John R. Emmons

Contact	email: john.emmons@wustl.edu	web: johnemmons.com

Summary

Master's student with a strong background in high performance computing and data science research. Solid understanding of several subject areas and proven record of solving significant problems in diverse fields. Plans to enter computer science PhD program next fall; seeking a summer 2016 internship before graduate school.

Education

Washington University in St. Louis, St. Louis, MO — August 2014 - May 2016
MS Computer Science (dual enrollment with BS) — GPA: 4.00
BS Computer Engineering and BS Electrical Engineering — GPA: 3.98

Drake University, Des Moines, IA (3+2 transfer to WU) — August 2011 - May 2016
BS Computer Science, Mathematics, and Physics (triple major) — GPA: 4.00

Relevant Skills

Languages: C/C++, Fortran, MATLAB, Python, R
Parallelism: CilkPlus, CUDA, Hadoop, Intel SSE, MPI, OpenMP, Pthreads
Publishing: Gnuplot, LaTeX, R (contributor to knitR package)
Software Development: Doxygen, Git, Jenkins, Subversion
Systems: Solid sysadmin fundamentals for *nix. Experienced with clusters/supercomputers

Selected Internships

California Institute of Technology | Topic: numerical differential equations
PI: Oscar Bruno — Summer 2015
○ Simulated EM-fields propagating along dielectric waveguides with arbitrary shape
○ Implemented a generic, high-order numerical method (MATLAB, Fortran, MPI)

Washington University in St. Louis | Topic: GPU motif finding
PI: Jeremy Buhler — Spring 2015 - present
○ Implemented the expectation maximization motif finding algorithm MEME
○ Ported CPU implementation of MEME to Nvidia GPU (CUDA, C/C++, Cub)

Carnegie Mellon University | Topic: DNA read mapping (string algorithms)
PI: Onur Mutlu — Spring 2014 - Fall 2014
○ Implemented generic, SMID-parallel DNA sequence alignment filter using Intel SSE3
○ Achieved a 3x speedup over state of the art using bit-vector approach (C, SSE3)

University of California, Berkeley | Topic: large-scale parallel data processing
PI: Allison Andrews — Summer 2013
○ Implemented a massively scalable file system backup algorithm at NERSC
○ Used Hadoop to perform distributed computing on supercomputer (Hadoop, Python)

Drake University | Topic: computational atomic physics
PI: Klaus Bartschat — Spring 2013 - Spring 2014
○ Simulated ultrafast, high-intensity laser pulses (attosecond timescale) on hydrogen atoms
○ Parallelized simulations to run on the Stampede supercomputer (Fortran, OpenMP)

Significant Awards

Washington University Harold P. Brown Fellowship winner — Spring 2014
○ Full-tuition scholarship awarded to a WU engineering student each year

Barry Goldwater Scholarship winner — Spring 2013
○ Highly selective, national scholarship for STEM undergrads

Drake University Physics Prize winner — Spring 2011
○ Physics exam and interview competition for a full-tuition scholarship

Selected Publications

[1] H. Xin, J. Emmons, O. Mutlu, et al. "Optimal Seed Solver: Optimizing Seed Selection in Read Mapping". Oxford Bioinformatics, Nov. 2015

[2] H. Xin, J. Emmons, O. Mutlu, et al. "Shifted Hamming Distance: A Fast and Accurate SIMD-Friendly Filter for Local Alignment in Read Mapping". Oxford Bioinformatics, Dec. 2014.

[3] I. Ivanov, J. Emmons, K. Bartschat, et al. "Displacement effect in strong-field atomic ionization by an XUV pulse". Physical Review A, Oct. 2014.