PRIZES AND AWARDS SESSION

Wednesday, July 12, 2021
9:00 AM EDT

2021 SIAM Annual Meeting

July 19 – 23, 2021

Held in Virtual Format

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AWM-SIAM Sonia Kovalevsky Lecture

Established in 2002, the AWM-SIAM Sonia Kovalevsky Lecture is awarded annually at the SIAM Annual Meeting. The lecture is intended to highlight significant contributions of women to applied or computational mathematics.

2021 Lecturer: **Vivette Girault**
Sorbonne University

Title of Lecture: **From Linear Poroelasticity to Nonlinear Implicit Elastic and Related Models**
Monday, July 19, 3:15pm – 4:00pm EDT

Citation: The 2021 AWM-SIAM Sonia Kovalevsky Lecture is awarded to Vivette Girault for being an outstanding numerical analyst with a long and distinguished career, who continues to have both deep and broad impact on computational science. Her work in finite element methods, computational fluid dynamics and mechanics is widely known and has been highly cited. The letters in support of this nomination suggest that what sets Professor Girault apart from others is her "uncompromising attitude towards making sure that she fully understands the underlying physics of the problems she works on", and this assessment explains her broad influence within as well as outside numerical analysis. Professor Girault has also been a fantastic mentor and role model for many junior mathematicians, being" quick-witted, rigorous, and excellent, with a radiant and humble personality".

Vivette Girault was born in France and went to primary school there until her family moved to Caracas, Venezuela and she attended Colegio Americano, an American High School in Caracas. After graduation, she did her undergraduate studies at McGill University in Montreal, Canada. Both high school and university had excellent mathematics teachers. After graduating from McGill University, Girault returned to France, where she started studying numerical analysis. At that time, numerical analysis was a new topic at the University of Paris, and she was very fortunate to be in the class of Professor Jacques-Louis Lions, a splendid mentor. Thanks to him, she was offered an assistant professorship in applied mathematics at the University of Paris, afterward named University Pierre et Marie Curie (UPMC) and now Sorbonne University, and did all her career there, except for two years when she worked at the University of Houston (Texas) with the groups of Dr. R. Glowinski and Dr. L.R. Scott.

At UPMC, Girault worked mostly with Dr. P.-A. Raviart, Dr. C. Bernardi and Dr. F. Hecht. She also collaborated with the group of Dr. T. Chacon at the University of Sevilla (Spain) and the group of Dr. H. Lopez at UCV (Universidad Central de Venezuela). She retired from UPMC in 2008, became emeritus professor there, and was visiting professor or scholar first at the University of Pittsburgh (group of Dr. I. Yotov), and next in Texas: U of H (group of Dr. Y. Kuznetsov), UT Austin (group of Dr. M.F. Wheeler), Texas A&M (groups of Dr. A. Bonito, Dr. J.-L. Guermond, Dr. K.R. Rajagopal) and Rice University (group of Dr. B. Riviere). Because of her close connection to Texas, her research that was originally on the theory and discretization of Navier-Stokes equations, veered mostly to the theory and numerics of problems of complex fluids, problems of poroelasticity, and now fascinating problems of nonlinear implicit models introduced by Professor K.R. Rajagopal.

Previous Lecturers:		
	2020	Bonnie Berger
	2019	Catherine Sulem
	2018	Eva Tardos
	2017	Liliana Borcea
	2016	Lisa J. Fauci
	2015	Linda S. J. Allen
	2014	Irene M. Gamba
	2013	Margaret Cheney
	2012	Barbara Lee Keyfitz
	2011	Susanne Brenner
	2010	Suzanne Lenhart
	2009	Andrea L. Bertozzi
	2008	Dianne O'Leary
	2007	Lai-Sang Young
	2006	Irene Fonseca
	2005	Ingrid Daubechies
	2004	Joyce R. McLaughlin
	2003	Linda R. Petzold

The AWM-SIAM Sonia Kovalevsky Lecturer receives a plaque containing the citation and signed by the AWM President and the SIAM President

George B. Dantzig Prize

The George B. Dantzig Prize is awarded every three years to one or more individuals for original research which by its originality, breadth, and depth is having a major impact on the field of mathematical optimization. MOS administers the prize and it is awarded jointly by MOS and SIAM.

2021 Recipients: **Hedy Attouch,** University of Montpellier
Michel Goemans, Massachusetts Institute of Technology

Citations: The 2021 George B. Dantzig Prize is awarded to Hedy Attouch for his fundamental contributions to modern variational analysis and nonsmooth optimization, including new notions of variational convergence, the introduction of novel topologies for the study of quantitative stability of variational systems, and their application in algorithm design and analysis, dynamical systems and partial differential equations.

The 2021 George B. Dantzig Prize is awarded to Michel Goemans for his outstanding contributions to the field of combinatorial optimization; most notably, the initiation of new research directions, introduction of novel and deep techniques, and ingenious use of sampling, rounding, and geometric ideas to significantly advance several fields, including the pioneering use of semi-definite programming for the design of approximation algorithms.

Hedy Attouch was Assistant Professor at the University Paris-Sud, Orsay, from 1971 to 1982 after finishing his studies at the Ecole Normale Supérieure (Cachan) and accomplishing the aggregation of Mathematics in 1970. In 1976 he accomplished his PhD (Thése de doctorat d'état en Mathématiques) at the University Paris VI under the supervision of H. Brezis with the dissertation entitled “PDE's associated to subdifferential operators".

Beginning with 1983, he was Professor of Mathematics at the University of Perpignan, from where he moved to the University Montpellier in 1988, where he was director of the Convex Analysis Laboratory and ACSIOM, and received the distinction of Professor, exceptional class. During his studies, he obtained a six-month grant for a CNRS-NSF post-doctoral position, which marked the departure of his collaboration with R. Wets. At the same period the post-doctoral visiting positions that he obtained at the University of Roma (with U. Mosco) and at the Scuola Normale Superiore di Pisa (with E. De Giorgi) marked the departure of his collaboration with the Italian school of variational analysis.

Attouch has published more than 140 articles in international journals of pure and applied mathematics, as well as 7 books and monographs. As reported by Google Scholar, his work has been cited over 11,000 times, and his h-index is 49. He supervised 26 PhD thesis or Habilitation thesis. All have become full professors or associate professors in French or international universities. Hedy Attouch serves as editor in several international journal of mathematics, including SIOPT. Attouch was responsible for several international research programs ANR (French), AFORS (US Air Force), ECOS-Sud (Chile).

Michel Goemans, a native of Belgium, is a Professor of Mathematics and the Head of the Department of Mathematics at MIT. He has held the Leighton Family Professorship at MIT, an Adjunct Professorship at the University of Waterloo, a Professorship at the UC Louvain, and a Visiting Professorship at Kyoto University. He received his undergraduate degree from UC Louvain in 1987 and his PhD from MIT in 1990. He also holds a Doctor Honoris Causa from UC Louvain. In addition to being a SIAM Fellow, he is also an AMS, ACM, Guggenheim and Sloan Foundation Fellow. His research in the area of combinatorial optimization has been rewarded twice by the SIAG/Optimization Prize, the 2012 Farkas prize, the 2000 Fulkerson prize and an invited lecture at the International Congress of Mathematicians (1998).

Previous Recipients:

2018	Andrzej Ruszczynski
2018	Alexander Shapiro
2015	Dimitri Bertsekas
2012	Jorge Nocedal
2012	Laurence Wolsey
2009	Gerard Cornuejols
2006	Eva Tardos
2003	Jong-Shi-Pang
2003	Alexander Schrijver
2000	Yurii Nesterov
1997	Stephen Robinson
1997	Roger Fletcher
1994	Claude Lemarechal
1994	Roger Wets
1991	Martin Groetschel
1991	Arkadi Nemirovski
1988	Michael J. Todd
1985	Ellis L. Johnson
1982	Michael J. D. Powell
1982	R. T. Rockafellar

The George B. Dantzig Prize includes a monetary award and a certificate containing the citation.

George Pólya Prize for Mathematical Exposition

The George Pólya Prize for Mathematical Exposition, established in 2013, is awarded every two years to an outstanding expositor of the mathematical sciences. The prize may be awarded for a specific work or for the cumulative impact of multiple expository works that communicate mathematics effectively. Following Pólya's example, the nature of the work may range from popular accounts of mathematics and mathematical discovery to pedagogy to systematic organization of mathematical knowledge.

2021 Recipient: **Nicholas J. Higham**
University of Manchester

Citation: The 2021 George Pólya Prize for Mathematical Exposition is awarded to Nicholas J. Higham for the crisp clarity, elegance, and accessibility of his mathematical and popular exposition on a broad range of topics in applied mathematics.

The work is characterized by the quality and clarity of prose as well as the breadth of impact in applied mathematics. His research books and papers have helped render deep ideas in numerical analysis accessible to a broad mathematical audience; his blog and his stellar contributions to the Princeton Companion to Applied Mathematics have sparked and maintained interest in our discipline amongst readers who are beginning their mathematical journey as well as those who are well along it. His interests are wide-ranging and eclectic (ranging from matrix functions to which fountain ink may be optimal for mathematical writing) and engage even the reluctant reader.

Nicholas J. Higham is Royal Society Research Professor and Richardson Professor of Applied Mathematics in the Department of Mathematics at the University of Manchester. He received his PhD in 1985 from the University of Manchester. He is a Fellow of the Royal Society, an ACM Fellow, a SIAM Fellow, and a Member of Academia Europaea.

Much of his research is concerned with the accuracy and stability of numerical algorithms, and the second edition of his monograph on this topic was published by SIAM in 2002. His other books are *Handbook of Writing for the Mathematical Sciences* (SIAM, third edition, 2020), *Functions of Matrices: Theory and Computation* (SIAM, 2008), *MATLAB Guide* (with Des Higham, third edition, SIAM, 2017), and the 1000-page *The Princeton Companion to Applied Mathematics* (2015), of which he was editor. His current research interests include mixed precision numerical linear algebra algorithms.

Previous Recipients:
2019 Steven Strogatz
2017 Nick Trefethen
2015 Gerhard Wanner

The George Pólya Prize for Mathematical Exposition includes an engraved medal and a monetary award that totals $10,000 for all winners.

George Pólya Prize in Applied Combinatorics

The George Pólya Prize in Applied Combinatorics, originally established in 1969, is awarded every four years for a notable application of combinatorial theory. The prize is broadly intended to recognize specific work. The award may occasionally be made for cumulative work, but such awards should be rare.

2021 Recipients: **Assefaw H. Gebremedhin,** Washington State University
Fredrik Manne, University of Bergen
Alex Pothen, Purdue University

Citation: The 2021 George Pólya Prize in Applied Combinatorics is awarded to Assefaw H. Gebremedhin, Fredrik Manne and Alex Pothen for efficient graph coloring algorithms and codes with applications to Jacobian and Hessian matrix computations.

Assefaw H. Gebremedhin is an associate professor in the School of Electrical Engineering and Computer Science at Washington State University (WSU). He received his undergraduate degree in electrical engineering from Addis Ababa University, Ethiopia, and his MS and PhD degrees in computer science from the University of Bergen, Norway. He has been a member of SIAM since 2001. He grew up both as a researcher and a person within the combinatorial scientific computing community and contributed to its formation and evolution. He currently leads the Scalable Algorithms for Data Science Lab at WSU. He is a recipient of the NSF CAREER Award.

Fredrik Manne is a professor of informatics at The University of Bergen, Norway. He received his PhD from the same institution in 1993. His main line of work has been centered around developing parallel algorithms for problems motivated from combinatorial scientific computing. He is currently head of education at the Department of Informatics and has won several awards for teaching and pedagogic work.

Alex Pothen is a professor of computer science at Purdue University. He received his undergraduate degree from the Indian Institute of Technology, Delhi, where he was a National Science Talent Scholar, and his PhD in Applied Mathematics from Cornell. He has been a SIAM member since 1984 and was designated as a SIAM Fellow in 2018. He helped found the combinatorial scientific computing community in the early 2000's and served as the founding Chair of the SIAM Activity Group on Applied and Computational Discrete Algorithms (ACDA) during 2018-2020.

Previous Recipients:

2016	David Saxton and Andrew Thomason
2016	Jozsef Balogh, Robert Morris, and Wojciech Samoti
2012	Vojtěch Rödl and Mathias Schacht
2008	Van H. Vu
2004	Neil Robertson and Paul Seymour
2000	Noga Alon
1996	Jeffry Ned Kahn and David Reimer
1992	Gil Kalai and Saharon Shelah
1987	Andrew Chi-Chih Yao
1983	Anders Bjorner and Paul Seymour
1979	Laszlo Lovasz
1975	Richard P. Stanley, Endre Szemeredi, and Richard M. Wilson
1971	Ronald L. Graham, Klaus Leeb, Bruce. L. Rothschild, Alfred W. Hales, and Robert I. Jewett

Each recipient of the George Pólya Prize in Applied Combinatorics shall receive an engraved medal and a cash award. The total to be awarded for all winners shall be $10,000.

I. E. Block Community Lecture

The I. E. Block Community Lecturer will be recognized and will deliver the lecture at the Block Community Lecture session, Tuesday, July 20, 1:30pm – 2:30pm EDT.

The I. E. Block Community Lecture was instituted in 1995 to encourage public appreciation of the excitement and vitality of applied mathematics by reaching out as broadly as possible to students, teachers, and members of the local community, as well as to SIAM members, researchers, and practitioners in fields related to applied and computational mathematics. The lecture is open to the public and is named in honor of I. Edward Block, a founder of SIAM who served as its Managing Director for nearly 20 years.

2021 Lecturer: **Jonathan C. Mattingly**
Duke University

Title of Lecture: **Can You Hear the Will of the People in the Vote? Assessing Fairness in Redistricting via Monte Carlo Sampling**
Tuesday, July 20, 1:30pm – 2:30pm EDT

Jonathan Christopher Mattingly grew up in Charlotte. He graduated from the NC School of Science and Mathematics and received a BS is Applied Mathematics with a concentration in physics from Yale University. After two years abroad with a year spent at ENS Lyon studying nonlinear and statistical physics on a Rotary Fellowship, he returned to the US to attend Princeton University where he obtained a PhD in Applied and Computational Mathematics in 1998 under the supervision of Yakov Sinai. After 4 years as a Szegö assistant professor at Stanford University and a year as a member of the IAS in Princeton, he moved to Duke in 2003. He is currently a James B. Duke Professor of Mathematics and a Professor of Statistical Science.

He is the recipient of an NSF CAREER award, a Presidential Early Career Award for Scientists and Engineers (PECASE), and a Sloan Foundation Faculty Fellowship. He is a fellow of the Institute for Mathematical Statistics (IMS) and the American Mathematics Society (AMS) and has served on the advisory boards for a number of NSF institutes. Mattingly's work centers on the long-time behavior of random dynamical systems and stochastic partial differential equations in particular. In particular he has definitive works on the ergodic theory of the two-dimensional Navier-Stokes equations and other SPDEs. He has also worked on the scaling limits and consistency of various stochastic numerical methods including Markov Chain Monte Carlo and methods to simulate stochastic differential equations. He has also worked on a number of biologically motivated problems including fluctuations in cell biochemical networks, the evolution and spread of influenza and the averaging of evolutionary trees.

Since 2013 he has also been working to understand and quantify gerrymandering and its interaction of a regions geopolitical landscape. This has led him to testify in a number of court cases including Common Cause v. Rucho, which went all the way to the US Supreme Court. He was also involved with a sequence of North Carolina state court cases which lead to the NC congressional and both NC legislative maps being deemed unconstitutional and replaced for the 2020 elections. He was awarded the Defender of Freedom award by the Common Cause for his work on Quantifying Gerrymandering. An interesting facet of this work is that it has included contribution from a number of undergraduate research projects.

A list of previous I.E. Block Community Lecturers appears on the following page.

Previous Lecturers:

2020 Erik Demaine
2018 Thomas Hales
2017 Emily Shuckburgh
2016 Tadashi Tokieda
2014 Sepandar (Sep) Kamvar
2013 Anette (Peko) Hosoi
2012 Robert Bridson
2010 Dmitri Tymoczko
2009 Andrew W. Lo
2008 Daniel Rockmore
2006 Simon Levin
2005 Christopher R. Johnson
2004 Michael B. Ray
2003 William J. Cook
2002 Christoph Bregler
2001 Steven H. Strogatz
2000 James A. Sethian
1999 Richard A. Tapia
1998 Robert C. Merton
1997 Joseph B. Keller
1996*Brian Rosen
1996*William F. Ballhaus Jr.
1995*Charles F. Van Loan
1995*Phillip A. Griffiths

The Block Lecture was not delivered in the ICIAM years 2007, 2011, 2015, or 2019.

*In 1997, the I. E. Block Lecture (given by Phillip A. Griffiths in 1995 and by William F. Ballhaus Jr. in 1996) was merged with the Community Lecture (given by Charles F. Van Loan in 1995 and by Brian Rosen in 1996).

The I. E. Block Community Lecturer receives an honorarium of $1,500 and an engraved clock.

John von Neumann Prize

The John von Neumann Prize is awarded for outstanding and distinguished contributions to the field of applied mathematical sciences and for the effective communication of these ideas to the community.

2021 Lecturer: **Chi-Wang Shu**
Brown University

Title of Lecture: **High Order Numerical Methods for Hyperbolic Equations**
Tuesday, July 20, 3:15pm – 4:15pm EDT

Citation: The 2021 John von Neumann Prize is awarded to Chi-Wang Shu for fundamental contributions to the numerical solution of partial differential equations. His work on finite difference essentially non-oscillatory (ENO) methods, weighted ENO (WENO) methods, finite element discontinuous Galerkin methods, and spectral methods has had a major impact on scientific computing.

Chi-Wang Shu obtained his B.S. from the University of Science and Technology of China in 1982 and his Ph.D. from the University of California at Los Angeles in 1986. He came to Brown University as an Assistant Professor in 1987, moving up to Associate Professor in 1992 and Full Professor in 1996. He was the Chair of the Division of Applied Mathematics between 1999 and 2005 and has been the Theodore B. Stowell University Professor of Applied Mathematics since 2008.

His research interest includes high order finite difference, finite element and spectral methods for solving hyperbolic and other convection dominated partial differential equations, with applications to areas such as computational fluid dynamics, semi-conductor device simulations and computational cosmology. He has served on editorial boards of several computational mathematics and scientific computing journals as associate editor, co-chief editor, or chief editor, including *Mathematics of Computation*, *SIAM Journal on Numerical Analysis*, *Journal of Computational Physics*, and *Journal of Scientific Computing*. His honors include the First Feng Kang Prize of Scientific Computing in 1995 and the SIAM/ACM Prize in Computational Science and Engineering in 2007. He is a SIAM Fellow, an AMS Fellow, an AWM Fellow, and an invited speaker at the International Congress of Mathematicians at Seoul in 2014.

A list of previous John von Neumann Lecturers appears on the following page.

The John von Neumann Lecturer receives a cash award of $5,000 and a hand-calligraphed certificate.

Previous Lecturers:

2020	Lloyd Nicholas Trefethen
2019	Margaret H. Wright
2018	Charles F. Van Loan
2017	Bernard J. Matkowsky
2016	Donald E. Knuth
2015	Jennifer Tour Chayes
2014	Leslie F. Greengard
2013	Stanley J. Osher
2012	Sir John Ball
2011	Ingrid Daubechies
2010	Bernd Sturmfels
2009	Franco Brezzi
2008	David I. Gottlieb
2007	Nancy Kopell
2006	George Papanicolaou
2005	Jerrold E. Marsden
2004	Alan C. Newell
2003	Heinz-Otto Kreiss
2002	Eric S. Lander
2001	David L. Donoho
2000	Persi W. Diaconis
1999	Charles S. Peskin
1998	Olga Ladyzhenskaya
1997	William (Velvel) Kahan
1996	Carl de Boor
1994	Martin D. Kruskal
1992	R. Tyrrell Rockafellar
1990	Andrew J. Majda
1989	Stephen Smale
1988	Germund G. Dahlquist
1987	Richard M. Karp
1986	Jacques-Louis Lions
1985	John W. Tukey
1984	Jurgen Moser
1983	Joseph B. Keller
1982	David Slepian
1981	Garrett Birkhoff
1980	Keith Stewartson
1979	Kurt O. Friedrichs
1978	Peter Henrici
1977	Kenneth J. Arrow
1976	Rene Thom
1975	Sir James Lighthill
1974	Jule Charney
1971	Paul A. Samuelson
1970	James H. Wilkinson
1969	George F. Carrier
1968	Peter D. Lax
1967	Chia-Chiao Lin
1966	Eugene P. Wigner
1965	Freeman J. Dyson
1964	Solomon Lefschetz
1963	Stanislaw M. Ulam
1962	Jean Leray
1961	Mark Kac
1960	Lars Valerian Ahlfors

No awards were made in 1972, 1973, 1991, 1993, or 1995.

Lagrange Prize in Continuous Optimization

The Lagrange Prize in Continuous Optimization is awarded every three years for an outstanding contribution in the area of continuous optimization published in the six calendar years prior to the award year. The MOS administers the prize and it is awarded jointly by MOS and SIAM.

The award is based primarily on the work's mathematical quality, significance, and originality. Clarity and excellence of the exposition and the value of the work in practical applications may be considered as secondary attributes. The extended period of six years reflects the fact that the value of fundamental work cannot always be immediately assessed.

2021 Recipients: **Léon Bottou,** Facebook
Frank E. Curtis, Lehigh University
Jorge Nocedal, Northwestern University

Citation: The 2021 Lagrange Prize in Continuous Optimization is awarded jointly to Léon Bottou, Frank Curtis, and Jorge Nocedal for their paper, "Optimization Methods for Large-Scale Machine Learning", SIAM Review 60(2), 2018, which provides a foundational and insightful review of optimization methods for large-scale machine learning, including a new perspective for the simultaneous consideration of noise reduction and ill-conditioning and the foundations and analysis of second-order stochastic optimization methods for machine-learning.

Léon Bottou received the Diplôme d'Ingénieur de l'École Polytechnique (X84) in 1987, the Magistère de Mathématiques Fondamentales et Appliquées et d'Informatique from École Normale Superieure in 1988, and a Ph.D. in Computer Science from Université de Paris-Sud in 1991. His research career took him to AT&T Bell Laboratories, AT&T Labs Research, NEC Labs America and Microsoft. He joined Facebook AI Research in 2015. The long-term goal of Léon's research is to understand how to build human-level intelligence. Although reaching this goal requires conceptual advances that cannot be anticipated at this point, it certainly entails clarifying how to learn and how to reason. Léon Bottou best known contributions are his work on deep neural networks in the 90s, his work on large scale learning and optimization, and possibly his more recent work on causal inference in learning systems. Léon is also known for the DjVu document compression technology.

Frank E. Curtis is an Associate Professor in the Department of Industrial and Systems Engineering at Lehigh University. He received his Ph.D. from Northwestern University in 2007, then spent two years as a postdoctoral researcher at the Courant Institute of Mathematical Sciences at New York University prior to joining Lehigh in 2009. His research focuses on the design, analysis, and implementation of algorithms for (nonconvex and nonsmooth) continuous optimization. He is a recipient of a DOE Early Career Award and the ICS Prize from the INFORMS Computing Society.

Jorge Nocedal is a Professor in the Department of Industrial Engineering and Management Sciences at Northwestern University. He obtained his B.S. degree from UNAM, Mexico, and a PhD from Rice University. His research is in optimization, both deterministic and stochastic, and with emphasis on large-scale problems. He served as editor-in-chief of the SIAM Journal on Optimization, is a SIAM Fellow, was awarded the 2012 George B. Dantzig Prize as well as the 2017 Von Neumann Theory Prize, for contributions to theory and algorithms of nonlinear optimization. He is a member of the US National Academy of Engineering.

Previous Recipients:	2018	Francis Bach, Nicolas Le Roux, and Mark Schmidt
	2015	Andrew R. Conn, Katya Scheinberg, and Luis Nunes Vicente
	2012	Emmanuel J. Candes and Benjamin Recht
	2009	Jean B. Lasserre
	2006	Roger Fletcher, Sven Leyffer, and Phillipe L. Toint
	2003	Adrian Lewis

The Lagrange Prize for Continuous Optimization includes a $1,500 monetary award and a certificate containing the citation.

Ralph E. Kleinman Prize

The Ralph E. Kleinman Prize is awarded every two years to one individual for outstanding research, or other contributions, that bridge the gap between mathematics and applications. Work that uses high-level mathematics and/or invents new mathematical tools to solve applied problems from engineering, science, and technology is particularly appropriate. The value of the work will be measured by the quality of the mathematics and its impact on the application. Each prize may be given either for a single notable achievement or for a collection of such achievements.

2021 Recipient: **Thomas J.R. Hughes**
University of Texas at Austin

Citation: The 2021 Ralph E. Kleinman Prize is awarded to Thomas J.R. Hughes for his influential and profound contributions to computational science and engineering and their impact on engineering design and simulation, while creating entirely new fields of mathematical research.

He has pioneered Finite Element and Isogeometric Analysis methods for solving partial differential equations that have impacted practically every contemporary finite element code and that are broadly used world-wide throughout engineering in the design of products or processes governed by solid and structural mechanics, fluid dynamics, and thermal and electromagnetic phenomena, including aerospace and automotive vehicles, biomedical devices, electronics, energy systems, infrastructure, and mechanical products.

Thomas J.R. Hughes is the leading researcher in Computer Aided Engineering and its integration with Computer Aided Design. He has made numerous seminal contributions to the analysis of structural, solid, fluid, and biomedical systems, and the seamless integration of analysis methodologies with design model representations. The fruits of his work have been incorporated in industrial and commercial computer programs that are used worldwide every day to design and analyze airplanes, automobiles, high-speed trains, consumer products, industrial processes, and other applications, and to non-invasively diagnose disease and guide medical interventions. He has originated new fields of computational engineering and mathematics research and continues to lead their development. He has been repeatedly recognized as a *Highly Cited Researcher* by Web of Science, and his published works have garnered over 120,000 citations with h-index of 154 in Google Scholar.

Dr. Hughes holds B.E. and M.E. degrees in Mechanical Engineering from Pratt Institute and an M.S. in Mathematics and Ph.D. in Engineering Science from the University of California at Berkeley. He taught at Berkeley, Caltech and Stanford before joining the University of Texas at Austin. At Stanford he served as Chairman of the Division of Applied Mechanics, Chairman of the Department of Mechanical Engineering, Chairman of the Division of Mechanics and Computation, and held the Mary and Gordon Crary Family Chair of Engineering.

He is co-editor of the international journal *Computer Methods in Applied Mechanics and Engineering*, a founder and past President of USACM and IACM, past Chairman of the Applied Mechanics Division of ASME, and past Chairman of the U.S. National Committee on Theoretical and Applied Mechanics (USNC/TAM).

Previous Recipients:

2019	Andrea L. Bertozzi
2017	Emmanuel Candés
2015	George Em Karniadakis
2013	Anna C. Gilbert
2011	Gunther Uhlmann
2009	Weinan E
2007	Salvatore Torquato
2005	Stanley J. Osher
2003	Graeme W. Milton
2001	William W. Symes
1999	Robert V. Kohn

The recipient of the Ralph E. Kleinman Prize receives $5,000 and a framed, hand-calligraphed certificate.

SIAM Prize for Distinguished Service to the Profession

The SIAM Prize for Distinguished Service to the Profession, established in 1985, is awarded to an applied mathematician who has made distinguished contributions to the furtherance of applied mathematics on the national or international level.

2021 Recipient: **Deborah Frank Lockhart**
National Science Foundation (Retired)

Citation: The 2021 SIAM Prize for Distinguished Service to the Profession is awarded to Deborah Lockhart in recognition of her far-reaching contributions to supporting and advancing applied mathematics and computational science in numerous venues, especially their central role in all of science and engineering. Her dedication and tireless efforts will have a lasting impact on our profession.

Deborah Frank Lockhart received her B.A. in Mathematics from New York University and her M.S. and Ph.D. in Mathematics from Rensselaer Polytechnic Institute. She was on the faculty of the State University of New York, College at Geneseo and Michigan Technological University prior to joining the National Science Foundation in 1988. During her career at NSF, she served as a program director in the Division of Mathematical Sciences (DMS) Infrastructure Program (1988-1993) and Applied Mathematics Program (1993-2004), as DMS Deputy Division Director from 2004 to 2011, as Deputy Division Director in the Division of Information and Intelligent Systems (IIS) from 2011 to 2016, and as Deputy Assistant Director for Mathematical and Physical Sciences from 2016 to 2019.

In August 2019, she retired from full-time government service. At various times she served as acting Division Director for DMS, IIS, the Division of Computing and Communication Foundations, and the Division of Undergraduate Education. She has served on committees for SIAM and MAA, and more recently has served as the Chair of the Mathematics Section of AAAS and the Section representative to the AAAS-wide Council. She is a Fellow of the AMS and AAAS and has received the Distinguished Service Award and Meritorious Service Award from NSF.

Previous Recipients:

2020	Tony F. Chan	2009	J. Tinsley Oden
2019	Maria J. Esteban	2008	Philippe Tondeur
2018	John Hopcroft	2006	Peter D. Lax
2017	Ya-xiang Yuan	2005	Cleve Moler
2016	Linda R. Petzold	2004	Richard A. Tapia
2015	Carlos Castillo-Chavez	2003	Gilbert Strang
2014	Arieh Iserles	2000	Margaret H. Wright
2013	Douglas N. Arnold	1997	Avner Friedman
2012	Barbara Lee Keyfitz	1988	Gene H. Golub
2011	David E. Keyes	1986	I. Edward Block
2010	Martin Grötschel		

The recipient of the SIAM Prize for Distinguished Service to the Profession receives a framed, hand-calligraphed certificate.

SIAM Student Paper Prizes

The SIAM Student Paper Prizes are awarded every year to the student authors of the most outstanding papers as determined by the prize committee. These awards are based solely on the merit and content of the students' contribution to the submitted papers. Priority is given to papers that have been published or have been accepted for publication. The purpose of the SIAM Student Paper Prizes is to recognize outstanding scholarship by students in applied mathematics or computing. Up to three awards may be given.

SIAM Student Paper Prize recipients will present their papers on Friday, July 23, 3:30pm – 5:30pm EDT.

2021 Recipients: **Yingjie Bi**
University of California, Berkeley

"Duality Gap Estimation via a Refined Shapley-Folkman Lemma"
Co-Author: Ao Kevin Tang, Cornell University

Published: *SIAM Journal on Optimization (2020)*
Volume 30, Issue 2, 1094-1118

Michelle Feng
California Institute of Technology

"Persistent Homology of Geospatial Data: A Case Study with Voting"
Co-Author: Mason A. Porter, University of California Los Angeles

Published: *SIAM Review (2021)*
Volume 63, Issue 1, 67-99

Yuanzhao Zhang
Northwestern University

"Symmetry-Independent Stability Analysis of Synchronization Patterns"
Co-Author: Adilson E. Motter, Northwestern University

Published: *SIAM Review (2020)*
Volume 62, Issue 4, 817-836

Affiliations reflect those at the time the paper was submitted to the competition.

Student recipients each receive a cash award of $1,000, a SIAM Student Travel Award, and a framed, hand-calligraphed certificate.

W. T. and Idalia Reid Prize in Mathematics

The W. T. and Idalia Reid Prize in Mathematics was established by SIAM in 1993 to recognize outstanding work in, or other contributions to, the broadly defined areas of differential equations and control theory. The prize, given annually since 2000, may be awarded either for a single notable achievement or a collection of such achievements. The prize fund was endowed by the late Mrs. Idalia Reid to honor her husband.

2021 Recipient: **Karl Kunisch**
University of Graz

Title of Lecture: **Solution Concepts for Optimal Feedback Control of Nonlinear Partial Differential Equations**
Wednesday, July 21, 3:30pm - 4:00pm EDT

Citation: The 2021 W. T. and Idalia Reid Prize is awarded to Karl Kunisch for his fundamental and lasting theoretical, numerical and computational contributions to nearly all aspects of PDE control theory, infinite dimensional optimization and applications to complex systems.

Karl Kunisch is a professor at the department of mathematics at the University of Graz, and Scientific Director of the Radon Institute of the Austrian Academy of Sciences in Linz. He received his PhD and Habilitation at the Technical University of Graz in 1978 and 1980. His research interests include optimization and optimal control, inverse problems and mathematical imaging, numerical analysis and applications, currently focusing on topics in the life sciences.

Professor Kunisch spent three years at the Lefschetz Center for Dynamical Systems at Brown University, USA, held visiting positions at INRIA Rocquencourt and the Université Paris Dauphine, and was a consultant at ICASE, NASA Langley, USA. Before joining the faculty at the University in Graz he was professor of numerical mathematics at the Technical University of Berlin.

Kunisch is also the author of two monographs and more than 340 papers. He is editor of numerous journals, including SIAM Optimization and Optimal Control, and SIAM Journal on Numerical Analysis.

Previous Recipients:

2020 Roland Glowinski	2012 Ruth F. Curtain	2004 Arthur J. Krener
2019 Miroslav Krstić	2011 Irena Lasiecka	2003 Harold J. Kushner
2018 Volker Mehrmann	2010 John A. Burns	2002 H. Thomas Banks
2017 Jean-Michel Coron	2009 Anders Lindquist	2001 Eduardo D. Sontag
2016 Ioannis G. Kevrekidis	2008 Max Gunzburger	2000 Constantine M. Dafermos
2015 Francis Clark	2007 Hector J. Sussmann	1998 Jacques-Louis Lions
2014 Alain Bensoussan	2006 Peter E. Kloeden	1996 Roger W. Brockett
2013 Tyrone Duncan	2005 Christopher I. Byrnes	1994 Wendell H. Fleming

The recipient of the W. T. and Idalia Reid Prize receives a cash award of $10,000 and an engraved medal.

SIAM Fellows

The SIAM Fellows program was established in 2009. Fellowship is an honorific designation conferred on certain SIAM members who have made outstanding contributions to fields served by SIAM. The 2021 Fellows were nominated by their peers and selected by an appointed committee of SIAM members.

The following members have been named SIAM Fellows for the Class of 2021:

Alejandro Aceves *Southern Methodist University*
James V. Burke *University of Washington*
Robert Calderbank *Duke University*
Xiaojun Chen *Hong Kong Polytechnic University*
Edmond Chow *Georgia Institute of Technology*
Robert D. Falgout *Lawrence Livermore National Laboratory*
Martín Farach-Colton *Rutgers University*
Shmuel Friedland *University of Illinois at Chicago*
Gary Froyland *University of New South Wales*
Tryphon T. Georgiou *University of California, Irvine*
Jean-Luc Guermond *Texas A&M University*
Trachette L. Jackson *University of Michigan*
Jeremy V. Kepner *MIT Lincoln Laboratory*
Denise Kirschner *University of Michigan*
Rachel Levy *American Mathematical Society/AAAS*
Per-Gunnar Martinsson *University of Texas at Austin*
Anna L. Mazzucato *Penn State University*
Kirsten A. Morris *University of Waterloo*
Habib N. Najm *Sandia National Laboratories*
Qing Nie *University of California, Irvine*
Béatrice Rivière *Rice University*
Jonathan E. Rubin *University of Pittsburgh*
Jennifer Scott *University of Reading and Science and Technology Facilities Council*
Eitan Tadmor *University of Maryland College Park*
Shang-Hua Teng *University of Southern California*
Rebecca M. Willett *University of Chicago*
Andreas Wächter *Northwestern University*
Jack Xin *University of California, Irvine*

2022 Prizes & Awards

Now Open for Nominations

For complete list of prizes and nomination deadlines, visit
https://www.siam.org/deadline-calendar

The following major prizes will be awarded in 2022:

AWM-SIAM Sonia Kovalevsky Lecture
George Pólya Prize in Mathematics
I.E. Block Community Lecture
The John von Neumann Lecture
Julian Cole Lectureship
Richard C. DiPrima Prize
SIAM Prize for Distinguished Service to the Profession
SIAM Student Paper Prize
W.T. and Idalia Reid Prize

The following SIAM Activity Group prizes will be awarded in 2022:

Dénes König Prize
Martin Kruskal Lecture
SIAM Activity Group on Data Science Career Prize
SIAM Activity Group on Data Science Early Career Prize
SIAM Activity Group on Imaging Science Best Paper Prize
SIAM Activity Group on Imaging Science Early Career Prize
SIAM Activity Group on Life Sciences Early Career Prize
SIAM Activity Group on Mathematics of Planet Earth Early Career Prize
SIAM Activity Group on Mathematics of Planet Earth Prize
SIAM Activity Group on Supercomputing Best Paper Prize
SIAM Activity Group on Supercomputing Career Prize
SIAM Activity Group on Supercomputing Early Career Prize
SIAM Activity Group on Uncertainty Quantification Early Career Prize
T. Brooke Benjamin Prize in Nonlinear Waves

The following joint prizes will be awarded in 2022:

AMS-MAA-SIAM Porter Public Lecture
Frank and Brennie Morgan Prize for Outstanding Research by an Undergraduate Student
JPBM Communications Award
MAA-SIAM-AMS Hrabowski-Gates-Tapia-McBay Lecture
Norbert Wiener Prize

For information on SIAM Prizes, visit
https://www.siam.org/prizes-recognition/view-all-prizes

The **SIAM Prize Program** is administered in the SIAM Executive Director's Office. Inquiries about any of the prizes SIAM sponsors should sent to prizeadmin@siam.org.