David Eriksson

Curriculum Vitæ

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Education

Sept. 2014 – Present
Doctor of Philosophy
Applied Mathematics
Cornell University
GPA: 4.22/4.0 (current)

Sept. 2012 – Mar. 2014
Master of Science
Engineering Mathematics and Computational Science
Chalmers University of Technology
GPA: 5.0/5.0

Sept. 2008 – June 2011
Bachelor of Science
Engineering Mathematics
Chalmers University of Technology
GPA: 4.92/5.0

Research Interests

Surrogate Optimization, Numerical Linear Algebra
Scientific Computing, High-Performance Computing
Machine Learning, Computational Geometry

Computer Skills

Advanced Knowledge	MATLAB, C++, C, LaTeX, Python, OpenMP, MPI
Intermediate Knowledge	UNIX, Fortran90, Mathematica, JAVA, Microsoft Windows, Microsoft Office
Basic Knowledge	R, CUDA, PETSc, Visual Studio

Awards

2016 **Teaching award in Computer Science**
Cornell University

2014 **Richard & Alice Netter Scholarship**
Cornell University

2014 **Fritz O Fernstroms Scholarship**
Sverige-Amerika Stiftelsen

2014 **Anna Whitlock Scholarship**
Anna Whitlocks Minnesfond

2009, 2011 **2nd place in the Nordic Mathematics Competition for university students**
Chalmers University of Technology

Volunteer Experience

Sept. 2013 – Mar. 2014
Intize
Tutored high-school students

Work Experience

Mar. 2014 – July 2014

Applied Researcher

Fraunhofer – Chalmers Centre, Gothenburg, Sweden
Point Cloud Visualization

I worked on visualization of huge point clouds with billions of points. It is of great interest to be able to visualize massive point clouds, but limitations in both RAM and graphic card memory make it impossible to render all the points in the point cloud with enough frames per second. The visualization software I developed in C++ is capable of rendering 50+ FPS with unlimited detail on a standard graphics card for point clouds having billions of points. The software reads points directly from the hard disk drive to the GPU when needed.

Sept. 2012 – Mar. 2014

Contracted Student

Fraunhofer – Chalmers Centre, Gothenburg, Sweden
Computational Geometry

I constructed out-of-core algorithms for distance computations between a massive point cloud having billions of points and another geometric object. Because of heavy memory requirements only a small subset of the point cloud could reside in memory at a given time. I derived sharp criteria for when a specific subset of the point cloud could contain the point closest to the geometric object to avoid unnecessary reads of points. My master's thesis was a continuation on this research.

June 2013 – Sept. 2013

Data Analyst

NASA Goddard Space Flight Center, Greenbelt, MD
Tropospheric Delay Ray Tracing

I interned for NVI Inc., a contractor at NASA Goddard Space Flight Center. I worked on computation of tropospheric delays directly from numerical weather models by numerically solving Maxwell's equations through the model data. The troposphere is the main contributor to the error budget of Very Long Baseline Interferometry (VLBI), which is a geodetic technique striving for millimeter precision. My approach showed a substantial improvement in baseline length and estimates of station positions.

June 2011 – June 2012

Data Analyst

NASA Goddard Space Flight Center, Greenbelt, MD
Mass Loading, Tropospheric Delay Ray Tracing

During the first half of the internship I worked on mass loading displacements due to changes in water mass and ocean bottom pressure. In order to model these effects I convolved a loading Green's function with the global mass loading distribution and found significant improvements in baseline lengths and estimates of station positions. During the spring I worked on a tropospheric delay project that I finished during my second internship.

Journal Publications

March 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)

July 2014 **Continental hydrology loading observed by VLBI measurements**
Journal of Geodesy
Vol. 88, Issue 7, pages 675-690
(with D. S. MacMillan)

Conference Proceedings

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)

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

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)

Workshops

Aug. 2016 **Argonne training program on extreme-scale computing (ATPESC)**
Argonne National Labs
July 31 – Aug 12