Can statistics keep your online information safer? Can it predict if you’re likely to be readmitted to the hospital after an initial visit?

Yes, according to the research that Klaire Roggeman, a statistics major in the University of Pittsburgh Kenneth P. Dietrich School of Arts and Sciences, has conducted as an undergraduate.

“In general, statistics plays an incredibly important role in research,” says Roggeman. “In any field, statistics allows for significant, valid conclusions to be made and for trustworthy predictions of future trends.”

**Applying Statistics Across Disciplines: From Health Care to Online Security**

Roggeman’s initial exposure to research involved applying statistical analysis to the health care field—a field that she is interested in pursuing professionally. In a data science class taught by Assistant Professor Lucas Menich, Roggeman and a group of classmates were charged with predicting whether an individual would be readmitted to the hospital after an initial visit. The group found a data set online and created a number of statistical models to try to decide which variables were important in prediction and to see how accurately they could predict the readmission rate.

“That’s the beauty of statistics,” says Roggeman. “It can apply to virtually anything you want it to.”

For her next research endeavor, Roggeman focused on forensic applications of statistical analysis during a two-month summer research project through Carnegie Mellon University. Roggeman was one of only 12 students nationwide to be selected for the program.

“The project I was placed on dealt with typing and handwriting,” explains Roggeman. “We had data that consisted of people’s holding and transition times of different keyboard keys (letters, numbers, symbols) while typing a predetermined password. As a four-person group, we created a statistical model using this data that was able to look at a random person’s typing pattern to decipher whether the pattern was typed by a prespecified ‘Person A’ or ‘not Person A.’”

“Research like this could be applied to online password security,” Roggeman continues. “If a Web site’s login page could learn a user’s typing pattern, the site could use this typing pattern as an additional layer of authentication to protect from hackers.”

**Research in Action: Statistical Consulting**

Roggeman’s undergraduate research, though, isn’t limited to hypotheticals. She already has put it into practice in the real world: Last term, she and several other undergraduate interns worked directly with clients from across the University when they needed statistical assistance with their research, a program offered through Professor Allan Sampson’s statistical consulting class.

“The clients we work with come from all different fields—from pharmacy to education to engineering—but all of them need statistics to be able to make any sort of conclusions about what they find,” says Roggeman. “I’m so thankful to have had this opportunity, because it has really shown me how statistics can be applied to any field.”

**Stats’ Surprising Connection to Communication**

One field that Roggeman was surprised to find so closely intertwined with statistics is communication. “Communication is such a huge component of statistics, and the statistics classes I’ve taken have emphasized this,” she says. “Without effective communication skills, statisticians would be unable to share any of the exciting methods, models, and predictions they create.”

Roggeman is completing a five-year combined bachelor’s/master’s degree in statistics.

“I wasn’t entirely sure what I wanted to do when I came to college,” says Roggeman. “It took me until the end of my first year in college to realize what a great field statistics is and that it’s what I wanted to pursue. My academic advisor, Carl Bodenschutz, was incredibly helpful during my transition into the statistics department and in helping me to pursue the combined bachelor’s/master’s program.”

Roggeman says that working with the statistics department has been one of the most rewarding experiences she has had at Pitt, not only because of the support and guidance she has received from the department’s faculty members but also because of all of the opportunities this dynamic department offers. She is particularly excited to be a founding member of DATAs, a new statistics and data science club launching this fall.

“Try out lots of things,” Roggeman encourages her classmates, “but stick to what you are passionate about. Put your time and energy into the things you like.”
As the liberal arts core of the University of Pittsburgh, the Kenneth P. Dietrich School of Arts and Sciences has always been deeply committed to fostering interdisciplinary study, melding the study of the humanities, social sciences, and natural sciences to create a well-rounded and meaningful experience for our students.

That commitment will only grow as we welcome Kathleen Blee, the new Bettye J. and Ralph E. Bailey Dean of the Kenneth P. Dietrich School of Arts and Sciences and the College of General Studies. While Blee officially began her deanship on August 15, 2017, she has been working since she was appointed in April to guarantee that her transition from her prior position as the Dietrich School’s senior associate dean would be smooth and effective.

In her role as dean, Blee intends to foster collaboration among and between departments that ultimately will lead to inventive, compelling research and scholarship and the development of new degree-granting programs.

“The arts and sciences are intellectually interdependent,” says Blee. “Some of the most exhilarating things are happening at the edges of the humanities, the natural sciences, and the social sciences where they bump up against each other. We need to embrace this interdependence and identify zones of intellectual opportunity.

“Many of our students and faculty are already creating these opportunities,” Blee continues. “More than 30 percent of our undergraduates are double and triple majoring, often pairing unexpected disciplines like music and math or biological sciences and religious studies.”

Interdisciplinarity is one of the core values of operating principles Blee has developed for the Dietrich School. Others include creating a welcoming environment, collaboration, communication, promoting diversity and inclusion, responsiveness, strategic decision making, supporting excellence, and transparency.

I look forward to working with Dean Blee and other Dietrich School leaders to expand the opportunities, reach, and impact of interdisciplinary study for our students.

Professor John A. Twining Associate Dean for Undergraduate Studies

To read more about Blee, visit as.pitt.edu/about/kathy-blee.
Before joining the University of Pittsburgh in 2000, Carl Bodenschatz served as deputy department head for operations and was a tenured professor at the U.S. Air Force Academy, where he taught mathematics, statistics, and operations research courses. During his time at the academy, he also served as director of research, statistics division chief, and calculus division chief. In addition, he spent a year as an adjunct professor at Colorado Technical University.

Bodenschatz is director of the Department of Statistics’ undergraduate program and developed the minor in applied statistics, the writing-intensive course for statistics majors, and the joint economics/statistics major.

What motivates you to teach?

“I am motivated by my belief in the essential nature of statistics in nearly every academic discipline and the mathematically beautiful and consistent connections among various probability distributions.”

Please talk about your teaching style.

“Recognizing that students have different learning styles, I try to employ several effective approaches in my teaching. Sometimes the same topic can be illustrated using graphical, numerical, and analytical techniques. I also am a firm believer that students need hands-on practice to thoroughly understand and master statistical techniques. I try to include example problems in class that will find interesting, relevant, and memorable. A zany or fun context to an example can help to keep the students engaged as they apply some complex statistical methods.”

What do you want your students to remember most about your classes?

“I hope they remember that I wanted every student to succeed and that I was fully committed to and invested in their success. I can’t learn the material for them, but I will do all I can to help them understand and be able to apply statistical methods. If they can remember the big picture of statistics, they don’t need to remember the fine details of specific procedures. If necessary, they can dig those out later. Most likely, they will use statistical software to handle the calculations. But they will need to understand which statistical method is appropriate in each situation.”

Why is it important for students to be interested in statistics?

“Statistics is used in the research of virtually every academic discipline. And even nonresearchers need a certain degree of statistical literacy to interpret and understand media reports and be responsible citizens.”

What advice would you give to parents whose undergraduate students may be interested in tackling this major?

“Parents should understand that there are many job titles besides statistician that a statistic major could qualify for, so a thorough job search can take extra effort and creativity. Also, more career opportunities exist for statisticians or analysts with a graduate degree.”

What changes have you seen in the field of statistics and the students who study it since you came to Pitt?

“Like other schools, Pitt has seen an explosive increase in the demand for statistics courses in the past 15 years. This is due (at least partly) to the advances in data science, big data, predictive analytics, and other applications in marketing and finance. Regarding students, we regularly hear about the improving quality of each freshman class; each incoming class is the ‘best ever.’ And the students’ skills using computers and other technology are truly impressive. I am fascinated by the students’ ability to manage their involvement in so many different interests.”

CAREERS IN STATISTICS:
Ranked Top 5 for 2017 and Beyond

This story originally ran on stat.pitt.edu.

Top-rated career websites have identified careers in statistics among the best jobs due to the increased emphasis on data and its multiple uses. Based on evaluating income, growth outlook, stress, and environmental factors, becoming a Statistician with an advanced degree will open many doors.

From CareerCast.com, “One key factor in the profession’s top billing is that employment is expected to jump by 34% in the coming seven years. The extraordinarily high hiring outlook is the result of increased demand in fields that might not otherwise seem like areas for Statisticians.

A Statistician’s skill set can be used to break down and analyze large quantities of data. The demand for these skills spans a variety of industries, including marketing, banking, government, sports, retail, and even healthcare.

Since so many different industries now rely on data interpretation, a second data analysis job made the best jobs of 2017: fifth-ranked Data Scientist.”
Chong, Downs, and Slinskey Legg Win Bellet Awards

The Kenneth P. Dietrich School of Arts and Sciences has selected its 2017 Tina and David Bellet Teaching Excellence Award winners—Lillian T. Chong, Gianni Downs, and Alison Slinskey Legg.

The awards were established in 1998 and endowed in 2008 with a $1.5 million gift from Dietrich School alumnus David Bellet and his wife, Tina, to acknowledge, reward, and encourage teachers. Winners are chosen based on their efforts to advise and mentor undergraduates, communicate subject matter and encourage high standards in the classroom. Pitt faculty and students nominate Dietrich School professors for the award, and the winners are celebrated with an invitation-only dinner and receive a one-time cash prize of $6,000.

A Pitt faculty member since 2006, Lillian T. Chong is an associate professor in the Department of Chemistry. She holds a secondary appointment in Pitt’s Department of Computational and Systems Biology and is the director of an on-campus research lab in the field of computational biophysics. Throughout her time at Pitt, Chong has actively involved undergraduates in her lab’s research, which has resulted in numerous publications in highly respected journals.

Gianni Downs is a lecturer in scenic design and scenic art as well as the director of undergraduate studies within the Department of Theatre Arts. He brings nearly 20 years of theater production experience to the classroom. Alison Slinskey Legg is a director of outreach programs for the Department of Biological Sciences. She develops and oversees a series of University-sponsored efforts to enhance public education throughout Southwestern Pennsylvania.