GOOGLE'S SEARCH FOR TALENT LEADS TO ORIE
ORIE is an awesome organization, as attested by the content of this newsletter: our alumni lead key efforts at Google; alumnus Howard Morgan and his wife, Eleanor, endow a new faculty position; current and recent students are spotlighted, including three students in the so-called 400 club; Jim Renegar receives a chaired professorship; the M.Eng. program was runner-up for the INFORMS Smith Prize; Jamol Pender received an NSF CAREER award, and much more. It is truly an honor to serve as Director of the School of ORIE!

You can also read about a wonderful alumni event, held at Cornell Tech in New York City, where we learned about some of the innovations that are re-shaping transportation in our world today, through the eyes of faculty members who are leading the charge. It was wonderful to catch up with many of you there. We hope to have similar events in the future that showcase innovations that are changing our world.

ORIE continues to play a key role in data science at Cornell, with this spring seeing the completion of “Data Science for All,” co-taught by ORIE and computer science. This fall, ORIE will introduce a new course on urban mobility. This fall we will also re-introduce the course ORIE 5100, “Design of Manufacturing Systems.” If you already took that class, you may remember that it could be re-branded as “Consulting Bootcamp,” and as such it is an extremely important course in our lineup. I’m delighted it is returning.

Here’s a snapshot of ORIE by the numbers: 28 faculty, including three professors of practice; 13 incoming Ph.D. students; 102 incoming M.Eng. students; 88 seniors, 87 juniors; new babies to ORIE faculty: two this spring, and one coming this fall!

But ORIE is much more than a collection of statistics, even though we are a statistics-driven organization. ORIE is a community of scholars, staff, students, alumni and friends who, together, make a huge positive difference in the world. Do keep in touch, and please let us know if you are ever planning to be back in Ithaca.

Cheers!

Shane Henderson
Director, ORIE
ORIE_Director@cornell.edu
607 255.9126
In Google’s quest for OR talent, Cornell is a top search result. At least a dozen ORIE alumni (at both the undergraduate and graduate levels) have joined the famous technology company in California on its mission “to organize the world’s information and make it universally accessible and useful.”

While the Cornell grads are at work on a variety of Google’s many products—which include cloud computing, advertising, software and hardware—they are heavily concentrated in the Operations Decision Support (ODS) team. “We’ve had great success hiring talent from Cornell,” said Thomas Olavson, director of ODS at Google.

The team of operations researchers and data scientists reports into the “technical infrastructure” (TI) product area, which plans and operates all of the company’s compute, network, and storage assets. Focusing on the physical components that make up Google’s cloud infrastructure in more than a dozen regional data centers around the world, ODS provides model-based decision support for delivering sufficient capacity to its internal customers—products such as YouTube, Apps or Cloud—and their growing number of end users. “That includes optimizing the supply chain of servers and network hardware, forecasting and planning long-term data center capacity, optimizing server-network deployment lifecycles and deployment plans, and maximizing utilization of our compute capacity through oversubscription and statistical forecasting,” Olavson explained. “No one has really managed compute capacity at this scale before. In cloud infrastructure, we’re defining a new field of OR as we go, much like supply chain or revenue management was in the early 90s.”

Within the team, ORIE grads are tackling these challenges from several different angles. Quantitative analyst Kenneth Chong, Ph.D. ’16, for example, specializes in inventory management and projects how many raw materials—such as hard drives, RAMs, and flash drives—to hold at manufacturing hubs in Atlanta, Ga., and Amsterdam, Netherlands, which assemble computers and ship them to data centers. (John Khawam ’00, M.Eng. ’01 also works with Chong, soon to be joined by James Dong, Ph.D. ’18.)

Senior program manager Chris Fry ’94, on the other hand, leads the Resource Efficiency Data Science (REDS) team, to which Juan Li, Ph.D. ’12, contributes as a data scientist. “We provide analytical support to help design a more efficient ‘Google of the future’ that enables our computing resources to be shared as efficiently as possible across the company,” Fry said. The team develops forecasting and capacity planning models, as well as tools and metrics to support the initiatives. “The biggest challenge is to find solutions that are easily scalable across locations and resource types,” Li said.

Her classmate Chao Ding, Ph.D. ’12 started out in ODS and forged deep collaborations with engineering teams.
Google’s employees work hard and play hard. Weici Hu, Ph.D. ’17, takes a break to play ping pong.

around efficiency problems related to the core compute system that underlies Google Cloud. “The system manages the scheduling of software applications onto hardware servers, software applications’ life cycle events, resource consumption and performance,” said Ding, now the data scientist tech lead of the Core Compute Analytics team that eventually grew out of these efforts. (Weici Hu, Ph.D. ’17, recently joined the team, as well.) “We are working to improve efficiency and performance of this core compute system through data analytics, predictive modeling, and system simulation. There is a diverse set of interesting problems to work on, so it’s hard to get bored.”

Ding’s sentiment is echoed by his fellow alumni, who—besides Google’s legendary perks, such as free gourmet meals throughout the day—appreciate the “atmosphere of creativity and challenge” that company founders Larry Page and Sergey Brin envisioned. “We are working on exciting problems that represent the future state of computing at one of the most high-tech companies in the world,” said Fry. “It’s high impact, and it’s fascinating.” Indeed, project impacts on the order of hundreds of millions of dollars are not unusual.

At the same time, the human scale matters. “People at Google really care about users and doing the right thing,” said Edmund Lo, M.Eng. ’12, lead program manager for YouTube Privacy. “The culture here fosters respect and understanding of others from multiple perspectives, which I wholly appreciate.” His colleagues similarly described a diverse workplace in which friendly individuals are passionate about their work and learn from each other.

And so ORIE alumni fit right in. “Cornell is one of the top OR programs, so grads typically have the very high technical caliber of OR, stats, and coding skills needed to pass the interview process for data scientists at Google,” said Olavson. “Also, every Cornell grad I’ve worked with has a genuine curiosity and desire to learn and explore—a great asset for a data scientist or operations researcher. I’ve never met a Cornell grad I didn’t like.”

By Olivia Hall
The Cornell Board of Trustees has elected ORIE Professor Jim Renegar as the Class of 1912 Professor in Engineering.

Renegar joins Jim Dai, Sid Resnick, David Ruppert and David Shmoys as chaired professors in ORIE. Dai is the Leon C. Welch Professor in Engineering, Resnick is the Lee Teng-Hui Professor in Engineering, Ruppert the Andrew Schultz Jr. Professor of Engineering and Shmoys is the Acheson-Lalibe Professor of Business Management and Leadership. Being named a chaired professor is the highest academic honor Cornell bestows.

“Jim is recognized worldwide as a leader in continuous optimization. He is a frequent recipient of teaching awards, and a willing and able contributor to the service roles that enable ORIE to run smoothly,” says Shane Henderson, director of ORIE. “He truly embodies the phrase ‘humble excellence.’ I cannot think of a more deserving awardee for this great honor. Well done, Jim!”

Members of the University’s Class of 1912 established the professorship to celebrate their 50th reunion in 1963. Floyd R. Newman 1912, a Cornell alumnus and petroleum industrialist of Cleveland and Medina, Ohio, was the galvanizing force behind establishing this fund and was joined by two classmates and 50th Reunion Officers — Frederick Krebs and Charles C. Colman — as donors.

Renegar, who currently serves as the associate director for undergraduate studies for the school, has been a member of the ORIE faculty since 1987 and served as director from 2004-09. In his research, Renegar focuses on developing mathematical foundations for a variety of algorithmic issues pertaining to continuous optimization and to the numerical solution of systems of algebraic nonlinear equations. This includes creating new families of algorithms possessing novel properties, as well as deepening our understanding of existing algorithms and modeling techniques.
DIETRICH BRINGS HANDS-ON APPROACH TO ORIE

Brenda Dietrich M.S. '83, Ph.D. '86 appreciates beauty and precision wherever she sees them, especially if they serve a practical purpose. They are what drew Dietrich—the newest addition to the ORIE faculty—to math as an undergraduate at the University of North Carolina and to its applications in OR during graduate school, and they keep her happy outside of work.

“I spend most of my free time on fiber arts—starting with the fleece off of a sheep, cleaning and organizing it and then spinning it into yarn, then dyeing it, and weaving or knitting it into something useful,” she said. “I find it very satisfying.”

True to her title as the Arthur ’59, M.S. ’61 and Helen Geoffrion Professor of Practice, Dietrich is bringing this hands-on approach to her new role in ORIE, informed by a long career at IBM, from which she retired at the end of 2017. “I was always planning to return to academia ‘in a few years,’” she said.

As a few years turned into 33, Dietrich pursued her interests in integer programming, mathematical optimization, resource allocation, and the synergistic use of machine learning and optimization, especially as they apply to physical systems. She did so while taking on many leadership roles at the company, including vice president positions related to data science and business analytics. For more than a decade, Dietrich also headed the Mathematical Sciences Division, where she led a team of 90 researchers through a time of growth and engagement. “We had a significant impact on many aspects of IBM’s business,” she explained.

Asked to highlight other examples of projects she remembers with pride, Dietrich pointed to managing a small, cohesive group that worked on scheduling, inventory planning, and forecasting for IBM manufacturing; leading the writing of a 10-year technology outlook in 1995—at the beginning of mobile phones, the public use of internet, and open source—that was remarkably accurate in its predictions; filing a patent (one of more than a dozen to her name) on “proactive” planning that allowed plans to be monitored and updated as needed at a time when most planning processes still ran on schedules; and, in the 1990s, addressing the so-called “implosion problem,” which determines what can be built with the parts on hand, with software that found use throughout IBM manufacturing, in the company’s consulting practice in Asia, and in addressing staffing questions.

Such varied and deeply grounded practice in the field made Dietrich the department’s “dream candidate,” said ORIE director Shane Henderson. A member of the National Academy of Engineering, as well as an IBM Fellow and INFORMS Fellow, “she has tremendous experience working with industrial partners and on collaborations bridging multiple organizations,” he said. Add to that “a strong practical outlook, a top-notch background in operations research,” and “cheerfulness and an open mind,” and she was a shoo-in for the job.

Now Dietrich is ready to pass on her decades of experience. “My initial focus is on strengthening the connections between the department and industry and expanding the opportunities for graduate students to work on and be exposed to usage of OR in industry,” she said. For example, she plans to create an internship-based course, which will also continue to keep her working on problems posed by companies. “I like applying OR to real problems, and I hope to teach others how to do this,” Dietrich said. “But I also like using real problems as inspiration and motivation for new research.”

The professor’s future studies may combine aspects of machine learning with more classical optimization. She also hopes to explore how users implement the recommendations provided by OR-based applications, based on her observation at IBM that product managers frequently modify engine-generated forecasts before entering them into a sales or inventory planning process. “Why do they do this?”, she asked. “Do they know something that is not captured in the data or the math? Are they right or wrong? And how can what they do, and what actually happens, be captured and used to improve the forecast?”

Henderson, for one, is looking forward to Dietrich’s contributions. “We are delighted to welcome back one of our own,” he said. “As one of our graduates, Brenda has a deep knowledge of ORIE’s past and present, and her career and credentials superbly position her to help shape ORIE’s future.”

By Olivia Hall
Talk about a big day for Jamol Pender. Just hours after his son Jamol Jr. was born, the assistant professor in ORIE was notified that he is a recipient of a National Science Foundation (NSF) Faculty Early Career Development Program (CAREER) award. This five-year grant, one of the NSF’s most prestigious, supports “early-career faculty who have the potential to serve as academic role models in research and education,” according to its description. “I was very much ecstatic when I found out,” said Pender. “It’s certainly an honor.”

Pender joined the Cornell ORIE faculty in 2015, attracted, he says, by the breadth and depth of the department, its strengths in probability and applied probability, and the existing relationships to faculty he had built during his graduate studies at Princeton, from which he received his Ph.D. in operations research and financial engineering in 2013. (He earned his B.S. and M.S. in electrical and systems engineering with a minor in mathematics from the University of Pennsylvania in 2008 and also completed two years of postdoctoral work in Columbia University’s department of industrial engineering and operations research.) In ORIE he is in good company: Several current faculty are prior CAREER award recipients.

Pender’s NSF proposal, “Improving Service Systems through Real-time and Delayed Information,” continues his graduate and postdoctoral work in queuing theory, which has its origins in telecommunication but now finds application in a wide variety of areas, including healthcare, financial systems, and traffic. While his dissertation under advisor William A. Massey focused on developing rigorous approximations for queues with time varying rates, he has since broadened his approach: “I started to do research connecting queuing theory with the information that’s being displayed to the customers or people in line,” he explained.

Take, for example, the George Washington Bridge, crossing the Hudson between New York City and New Jersey. Display message signs tell drivers estimated travel times on the upper and lower levels. When they are unequal, people generally choose the shorter time. But delays in transmitting the information can lead that route to become crowded, eventually shifting the signs and resulting in oscillations in the traffic patterns. “I always do the opposite of what the sign says,” Pender admitted.

Collaborative research with colleagues in mechanical engineering and applied mathematics showed exactly how much of a delay caused oscillations. “Now much of my research is trying to eliminate these oscillations by presenting a different type of information, for example on pollution effects on the road,” Pender said. For the mathematical angle, he is also collaborating with colleagues in other departments such as civil engineering and is pleased with how well Cornell has lived up to its reputation for interdisciplinary research. “I would never have thought I’d be working with people in mechanical engineering or civil engineering prior to getting here,” he said.

ORIE director Shane Henderson sees great promise in Pender’s efforts. “Jamol’s proposed work is extremely important to our modern economy, in which sharing systems enabled through information technology play a larger and larger role,” he said. “We in ORIE believe he is a scholar of first order who is uniquely positioned to tackle these important problems, and this award is evidence that the National Science Foundation agrees with us.”

Much of the $500,000 grant will go toward funding Ph.D. students, in addition to paying for sponsorships for undergraduates to attend a conference, student summer jobs, and invitations for guest speakers to Pender’s classes. Reaching beyond Cornell, Pender also plans to help educate and recruit future graduate students by giving lectures on queueing theory and OR more generally at historically black colleges and universities (HBCUs). Most HBCUs do not possess an OR department, thus Pender is using some of the award to provide exposure to OR for HBCU students.

“It is wonderful to see this recognition of Jamol’s many skills, given that he has already won awards for his teaching and advising,” said Henderson. “Talk about your all-rounder—he’s a jack-of-all-trades, and a master of them all.”

By Olivia Hall
Cornell’s ORIE M.Eng. programs in Ithaca and New York City recently came in second in a national competition hosted by the Institute for Operations Research and the Management Sciences (INFORMS). The competition for the 2018 UPS George D. Smith Prize came down to two finalists—the ORIE M.Eng. programs and the M.S. program in Business Analytics at the Haslam College of Business at the University of Tennessee.

The Smith Prize has been awarded by INFORMS each year since 2011 for “effective and innovative preparation of students to be good practitioners of operations research, management science, or analytics.” The prize is named for George D. Smith, who was the chief executive officer of United Parcel Service (UPS) and a strong believer in the power of operations research practitioners to get maximum efficiency out of complex operations.

Kathryn Caggiano, ORIE Professor of Practice and Director of the M.Eng. program on the Ithaca campus, led Cornell’s efforts in the competition, assisted by former M.Eng. Director Mark Eisner. “Cornell’s School of Operations Research and Information Engineering has been committed for over 50 years to graduating students who are ready and able to step into a professional role,” says Caggiano. “Our M.Eng. programs in Ithaca and New York City have kept pace with the demands of industry in an age of big, messy data, and it was a real honor to be considered for the Smith Prize in recognition of the quality of our programs.”

The competition itself is a multi-part process, with schools first submitting an extensive application packet in the fall. Based on these packets, finalists are chosen to move on to the next round. The finalists then have roughly two months to put together a 45-minute presentation that is delivered before a team of INFORMS judges at the annual INFORMS Business Analytics Conference.

This year, that conference took place in Baltimore, Maryland on April 15-17. Caggiano, Cornell Tech associate professor Itai Gurvich, Mark Eisner and several other team members made their way to Baltimore, where they took the stage and told the judges the Cornell ORIE M.Eng. story.

The story included overviews of the two programs, personal histories from current students Vidita Gawade (Ithaca) and Eli Levin (Cornell Tech), and alumna Erika Hoppner ‘13, M.Eng. ’14, recorded interviews with corporate project sponsors from Home Depot, the Hospital for Special Surgery, Pitney Bowes, EY, and E&J Gallo, and video testimonials from Dean Lance Collins and ORIE Director Shane Henderson that emphasized the unique and innovative aspects of the Cornell ORIE M.Eng. programs.

Everyone at Cornell involved in the Smith Prize presentation got the chance to step back and take a look at the entire ORIE M.Eng. program and see how truly innovative, engaging, and impactful it is. An Ithaca production company, WellSaid Media, helped create three short videos that were part of the Cornell team’s final presentation before the judges.

“The fact that so many of our corporate sponsors were willing and eager to praise the value of the programs and the practitioners we produce really says a lot,” says Caggiano. “Many of our alumni are hired by these same companies and go on to have a real impact right away. Although we did not win the Smith Prize this year, it was gratifying to see that everyone involved genuinely embraced our message and validated our position as one of the best programs in the country.”

By Chris Dawson
In spring 1997, Cornell’s Department of Athletics and Physical Education began a program called the 400 Club to recognize the best and brightest among the student-athletes. The club honors those who achieved a perfect 4.0 grade point average during the previous semester with a special breakfast.

Considering the time commitment required to compete among the best in the nation, on top of the demanding academic schedule faced by all Cornell students, it’s particularly impressive to see many of Cornell’s student-athletes not only competing at a high level, but also performing exceptionally well in the classroom.

This spring, three ORIE students—Vincent Declercq, Jack Nicoletti and Tim Willittes—were honored at the breakfast for students achieving a 4.0 grade point average during the fall 2017 semester.

Vincent Declercq is a senior on the men’s swimming and diving team. A native of Dendermonde, Belgium, he came to Cornell to pursue excellence both in the classroom and in the pool. His collegiate athletic career came to a close at the Ivy League championships in February, where he placed 12th in the 200 butterfly, 13th in the 100 butterfly, 16th in the 200 individual medley and was a member of the fourth-place 400 medley relay team. Outside of the classroom and athletics, Vincent has been engaged in Greek life and the international student community.

Jack Nicoletti is a sophomore in the College of Engineering double majoring in operations research and chemical engineering. Outside of the classroom, he is a member of Sparkstone Analytics (an algorithmic stock trading club) and the treasurer and philanthropy chair for his fraternity. A native of Barrington, Ill., he is also a member of a research group in the chemical engineering department focused on supply chain optimization for chemical processes. As a member of Cornell’s sprint football team, Jack was named second-team All-CSFL after catching a team-best 27 passes for 306 yards and one touchdown. In his free time, Nicoletti enjoys watching sports, playing sports, and exploring the scenic parks around Cornell’s campus.

Tim Willittes is a senior in the School of Operations Research and Information Engineering with a minor in business. In addition to his work in the classroom, Tim is a starting pitcher on the Cornell varsity baseball team and volunteers his time in multiple organizations within the athletic and engineering communities. On the diamond, the Scottsdale, Ariz., native buoyed the Big Red’s starting rotation with a 4-4 record and 5.56 earned run average while leading team in starts (11), victories (four), strikeouts (54) and quality starts (six). He has done medical research at the Perelman School of Medicine at the University of Pennsylvania, where he performed analysis on data from a previously conducted clinical trial to gain a deeper understanding of coping mechanisms in patients with knee osteoarthritis, and their relationship to benefit from exercise physical therapy treatment. After graduation, Willittes will join Johnson & Johnson as an ITLDP associate analyst.
CFEM students win portfolio construction case competition

A team of Cornell students, including two from ORIE’s master’s in financial engineering (MFE) program, won the Parker Center for Investment Research’s Investment Portfolio Case Competition, jointly organized with Cornell Financial Engineering Manhattan (CFEM).

CFEM students Zhaosu Cai and Tian Yuan Liu teamed with Kyle Horne and Lindsey Staley of the SC Johnson College of Business master’s in business administration program to claim first place in the competition at Cornell Tech earlier this month.

A total of 10 teams from a variety of MBA and MFE programs turned out for the event. Student teams were tasked with proposing a custom defined contribution plan. A panel of judges from J.P. Morgan, Alliance Bernstein, Dimensional Fund Advisors, and TIAA listened to all presentations, and then selected four teams for the final round. All presenters were given limited time for their presentation, after which time the judges posed a broad range of questions to the teams.

Cornell sent two teams to the competition, both comprising of two first-year MFE and two MBA students.

In addition to competing in the case competition, these students enjoyed networking with professionals in asset management and having coffee chats with hiring managers.

“It was great to see Cornell students in action, tackling a very relevant and realistic problem that pension funds face today,” says Victoria Averbukh Ph.D. ’97, director of CFEM. “I am very proud of both Cornell teams as I believe they have offered creative and, potentially, robust solutions to a true investment challenge. This case competition is only one example of many opportunities offered to Cornell MFEs to learn from finance practitioners and showcase their skills to a variety of recruiters.”

Second place went to an MBA team from the University of Chicago’s Booth School of Business, while another team from Cornell claimed third place. New York University’s Stern School of Business took fourth place.

In addition to Cornell, Boston College, Columbia, New York University, the University of Chicago and Yale also had teams entered in the competition.

This is the second year a portfolio construction case competition has been offered by the Parker Center for Investment Research. A team of four CFEM students won the 2017 competition.

Big Data Finance Conference @ CFEM

For the second year in a row, CFEM co-sponsored and co-organized the Big Data Finance Conference that took place on Friday, May 11, 2018. With our continued commitment to incorporating financial data science into the CFEM curriculum, it was wonderful to see our alumni among some of the most innovative minds in the field. Thank you to everyone who participated, and we look forward to an even bigger turnout at next year’s BDF!

We’ve moved!

Earlier this year, the Cornell Financial Engineering Manhattan staff moved its offices off of 55 Broad Street. We’re now located at Cornell Tech. You can reach us at:

CFEM
Cornell Tech
2 West Loop Road
New York, NY 10044
718.578.9934
For those who once felt like dinosaurs in operations research, the resurgence in competitive taxi and bike-sharing apps has opened up a new frontier in competitive business.

That was the consensus April 21 when three transportation titans with ties to Cornell detailed their excitement and predictions for the rapidly changing transit industry.

During a panel discussion on “Transports of Delight: Cornell Drives Innovation in Shared Transportation” at Cornell Tech’s Roosevelt Island campus, professors who work part time for ride-share and bike-share companies wowed more than 100 students with statistics on peak use and growth trends in an industry that also is reducing the world’s carbon footprint.

Jay Walder, CEO of Motivate and former chairman of the Metropolitan Transportation Agency, pointed out that 600 miles of subways were constructed in New York City from 1904 to 1939. Only three new miles of subways have been built there in the past 50 years, he said.

Peter Frazier, associate professor in Cornell’s School of Operations Research and Information Engineering, who also works part time for Uber, said, “Ride sharing is only continuing to grow.”

Engineering studies and statistics are important to figuring out rider patterns and peak efficiencies according to Frazier and Garrett Van Ryzin, professor of operations, technology and information management at Cornell Tech and a part-time employee at Lyft. (Lyft was founded by Cornell graduate John Zimmer ’06.)

Frazier and Van Ryzin said there are emerging trends in monitoring ride-sharing, such as back-to-back trips and trip swaps that reduce ride-share travel times and make business more profitable. An estimated 6.2 million gallons of fuel can be saved by maximizing ride shortcuts, it was reported, but the savings relies on traditional operations research methodology.

“It’s a wonderful time to be doing the kind of work we do,” Frazier said. “Cornell Operations Research and Information Engineering is playing a big role in solving these problems. I am really proud of all the work Cornell folks have done at Uber.”

Van Ryzin, who joined Cornell Tech in July 2017, said, “This is a golden age for OR (operations research) people. ... There’s a huge demand.”

Addressing an entirely separate—but also environmental friendly—mode of transportation was David Shmoys, the Acheson/Laibe Professor of Business Management and Leadership Studies.

Shmoys said New York’s Citibike ride share program averages more than 2 million rides in a good month. Ridership has risen from 10 million in 2015 to 14 million in 2016 to 17 million rides last year, Shmoys said. New Yorkers share about 12,000 bikes at 700 storage stations.

The largest challenge, Shmoys said, has been making sure the stations have an adequate number of bikes at peak use times — and that stations don’t run out of stalls at peak drop-off times. (The reshuffling of bikes using trucks is a costly component of the program.)

“It’s really, really wonderful to ride these bikes,” said Walder, who founded his own bike-sharing company and is now leading progress in incorporating electric bicycles.

One glitch identified by the Cornell researchers comes when independent drivers chose to work for both Uber and Lyft. Not only does this mess with car availability (the driver may shut his/her cellphone off while working for one of the companies), but it can cut into estimated pickup times and the efficiency of shared rides, inevitably fouling up OR statistics.

By Jon Craig ’80
UNDERSTANDING THE IMPORTANCE OF THE HUMAN ELEMENT IN DECISION MAKING

Angela Zhou is a doctoral student at Cornell’s School of Operations Research and Information Engineering (ORIE). She is based in New York City and works with her advisor, Assistant Professor Nathan Kallus, at the Cornell Tech campus on Roosevelt Island. Before studying at Cornell, Zhou earned her B.S.E. in operations research and financial engineering from Princeton University.

“In high school I was interested in a lot of subjects,” says Zhou. “I liked physics; I liked math; I liked anthropology.” Zhou attended a pre-engineering-themed high school and continued to read widely across the mathematical and social sciences. “Before I went to college I thought I was interested in physics and economics,” says Zhou. “As fields, they have very different ways of modeling and representing the world.”

Once Zhou got to Princeton she chose to major in operations research and financial engineering, thinking that it would be the closest approximation to applied math. She realized that operations research had long been studying how to model the world and capture insights from the complexities of real life. While studying at Princeton Zhou had several internships that showed her the broad relevance of these mathematical tools, from data science research to the tech industry.

When it came time to choose a graduate school, Cornell’s OR program was an excellent fit for Zhou. “My undergrad senior thesis was really inspired by work done by Cornell researchers,” says Zhou, “so I was familiar with the quality of their work. And when I looked at the Ph.D. program I appreciated the department’s blend of theory and impactful practice.”

Zhou’s work with Kallus is most immediately focused on supporting better decision-making from observed data, in view of applications in healthcare and policy, using ideas from causal inference, machine learning, and optimization. But, in the end, Zhou says she wants to make tools that will allow users from many domains to leverage their data. “I’m working on the evidence-based methodology used by practitioners from a variety of fields, and hoping to enhance its expressiveness and reliability to support better data-driven decisions. In the tech industry, we call it A/B testing; clinical trials in medicine and field experiments in the social sciences. In all of these areas, it can be expensive to run new experiments and thus we need to leverage observational data” says Zhou. “One of the reasons I was drawn to work with Nathan Kallus is my respect for some of his previous work on the opportunities and subtleties at the interface between data and decision-making.”

Zhou understands the importance of the human element in any decision-making tool she creates. “Behavioral economics reminds us that we need to consider how humans actually act on information, especially since they have richer contextual information, when we think about how decisions are made in reality.” says Zhou. Zhou hopes that data-driven decision-making can empower practitioners and researchers to identify valuable insights from domain-specific data.
Prior to graduating with her B.S. in ORIE in May, Wenjia You packed a lot into her four years on the East Hill.

In addition to being named to the dean’s list every semester, she was selected to participate in the McKinsey 2016 Undergraduate Women’s Summit and Oliver Wyman 2016 Women’s Leadership Series. You, who also minored in both history of art and mathematics at Cornell, placed second in the 2015 Consulting NOW Case Competition.

While studying abroad in Rome during the spring semester of 2017, Wenjia worked as a research and curatorial assistant at the American Academy in Rome. Her work involved digitalizing the archaeological study collection and curating a Kurdish cultural preservation exhibition. She also conducted site visits and research on four museums in Rome, Naples and Athens to discuss the use of augmented reality and virtual reality in exhibitions.

A teaching assistant in BEE 1510 and ENGRD 2700, You taught weekly discussions in ENGRD 2700 and was the Class 2018 Programming Chair at University Class Councils. She served as vice president of marketing and membership for the Cornell Society for Women in Business (SWIB).

Originally from Nanjing, Jiangsu in China, Wenjia was an investment banking summer analyst for Bank of America Merrill Lynch in 2016 and followed that up at Deloitte Consulting LLP as a business technology summer scholar in 2017.

You has joined Deloitte’s New York City office as a management consulting analyst, where she’ll help clients shape strategy and improve performance based on data analytics and management. Her long-term plan includes using a consulting background and diversity program experiences to help non-governmental organizations run effective marketing campaigns and improve organizational efficiency.
Howard Morgan, Ph.D. ’68, and his wife, Eleanor, have made a generous contribution to Cornell Engineering, endowing the Eleanor and Howard Morgan Professorship in the School of Operations Research and Information Engineering (ORIE).

The gift will enable the appointment or retention of a distinguished faculty member, helping to raise the research profile of the school, according to Shane Henderson, director of ORIE.

“Such faculty stars also help greatly in attracting the best and brightest graduate and undergraduate students to Cornell,” said Henderson.

The faculty member will be based on the Ithaca campus, but will have connections to Cornell Tech in New York City, where ORIE offers one of its master’s degrees, among other activities.

Henderson noted the Morgans’ previous support of the school, calling them “tremendous friends of ORIE.” The couple endowed a doctoral fellowship that has supported numerous students and helped to strengthen ORIE’s Ph.D. program. Howard has also given talks on campus and met with students to share his knowledge of turning ideas into companies.

“Howard is an enormously popular speaker in our Engineering Enterprise Colloquium. Rarely do we get so many student questions as when he speaks,” said Henderson. “And now the Morgans are helping us appoint star faculty. We are extremely grateful.”

By Syl Kacapyr
**GIVING OPPORTUNITIES IN ORIE**

**Named Professorships in Data Science**
Data science is an area of tremendous growth at Cornell and, indeed, worldwide. Research in machine learning and data mining is opening up new application domains and changing the face of our economy. Autonomous vehicles are the most prominent examples of the revolution under way, but there are many other initiatives. ORIE faculty are playing a key role in this revolution, with expertise in Bayesian machine learning and optimization being key strengths. We could bring additional experts to Cornell, helping to strengthen Cornell’s leading presence in this sphere.

$5 million endowment

**Integrating Practical Research Experience in Data-Driven Decision-Making for Undergraduates**
Endow a Professor of Practice focused on building, sustaining, coordinating, and advising a pool of data-driven analytic and decision-making projects suitable for undergraduate teams to dramatically expand the availability of such projects to ORIE majors.

$3 million endowment to fund professorship (of practice)
$1 million to fund renovation for computation lab for collaboration

**Enhancing the Graduate Experience**
- **Ph.D. Fellowships/Awards**
  - Endowed $1.5 million minimum
  - Term (5-year current use award) $300,000
  - Graduate “Award” $100,000 minimum
- **M.Eng. Fellowships/Awards**
  Since 1964, undergraduate students matriculating in the College of Engineering do not receive an engineering degree. Upon graduation, they receive a B.S. degree. The college initiated the M.Eng. program in 1964; this program gives a student an engineering degree. At the time, the faculty felt that the four-year undergraduate program did not adequately prepare a student to be an engineer. The desire was to have a substantial portion of the graduating students enter the M.Eng. program. Why? The M.Eng. experience provides an extended hands-on project team experience that gives tremendous value beyond an undergraduate program. Over time, the fraction of graduating students entering the M.Eng. program has dropped considerably. A reason for this decline, based on many conversations with students, is the program’s cost. Making the M.Eng. program affordable for our undergraduates would strengthen the education of those students, while also bolstering the quality of our M.Eng. graduates. We want to offer 10 full tuition scholarships and a like number of ½ tuition scholarships to graduating ORIE Cornell students.

$500,000 minimum endowment
$25,000 to support for one year

**Data-Driven Decision-Making Workshops**
For the past three years, a key element of the intellectual landscape for both faculty and doctoral students has been a 1½-day workshop in the fall to which we invite a dozen leading young scholars (within two years +/- of finishing their Ph.D.s) to present current research in data-driven decision-making. This serves an important role in faculty recruiting, performs an invaluable function in educating our own doctoral students (who also present posters of their own research), and has become one of the high-visibility ways for a “rising star” to show that he or she is a “hot ticket” in the academic recruiting track.

$500,000 minimum endowment
$25,000 to support for one year

**Community Building**
The doctoral student lounge is a naming opportunity (for a $250,000 minimum) and there is a need to support the series of faculty/student lunches with Ph.D. students ($10,000 per year).

**General Gifts**
We are grateful for any gifts you provide to support school initiatives.

**How to Give**
If you are interested in learning more about any of these giving opportunities, please contact Tony Simione, Office of Alumni Affairs and Development, Cornell Engineering, at ams637@cornell.edu or 607.255.1288.
WELCOME BACK ALUMNI  
CORNELL REUNION JUNE 7-10, 2018

Join us at the ORIE Reunion Breakfast  
Saturday, June 9, 2018  
8:30-10:00 a.m.  
Weiss Lounge—411 Rhodes Hall  
Come reconnect with classmates, fellow alumni and faculty.