JONATHAN FRAINE

Data Scientist and Data Analyst

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EXPERIENCE

Research Scientist

Space Science Institute   **Nov 2018 – Current**

- 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 ∼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/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   ●●○○○