Victor Lawrence Minden

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Education

Stanford University, Stanford, CA
Ph.D. & M.S. in Computational and Mathematical Engineering, 2017
Thesis title: *Data-sparse Algorithms for Structured Matrices*

Tufts University, Medford, MA
B.S. in Electrical Engineering and Mathematics, 2012
Graduated *summa cum laude* with highest thesis honors

Experience

Flatiron Institute, New York, NY
Research Fellow, computational neuroscience group, September 2017 – present
- Developing neurally plausible learning algorithms for online dimensionality reduction

Lawrence Berkeley National Laboratory, Berkeley, CA
Research Associate, Summer 2014
- Developed a novel algorithm for time-stepping constant-coefficient hyperbolic equations with rigorous consistency and stability results

Lawrence Livermore National Laboratory, Livermore, CA
Intern with Cyber Defenders, Summer 2012
- Analyzed spectral clustering techniques for network applications

National Security Agency, Fort Meade, MD
Intern with the Director's Summer Program, Summer 2011
- Developed algorithms in MATLAB for temporal graph analysis using novel clustering methods

Argonne National Laboratory, Argonne, IL
Intern, Summer 2010, Research Aide, 2010-2011
- Contributed GPU parallelization capabilities to PETSc, a C/C++ software library for high-performance linear algebra and scientific computation

Relevant Activities

C^2: Computational Consulting, Stanford University
President (2014-2015) and consultant in mathematics and algorithms, 2013-2017

Relevant Awards

Stanford Graduate Fellowship, Office of Technology Licensing Fellow 2016
DOE Computational Science Graduate Fellowship 2012
Eta Kappa Nu ECE Honor Society, Tufts University 2011
Tau Beta Pi Engineering Honor Society, Tufts University 2011

Programming

Python, MATLAB, C++, C, Julia, MPI, OpenMP, LaTeX

Relevant Coursework

statistical learning theory, convex optimization, stochastic processes, large-scale optimization, geometric and topological data analysis, modern signal processing, numerical linear algebra, parallel methods in numerical analysis, compiler optimizations, spectral graph theory, advanced topics in scientific computing

Publications

1. *V. Minden* and L. Ying, **A Simple Solver for the Fractional Laplacian in Multiple Dimensions**, in review.

2. A. Damle, *V. Minden*, and L. Ying, **Robust and Efficient Multi-way Spectral Clustering**, to appear in Information and Inference.

3. *V. Minden*, A. Damle, K. L. Ho, and L. Ying, **Fast Spatial Gaussian Process Maximum Likelihood Estimation via Skeletonization Factorizations**, Multiscale Model. Simul. 15-4 (2017), pp. 1584-1611.

4. *V. Minden*, K. L. Ho, A. Damle, and L. Ying, **A Recursive Skeletonization Factorization Based on Strong Admissibility**, Multiscale Model. Simul. 15-2 (2017), pp. 768-796.

5. B. Lo, *V. Minden*, and P. Colella, **A Real-Space Green's Function Method for the Numerical Solution of Maxwell's Equations**, Communications in Applied Mathematics and Computational Science 11-2 (2016), pp. 143-170.

6. *V. Minden*, A. Damle, K. L. Ho, and L. Ying, **A Technique for Updating Hierarchical Skeletonization-Based Factorizations of Integral Operators**, Multiscale Model. Simul. 14-1 (2016), pp. 42-64.

7. *V. Minden*, C. Youn, and U. A. Khan, **A Distributed Self-Clustering Algorithm for Autonomous Multi-Agent Systems**, in the Proceedings of the 50th Annual Allerton Conference on Communication, Control and Computing, Monticello, IL, Oct. 2012.

8. *V. Minden*, B. Smith, and M. G. Knepley, **Preliminary Implementation of PETSc Using GPUs**, in the Proceedings of the 2010 International Workshop of GPU Solutions to Multiscale Problems in Science and Engineering, Springer, 2011.

Conference Talks

1. **Copper Mountain Conference on Iterative Methods**, Copper Mountain, CO, 2018. "A recursive skeletonization factorization based on strong admissibility".

2. **SIAM Annual Meeting**, Pittsburgh, PA, 2017. "Fast spatial Gaussian process maximum likelihood estimation".

3. **SIAM Annual Meeting**, Boston, MA, 2016. "Efficient preconditioners and hierarchical interpolative decompositions".

4. **SIAM Conference on Uncertainty Quantification**, Lausanne, CHE, 2016. "Fast spatial Gaussian process maximum likelihood estimation via skeletonization factorizations".

5. **SIAM Conference on Applied Linear Algebra**, Atlanta, GA, 2015. "Exploiting hierarchical low-rank compression for fast updating".

6. **SIAM Annual Meeting**, Chicago, IL, 2014. "Updating techniques for hierarchical factorizations".

7. **Allerton Conference on Communication, Control, and Computing**, Monticello, IL, 2012. "A distributed self-clustering algorithm for autonomous multi-agent systems".

Teaching Experience

Projects in Applied and Computational Mathematics, Stanford University
Student Mentor, Spring 2015 & Winter 2013
CME Refresher Course: Linear Algebra, Stanford University
Instructor, September 2014
Discrete Mathematics, Tufts University
Teaching Assistant, Spring 2011
Assorted Mathematics / Computer Science, Tufts University
Tutor with the Academic Resource Center, 2009-2011