

# Ryan Marcus

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## PROFILE

I am a research assistant at the Los Alamos National Laboratory. I work in the high performance computing group on application readiness. I graduated with honors from the University of Arizona with a degree in computer science and minors in mathematics and gender studies. In Fall of 2014, I will pursue a Ph.D. in computer science at Brandeis University.

## EXPERIENCE

### **The University of Arizona with Dr. Richard Snodgrass - 2013-2014**

I wrote my undergraduate thesis with direction from Professor Snodgrass. I designed and implemented a suite of validation tools for AMELIE, a project that studies the intricacies of causal modeling. I have also been involved in planning the overall structure of the project, and I helped implement the first prototype.

### **Los Alamos National Laboratory with Dr. William Ward 2013**

I worked with Dr. Ward on the laboratory's 3D reconstruction code, RECON. I designed parallel versions of many serial algorithms and implemented them on GPGPUs, and I designed a fast algorithm to approximate median filters. Overall, my work improved the performance of RECON by a factor of three.

### **The University of Arizona with Dr. Shaughan Lavine - 2012-2013**

Dr. Lavine and I developed a novel Monte Carlo algorithm for finding functional dependencies within large databases. We employed various HPC techniques to accelerate the algorithm, and we were able to optimize several production database schemas at the UofA.

### **Los Alamos National Laboratory with Dr. Larry Cox 2009-2012**

I work with Dr. Larry Cox on Los Alamos' premier neutron transport code, MCNP. My work includes co-design for exascale applications as well as working with a large Fortran project. Some of our work was presented at SC10 and SC11.

### **Arizona College Debate Team 2010-2013**

I participated in competitive collegiate policy debate, which included synthesizing thousands of scholarly articles into succinct arguments. I advanced to the top 10% of all debaters, participating at three national championship tournaments. I also worked as a volunteer debate coach for Catalina Foothills High School.

### **AP Computer Science Tutoring - 2010-2012**

I tutored students at Los Alamos High School who were enrolled in the AP Computer Science class. This included preparing practice problems, planning and giving short lectures, and assisting teachers with grading student work.

### **EDUCATION**

University of Arizona, 2010-2014. Honors B.S. in Computer Science with minors in mathematics and gender studies.

CS 453, Compilers and Systems Software, included the design and implementation of a C compiler using Flex and Bison.

CS 460H, Honors Database Design, included the design and implementation of a care-tracking database for the Saguaro Church's elderly-outreach program.

CS 422, Parallel and Distributed Programming, included building a fault-tolerant distributed hash table.

CS 445, Algorithms, included the formal analysis of a variety of algorithms, and proofs of algorithms in the fields of computational geometry and data structures.

### **PAPERS AND PRESENTATIONS**

Marcus, Ryan C ; Ward, William C. "DP: a Fast Median Filter Approximation" LA-UR-13-25331 ; 2013

Marcus, Ryan C. "MCMini: Monte Carlo on GPGPU" LA-UR-12-23206 ; 2012

Cox, Lawrence J ; Marcus, Ryan C. "Developing a Monte Carlo mini-app for exascale co-design" LA-UR-11-06085 ; 2011 (presented at SC11)

Cox, Lawrence J ; Marcus, Ryan C. "A Monte Carlo Transport mini-App for Exascale Co-design R&D" LA-UR-11-06271 ; 2011 (displayed as SC11)