

JONATHAN FRAINE

Data Scientist and Data Analyst

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EXPERIENCE

Research Scientist

Space Science Institute

Nov 2018 – Current

- Improving quality assurance for the NASA Space Telescopes w/ deep learning
- Anomaly detection for the Kepler Mission w/ machine & deep learning

Research Scientist and Deputy Project Manager

Space Telescope Science Institute

Feb 2017 – Nov 2018

- Deputy project manager of the Exoplanet Characterization Toolkit (exoctk.stsci.edu).
- Created & lead the machine learning team for the James Webb Telescope.
- Designed deep learning platform for classification of Hubble Space Telescope images (w/ Tenorflow and Keras); poised to save 1000 person hours per year.
- Created random forest pipeline to identify anomalous pixels in infrared detectors (w/ Scikit-learn); improved operational efficiency by ~4x.
- Co-developed the contamination visibility tool backend (exoctk.stsci.edu/contam_visibility).
- Co-developed Bayesian inference and correlated noise package (github.com/munozcar/skywalker)
- Co-developed instrument simulation software for exoplanet observations (github.com/spacetelescope/awesimss).
- Wrote > 15 unique documentation articles for community support (jwst-docs.stsci.edu).

Postdoctoral Research Associate

University of Arizona

Sept 2015 – Feb 2017

- Wrote the Stage-2 information extraction pipeline for adv. infrared detectors.
- Disrupted how NASA research scientists identify anomalous infrared pixels.
- Taught information extraction and pipeline development to our team.

Doctoral Research Associate

University of Maryland

Aug 2009 – Aug 2015

- Developed Bayesian inference analysis package for information extraction (github.com/exowanderer/wanderer)
- Published prestigious Nature publication: Water on a Small Exoplanet (nature.com/news/wet-exoplanet-has-clear-skies-1.15973).
- Predoctoral Fellowship at California Institute of Technology.
- Predoctoral Fellowship at Pontificia Universidad Catolica de Santiago.

Selected Publications & Honors

United Nations

Economic and Social Commission of Western Asia Panelist (2019)

"Prospects of Innovation and Technology in Official Statistics" and
"Use of Technology in Official Statistics: Ethical Considerations"

NATIONAL ACADEMY OF SCIENCES

Exoplanet Science Strategy Published Contribution

"Transiting Exoplanet Characterization Beyond 2030: A Case for
Observing Giant Planets with Giant Telescopes" Fraine et al. 2018

NATURE PUBLICATION

Detection of Water Vapour on a Small Planet

"Water Vapour Absorption from the Clear Atmosphere of an
Exo-Neptune" Fraine et al. 2014 Vol. 513, Issue 7519, pp. 526-529

EDUCATION

PhD in Astrophysics

University of Maryland

2015

Predoctoral Fellowship

California Institute of Technology

2014

Predoctoral Fellowship

Pontificia Universidad Católica - Chile

2013

M.Sc. in Astrophysics

University of Maryland

2009 – 2011

M.Sc. in Computational Mathematics

University of Central Florida

2007 – 2009

B.Sc. in Physics & Astronomy

University of Central Florida

2003 – 2006

SKILLS

Project Management

Artificial Intelligence

Public Speaking

Deep Learning

Deep Analytics

Machine Learning

Random Forests

SVMs

Statistical Analysis

Bayesian Inference

Data Collection

Data Mining

Generative Modeling

Regression

Classification

Clustering

TOOLS

TensorFlow, Keras, Scikit-learn, Git, AWS

ANALYTICAL METHODS

Bayesian Inference, Predictive Analytics,
Time Series Analysis, Machine Learning,
Signal Processing, Simulation

DOMAIN KNOWLEDGE

Remote Sensing, Astrophysics,
Atmospheric Physics, Bayesian statistics,
Infrared Detectors

PROGRAMMING LANGUAGES

Python, \LaTeX

C/C++, Unix

Matlab, IDL

HTML, JavaScript, SQL

LANGUAGES

English

Arabic

Spanish

