling for conferences and workshops or to conduct research around the world.

The South Bend Area

One factor that makes the fellowship amounts even more attractive is the low cost of living in the South Bend area. Some graduate students are able to purchase homes and maintain a high standard of living while attending Notre Dame.

Ready to Apply?

The application deadline for the 2018–19 academic year is January 10, 2018. All materials for application should be submitted through the Graduate School's application system, which can be found at *gradconnect.nd.edu/apply*