Columbia Engineer Wins Presidential Award for Scientists

An operations researcher who develops simulation algorithms to maximize the efficiency of hospitals, among other applications, has received a 2016 Presidential Early Career Award for Scientists and Engineers (https://www.whitehouse.gov/the-press-office/2016/02/18/president-obama-honors-extraordinary-early-career-scientists) .

Antonius “Ton” Dieker (http://ieor.columbia.edu/Antonius-dieker) , an associate professor in Columbia’s Department of Industrial Engineering and Operations Research (IEOR) and a member of the Data Science Institute (http://datascience.columbia.edu) , will receive the award in a ceremony at the White House later this year. The award is the highest honor the U.S. government gives to young scientists and engineers.

—Photo by Timothy Lee Photographers

“Ton is not afraid of working on some of the hardest problems in applied probability," said operations researcher Garud Iyengar (http://ieor.columbia.edu/garud-n-iyengar) , chair of the IEOR department and a member of the Data Science Institute. “He has recently shown that optimal routing and scheduling of data packets in large communication networks can be achieved with local information decision rules only. This is significant as the size of networks continue to grow.”

The National Science Foundation nominated Dieker for outstanding research on the stochastic, or unpredictable, behavior of engineered and physical systems, as well as his teaching, which includes an innovative computer game he developed for learning statistics.

Dieker is an expert in random processes and computer simulation algorithms, tools that allow researchers to run a model and predict future events. Such tools are useful to regulators in predicting how well banks respond to financial shocks, to scientists in predicting future climate under various carbon-emissions rates, and to engineers in predicting how factory layouts will boost performance.

He is currently focused on finding ways to make simulation algorithms faster and more accurate. In a recent paper (http://arxiv.org/abs/1406.5624) in the journal *Extremes*, he and a colleague used techniques from probability theory to develop a simulation algorithm that predicts extreme rainfall better than previous algorithms.

An interest in math and solving real world problems led Dieker to study operations research in his native Netherlands. His master's thesis, in 2002, compared the output of all available simulation algorithms of fractional Brownian motion, a type of model that takes into account long-range dependencies. It continues to be a standard reference. For his PhD, he studied the modeling, estimation, and simulation of rare events.

Dieker joined Columbia Engineering in July 2014 from Georgia Tech, where he applied resource allocation theory to elections planning in a county near Atlanta and developed a computer game, Theme Park, which gives students the chance to explore statistics and probability theory while making capacity decisions.

Previous honors include the Erlang Prize from the Applied Probability Society of the Institute for Operations Research and the Management Sciences (INFORMS), an IBM faculty award, and an NSF CAREER award.

Previous Columbia Engineering professors to receive the award include Jose Blanchet (http://ieor.columbia.edu/jose-blanchet), professor of industrial engineering and operations research, and Xi Chen (http://eee.columbia.edu/xi-chen), associate professor of earth and environmental engineering.

—by Kim Martineau

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