David Samuel Bindel

Professor of Computer Science

http://www.cs.cornell.edu/~bindel/cv/cv.pdf

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Research interests

- Applied numerical linear algebra
- Scientific computing
- High-performance computing
- Spectral network analysis methods
- Optimization via surrogate models
- Finite element analysis
- Computational tools for electrical power grids
- Simulation tools for micro-electro-mechanical systems (MEMS)

Education

May 1999	B.S. in Mathematics and in Computer Science, University of Maryland, College Park
December 2006	Ph.D. in Computer Science, University of California, Berkeley
Advisors:	James Demmel (Computer Science Division and Department of Mathematics) Sanjay Govindjee (Department of Civil Engineering)
Dissertation title:	*Structured and Parameter-Dependent Eigensolvers for Simulation-Based Design of Resonant MEMS*

Professional Experience

September 2022-September 2025.	Collaboration Director, Simons Collaboration on Hidden Symmetries and Fusion Energy.
January 2021-December 2023.	Associate Dean for DEI, Ann S. Bowers College of Computing and Information Science, Cornell University.
July 2020-June 2025.	Director, Center for Applied Mathematics, Cornell University
Summer 2023-present.	Professor, Department of Computer Science, Cornell University
Summer 2017-Summer 2023.	Associate Professor, Department of Computer Science, Cornell University
Spring 2019.	Visiting Scholar, Department of Statistics, University of Chicago
Fall 2018.	Faculty Research Participant, Argonne National Laboratory
Summer 2009-Summer 2017.	Assistant Professor, Department of Computer Science, Cornell University
Fall 2006-Summer 2009.	Courant Instructor of Mathematics, New York University
Fall 1999-Summer 2006.	Graduate Student Researcher, CS Division, UC Berkeley
Fall 2005 and Spring 2001.	Graduate Student Instructor, CS Division, UC Berkeley

Awards

2020 *James and Mary Tien Excellence in Teaching Award*
Highest award for teaching in Cornell's College of Engineering.

2019 *KDD Best Research Paper Award*

2018 *Cornell COE Research Excellence Award*
Awarded annually to two Cornell engineering professors at each level.

2018 *ASPLOS Most Influential Paper Award 2018*
Recognizes a historical ASPLOS paper that has had major influence on the field.

2015 *Middleware Best Student Paper*

2015 *KDD Best Student Paper*

2015 *SIGEST Featured Paper*
Featured paper in SIAM Review from specialist journals on a rotating basis

2015 *SIAG/LA Prize*
Awarded once every three years for the best applied linear algebra journal paper.

2014 *Douglas Whitney Award*
Awarded annually to a Cornell Engineering faculty for teaching excellence.

2010 *Sloan Research Fellowship*

2008 *Alston S. Householder Award*
Awarded once every three years for best thesis in numerical linear algebra.

1999 *NSF Graduate Student Fellowship*

Publications

Journal papers

1. David Bindel, Matt Landreman, and Misha Padidar. Understanding trade-offs in stellarator design with multi-objective optimization. *Journal of Plasma Physics*, 85(5):905890503, 2023.

2. David Bindel, Matt Landreman, and Misha Padidar. Direct optimization of fast-ion confinement in stellarators. *Plasma Physics and Controlled Fusion*, 65:065012, 2023.

3. Xinran Zhu, Leo Huang, Eric Hans Lee, Cameron Alexander Ibrahim, and David Bindel. Bayesian transformed gaussian processes. *Transactions on Machine Learning Research*, 2023.

4. Silke Glas, Misha Padidar, Ariel Kellison, and David Bindel. Global stochastic optimization of stellarator coil configurations. *Journal of Plasma Physics*, 88(2), April 2022.

5. Min Pang, Christine A. Shoemaker, and David Bindel. Early termination strategies with asynchronous parallel optimization in application to automatic calibration of groundwater PDE models. *Environmental Modelling and Software*, 147:105237, January 2022.

6. Mengqi Xia, Bruce Walter, Eric Michielssen, David Bindel, and David Marschner. A wave optics based fiber scattering model. *ACM Transactions on Graphics*, 39:252, December.

7. Pan Shi, Kun He, David Bindel, and John Hopcroft. Krylov subspace approximation for local community detection in large networks. *ACM Transactions on Knowledge Discovery from Data*, October 2019.

8. Marc Auréle Gilles, Christopher Earls, and David Bindel. A subspace pursuit method to infer refractivity in the marine atmospheric boundary layer. *IEEE Transactions on Geosciences and Remote Sensing*, 57(8):5606–5617, August 2019.

9. Pan Shi, Kun He, David Bindel, and John Hopcroft. Locally-biased spectral approximation for community detection. *Knowledge-Based Systems*, 164:459–472, 2019.

10. Colin Ponce, David Bindel, and Panayot Vassilevski. A nonlinear algebraic multigrid framework for the power flow equations. *SIAM Journal of Scientific Computing*, 40(3):B812–B833, 2018.

11. Yixuan Li, Kyle Kloster, Kun He, David Bindel, and John Hopcroft. Local spectral clustering for overlapping community detection. *ACM Transactions on Knowledge Discovery from Data*, 12(2):17, 2018.

12. Colin Ponce and David Bindel. FLiER: Practical topology update detection using sparse PMUs. *IEEE Transactions on Power Systems*, 32(6):4222–4232, 2017.

13. Erdal Yilmaz and David Bindel. Temperature sensitivity and shape optimization of solid-state wave gyroscopes. *IEEE Sensors*, 16(6):6213–6221, 2016.

14. David Bindel and Amanda Hood. Localization theorems for nonlinear eigenvalues. *SIAM Review*, 57(4):585–607, December 2015.
SIGEST feature article.

15. David Bindel, Jon Kleinberg, and Sigal Oren. How bad is forming your own opinion? *Games and Economic Behavior*, 92(C):248–265, 2015.

16. David Bindel, Mark Friedman, Willy Govaerts, Jeremy Hughes, and Yuri A. Kuznetsov. Numerical computation of bifurcations in large equilibrium systems in MATLAB. *Journal of Computational and Applied Mathematics*, 261:232–248, 2014.

17. David Bindel and Amanda Hood. Localization theorems for nonlinear eigenvalues. *SIAM Journal on Matrix Analysis*, 34(4):1728–1749, 2013.
2015 SIAG/LA award (best journal paper in applied LA in three years).

18. Wenlei Xie, Guozhang Wang, David Bindel, Alan Demers, and Johannes Gehrke. Fast iterative graph computation with block updates. *Proceedings of the VLDB Endowment*, 6(14):2014–2025, 2013.

19. Wei He, David Bindel, and Sanjay Govindjee. Topology optimization in micromechanical resonator design. *Optimization and Engineering*, 13(2), 2012.

20. Yao Zhao, Yan Chen, and David Bindel. Towards unbiased end-to-end network diagnosis. *IEEE/ACM Transactions on Networking*, 17(6):1724–1737, December 2009.

21. David Bindel, James Demmel, and Mark Friedman. Continuation of invariant subspaces in large bifurcation problems. *SIAM Journal on Scientific Computing*, 30(2):637–656, February 2008.

22. Yan Chen, David Bindel, Hanhee Song, Brian Chavez, and Randy Katz. Algebra-based scalable overlay network monitoring: Algorithms, evaluation, and applications. *ACM Transactions on Networking*, 15(5):1084–1097, October 2007.

23. David Bindel and Maciej Zworski. Symmetry of bound and antibound states in the semiclassical limit. *Letters in Math Physics*, 81(2):107–117, August 2007.

24. David Bindel and Sanjay Govindjee. Elastic PMLs for resonator anchor loss simulation. *International Journal for Numerical Methods in Engineering*, 64(6):789–818, October 2005.

25. David Bindel, James Demmel, William Kahan, and Osni Marques. On computing Givens rotations reliable and efficiently. *ACM Transactions on Mathematical Software*, 28(2):206–238, June 2002.

Conference papers

1. Ariel E. Kellison, Andrew W. Appel, Mohit Tekriwal, and David S. Bindel. LAProof: A library of formal proofs of accuracy and correctness for linear algebra programs. In *Proceedings of the 30th IEEE International Symposium on Computer Arithhmetic (ARITH)*, September 2023. To appear.

2. Mohit Tekriwal, Andrew W. Appel, Ariel E. Kellison, Jean-Baptiste Jeannin, and David S. Bindel. Verified correctness, accuracy, and convergence of a stationary iterative linear solver: Jacobi method. In *Proceedings of the 16th Conference on Intelligent Computer Mathematics (CICM)*, September 2023. To appear.

3. Dongping Qi, David Bindel, and Alexander Vladimirsky. Surveillance evasion through bayesian reinforcement learning. In Francisco Ruiz, Jennifer Dy, and Jan-Willem van de Meent, editors, *Proceedings of The 26th International Conference on Artificial Intelligence and Statistics*, volume 206 of *Proceedings of Machine Learning Research*, pages 8448–8462. PMLR, 25–27 Apr 2023.

4. Xinran Zhu, Jacob Gardner, and David Bindel. Efficient variational Gaussian processes initialization via kernel-based least squares fitting. In *Proceedings of NeurIPS 2022 Workshop on Gaussian Processes, Spatiotemporal Modeling, and Decision-making Systems*, December 2022.

5. Xinran Zhu, Yang Liu, Pieter Ghysels, David Bindel, and Xiaoye S. Li. GPTuneBand: Multi-task and multi-fidelity autotuning for large-scale high performance computing applications. In *Proceedings of the SIAM Conference on Parallel Processing*, February 2022.

6. Misha Padidar, Xinran Zhu, Leo Huang, Jacob Gardner, and David Bindel. Scaling Gaussian processes with derivative information using variational inference. In *Proceedings of NeurIPS 2021*, December 2021.

7. Moontae Lee, Sungjun Cho, Kun Dong, David Mimno, and David Bindel. On-the-fly rectification for robust large-vocabulary topic inference. In *Proceedings of the 38th International Conference on Machine Learning*, volume 139, pages 6087–6097, July 2021.

8. Leo Huang, Andrew Graven, and David Bindel. Density of states graph kernels. In *Proceedings of the 2021 SIAM International Conference on Data Mining*, pages 289–297, 2021.

9. Ian Delbridge, David Bindel, and Andrew Gordon Wilson. Randomly projected additive Gaussian processes for regression. In *Proceedings of Machine Learning and Systems 2020*, pages 7526–7536, 2020.

10. Eric Hans Lee, David Eriksson, David Bindel, and Bolong Cheng. Efficient rollout strategies for bayesian optimization. In *Proceedings of Uncertainty in Artificial Intelligence 2020*, page 124, July 2020.

11. Kyle Wilson and David Bindel. On the distribution of minima in intrinsic-metric rotation averaging. In *Proceedings of CVPR 2020*, June 2020.

12. Moontae Lee, David Bindel, and David Mimno. Prior-aware composition inference for spectral topic models. In *Proceedings of AISTATS 2020, PMLR 108*, pages 4258–4268, June 2020.

13. Moontae Lee, Sungjun Cho, David Bindel, and David Mimno. Practical correlated topic modeling and analysis via the rectified anchor word algorithm. In *Proceedings of EMNLP 2019*, November 2019.

14. Kun Dong, Austin R. Benson, and David Bindel. Network density of states. In *Proceedings of KDD*, August 2019.
Best research paper award

15. Ian Delbridge, David Bindel, and Andrew Gordon Wilson. Ramdomly projected additive gaussian processes. In *Proceedings of the Third Workshop on Tractable Probabilistic Modelnig (TPM 2019)*, June 2019.

16. David Eriksson, Kun Dong, Eric Lee, David Bindel, and Andrew Gordon Wilson. Scaling Gaussian process regression with derivatives. In *Proceedings of NeurIPS 2018*, December 2018.

17. Jacob Gardner, Geoff Pleiss, Killian Weinberger, David Bindel, and Andrew Gordon Wilson. GPyTorch: Blackbox matrix-matrix Gaussian process inference with GPU acceleration. In *Proceedings of NeuroIPS 2018*, December 2018.

18. Kun Dong, David Eriksson, Hannes Nickisch, David Bindel, and Andrew Gordon Wilson. Scalable log determinants for gaussian process kernel learning. In *Proceedings of NIPS 2017*, December 2017.

19. Moontae Lee, David Bindel, and David Mimno. From correlation to hierarchy: Practical topic modeling via spectral inference. In *Proceedings of the 12th INFORMS Workshop on Data Mining and Decision Analytics*, October 2017.
Best student paper award

20. Pan Shi, Kun He, David Bindel, and John Hopcroft. Local lanczos spectral approximation for community detection. In *Proceedings of ECML-PKDD*, September 2017.

21. Kyle Wilson, David Bindel, and Noah Snavely. When is rotations averaging hard? In *Proceedings of ECCV 2016*, October 2016.

22. Kun He, Pan Shi, John Hopcroft, and David Bindel. Local spectral diffusion for robust community detection. In *KDD Workshop on Mining and Learning with Graphs*, August 2016.

23. Erdal Yilmaz and David Bindel. Temperature sensitivity of solid-wave gyroscopes (late news). In *Proceedings of the Hilton Head Solid-Sate Sensor and Actuator Workshop 2016*, June 2016.

24. Adam Efe Gencer, Emin Gun Sirer, Robbert Van Renesse, and David Bindel. Configuring distributed computations using response surfaces. In *Proceedings of Middleware 2015*, December 2015.
Best student paper.

25. Moontae Lee, David Bindel, and David Mimno. Robust spectral inference for joint stochastic matrix factorization. In *Proceedings of NIPS 2015*, pages 2710–2718, December 2015.

26. Kun He, Yiwei Sun, David Bindel, John Hopcroft, and Yixuan Li. Detecting overlapping communities from local spectral subspaces. In *Proceedings of ICDM 2015*, November 2015.

27. Wenlei Xie, David Bindel, Alan Demers, and Johannes Gehrke. Edge-weighted personalized PageRank: Breaking a decade-old performance barrier. In *Proceedings of ACM KDD 2015*, August 2015.
Best student paper award.

28. Yixuan Li, Kun He, David Bindel, and John Hopcroft. Uncovering the small community structure in large networks: A local spectral approach. In *Proceedings of WWW 2015*, May 2015.

29. Kun Dong and David Bindel. Modified kernel polynomial method for estimating graph spectra. In *SIAM Network Science 2015 (poster)*, May 2015.

30. Erdal Yilmaz and David Bindel. Effects of imperfections on solid-wave gyroscope dynamics. In *Proceedings of IEEE SENSORS 2013*, November 2013.

31. Tao Zou, Guozhang Wang, Marcos Vaz Salles, David Bindel, Alan Demers, Johannes Gehrke, and Walker White. Making time-stepped applications tick in the cloud. In *Proceedings of the Second ACM Symposium on Cloud Computing (SOCC)*, October 2011.

32. David Bindel, Sigal Oren, and Jon Kleinberg. How bad is forming your own opinion? In *Proceedings of the 52nd IEEE Symposium on Foundations of Computer Science (FOCS)*, October 2011.

33. Cynthia Bruyns-Maxwell and David Bindel. Modal parameter tracking for shape changing objects. In *Proceedings of DAFx 2007*, September 2007.

34. James Demmel, Jack Dongarra, Beresford Parlett, William Kahan, Ming Gu, David Bindel, Yozo Hida, Xiaoye Li, Osni Marques, Jason Riedy, Christof Voemel, Julien Langou, Piotr Lusczek, Jakub Kurzak, Alfredo Butarri, Julie Langou, and Stanimire Tomov. Prospectus for the next LAPACK and ScaLAPACK libraries. In *Proceedings of PARA 2006*, pages 11–23, 2006.

35. Cynthia Bruyns and David Bindel. Shape changing symmetric objects for sound synthesis. In *Proceedings of 121st AES*, October 2006.

36. Yao Zhao, Yan Chen, and David Bindel. Toward unbiased end-to-end network diagnosis. In *Proceedings of SIGCOMM 2006*, pages 219–230, 2006.

37. Yao Zhao, Yan Chen, and David Bindel. Toward deterministic overlay diagnosis. In *ACM SIGMETRICS/Performance 2006*, pages 387–388, 2006.

38. Tsuyoshi Koyama, David Bindel, Wei He, Emmanuel Quevy, James Demmel, Sanjay Govindjee, and Roger Howe. Simulation tools for damping in high frequency resonators. In *Proceedings of IEEE SENSORS 2005*, November 2005.

39. Yao Zhao, Yan Chen, and David Bindel. Scalable and deterministic overlay network diagnosis. In *Proceedings of ACM SIGCOMM 2005 (poster)*, 2005.

40. David Bindel, James Demmel, Willy Govaerts, and Yuri Kuznetsov. Bifurcation analysis of large equilibrium systems in MATLAB. In *Proceedings of ICCS 2005*, volume 3514 of *Springer LNCS*, pages 50–57, April 2005.

41. David Bindel, Emmanuel Quevy, Tsuyoshi Koyama, James Demmel, and Roger Howe. Anchor loss simulation in resonators. In *Proceedings of MEMS 2005*, February 2005.

42. Yan Chen, David Bindel, Hanhee Song, and Randy Katz. An algebraic approach to practial and scalable overlay network monitoring. In *Proceedings of ACM SIGCOMM 2004*, 2004.

43. David Bindel, Zhaojun Bai, and James Demmel. Model reduction for RF MEMS simulation. In *Proceedings of PARA 2004*, June 2004.

44. Yan Chen, David Bindel, and Randy Katz. Tomography-based overlay network monitoring. In *Proceedings of ACM SIGCOMM Internet Measurement Conference (IMC)*, 2003.

45. Jason Clark, David Bindel, Wayne Kao, Ernest Zhu, Andrew Kuo, Ningning Zhou, Jiawang Nie, James Demmel, Zhaojun Bai, Sanjay Govindjee, Kristofer S. J. Pister, Ming Gu, and Alice Agogino. Addressing the needs of complex MEMS design. In *Proceedings of MEMS 2002*, January 2002.

46. Yan Chen, Adam Bargteil, David Bindel, Randy Katz, and John Kubiatowicz. Quantifying network denial of service: A location service case study. In *Proceedings of the International Conference on Information and Communications Security (ICICS)*, volume 2229 of *LNCS*, pages 340–351. Springer, November 2001.

47. Jason Clark, David Bindel, Ningning Zhou, Sunil Bhave, Zhaojun Bai, James Demmel, and Kristofer S. J. Pister. SUGAR: Advancements in a 3d multi-domain simulation package for MEMS. In *Proceedings of the Microscale Systems: Mechanics and Measurements Symposium*, June 2001.

48. Zhaojun Bai, David Bindel, Jason Clark, Ningning Zhou, James Demmel, and Kristofer S. J. Pister. New numerical techniques and tools in SUGAR for 3D MEMS simulation. In *Proceedings of the Fourth International Conference on Modeling and Simulation of Microsystems (MSM)*, March 2001.

49. John Kubiatowicz, David Bindel, Yan Chen, Steven Czerwinski, Patrick Eaton, Dennis Geels, Ramakrishna Gummadi, Sean Rhea, Hakim Weatherspoon, Westley Weimer, Chris Wells, and Ben Zhao. OceanStore: An architecture for global-scale persistent storage. In *Procedings of the Ninth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2000)*, November 2000.
ASPLOS Most Influential Paper Award 2018

50. Jason Clark, Ningning Zhou, David Bindel, Luca Schenato, W. Wu, James Demmel, and Kristofer S. J. Pister. 3D MEMS simulation modeling using modified nodal analysis. In *Proceedings of the Microscale Systems: Mechanics and Measurements Symposium*, pages 68–75, June 2000.

Reports

1. Yanhao Yang, Meng Wang, David Bindel, and Hun He. Streaming local community detection through approximate conductance. Technical report, October 2021.

2. Dongping Qi, David Bindel, and Alex Vladimirsky. Surveillance evasion through Bayesian reinforcement learning. Technical report, September 2021.

3. David Eriksson, David Bindel, and Christine Shoemaker. pySOT and POAP: An event-driven asynchronous framework for surrogate optimization. Technical report, August 2019.

4. Amanda Hood and David Bindel. Pseudospectral bounds on transient growth for higher order and constant delay differential equations. Technical report, November 2016.

5. Colin Ponce and David Bindel. FLiER: Practical topology update detection using sparse PMUs. Technical report, July 2016.

6. Jeffrey Chadwick and David Bindel. An efficient solver for sparse linear systems based on rank-structured Cholesky factorization. Technical report, July 2015.

7. David Bindel and Amanda Hood. Localization theorems for nonlinear eigenvalues. Technical report, August 2013.

8. Wei He, David Bindel, and Sanjay Govindjee. Topology optimization in micromechanical resonator design. Technical Report UCB/SEMM-2009/04, Structural Engineering Mechanics and Materials, Department of Civil and Environmental Engineering, University of California, Berkeley, December 2009.

9. David Bindel. *Structured and Parameter-Dependent Eigensolvers for Simulation-Based Design of Resonant MEMS*. PhD thesis, University of California, Berkeley, August 2006.
2008 Householder Award (best NLA thesis over three years)

10. David Bindel and James Demmel. Continuation of invariant subspaces for large bifurcation problems. Technical Report EECS-2006-13, UC Berkeley Computer Science Division, February 2006.

11. David Bindel, Shivkumar Chandresekaran, James Demmel, David Garmire, and Ming Gu. A fast and stable nonsymmetric eigensolver for certain structured matrices. Technical report, May 2005.

12. David Bindel and Sanjay Govindjee. Elastic PMLs for resonator anchor loss simulation. Technical Report UCB/SEMM-2005/01, Structural Engineering Mechanics and Materials, Department of Civil and Environmental Engineering, University of California, Berkeley, February 2005.

13. Yan Chen, David Bindel, Hanhee Song, and Randy Katz. Tomography-based overlay network monitoring. Technical Report CSD-03-1252, UC Berkeley Computer Science Division, June 2003.

14. David Bindel, James Demmel, William Kahan, and Osni Marques. On computing Givens rotations reliable and efficiently. Technical Report 128, LAPACK Working Notes, January 2001.

15. John Kubiatowicz, David Bindel, Yan Chen, Steven Czerwinski, Patrick Eaton, Dennis Geels, Ramakrishna Gummadi, Sean Rhea, Hakim Weatherspoon, Westley Weimer, Chris Wells, and Ben Zhao. OceanStore: An architecture for global-scale persistent storage. Technical Report CSD-00-1102, UC Berkeley Computer Science Division, March 2000.

External talks

Colloquium and seminar talks

1. Apr 2022, The Structure and Interpretation of Graph Spectral Densities, Michigan Applied Interdisciplinary Mathematics (AIM) seminar.
2. Jan 2022, Inducing Point Approximations of Kernel Matrices, eNLA seminar, online.
3. Mar 2020, Understanding Graphs through Spectral Densities, University of Buffalo Applied Math Seminar.
4. Oct 2019, Understanding Graphs through Spectral Densities, WMU math colloquium.
5. Jun 2019, Numerical Methods for Data Science: Spectral Network Analysis, Part II, Special lecture series at University of Chicago.
6. Jun 2019, Numerical Methods for Data Science: Spectral Network Analysis, Part I, Special lecture series at University of Chicago.
7. Jun 2019, Numerical Methods for Data Science: Kernel Methods, Part II, Special lecture series at University of Chicago.
8. Jun 2019, Numerical Methods for Data Science: Kernel Methods, Part I, Special lecture series at University of Chicago.

9. Jun 2019, Numerical Methods for Data Science: Latent Factor Models, Part II, Special lecture series at University of Chicago.
10. Jun 2019, Numerical Methods for Data Science: Latent Factor Models, Part I, Special lecture series at University of Chicago.
11. May 2019, Understanding Graphs through Spectral Densities, CS Colloquium, William and Mary.
12. May 2019, Understanding Graphs through Spectral Densities, Math Colloquium, Virginia Tech.
13. May 2019, Numerical Methods for Data Science: Spectral Network Analysis, Part II, Special lecture series at University of Maryland, College Park.
14. Apr 2019, Numerical Methods for Data Science: Spectral Network Analysis, Part I, Special lecture series at University of Maryland, College Park.
15. Apr 2019, Numerical Methods for Data Science: Kernel Methods, Part II, Special lecture series at University of Maryland, College Park.
16. Apr 2019, Numerical Methods for Data Science: Kernel Methods, Part I, Special lecture series at University of Maryland, College Park.
17. Apr 2019, Numerical Methods for Data Science: Latent Factor Models, Part II, Special lecture series at University of Maryland, College Park.
18. Apr 2019, Numerical Methods for Data Science: Latent Factor Models, Part I, Special lecture series at University of Maryland, College Park.
19. Jan 2019, Stochastic Linear Algebra for Scalable Gaussian Processes, Applied Mathematics Colloquium, Illinois Institute of Technology.
20. Jan 2019, Stochastic Linear Algebra for Scalable Gaussian Processes, CAM Colloquium, University of Chicago.
21. Oct 2018, Stochastic Linear Algebra for Scalable Gaussian Processes, IEMS Seminar, Northwestern University.
22. Jun 2018, Understanding Graphs through Spectral Densities, Seminar at Huazhong University of Science and Tech.
23. Jun 2018, Understanding Graphs through Spectral Densities, ZY-INS Colloquium, Shanghai Jiao Tong University.
24. Feb 2017, Model Reduction for Edge-Weighted Personalized PageRank, Berkeley CS Colloquium.
25. Jan 2017, Nonlinear Eigenvalue Problems: Theory and Applications, Berkeley Applied Math Seminar.
26. Dec 2016, Model Reduction for Edge-Weighted Personalized PageRank, NYU Numerical Analysis and Scientific Computing Seminar.
27. Oct 2016, Fast Fingerprints for Power System Events, Argonne National Lab.
28. Aug 2016, Fast Fingerprints for Power System Events, Lawrence Berkeley Lab.
29. Apr 2016, Model Reduction for Edge-Weighted Personalized PageRank, Purdue Computational and Applied Mathematics Seminar.
30. Mar 2016, Model Reduction for Edge-Weighted Personalized PageRank, Hong Kong Baptist University.
31. Mar 2016, Nonlinear Eigenvalue Problems: Theory and Applications, University of Arizona Math Colloquium.
32. Oct 2015, Model Reduction for Edge-Weighted Personalized PageRank, Stanford LA/Opt Seminar.
33. Oct 2015, Model Reduction for Edge-Weighted Personalized PageRank, Berkeley Matrix Computations Seminar.
34. Apr 2014, Music of the Microspheres, Oxford University NA Seminar.
35. Jan 2014, Music of the Microspheres, UMCP NA Seminar.
36. Nov 2013, Music of the Microspheres, Seminar at UTRC.
37. Oct 2013, Music of the Microspheres, Tufts/Schlumberger Scientific Computing Seminar.
38. Apr 2013, Computer Aided Design of Micro-Electro-Mechanical Systems, Civil Engineering Seminar at Duke.
39. Nov 2011, Communities, Spectral Clustering, and Random Walks, University of Chicago Scientific Computing Seminar.

40. Apr 2011, Matrix Factorizations for Computer Network Tomography, NYU NA Seminar.
41. Nov 2009, Applications and Analysis of Nonlinear Eigenvalue Problems, Simon Fraser University NA Seminar.
42. Nov 2008, Computer-Aided Design for Micro-Electro-Mechanical Systems, Stanford LA/Opt Seminar.
43. Nov 2008, Computer-Aided Design for Micro-Electro-Mechanical Systems, MIT Applied Math Colloquium.
44. Oct 2008, Bounds and Error Estimates for Nonlinear Eigenvalue Problems, Berkeley Applied Math Seminar.
45. Feb 2008, Computer-Aided Design for Micro-Electro-Mechanical Systems, McGill NA Seminar.
46. Jan 2008, Computer-Aided Design for Micro-Electro-Mechanical Systems, Rice University Applied Math Colloquium.
47. Nov 2007, Computer-Aided Design for Micro-Electro-Mechanical Systems, Temple University NA Seminar.
48. Nov 2007, Computer-Aided Design for Micro-Electro-Mechanical Systems, Cornell CS Colloquium.
49. Mar 2007, Computer-Aided Design for Micro-Electro-Mechanical Systems, Columbia Applied Math Colloquium.
50. Aug 2006, Spectral Inclusion Regions for Bifurcation Analysis, Stanford NA Seminar.
51. Apr 2006, Computer-Aided Design for Micro-Electro-Mechanical Systems, Purdue CS.
52. Apr 2006, Computer-Aided Design for Micro-Electro-Mechanical Systems, CU Boulder CS Colloquium.
53. Mar 2006, Computer-Aided Design for Micro-Electro-Mechanical Systems, UC Davis CS Colloquium.
54. Feb 2006, Computer-Aided Design for Micro-Electro-Mechanical Systems, Penn State University.
55. Feb 2006, Computer-Aided Design for Micro-Electro-Mechanical Systems, Caltech CS Colloquium.
56. Jan 2006, Computer-Aided Design for Micro-Electro-Mechanical Systems, Sandia National Labs.
57. Nov 2004, Computer-Aided Design of MEMS, NYU Numerical Analysis Seminar.
58. Jun 2002, SUGAR: A MEMS Simulation Program, Sun Microsystems.
59. Mar 2002, Simulating MicroElectroMechanical Systems, UC Davis.

Workshop and conference talks

1. Aug 2023, Linear Algebra, Invariant Circles, and Fusion Plasmas, BIRS Workshop on New Directions in Applied Linear Algebra. *Invited.*
2. Mar 2023, Global Stochastic Optimization of Stellarator Coils, SIAM Computational Science and Engineering 2023, Amsterdam. *Minisymposium.*
3. Jul 2022, Inducing Point Approximations of Kernel Matrices, SIAM Annual Meeting 2022, Pittsburgh (hybrid). *Minisymposium.*
4. Jun 2022, Constrained, Multi-Objective, and Parameterized Optimization, Simons Collaboration Meeting, Institute for Plasma Physics, Greifswald, Germany. *Invited.*
5. Jun 2022, Chebyshev Featurization, Householder Symposium XXI, Selva di Fasano. *Invited.*
6. Feb 2022, Spectral Network Analysis: Beyond the Spectrum's Edge, Workshop on Complex Networks: Analysis, Numerics, and Applications at UMD. *Invited.*
7. May 2021, Structured Numerical Linear Algebra for Gaussian Process Modeling, SIAM Applied Linear Algebra 2021, online. *Plenary.*
8. Mar 2021, Surrogate-Based Optimization of Stellarators, SIAM Computational Science and Engineering 2021, online. *Minisymposium.*
9. Dec 2019, Surrogate Methods for Optimizing Fusion Device Designs, SIAM Analysis of PDEs 2019, La Quinta. *Minisymposium.*
10. Oct 2019, From Bells of Frost to Opinion's Cost: The Many Applications of Eigenvalues, WMU Fall Math Public Lecture. *Invited.*
11. Jul 2019, Understanding Graphs through Spectral Densities, ICIAM 2019. *Minisymposium.*
12. Jul 2019, Dynamics via Nonlinear Pseudospectra, ICIAM 2019. *Minisymposium.*
13. Jul 2019, Understanding Graphs through Spectral Densities, SIAG-LA lecture at ILAS 2019. *Plenary.*

14. Mar 2019, Global, Robust, Multi-Objective Optimization of Stellarators, Simons Collaboration on Hidden Symmetries and Fusion Energy Annual Meeting. *Invited.*
15. Feb 2019, Nonlinear Eigenvalue Localization for Damping Bounds, SIAM Computational Science and Engineering 2019, Spokane. *Minisymposium.*
16. Sep 2018, LA Support for Scalable Kernel Methods, Workshop on Approximation Theory and Machine Learning, Purdue. *Invited.*
17. Jul 2018, Understanding Graphs through Spectral Densities, SIAM Network Science, Portland. *Plenary.*
18. Jun 2018, Stochastic LA for Scaling GPs, International Workshop on Computational Math, Suzhou. *Invited.*
19. Apr 2018, Multi-Objective Stochastic Optimization of Magnetic Fields, Simons Foundation Proposal Presentation. *Invited.*
20. Nov 2017, Scalable Algorithms for Kernel-Based Surrogates in Prediction and Optimization, Workshop on Surrogate Models and Coarsening Techniques, UCLA IPAM. *Invited.*
21. Jul 2017, Dynamics via Nonlinear Pseudospectra, Foundations of Computational Math 2017. *Minisymposium.*
22. Jun 2017, Stochastic estimators in Gaussian process kernel learning, Householder Symposium. *Invited.*
23. Mar 2017, An Efficient Solver for Sparse Linear Systems based on Rank-Structured Cholesky Factorization, SIAM CSE 2017. *Minisymposium.*
24. Jul 2016, Celebrating Charlie, SIAM Annual Meeting, Boston. *Minisymposium.*
25. Jul 2016, Density of States for Graph Analysis, SIAM Annual Meeting, Boston.
26. Mar 2016, An Efficient Solver for Sparse Linear Systems based on Rank-Structured Cholesky Factorization, TSIMF Workshop on Structured Matrix Computations with Applications. *Invited.*
27. Dec 2015, Grumbles of a Numerical Analyst, Dagstuhl Seminar on Approximate and Probabilistic Computing. *Invited.*
28. Oct 2015, An Efficient Solver for Sparse Linear Systems based on Rank-Structured Cholesky Factorization, SIAM LA 2015. *Minisymposium.*
29. Oct 2015, Localizing Nonlinear Eigenvalue Problems: Theory and Applications, SIAM LA 2015 (Prize Lecture). *Plenary.*
30. Aug 2015, Edge-Weighted Personalized PageRank: Breaking a Decade-Old Performance Barrier, KDD 2015.
31. Aug 2015, Edge-Weighted Personalized PageRank: Breaking a Decade-Old Performance Barrier, KDD 2015 (poster session).
32. Mar 2015, RBF Response Surfaces with Inequality Constraints, SIAM CSE. *Minisymposium.*
33. Feb 2015, FLiER: Practical Topology Error Correction Using Sparse PMUs, ARPAe Innovation Summit, National Harbor, MD.
34. Jun 2014, Music of the Microspheres, Householder Symposium. *Plenary.*
35. Apr 2014, Eigenvalue Localization and Applications, NEP14 Workshop. *Invited.*
36. Jul 2013, An Efficient Solver for Sparse Linear Systems based on Rank-Structured Cholesky Factorization , Workshop on Forty Years of Nested Dissection, University of Waterloo.
37. Jan 2013, Some perturbation theorems for nonlinear eigenvalue problems, Workshop on Dissipative Spectral Theory, Cardiff. *Invited.*
38. Dec 2012, Computer Aided Design of Micro-Electro-Mechanical Systems, SCMS Workshop on Recent Advances in Scientific Computing, Fudan University . *Invited.*
39. Dec 2012, Computer Aided Design of Micro-Electro-Mechanical Systems, FIST Workshop at Shanghai Tech. *Invited.*
40. Oct 2012, From Networks to Numerical Linear Algebra, NYCAM.
41. Sep 2012, Numerical Analysis of Resonances, Weyl at 100 Workshop (Fields Institute). *Invited.*
42. Jul 2012, Communities, Spectral Clustering, and Random Walks, MMDS. *Invited.*
43. Jul 2012, AxFEM: Micro-Gyro Simulation and Modeling, DARPA MRIG Program Meeting.
44. Jul 2011, Analyzing Resonances via Nonlinear Eigenvalues, ICIAM. *Minisymposium.*

45. Jul 2011, Matrix Factorizations for Computer Network Tomography, Householder Symposium. *Plenary.*
46. May 2011, Integrating Multiphysics and Multiscale Modeling Environment Together, DSRC Meeting, Alexandria. *Invited.*
47. Apr 2011, Matrix Factorizations for Computer Network Tomography, NYCAM.
48. Mar 2011, Structure-Preserving Model Reduction for MEMS, SIAM CSE Meeting. *Minisymposium.*
49. Jul 2010, Resonances: Interpretation, Computation, and Perturbation, Workshop in honor of Pete Stewart at UT Austin. *Invited.*
50. Jul 2010, Structure-Preserving Model Reduction for MEMS Modeling, SIAM Annual Meeting. *Minisymposium.*
51. Apr 2010, Finite Element Software for Bone Deformation and Failure, BTHSCA1 Workshop, UCLA IPAM. *Invited.*
52. Oct 2009, Resonances and Nonlinear Eigenvalue Problems, NYCAM.
53. Jul 2009, Bounds and Error Estimates for Resonance Problems, SIAM Annual Meeting. *Minisymposium.*
54. Jul 2009, Numerical Methods for Resonance Calculations, MSRI Workshop on Resonances. *Invited.*
55. Oct 2008, Numerical Methods for Resonance Calculations, BIRS Resonance Workshop. *Invited.*
56. Jun 2008, Computer-Aided Design for Micro-Electro-Mechanical Systems, Householder Symposium (Householder Award Talk). *Plenary.*
57. Jun 2008, Error Bounds and Error Estimates for Nonlinear Eigenvalue Problems, Householder Symposium. *Minisymposium.*
58. Dec 2007, Numerical and Semi-Analytical Structure-Preserving Model Reduction for MEMS , DARPA MEMS/NEMS Workshop. *Invited.*
59. Sep 2007, Numerical and Semi-Analytical Structure-Preserving Model Reduction for MEMS , ICIAM. *Minisymposium.*
60. Jul 2007, Structure Preserving Model Reduction for Damped Resonant MEMS, USNCCM. *Minisymposium.*
61. Jul 2007, Numerical and Semi-Analytical Structure-Preserving Model Reduction for MEMS , ICIAM. *Minisymposium.*
62. Feb 2007, Continuation of Sparse Eigendecompositions, SIAM CSE. *Minisymposium.*
63. Feb 2007, Model Reduction and Mode Computation for Damped Resonant MEMS, SIAM CSE. *Minisymposium.*
64. May 2006, Modeling Resonant Microsystems, Abel Symposium. *Invited.*
65. Jul 2005, Elastic PMLs for Resonator Anchor Loss Simulation, US National Conference on Computational Mechanics. *Minisymposium.*
66. Jul 2005, Eigenproblems in Resonant MEMS Design, SIAM Annual Meeting. *Minisymposium.*
67. May 2005, Continuation of Invariant Subspaces of Sparse Parameter-Dependent Matrices, Householder Symposium. *Plenary.*
68. Jul 2004, Fast Hessenberg QR Iteration for Companion Matrices, SIAM Annual Meeting. *Minisymposium.*
69. Jun 2004, Reduced Order Models in Microsystems and RF MEMS, PARA 2004. *Minisymposium.*
70. Mar 2004, Simulating RF MEMS, Bay Area Scientific Computing Day. *Invited.*
71. Jul 2003, Fast QR Iteration for Companion Matrices, SIAM Linear Algebra Meeting. *Minisymposium.*
72. Apr 2002, SUGAR: A MEMS Simulation Program, MSM 2002.

Released software

- *PySOT*: Python Surrogate Optimization Toolbox
- *POAP*: Python for Optimization with Asynchronous Plumbing
- *GraphDoS*: Analyzing graphs based on global and local Density of States
- *RSC*: Rank-structured Cholesky for fast PDE solves

- *AxFEM*: Fast simulation of near-axisymmetric resonant MEMS
- *MatScat*: 1D scattering and resonance computation in MATLAB
- *BoneFEA*: Finite element analysis of human bones
- *MATFEAP*: MATLAB interfaces to the FEAP finite element code
- *MWrap*: A gateway language for mixing MATLAB and C
- *Matexpr*: A MATLAB-like mini-language for fast inner loops in C
- *HiQLab*: Finite element analysis of damping in high-frequency MEMS
- *SUGAR*: System-level simulation software for MEMS
- *CLAPACK 3.0*: C interfaces to the LAPACK linear algebra library

Teaching

- S23 Numerical Analysis: Linear and Nonlinear Problems (CS 4220/5223 / MATH 4260)
- F22 Matrix Computations (CS 6210)
- S22 Numerical Analysis: Linear and Nonlinear Problems (CS 4220/5223 / MATH 4260)
- S21 Numerical Methods for Data Science (CS 6241)
- F20 Applications of Parallel Computers (CS 5220)
- S20 Numerical Analysis: Linear and Nonlinear Problems (CS 4220/5223 / MATH 4260)
- F19 Matrix Computations (CS 6210)
- Summer19 Numerical Methods for Data Science (SJTU CS 259)
- Summer18 Numerical Methods for Data Science (SJTU CS 259)
- S18 Numerical Methods for Data Science (CS 6241)
- F17 Applications of Parallel Computers (CS 5220)
- S17 Numerical Analysis: Linear and Nonlinear Problems (CS 4220/5223 / MATH 4260)
- F16 Matrix Computations (CS 6210)
- S16 Numerical Analysis: Linear and Nonlinear Problems (CS 4220/5223 / MATH 4260)
- F15 Applications of Parallel Computers (CS 5220)
- S15 Numerical Analysis: Linear and Nonlinear Problems (CS 4220/5223 / MATH 4260)
- S14 Applications of Parallel Computers (CS 5220)
- F13 Matrix Computations (CS 6210)
- F12 Matrix Computations (CS 6210)
- S12 Introduction to Scientific Computing (CS 3220)
- F11 Applications of Parallel Computers (CS 5220)
- S11 Introduction to Scientific Computing (CS 3220)
- S10 Applications of Parallel Computers (CS 5220)
- F09 Matrix Computations (CS 6210)
- S09 Scientific Computing (NYU G22.2112)
- F08 High Performance Scientific Computing (NYU G22.2945)
- S08 Honors Calculus II (NYU V63.0222)
- F07 Theory of Probability (NYU V63.0233)
- S07 Honors Calculus II (NYU V63.0222)
- F06 Quantitative Reasoning: Mathematical Patterns in Nature (NYU V55.0101)
- F05 Compilers and Programming Languages (Berkeley CS 164), TA for Richard Fateman
- F01 Applications of Parallel Computers (Berkeley CS 267), TA for Kathy Yelick

Service

External activities

- 2023-2024: Committee chair, 2024 SIAG/DATA Career and Early Career Prize committee.
- 2025: Committee member, Local organizing committee, Householder XXII Meeting.
- 2025: Co-chair, Program committee, SIAM Computational Science and Engineering 2025.
- 2023-2024: Committee member, SIAM Nominating Committee.
- 2022: Reviewer, ICLR 2023.
- 2022: Program committee member, MLSys 2023.
- 2022: Committee member, Program committee, SIAM Network Science 2022.
- 2022: Committee member, 2023 SIAG/CSE Early Career Prize Selection Committee.
- 2022: Committee member, Organizing Committee, SIAM Mathematics of Data Science 2022.
- 2022: Senior PC member, ACM KDD.
- 2022: Reviewer, ICML 2022.
- 2022: Reviewer, AISTATS 2022.
- 2021-2023: Associate editor, SIAM Journal of Scientific Computing.
- 2021: Reviewer, ICLR 2022.
- 2021: Reviewer, ICML 2021.
- 2021: PC member, UAI 2021.
- 2021: Senior PC member, ACM KDD.
- 2020: Reviewer, ICLR 2020 reviewer.
- 2020: Reviewer, NeurIPS 2020 reviewer.
- 2020: Reviewer, ICML 2020 reviewer.
- 2019: Committee member, Program committee for SIAM CSC.
- 2019: Reviewer, NeurIPS 2019 reviewer.
- 2019: Reviewer, ICML 2019 reviewer.
- 2018: Program committee member, 2nd Black in AI Workshop.
- 2018: Scientific committee co-chair, SIAM Applied Linear Algebra Conference.
- 2017: Program committee member, IEEE International Parallel and Distributed Processing Symposium.
- 2016: Minisymposium organizer, SIAM Annual Meeting.
- 2016: Program committee member, IEEE International Parallel and Distributed Processing Symposium.
- 2015: Program committee member, IEEE International Parallel and Distributed Processing Symposium.
- 2015: Organizing committee member, Workshop on Development of Modern Methods for Linear Algebra.
- 2015-present: Scientific committee member, Householder Symposium on Numerical Linear Algebra.
- 2014: Poster commitee member, Supercomputing.
- 2013: Local organizer, Fourth New York Conference on Applied Mathematics.
- 2013: Technical program committee member, Supercomputing.
- 2012-2015: Secretary, SIAM Activity Group on Linear Algebra.
- 2012: Organizing committee member, Third New York Conference on Applied Mathematics.
- 2011: Organizing committee member, Second New York Conference on Applied Mathematics.
- 2017-2020: Associate editor, Journal of Computational Mathematics.
- 2010-present: Editor, Numerical Linear Algebra with Applications.
- 2008-present: Managing editor, Electronic Transactions on Numerical Analysis.
- 2007: Minisymposium organizer, SIAM Computational Science and Engineering Meeting.
- 2002-2004: Secretary, IEEE 754R Standard Revision Committee.

Local activities

- 2022: Committee member, Grad Student Advisor Feedback Task Force phase 2.
- 2022: Committee member, Cornell Engineering Teaching Award Committee.
- 2022: Committee member, Implementation committee, Cornell undergrad educational requirements on race and equity.
- 2021-2022: Committee member, CS recruiting committee.
- 2021: Committee member, COE Research Excellence Awards Committee.
- 2021: Committee member, Grad Student Advisor Feedback Task Force.
- 2021: Reviewer, CIDA RIF reviewer.
- 2021: Committee member, Part-Time Bachelor's Degree Committee.
- 2021-2023: Associate Dean for DEI, College of Computing and Information Science.
- 2020-2025: Director, Center for Applied Mathematics.
- 2020: Committee member, CIDA Website Dev Committee.
- 2020: Reviewer, CIDA RIF reviewer.
- 2019-2021: Committee member, Cornell English Language Support Office Advisory Board.
- 2019-2020: Committee member, CIS Dean Search Committee.
- 2019-2020: Committee member, Applied Math Graduate Admissions Committee.
- 2019-present: Committee member, Applied Math Membership Committee.
- 2019-2020: Committee chair, CS Graduate Admissions Committee.
- 2019-present: Committee member, CS Diversity, Inclusion, and Climate Committee.
- 2017-2018: External committee member, ECE/CAM Faculty Recruiting Committee.
- 2017-2018: Committee member, CS Chair Search Committee.
- 2017-2018: Committee chair, CS Graduate Admissions Committee.
- 2017-2017: Committee member, CS Colloquium Committee.
- 2017-2017: Committee Member, Applied Math Graduate Admissions Committee.
- 2016-2017: Committee member, CS Faculty Recruiting Committee.
- 2015-2016: Committee member, CS Graduate Admissions.
- 2015: Committee member, Applied Math Curriculum Review Committee.
- 2014: Judge, BigRed Hacks.
- 2013-2014: Committee member, Applied Math Graduate Admissions.
- 2011-2012: Committee member, Applied Math Graduate Admissions.
- 2011-2014: Committee member, Cornell Faculty Advisory Board on Information Technology.
- 2010-2011: Committee member, CS Graduate Admissions.
- 2010-2011: Committee member, Applied Math Graduate Admissions.
- 2009-2010: Committee member, CS Graduate Admissions.
- 2009-2010: Committee member, Applied Math Graduate Admissions.
- 2009-present: Organizer, Cornell Scientific Computing and Numeric Seminar.

Review activity

- ACM Journal on Emerging Technologies in Computing Systems (2014)
- ACM Transactions on Mathematical Software (2021, 2020, 2017, 2016, 2015, 2014, 2013)
- American Mathematical Monthly (2015)
- Autonomous Agents and Multi-Agent Systems (2022)
- SIAM Journal on Applied Mathematics (2016)
- SIAM Journal on Matrix Analysis (2019, 2018, 2015, 2014, 2012, 2009, 2008, 2007, 2006, 2005)
- SIAM Journal on Multiscale Modeling and Simulation (2012)
- SIAM Journal on Scientific Computing (2019, 2017, 2016, 2015, 2014, 2009, 2008)
- IEEE Sensors (2014)
- IEEE Transactions on Dependable and Secure Computing (2014)
- IEEE Journal of Microelectromechanical Systems (2011, 2010, 2009, 2008, 2007, 2003)

- IEEE Transactions on Signal Processing (2007)
- Applicable Analysis (2007)
- Applied Mathematics and Computation (2017, 2011)
- Communications in Pure and Applied Math (2010)
- Data Mining and Knowledge Discovery (2019, 2018)
- International Journal of Computer Mathematics (2012)
- International Journal of Solids and Structures (2015)
- Journal of Applied Mechanics (2007)
- Journal of Applied Physics (2007)
- Journal of Computational Physics (2022, 2021, 2016, 2015, 2012, 2011)
- Journal of Experimental Algorithms (2019)
- Journal of Micromechanics and Microengineering (2017, 2016, 2015, 2014, 2011, 2009, 2008, 2007)
- Journal of Machine Learning Research (2016)
- Journal of Physics A: Mathematical and Theoretical (2007)
- Linear Algebra and its Applications (2022, 2021, 2020, 2018, 2017, 2015, 2014, 2013, 2010, 2009, 2003)
- Mathematics of Computation (2007)
- Multiscale Modeling and Simulation (2013)
- Numerical Linear Algebra with Applications (2022, 2021, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011, 2010)
- Numerische Mathematik (2011, 2009)
- Transactions of the Canadian Society for Mechanical Engineering (2009)
- DSL 2011: IFIP Working Conference on Domain-Specific Languages (2011)
- PARA04 conference proceedings (2004)
- IEEE ARITH conference (2004)
- ACM International Conference on Supercomputing (2003)
- ACM SIGGRAPH (2011, 2009)
- Proposal referee for the Netherlands science foundation (NWO) (2003)
- Proposal referee for DOE (2015, 2009, 2022)
- Proposal referee for NSF (2021, 2019, 2018, 2017, 2016, 2012)
- Proposal referee for NASA (2017)
- Proposal referee for NSERC (2023, 2019)

Professional Societies

- Member, SIAM (Society for Industrial and Applied Mathematics)
- Member, ILAS (International Linear Algebra Society)
- Member, AMS (American Mathematical Society)
- Member, ACM (Association for Computing Machinery)
- Member, IEEE (Institute of Electrical and Electronics Engineers)

Students and Postdoctoral Associates

Postdoctoral associates

1. Silke Glas (Ph.D., Ulm University, 2018)
   Topic: Optimization of stellarators

PhD students

1. Caira Anderson (Applied Math Ph.D., in progress)
   Topic: MHD stability in stellarators

2. Michael Czekanski (Statistics Ph.D., in progress)
   Topic: Monte Carlo transport calculations for stellarators

3. Ariel Kellison (Computer Science Ph.D., in progress)
   Topic: Formal verification of numerical methods

4. Darian Nwankwo (Computer Science Ph.D., in progress)
   Topic: Transformed kernel methods for prediction and optimization

5. Max Ruth (Applied Math Ph.D., in progress)
   Topic: Nonlinear dynamics and stellarators

6. Xinran Zhu (Applied Math Ph.D., in progress)
   Topic: Numerical analysis of kernel methods

7. Misha Padidar (Applied Math Ph.D., 2023)
   Thesis: *Challenges in the optimization-aided design of magnetic confinement systems*

8. Eric Lee (Computer Science Ph.D., 2020)
   Thesis: *Budget-Constrained Bayesian Optimization*

9. Kun Dong (Applied Math Ph.D., 2019)
   Thesis: *Randomized Numerical Linear Algebra for Large-Scale Matrix Data*

10. David Eriksson (Applied Math Ph.D., 2018)
    Thesis: *Scalable kernel methods and their use in black-box optimization*
    Co-advised (secondary advisor: Christine Shoemaker)

11. Moontae Lee (Computer Science Ph.D., 2018)
    Thesis: *Joint-stochastic spectral inference for robust co-occurrence modeling and latent topic analysis*
    Co-advised (primary advisor: David Mimno)

12. Amanda Hood (Applied Math Ph.D., 2017)
    Thesis: *Localizing the eigenvalues of matrix-valued functions: analysis and applications*

13. Colin Ponce (Computer Science Ph.D., 2016)
    Thesis: *Network-Structured Error Flattening for Power Grids and Other Real-World Networks*

14. Erdal Yilmaz (Applied Physics Ph.D., 2016)
    Thesis: *Design, Analysis and Simulation of Microscale Solid-Wave Gyroscopes*
    Research advisor (formally advised by Richard Lovelace)

Masters students

1. Felix Hohne (Computer Science M.Eng., 2023)
   Project: Interfacing DESC with Julia

2. Sahil Dev (Computer Science M.Eng., 2022)
   Project: Streamlining Spark Cluster Setup with Flintrock

3. Junyoung Lim (Computer Science M.Eng., 2021)
   Project: Learning to Cluster

4. Erik Louie (Computer Science M.Eng., 2021)
   Project: Learning to Cluster
5. Kevin Chaudhuri (Computer Science M.Eng., 2020)
   Project: Matrix exponentials in modeling electron spin resonance spectra
6. Yuanxi Shen (Computer Science M.Eng., 2020)
   Project: Fast Bayesian Transformed Gaussian Prediction
7. Sungjun Cho (Computer Science M.S., 2020)
   Thesis: *Robust and Scalable Spectral Topic Modeling for Large Vocabularies*
8. Bingqing Ma (Computer Science M.Eng., 2018)
   Project: Web Interface to a Finite Element Analysis Program
9. Alvin Zhu (Computer Science M.Eng., 2018)
   Project: Fast non-negative projection of low rank matrices
10. Tommy Shum (Computer Science M.Eng., 2018)
    Project: PySOT in the Cloud
11. Peiyu Shi (Computer Science M.Eng., 2018)
    Project: A web dashboard for PySOT
12. Israr Mahmood (Computer Science M.Eng., 2018)
    Project: A web dashboard for PySOT
13. Daniel Liu (Computer Science M.Eng., 2017)
    Project: Bayesian optimization in PySOT
14. Han Wen Chen (Computer Science M.Eng., 2017)
    Project: Jupyter Notebooks for Finite Element Analysis
15. Michael Ficenic (Computer Science M.Eng., 2017)
    Project: Network Classification via Spectral Features
16. Paul West (Computer Science M.Eng., 2017)
    Project: Optimization with Pre-Emptible VMs
17. Joel Lubitinsky (Computer Science M.Eng., 2017)
    Project: Resource-Coupled Evolutionary Games
18. Ioana-Maria Tamas (Computer Science M.Eng., 2017)
    Project: Resource-Coupled Evolutionary Games
19. Batu Inal (Computer Science M.Eng., 2016)
    Project: Super Seminar Scraper
20. Sania Nagpal (Computer Science M.Eng., 2016)
    Project: Fast Trial Spaces for Parameterized PageRank Problems
21. Suarabh Netravalkar (Computer Science M.Eng., 2016)
    Project: Fast Trial Spaces for Parameterize PageRank Problems
22. Shitong Jia (Computer Science M.Eng., 2016)
    Project: Etch-a-Sketch 3D
23. Jing Jing (Computer Science M.Eng., 2016)
    Project: Super Seminar Scraper

24. Jiankun Lu (Computer Science M.Eng., 2016)
    Project: Super Seminar Scraper

25. Xiangyu Zhang (Computer Science M.Eng., 2016)
    Project: Edge-Weighted Parameterized PageRank: A Demo

26. Markus Salasoo (Computer Science M.Eng., 2016)
    Project: Edge-Weighted Parameterized PageRank: A Demo

27. Ziyang Tang (Computer Science M.Eng., 2016)
    Project: Optimizing Price of Anarchy in a Model of Opinion Formation

28. Jia Zhang (Computer Science M.Eng., 2016)
    Project: Spectral Histograms on Networks

29. Xiaoan Yan (Computer Science M.Eng., 2015)
    Project: Edge-Weighted Parameterized PageRank: A Demo

30. Chen Ting-Hao (Electrical Engineering M.Eng., 2013)
    Project: MEMS Simulation as a Service

31. Syed Hassan (Computer Science M.Eng., 2013)
    Project: MEMS Simulation as a Service

32. Kim Young Jae (Computer Science M.Eng., 2013)
    Project: Teaching Support Vector Machines to Predict Profitable Stock Offers

33. Jungmin Yun (Computer Science M.Eng., 2012)
    Project: Python Implementation of a Stochastic RBF Optimization Method

34. Jesseon Chang (Computer Science M.Eng., 2012)
    Project: Python Implementation of a Stochastic RBF Optimization Method

35. Chen-Yi Chen (Computer Science M.Eng., 2012)
    Project: A Flexible Interface to FEAP

36. Scott Purdy (Computer Science M.Eng., 2010)
    Project: Process Replication for HPC Applications

37. Peter Hunt (Computer Science M.Eng., 2010)
    Project: Process Replication for HPC Applications

38. Silvio Tarca (Scientific Computing (NYU) M.S., 2010)
    Thesis: *Performance Optimization of Symmetric Factorization Algorithms*

Undergraduate research projects

1. Tejal Nair, Variational Gaussian Processes (2023)
2. Tony Xu, Stability-Constrained Optimization for Stellarators (2023)
3. Sean Yang, Near-Axis Expansion of Stellarators in Julia (2023)
4. Stella Dang, Soliton Stability (2022)
5. Paco Rilloraza, Stellarator Optimization (2020)
6. Catherine Horng, Learning to Cluster (2020)
7. Shengye Zang, Learning to Cluster (2020)
8. Andrew Yates, Nonlinear Eigenvalue Problems and Traveling Wave Stability (2020)
9. Ziwei Gu, Learning to Cluster (2020)
10. Leo Huang, Fast Bayesian Transformed Gaussian Prediction (2019)

11. Cameron Ibrahim, Fast Bayesian Transformed Gaussian Prediction (2019)
12. Sungjun Cho, Spectral Topic Modeling (2017)
13. Nathaniel Rogalskyj, Identifying Network Changes from Ringdown Analysis (2016)
14. Anna Yesypenko, Graph Analysis via Density of States (2016)
15. Moteleolu Onabajo, Graph Analysis via Density of States (2016)
16. Jianqiu Wang, Graph Analysis via Density of States (2016)
17. Humam Alwassel, Automated Floating Point Error Analysis (2015)
18. Patrick Chen, Super Seminar Scraper (2015-16)
19. Jooyoung Park, Maximum Entropy Method Implementation in MATLAB (2015)
20. Sheroze Sherifdeen, MatScat for Python (2015-16)
21. Nimit Sohoni, Review of the FEAST Eigensolver (2015)
22. Leon Davis, Diagonal Completion for Low-Rank Matrices (2015)
23. Greg Rosenthal, PageRank with Random Edge Weights (2015)
24. Eric Ma, Graph Analysis via Spectral Histograms (2015)
25. Brandon Hartz, Fast PageRank on Parameter-Dependent Graphs (2014)
26. Marshall Jiang, Randomly Projected GMRES (2014-15)
27. Kyu-Young Kim, Evaluating Overlapping Community Detection via Matrix Factorizations (2011-12)
28. Jiexun Xu, Fast Factorizations for Network Tomography (2008)
29. Iva Vukicevic, Error Bounds and Estimates for a Discrete Sine-Gordon Equation (2008)
30. Daniel Parry, Bounds on Biased and Unbiased Random Walks (2008)
31. Anwis Davis, MEMS Web Service (2002)
32. Ernest Zhu, MEMS Web Service (2001)
33. Wayne Kao, MEMS Web Service (2001)

Thesis committees

Current committees

1. Griffin Berlstein (Computer Science Ph.D. student)
2. Jonah Botvinivk-Greenhouse (Applied Math Ph.D. student)
3. Jacob Brown (Applied Math Ph.D. student)
4. Poompol Buathong (Applied Math Ph.D. student)
5. Chiatai Chen (Applied Physics Ph.D. student)
6. Aditya Chetan (Computer Science Ph.D. student)
7. Michael Czeskanski (Statistics Ph.D. student)
8. Youssef Fahmy (Statistics Ph.D. student)
9. Tayler Fernandes Nuñez (Applied Math Ph.D. student)
10. Mallory Gaspard (Applied Math Ph.D. student)
11. Arnav Gupta (Theoretical and Applied Mechanics Ph.D. student)
12. Ariel Kellison (Computer Science Ph.D. student)
13. Kapil Khanal (Systems Engineering Ph.D. student)
14. David Lee (Computer Science Ph.D. student)
15. Si Yi Meng (Computer Science Ph.D. student)
16. Shriya Nagpal (Applied Math Ph.D. student)
17. Darian Nwankwo (Computer Science Ph.D. student)
18. Shawn Ong (Applied Math student)
19. Max Ruth (Applied Math Ph.D. student)
20. Cade Sbrocco (Physics Ph.D. student)
21. Jiatian Sun (Computer Science Ph.D. student)
22. Katerina Tang (Applied Math Ph.D. student)
23. Albert Tseng (Computer Science Ph.D. student)

24. Jiayue Wan (Operations Research Ph.D. student)
25. Junxiong Wang (Computer Science Ph.D. student)
26. Aaron Wheeler (Chemical Engineering Ph.D. student)
27. Qian Xie (Operations Research Ph.D. student)
28. Xinchen Xu (Applied Math Ph.D. student)
29. Yujia Zhang (Applied Math Ph.D. student)
30. Yunxiang Zhang (Operations Research Ph.D. student)
31. Xinran Zhu (Applied Math Ph.D. student)
32. Jennifer Zvonek (Applied Math Ph.D. student)

Past committees

1. Yandong Li (Applied Physics Ph.D., 2023)
   Thesis: *Towards Robust Photonic Information Processing – Fundamentals, Designs, Limitations, and Improvements*

2. Yuchen Xu (Statistics Ph.D., 2023)
   Thesis: *Statistical Advances in Simultaneous Diagonalization and Joint Object Detection*

3. Dongping Qi (Applied Math Ph.D., 2023)
   Thesis: *Challenges in Continuous Path Planning: Rarefactions, Uncertainty, and Reinforcement Learning*

4. Yurong You (Computer Science Ph.D., 2023)
   Thesis: *Enhancing 3D Perception with Unlabeled Repeated Historical Data for Autonomous Vehicles*

5. Misha Padidar (Applied Math Ph.D., 2023)
   Thesis: *Challenges in the optimization-aided design of magnetic confinement systems*

6. Christophe Bonneville (Civil Engineering Ph.D., 2023)
   Thesis: *Bayesian Machine Learning Algortihms for Uncertainty Quantification, Optimization, and Equation Discoveries in Engineering Physics*

7. Max Lipton (Mathematics Ph.D., 2023)
   Thesis: *Dynamical Systems in Pure Mathematics*

8. Jikun Wang (Mechanical Engineering Ph.D., 2023)
   Thesis: *Nonlinear Viscoelasticity and Damage for Soft Materials*

9. Raul Astudillo Marban (Operations Research Ph.D., 2022)
   Thesis: *Exploting Composite Functions in Bayesian Optimization*

10. Mengqi Xia (Computer Science Ph.D., 2022)
    Thesis: *Physically Realistic Rendering of Complex Materials Using Wave Optics*

11. Qinru Shi (Applied Math Ph.D., 2022)
    Thesis: *Combinatorial Optimization and Decision-Making with Applications in Computational Sustainability*

12. Sebastian Ament (Computer Science Ph.D., 2022)
    Thesis: *Advances in Bayesian and Sparse Optimization for Autonomous Scientific Discovery*

13. John Ryan (Computer Science Ph.D., 2022)
    Thesis: *Fast Kernel Matrix Approximations by Series Expansions*

14. Hubert Lin (Computer Science Ph.D., 2022)
    Thesis: *Towards Robust Visual Perception Systems in Real-World Environments*

15. Tianyi Shi (Applied Math Ph.D., 2022)
    Thesis: *Tensor Computations with Dimensionality Manipulations*

16. Andrew Horning (Applied Math Ph.D., 2021)
    Thesis: *Computing Spectral Properties of Infinite-Dimensional Operators*

17. Fujun Luan (Computer Science Ph.D., 2021)
    Thesis: *Forward and Inverse Rendering with Gradient-Based Optimization*

18. Ankita Mukhtyar (Chemical Engineering Ph.D., 2021)
    Thesis: *Towards Understanding the Disorder to Order Transitions in Soft Materials*

19. Junteng Jia (Computer Science Ph.D., 2021)
    Thesis: *Modeling and Learning Attributed Graphs*

20. Gabriela Calinao Correa (Material Science M.S., 2020)
    Thesis: *Direct electron detectors: architecture and algorithms*

21. Aasim Ayaz Wani (Chemical Engineering M.S., 2020)
    Thesis: *Computer Aided Retrosynthesis for Metabolic Pathways*

22. Eric Lee (Computer Science Ph.D., 2020)
    Thesis: *Budget-Constrained Bayesian Optimization*

23. Chaitali Joshi (Physics Ph.D., 2020)
    Thesis: *Frequency Domain Quantum Processing via Four-Wave Mixing*

24. Enrique Rojas (Atmospheric Science Ph.D., 2020)
    Thesis: *Farley-Buneman instabilities in the auroral region: Continuous hybrid simulations and empirical modeling.*

25. Saul Toscano (Operations Research Ph.D., 2019)
    Thesis: *Grey-Box Bayesian Optimization: Improving Performance by Looking Inside the Black-Box*

26. Calvin Wylie (Operations Research Ph.D., 2019)
    Thesis: *Partly Smooth Models and Algorithms*

27. Kun Dong (Applied Math Ph.D., 2019)
    Thesis: *Randomized Numerical Linear Algebra for Large-Scale Matrix Data*

28. Marc Gilles (Applied Math Ph.D., 2019)
    Thesis: *At the intersection of differential equations and optimization: inverse problems, path planning and Krylov subspaces*

29. Shreyas Honrao (Material Science Ph.D., 2018)
    Thesis: *DFT study of the complex diffusion of oxygen in cobalt and machine learning of ab-initio energy landscapes for crystal structure predictions.*

30. David Eriksson (Applied Math Ph.D., 2018)
    Thesis: *Scalable kernel methods and their use in black-box optimization*

31. Sheng Wang (Mechanical Engineering Ph.D., 2018)
    Thesis: *Towards large-scale simulations of two-phase flows with moving contact lines in complex geometries*

32. Yu Su (Chemical Engineering Ph.D., 2018)
    Thesis: *Modeling many-body hydrodynamic interactions in concentrated colloidal suspensions via large-scale dynamic simulations*

33. Moontae Lee (Computer Science Ph.D., 2018)
    Thesis: *Joint-stochastic spectral inference for robust co-occurrence modeling and latent topic analysis*

34. Jiayi Guo (Operations Research Ph.D., 2018)
    Thesis: *Smooth Quasi-Newton Methods for Nonsmooth Optimization*

35. Benjamin Revard (Material Science Ph.D., 2017)
    Thesis: *Development of an Evolutionary Algorithm for the Ab Initio Discovery of Two-Dimensional Materials*

36. Nicholas Savva (Computer Science M.S., 2017)
    Thesis: *A Practical Framework for Measuring and Modeling the Appearance of Strongly Anisotropic Materials*

37. Zachary Clawson (Applied Math Ph.D., 2017)
    Thesis: *Shortest Path Problems: Domain Restriction, Anytime Planning, and Multi-Objective Optimization*

38. Amanda Hood (Applied Math Ph.D., 2017)
    Thesis: *Localizing the eigenvalues of matrix-valued functions: analysis and applications*

39. Sepehr Saroukhani (Civil Engineering Ph.D., 2017)
    Thesis: *Atomistic Modeling of Dislocation Motion at Experimental Time-Scales*

40. Michael Meyer (Computational Biology Ph.D., 2017)
    Thesis: *Methods for Functional Inference in the Proteome and Interactome*

41. William Nicholson (Statistics Ph.D., 2016)
    Thesis: *Tools For Modeling Sparse Vector Autoregressions*

42. Kyle Wilson (Applied Math Ph.D., 2016)
    Thesis: *Robustly Modeling The World From Photos*

43. Danielle Toupo (Applied Math Ph.D., 2016)
    Thesis: *Nonlinear Dynamics Of Cycles In Evolutionary Games*

44. Colin Ponce (Computer Science Ph.D., 2016)
    Thesis: *Network-Structured Error Flattening For Power Grids And Other Real-World Networks*

45. Erdal Yilmaz (Applied and Engineering Physics Ph.D., 2016)
    Thesis: *Design, Analysis And Simulation Of Microscale Solid-Wave Gyroscopes*

46. Shuo Chen (Computer Science Ph.D., 2016)
    Thesis: *Representation Learning For Sequence And Comparison Data*

47. Manuel Diaz (Civil Engineering Ph.D., 2015)
    Thesis: *A Modified Error In Constitutive Equation Approach For Viscoelasticity Imaging With Interior Data*

48. Parvez Sukheswalla (Mechanical Engineering Ph.D., 2015)
    Thesis: *Computational Investigation Of The Dynamics Of Inertial Particles In Homogeneous Turbulent Shear Flow*

49. Hyung Joo Park (Applied Math Ph.D., 2015)
    Thesis: *Topics In Structure Determination Of Submicron Sized Objects*

50. Wenlei Xie (Computer Science Ph.D., 2015)
    Thesis: *Iterative Graph Computation In The Big Data Era*

51. Tao Zou (Computer Science Ph.D., 2015)
    Thesis: *Optimizing Response Time For Distributed Applications In Public Clouds*

52. Santoshkalyan Rayadhurgam (Chemical Engineering M.S., 2015)
    Thesis: *Computational Study Of Charge Conducting Spacer Molecules In Leadchalcogenide Quantum Dots*

53. Shashank Adimulam (Electrical Engineering M.S., 2015)
    Thesis: *Hardware Model Of A Mixed Radix Fast Fourier Transform For LTE 3Gpp*

54. Laura Fegely (Electrical Engineering Ph.D., 2014)
    Thesis: *Goblits To OMG: 3D Fabrication Techniques For An Opto-Mechanical Gyroscope*

55. James Warner (Civil Engineering Ph.D., 2014)
    Thesis: *Advances In Uncertainty Quantification And Inverse Problems In Computational Mechanics*

56. Adam Chacon (Applied Math Ph.D., 2014)
    Thesis: *Eikonal Equations: New Two-Scale Algorithms And Error Analysis*

57. Anthony Sabelli (Applied Math Ph.D., 2013)
    Thesis: *Novel Methods For Source Localization And Material Identification*

58. Ilias Bilionis (Applied Math Ph.D., 2013)
    Thesis: *Bayesian Methods For Uncertainty Quantification*

59. Guozhang Wang (Computer Science Ph.D., 2013)
    Thesis: *Automatic Scaling Iterative Computations*

60. Jeffrey Chadwick (Computer Science Ph.D., 2013)
    Thesis: *Sound Synthesis For Physics-Based Computer Animation*

61. David Rowinski (Mechanical Engineering Ph.D., 2013)
    Thesis: *Calculations Of Turbulent Reacting Flows Using PDF Methods*

62. Ananth Kaushik (Chemical Engineering Ph.D., 2013)
    Thesis: *A Computational Study Of The Molecular And Electronic Structure Of Self-Assembled Nanocrystal Superlattices*

63. Ryan Peterson (Computer Science Ph.D., 2012)
    Thesis: *Efficient Content Distribution With Managed Swarms*