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Naylor Prize and Lectureship 2019
Citation for Professor Nick Higham FRS

Professor Nicholas Higham FRS, of the University of Manchester, is awarded a Naylor Prize and Lectureship for his leadership in numerical linear algebra, numerical stability analysis, and communication of mathematics.

In numerical linear algebra, Higham has been arguably the world leader for a generation. He has written definitive papers on a wide range of topics including condition number estimation, matrix nearness problems, the polar decomposition, correlation matrices, square roots of matrices, the matrix exponential, eigenvalue problems both linear and nonlinear, and more. Much of this work came together in his strikingly original monograph *Functions of Matrices: Theory and Computation*, which has defined the field since its appearance in 2008.

In numerical stability analysis, Higham's influence has been equally world-leading. His other monograph, *Accuracy and Stability of Numerical Algorithms*, is the pre-eminent work on this subject. Among the problems for which Higham has contributed stability analyses are Gaussian elimination, floating point summation, barycentric Lagrange interpolation, Cholesky factorization, triangular matrix computations, and, most recently, algorithms to take advantage of fast energy-efficient hardware with reduced precision.

Higham is in every way the successor to Turing Award winner James Wilkinson, who played a leading role in creating numerical linear algebra and numerical stability analysis in the decades after World War II.

Higham's impact, however, is equally outsized in a third area: the communication of mathematics, where he has written three further books: *Handbook of Writing for the Mathematical Sciences*, *MATLAB Guide* (with his brother D. J. Higham), and *The Princeton Companion to Applied Mathematics* (for which he served as general editor yet wrote 100 pages himself). Higham has a passion for clear exposition that is rare among mathematicians, and an expert fascination too with the tools that support such activities.

Finally, among Higham's many additional contributions to applied mathematics must be mentioned his creation of the UK's preeminent research group in numerical linear algebra at the University of Manchester and his service as President of SIAM during 2017–18.