Jon Zink, Ph.D.

Basic Information

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Computational astrophysicist with a proven history of using statistical analysis to characterize exoplanet systems looking for a Data Science position in a mid-sized data-centric company.

Professional Experience

California Institute of Technology
NASA Hubble Postdoctoral Fellow **September, 2021 - Present**

- Led and coordinated team of 16 scientists, including junior researchers, to perform quality control tasks; to write grants; deliver science products; and produce peer-reviewed publications.
- Extracted unprecedented exoplanet population trend with 99.99% confidence by accounting for sample biases/reliability using Markov Chain Monte Carlo methods: see NASA press release.
- Executed K-means clustering analysis with Python/Scikit-learn to group planet classes, reducing the measurement uncertainty of existing methods by 22%.
- Implemented Bayesian hierarchical modeling with PyMC to resolve a 30-year-old planetary formation mystery by identifying an intra-system correlation in giant planet systems.
- Developed Gaussian process regression methodology for robust correlated-noise removal, improving planetary signal recovery by 9X and adopted by 12 independent research groups.
- Validated 60 planet signals through conditional survival analysis in R, concluding that each event had a false-positive likelihood of less than 0.1%.

University of California, Los Angeles
Graduate Researcher **September, 2016 - June, 2021**

- Developed Python algorithm able to search highly contaminated time series data and identify planet signals with 94% reliability, resulting in the discovery of 372 planets: see Forbes & Newsweek press.
- Implemented random forest regression with TensorFlow to characterize $\sim 200,000$ stars, resulting in 93% accuracy of the validation set classification, a 48% improvement of existing methods.
- Derived Poisson point-process expansion, addressing bias issues associated with order statistics, improving the precision of inferred exoplanet population models by 36%.
- Produced novel likelihood function for forward model comparison, using the Anderson-Darling EDF and a modified Poisson PDF, enabling algorithm convergence 10X faster than existing methods.

Software Development

- Produced open source Python package able to parse exoplanet signals from statistical fluctuations in time series data, used by 27 independent research groups: see EDIunplugged on Github.
- Developed forward modeling software in Python and R (ExoMult), enabling direct assessment, via sample biased Monte Carlo simulations, of complex intra-system correlations.
- Applied multi-core parallel structure to open-source code, resulting in a 12X speed boast for a memory intensive simulation.
- Contributed to open source Python software through bug fixes and feature additions: see KPF pipeline on GitHub.

Skills

Machine Learning: SVM, PCA, Supervised Learning, and Deep Learning
Software and Computing: SQL, HTML, multi-threading, and Object-Oriented Coding
Professional: 17 publications and 43 presentations for both technical/non-technical audiences

Education

University of California, Los Angeles

- Ph.D., Astrophysics, 2021
- B.S., Astrophysics, 2014