Anil Damle

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Cornell University
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Current position

Cornell University **7/2017 -**
Assistant Professor, Department of Computer Science

Prior positions

University of California, Berkeley **7/2016 - 7/2017**
NSF Postdoctoral Fellow, Department of Mathematics

Education

Stanford University **9/2011 - 6/2016**
Ph.D. Computational and Mathematical Engineering

Thesis title: Sparse representations and fast algorithms for Kohn-Sham orbitals

Adviser: Lexing Ying

University of Colorado Boulder **8/2006 - 5/2011**
M.S. Applied Mathematics

Thesis title: Near optimal rational approximations of large data sets

Adviser: Gregory Beylkin

B.S. Applied Mathematics / Electrical and Computer Engineering
Engineering Honors Program

Submitted preprints

- Austin R. Benson, Anil Damle, and Alex Townsend "Over-parametrized neural networks as under-determined linear systems," *arXiv preprints*, arXiv:2010.15959, 2020
- Vasileios Charisopoulos, Austin R. Benson, and Anil Damle "Communication-efficient distributed eigenspace estimation," *arXiv preprints*, arXiv:2009.02436, 2020
- Eric Fuemmeler, Anil Damle, Robert DiStasio "Selected Columns of the Density Matrix in an Atomic Orbital Basis I: An Intrinsic and Non-Iterative Orbital Localization Scheme for the Occupied Space," *submitted*, 2020
- John Paul Ryan and Anil Damle "Parallel Skeletonization for Integral Equations in Evolving Multiply-Connected Domains," *arXiv preprints*, arXiv:2001.11619, 2020
- Vasileios Charisopoulos, Austin R. Benson, and Anil Damle "Incrementally Updated Spectral Embeddings," *arXiv preprints*, arXiv:1909.01188, 2019

Journal Publications

- Anil Damle, and Yuekai Sun "Uniform bounds for invariant subspace perturbations," *SIAM J. Matrix Anal. Appl.*, 41(3), 1208–1236

- Thomas Reeves, Anil Damle, and Austin R. Benson "Network Interpolation," *SIAM Journal on Mathematics of Data Science*, 2(2), 505–528
- Anil Damle, Antoine Levitt, and Lin Lin "Variational formulation for Wannier functions with entangled band structure," *SIAM Multiscale Modeling and Simulation*, 17 (1), 167-191, 2019
- Anil Damle, Victor Minden, and Lexing Ying "Simple, direct and efficient multi-way spectral clustering," *Information and Inference: a Journal of the IMA*, 8 (1), 2019
- Anil Damle and Lin Lin "Disentanglement via entanglement: A unified method for Wannier localization," *SIAM Multiscale Modeling and Simulation*, 16 (3), 1392-1410, 2018
- Victor Minden, Kenneth L. Ho, Anil Damle, Lexing Ying "A recursive skeletonization factorization based on strong admissibility," *SIAM Multiscale Modeling and Simulation*, 15 (2), 2017
- Anil Damle, Lin Lin and Lexing Ying "Computing Localized Representations of the Kohn–Sham Subspace Via Randomization and Refinement," *SIAM Journal on Scientific Computing*, 39 (6), 2017
- Victor Minden, Anil Damle, Kenneth Ho and Lexing Ying "Fast spatial Gaussian process maximum likelihood estimation via skeletonization factorizations," *SIAM Multiscale Modeling and Simulation*, 15 (4), 2017
- Anil Damle, Lin Lin and Lexing Ying "SCDM-k: Localized orbitals for solids via selected columns of the density matrix," *Journal of Computational Physics*, 334 (1), 2017
- Anil Damle and Yuekai Sun "A geometric approach to archetypal analysis and non-negative matrix factorization," *Technometrics*, 59 (3), 2017
- Victor Minden, Anil Damle, Kenneth Ho and Lexing Ying "A technique for updating hierarchical skeletonization-based factorizations of integral operators," *SIAM Multiscale Modeling and Simulation*, 14 (1), 2016
- Anil Damle, Lin Lin and Lexing Ying "Compressed representation of Kohn-Sham orbitals via selected columns of the density matrix," *Journal of Chemical Theory and Computation*, 11 (4), 2015
- Anil Damle, Lin Lin and Lexing Ying, "Pole expansion for solving a type of parametrized linear systems in electronic structure calculations," *SIAM Journal on Scientific Computing*, 36 (6), 2014
- Anil Damle, Gregory Beylkin, Terry Haut and Lucas Monzón, "Near optimal rational approximations of large data sets", *Applied and Computational Harmonic Analysis*, 35 (2), 2013

Conferences with Proceedings

- Vasileios Charisopoulos, Austin R. Benson, and Anil Damle "Entrywise convergence of iterative methods for eigenproblems," Advances in Neural Information Processing Systems, (33), 2020
- Geoff Pleiss, Martin Jankowiak, David Eriksson, Anil Damle, Jacob R. Gardner "Fast matrix square roots with applications to Gaussian processes and Bayesian optimization," Advances in Neural Information Processing Systems, (33), 2020
- Matanya B. Horowitz, Anil Damle and Joel W. Burdick, "Linear Hamilton Jacobi Bellman equations in high dimensions," *Proceedings Conference on Decision and Control*, Los Angeles, CA, pp. 5880-5887, Dec. 2014
- Anil Damle and Lucy Y. Pao. "Simultaneous numerical optimization for data association and parameter estimation," *Proceedings Joint IEEE Conference on Decision and Control and European Control Conference*, Orlando, FL, pp. 7800-7805, Dec. 2011

Talks

University of Chicago Applied Math Colloquium, Virtual (October 2020)

Oxford Numerical Analysis Seminar, Virtual (April 2020)

Wannier90 v3.0: new features and applications, Virtual (March 2020)

SCAN Seminar, Cornell University (January 2020)

Joint ATD + AMPS Annual Workshop, Washington (October 2019)
Cornell Center for Applied Math Colloquium, Cornell (September 2019)
International Congress on Industrial and Applied Mathematics, Valencia (July 2019)
International Congress on Industrial and Applied Mathematics, Valencia (July 2019)
Linear Algebra and Optimization Seminar, Stanford (May 2019)
Cornell Center for Applied Math Colloquium, Cornell (September 2018)
SIAM Conference on Mathematical Aspects of Materials Science, Portland (July 2018)
SIAM Conference on Applied Linear Algebra, Hong Kong (May 2018)
Workshop on Mathematical Methods in Quantum Chemistry, Oberwolfach (March 2018)
CSoI seminar, Purdue University (November 2017)
SCAN seminar, Cornell University (September 2017)
CS Brown Bag seminar, Cornell University (August 2017)
SIAM Annual Meeting, Pittsburgh (July 2017)
Householder Symposium XX on Numerical Linear Algebra, Virginia Tech (June 2017)
Applied Mathematics and Analysis Seminar, Duke University (October 2016)
SIAM Annual Meeting, Boston (July 2016)
SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia (May 2016)
Linear Algebra and Optimization Seminar, Stanford (April 2016)
Joint Annual Meeting of GAMM and DMV, Braunschweig (March 2016)
Computer Science Colloquium, Cornell University (February 2016)
SIAM Conference on Applied Linear Algebra, Atlanta (October 2015)
Applied Math Seminar, University of California Berkeley (September 2015)
International Congress on Industrial and Applied Mathematics, Beijing (August 2015)
Applied Math Seminar, Stanford University (April 2015)
Bay Area Scientific Computing Day, Stanford University (December 2014)
Lawrence Berkeley National Lab (April 2014)

Cornell Teaching

CS 6220: Data-sparse Matrix Computations (Spring 2021)
CS 3220: Computational Mathematics for Computer Science (Fall 2020)
CS 6220: Data-sparse Matrix Computations (Spring 2020)
CS 3220: Computational Mathematics for Computer Science (Fall 2019)
CS 4220 / MATH 4260: Numerical Analysis: Linear and Nonlinear Problems (Spring 2019)
CS 6210: Matrix Computations (Fall 2018)
CS 4220 / MATH 4260: Numerical Analysis: Linear and Nonlinear Problems (Spring 2018)
CS 6220: Data-sparse Matrix Computations (Fall 2017)

Service

Cornell SCAN seminar — Cornell University
Co-organizer — *Fall 2018 —Spring 2021*

Cornell Computer Science Department — Cornell University
PhD admissions committee — *Spring 2020*

Cornell Computer Science Department — Cornell University
Colloquium committee — *Summer 2018 and Summer 2019*

Cornell Computer Science Department — Cornell University
PhD requirements committee — *Spring 2018*

Cornell Center for Applied Math — Cornell University
PhD admissions committee — *Spring 2018 and Spring 2019*

Reviewer

Information and Inference: A Journal of the IMA, ICML, NeurIPS, SIAM Journal on Scientific Computing, Applied and Computational Harmonic Analysis, Communications on Mathematical sciences, Journal of Computational Physics, Journal of Machine Learning Research, SIAM book proposals, Springer book proposals, Journal of Chemical Theory and Computation, SIAM Journal on Mathematics of Data Science, Physica Status Solidi B: Basic Solid State Physics, and Journal of Computational Chemistry

Minisymposium (co-)organizer

SIAM Conference on Applied Linear Algebra 2018, SIAM Conference on Mathematics of Data Science 2020, SIAM Annual Meeting 2020

Grants Awarded

ATD: Collaborative Research: Statistically Principled Real-Time Detection of Anomalies for Temporal Network Data (2018-2021)
National Science Foundation
In the amount of $124,999.00 *with co-PI Austin Benson and as part of a collaborative grant with with co-PI Yuekai Sun at the University of Michigan*

Awards

Jack Youden Prize for Best Expository Paper, 2017
Technometrics

Gene Golub Doctoral Dissertation Award, 2016
Stanford University, ICME

Postdoctoral Fellowship in Mathematical Sciences, 2016
National Science Foundation

Gerald J. Lieberman Fellowship, 2015
Stanford University
"The Lieberman Fellowship recognizes doctoral students who have demonstrated broad potential for leadership in academia."

Simons Foundation Math+X Graduate Assistantship, 2014
Stanford University, Math+X

Teaching Assistant Award, 2014
Stanford University, ICME

Student Leadership Award, 2013
Stanford University, ICME

Graduate Research Fellowship, 2011
National Science Foundation