



# ACTUARIAL SCIENCE PROGRAM

University of Illinois at Urbana-Champaign



# Actuarial Science Program

The Actuarial Science Program at Illinois is one of the most prominent and largest in the country, with nearly 400 undergraduate majors and more than 50 graduate students. It has been designated a Center of Actuarial Excellence by the Society of Actuaries—one of fewer than 20 programs in the U.S. so recognized.

Numerous companies and individuals support the program's activities. In addition, the energy and dedication of our actuarial science students are revealed in the breadth and number of opportunities for program participation.

- Highly sought after graduates, with more than 30 companies from varied industries coming to campus to recruit
- Partnerships with on-campus insurance research and development centers at the University of Illinois Research Park
- Distinguished program with notable alumni including past presidents of professional organizations and industry leaders
- Comprehensive curriculum on life, property/casualty insurance, and employee benefits
- Center of Actuarial Excellence, highest distinction awarded by the Society of Actuaries
- Casualty Actuarial Society—University Award, inaugural winner
- Distinguished faculty and staff are Fellows of the Society of Actuaries
- Cutting-edge research projects funded by the Society of Actuaries and the Actuarial Foundation



## Why become an actuary

Few jobs can offer all the benefits of being an actuary: high starting salary, great opportunities for career and salary growth, job security, and the ability to make a meaningful impact on people's lives. A degree in actuarial science from the University of Illinois can be your jumping-off point to a satisfying career.

The Actuarial Science Program at Illinois requires our graduates to take courses covering over 80 percent of all the material for each of the first five Society of Actuaries (SOA) exams. These are required courses, not electives, so all of our graduates have a strong technical background. The range of courses taken by our students mirrors an important fact about the actuarial profession: it is one of the most multidisciplinary of careers.

In addition to these foundational mathematics and actuarial courses, our graduates take at least five economics or finance courses to prepare them to see the big picture for the consulting, insurance and financial service industries. These courses are on top of the general education requirements, which allow for exposure to a broad range of topics, including courses in communication and reasoning skills.

## Employment after graduation

Our graduates find employment at consulting firms such as Aon Hewitt, Deloitte, Mercer, Milliman, PwC, and Willis Towers Watson, and at insurance and financial services companies such as AAIS, Aetna, Allstate, Anthem, CNA, Country Financial, Goldman-Sachs, Liberty Mutual, MGIC, Pinnacle, Sears Holdings, and State Farm.

## Innovations and opportunities

We provide students with hands-on, real-world experiences through partnerships with on-campus research and development centers at the University of Illinois Research Park, through case studies in coursework, and through sponsored contests.

For example the State Farm Research and Development Center, located in the University of Illinois Research Park, provides opportunities for many students to participate in team-based real-world projects.

We periodically offer of special classes, such as an Actuarial Capstone Course, which provides students an opportunity to integrate their various classroom experiences in a real world case-study environment.

**"I HAVE WORKED AT RESEARCH PARK FOR SEVEN SEMESTERS AND THE AMOUNT OF DIFFERENT PROJECTS I HAVE SEEN AND COMPLETED HAS MADE ME VERY EXCITED THAT THIS IS WHAT I WILL BE DOING FOR MY CAREER. IT HAS BEEN A GREAT EXPERIENCE CONFIRMING THAT I HAVE MADE THE RIGHT CAREER CHOICE."**

**—LEE DRINKWATER**

## Actuarial Science Club

Many students take advantage of the opportunity to gain leadership experience, develop communication and teamwork skills, and make contacts in the risk and insurance industries by becoming officers and organizers in the Actuarial Science Club (ASC).

This remarkable organization not only creates a sense of community, it brings active learning to a new dimension by involving students directly in the career development and outreach missions of the Actuarial Science Program.

The ASC arranges for company presentations, organizes and coordinates our recruiting events, and sponsors numerous social activities. The ASC also facilitates student mentoring relationships and takes on a variety of other projects—for example, helping to improve financial literacy programs in middle and high schools in Illinois.



**"ASC IS GREAT FOR NETWORKING. WHETHER IT'S MAKING FRIENDS WITH PEOPLE THAT ARE TAKING THE SAME EXAMS AS YOU OR SPEAKING WITH COMPANY REPRESENTATIVES AT PRESENTATIONS, THE CLUB OFFERS STUDENTS THE OPPORTUNITY TO CONNECT WITH PEOPLE PURSUING SIMILAR CAREER PATHS."**

**—KAREN LIU**



## Undergraduate research opportunities

In 2014, our Actuarial Science Program received a grant from the Society of Actuaries to implement a formal program of undergraduate research opportunities in actuarial science. As quantifiers of risks and contingencies, actuaries are regularly confronted with potential and emerging risks, and they must be prepared to adopt—or develop—new techniques for the identification, quantification, and management of risks.

The undergraduate actuarial research program is an opportunity for students to gain experience in the research process and develop skills that will be useful for problem solving and project planning throughout their careers. In a world where risks are continuously emerging and evolving, the research program allows students to gain an appreciation for extending their knowledge and capabilities in order to effectively manage those risks.

The Undergraduate Research Program at Illinois is sponsored by the Society of Actuaries. It is one of only a few such programs in the nation that aims to provide actuarial science undergraduate students with an opportunity to perform and disseminate research, and develop students' skills in research methodology, project management, writing, and presentation.



## Faculty research

Housed in the Department of Mathematics, known for its world-renowned probabilists, the Illinois Actuarial Science Program is a unique place for the coalescence of world-class mathematical education and actuarial research.

Our actuarial faculty members are actively involved in a wide range of research projects, many of which are sponsored by the Society of Actuaries and the Actuarial Foundation.

The actuarial science group also leads the Computational Risk Management Research Lab, which provides a channel for faculty and students to work with practitioners and to explore analytics on emerging technical problems from insurance and financial industries.

# Bachelor of Science in Actuarial Science

## ***Prerequisites and supporting coursework***

Calculus ..... Foundation for later statistics and actuarial mathematics courses  
Computer Science..... Introduction to the practice of programming for solutions to basic problems, with applications to various areas

## ***Core mathematics and actuarial courses***

Theory of Interest..... Overview of the mathematics of compound interest and annuities with applications to finance  
Probability & Statistics ..... Prepares students for the actuarial exam on probability and for further study of actuarial mathematics  
Linear Algebra ..... Emphasizes techniques of linear algebra and introductory and advanced applications to actuarial science, finance and economics  
Methods of Applied Statistics\* ... Systematic, calculus-based coverage of widely used methods of applied statistics  
Life Contingencies ..... Study of the distribution of the time-to-death random variable and its implications for evaluations of insurance and annuity functions, net premiums, and reserves (2 semesters)  
Actuarial Theory:  
Financial Economics..... Models for financial economics  
Actuarial Theory:  
Loss Models ..... Frequency and severity models

## ***Finance and economics***

Corporate Finance\*\* ..... Study of corporate financial management, including how the financial manager's choices add value to shareholder wealth through investment financing and operating decisions (2 semesters)  
Financial Markets..... Theory and applications of financial markets including the foundations of portfolio theory, risk management, and asset valuation

Two additional courses selected from:

- Intermediate Microeconomics<sup>†</sup>
- Intermediate Macroeconomics<sup>†</sup>
- Introduction to Insurance
- Property-Liability Insurance
- Managing Financial Risk for Insurers
- Employee Benefit Plans

*\*meets the requirement for Validation by Educational Experience for Applied Statistics*

*\*\*meets the requirement for Validation by Educational Experience for Corporate Finance*

*†meets the requirement for Validation by Educational Experience for Economics (both courses must be taken)*

## **Master of Science in Applied Mathematics: Actuarial Science**

- Three semester program; courses cover almost all material for Associate-level SOA and CAS exams
- Instructors are full-time professors who are credentialed actuaries
- Fast-tracked education for candidates with no previous actuarial background
- Students with actuarial background can take advanced course work in mathematics, statistics, finance and quantitative risk management
- Core actuarial curriculum in an active learning environment, with integrated computational case studies based on real industry projects

## **Doctor of Philosophy in Mathematics: Concentration in Actuarial Science and Risk Analytics**

- Highly selective program for students with superb quantitative skills intending to pursue research careers in academia or insurance and financial industries
- World-class mathematical education and actuarial research in a broad scientific environment
- Full financial support for up to six years
- Internship opportunities under the nationally renowned NSF-funded Program for Interdisciplinary and Industrial Internships at Illinois (PI4)





College of  
**Liberal Arts & Sciences**  
A T I L L I N O I S

Actuarial Science Program

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