Matthew R. Brinson

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SUMMARY

Recent physics MSc graduate with hands-on experience employing mathematical and computational techniques, who is passionate about continually learning new methods and technologies. Works well both as a team player and independently.

SKILLS

- Fluent in Python
- sklearn, pandas, numpy, scipy, matplotlib
- random forests, k-Neighbors, boosted trees, logistic/linear regression
- Strong mathematical/analytical skills
- Intermediate C/C++ programming
- Object oriented programming
- Bayesian statistics
- Markov Chain Monte Carlo
- SLURM/supercomputing clusters
- Github
- Unix/Linux
- Command line/shell scripting

EXPERIENCE

Programming

Python

- Finished in the top 33% for Kaggle Santander Customer Satisfaction competition using boosted trees in the xgboost library, and achieved 96% accuracy in MNIST data digit recognizer Kaggle competition using sklearn k-Neighbors classifier. In each case, the classifiers were coupled with cross validation, grid search, and model evaluation techniques.
- Showed that my research group had increased sensitivity to gravitational waves by a factor of 3 using an Adaptive Metropolis Markov Chain Monte Carlo algorithm that sampled probability distributions of a 45-dimensional parameter set by analyzing 47 MB of pulsar timing data.
- For personal edification, developed my own smoothed particle hydrodynamics code with an incorporated Octree algorithm that simulated the expansion of a compressed ideal gas in a box.

C/C++

- Modified/debugged tens of thousands of lines of code written in C++ in order to incorporate a nuclear burning process written in Fortran into smoothed particle hydrodynamics simulations of white dwarf mergers.
- With my nuclear fusion model, improved upon previous research by showing that in some cases, merger temperatures can be as much as 3 times greater than in models without fusion.

Communication

- At graduate student level, taught algebra based physics labs, a college algebra course, and have tutored for all levels of undergraduate physics
- Gave presentation to the Milwaukee Astronomical Society on gravitational waves.

EDUCATION

MSc, Physics — Aug. 2012 – May 2017
University of Wisconsin–Milwaukee, Milwaukee, WI
Concentration: Computational Astrophysics & Gravitational Wave Physics

BS, Physics (honors) — Apr. 2012
University of Pittsburgh, Pittsburgh, PA
Minor: Mathematics