

Mathematics & Statistics

“My class is their focus for 18 days. They do the homework, they come to class prepared, and they listen. And it works.”

Ann Cannon, Professor of Mathematics and Statistics

Mathematics is a language and, like all languages, it is best learned through immersion. Cornell's One Course At A Time schedule provides opportunities to focus intently without artificial time constraints, allowing learning to occur quickly and deeply. Professors also use the extended class time for group projects and collaborative problem-solving, which allows students to develop teamwork, communication, and presentation skills to supplement their mastery of mathematics and statistics concepts.

Majors in mathematics and statistics choose from three areas of focus: theoretical mathematics, applied mathematics, and statistics. Cornell offers two minors: mathematics and applied mathematics. The department faculty includes two theoretical mathematicians, a statistician, and a professor with an applied background who is shared with the Department of Computer Science.

Cornell students undertake meaningful research under the guidance of faculty members during summers and through independent study. Students frequently attend graduate school, often in conjunction with other disciplines. Recent graduates have pursued advanced degrees in physics, chemistry, statistical genetics, sociology, statistics, and actuarial science, among others.

Students also have the opportunity to give or receive assistance in math and statistics through the library's Quantitative Reasoning Studio. The studio is directed by a full-time academic consultant who also delivers subject-

specific lessons in math and statistics to a wide range of Cornell courses.

BENEFITS OF ONE COURSE AT A TIME

On Cornell's One Course At A Time schedule math classes meet for three to four hours a day, but this does not mean three- to four-hour lectures. Professors take advantage of the unique schedule to teach with innovative methods, including inquiry-based learning and project-focused approaches.

For example, Linear Algebra students have worked in teams to find the optimal arrangement of housing designs in an apartment complex. In Differential Equations and Math Modeling, a team might analyze the performance of a glider-based military drone, serve as expert witnesses in assessing the safety of a local skate park, or find the optimal way to board passengers on an airplane.

Similarly, coursework in statistics goes beyond standard textbook assignments to cover topics such as modeling, epidemiology, and issues surrounding “big data.” For example, Data Analytics is team-taught with a computer science professor. The course features group projects that bring sophisticated statistical and visualization tools to bear on data sets ranging from Twitter hashtags to athletic results to celebrity photos.

The One Course calendar and Cornell's small class sizes benefit math students of all abilities because the extended contact time with professors enables individualized learning—nobody is left behind or held back. In addition, most exams are not timed, allowing students to take as much time as needed to fully demonstrate their knowledge.

CURRICULUM HIGHLIGHTS

Majors complete a capstone experience consisting of an advanced project and completion of the department's unique culture points program. The capstone project is normally completed during

Faculty Bios & Courses

STEVE BEAN

Associate Professor of Mathematics

Teaches courses in mathematics. He is interested in all areas of geometry; in particular, projective geometry, a subject that has ties to the idea of perspective in art. He is also fascinated by prime numbers and patterns in their distribution. Ph.D. in Mathematics, University of Iowa

ANN CANNON

Professor of Statistics and Mathematics

Teaches statistics courses, and her main professional interest is in statistics education. She is co-author of Stat 2: Building Models for a World of Data (2012), a textbook for the second introductory course in statistics. Ph.D. in Statistics, Iowa State University

TONY DE LAUBENFELS

Professor of Computer Science and Mathematics

Teaches courses in mathematics, statistics, and computer science. He has been a leader in bringing computing technology into teaching and learning at Cornell. M.S. in Mathematics and M.S. in Computer Science, University of Iowa

JIM FREEMAN

Professor of Mathematics

Teaches courses in mathematics and introductory statistics. His professional interests include algebra and the mathematics of origami. He managed Cornell's first Internet connection and networks and served as the college's first webmaster. Ph.D. in Mathematics, University of Notre Dame

the senior year and involves research on a project of the student's own design.

The purpose of the culture points component of the capstone experience is to encourage students to engage with mathematics outside the classroom. Points can be earned through a variety of activities including attending campus seminars or professional conferences, participating in mathematics competitions, presenting research results, or attending social events with the Math Club.

Majors also complete a two-course sequence designed to explore an aspect of mathematics or statistics in more depth. Options include Mathematical Statistics I & II, Modern Algebra I & II, Analysis I & II, and Applied Mathematics I & II.

RESEARCH

Our summer research program allows students to go beyond prescribed approaches to contrived problems. In the process they not only seek the answers to interesting problems, but also choose what questions to address and how best to address them.

Recent projects have investigated youth archery data, biofluid mechanics of fish suction feeding, cellular automata clusters, elliptic curves, the Menger sponge in n-dimensions, the history of the Gamma function, and the dispersal of dogbane beetles in tall-grass prairies.

Students have also been successful in landing summer or semester-long research placements at a variety of prestigious institutions. Two recent students have spent research semesters abroad: at the Aquincum Institute of Technology in Budapest, Hungary, and at the Albert Einstein Institute in Hannover, Germany. Others have completed summer research at places like the University of Nebraska, the University of Iowa, the University of Pittsburgh, and Rutgers University.

INTERNSHIPS/FELLOWSHIPS

Students also have the chance to take part in internships where they can apply their coursework in a professional setting. Students have recently taken part in internships and fellowships at the National Oceanic and Atmospheric Administration Marine Fisheries as a statistical analyst, and at AEGON, the National Cancer Institute, and BCS Inc., among others.

AFTER CORNELL

The National Association of Colleges and Employers (NACE) reports that demand for mathematicians is projected to grow 21 percent from 2014 to 2024, much faster than the average for all occupations, with an average starting salary in 2016 of \$60,153. In addition to their role in basic research, mathematicians are valued in many industries to analyze the increasing volume of digital and electronic data.

ALUMNI CAREERS

Middle and high school math teacher, Lone Tree Community School District, Lone Tree, Iowa (Class of 2016)

Data analyst, Bloomberg L.P., Seattle, Washington (Class of 2015)

Actuarial student, Transamerica Life Insurance, Cedar Rapids, Iowa (Class of 2015)

Web developer, AppealingStudio, Frisco, Texas (Class of 2015)

Web developer, Go Green Enterprises, Cedar City, Utah (Class of 2015)

Quantitative analyst, NuFit Media, Boston, Massachusetts (Class of 2015)

Server systems staff, Epic Systems, Madison, Wisconsin (Class of 2015)

Technical systems analyst, Epic Systems, Madison, Wisconsin (Class of 2015)

Analyst, PMM Partners Ltd., Yangon, Myanmar (Class of 2014)

Benefits operations manager, Aon Hewitt, Lincolnshire, Illinois (Class of 2014)

Risk analyst, Aegon Asset Management, Cedar Rapids, Iowa (Class of 2014)

Algorithm engineer intern, Alibaba Group, Raleigh-Durham, North Carolina (Class of 2013)

Consumer loan underwriter, Wells Fargo, Raleigh-Durham, North Carolina (Class of 2013)

Quality assurance software developer, Pitney Bowes Software, Arvada, Colorado (Class of 2012)

Engineer, Piazza, San Francisco, California (Class of 2012)

Financial specialist, Venture Bank, Minneapolis, Minnesota (Class of 2012)

Senior analyst, Cogo Labs, Boston, Massachusetts (Class of 2012)

Actuarial analyst, GE Capital - North American Life and Health, Kansas City, Kansas (Class of 2011)

GRADUATE SCHOOLS ATTENDED

Ph.D., economics, Vanderbilt University, Nashville, Tennessee (Class of 2015)

Ph.D., statistics, North Carolina State University, Raleigh, North Carolina (Class of 2013)

Ph.D., physics, University of Kentucky, Lexington, Kentucky (Class of 2013)

M.A., statistics, Bowling Green State University, Bowling Green, Ohio (Class of 2013)

Ph.D., political economy and government, Harvard University, Cambridge, Massachusetts (Class of 2012)

M.S., applied statistics, Ohio State University, Columbus, Ohio (Class of 2012)

M.S., computational mathematics, Stanford University, Stanford, California (Class of 2012)

M.D., University of Minnesota, Minneapolis, Minnesota (Class of 2012)

Ph.D., computer science, University of Colorado Boulder, Boulder, Colorado (Class of 2012)

Ph.D., computational medicine and bioinformatics, University of Michigan, Ann Arbor, Michigan (Class of 2012)