David James Silvester

Birthplace Dumfries, Scotland 26–12–58

Academic Qualifications

Ysgol Ardudwy, Harlech, Gwynedd.
1971–1977 : Five A–levels (All Grade A) : Eleven O–Levels.

University of Manchester Institute of Science and Technology (UMIST).
1977–1980 : B.Sc Mathematics, First Class Honours.
1980–1983 : Ph.D Numerical Analysis.

Professional Affiliations

Society for Industrial and Applied Mathematics (SIAM Fellowship) (2023–present).
Institute for Mathematics and Applications (IMA Fellowship) (2010–present).

Employment

October 2003 – Present : Professor of Numerical Analysis,
UMIST $\longrightarrow$ University of Manchester, United Kingdom

September 1984 – September 2003 : Lecturer/Senior Lecturer/Reader,
Mathematics Department, UMIST, United Kingdom

January 1984 – August 1984 : Higher Scientific Officer,
United Kingdom Atomic Energy Authority,
AERE Harwell, Oxfordshire, United Kingdom.

Awards

January 1991 – September 1991 : Fulbright (Senior) Fellowship.

International Appointments

October 2019 – November 2019 : Romberg Visiting Professor,
University of Heidelberg, Germany

July 2009 – August 2009 : Visiting Professor,
Université du Littoral – Côte d'Opale, France

March 1999 – June 1999 : Visiting Associate Professor,
Computer Science Department, Stanford University, USA.

March 1994 – June 1994 : Visiting Research Fellow,
Computer Science Department, University of Maryland, College Park, USA.

January 1991 – September 1991 : Visiting Assistant Professor,
Computer Science Department, Stanford University, USA.

Research outputs in the last three years

⋆ Silvester, D. Machine learning for hydrodynamic stability, arXiv:2407.09572,
`https://arxiv.org/abs/2407.09572`

○ Pestana, J. and Silvester D. Fast solution of incompressible flow problems with two-level pressure approximation, Numerische Mathematik, open access, 2024.
`https://doi.org/10.1007/s00211-024-01420-z`

○ Feng Yani, Liao Q. and Silvester D. Robin-type domain decomposition with stabilized mixed approximation for incompressible flow, Computers and Mathematics with Applications, **147**, 53–63, 2023. `https://doi.org/10.1016/j.camwa.2023.07.016`

○ Kent B., Powell, C., Silvester D. and Zimón, M. Efficient adaptive stochastic collocation strategies for advection-diffusion problems with uncertain inputs, Journal of Scientific Computing, **96**, 64, 2023. `https://doi.org/10.1007/s10915-023-02247-w`

○ Papanikos G., Powell, C. and Silvester, D. IFISS3D: A computational laboratory for investigating finite element approximation in three dimensions, ACM Transactions on Mathematical Software, 2023. `https://doi.org/10.1145/3604934`

○ Bespalov, A. and Silvester, D. Error estimation and adaptivity for stochastic collocation finite elements Part II: multilevel approximation, SIAM J. Scientific Computing, **45**, A784–A800, 2023. `http://doi.org/10.1137/22M1479361`

○ Bespalov, A., Silvester, D. and Xu, F. Error estimation and adaptivity for stochastic collocation finite elements Part I: single-level approximation, SIAM J. Scientific Computing, **44**, A3393–A3412, 2022. `https://doi.org/10.1137/21M1446745`

○ Khan, A. and Silvester, D. Robust a posteriori error estimation for mixed finite element approximation of linear poroelasticity. IMA J. of Numerical Analysis **41**, 2000–2025, 2021. `https://doi.org/10.1093/imanum/draa058`

○ Khan, A., Bespalov, A., Powell, C. and Silvester, D. Robust a posteriori error estimators for stochastic Galerkin formulations of parameter-dependent linear elasticity equations, Mathematics of Computation, **90**, 613–636, 2021. `https://doi.org/10.1090/mcom/3572`

○ Bespalov, A., Rocchi, L. and Silvester, D. T–IFISS: a toolbox for adaptive FEM computation, Computers and Mathematics with Applications, **81**, 373–390 2021. `https://doi.org/10.1016/j.camwa.2020.03.005`

- I have over 7500 citations on Google Scholar, see
`http://scholar.google.co.uk/citations?user=-7jBp94AAAAJ`.
My Google Scholar h-index is 34.

- I have 70 publications indexed by MathSciNet in the MR Citation Database, see
`http://www.ams.org/mathscinet/search/author.html?mrauthid=249706`.
These have been cited over 2800 times by over 2000 unique citing authors.

Research highlights (previous ○, ongoing ●)

- My research is funded by a research network grant (AI hub) on the "Mathematical and Computational Foundations of Probabilistic AI" awarded by EPSRC in November 2023. ○ I have been awarded 23 research grants over my academic career, see
`https://gow.epsrc.ukri.org/NGBOViewPerson.aspx?PersonId=14415`.

- I have supervised *fourteen* PhD students to successful thesis submission including two students from Africa, one from India and one from Indonesia. My academic ancestry is recorded on the Mathematics Geneology Project, see `http://genealogy.math.ndsu.nodak.edu/id.php?id=197169`

○ The second edition of the research monograph *Finite elements and fast iterative solvers: with applications in incompressible fluid dynamics* (xiv+479 pp. ISBN: 978-0-19-967879-2) was published by Oxford University Press in June 2014. Over 1500 copies have been sold to date.

Teaching highlights (previous ○, ongoing ●)

○ Our undergraduate textbook *Essential partial differential equations* (xi+368 pp. ISBN: 978-3-319-22568-5) was published in October 2015. Over 77,000 downloads from the Springer website have been made to date. "The writing is lively, the authors make appealing use of computational examples and visualization, and they are very successful at conveying and integrating physical intuition. This is probably the best introductory book on PDEs that I have seen in some time. It is well worth a look." (William J. Satzer, MAA Reviews, maa.org, April, 2016)

○ The latest version of our open-source software IFISS was released in August 2023.
`https://personalpages.manchester.ac.uk/staff/david.silvester/ifiss/`
The toolbox is used to support teaching and learning in universities around the world and is frequently used as a source of reproducible test problems, see `http://swmath.org/software/4398`

● I am currently writing a suite of 50 video tutorials on modelling incompressible flow
`https://personalpages.manchester.ac.uk/staff/david.silvester/videolectures.html`
These are currently being viewed by researchers in a number of universities around the world.

Service and leadership (past ○, ongoing ●)

○ Secretary & Treasurer of the UK and Republic of Ireland SIAM section (1998–2000).
President of the UK and Republic of Ireland SIAM section (2009–2011).

○ I was *chair* of an international panel that evaluated 74 mathematics proposals for the Portuguese Research Funding Council (FCT) at a meeting in Lisbon held in 2017.

○ I was a member of an external panel that evaluated the continuation of funding for the Oberwolfach Research Institute for Mathematics (MFO) in Germany in May 2016.

○ I was the main organiser of a BIRS workshop on "New Directions in Applied Linear Algebra" held in Banff, Canada, in August 2023.

● I have been a member of the international programme committee for the Copper Mountain biennial conference series on "Iterative Methods in Scientific Computing" since 2004. I organised the student paper competition in 2008. The most recent meeting was held in April 2024.

● I am a conscientious *reviewer*: I have refereed papers for thirteen different journals within the last five years; see `https://publons.com/author/1350485/`.

● I am currently serving as an *external examiner* for undergraduate mathematics at the University of Warwick. ○ I was an external examiner for undergraduate degrees at Imperial College London (2006–2009), Cardiff University (2019–2022) and for the MSc in applied mathematics at Oxford University (2011–2014).

● I have been a member of the EPSRC Peer Review College since its inception in 2000. ○ I have been invited to sit on nine EPSRC panels to date and I chaired the Mathematical Sciences responsive mode panel held in February 2019.

● I am a member of the advisory board for the National Academy for the Mathematical Sciences. I have specific responsibility for Academies and Societies and for EDI (Equality, Diversity and Inclusion), see `https://www.acadmathsci.org.uk`.