JONATHAN FRAINE

Data Scientist and Data Analyst

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EXPERIENCE

Research Scientist

Space Science Institute — **Nov 2018 – Current**

- Data science (Machine Learning) consultancy for Public and Private Sectors
- Genetic algorithm, hyperparameter optimization w/ deep generative models.
- Improving quality assurance for the NASA Space Telescopes w/ deep learning
- Anomaly detection for several NASA Missions 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 $\sim$4x.
- Co-developed the contamination visibility tool back end (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/awesimsoss).
- 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 ●●○○○