Mark Wellons

University of Wisconsin-Madison
Department of Computer Sciences

(304) 542-4464
mwellons@cs.wisc.edu
http://pages.cs.wisc.edu/∼mwellons/

Objective Statement

Obtain a software development or research position at a technology company where I can utilize my data science, math, and research background. The ideal position would start in or around February 2014.

Education

University of Wisconsin-Madison	2012-Present
Ph.D. in Computer Science (In Progress)	
University of Wisconsin-Madison	2010-2012
Masters in Computer Science	
The College of Wooster	2004-2008
B.A. Physics and Computer Science	

Experience

Software Developer Intern, Pivotal   Summer 2012 & Summer 2013

- Developed modules for multinomial regression, principle component analysis, and clustered sandwich error estimators for the MADlib analytics package for the GreenPlum database.
- Developed software for releases 1.0 and 1.1 of MADlib.

Research Assistant, The University of Wisconsin-Madison   Winter 2011-Present
with Dr. Christopher Ré, Department of Computer Sciences

- Developed software for fusing multiple sensors in a noisy environment to improve measurement resolution. (Joint work with Raytheon).
- Developing robust statistical algorithms for the IceCube South Pole Neutrino Observatory. (Joint work with the IceCube Collaboration)
  - Improved both the false-positive rate and the true-positive rate in detecting neutrinos.
  - Improved the bandwidth efficiency for transmitting useful data from the observatory.
  - Wrote and maintained software currently running at the South Pole.

Research Assistant, The University of Wisconsin-Madison   Summer 2010 - Fall 2010
with Dr. Susan Coppersmith, Department of Physics

- Implemented simulation of quantum walk to test for graph isomorphism.
- Parallelized the quantum simulator to a large high-throughput system.
- Generated novel graphs that are expected to be challenging to distinguish using quantum walks.
- Developed explicit construction algorithm for graph-pairs indistinguishable to a quantum walk with any fixed number of particles.

Internal Programmer, eDOCS America Corporation   Summer 2009 - Spring 2010

- Wrote software to automate document processing, data analysis, and database management.
- Reduced the time required for data management tasks by orders of magnitude.

Research Intern, The University of California-Davis   Summer 2007
with Dr. Rena Zieve, Department of Physics

- Measured the circulation of super-fluid helium vortices.
- Manufactured containment cells for super-fluid helium.
- Developed software to improve data-collection automation.

Research Intern, The University of Alaska-Fairbanks   Summer 2006
with Dr. Anton Kulchitsky, Department of Physics

- Constructed a simulation modeling the propagation of the solar wind from the Sun to the Earth.
- Wrote numerical solver for flow-modeling partial-differential equations.

Publications

Improvement in Fast Particle Track Reconstruction with Robust Statistics , Submitted 2013, Nuclear Instruments and Methods in Physics Research Section A

First Observation of PeV-Energy Neutrinos with IceCube , Submitted 2013, Physical Review Letters

Noninteracting multiparticle quantum random walks applied to the graph isomorphism problem for strongly regular graphs, 2012, Physical Review A

Universality in Eight-arm Star Polystyrene and Methylcyclohexane Mixtures Near the Critical Point, 2007, Journal of Chemical Physics 127.

Conference Presentations

Robust Statistics in IceCube Initial Muon Reconstruction, International Cosmic Ray Conference, July 7, 2013.

Robust Statistics in a Neutrino Detection, University of Wisconsin-Madison Database Affiliates, October 14, 2012.

Robust Data Analysis Algorithms in a Neutrino Telescope, University of Wisconsin-Madison Database Affiliates, October 17, 2011.

Numerical investigations of quantum walks with hard-core bosons and the graph isomorphism problem, American Physical Society, March Meeting 2011, March 24, 2011.

Technical Skills

Programming Languages: C/C++, Python, Java

Tools: GAMS, MatLab, Mathematica, Condor, LaTeX, Git

Operating Systems: Linux, Windows, Mac OS X