Curriculum Vitae — Gunnar Martinsson

Contact information

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Research interests

Numerical analysis, scientific computing, and applied mathematics. Recent work includes:

- Randomized methods in numerical linear algebra.
- Fast solvers for elliptic PDEs. $O(N)$ direct solvers. Structured matrix computations.
- Efficient algorithms for large data sets.
- Numerical methods for scattering problems, computational fluid dynamics, acoustics, etc.
- Applied harmonic analysis; fast multipole methods; boundary integral equation methods.
- Modeling of heterogeneous materials; bandgap phenomena; lattice equations.

Professional appointments

2024 –	*Deputy Director*, Oden Institute, University of Texas at Austin,
2024 –	*Visiting Professor of Mathematics,* University of Oxford, United Kingdom.
2018 –	**Professor of Mathematics, University of Texas at Austin**, *W. A. "Tex"Moncrief, Jr., Endowed Chair No. 4 in Simulation-Based Engineering Sciences*.
2017 –	*Visiting Professor of Applied Mathematics,* University of Colorado, Boulder.
2017 – 2022	*Affiliated Professor of Mathematics,* Royal Inst. of Technology (KTH), Stockholm.
2017 – 2018	*Professor of Mathematics,* University of Oxford.
2017 – 2018	*Official Student (i.e. fellow),* Christ Church, Oxford.
2015 – 2017	*Professor of Applied Mathematics,* University of Colorado, Boulder.
2010 – 2015	*Associate Professor of Applied Mathematics,* University of Colorado, Boulder.
2005 – 2010	*Assistant Professor of Applied Mathematics,* University of Colorado, Boulder.
2002 – 2005	*Gibbs Assistant Professor of Mathematics,* Yale University.

Education

1998 – 2002	*Ph.D.,* University of Texas at Austin, CAM. Advisors: Ivo Babuška and Gregory Rodin.
1996 – 1998	*Licentiate,* Chalmers Univ. (Sweden), Mathematics. Advisor: Vidar Thomée.
1992 – 1995	*Civ. Ing.,* Chalmers Univ. (Sweden), Engineering Physics. John Ericsson medal awardee.

Other activities

2021 – 2025	*Associate Editor*, BIT Numerical Mathematics.
2017 – 2022	*Chair of Scientific Steering Committee*, MathDataLab, Royal Inst. of Techn., Stockholm.
2012 – 2023	*Associate Editor*, Advances in Computational Mathematics.
2012 – 2021	*Associate Editor*, SIAM Journal on Scientific Computation.
2012 – 2017	*Director of Graduate Studies*, Dept. of Applied Math., Univ. of Colorado-Boulder.

Distinctions

- Simons Fellow in Mathematics, 2025/26.
- Wallenberg Professorship through Institute Mittag-Leffler, Fall 2025.
- Moncrief Grand Challange Award, 2023 (University of Texas at Austin).
- SIAM Fellow, class of 2021.
- SIAM Germund Dahlquist Prize, 2017.
- Principal lecturer, CBMS/NSF conference on Fast Direct Solvers at Dartmouth College, 2014.
- NSF Career Award, 2008 – 2014.
- Wenner-Gren Foundation Fellowship, 2012.
- College Scholar Award. College of Arts and Sciences, Univ. of Colorado, Boulder, 2011.
- The Sweden-America Foundation Graduate Fellowship, 2001-2002.
- The John Ericsson Medal, Chalmers University of Technology, 1996.
- Member, Swedish team, International Physics Olympiad, Havanna, 1991.

Research grants and awards

2024 – 2027 DOE DE-SC0025312. Co-PI (with PI Joseph Kileel), $495 000.
2023 – 2026 NSF 2313434. With Y. Nakatsukasa (Oxford). UT component $322 730.
2021 – 2024 DOE DE-SC0022251. Sole PI. $300 000.
2020 – 2024 NSF 1952735. Lead PI for $1.37M FRG award. UT component $677 023.
2020 – 2023 NSF 2012606. With J. Bremer (UC-Davis). UT component $111 866.
2018 – 2024 ONR N00014-18-1-2354. Sole PI. $824 000.
2018 – 2021 EPSRC EP/R019215/1. Sole PI. £331 000. *(Declined due to relocation.)*
2016 – 2019 NSF DMS-1620472. Sole PI. $250 000.
2014 – 2018 NSF DMS-1407340. Co-PI. "Big Data" in undergraduate education. $590 300.
2013 – 2015 DARPA N66001-13-1-4050. Sole PI. $188 916.
2013 – 2016 NSF DMS-1320652. With Denis Zorin (NYU). U. Colorado component $219 187.
2012 – 2013 ONR K00177 IRES 12-004454. Multi-PI conference proposal. $44 700.
2012 – 2013 NSF DMS-1207829. Multi-PI conference proposal. $50 000.
2009 – 2013 NSF DMS-0941476 (CDI-Type I). With François Meyer (EE, CU-Boulder). $535 784.
2008 – 2013 NSF DMS-0748488 (CAREER award). Sole PI. $400 000.
2006 – 2009 NSF DMS-0610097. Sole PI. $151 600.

Postdoctoral scholars

Simon Dirckx 2024 –
Joar Bagge 2023 –
Kate Pearce 2022 –
Heather Wilber 2021 – 2023 (tenure-track U. Washington).
Chao Chen 2020 – 2023 (tenure-track NCSU).
Ke Chen 2019 – 2022 (tenure-track U. Delaware).
Bowei Wu 2019 – 2022 (tenure-track U. Mass-Lowell).
Sergey Voronin 2014 – 2016.

Doctoral students

Yunhui Cai Expected to graduate in 2027.
Joseph Kump Expected to graduate in 2027. (Co-advised with Patrick Heimbach.)
Anna Yesypenko Completed in Nov. 2023. (Tenure track assist. prof. Ohio State.)
Yijun Dong Completed in April 2023. (Co-advised with Rachel Ward.)
James Levitt Completed in April 2022.
Nathan Heavner Completed in April 2019.
Tracy Babb Completed in Jan. 2019.
Sijia Hao Completed in May 2015.
Dan Kaslovsky Completed in May 2012. (Co-advised with François Meyer.)
Nathan Halko Completed in Feb. 2012.
Adrianna Gillman Completed in Aug. 2011. (Currently assoc. prof. at U. Colorado-Boulder.)
Patrick Young Completed in Dec. 2010. (Co-advised with Kamran Mohseni.)

Publications

Most publications are available at: https://users.oden.utexas.edu/∼pgm/main_publications.html

Monograph

"Fast Direct Solvers for Elliptic PDEs". 2019. 332 pages. SIAM CBMS monograph series.

Refereed journal articles

- Y. Dong, C. Chen, P.G. Martinsson, and K. Pearce, "Robust Blockwise Random Pivoting: Fast and Accurate Adaptive Interpolative Decomposition". SIAM J. on Matrix Anal. and Appl., **46**(3), 2025.
- A. Yesypenko, C. Chen, and P.G. Martinsson, "A simplified fast multipole method based on strong recursive skeletonization". Journal of Computational Physics, **524**(1), 2025.

- K. Pearce, C. Chen, Y. Dong, and P.G. Martinsson, "Adaptive Parallelizable Algorithms for Interpolative Decompositions via Partially Pivoted LU". Numerical Linear Algebra with Applications, **32**(1), 2025.
- Y. Dong, P.G. Martinsson, Y. Nakatsukasa, "Efficient Bounds and Estimates for Canonical Angles in Randomized Subspace Approximations". SIAM J. on Matrix Comp, **45**(4), 2024.
- A. Yesypenko, P.G. Martinsson, "SlabLU: A Two-Level Sparse Direct Solver for Elliptic PDEs". *Adv. in Comp. Mathematics.*, **50**(90), pp. 1572–9044, 2024.
- K. Chen, D. Appelö, T. Babb, P.G. Martinsson, "Fast and high-order approximation of parabolic equations using hierarchical direct solvers and implicit Runge-Kutta methods". *Communications on Applied Mathematics and Computation.* Accepted for publication.
- Levitt, J. and Martinsson, P.G., "Linear-Complexity Black-Box Randomized Compression of Rank-Structured Matrices", *SIAM J. on Scientific Computing*, **46**(3), pp.A1747-A1763, 2024.
- Levitt, J. and Martinsson, P.G., "Randomized compression of rank-structured matrices accelerated with graph coloring", *Journal of Computational and Applied Mathematics*, **451**(1), 2024.
- B. Wu, P.G. Martinsson, "A Unified Trapezoidal Quadrature Method for Singular and Hyper-singular Boundary Integral Operators on Curved Surfaces", *SIAM J. on Num. Anal.*, **61**(5), 2023.
- N. Heavner, P.G. Martinsson, G. Quintana-Ortí, "Computing rank-revealing factorizations of matrices stored out-of-core". *Concurrency and Computation: Practice and Experience*, **35**(22), 2023.
- C. Chen, N. Heavner, A. Gopal, P.G. Martinsson, "Efficient algorithms for computing rank-revealing factorizations on a GPU". *Numerical Linear Algebra with Applications*, **30**(6), 2023.
- Y. Dong and P.G. Martinsson, "Simpler is better: a comparative study of randomized pivoting algorithms for CUR and interpolative decompositions". *Adv. in Comp. Mathematics*, **49**(4), 2023.
- A. Gopal, P.G. Martinsson, "An accelerated, high-order accurate direct solver for the Lippmann–Schwinger equation for acoustic scattering in the plane". *Adv. in Comp. Mathematics*, **48**(4), 2022.
- N. Heavner, F. Igual, G. Quintana-Ortí, P.G. Martinsson, "Algorithm 1022: Efficient Algorithms for Computing a Rank-Revealing UTV Factorization on Parallel Computing Architectures". *ACM TOMS*, **48**(2), pp. 1 – 42, 2022.
- B. Wu, P.G. Martinsson, "Corrected Trapezoidal Rules for Boundary Integral Equations in Three Dimensions", *Numerische Mathematik*, **149**(4), pp. 1–47, 2021.
- B. Wu, P.G. Martinsson, "Zeta Correction: A New Approach to Constructing Corrected Trapezoidal Quadrature Rules for Singular Integral Operators" *Advances in Comp. Math.*, **47**(45), 2021.
- P.G. Martinsson, J. Tropp, "Randomized Numerical Linear Algebra: Foundations & Algorithms." *Acta Numerica*, **29**, pp. 403–572, 2020.
- P.G. Martinsson, G. Quintana-Ortí, N. Heavner, "randUTV: A blocked randomized algorithm for computing a rank-revealing UTV factorization." *ACM TOMS*, **45**(1), pp. 4:1–4:26, 2019.
- P.G. Martinsson, "Randomized methods for matrix computations." In *The Mathematics of Data, IAS/Park City Mathematics Series*, **25**(4), pp. 187 – 231, 2018.
- T. Babb, A. Gillman, S. Hao, P.G. Martinsson, "An accelerated Poisson solver based on a multidomain spectral discretization." *BIT Journal on Numerical Analysis,* **58**(4), pp. 851–879, 2018.
- P.G. Martinsson, G. Quintana-Ortí, N. Heavner, and R. van de Geijn, "Householder QR Factorization With Randomization for Column Pivoting (HQRRP)." *SIAM J. on Scientific Comp.*, **39**(2), pp. C96-C115, 2017.
- P.G. Martinsson and S. Voronin, "Efficient algorithms for CUR and interpolative matrix decompositions." *Advances in Comp. Mathematics,* **43**(3), pp. 495–516, 2017.
- P.G. Martinsson, "Compressing rank-structured matrices via randomized sampling." *SIAM J. on Scientific Comp.,* **38**(4), pp. A1959–A1986, 2016. Arxiv.org report #1503.07152.

- M.A. Echeverri Bautista, M.A. Francavilla, P.G. Martinsson, F. Vipiana, "$O(N)$ Nested Skeletonization Scheme for the Analysis of Multiscale Structures Using the Method of Moments," *IEEE Journal on Multiscale and Multiphysics Computational Techniques*, **1**, pp. 139–150, 2016.
- P.G. Martinsson and S. Voronin, "A randomized blocked algorithm for efficiently computing rank-revealing factorizations of matrices." *SIAM J. on Scientific Comp.*, **38**(5), S485 – S507, 2016.
- S. Hao and P.G. Martinsson, "A direct solver for elliptic PDEs in three dimensions based on hierarchical merging of Poincaré-Steklov operators." *Journal of Computational and Applied Mathematics,* **308**, pp. 419 – 434, 2016.
- T. Haut, T. Babb, P.G. Martinsson, B. Wingate, "A high-order scheme for solving wave propagation problems via the direct construction of an approximate time-evolution operator." *IMA Journal of Numerical Analysis.* **36**(2), pp. 688 – 716, 2016.
- J. Bremer, A. Gillman, P.G. Martinsson, "A high-order accurate accelerated direct solver for acoustic scattering from surfaces." *BIT Numerical Math.* **55**(2), pp. 367 – 397, 2015.
- S. Hao, P.G. Martinsson, P. Young, "An efficient and highly accurate solver for multi-body acoustic scattering problems involving rotationally symmetric scatterers." *CAMWA (Computers and Mathematics with Applications).* **69**(4), pp. 304 – 318, 2015.
- E. Corona, P.G. Martinsson, D. Zorin "An $O(N)$ Direct Solver for Integral Equations in the Plane". *Advances in Computational and Harmonic Analysis,* **38**(2), pp. 284 – 317, 2015.
- A. Gillman, A. Barnett, P.G. Martinsson "A spectrally accurate direct solution technique for frequency-domain scattering problems with variable media". *BIT Numerical Mathematics,* **55**(1), pp. 141-170, 2015. (arXiv.org report #1308.5998).
- A. Gillman and P.G. Martinsson "A direct solver with $O(N)$ complexity for variable coefficient elliptic PDEs discretized via a high-order composite spectral collocation method." *SIAM J. on Scientific Computation,* **36**(4), pp. A2023 - A2046, 2014.
- A. Gillman and P.G. Martinsson, "An $O(N)$ algorithm for constructing the solution operator to elliptic boundary value problems in the absence of body loads." *Advances in Computational Mathematics,* **40**(4), pp. 773–796, 2014.
- A. Gillman and P.G. Martinsson, "A fast solver for Poisson problems on infinite regular lattices." *Journal of Computational and Applied Mathematics*, **258**(1), pp. 42–56, 2014.
- A. Gillman, S. Hao, and P.G. Martinsson, "A simplified technique for the efficient and highly accurate discretization of boundary integral equations in 2D on domains with corners." *Journal of Computational Physics*, **256**(1), pp. 214–219, 2014.
- S. Hao, A. Barnett, P.G. Martinsson, and P. Young, "High-order accurate Nyström discretization of integral equations with weakly singular kernels on smooth curves in the plane" *Advances in Computational Mathematics*, **40**(1), pp. 245–272, 2014.
- P.G. Martinsson, "A direct solver for variable coefficient elliptic PDEs discretized via a composite spectral collocation method." *Journal of Computational Physics*, **242**(1), pp. 460–479, 2013.
- P. Young, S. Hao, and P.G. Martinsson, "A high-order Nyström discretization scheme for boundary integral equations defined on rotationally symmetric surfaces" *Journal of Computational Physics*, **231**(11), pp. 4142–4159, 2012.
- A. Gillman, P. Young, and P.G. Martinsson, "A direct solver with $O(N)$ complexity for integral equations on one-dimensional domains". *Frontiers of Math. in China*, **7**(2), pp. 217–247, 2012.
- N. Halko, P.G. Martinsson, J. Tropp, "Finding structure with randomness: Probabilistic algorithms for constructing approximate matrix decompositions." *SIAM Review*, **53**(2), pp. 217–288, 2011.
- P.G. Martinsson, "A fast randomized algorithm for computing a Hierarchically Semi-Separable representation of a matrix". *SIAM J. on Matrix Analysis and Appl.*, **32**(4), pp. 1251–1274, 2011.

- N. Halko, P.G. Martinsson, Y. Shkolnisky, M. Tygert, "An Algorithm for the Principal Component Analysis of large Data Sets". *SIAM J. on Scientific Computation*, **33**(5), pp. 2580–2594, 2011.
- P.G. Martinsson, V. Rokhlin, and M. Tygert, "A randomized algorithm for the decomposition of matrices". *Applied and Computational Harmonic Analysis*, **30**(1), pp. 47–68, 2011.
- A. Gillman and P.G. Martinsson, "Fast and accurate numerical methods for solving elliptic difference equations defined on lattices". *Journal of Computational Physics*, **229**(24), pp. 9026–9041, 2010.
- P.G. Martinsson and G.J. Rodin, "Boundary algebraic equations for lattice problems". *Proc. R. Soc. A*, **465**(2108), pp. 2489-2503, 2009.
- L. Greengard, D. Gueyffier, P.G. Martinsson, V. Rokhlin, "Fast direct solvers for integral equations in complex three-dimensional domains". *Acta Numerica*, **18**, pp. 243–275, 2009.
- P.G. Martinsson, "A fast direct solver for a class of elliptic partial differential equations". *Journal of Scientific Computation*, pp. 316-330, **38**(3), 2009.
- E. Liberty, F. Woolfe, P.G. Martinsson, V. Rokhlin, and M. Tygert, "Randomized algorithms for the low-rank approximation of matrices". *Proc. of the National Academy of Sciences*, **104**(51), 2007.
- P.G. Martinsson and V. Rokhlin, "A fast direct solver for scattering problems involving elongated structures". *Journal of Computational Physics*, **221**, pp. 288–302, 2007.
- P.G. Martinsson and I. Babuška, "Mechanics of Materials with Periodic Truss or Frame Micro-structures". *Archives of Rational Mechanics and Analysis*, **185**(2), pp. 201–234, 2007.
- P.G. Martinsson and I. Babuška, "Homogenization of materials with periodic skeletal micro-structures". *Mathematical Models and Methods in Applied Sciences*, **17**(5), pp. 805–832, 2007.
- P.G. Martinsson and V. Rokhlin, "An Accelerated Kernel-Independent Fast Multipole Method in One Dimension", *SIAM J. of Scientific Computing*, **29**(3), 2007.
- P.G. Martinsson, "Rapid evaluation of electro-static interactions in two-phase dielectric media". *Journal of Computational Physics*, **211**(1), pp. 289–299, 2006.
- P.G. Martinsson, V. Rokhlin, and M. Tygert, "On Interpolation and Integration in Finite-Dimensional Spaces of Bounded Functions". *Comm. in Applied Mathematics and Comp. Science*, 1, Jan. 2006.
- P.G. Martinsson and V. Rokhlin, "A fast direct solver for boundary integral equations in two dimensions". *Journal of Computational Physics*, **205**(1), pp. 1 – 23, 2005.
- P.G. Martinsson, M. Tygert and V. Rokhlin, "An $O(N \log^2 N)$ algorithm for the inversion of general Toeplitz matrices". *Computers & Mathematics with Applications*, **50**, pp. 741 – 752, 2005.
- H. Cheng, Z. Gimbutas, P.G. Martinsson, V. Rokhlin, "On the compression of low rank matrices". *SIAM Journal of Scientific Computing*, **26**(4), pp. 1389-1404, 2005.
- P.G. Martinsson and A.B. Movchan, "Vibrations of Lattice Structures and Phononic Bandgaps". *The Quarterly Journal of Mechanics and Applied Mathematics*, **56**, pp. 45-64, 2003.
- P.G. Martinsson and G.J. Rodin, "Asymptotic Expansions of Lattice Green's Functions". *Proceedings of the Royal Society A*, **458**, pp. 2609–2622, 2002.
- E. Cornea, R. Howard and P.G. Martinsson, "Solutions near Singular Points to the Eikonal and Related First-Order Nonlinear Partial Differential Equations in Two Dimensions". *Differential and Integral Equations*, **14**, pp. 1441-1468, 2001.

Refereed conference proceedings, encyclopedia articles, etc

- T. Liang, C. Chen, P.G. Martinsson, G. Biros, "A distributed-memory parallel algorithm for discretized integral equations using Julia". IEEE IPDPS'24 Proceedings.
- A. Yesypenko and P.G. Martinsson, "GPU Optimizations for the Hierarchical Poincaré-Steklov Scheme". DD '27: International Conference on Domain Decomposition Methods, Springer, pp. 519–528, 2022.

- C. Chen and P.G. Martinsson, "Solving Linear Systems on a GPU with Hierarchically Off-Diagonal Low-Rank Approximations". SC '22: Proceedings of the International Conference on High Performance Computing, Networking, Storage and Analysis, Article No. 84, pages 1–15, 2022.
- A. Gopal and P.G. Martinsson, "Broadband Recursive Skeletonization". In *Proceedings of ICOSAHOM'21: Spectral and High Order Methods for Partial Differential Equations*, Springer, pp. 31–66, 2023.
- A. Buluc, T. Kolda, S. Wild, et al, "Randomized Algorithms for Scientific Computing (RASC)". *DOE workshop report*, arxiv #2104.11079, 2021.
- T. Babb, P.G. Martinsson, and D. Appelö, "HPS Accelerated Spectral Solvers for Time Dependent Problems: Part I, Algorithms" In collection *Spectral and High Order Methods for Partial Differential Equations*, book series *Lecture notes in computational science and engineering*, **134**, pp. 131 – 142, Springer, 2020
- T. Babb, P.G. Martinsson, and D. Appelö, "HPS Accelerated Spectral Solvers for Time Dependent Problems: Part II, Numerical Experiments" In collection *Spectral and High Order Methods for Partial Differential Equations*, book series *Lecture notes in computational science and engineering*, **134**, pp. 155 – 166, Springer, 2020
- P.G. Martinsson, "Randomized Projection Methods in Linear Algebra and Data Analysis." SIAM News, Dec. 2018.
- M. A. Echeverri Bautista, M. A. Francavilla, P. G. Martinsson, F. Vipiana, "A Nested Compressive Solver for MoM Matrices," Proc. IEEE Intern. Symp. on Antennas and Prop., Puerto Rico, 2016.
- P.G. Martinsson, "Fast Multipole Methods," In *Encyclopedia of Applied and Computational Mathematics* by Springer, edited by Björn Engquist.
- F. Cajko, E. Michielssen, L. Gomez, P.G. Martinsson, L. Hernandez-Garcia. "A Fast Direct Solver for TMS Analysis and Design in 3D." 2011 IEEE International Symp. on Antennas and Propagation.
- A. Gillman, P. Young, P.G. Martinsson "Numerical homogenization via approximation of the solution operator". In B. Engquist, O. Runborg, R. Tsai, editors, *Numerical Analysis of Multiscale Computations*, volume 82 of Lecture Notes in Computational Science and Engineering, Heidelberg, 2011, pp. 187–216. Springer Verlag.
- A. Szlam, P.G. Martinsson, and M. Tygert. "Normalized power iterations for the computation of SVD." NIPS workshop on low-rank methods for large-scale machine learning, Vancouver, 2010.
- P.G. Martinsson and G.J. Rodin, "Boundary Algebraic Equations for Lattice Problems". *IUTAM proceedings, Liverpool, 2002*

Presentations

Selected conference presentations and tutorials

2025
- Mini-tutorial speaker, SIAM CSE, Fort Worth, March 2025.
- Invited long mini-symposium lecture, JMM, Seattle, Jan. 2025.

2024
- Invited lecture, IABEM Workshop, Shenzhen, China, Dec. 2024.
- Plenary lecture, SIAM TX-LA annual meeting, Waco, TX, Oct. 2024.

2023
- Invited lecture at Numerical Analysis in the 21st Century, Oxford, Aug. 2023.
- Invited lecture at ICERM workshop, Providence, June 2023.
- Semi-plenary lecture at FoCM, Paris, June 2023.
- Colloquium for the SIAM Pacific Northwest section, May 2023.

2021
- Two invited lectures at the Woudschoten 2021 meeting, The Netherlands, Oct. 2021.
- Plenary lecture at ICOSAHOM, Vienna, Austria, July 2021. (Virtual due to Covid-19.)
- Plenary lecture at SIAM Annual meeting in Spokane, WA; July 2021. (Virtual due to Covid-19.)
- Complexity of Matrix Computations lecture, June 2021.
- Electronic Numerical Linear Algebra lecture, March 2021.

2020
- Invited lecture at DOE Workshop on randomized algorithms, Nov. 2020.
- Keynote at *Numerical Analysis for Data Science Opening Workshop*, SAMSI, Aug. 2020. (Zoom.)
- Invited lecture at IABEM workshop, Shenzhen, China, April 2020. (Postponed due to Covid-19.)

2019
- Plenary lecture at TRIPODS southwest conference, Tucson, AZ, May 2019.
- Invited talk for the Edinburgh Mathematical Society, Glasgow, Feb. 2019.

2018
- IPAM workshop "Big Data meets Large Scale Computing", UCLA, Sep. 2018.
- Simons institute "Randomized Numerical Linear Algebra and Applications", Berkeley, Sep. 2018.
- ICERM workshop on fast algorithms for point configurations, Brown U., March 2018.
- Invited plenary talk, SIAM UKIE Annual Meeting, Southampton, Jan. 2018.

2017
- Lecture at opening workshop for MathDataLab at KTH, Stockholm, Nov. 2017.
- SIAM Germund Dahlquist Prize lecture, SciCADE, Bath, UK, September 2017.

2016
- Invited plenary talk, Workshop on Fast Direct Solvers.
  Purdue Center for Computational & Applied Mathematics, November, 2016.
- Summer school lecturer ("The Mathematics of Data"), Park City Mathematics Institute.
  Park City, UT, June 27 – July 3, 2016.
- Invited plenary talk, SHAXC, Kaust, Saudi Arabia, May 2016.

2015
- Invited plenary talk at MMMA-2015 conference in Moscow, Russia, Aug. 2015.
- Invited plenary talk at "Sparse Days III" conference in St. Girons, France, July 2015.

2014
- Invited talk at ICAM 2014, City University of Hong Kong, Dec. 2014.
- Principal lecturer for CBMS/NSF conference on *Fast Direct Solvers for Elliptic PDEs*.
  Dartmouth College, June 23 – 27, 2014
- Speaker at ICERM workshop on spectral methods for graphs, Brown U., May 2014.

2012
- *Randomized methods in numerical linear algebra*
  Plenary lecture at "Challenges in Geometry, Analysis and Computation: High Dimensional Synthesis"
  Yale University, June 2012.
- *Fast Methods in Scientific Computing*
  Keynote speaker at E-CAero Spring School. Montestigliano, Italy, March 2012.

2011
- *Randomized Methods for Very Large-Scale Linear Algebra*
  Random Matrix Theory workshop at FoCM'11, Budapest, Hungary, July 2012.

2010 • *Randomized methods for computing the SVD or PCA of very large matrices*
Workshop on Algorithms for Modern Massive Data Sets. Palo Alto, CA.

2009 • *Making very large-scale linear algebraic computations possible via randomization*
Tutorial lecture at NIPS 2009. Vancouver, Canada.

• *Fast matrix computations via randomized sampling*
Special session on "Mathematics of Knowledge and Information", AMS Annual meeting 2009.

Selected department colloquia and seminars

2025 • Computational Mathematics and Applications Seminar, Oxford, May 2025.
• Computational Mathematics Seminar, U. Illinois-UC, Feb. 2025.

2024 • Applied mathematics seminar, Imperial College & UCL, London, Sep. 2024.
• Mathematics colloquium, University of Wisconsin at Madison, March 2024.

2023 • Statistics & applied math colloquium, University of Chicago, Nov. 2023.

2022 • Computational Mathematics and Applications Seminar, Oxford, May 2022.
• Applied Mathematics Colloquium, Cornell, April. 2022.

2021 • Clements Scientific Computing Seminar Series, SMU, Dallas, Oct. 2021.
• Scientific Computing Seminar, Emory, April 2021.

2020 • Random matrix seminar, Oxford, Feb. 2020.
• Computational Mathematics and Applications Seminar, Oxford, Feb. 2020.

2019 • Courant institute mathematics colloquium, Sep. 2019.
• Applied and computational mathematics seminar, Texas A&M, Nov. 2019.

2018 • MathDataLab, KTH, Dec. 2018.
• Keller Colloquium, Caltech, Oct. 2018.
• Applied mathematics seminar, Univ. of Bath, April 2018.
• Applied mathematics seminar, Univ. of Manchester, April 2018.
• Applied mathematics seminar, Univ. College London, Feb. 2018.
• Applied mathematics seminar, Univ. of Warwick, Jan. 2018.

2017 • Computational Mathematics and Applications Seminar, Oxford, May 2017.
• Applied mathematics seminar, University of Texas at Austin, April 2017.

2016 • Applied mathematics seminar, University of Texas at Austin, Sep. 2016.
• ICES seminar, University of Texas at Austin, March 2016.

2015 • CAAM colloquium, Rice University, November 2015.
• Mathematics colloquium, New York University, May 2015.
• Scientific and Statistical Computing Seminar, Univ. of Chicago, Feb. 2015.

2014 • Mathematics colloquium, Rensselaer Polytechnic Institute, March 2014.
• PACM colloquium, Princeton, Feb. 2014.
• AMCS colloquium, University of Pennsylvania, Feb. 2014.
• Mathematics colloquium, Colorado School of Mines, Feb. 2014.

2013 • Matrix computations seminar, Berkeley, Nov. 2013.

2012 • ICES seminar, Univ. of Texas at Austin, Dec. 2012
• ACM seminar, Univ. of Michigan, Nov. 2012
• ACM colloquium, Caltech, Nov. 2012.
• Computational mathematics seminar, UC-Davis, Oct. 2012.
• Numerical analysis seminar, Royal Institute of Technology (Sweden), May 2012.
• Computational mathematics seminar, Chalmers University (Sweden), Jan. 2012.

Teaching

Courses developed

- *Randomized algorithms for matrix computations and data analysis*
12-lecture course taught to M.Sc. students in the Oxford MMSC program.
- *Fast Algorithms for Big Data (APPM5720)*
University of Colorado at Boulder. Newly developed in Spring 2016.
- *Applied Analysis I and II (APPM5440 and APPM5450)*
University of Colorado at Boulder. Redeveloped curriculum in 2005. Taught multiple times.

- *Summer school on "Fast Direct Solvers"*
  10-lecture intensive course developed for CBMS conference at Dartmouth College, 2015.
  Course is now available online — slides, videos of lectures, tutorial codes, etc.
- *Fast Methods in Scientific Computation (APPM 4720/5720)*
  University of Colorado at Boulder. Newly developed 2011.
- *Spring school on "Fast Methods in Scientific Computing"*
  Montestigliano, Italy, March 2012. For advanced graduate students.

Courses taught

- *Approximation of functions (C6.3)*
  Fourth year at Oxford on approximation theory.
- *Differential Equations with Linear Algebra (APPM2360)*
  University of Colorado at Boulder. Large-section undergraduate class (140 students per section).
- *Linear Algebra with Applications (MATH222a)*
  Yale University. Mid-level undergraduate class.
- *Multivariate Calculus (MATH120b)*
  Yale University. Entry-level calculus class.

Service

External service

- Member of Advisory Board for Digital Twins Network at the Alan Turing Institute in London, funded through a £3M award from UKRI, 2023 – 2028.
- Chair of Advisory Board of MathDataLab, Royal Institute of Technology (KTH), Stockholm, 2017 – 2022.

Conferences and workshops organized

- Organizer for long program *Interfaces and unfitted discretization methods*
  Institute Mittag-Leffler, Stockholm, Fall 2025. Member of the organizing committee.
- Workshop on *Modern Applied and Computational Analysis*
  ICERM, Brown University, June 26–30, 2023. Member of the organizing committee.
- Royal Institute of Technology in Stockholm international conference on *Mathematics of Complex Data*, June 13 – 16, 2022, Stockholm, Sweden. Member of the organizing committee.
- BIRS Oaxaca workshop on *Outstanding Challenges in Computational Methods for Integral Equations (20w5060)*, May 23 - May 28, 2022. Member of the organizing committee.
- Member of organizing committee, *SIAM Conference on Applied Linear Algebra*, New Orleans, May 2021.
- Royal Institute of Technology in Stockholm workshop on *Mathematics for Complex Data*, June 24-26, 2019. Member of the organizing committee.
- Oberwolfach mini-workshop *Fast Solvers for Highly Oscillatory Problems*, Oct. 30 – Nov. 5, 2016. Member of the organizing committee.
- Workshop on *Eigenvectors in graph theory and related problems in numerical linear algebra*
  ICERM, Brown University, May 5–9, 2014. Chair of the organizing committee.
- Workshop on *Integral Equation Methods, Fast Algorithms and Applications*
  Banff International Research Station, Dec. 2013. Member of the organizing committee.
- Conference *Challenges in Geometry, Analysis and Computation: High Dimensional Synthesis*
  June 2012, Yale University. Member of the organizing committee, and co-PI of NSF grant #1207829.
- Workshop on *Integral Equation Methods, Fast Algorithms and Applications*
  IMA (at Univ. of Minnesota), Aug. 2010. Member of organizing committee.

Ph.D. examinations

- External examiner; Maike Meier; University of Oxford; Sep. 2024.
- External referee; Théo Mary; Université de Toulouse; Nov. 2017.
- External reader; Daniel Beylkin; Yale University; May 2015.
- External reader; Andrei Osipov; Yale University; May 2011.

- External reader; Andreas Glaser; Yale University; May 2007.
- External reader; Michael O'Neil; Yale University; May 2007.
- Faculty opponent; Jonas Englund; Lund University; June 2006.

Dissertation committees

- Chuning Wang, math, University of Texas at Austin, in progress.
- Ruhui Jin, CSEM, University of Texas at Austin, completed June 2022.
- Keyi Wu, CSEM, University of Texas at Austin, completed May 2022.
- Vikram Bhamidipati, aerospace engineering, University of Texas at Austin, Nov. 2021.
- Boris Bonev, mathematics, EPFL, Switzerland, August 2021.
- Amelia Henriksen, CSEM, University of Texas at Austin, completed August 2021.
- Osman Malik, Applied Mathematics, University of Colorado at Boulder, May 2021.
- Igor Chollet, Sorbonne University, Paris, France, March 2021.
- Qi Lei, CSEM, University of Texas at Austin, completed May 2020.
- Jiong Zhang, CSEM, University of Texas at Austin, completed March 2020.
- Chenhan Yu, Computer Science, University of Texas at Austin, completed 2018.
- Hilary Fairbanks, Applied Mathematics, University of Colorado at Boulder, 2018.
- Dimitri Krattiger, Aerospace Engineering, University of Colorado at Boulder, 2017.
- Benjamin Sturdevant, Applied Mathematics, University of Colorado at Boulder, 2016.
- Bradley Martin, Applied Mathematics, University of Colorado at Boulder, 2016.
- David Appelhans, Applied Mathematics, University of Colorado at Boulder, 2014.
- Jon Häggblad, Numerical Analysis, KTH (Royal Inst. of Technology), Stockholm, 2012
- Matthew Reynolds, Applied Mathematics, University of Colorado at Boulder, 2012.
- David Biaggioni, Applied Mathematics, University of Colorado at Boulder, 2012.
- Rikard Ojala, Mathematics, Lund University, 2011.
- Christopher Kurcz, Applied Mathematics, University of Colorado at Boulder, 2007.
- Jisun Lim, Applied Mathematics, University of Colorado at Boulder, 2007.

Service and committees at the University of Texas

- Deputy Director of the Oden Instute, 2024 –.
- Developed successful proposal for hiring of 4 faculty members in *Scientific Machine learning*, 2024.
- Co-chair of working group to develop strategic hiring plan, Oden Institute, 2023.
- Chair of search committee for Moncrief endowed chair in data science, Oden Institute, 2021 –.
- Member of faculty search committee for Simons Math+X chair (Math+EE), 2023.
- Chair of evaluation committee for third year review of Joseph Kileel, math, UT-Austin.
- U. Texas lead for a strategic partnership between the Oden Institute and the Alan Turing Institute in London, 2022 –.
- Institute Advisory Board for Oden Institute, 2018 –.
- Chair faculty search committee for assistant professor search in data science, Oden Institute, 2019/20.
- Member of faculty search committee for assistant professor searches in computational medicine and data science, Oden Institute, 2018/19.
- Faculty Activity Report evaluation committee, mathematics, 2019/20.
- CSEM GSC, 2018 – 2022.

Service and committees at the University of Oxford and at Christ Church

- Governing Body, Christ Church, Oxford, 2017 – 2018.
- Admissions committee, Math. Modeling and Scientific Computing master's program, Mathematical Institute, Oxford, 2017 – 2018.
- Computing Committee, Christ Church, Oxford, 2017 – 2018.

Service and committees at the University of Colorado

- Chair of tenured associate professor search committee 2016/2017.
- Director of graduate studies in Applied Mathematics, 2012–2017.
- Assistant professor search committee 2015/2016.
- Dean's committee on graduate education in College of Arts & Sciences, 2014 – 2015.
- Department executive committee, 2012–2017.

- Assistant professor search committee 2013/2014.
- Mathematics / applied mathematics coordination committee, 2012/13.
- Program development committee for new center on Scientific Computation 2010/2011.
- Postdoctoral program committee 2010/2011.
- Assistant professor search committee 2008/2009.
- Colloquium chair 2008/2009.
- Graduate committee 2006/2007 and 2007/2008.
- Instructor search committee 2005/2006.