UC SANTA BARBARA
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Ahead of the Curve

In chronic kidney disease (CKD), the kidneys lose their function progressively over time. At the condition's advanced stage — end stage renal disease — patients must receive a kidney transplant, or undergo dialysis. Those on dialysis often suffer from multiple comorbidities including diabetes and cardiovascular disease, and their mortalities and hospitalization rates are much higher than those of the general population.

Currently, more than 26 million American adults suffer from CKD.

UC Santa Barbara professor Yuedong Wang and his team work on statistical and computational methods for exploring the large amount of CKD and dialysis data to gain insights into the patient's biology and advance personalized medicine.

"It is very gratifying to see some of our research has been implemented in clinics to improve the care for dialysis patients," said Wang, a faculty member in the Department of Statistics and Applied Probability (PSTAT) and a founding member of the MONitoring Dialysis Outcomes (MONDO) Initiative, which collects, merges and analyzes data from dialysis providers around the world.

For his "contributions to non-parametric regression and computational statistics, in particular smoothing spline methodology for dependent observation and applications to bioinformatics and biomedical modeling," Wang has been elected a fellow of the 2019 Class of Institute of Mathematical Statistics (IMS). He joins UC Santa Barbara professors and fellow PSTAT faculty members Jean-Pierre Fouque and S. Rao

Jammalamadaka as the department's third IMS fellow.

"I am deeply honored to have been elected as an IMS fellow," Wang said. "I am grateful for the support of my colleagues and UCSB."

Among Wang's most significant work is his effort in the area of spline-smoothing, a technique for interpreting large, often "noisy" sets of data to capture the larger trend. Originating as a shipbuilder's tool for making hydrodynamic hulls, a spline serves as a guide for bending material in an efficient, smooth curve between two fixed points. Similarly, in the world of computational statistics, a spline is an estimation within an array of points that fits the data with minimal fluctuations, often the smoother the better. It can be used in a variety of applications to estimate trends in large data sets over time such as in economics, demography and biomedicine.

"Professor Wang is very deserving of this honor, as his research uses innovative methods with real-world applications," said Pierre Wiltzius, dean of mathematical, life and physical sciences. "His work is particularly impressive for its state-of-the-art statistical tools to analyze large biomedical data sets, ultimately helping us improve healthcare delivery. I congratulate him on this tremendous accomplishment."

Wang has made contributions to statistical methodology, theory, computation, software and applications. He has worked a broad range of areas including nonparametric and semi-parametric methods, machine learning, big data and biomedical applications. A member of the Department of Statistics and Applied Probability since 1997, Wang is the author of over 122 papers and six book chapters. He has written four software packages on the theory and practice of computational statistics, and on biomedical topics such as hormone-driven conditions, including circadian rhythms, diabetes and endometriosis, as well as on genomics and stuttering. He is also the author of "Smoothing Splines: Methods and Applications" (CRC Press, 2011).

Wang and the 24 other new 2019 IMS Fellows will be presented at the IMS Presidential Address and Awards Session at the Joint Statistical Meeting on Monday, July 29.

About UC Santa Barbara

The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.