

# David Eriksson

## *Curriculum Vitae*

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🐙 <https://github.com/dme65/>

## Education

- 2014 – **Cornell University**  
Present • Ph.D. in Applied Mathematics, expected May 2019  
• TA award in Computer Science, Spring 2016  
• Overall TA rating: 4.8/5.0  
• GPA: 4.22/4.0 (current)
- 2012 – **Chalmers University of Technology**  
2014 • M.Sc. in Engineering Mathematics and Computational Science  
• Graduated top of class  
• GPA: 5.0/5.0
- 2008 – **Chalmers University of Technology**  
2011 • B.Sc. in Mathematics  
• Graduated top of class  
• GPA: 4.92/5.0

## Research Interests

Bayesian Optimization, Numerical Linear Algebra,  
Machine Learning, Scientific Computing,  
High-Performance Computing, Numerical Analysis.

## Current Research

### Asynchrony in Bayesian optimization

- Designing and implementing asynchronous algorithms.
- Using elasticity in modern cloud platforms.
- Software packages:
  - pySOT ([github.com/dme65/pySOT](https://github.com/dme65/pySOT))
  - SOT ([github.com/dme65/SOT](https://github.com/dme65/SOT))

### Baesian optimization with additional information

- Incorporating energy bounds, Lipschitz constants, and other information in Bayesian optimization.

### Structured solvers

- Scalable Gaussian process regression.
- Scalable radial basis function interpolation.
- Block-Kronecker structure.

## Awards

- 2017 **Anna Whitlock Scholarship**  
*Anna Whitlock's Foundation*
- 2016 **Teaching Assistant Award in Computer Science**  
*Cornell University*
- 2014 **Richard & Alice Netter Fellowship**  
*Thanks to Scandinavia*
- 2014 **Fritz O Fernstroms Scholarship**  
*The Sweden-America Foundation*
- 2011 **Anna Whitlock Scholarship**  
*Anna Whitlock's Foundation*

## Work Experience

- The MathWorks** May. 2017 – Aug. 2017  
Software Developer  
*Global Optimization*
  - Implemented an asynchronous surrogate optimization framework.
  - Performed design review, code review, unit testing, and benchmarking.
  - Gave several internal talks and software tutorials.
  - Helped internal customers solve challenging optimization problems.
- Fraunhofer – Chalmers Centre** Mar. 2014 – July 2014  
Applied Researcher  
*Point Cloud Visualization*
  - Developed algorithms for visualizing point clouds with billions of points.
  - Used these algorithms to design a visualization software in C++ capable of rendering 50+ FPS with unlimited detail on a standard graphics card.
- Fraunhofer – Chalmers Centre** Sept. 2012 – Mar. 2014  
Contracted Student  
*Computational Geometry*
  - Constructed out-of-core algorithms for shortest distance computations between a point cloud with billions of points and a geometric object.
  - Satisfied the heavy memory requirements by only keeping the relevant points in memory at a given time.
  - Derived sharp criteria for when a specific subset of the point cloud can contain the point closest to the geometric object.
- NASA Goddard Space Flight Center** June 2013 – Sept. 2013  
Data Analyst  
*Tropospheric Delay Ray Tracing*
  - Computed tropospheric delays by solving the Eikonal equation numerically through the weather model data.
  - Showed a substantial improvement in baseline length and station positions.
- NASA Goddard Space Flight Center** June 2011 – June 2012  
Data Analyst  
*Mass Loading*
  - Computed mass loading displacements due to changes in water mass and ocean bottom pressure.
  - Convolved a loading Green's function with the global mass loading field.
  - Found significant improvements in baseline lengths and station positions.

## Extracurricular Activity

- 2018 **Colman Leadership Program**  
*Cornell University*
- 2016 – **President of the Scientific Software Club**  
Present *Cornell University*  
[cornell-ssw.github.io](https://cornell-ssw.github.io)
- 2016 **Argonne Training Program on Extreme-Scale Computing (ATPESC)**  
*Argonne National Labs*

## Computer Skills

C++, Python, MATLAB, C, UNIX, L<sup>A</sup>T<sub>E</sub>X, Git, OpenMP, MPI.

## Publications

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- Dec. 2017 **Scalable log determinants for Gaussian process kernel learning**  
*Appears at Advances in Neural Information Processing Systems 30 (NIPS), 2017*  
(with K. Dong, H. Nickisch, D. Bindel, A. Wilson)
- Mar. 2016 **Fast exact shortest distance queries for massive point clouds**  
*Graphical Models*  
Vol. 84, pages 28-37  
(with E. Shellshear)
- Dec. 2014 **Tropospheric delay raytracing applied in VLBI analysis**  
*Journal of Geophysical Research*  
Vol. 119, Issue 12, pages 9156–9170  
(with D. S. MacMillan and J. M. Gipson)
- Sept. 2014 **Approximate distance queries for path-planning in massive point clouds**  
*11th International Conference on Informatics in Control, Automation and Robotics (ICINCO)*  
Vol. 2, pages 20-28, IEEE, Vienna, Austria  
(with E. Shellshear)
- July 2014 **Continental hydrology loading observed by VLBI measurements**  
*Journal of Geodesy*  
Vol. 88, Issue 7, pages 675-690  
(with D. S. MacMillan)
- Aug. 2013 **Nontidal ocean loading observed by VLBI measurements**  
*21st Meeting of the European VLBI Group for Geodesy and Astronomy*  
Vol. 1, pages 135-140, Espoo, Finland  
(with D. S. MacMillan)
- Mar. 2012 **Continental hydrology loading observed by VLBI measurements**  
*IVS 2012 General Meeting Proceedings*  
pages 415-419, Madrid, Spain  
(with D. S. MacMillan)

## Presentations

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- Dec. 2017 **Scalable log determinants for Gaussian process kernel learning**  
*NIPS, 2017*  
Long Beach, CA
- Oct. 2017 **On solving Khatri-Rao systems of equations**  
*SCAN Seminar, 2017*  
Cornell University, NY
- Oct. 2017 **Asynchronous parallel stochastic global optimization using radial basis functions**  
*INFORMS, 2017*  
Houston, TX
- Mar. 2017 **Global optimization with native space semi-norm bounds**  
*SIAM CSE, 2017*  
Atlanta, GA
- June. 2016 **Asynchronous surrogate optimization in Python (pySOT + POAP)**  
*Computational Methods in Water Resources, 2016*  
Toronto, Canada
- Aug. 2013 **Atmospheric ray tracing and its impact in VLBI analysis**  
NASA Goddard Space Flight Center, Greenbelt, MD  
(with D. S. MacMillan and J. M. Gipson)
- Dec. 2012 **Explaining the VLBI estimated degree-1 load variation via atmospheric, oceanic, and hydrological mass variations**  
*American Geophysical Union, Fall Meeting 2012*  
San Francisco, CA  
(with D. S. MacMillan)
- Nov. 2011 **Mass loading in VLBI analysis**  
NASA Goddard Space Flight Center, Greenbelt, MD  
(with D. S. MacMillan)