Dr. Michael Kuhlen

CONTACT INFORMATION

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EXPERIENCE

Fellow, Insight Data Science, Mountain View, CA — Aug. - Oct. 2013

- Created *Delay Me Not!* (www.delaymenot.info), a flight delay predictor providing ticket purchasing advice.
- Analyzed 150 million domestic flights from 1987 to 2013, stored in a MySQL database.
- Applied a variety of machine learning regression and classification algorithms (linear and logistic regression, k-nearest-neighbors, random forests) using Python's numpy, scipy, pandas, and scikit-learn packages to model flight delay predictions.
- Designed an interactive web front end, utilizing Flask, Twitter Bootstrap, and JavaScript, hosted on my own nginx webserver.

Postdoctoral Researcher

Theoretical Astrophysics Center, UC Berkeley, Berkeley, CA — 2009 - 2013
Institute for Advanced Study, Princeton, NJ — 2006 - 2009

- Performed large-scale numerical N-body simulations (on 1000's of cores on NASA's *Pleiades* and NCCS's *Jaguar* supercomputers) of the formation of a Milky-Way-analog galaxy (featured in the Department Of Energy's OASCR *Breakthroughs 2008* report on Recent Significant Advancements in Computational Science).
- Analyzed and visualized 20TB of numerical simulation data consisting of billions of particles per time step.
- Studied the formation of dwarf galaxies utilizing state-of-the-art cosmological adaptive mesh refinement (AMR) hydrodynamics simulations.
- Developed C and Python tools (often MPI-parallelized) for numerical data analysis and visualization.
- Contributed to the development of the *Enzo* cosmological hydrodynamics community code (enzo-project.org) written in C++ and Fortran, and the *yt Project* (yt-project.org), an astrophysics data analysis and visualization package for Python.
- Published 41 papers (18 first author) in peer reviewed journals (including Nature and Science), which together have received more than 2,500 citations.

Ph.D. Student, UC Santa Cruz, Santa Cruz, CA — 2000 - 2006

- Applied different numerical techniques and simulation codes to study a wide range of astrophysical research topics, ranging from stellar convection to cosmological structure formation.
- Analyzed, visualized, and synthesized simulation data with self-developed, open-source (VisIt), and commercial (IDL, Mathematica) tools.
- Co-taught the Akamai Maui Short Course, applying inquiry-based science education techniques to prepare Hawaiian undergraduates for summer internships at local technology companies.

SKILLS

Languages: Python, C, MySQL, bash, HTML/CSS, LaTeX, C++ (some exp.), JavaScript (some exp.)

Tools: git, hg, sed, awk, numpy, scipy, pandas, scikit-learn, matplotlib, mpi4py, IPython notebook, HDF5, Flask, Twitter Bootstrap

Other: Linux (10+ years), numerical simulation (N-body and AMR CFD), numerical analysis, parallel computation (MPI), visualization, machine learning and classification (some exp.)

EDUCATION

University of California at Santa Cruz, Santa Cruz, California
Ph.D., Astronomy & Astrophysics, "Adventures in Numerical Astrophysics" — June 2006

California Institute of Technology, Pasadena, California
B.S., Physics — June 2000

PUBLIC TALKS

- Mt. Tamalpais State Park Astronomy Program (co-sponsored by Bay Area Wonderfest) "Dark Matter, Dark Skies, Bright Minds", June 2012
- SF Amateur Astronomers, "The Milky Way as a Dark Matter Laboratory", May 2012
- "What Physicists Do" lecture at Sonoma State University, October 4, 2010