College of Arts and Science

Department of Statistics

Statistics can tell us how much safer it is to fly than drive, the odds of winning the lottery, our life expectancy and who is likely to win the next election. These are simple problems compared with what MU students learn about analyzing complex economic, biomedical, sociological and other data. Good news: Statistics also tell us there's a growing demand for statisticians.

Our Strengths

Four of the department's faculty members are Fellows of the American Statistical Association. Three are Fellows of the Institute of Mathematical Statistics and elected members of the International Statistical Society. One is a Fellow of the Royal Statistical Society- Their professional accomplishments put them at the frontier of modern statistics, which is being shaped by the collaborative research of teams of scientists using computer-intensive statistical methodology.

Teaching methods mirror the approach to research. Through course work and the senior seminar, each student works closely with five or more faculty members on projects involving collaborative research and statistical computing on the department's network of computers running Windows and Linux.

The department offers its majors broad training in statistical theory and applications. Individualized programs designed in consultation with an adviser prepare students for graduate study or careers in actuarial science, business, bio-medical areas, government or industry. Faculty members have interests in diverse fields such as agriculture, business, ecology, economics, engineering, environmental science, health sciences, life sciences, meteorology, psychology, social sciences and wildlife, making it easy to advise undergraduates about career possibilities in many areas.

Faculty members are recognized internationally for their expertise in several areas:

Bayesian statistics uses a simple, yet powerful, framework in which prior probabilities about a process are updated by observed data. In recent years, the use of novel computer simulation approaches has led to an ongoing "revolution" in the application of Bayesian methodology to nearly every academic discipline. Faculty members at MU have been very much involved in the development of this methodology and their applications.

Biostatistics involves faculty members collaborating with medical researchers on projects involving AIDS research, arthritis studies, genetics, spinal-cord injury, smoking restrictions in the workplace and quality of care in nursing homes.

Reliability and survival analysis use probabilistic models to predict the time of events such as the failure of a mechanical component, death or the recurrence of a tumor. The department has hosted several international conferences on reliability.

The department is known for pioneering research in spatial/temporal data analysis, techniques for modeling variables over space and time in, for example, levels of hemoglobin or changes in cancer-mortality rates.

Personal Attention

The collaborative nature of research and teaching in the department constantly brings students and faculty members together in class and in the computer lab. They know each other by first names, and they see each other so regularly that their questions rarely wait long for answers. Faculty members want students to succeed at MU and later on because they take pride in the department and in the accomplishments of its alumni.

Majoring in Statistics

The department encourages students to study an area in which statistics is applied such as biology, business, economics, engineering, health sciences, marketing or psychology. This approach strengthens their communication and quantitative skills, and they learn to make effective use of probability arguments and computer software in actual statistical analyses. The statistics department offers both a bachelor of arts degree and a bachelor of science degree.

Degree Requirements

For both the BA and the BS degrees, students may follow either the traditional track or the applied track. Students who later may do graduate studies in the quantitative sciences are strongly encouraged to follow the traditional track. In addition to the University's and the College of Arts and Science's requirements, the Department of Statistics has the following requirements.

Bachelor of Arts

Statistics

For both the traditional and applied tracks: *Stat 4970 Senior Seminar* plus an additional 18 hours offered by the department, at least 15 hours of which must be numbered 4000 or above, must include *Stat 3500 Introduction to Probability and Statistics II, 4710 Introduction to Mathematical Statistics* ***or*** *4760 Statistical Inference* and may not include *Stat 4050 Connecting Statistics to Middle and Secondary Schools.*

Mathematics

For the traditional track: *Math 1500 Analytic Geometry & Calculus I, 1700 Calculus II, 2300 Calculus II* ***and*** *4140 Matrix Theory.*

For the applied track: either *Math 1500 Analytic Geometry & Calculus I* ***or both***

Math 1300 Finite Mathematics ***and*** *Math 1320 Elements of Calculus.* The applied track also requires six additional hours of statistics courses (beyond those used to fulfill the statistics requirements of the degree) or approved statistically oriented courses. These six hours must be numbered 4000 or above and may not include *Stat 4050.*

Computing

Both the traditional and applied tracks: *CS 1040 Introduction to Problem Solving and Programming* ***or*** *CS 1050 Algorithm Design and Programming I.*

Bachelor of Science

In addition to the requirements for a BA degree, statistics students pursuing a BS (either the traditional or applied track) are required to take *English 2030 Professional Writing* and an additional three hours in computer science or other approved computing courses. *Stat 4110 Statistical Software and Data Analysis* may be used for this computing requirement if it is not counted in the statistics requirement, above.

Stat 4750 Introduction to Probability Theory and *4760 Statistical Inference* are particularly helpful in preparing for actuarial examinations.

Advising

An adviser is assigned to each major, and all professors are available to talk with students informally about their programs and career choices. As an added benefit, the department invites statisticians from government and industry to take part in the colloquium series, which provides a wealth of information about career possibilities.

The Career Center is another source of information about statistics-related fields, and students are encouraged to take advantage of its resources early and often.

Internships

While the department has no formal internship program, internships are often available to interested students. Some statistics undergraduates have worked with faculty on their research projects and in the School of Journalism Media Research Bureau. Others have been successful in getting summer employment using their statistical training.

Value of a Statistics Degree

The world is statistically oriented, so a degree in statistics, combined with a special emphasis area or not, opens many doors. Graduates have gone on to earn advanced degrees or take positions in advertising, health sciences, industry, insurance, marketing, pharmaceutical companies, public-opinion research, general consulting and other fields-Recent graduates have begun graduate studies at the University of Alabama, North Carolina State University, University of Washington at Seattle and the University of Missouri. Others have taken employment, for instance at Anheuser-Busch in St. Louis and ETC Institute in Olathe, Kansas.

Missouri Admission

The University admits students on the basis of their chances for success here. The main criteria are the high-school curriculum, test scores and class rank.

Applicants are expected to have followed a college-preparatory program with at least 17 units of credit, as follows (one unit equals one year).

Four units of English
Two units emphasizing composition or writing skills are required; one unit may be in speech.

Four units of mathematics
Acceptable courses include algebra I, geometry, algebra II, pre-calculus/trigonometry/analytic geometry, calculus and math analysis. Courses such as computer math, programming, consumer math and accounting are not acceptable.

Three units of science
At least one must be a laboratory course, such as earth science, biology, chemistry or physics. Courses such as general science and agricultural science are not acceptable.

Three units of social studies
Examples are world history, American government and principles of democracy.

Two units in a single foreign language

One unit in fine arts

If you apply for financial aid, you will learn about scholarships and grants for which you are eligible.

If you are interested in majoring in statistics, think about taking advanced courses in mathematics, statistics or computer programming. Many community colleges offer courses to high school students.

How to Apply

For information about applying to the statistics program, call or write:

Department of Statistics

University of Missouri

146 Middlebush Hall

Columbia, MO 65211-6100

Phone: 573 882-6376

E-mail: bachinfo@stat.missouri.edu

Web: www.stat.missouri.edu

For information about applying to MU, call or write:

Office of Admissions

230 Jesse Hall

Columbia, MO 65211-1300

Phone: 573-882-7786

800-225-6075 (toll free in Missouri and Illinois)

Fax: 573-882-7887

E-mail: mu4u@missouri.edu

Web: www.missouri.edu

The University of Missouri does not discriminate on the basis of race, color, religion, national origin, ancestry, sex, age, disability or status as a disabled veteran or veteran of the Vietnam era. For more information, call Human Resource Services at 573-882-4256 or the U.S. Department of Education, Office of Civil Rights.