PROFESSOR STEFAN GÜTTEL

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— Short CV as of August 2024 —

A. Personal information

► Professional experience

2023–2027	Royal Society Industry Fellow at the Arup Group (50% time)
2021–	Professor of Applied Mathematics at the University of Manchester
2012–2021	Lecturer (2012), Senior Lecturer (2016), Reader (2018) at U Manchester
2011–2012	Postdoc at the University of Oxford, UK
2010–2011	Postdoc at the University of Geneva, Switzerland
► Education	
2010	Ph.D. in Applied Mathematics (Dr. rer. nat., summa cum laude)
2008	Research exchange at the National Institute of Informatics, Japan
2006–2010	Ph.D. candidate at TU Bergakademie Freiberg, Germany,
	Supervisor: Prof. Michael Eiermann
2006	Diplom in Applied Mathematics (DiplMath., best possible grade 1.0)
2005–2006	Erasmus student at the University of Cyprus, Cyprus
2001–2006	Undergraduate studies at TU Bergakademie Freiberg, Germany

B. Research contributions and recognitions

▶ Publications in peer-reviewed journals (last 5 years)

A complete publication list is available on Google Scholar. Total GS citations: 2,870. H-index: 28.

- [1] S. GÜTTEL, D. KRESSNER, AND B. VANDEREYCKEN. Randomized sketching of nonlinear eigenvalue problems. *Accepted for publication in SIAM Journal on Scientific Computing*, 2024.
- [2] S. GÜTTEL AND I. SIMUNEC. A sketch-and-select Arnoldi process. *To appear in SIAM Journal on Scientific Computing*, 2024.
- [3] X. CHEN AND S. GÜTTEL. Fast and explainable clustering based on sorting, *Pattern Recognition*. 150:110298, 2024.
- [4] X. CHEN AND S. GÜTTEL. Fast and exact fixed-radius neighbor search based on sorting, *PeerJ Computer Science*, 10:e1929, 2024.
- [5] S. GÜTTEL AND M. SCHWEITZER. Randomized sketching for Krylov approximations of large-scale matrix functions, *SIAM J. Matrix Analysis and Applications*, 44:1073–1095, 2023.
- [6] X. CHEN AND S. GÜTTEL. An efficient aggregation method for the symbolic representation of temporal data, *ACM Trans. Knowledge Discovery from Data*, 17:1–22, 2023.
- [7] G. M. NEGRI PORZIO, S. GÜTTEL AND F. TISSEUR. Robust rational approximations of nonlinear eigenvalue problems, *SIAM Journal on Scientific Computing*, 44(4):A2439–A2463, 2022.

- [8] V. DRUSKIN, S. GÜTTEL, AND L. KNIZHNERMAN. Model order reduction of layered waveguides via rational Krylov fitting, *BIT Numerical Mathematics*, 62:1551–1572, 2022.
- [9] S. GÜTTEL AND J. W. PEARSON. A spectral-in-time Newton-Krylov method for nonlinear PDEconstrained optimization, *IMA Journal of Numerical Analysis*, 42(2):1478–1499, 2022.
- [10] S. GÜTTEL AND M. SCHWEITZER. A comparison of limited-memory Krylov methods for Stieltjes functions of Hermitian matrices, SIAM Journal on Matrix Analysis and Applications, 42(1):83– 107, 2021.
- [11] L. BARASH, S. GÜTTEL, AND I. HEN. Calculating elements of matrix functions using divided differences, *Computer Physics Communications*, 271:108219, 2021.
- [12] E. POUPARD, W. P. HEATH, AND S. GÜTTEL. A Hamiltonian decomposition for fast interior-point solvers in model predictive control, *Automatica*, 131:109833, 2021.
- [13] I. G. GOSEA AND S. GÜTTEL. Algorithms for the rational approximation of matrix-valued functions, *SIAM Journal on Scientific Computing*, 43(5):A3033–A3054, 2021.
- [14] S. GÜTTEL, D. KRESSNER, AND K. LUND. Limited-memory polynomial methods for large-scale matrix functions, *GAMM Mitteilungen*, 43(4):e202000019, 2020.
- [15] S. ELSWORTH AND S. GÜTTEL. ABBA: Adaptive Brownian bridge-based symbolic aggregation of time series, *Data Mining and Knowledge Discovery*, 34:1175–1200, 2020.
- [16] S. ELSWORTH AND S. GÜTTEL. The block rational Arnoldi method, *SIAM Journal on Matrix Analysis and Applications*, 41(2):365–388, 2020.
- [17] C. QIU, S. GÜTTEL, X. REN, C. YIN, Y. LIU, B. ZHANG, AND G. EGBERT. A block rational Krylov method for three-dimensional time-domain marine controlled-source electromagnetic modelling, *Geophysical Journal International*, 218:100–114, 2019.

► Awards and recognitions

- 2023 Royal Society Industry Fellow—competitively awarded Fellowship for four years
- 2023 **ILAS Taussky–Todd Prize**—awarded every three years by the International Linear Algebra Society for distinguished contributions to the field of Linear Algebra
- 2021 SIAM James H. Wilkinson Prize in Numerical Analysis and Scientific Computing one of the Major Prizes awarded by the Society for Industrial and Applied Mathematics
- 2020 Fellowship of the Alan Turing Institute—competitively awarded (first award in 2018)
- 2018 **Manchester Teaching Excellence Award**—for significant achievements in teaching; up to four prizes awarded annually across U Manchester (approx. 10,000 eligible staff)
- 2017 U Manchester Better World Award—for real-world impact of knowledge transfer
- 2016 Fellow of the Higher Education Academy (now called Advance HE)
- 2014 U Manchester Exceptional Performance Reward—for research and teaching activities
- 2013 **U Manchester Teaching Awards nominations**—nominated in the categories "Best Lecturer in Engineering and Physical Sciences" and "Most Innovative Lecturer"
- 2011 **Honourable mention for Householder Prize**—Ph.D. thesis shortlisted for the 2011 Householder Prize for outstanding dissertations in numerical linear algebra
- 2008 JSPS Fellowship—competitive award by the Japan Society for the Promotion of Science
- 2007 Georgius-Agricola Medal—awarded by TU Freiberg for the best Diploma project
- 2005 DAAD Stipend—4-month stipend awarded by Deutscher Akademischer Austauschdienst

Grants

2025–2028	EPSRC responsive mode grant (£406,418 as PI)
2023–2027	Royal Society Industry Fellowship, Arup and Royal Society (£374,856 as PI)
2020–2022	Knowledge Transfer Partnership (KTP) with Arup, Innovate UK (£352,190 as co-I)
2020–2021	Turing Fellow Project, Alan Turing Institute (£73,127 as PI)
2017–2021	KTP with Process Integration Ltd., Innovate UK (£320,581 as PI)
2013–2016	KTP with AspenTech (Sabisu), Technology and Strategy Board (£302,849 as PI)
2012	LMS Research Workshop grant, London Mathematical Society (£2,975 as PI)
2011–2012	Postdoc stipend, German Research Foundation (£49,500 as PI)

C. Conference and workshop activities

▶ Plenary lectures (last 5 years, with expenses covered if applicable)

09/2024	Keynote lecturer at the 48th Woudschoten Conference of the Dutch–Flemish Scientific Computing Society, The Netherlands
06/2023	ILAS Taussky–Todd Prize talk, 25th Conference of the International Linear Algebra So- ciety, Madrid, Spain
03/2021	SIAM James H. Wilkinson Prize talk "Rational Krylov: A Toolkit for Scientific Comput- ing," SIAM Conference on Computational Science and Engineering 2021 (online)

► Co-organized conferences and workshops (last 5 years)

- 2020–22 Online Seminar on Numerical Linear Algebra (sites.google.com/view/e-nla/)
- 12/2019 Workshop "Computational Complex Analysis," Newton Institute, Cambridge (https://www.newton.ac.uk/event/catw03)
- 11/2019 Workshop "Mathematics and Data Science: Preparing for a Career as Data Scientist," U Manchester (personalpages.manchester.ac.uk/staff/stefan.guettel/career)
- 10/2019 GAMM ANLA workshop on "Linear Algebra Challenges in the Sciences," University of Chemnitz, Germany (https://gammanla.wordpress.com/)
- 06/2019 Workshop "Iterative Methods from the Continuum Perspective," Hamilton Mathematics Institute, Ireland (https://siamukie.wordpress.com/2018/12/18/dublin2019/)

D. Teaching and learning

I have developed and taught courses at all levels of the mathematics curriculum at U Manchester:

- MATH36160 Mathematics and Applications of Machine Learning: In development.
- MATH36022 Numerical Analysis II: Advanced course for Mathematics undergraduate students in their third year of studies. Taught in 2023 and 2024.

- MATH20411 PDEs and Vector Calculus B: I taught this course from 2018–2020, including the preparation of midterm assessments and final exam papers.
- MATH20621 Programming with Python: Developed for Mathematics undergraduate students, now a compulsory second-year unit for more than 300 students. Taught from 2016–2022.
- MATH65740 Transferable Skills: Developed and lead a MATLAB course for this MSc-level unit since 2015. Taken by all Applied Maths MSc students and separately assessed.
- MATH36001 Matrix Analysis: I taught this course from 2012–2015, including the preparation of midterm assessments and final exam papers.

In 2018, I received a Manchester Teaching Excellence Award, a University-wide recognition for significant and sustained commitment to excellence in teaching.

E. Leadership and community service

- ▶ Recent activities in international organisations and committee work
 - **ILAS Board of Directors** (elected in 2023). Handling the employment of staff and assume responsibility for the management of the Society. (https://ilasic.org/who-we-are/)
 - SIAM Membership Committee (since 2020, reappointed in 2022 by the SIAM President). This committee represents the interests of SIAM's 14,500 international members. I also served on the EDI Subcommittee. (https://www.siam.org/about-siam/committees/membership-committee)
 - Vice-Chair of GAMM Activity Group on Numerical and Applied Linear Algebra (elected in 2015, re-elected in 2018–2021). This group comprises more than 90 international members and holds an annual workshop. (https://gammanla.wordpress.com/about/)
 - Secretary and Treasurer for the SIAM UKIE Section (elected 2016–2018). The section comprises more than 700 SIAM members based in the UK and Ireland, holds an annual meeting, and sponsors prizes. (https://archive.siam.org/sections/siamukie/)
 - Scientific Committee Member of the Parallel-in-Time Integration Group (2015–2017), following the organization of its 2013 meeting sponsored by the LMS. (parallel-in-time.org)

► Recent work on editorial boards

- Associate Editor of PeerJ Computer Science (since 2023)
- Associate Editor of Electronic Transactions on Numerical Analysis (since 2020)
- Associate Editor of the SIAM Journal on Scientific Computing (2015–2021)
- Editor of *ICIAM Dianoia* (since 2019, https://iciam.org/newsletter/dianoia)
- Editor of two *GAMM Mitteilungen* Special Issues on Applied and Numerical Linear Algebra published by Wiley in 2020 (https://onlinelibrary.wiley.com/toc/15222608/2020/43/3)
- Guest editor of a 2018 Special Issue of *Linear Algebra and its Applications*, Elsevier (www.sciencedirect.com/journal/linear-algebra-and-its-applications/vol/576/suppl/C)

► Internal to the University of Manchester

• **Director of MADSIM** (since 2022). Faculty-wide Doctoral Training Centre for Mathematics and Data in Scientific and Industrial Modelling. Currently 30 PhD students across nine Departments.