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MY DIETRICH SCHOOL STORY

Klaire Roggeman: The Beauty of Statistics

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 Mentch, 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 Bodenschatz, 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."

ENGAGING STUDENTS COMPLETELY

The Department of Statistics fully engages students both inside and outside the classroom.

DATAs, the new statistics and data science club, will debut this fall. The group meets Wednesdays at 9 p.m. (location to be determined). E-mail pittdatas@gmail.com to find out more.

Also in the works is a **Stats in Action series,** in which area professionals will visit campus to talk about their jobs, their experiences, and how they use statistics in their careers. This will be a great way to learn about unique and exciting career options and hear firsthand about people's actual career paths.

The Department of Statistics provides a five-year combined bachelor's and master's degree in statistics as well as a Bachelor of Science degree with a statistics and economics joint major.

Faculty in the Department of Statistics work closely with students on undergraduate research projects, help them to prepare for graduate programs, connect students to meaningful career opportunities, and serve as faculty mentors for students completing internships.

Did you know?
Pitt's Department of Statistics is ranked fifth in the country by Great Value Colleges.

Learn more about the Department of Statistics at **stat.pitt.edu.**

MESSAGE FROM THE ASSOCIATE DEAN

Deepening Our Commitment to Interdisciplinary Learning

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 and the Dietrich School's leadership team have 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."

Kathleen Blee

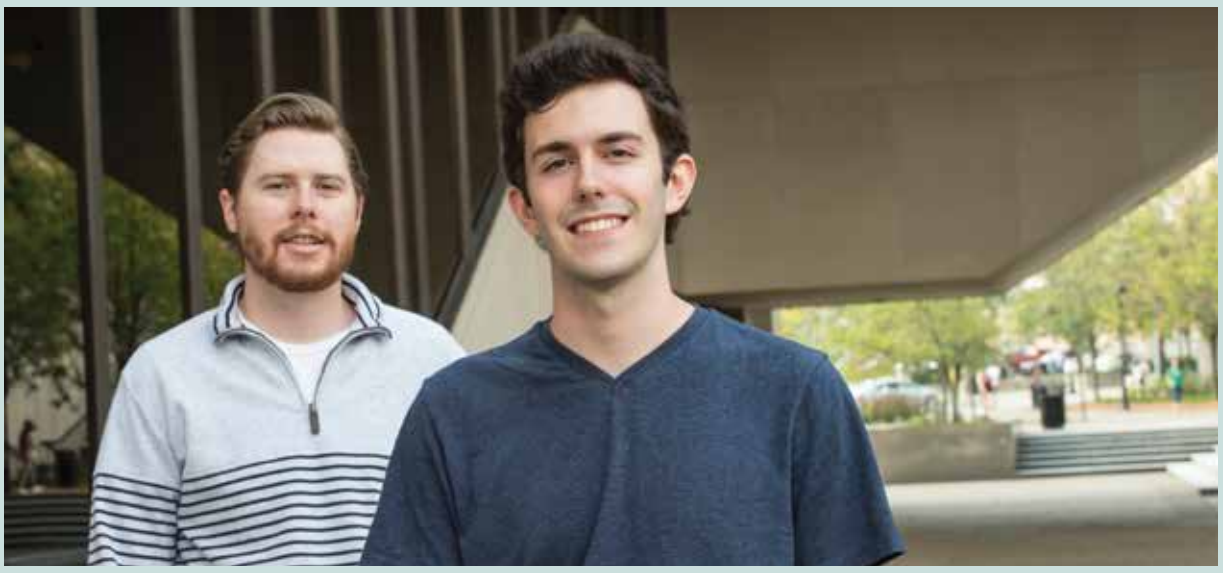
Interdisciplinarity is one of the core values or operating principles Blee has developed for the Dietrich school. Others include creating a welcoming environment, collaboration, communication, promoting diversity and inclusion, responsiveness, strategic decision making, supporting excellence, and transparency.

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. Twyning
Associate Dean for Undergraduate Studies

To read more about Blee, visit **as.pitt.edu/about/kathy-blee.**

Mentoring the Future "Gatekeepers of Science"



Assistant professor Lucas Mentch (left) and student Nicholas Kissel

"As technology progresses, the ability to store and share vast amounts of information is becoming easier and easier," says Lucas Mentch, assistant professor in the University of Pittsburgh Department of Statistics. "Our smartphones, TVs, laptops, and wearable devices (like Apple Watches and Fitbits) are constantly collecting data on us. Throughout the course of a normal day, most of us are providing loads of data to dozens of organizations, typically without knowing or realizing it."

This data collection, according to Mentch, has led to an increased need for statisticians who can process and extract insights from that data. Enter the next generation of statisticians, whom Mentch is deeply committed to teaching by serving as an undergraduate research mentor.

"The undergraduate students I work with are often doing the vast majority of the applied work on research projects," he says. "I guide the process and steer them in the right direction, but they actively engage in discussions with scientists and practitioners, and in most cases, with a little experience, they begin to develop ideas and directions on their own. The data analysis skills possessed by many of our upper-level undergraduates surpass those of the domain scientists we collaborate with, so they are able to make genuine contributions."

In some cases, Mentch invites undergraduates to help with his own research projects. (He's involved in 18 such projects at the University, so there's no shortage of opportunities.)

Other times, students bring ideas for their own independent research projects to him, as was the case with Nicholas Kissel, an undergraduate student pursuing a double major in statistics and applied mathematics.

Kissel first became involved in research because of something he actually did not find. As part of the group project in Mentch's data science class, Kissel and his classmates were unable to find any good predictors of hospital readmissions for diabetes patients. When Kissel came across an article claiming to have found a valid predictor variable later that same year, his curiosity compelled him to reevaluate his initial research.

Kissel reached out to Mentch and together they designed a new research project, this time incorporating more advanced techniques and providing a thorough analysis of which variables might be important for which patients.

"The biggest value for undergraduates, I think, is the experience itself," says Mentch. "The student has a chance to make a real contribution to a project that can potentially have a very real impact. Of course, it's also something that employers and graduate schools look very favorably upon. Being able to demonstrate that you've already
successfully carried out advanced research projects as an undergraduate carries a lot of weight."

While working with Kissel on the hospital readmissions project, Mentch noticed that many of the skills Kissel was developing were similar to those needed to support another research project. That project, a collaboration with Xi Mi, focuses on sports medicine and aims to predict the likelihood of injury among individuals in the U.S. Army Special Forces.

"I enjoy working with undergraduates like Nick," Mentch says. "They're very bright and capable individuals, and with them, you can accomplish a great deal.

"At the end of the day, it's up to us to provide the theory and methods necessary to ensure that scientific conclusions are valid and appropriate," says Mentch. "Doing our part to enforce a high standard is more important than ever in the current age of 'big data,' where more and more interest is being shown in data-based decision making. I see our role as being essentially the gatekeepers of science, and new gatekeepers must be ready for what lies ahead."

An Introduction to Interdisciplinary Learning

Neuroscience and art. Biology and interpersonal communication. English lit and political science.

At first glance, these may not seem like natural pairings. But in the Kenneth P. Dietrich School of Arts and Sciences Academic Communities, first-year students take courses in multiple disciplines grouped around a common theme.

Zoe Au

Renata Mitchell

In The Beautiful Mind community, students examine the intersection of neuroscience and art. They develop their artistic talent in Drawing Studio 1 and study the brain in Brain and Behavior.

In Health Care Communication, students take the first steps toward developing the communication skills they'll need to be successful health care professionals by taking Interpersonal Communication alongside Foundations of Biology 1.

In the Global Studies community, students fulfill their English literature credit with the course Global Fictions while also taking the political science class Introduction to Global Studies.

These thematic blocks of first-year-level courses provide an introduction to the interdisciplinary culture of the Dietrich School. They provide a framework in which students can experience how studying across disciplines provides a more meaningful and valuable perspective and more well-rounded learning.

Zoe Au studied how science fiction in literature and film draws on existing myth and religion in the Gods and Androids Academic Community.

"The classes I took in this community pointed out things I wouldn't have noticed before," she says. "Now I see connections. The myths we studied come up all the time in literature and even in random classes. I see connections everywhere."

Fellow community member Renata Mitchell echoes this sentiment: "What I learned in my Academic Community helped me with the rest of my classes in my first year. The material applied to my other courses, and it all came together for me."

As an added benefit, because these classes are taken with the same small group of students, participants also meet like-minded people right away and start to explore potential majors with peers who share their passions.

"It can be hard to meet people in college," Au says. "This was a great way to meet people who like the same things I do."

Learn more about Academic Communities at **asundergrad.pitt.edu/ac.**

FACULTY PROFILE

A Conversation with Carl Bodenschatz

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 students 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 it is 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 statistics 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."

FYI

Broaden Your Path, Don't Narrow Your Focus

by Cassie Berkey, Dietrich School Peer Advisor

Starting college is exciting—but it also can be overwhelming. It certainly was for me. New Dietrich School students have so many options for courses of study and paths of interest that deciding on one may seem like an impossible task.

Thankfully, in my Dietrich School experience, I realized that I didn't have to decide on just one.

I have interests in a lot of different disciplines that I wanted to experience at a collegiate level: history, science, medicine, philosophy, education, public health, music, and more. As an undergraduate student in the Dietrich School, I have been able to pursue those interests:

- Though my research with traumatic brain injury, I have immersed myself in real-world neuroscience to enhance what I was learning in the classes for my neuroscience major.
- I was able to pursue my passion for American history with a minor, and found a way to connect my interests in public health, medicine, and philosophy via the Certificate in Conceptual Foundations of Medicine.
- Through my internship as a peer advisor, I get to help students at the start of their college journeys. I get more than just a part-time job: I get the satisfaction of watching students grow and learn from my own story.
- The innumerable clubs and organizations at the University of Pittsburgh have given me the opportunity to volunteer; find other students with similar passions; gain invaluable leadership experience; and continue to pursue my love of music in a fun, gratifying, and lighthearted way.

College isn't just about the end goal of graduation; it's about the journey to that point and taking in every experience and opportunity for academic, career, and personal growth that you can. Pursuing my many interests has not only allowed me to experience so much of what Pitt has to offer, it's also opened doors for future possibilities after I leave Pitt and has helped me to grow as a person.

I encourage new students to be open to the opportunities Pitt offers at every level of interest in so many diverse disciplines. Let yourself explore a new passion, whether it's at the level of a major or just joining a student organization. While it may be difficult, I especially encourage parents to support their student by having open and honest dialogues about interests at every level.

The Dietrich School is a phenomenal place to invest in yourself and your future by delving into passions both old and new. Use experiential learning opportunities; campus organizations; and major, minor, and certificate programs to explore all of your passions as you craft your unique Dietrich School story.

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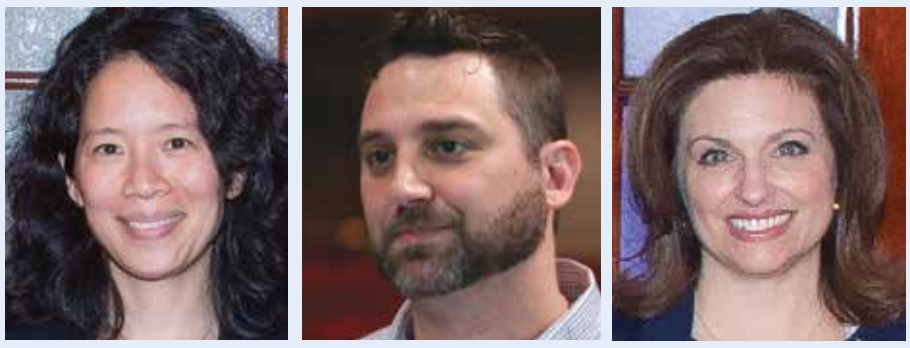
Chong, Downs, and Slinskey Legg Win Bellet Awards

This article is excerpted from the April 5, 2017 issue of the Pitt Chronicle.



From left: Lillian T. Chong, Gianni Downs, and Alison Slinskey Legg

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.

CALENDAR OF EVENTS

NOVEMBER

9	Thursday	Deadline to apply for April 2018 graduation
22–26	Wednesday–Sunday	Thanksgiving recess for students (no classes)
23–24	Thursday–Friday	Thanksgiving recess for faculty and staff (University closed)

DECEMBER

8	Friday	Last day for fall term undergraduate day classes
11–16	Monday–Saturday	Final examination period for undergraduate day classes; evening classes will continue to meet during this period; final examinations should be held during the last scheduled class meeting.
16	Saturday	Fall term ends; official date for degrees awarded in fall term
17	Sunday	Residence halls close
December 17–January 7		
	Sunday–Sunday	Winter recess (no classes)
19	Tuesday	Fall term grades must be approved by instructors
20	Wednesday	Fall term grades available online
December 22–January 1		
	Friday–Monday	Winter recess for faculty and staff

For deadlines and information regarding financial aid, visit **oafa.pitt.edu/financialaid.**

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