

■ 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*

Thesis advisor: Lexing Ying

Tufts University, Medford, MA

B.S. in Electrical Engineering and Mathematics, 2012

Graduated *summa cum laude* with highest thesis honors

Thesis title: *Improved Iterative Methods for NAPL Transport Through Porous Media*

Thesis advisor: Scott MacLachlan

RESEARCH POSITIONS

Flatiron Institute, New York, NY

Flatiron Research Fellow, September 2017 – present

- Work with Dmitri Chklovskii and the computational neuroscience group
- Developing neurally plausible learning algorithms for online dimensionality reduction

Lawrence Berkeley National Laboratory, Berkeley, CA

Research Associate, Summer 2014

- Worked with Phil Colella and the applied numerical algorithms group
- 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

- Worked with Van Henson and the eigensolvers group
- 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
- Implemented spectral graph theoretic and tensor analytic methods for investigating trends in dynamic relational data

Argonne National Laboratory, Argonne, IL

Intern, Summer 2010, Research Aide, 2010-2011

- Worked with Barry Smith and the Portable, Extensible Toolkit for Scientific Computation (PETSc) group
- Contributed GPU parallelization capabilities to PETSc, a C/C++ software library for high-performance linear algebra and scientific computation

ACTIVITIES

C²: Computational Consulting, Stanford University

President (2014-2015) and consultant in mathematics and algorithms, 2013-2017

EDGE Student Mentorship Program, Stanford University

Student mentor to two doctoral students in the Enhancing Diversity in Graduate Education (EDGE) program, 2015-2017

- PROGRAMMING** Python, MATLAB, C++, C, Julia, MPI, OpenMP, L^AT_EX
- AWARDS**
- Student Leadership Award**, ICME, Stanford University 2017
 - Ben Rolfs Memorial Award**, ICME, Stanford University 2017
 - Stanford Graduate Fellowship**, Office of Technology Licensing Fellow 2016
 - DOE Computational Science Graduate Fellowship** 2012
 - NSF Graduate Research Fellowship** (declined) 2012
 - Alpha Xi Delta Prize Scholarship**, Tufts University 2012
 - Marshall Hochhauser Prize**, Tufts University 2012
 - Eta Kappa Nu ECE Honor Society**, Tufts University 2011
 - Tau Beta Pi Engineering Honor Society**, Tufts University 2011
 - Student Chapter Certificate of Recognition**, SIAM 2011
 - Honorable Mention** (with S. Bidwell, L. Clegg), COMAP MCM 2011
 - INFORMS Prize** (with D. Brady, L. Clegg), COMAP MCM 2010
 - Outstanding Winner** (with D. Brady, L. Clegg), COMAP MCM 2010
- PREPRINTS**
1. *V. Minden* and *L. Ying*, **A Simple Solver for the Fractional Laplacian in Multiple Dimensions**, in review.
- PUBLICATIONS**
1. *A. Damle*, *V. Minden*, and *L. Ying*, **Simple, Direct, and Efficient Multi-way Spectral Clustering**, to appear in *Information and Inference*.
 2. *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.
 3. *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.
 4. *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.
 5. *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.
 6. *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.
 7. *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".

SEMINAR TALKS

1. **Cornell Scientific Computing and Numerics Seminar**, Ithaca, NY, 2018. "A recursive skeletonization factorization based on strong admissibility".
2. **Stanford Linear Algebra and Optimization Seminar**, Stanford, CA, 2016. "Fast algorithms exploiting low-rank structure for graph clustering and integral equations".
3. **ICME Student Seminar**, Stanford, CA, 2014. "A numerical method for solving Maxwell's equations in free-space using an approximate IVP Green's function".
4. **Tufts SIAM Student Seminar**, Medford, MA, 2010. "GPU computing for scientific computation applications".
5. **Tufts Mathematics Department Seminar**, Medford, MA, 2010. "From kills to kilometers: using centographic techniques and rational choice theory for geographical profiling of serial killers".

OTHER TALKS

1. **DOE CSGF Annual Program Review**, Arlington, VA, 2016. "Fast spatial Gaussian process maximum likelihood estimation via skeletonization factorizations".
2. **Bay Area Scientific Computing Day**, Berkeley, CA, 2015. "Fast spatial Gaussian process maximum likelihood estimation".
3. **Gene Golub SIAM Summer School Speed Talk**, Delphi, GRC, 2015. "Fast computations with kernel matrices using hierarchical factorizations".

CONFERENCE POSTERS

Computational and Systems Neuroscience (Cosyne), Denver, CO, 2018. "Biologically plausible online PCA without recurrent neural dynamics".

OTHER POSTERS

1. **ICME Student Xpo**, Stanford, CA, 2017. "Robust and efficient multi-way spectral clustering".
2. **ICME Student Xpo**, Stanford, CA, 2016. "Fast spatial Gaussian process maximum likelihood estimation via skeletonization factorizations".
3. **DOE CSGF Annual Program Review**, Arlington, VA, 2015. "A real-space Green's function method for the numerical solution of Maxwell's equations in free space".
4. **ICME Student Xpo**, Stanford, CA, 2015. "Updating hierarchical factorizations in response to localized modifications".
5. **DOE CSGF Annual Program Review**, Arlington, VA, 2014. "Updating techniques for tree-based factorizations".
6. **DOE CSGF Annual Program Review**, Arlington, VA, 2013. "Spectral methods for seed-set expansion on graphs".

7. **LLNL Student Poster Session**, Livermore, CA, 2012. "Commute time ad related metrics for seed-set expansion".

TEACHING

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