David Samuel Bindel

Assistant Professor of Computer Science

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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

Summer 2009-present.	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

Research interests

- Numerical linear algebra, particularly eigenvalue problems
- Modeling microelectromechanical systems (MEMS)
- Computational mechanics and finite element analysis
- Numerical analysis of problems from computer networking and systems
- Social network analysis
- Numerical software engineering

Awards

SIAG LA Best Paper Prize (2015)
SIAM Review SIGEST Selection (2015)
Douglas C. Whitney Award for Distinguished Teaching (2014)
Sloan Research Fellowship (2010)
Alston S. Householder Award for Best Dissertation in Numerical Linear Algebra (2008)
NSF Graduate Student Fellowship (Fall 99-Spring 02)

Publications

Journal articles

1. David S. Bindel and Amanda Hood. Localization theorems for nonlinear eigenvalues. *SIAM Review*, 57(4), 585–607, 2015.
2. David S. 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.

3. David S. Bindel and Amanda Hood. Localization theorems for nonlinear eigenvalues. *SIAM Journal on Matrix Analysis*, 34(4), 1728–1749. http://arxiv.org/abs/1303.4668
4. David S. Bindel, Sigal Oren, and Jon Kleinberg. How Bad is Forming Your Own Opinion? *Games and Economic Behavior*, available online 3 July 2014.
5. Wei He, David S. Bindel, and Sanjay Govindjee. Topology optimization in micromechanical resonator design. *Optimization and Engineering*, 13(2): 271–292, 2012. (Available online February 2011.)
6. Yao Zhao, Yan Chen, and David S. Bindel. Towards unbiased end-to-end network diagnosis. *ACM Transactions on Networking*, 17(6): 1724–1737, December 2009.
7. David S. 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.
8. Yan Chen, David S. Bindel, Hanhee Song, Brian Chavez, and Randy H. Katz. Algebra-based scalable overlay network monitoring: Algorithms, evaluation, and applications. *ACM Transactions on Networking*, 15(5): 1084–1097, October 2007.
9. David S. Bindel and Maciej Zworski. Symmetry of bound and antibound states in the semiclassical limit. *Letters in Math Physics*, 81(2):107–117, August 2007.
10. David S. Bindel and Sanjay Govindjee. Elastic PMLs for resonator anchor loss simulations. *International Journal for Numerical Methods in Engineering*, 64(6):789–818, October 2005.
11. David S. Bindel, James W. Demmel, William Kahan, and Osni Marques. On computing Givens rotations reliably and efficiently. *ACM TOMS*, 28(2):206–238, June 2002.

Conference proceedings

1. Moontae Lee, David Bindel, and David Mimno. Robust Spectral Inference for Joint Stochastic Matrix Factorization. *NIPS 2015*, December 2015.
2. Kun He, Yiwei Sun, David Bindel, John Hopcroft, and Yixuan Li. Detecting Overlapping Communities from Local Spectral Subspaces. *ICDM 2015*, November 2015.
3. Adam Efe Gencer, Emin Gun Sirer, Robbert Van Renesse and David Bindel. Configuring Distributed Computations Using Response Surfaces. *Middleware 2015*, December 2015. (Best student paper.)
4. Wenlei Xie, David S. Bindel, Alan Demers, and Johannes Gehrke. Edge-Weighted Personalized PageRank: Breaking a Decade-Old Performance Barrier. *KDD 2015*, August 2015. (Best student paper.)
5. Yixuan Li, Kun He, David Bindel and John E. Hopcroft. Uncovering the Small Community Structure in Large Networks: A Local Spectral Approach *WWW 2015*, May 2015.
6. Erdal Yilmaz and David S. Bindel. Effects of Imperfections on Solid-Wave Gyroscope Dynamics. In *Proceedings of IEEE Sensors 2013*, November 2014.
7. Wenlei Xie, Guozhang Wang, David S. Bindel, Alan Demers, and Johannes Gehrke. Fast Iterative Graph Computations with Block Updates. In *Proceedings of the VLDB Endowment*, 6(14), pages 2014–2025, March 2013.
8. Tao Zou, Guozhang Wang, Marcos Vaz Salles, David S. 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*, October 2011.
9. David S. 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*, October 2011.
10. Cynthia Bruyns-Maxwell and David S. Bindel, Modal Parameter Tracking for Shape Changing Objects. In *Proceedings of DAFx 2007*, Bordeaux, France, September 2007.
11. James Demmel, Jack Dongarra, Beresford N. Parlett, William Kahan, Ming Gu, David S. Bindel, Yozo Hida, Xiaoye S. Li, Osni Marques, E. Jason Riedy, Christof Voemel, Julien Langou, Piotr Luszczek, Jakub Kurzak, Alfredo Buttari, Julie Langou, Stanimire Tomov. Prospectus for the next LAPACK and ScaLAPACK libraries. In *Proceedings of PARA 2006*, pages 11–23, 2006.
12. Cynthia Bruyns and David S. Bindel, Shape Changing Symmetric Objects for Sound Synthesis. In *Proceedings of 121st AES*, San Francisco, CA, October 2006.

13. Yao Zhao, Yan Chen, and David Bindel. Toward unbiased end-to-end network diagnosis. In *Proceedings of SIGCOMM 2006*, pages 219–230, 2006.
14. Yao Zhao, Yan Chen, and David Bindel. Toward deterministic overlay diagnosis. In *ACM SIGMETRICS/Performance 2006* (poster), pages 387–388, 2006.
15. Tsuyoshi Koyama, David S. Bindel, Wei He, Emmanuel Quevy, James Demmel, Sanjay Govindjee, and Roger T. Howe. Simulation tools for damping in high frequency resonators. In *Proceedings of IEEE SENSORS 2005*, Irvine, CA, November 2005.
16. Yao Zhao, Yan Chen, and David S. Bindel. Scalable and deterministic overlay network diagnosis. In *Proceedings of ACM SIGCOMM 2005* (poster), 2005.
17. David S. Bindel, James W. Demmel, Mark J. Friedman, Willy J.F. Govaerts, and Yuri A. Kuznetsov. Bifurcation analysis of large equilibrium systems in MATLAB. In *Proceedings of ICCS 2005*, volume 3514, pages 50–57. Springer-Verlag, April 2005.
18. David S. Bindel, Emmanuel Quevy, Tsuyoshi Koyama, Sanjay Govindjee, James W. Demmel, and Roger T. Howe. Anchor loss simulation in resonators. In *Proceedings of MEMS 2005*, Miami, FL, February 2005.
19. Yan Chen, David S. Bindel, Hanhee Song, and Randy H. Katz. An algebraic approach to practical and scalable overlay network monitoring. In *Proceedings of ACM SIGCOMM 2004*, 2004.
20. David S. Bindel, Zhaojun Bai, and James W. Demmel. Model reduction for RF MEMS simulation. In *Proceedings of PARA 04*, Lecture Notes in Computer Science. Springer, June 2004.
21. David S. Bindel, James W. Demmel, and Mark J. Friedman. Continuation of invariant subspaces for large bifurcation problems. In *SIAM Linear Algebra Meeting, 2003*, Williamsburg, VA, July 2003.
22. Yan Chen, David S. Bindel, and Randy H. Katz. Tomography-based overlay network monitoring (poster). In *ACM SIGCOMM 2003*, 2003. Abstract to appear in ACM Computer Communication Review, 2004.
23. Yan Chen, David S. Bindel, and Randy H. Katz. Tomography-based overlay network monitoring. In *Proceedings of ACM SIGCOMM Internet Measurement Conference (IMC)*, 2003.
24. James V. Clark, David S. Bindel, Wayne Kao, Ernest Zhu, Andrew Kuo, Ningning Zhou, Jiawang Nie, James W. 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*, Las Vegas, NV, January 2002.
25. Yan Chen, Adam Bargteil, David S. Bindel, Randy H. Katz, and John Kubiatowicz. Quantifying network denial of service: A location service case study. In S. Qing, T. Okamoto, and J. Zhou, editors, *Proceedings of the International Conference on Information and Communications Security (ICICS)*, volume 2229 of *Lecture Notes in Computer Science*, pages 340–351, Xian, China, November 2001. Springer.
26. Jason V. Clark, David S. Bindel, Ningning Zhou, Sunil Bhave, Zhaojun Bai, James W. 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*, Portland, OR, June 2001.
27. Zhaojun Bai, David S. Bindel, Jason V. Clark, Ningning Zhou, James W. Demmel, and Kristofer S.J. Pister. New numerical techniques and tools in SUGAR for 3D MEMS simulation. In *Tech. Proc. of the 4th Intern. Conf. on Modeling and Simulation of Microsystems*, Hilton Head Island, SC, March 2001.
28. John Kubiatowicz, David S. 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 *Proceedings of the Ninth international Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2000)*, November 2000.
29. Jason V. Clark, Ningning Zhou, David S. Bindel, Luca Schenato, W. Wu, James W. 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, Orlando, FL, June 2000.

Reports

1. Jeff Chadwick and David S. Bindel An Efficient Solver for Sparse Linear Systems Based on Rank-Structured Cholesky Factorization http://arxiv.org/abs/1507.05593, Jul 2015.
2. Colin Ponce and David S. Bindel FLiER: Practial Topology Error Correction Using Sparse PMUs http://arxiv.org/abs/1409.6644, Jan 2015.
3. David S. Bindel and Amanda Hood. Localization theorems for nonlinear eigenvalues. http://arxiv.org/abs/1303.4668, Aug 2013.
4. Wei He, David S. 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.
5. David S. Bindel. Structured and parameter-dependent eigensolvers for simulation-based design of resonant MEMS. Technical Report EECS-2006-109, UC Berkeley Computer Science Division, August 2006.
6. David S. Bindel, James W. Demmel, and Mark J. Friedman. Continuation of invariant subspaces for large bifurcation problems. Technical Report EECS-2006-13, UC Berkeley Computer Science Division, February 2006.
7. David S. Bindel, Shivkumar Chandresekaran, James W. Demmel, David Garmire, and Ming Gu. A fast and stable nonsymmetric eigensolver for certain structured matrices. Technical report in progress, 2005.
8. David S. 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.
9. Yan Chen, David S. Bindel, Hanhee Song, and Randy H. Katz. Tomography-based overlay network monitoring. Technical Report CSD-03-1252, UC Berkeley Computer Science Division, June 2003.
10. John Kubiatowicz, David S. 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.

Talks

Colloquium and seminar talks

1. "Model Reduction for Edge-Weighted Personalized PageRank." Purdue Numerical Analysis Seminar, April 2016.
2. "Model Reduction for Edge-Weighted Personalized PageRank." Hong Kong Baptist University Math Colloquium, March 2016.
3. "Nonlinear Eigenvalue Problems: Theory and Applications." University of Arizona Math Colloquium, March 2016.
4. "Nonlinear Eigenvalue Problems: Theory and Applications." Cornell Applied Math Colloquium, January 2016.
5. "Model Reduction for Edge-Weighted Personalized PageRank." Stanford LA/Opt Seminar, October 2015.
6. "Model Reduction for Edge-Weighted Personalized PageRank." Berkeley Matrix Computations Seminar, October 2015.
7. "Music of the Microspheres." Numerical Analysis Seminar, Oxford University, April 2014.

8. "Music of the Microspheres." Numerical Analysis Seminar, University of Maryland, College Park, January 2014.
9. "Music of the Microspheres." Seminar at UTRC, Connecticut, Oct 2013.
10. "Music of the Microspheres." Tufts/Schlumberger Scientific Computing Seminar, Tufts University, Oct 2013.
11. "CAD for MEMS: From Eigenvalues to Devices." Civil and Environmental Engineering Seminar, Duke University, April 2013.
12. "Communities, Spectral Clustering, and Random Walks." Scientific and Statistical Computing Seminar, University of Chicago, November 2011.
13. "Matrix Factorizations for Computer Network Tomography." Numerical Analysis Seminar, New York University, April 2011.
14. "Computer Aided Design for Micro-Electro-Mechanical Systems." Mechanical and Aerospace Engineering Colloquium, Cornell University, February 2011
15. "Applications and Analysis of Nonlinear Eigenvalue Problems." CSC Seminar, Simon Fraser University, November 2009.
16. "Computer-Aided Design of MEMS." ICME Colloquium, Stanford University, November 2008.
17. "Computer-Aided Design of MEMS." Applied Mathematics Colloquium, MIT, November 2008.
18. "Bounds and Error Estimates for Nonlinear Eigenvalue Problems." Applied Mathematics Seminar, UC Berkeley, October 2008.
19. "Computer-Aided Design of MEMS." Applied Mathematics Seminar, McGill University, February 2008.
20. "Computer-Aided Design of MEMS." Computational and Applied Mathematics Colloquium, Rice University, January 2008.
21. "Computer-Aided Design of MEMS." Applied Mathematics and Scientific Computing Seminar, Temple University, November 2007.
22. "Computer-Aided Design of MEMS." Computer Science Colloquium, Cornell University, November 2007.
23. "Computer-Aided Design of MEMS." Applied Math Colloquium, Columbia University, March 2007.
24. "Spectral Inclusion Regions for Bifurcation Analysis." Numerical Analysis Seminar, NYU, August 2006.
25. "Spectral Inclusion Regions for Bifurcation Analysis." Numerical Analysis Seminar, Stanford University, August 2006.
26. "Computer-Aided Design of MEMS." Computer Science Colloquium, Purdue University, April 2006.
27. "Computer-Aided Design of MEMS." Computer Science Colloquium, CU Boulder, April 2006.
28. "Computer-Aided Design of MEMS." Computer Science Colloquium, UC Davis, March 2006.
29. "Computer-Aided Design of MEMS." Computer Science Colloquium, Penn State University, February 2006.
30. "Computer-Aided Design of MEMS." Information Science and Technology Seminar, Caltech, February 2006.
31. "Computer-Aided Design of MEMS." Sandia National Labs, January 2006.
32. "Computer-Aided Design of MEMS: Eigenvalues, Energy Losses, and Dick Tracy Watches." Numerical Analysis Seminar, NYU, November 2004.
33. "Simulating MicroElectroMechanical Systems." Presentation at UC Davis, Mar 2002.

Minisymposia and invited talks

1. "An Efficient Solver for Sparse Linear Systems based on Rank-Structured Cholesky Factorization." Workshop on Structured Matrix Computations and Applications, Tsinghua Sanya International Mathematics Forum, Sanya, Hainan, China, March 2016.
2. "An Efficient Solver for Sparse Linear Systems based on Rank-Structured Cholesky Factorization." SIAM Applied Linear Algebra Meeting, Atlanta, October 2015.

3. "Localizing Nonlinear Eigenvalue Problems: Theory and Applications." SIAM Applied Linear Algebra Meeting, Atlanta, October 2015 (SIAG LA Prize Lecture).
4. "Edge-Weighted Personalized PageRank: Breaking a Decade-Old Performance Barrier." ACM KDD, Sydney, August 2015.
5. "RBF Response Surfaces with Inequality Constraints." SIAM CSE Meeting, Salt Lake City, March 2015.
6. "Structured Eigensolvers for the Analysis of Next-Generation Gyroscopes." SIAM Annual Meeting, Chicago, July 2014.
7. (Plenary talk) "Music of the Microspheres," Householder Symposium on Numerical Linear Algebra, Spa, Belgium, June 2014.
8. "Eigenvalue Localization and Applications," Workshop on Nonlinear Eigenvalue Problems (NEP14), University of Manchester, April 2014.
9. "An Efficient Solver for Sparse Linear Systems based on Rank-Structured Cholesky Factorization." Workshop on Forty Years of Nested Dissection, University of Waterloo, July 2013
10. "Some Perturbation Theorems for Nonlinear Eigenvalues." Workshop on Dissipative Spectral Theory: Operator Theory, PDEs and Numerics, Cardiff University, January 2013.
11. "Computer-Aided Design of Micro-Electro-Mechanical Systems." Workshop on Recent Advances in Scientific Computing, Fudan University, December 2012.
12. "Computer-Aided Design of Micro-Electro-Mechanical Systems." Frontiers of Information Science and Technology (FIST 2012), Shanghai Tech, December 2012.
13. "Numerical Analysis of Resonances." Weyl Law at 100 Workshop at the Fields Institute, September 2012.
14. "Communities, Spectral Clustering, and Random Walks." Workshop on Modern Massive Data Sets (MMDS), July 2012.
15. "Analyzing Resonances via Nonlinear Eigenvalues." International Conference on Industrial and Applied Mathematics, July 2011.
16. "Matrix Factorizations for Computer Network Tomography." Householder meeting, June 2011.
17. "Structure-Preserving Model Reduction for MEMS." SIAM Computational Science and Engineering 2011, March 2011.
18. "Resonances: Interpretation, Computation, and Perturbation." Conference on Numerical Linear Algebra: Perturbation, Performance, and Portability, July 2010.
19. "Structure-Preserving Model Reduction for MEMS Modeling." SIAM Annual Meeting, July 2010.
20. "Design of Finite Element Software for Modeling Bone Deformation and Failure." Bone Tissue: Hierarchical Simulations for Clinical Applications (BTHSCA1), April 2010.
21. "Bounds and Error Estimates for Resonance Problems." SIAM Annual Meeting, July 2009.
22. "Numerical Methods for Resonance Calculations." BIRS Workshop on Mathematical Theory of Resonances, October 2008.
23. "Computer-Aided Design of Micro-Electro-Mechanical Systems." (Householder 2008 Prize Lecture). Householder meeting, June 2008.
24. "Error Bounds and Error Estimates for Nonlinear Eigenvalue Problems." Householder meeting, June 2008.
25. "Numerical and Semi-Analytical Structure Preserving Model Reduction for MEMS." ENUMATH 2007, September 2007.
26. "Numerical and Semi-Analytical Structure Preserving Model Reduction for MEMS." ICIAM 2007, July 2007.
27. "Continuation of Sparse Eigendecompositions." SIAM Computational Science and Engineering 2007, February 2007.
28. "Model Reduction and Mode Computation for Damped Resonant MEMS." SIAM Computational Science and Engineering 2007, February 2007.
29. "Computer-Aided Design for Micro-Electro-Mechanical Systems." Bay Area Scientific Computing Day, March 2006.

30. "Modeling Resonant Microsystems: Toward Cell Phones on a Chip?" Abel Symposium 2006, May 2006.
31. "Eigenproblems in Resonant MEMS Design." SIAM Annual Meeting, July 2005.
32. "Continuation of Invariant Subspaces of Sparse Parameter-Dependent Matrices." Householder meeting, May 2005.
33. "Continuation of Invariant Subspaces." ARCC Workshop on Stability Criteria for Multi-Dimensional Waves and Patterns, May 2005.
34. "Fast Hessenberg QR Iteration for Companion Matrices." SIAM Annual Meeting, July 2004.
35. "Simulating RF MEMS." Bay Area Scientific Computing Day, March 2004.
36. "Fast QR Iteration for Companion Matrices." SIAM Linear Algebra Meeting, July 2003.

Other talks

1. "Grumbles of a Numerical Analyst: Some Ideas, Questions, and Wishes." Dagstuhl Seminar on Approximate and Probabilistic Computing, December 2015.
2. "Computing pi: A Light Lunchtime Entertainment." Cornell University High School Programming Competition, April 2015.
3. "Mutating Matrices from a Gamut of Graphs." Cornell CS Brown Bag Lunch, February 2015.
4. "FLiER: Practical Topology Error Correction Using Sparse PMUs." ARPA-E Innovation Summit, February 2015.
5. "GridCloud." ARPA-E GENI Annual Meeting, January 2015.
6. "Radial Basis Function Interpolation with Bound Constraints." Cornell Scientific Computing and Numerics Seminar, Sep 2014.
7. "A Tale of Two Eigenvalue Problems." Cornell CS Brown Bag Lunch, November 2013.
8. "From Networks to Linear Algebra." New York Conference on Applied Mathematics (NYCAM), October 2012.
9. "Matrix Factorizations for Computer Networks." New York Conference on Applied Mathematics (NYCAM), April 2011.
10. "Resonances: Interpretation, Computation, and Perturbation." Cornell Scientific Computing and Numerics Seminar, March 2011.
11. "Computer-Aided Design of MEMS." Cornell Electron Devices Society, October 2009.
12. "Resonances and Nonlinear Eigenvalue Problems." New York Conference on Applied Mathematics (NYCAM), October 2009.
13. "Applications of Matrix Structure." Cornell CS Brown Bag Lunch, September 2009.
14. "Finite Element Analysis of Human Bone Models." Courant Biomathematics Seminar, April 2008.
15. "Damping Mechanisms in Resonant Microsystems." Courant Materials Working Group, March 2008.
16. "Numerical and Semi-Analytical Structure-Preserving Model Reduction for MEMS." DARPA MEMS/NEMS Workshop, December 2007.
17. "Structure Preserving Model Reduction for Damped Resonant MEMS." US National Congress on Computational Mechanics, July 2007.
18. "Elastic PMLs for Resonator Anchor Loss Simulation." US National Congress on Computational Mechanics, July 2005.
19. "Modeling of Thermoelastic Damping in MEMS Resonators." US National Congress on Computational Mechanics, July 2005. (Presenter: Tsuyoshi Koyama)
20. "MEMS Resonator Simulation." BSAC Industrial Advisory Board meeting, March 2005.
21. "SUGAR: A MEMS Simulation Program." Presentation at Sun Microsystems, Jun 2002.
22. "SUGAR: A MEMS Simulation Tool." Tutorial talk at Modeling and Simulation of Microsystems (MSM), April 2002.

Teaching

Spring 2016	Numerical Analysis: Linear and Nonlinear Problems
Fall 2015	Applications of Parallel Computers
Spring 2015	Numerical Analysis: Linear and Nonlinear Problems
Spring 2014	Applications of Parallel Computers
Fall 2013	Matrix Computations
Fall 2012	Matrix Computations
Spring 2012	Introduction to Scientific Computing
Fall 2011	Applications of Parallel Computers
Spring 2011	Introduction to Scientific Computing
Fall 2010	Applications of Parallel Computers
Fall 2009	Matrix Computations
Spring 2009	Scientific Computing
Fall 2008	High-Performance Scientific Computing
Spring 2008	Honors Calculus II
Fall 2007	Introduction to Probability Theory
Spring 2007	Honors Calculus II
Fall 2006	Quantitative Reasoning: Mathematical Patterns in Nature
Fall 2005	Compilers and Programming Languages
Spring 2001	Applications of Parallel Computers

PhD students

These students are all in progress:

1. Eric Lee, Computer Science – Demand response optimization and fault analysis for power grids
2. Kun Dong, Applied Math – Non-negative matrix factorizations for topic modeling
3. Erdal Yilmaz, Applied and Engineering Physics – MEMS gyroscope simulations (graduating May 2016)
4. Amanda Hood, Applied Math – Nonlinear eigenvalue problems for resonances (graduating May 2016)
5. Colin Ponce, Computer Science – Fault diagnosis in electrical networks (graduating May 2016)

Masters students

1. Batu Inal (2016) – *Super Seminar Scraper*
2. Sania Nagpal (2016) – *Fast trial spaces for parameterized PageRank problems*
3. Suarabh Netravalkar (2016) – *Fast trial spaces for parameterized PageRank problems*
4. Shitong Jia (2015) – *Etch-a-Sketch 3D*
5. Jing Jing and Jiankun Lu (2015) – *Super Seminar Scraper*
6. Xiangyu Zhang (2015) – *Edge-weighted parameterized PageRank: a demo*
7. Ziyang Tang (2015) – *Optimizing price of anarchy in a model of opinion formation*
8. Jia Zhang (2015) – *Spectral histogram on networks*
9. Xiangyu Zhang and Markus Salasoo (2015) – *Edge-weighted parameterized PageRank: a demo*
10. Ting-Hao Chen and Syed Hassan (2013) – *MEMS Simulation as a Service*
11. Yong Jae Kim (2013) – *Teaching Support Vector Machines to Predict Profitable Stock Offers*
12. Jungmin Yun and Jesseon Chang (2012) – *Python implementation of a stochastic RBF optimization method*
13. Chen-Yi (Charlie) Chen (2012) – *A flexible interface to FEAP*
14. Peter Hunt and Scott Purdy (2010) – *Process replication for HPC applications*
15. Silvio Tarca (2010) – *Performance optimization of symmetric factorization algorithms*

Undergraduate research students

1. Humam Alwassel (2015)
2. Patrick Chen (2015–2016)
3. Joo Young Park (2015)
4. Sheroze Sheriffdeen (2015–2016)
5. Nimit Sohoni (2015)
6. Leon Davis (2015)
7. Greg Rosenthal (2015)
8. Eric Ma (2015)
9. Brandon Hartz (2014)
10. Marshall Jiang (2014–2015)
11. Kyu-Young Kim (2011–2012)
12. Jiexun Xu (2008)
13. Iva Vukicevic (2008)
14. Daniel Parry (2008)
15. Anwis Das (2002)
16. Ernest Zhu (2001)
17. Wayne Kao (2001)

Released software packages

1. **RSC** A rank-structured Cholesky factorization code derived from Cholmod.
2. **PySOT** A Python package for parallel response-surface based surrogate optimization methods.
3. **POAP** Python Optimization Asynchronous Pluming.
4. **AxFEM** A finite element simulator for computing properties of axisymmetric resonant structures such as gyroscopes.
5. **MWwrap** A wrapper generator for automating calls to C/C++ and Fortran codes from MATLAB.
6. **Matexpr** A source-to-source translator for compiling MATLAB-like expressions within C/C++.
7. **BoneFEA** A commercial code for fast simulation of failure in human bone.
8. **HiQLab** A finite element simulator for computing losses in resonant microsystems.
9. **MATFEAP/FEAPMEX** MATLAB interfaces to the FEAP finite element analysis code.
10. **SUGAR** A lumped-element modeling system for MEMS based on modified nodal analysis. I also worked on M&MEMS, a web-based interface to the SUGAR simulator.
11. **CLAPACK** C translation of version 3.0 of the LAPACK library for dense numerical linear algebra.

Referee activity

- *ACM Journal on Emerging Technologies in Computing Systems* (2014)
- *ACM Transactions on Mathematical Software* (2013, 2014, 2015)
- *American Mathematical Monthly* (2015)
- *SIAM Journal on Matrix Analysis* (2005, 2006, 2007, 2008, 2009, 2012, 2014, 2015)
- *SIAM Journal on Multiscale Modeling and Simulation* (2012)
- *SIAM Journal on Scientific Computing* (2008, 2009, 2014, 2015)
- *IEEE Sensors* (2014)
- *IEEE Transactions on Dependable and Secure Computing* (2014)
- *IEEE Journal of Microelectromechanical Systems* (2003, 2007, 2008, 2009, 2010, 2011)
- *IEEE Transactions on Signal Processing* (2007)
- *Applicable Analysis* (2007)
- *Applied Mathematics and Computation* (2011)

- *Communications in Pure and Applied Math* (2010)
- *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* (2011, 2012, 2015)
- *Journal of Micromechanics and Microengineering* (2007, 2008, 2009, 2011, 2014, 2015)
- *Journal of Physics A: Mathematical and Theoretical* (2007)
- *Linear Algebra and its Applications* (2003, 2009, 2010, 2013, 2014, 2015)
- *Mathematics of Computation* (2007)
- *Multiscale Modeling and Simulation* (2013)
- *Numerical Linear Algebra with Applications* (2010, 2011, 2012, 2013, 2014)
- *Numerische Mathematik* (2009, 2011)
- *Transactions of the Canadian Society for Mechanical Engineering* (2009)
- Technical program commitee, IPDPS 2016.
- Technical program commitee, IPDPS 2015.
- Technical program commitee, IPDPS 2014.
- Posters committee, Supercomputing 2014.
- Technical program committee, Supercomputing 2013.
- 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 (2009, 2011)
- Proposal referee for the Netherlands science foundation (NWO)
- Proposal referee for DOE (2009, 2015)

Professional activities

- Scientific Co-Chair, SIAM Applied Linear Algebra 2018.
- Householder Symposium Committee, 2014–present.
- Secretary, SIAM Activity Group on Linear Algebra, January 2013–January 2016.
- Organizer, New York Conference on Applied Mathematics, 2011–2013.
- Editor, *Numerical Linear Algebra with Applications*, 2010 – present.
- Managing editor, *Electronic Transactions on Numerical Analysis*, 2008 – present.
- Organizer, Cornell scientific computing and numerics (SCAN) seminar, 2009 – present.
- Organizer, NYU numerical analysis and scientific computing seminar, Fall 2007–Spring 2009.
- Secretary, IEEE 754 standard revision committee, January 2002 – March 2004 (`http://grouper.ieee.org/groups/754/`)
- Member: American Mathematical Society, Society for Industrial and Applied Mathematics, and Association for Computing Machinery

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