

Pate Motter

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Education

Candidate for Doctor of Philosophy in Computer Science expected May 2017
University of Colorado, Boulder

Master of Science in Computer Science May 2013
University of Colorado, Boulder

Bachelor of Science in Computer Science, minor in Mathematics May 2011
University of Arkansas, Fayetteville

Research Experience

Summer Computing Intern, Lawrence Livermore National Laboratory w/ Ian Karlin May 2015 – August 2015

- Continued work on [BLAST](#) hydrodynamics code
- Created benchmarking suite for comparing high performance linear algebra libraries
- Ported BLAST to some of these libraries (Eigen, BLAZE, Armadillo) to compare performance
- Presented poster, "[Blast Motivated Small Dense Linear Algebra Library Comparison](#)"

Doctoral Research / Research Assistant, [Lighthouse Project](#), University of Colorado August 2014 – Present

- Examining the performance of existing solver-preconditioner predictor methods at different resource scales
- Developing methods of predicting the best solver-preconditioner pairs based on machine learning techniques
- Expanding Lighthouse's framework to include portions of [Trilinos](#)
- Created application which calculates various matrix properties using Trilinos

Summer Computing Intern, Lawrence Livermore National Laboratory w/ Ian Karlin May 2014 – August 2014

- Worked on the [BLAST hydrodynamics code](#)
- Examined performance gain possibilities for computationally intensive kernels
- Award for best student poster, "[Analysis and Improvement of Corner Force Computation in BLAST](#)"

Software Developer, TerraSpark Geosciences Aug 2011 – Jan 2014

- Implemented filters for seismic interpretation in C++, OpenCL, OpenMP and MPI
- Improved speed of execution and enabling clients to utilize heterogeneous processing
- Designed seismic noise reduction techniques using wavelets and curvelets

Passionate on Parallel-REU Research Student, University of Illinois, Urbana-Champaign May 2010 – Aug 2010

- Improved existing risk analysis Python code to be more efficient when running on clusters
- Implemented a GUI as well as intelligent load balancing and termination

REU Research Student, University of California, Santa Cruz May 2009 – Aug 2009

- Developed data recording system for wearable exoskeleton robot
- Communicated with device using C and Matlab Simulink to store and replay data of 3D positions

REU Research Student, University of Arkansas May 2008– Aug 2008

- Performed molecular dynamic simulations of Copper-Nickel nano-laminates
- Determined the plastic deformation properties of various Cu-Ni laminates
- Developed in C++ and the LAMMPS library for running on clusters

Peer-reviewed Publications

- Jessup, E., Motter P., Norris, B., Sood K., "Performance-based numerical solver selection in the lighthouse framework," SIAM J. Sci. Comput., pp. 1–20, 2016. (To Appear)
- Koh, K. H., Repenning, A., Nickerson, H., Endo, Y., Motter, P., [Will it Stick? Exploring the Sustainability of Computational Thinking Education Through Game Design](#), ACM Special Interest Group on Computer Science Education Conference, (SIGCSE 2013), March 6-9, 2013, Denver, Colorado, USA

Peer-reviewed Presentations

- Marbach, J., Motter, P., [GPU Acceleration for Seismic Interpretation Algorithms](#), GPU Technology Conference. May 2012, San Jose, California, USA.

- Marbach, J. Welch R. Motter, P. Dominguez, S. [Porting Makes You Stronger: Implementing Challenging Seismic Attributes on the GPU](#), GPU Technology Conference. March 2013, San Jose, California, USA.

Peer-reviewed Posters

- P. Motter, I. Karlin, and C. Earl, "[BLAST Motivated Small Dense Linear Algebra Library Comparison](#)." SC '15, Austin, TX, 2015.
- K. Sood, P. Motter, E. Jessup, and B. Norris, "[Automating Sparse Linear Solver Selection with Lighthouse](#)." SC '15, Austin, TX, 2015.

Other Posters

- P. Motter, I. Karlin, R. Rieben, and S. Langer, "[Analysis and Improvement of Corner Force Computation in BLAST](#)." LLNL Student Poster Symposium, 2014. Awarded best poster.

Awards

- XSEDE allocation for furthering my thesis work - #CCR160019 (2016)
 - 200k+ SUs
- Selected to attend [Argonne's Training Program on Extreme-Scale Computing](#) (2016)
- Nvidia Research Grant for GPU-based machine learning and numerical linear algebra (2015)
 - Nvidia Titan X
- Best poster award at LLNL Summer Student Symposium (2014)
- Nvidia Research Grant for low-power high-performance computing (2013)
 - Kayla and Carma development kits
 - Nvidia Tesla K20

University Projects

- N-Body Problem Solver*, University of Colorado - Graphics Course Final Project Dec 2012
- Developed OpenGL N-Body solver that compares performance of serial C++, OpenMP, and OpenCL
 - Incorporated the interoperability of OpenCL and OpenGL
- GPGPU Linear Program Solver*, University of Colorado - Linear Programming Course Final Project Dec 2011
- Developed program to perform the simplex method in OpenCL and C++
- Chua's Circuit*, University of Colorado - Chaotic Dynamics Final Project May 2011
- Constructed Chua's circuit in addition to a simulated version and its ODE counterpart
 - Performed statistical analysis on the three versions using Python and oscilloscope readings

Teaching Experience

- Teaching Assistant*, University of Colorado – Computer Systems course August 2014 – Dec 2014
- Taught and graded three lab sections of the undergraduate systems course
 - Lectured and helped teach C, x86 assembly, low-level performance analysis
- Teaching Assistant*, University of Colorado – Data Structures course Jan 2014 – May 2014
- Taught and graded three lab sections of an undergraduate data structures course
 - Lectured and helped teach C++, Java, data structures, algorithmic analysis
- Knapsack Problem*, University of Colorado – Algorithms Course Mar 2013
- Lectured over dynamic programming and its applications to the knapsack problem.
- Freshman Engineering Peer Mentor*, University of Arkansas Aug 2008 – May 2011
- Mentored 14 freshmen engineering students
 - Met individually each week to determine and personal problems and how to solve them

Other Experience

- University of Arkansas Programming Team*, University of Arkansas Aug 2008 – May 2011
- Worked as a three-member team to competitively solve a variety of computational problems
 - Competed in various collegiate competitions