Douglas Rudd, Ph.D.

CONTACT INFORMATION

Research Computing Center
University of Chicago
6030 S. Ellis Ave. Suite 126
Chicago, IL 60637

(609) 865-5234
drudd@uchicago.edu
http://users.rcc.uchicago.edu/~drudd/
http://drudd.com/

EDUCATION

University of Chicago, Chicago, IL **2002-2007**

- Ph.D., Astronomy & Astrophysics, 2007
- Enrico Fermi Institute, Nathan Sugarman Research Award, 2006
- M.S., Astronomy & Astrophysics, 2003
- McCormick Fellowship, 2002-2004

University of Arizona, Tucson, AZ **1998-2002**

- B.A., Honors, Astronomy and Computer Science, 2002
- Department of Astronomy, Research Award, 2002
- College of Science, Academic Distinction, 1999
- National Merit Scholarship, 1998

ACADEMIC EXPERIENCE

Research Computing Center & Kavli Institute for Cosmological Physics **2012-present**
University of Chicago, Chicago, IL *Scientific Computing Consultant*

- Provide HPC expertise to researchers using cluster computing resources at the University of Chicago and elsewhere
- Contribute to the development of astrophysical codes including CosmoSIS (`https://bitbucket.org/joezuntz/cosmosis/`), YT (`http://yt-project.org`), and CART (`https://bitbucket.org/cartamr/cart`)
- Teach workshops on various research computing topics including Python for HPC, OpenMP, MPI, and Debugging and Optimization

Yale Center for Astronomy & Astrophysics **2010-2012**
Yale University, New Haven, CT *Postdoctoral Associate*

- Performed one of the largest hydrodynamic cosmological simulations to explore the statistics of turbulent motions in massive galaxy clusters
- Mentored two graduate students and one undergraduate student in computational cosmology projects, including configuring and running simulations and developing new physics modules.

School of Natural Sciences **2007-2010**
Institute for Advanced Study, Princeton, NJ *Postdoctoral Member*

- Continued research program modeling astrophysical uncertainties in using observations of galaxy clusters to constrain the properties of dark energy
- Awarded NSF grant (PI) to prepare CART cosmological simulation code for petascale platforms. Developed hybrid parallel model (MPI+OpenMP). Collaborated in developing a performance model for identifying scalability limitations and testing new load balancing algorithms

Department of Astronomy and Astrophysics **2002-2007**
University of Chicago, Chicago IL *Graduate Research Assistant*

- Developed distributed-parallel cosmological hydrodynamic simulation code CART
- Explored the influence of baryonic physics on the growth of cosmological structure
- Created a large sample of simulated galaxy clusters to study the formation history dependence of their observational properties

Industry Experience

Geo-Design, Inc. **1999-present**
Tucson, AZ *Systems Administrator*

- Configured and administered web and database servers. Performed migrations from local hosting to colocated servers to AWS load balanced instances
- Developed, supervised development, and maintained various web applications

Astronomica.org, Department of Astronomy **2000-2002**
University of Arizona, Tucson, AZ *Web Developer*

- Led team of students in converting an astronomy textbook into an online resource
- Developed web applets for illustrating basic astronomy concepts
- Configured and maintained web and database server

ProNet, Inc. **1997-1999**
Phoenix, AZ *Database Application Developer*

- Developed custom database applications and provided network and on-site computer support for client businesses
- Integrated 3rd-party accounting software with a custom inventory management application, designed to streamline appraisal and sales of used-vehicles using handheld wireless barcode scanners

Selected Publications

"CosmoSIS: modular Cosmological parameter estimation", Zuntz, J., Paterno, M., Jennings, E., **Rudd, D.**, Manzotti, A., Dodelson, S., Bridle, S., Sehrish, S., & Kowalkowski, J., 2014, *Submitted*, arXiv:1409.3409

"Neutrinos Help Reconcile Planck Measurements with the Local Universe", Wyman, M., **Rudd, D. H.**, Vanderveld, R. A., & Hu, W., *Physical Review Letters*, 2014, 112, 5

"Improving parallel IO performance of cell-based AMR cosmology applications", Yu, Y., **Rudd, D. H.**, Lan, Z., Gnedin, N. Y., Kravtsov, A. V., & Wu, J., 2012, *Proceedings of IEEE 26th International Symposium on Parallel & Distributed Processing*, 933-944

"Nonequilibrium Electrons and the Sunyaev-Zel'dovich Effect of Galaxy Clusters", **Rudd, D. H.** & Nagai, D., 2009, *The Astrophysical Journal*, 701, L16

"Effects of Baryons and Dissipation on the Matter Power Spectrum", **Rudd, D. H.**, Zentner, A. R., Kravtsov, A. V., 2008, *The Astrophysical Journal*, 672, 19

Technical Skills

- Application development and analytics on a variety of platforms including Python, C/C++, and Java
- Data cleaning, analysis, and visualization in a Unix environment
- Designing and deploying database-driven web applications
- High-performance computing using MPI and OpenMP