David Eriksson

Curriculum Vitæ

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Education

2014 – Present **Cornell University**
- Ph.D. in Applied Mathematics, expected Dec 2018
- TA award in Computer Science, Spring 2016
- Overall TA rating: 4.7/5.0
- GPA: 4.21/4.0 (current)

2012 – 2014 **Chalmers University of Technology**
- M.Sc. in Engineering Mathematics and Computational Science
- Graduated top of class
- GPA: 5.0/5.0

2008 – 2011 **Chalmers University of Technology**
- B.Sc. in Mathematics
- Graduated top of class
- GPA: 4.92/5.0

Research Interests

Machine Learning, Bayesian Optimization, Numerical Linear Algebra, Scientific Computing.

Current Research

Scalable Machine Learning
- Gaussian process regression with millions of points.
- Bayesian optimization in higher dimensions.
- Utilizing Kronecker and tensor product structure.

Bayesian Optimization with Additional Information
- Incorporating derivative information, function value bounds, and other information in Bayesian optimization.

Asynchrony in Bayesian Optimization
- Designing and implementing asynchronous algorithms.
- Software packages:
  - `pySOT` (github.com/dme65/pySOT)
  - `SOT` (github.com/dme65/SOT)

Awards

2017 **Anna Whitlock Scholarship** ($3,000)
Anna Whitlock's Foundation

2016 **Teaching Assistant Award in Computer Science**
Cornell University

2014 **Richard & Alice Netter Fellowship** ($20,000)
Thanks to Scandinavia

2014 **Fritz O Fernstrom's Scholarship** ($10,000)
The Sweden-America Foundation

2011 **Anna Whitlock Scholarship** ($3,000)
Anna Whitlock's Foundation

Computer Skills

C++, Python, MATLAB, Git, LaTeX, UNIX.

Work Experience

Google May. 2018 – Aug. 2018
Software Engineering Intern Mountain View, CA, USA
Machine Learning
- ***(Search Click Quality)*** Invented an improved ML model for ad selection.
- Used this model in a live experiment and analyzed the results.
- Built a library for training and comparing ad selection models.
- Analyzed human labeled data and suggested ways to improve data quality.
- ***(Extra Project with Google Vizier)*** Implemented a new black-box optimization algorithm for high-dimensional problems.
- My algorithm outperforms their default and runs 1000 times faster.

The MathWorks May. 2017 – Aug. 2017
Software Developer Intern Natick, MA, USA
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 Gothenburg, Sweden
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 Gothenburg, Sweden
Computational Geometry
- Constructed out-of-core algorithms for shortest distance computations between a point cloud with billions of points and a geometric object.
- Derived sharp inequalities to meet performance and memory requirements.

NASA Goddard Space Flight Center June 2013 – Sept. 2013
Data Analyst Intern Greenbelt, MD, USA
Tropospheric Delay Ray Tracing
- Computed tropospheric delays by solving the Eikonal equation.
- Used weather model data from the NASA GMAO GEOS-5 model.
- Showed a substantial improvement in baseline length and station positions.

NASA Goddard Space Flight Center June 2011 – June 2012
Data Analyst Intern Greenbelt, MD, USA
Mass Loading
- Computed mass loading displacements of the surface of the earth due to changes in water mass and ocean bottom pressure.

Extracurricular Activity

2018 **Colman Leadership Program**
Cornell University

2016 – Present **President of the Scientific Software Club**
Cornell University
cornell-ssw.github.io

2016 **Argonne Training Program on Extreme-Scale Computing (ATPESC)**
Argonne National Labs

Publications

Under review — **Scaling Gaussian process regression with derivatives**
Neural Information Processing Systems, (NIPS) 2018
(with K. Dong, E. Lee, D. Bindel, A. Wilson)

Under review — **On solving Khatri-Rao systems, coupled matrix equations, and generalized Sylvester equations**
Numerical Linear Algebra with Applications
(with C. Van Loan)

Dec. 2017 — **Scalable log determinants for Gaussian process kernel learning**
Neural Information Processing Systems, (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

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)