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A big day for ORIE's Pender



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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 grant 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."

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