# 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, **Simple, Direct, 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