

Illustrating the Impact of the Mathematical Sciences

Committee

Tamara Kolda

Chair

Tamara Kolda is an independent mathematical consultant under the auspices of her company MathSci.ai based in California and was previously a Distinguished Member of the Technical Staff at Sandia National Laboratories in Livermore, California. She specializes in mathematical algorithms and computation methods for tensor decompositions, tensor eigenvalues, graph algorithms, randomized algorithms, machine learning, network science, numerical optimization, and distributed and parallel computing. She is an elected Member of the National Academy of Engineering (NAE), a Fellow of the Society for Industrial and Applied Mathematics (SIAM), and a Fellow of the Association for Computing Machinery (ACM). She is the founding Editor-in-Chief for the SIAM Journal on the Mathematics of Data Science. She is a member of the National Academies Board of Mathematics Sciences and Analytics.

Russel E. Caflisch

Member

Russel E. Caflisch is director of the Courant Institute at New York University (NYU) and a professor in the Mathematics Department. He received his bachelor's degree from Michigan State University, and he earned a master's degree and Ph.D. in mathematics from the Courant Institute of Mathematical Sciences at NYU. Professor Caflisch's expertise includes topics in the field of applied mathematics, including partial differential equations, fluid dynamics, plasma physics, materials science, Monte Carlo methods, and computational finance. He was named a fellow of SIAM in 2009, the American Academy of Arts and Sciences in 2012, and the American Mathematical Society in 2013. He was elected a member of the National Academy of Sciences in April 2019.

Irene Fonseca

Member

Irene Fonseca is the Kavcic-Moura University Professor of Mathematics and the director of the Center for Nonlinear Analysis at Carnegie Mellon University. An internationally respected educator and researcher in applied mathematics, Fonseca was bestowed a knighthood in the Military Order of St. James (Grande Oficial da Ordem Militar de Santiago da Espada) by the then-President of Portugal, Jorge Sampaio, in 1997. For her teaching and research contributions to Carnegie Mellon University, Fonseca was honored with the Mellon College of Science endowed chair in 2003 and named a University Professor in 2014. In 2012 she was elected president of the Society for Industrial and Applied Mathematics, one of the largest organizations dedicated to mathematics and computational science in the world. She is a Fellow of the American Mathematical Society (AMS), a Fellow of the Society for Industrial and Applied Mathematics (SIAM), and a Fellow of the European Academy of Sciences. She serves in over 20 Editorial Boards, including *Advances in Calculus of Variations*, *Archive for Rational Mechanics and Analysis*, *CAMS (Communications of the AMS)*, *Journal of Nonlinear Science*, *M3AS*, and *SIAM Journal on Mathematical Analysis*. She is a member of several advisory and scientific boards of research centers and institutes, she participates in international prize committees, and is in review and evaluation panels of multiple universities in the US and abroad. Fonseca's research program sits at the interface between pure and applied analysis and is motivated by applications in the physical sciences and engineering. Her recent work is focused on variational techniques as they apply to contemporary problems in materials sciences and computer vision, including the mathematical study of shape memory alloys, ferroelectric and magnetic materials, composites, thin structures, phase transitions, epitaxy, image segmentation, staircasing, and recolorization in computer vision.

Montserrat Fuentes

Member

Montserrat "Montse" Fuentes began her tenure as the 24th President of St. Edward's University on July 1, 2021. Dr. Fuentes also holds an appointment as Professor of Mathematics in the School of Natural Sciences. Prior to this appointment, she joined the University of Iowa as executive vice president and provost and professor of Statistics and Actuarial Science in the College of the Liberal Arts and Sciences and professor of Biostatistics in the College of Public Health. Dr. Fuentes brings to St. Edward's University a rich history of academic and administrative leadership in higher education. She is a first-generation college student and received a dual bachelor's degree in mathematics and music (piano performance) from the University of Valladolid in Spain and a Ph.D. in statistics from the University of Chicago. She has also served as director of the Network on Statistical Methods in Atmospheric and Oceanic Sciences, a National Science Foundation (NSF)-funded center to promote multi-institutional and interdisciplinary research training at the interface of statistics and atmospheric and oceanic sciences, with 200 members and 21 affiliated institutions. In her leadership roles, she has promoted a transformative educational experience, focusing on enhancing student success and promoting experiential learning with an unwavering commitment to diversity, inclusion and inclusive excellence. She has also established innovative programs and partnerships, sought fiscal sustainability and built a culture of appreciation and success.

Ryan Garibaldi

Member

Ryan (Skip) Garibaldi is director of the Institute for Defense Analyses' Center for Communications Research (CCR) in La Jolla, California, where he leads a team of mathematicians and computer scientists in fundamental research. He is known for his academic work on algebraic groups, including exceptional groups such as E8, and on cohomological invariants. He is also known for his joint work with other mathematicians and investigative reporters on extremely rare phenomena, which, coupled with publicly available data, led to the exposure of criminals using state lotteries as part of the schemes, arrests, and changes in state policy. Dr. Garibaldi's previous positions include associate director of the Institute for Pure and Applied Mathematics at the University of California, Los Angeles, and Winship Distinguished Research Professor of Mathematics at Emory University. He has been a member of the Air Force Scientific Advisory Board and the Defense Science Study Group. Dr. Garibaldi received his Ph.D. in mathematics from the University of California, San Diego, and bachelors' degrees in computer science and in mathematics from Purdue University. His work has been recognized with the Lester R. Ford Award from the Mathematical Association of America, the US Air Force Commander's Public Service Award, and a keynote address at the Joint Mathematics Meeting.

Tom Grandine

Member

Tom Grandine is a senior technical fellow for applied mathematics at Boeing, focusing on the company's advanced research and technology organization. He has a B.S. in mathematics and computer science from Yale University and an M.S. in computer science, an M.A. in mathematics, and a Ph.D. in numerical analysis from the University of Wisconsin-Madison. His areas of expertise include advanced geometric design, curve and surface modeling, numerical approximation, splines, and multidisciplinary design optimization. He has extensive experience in computational methods for both design and manufacturing applications. He is a long-time member and fellow of the Society for Industrial and Applied Mathematics. His involvement in SIAM includes six years as vice president for industry, and he is currently a member of the Board of Trustees.

Trachette Jackson

Member

Trachette Jackson is a professor in the Department of Mathematics in the College of Literature, Science, and the Arts and Assistant Vice President for Research – DEI Initiatives at the University of Michigan. Motivated by addressing critical challenges associated with cancer therapeutics, developing multiscale mathematical models is the aim of much of Dr. Jackson's research. She designs these models to optimize the use of anticancer agents that specifically target active molecular pathways that cancer cells use to promote their growth and survival. Dr. Jackson is an award-winning educator and scholar who has received honors for her accomplishments in both areas. In 2003, she became the second African American woman to receive the prestigious Alfred P. Sloan Research Award in Mathematics; in 2005, she received the James S. McDonnell 21st Century Scientist Award; in 2008, *Diverse Magazine* honored her as one of the year's Emerging Scholars. In 2010 she received the Blackwell-Tapia Prize, which biannually recognizes a mathematician for their research achievements and contributions to addressing diversity in mathematics. In 2012 she was elected to the inaugural class of Simon's Foundation Fellows, an honor featured in the *NY Times*. More recently, Dr. Jackson was elected into the inaugural class of Association for Women in Mathematics (AWM) Fellows and the 2021 class of the Society of Industrial and Applied Mathematics (SIAM) Fellows, becoming the first African American to have this honor.

Xiao-Li Meng

Member

Xiao-Li Meng is the Whipple V. N. Jones Professor of Statistics at Harvard University, and the Founding Editor-in-Chief of *Harvard Data Science Review*. He is the recipient of numerous awards and honors for his more than 150 publications in at least a dozen theoretical and methodological areas, as well as in areas of pedagogy and professional development. He was named the best statistician under the age of 40 by COPSS (Committee of Presidents of Statistical Societies) in 2001 and elected to the American Academy of Arts and Sciences in 2020. He has delivered over 500 research presentations and public speeches on these topics, and he is the author of "The XL-Files," a thought-provoking and entertaining column in the *IMS (Institute of Mathematical Statistics) Bulletin*. His interests range from the theoretical foundations of statistical inferences and data science (e.g., the interplay among Bayesian, Fiducial, and frequentist perspectives; frameworks for multi-source, multi-phase and multi-resolution inferences) to statistical methods and computation (e.g., posterior predictive p-value; EM algorithm; Markov chain Monte Carlo; bridge and path sampling), and to applications in natural, social, and medical sciences and engineering (e.g., complex statistical modeling in astronomy and astrophysics, assessing disparity in mental health services, and quantifying statistical information in genetic studies). Meng received his BS in mathematics from Fudan University in 1982 and his PhD in statistics from Harvard in 1990. He was on the faculty of the University of Chicago from 1991 to 2001 before returning to Harvard, where he served as the Chair of the Department of Statistics (2004-2012) and the Dean of Graduate School of Arts and Sciences (2012-2017).

Jill C. Pipher

Member

Jill Pipher is Vice President for Research at Brown University and Elisha Benjamin Andrews Professor of Mathematics. Pipher obtained her B.A. in mathematics from UCLA in 1979, and she earned her Ph.D. in mathematics from UCLA in 1985. She was a Dickson Instructor and assistant professor at the University of Chicago before joining the faculty of Brown as associate professor in 1989. Pipher's research areas include harmonic analysis, partial differential equations, and lattice-based cryptography. She has frequently lectured for both specialist and general audiences at venues in the United States and abroad. She has published many papers in her areas of expertise and has co-authored an undergraduate cryptography textbook. She jointly holds four patents related to the NTRU encryption algorithm. She was the founding director of the Institute for Computational and Experimental Research in Mathematics (ICERM), a National Science Foundation mathematics institute, from 2010 to 2016. In 2014, she was an invited speaker at the International Congress of Mathematicians. She was a co-founder of Ntru Cryptosystems, Inc. Pipher's professional honors include an NSF postdoctoral fellowship, an NSF Presidential Young Investigator Award, and an Alfred P. Sloan Foundation Fellowship. She is a fellow of the American Mathematical Society, the Association for Women in Mathematics and the Society for Industrial and Applied Mathematics. She served as president of the Association for Women in Mathematics from 2011 to 2013, was a National Women's History Month 2013 honoree, and served as President of the American Mathematical Society from 2019 to 2021. In 2015, she was elected to the American Academy of Arts and Sciences and in 2022 she became a fellow of the American Association for the Advancement of Science.

Terence C. Tao

Member

Terence Tao is a professor of mathematics at the University of California, Los Angeles, where he has taught since 1996, when he joined the department as the Hedrick Assistant Professor. He has been a visiting professor at the University of New South Wales (2000) and an honorary professor at Australia National University (2001-2003). Tao has authored and contributed to several books, and his numerous articles have appeared in such publications as the Annals of Mathematics, Acta Mathematica, and the American Journal of Mathematics. He received an M.Sc. (1992) from Flinders University of South Australia and a Ph.D. (1996) from Princeton University.