Michael A. Gully-Santiago

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Current Position

Research Fellow UT Austin Deptartment of Astronomy · Austin, TX · 02/2020–*present*

Education and Experience

Postdoctoral Scientist Kavli Institute at Peking University · Beijing, China · 10/2015–10/2016

Ph.D., Astronomy The University of Texas at Austin · Austin, TX · 8/2008–5/2015

Dissertation: "Innovative Technologies for and Observational Studies of Star and Planet Formation"

NASA Fellow, JPL Microdevices Lab, 9/2010-9/2013

B. A., Astronomy & Physics Boston University · Boston, MA · 9/2003–5/2007

Projects

`Starfish`: Open source statistical framework for spectral inference Peking U. · github.com/gully/Starfish

Advanced Python 3 framework employs Gaussian Process regression, PCA, MCMC, ∼TB model data

Lead developer in 2016, second most commits overall; modified parallel architecture, extended the code to model new physics; supported community involvement through docs, tutorials, GitHub issues

`welter`: Applications of `Starfish` to fundamental physics Peking U. · github.com/BrownDwarf/welter

Designed and implemented statistical computations resulting in first of its kind detection of very weak signal with exceptional confidence; deployed to local hardware and supercomputing resources with custom resource management

`kinder`: High precision time series analysis in `pandas` Peking U. · github.com/BrownDwarf/kinder

Applied Lomb-Scargle periodogram analysis and cross-validation regression methods to identify 12 targets of interest from 6,335 sets of time series; Made interactive `D3.js` dashboard with Python `Bokeh`

`BAADE`: Needle-in-a-haystack searches for rare objects UT Austin · github.com/BrownDwarf/BAADE

Wrote custom IDL data reduction code to reduce 50 GB of images into 530 spectra

Used ML clustering, `pandas` to discover 15 rare space objects from 54,373 instance, 13 feature catalog

X^1 Measuring tiny gaps in bonded silicon wafers NASA JPL · github.com/Echelle/AO_bonding_paper

Developed and applied linear algebraic "incoherent transfer matrix" method to improve gap detection by $25\times$

Precision silicon optics metrology and fabrication with electron beam and photo lithography

NASA JPL · Pickle Microelectronics Research Center · UTexas Center for Nano and Molecular Science

Managed multiple device development projects; led strategy; facilitated communication among remote teams

Computer Skills and Communication

Python: `Jupyter Notebooks, pandas, numpy, scipy, matplotlib, seaborn, emcee, multiprocessing`

Other: shell scripting, **git**, , LaTeX, conda, SLURM, , , Interactive Data Language (IDL)

Active participant and speaker at Python Meetups (Beijing, Austin, Boston)

Lead organizer of data science tutorials and hackathons at PKU and UT Austin

Producer and cohost of 30 science podcasts on KVRX 91.7 FM