

# Julia (Jules) Fowler

## SOFTWARE ENGINEER II

they · them · theirs

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## Summary

**Astronomer** : space-based instrumentation and exoplanet astronomy focused.

**Software Engineer** : **Python** and **Git** expert, Linux enthusiast.

**Instructor** : Software Carpentry Instructor and Python training developer.

**Activist** : member of the AAS committee for Sexual and Gender Minorities in Astronomy.

## Certifications & Skills

<b>Certified SCRUM Master</b>	SCRUM Alliance
<b>Certified Software Carpentry Instructor</b>	Software Carpentry
<b>Laser Safety Certification</b>	Laser Institute of America
<b>Python</b>	expert
<b>Git</b>	expert
<b>conda</b>	expert
<b>bash</b>	expert
<b>Linux</b>	expert
<b>Mac OS</b>	expert
<b>Windows</b>	expert
<b>LaTeX</b>	expert
<b>Mathematica</b>	advanced
<b>Markdown</b>	advanced
<b>HTML</b>	advanced
<b>Julia</b>	beginner
<b>IDL</b>	beginner
<b>IRAF/PyRAF</b>	beginner
<b>JavaScript</b>	beginner
<b>CSS</b>	beginner

## Research Experience

### Russel B. Makidon Optics Lab

Baltimore, MD

SPACE TELESCOPE SCIENCE INSTITUTE (STScI)

October 2018 - PRESENT

- Principal Investigator of the Generalized Lab Architecture for Restructured Optical Experiment (G.L.A.R.E.) – an STScI Director's Discretionary Research project to build autonomous experiment software for LUVIOR-like coronagraphy experiments.
- Wrote pure **Python** controller software for nPoint tip/tilt controller as part of a optics testbed.
- Provided deomnstartions of small scale coronagraphic test bench (babyCAT) at AAS and Astronomy on Tap.
- *Advisors : Rémi Soummer & Marshall Perrin*

### Exoplanet Characterization Toolkit

Baltimore, MD

STScI

May 2017 - PRESENT

- Developed first on-the-fly observation planning tool for exoplanet observations with James Webb Space Telescope (JWST).
- Built an **HDF5** database and web interface for the Goyal et.al.grid of forward model transmission spectra.
- Managed ExoCTK web applocation from server-side to front end development, and converted existing codebase to best **Python** practices.
- *Advisors : Kevin Stevenson & Nikole Lewis*

### Space Telescope Advanced Research Group for the Atmospheres of Transiting Exoplanets

Baltimore, MD

STScI

Oct. 2017 - Oct. 2018

- Wrote open source pipeline to reduce WFC3/IR spatial scan data, fit transit parameters with a Markov-Chain Monte Carlo (MCMC) simulation, calculate Bayesian statistics, and produce transmission spectra.
- Introduced the group to and implemented best **Python** and open source software practices.
- *Advisors : Hannah Wakeford & Jeff Valenti*

## Wide Field Camera Three Instrument Team

Baltimore, MD

STScI

Aug. 2016 - PRESENT

- Lead of the WFC3 Quicklook project, developing automated monitors and calibration software on a large-scale web and database application.
- Principal Investigator of eleven HST calibration proposals.
- Re-factored and automated outdated software, including various **Python**, **IDL**, and **IRAF/Pyraf** monitors.
- Created user guides and tools for WFC3/IR slitless spectroscopy data reduction and anomaly tracking.
- *Advisors : Elena Sabbi & Sylvia Baggett*

## Tufts University

Somerville, MA

SUMMER SCHOLAR & SENIOR THESIS

May 2015 - July 2016

- Compared energy contribution of low energy radio jets to gas outflows in AGN.
- Used **slurm** parallel cluster computing and **CASA** to reduce a terrabyte of multi-band Very Large Array (VLA) data.
- Detailed reduction and small numbers statics in a senior honors thesis.
- *Advisor : Anna Sajina*

## University of Texas, Austin

Austin, TX

RESEARCH INTERN

May 2012 - August 2013

- Performed stellar evolution and structure research on Betelgeuse and Wolf-Rayet stars.
- Created computational models using **MESA** star.
- *Advisor : Craig Wheeler*

## Work Experience

### Space Telescope Science Institute

Baltimore, MD

SOFTWARE ENGINEER II

Aug. 2016 - PRESENT

- Member of the Wide Field Camera Three Instrument Team and involved with multiple science projects across the institute.
- Started SpaceGAYs, the first LGBT+ affinity group at STScI, and member of the Invision Diversity Working Group.
- Designed Advanced **Python** training with outside vendor, and gave SWC inspired introductory **Python** and **Git** training.

### Tufts University, Department of Physics and Astronomy

Somerville, MA

TEACHING ASSISTANT & HOMEWORK GRADER

Sept. 2014- July 2016

- Lab TA for introductory mechanics and class TA for general audience astronomy seminar.
- Graded homework for introductory mechanics and electricity and magnetism.

### Tufts University, Academic Resource Center

Somerville, MA

TUTOR & EXAM ASSISTANT

Sept. 2014- July 2016

- Tutored individual students and led study groups for introductory physics, calculus, and linear algebra.
- Assisted students with accessible exam accommodations.

## Education

### Tufts University

Somerville, MD

B.S. ASTROPHYSICS & PHILOSOPHY

Sept. 2012 - May 2016

- Graduated with High Thesis Honors.
- Dean's List 2013, 2015

### University of Maryland, College Park

College Park, MD

ADVANCED SPECIAL STUDENT

Spring 2017

- High Energy Astronomy.

### University of Texas, Austin

Austin, TX

SUMMER TRANSIENT STUDENT

Summer 2013, 2014

- Calculus II & III, Linear Algebra, Differential Equations, Logic

## Awards & Grants

### GRANTS

- |      |  |                |
|------|--|----------------|
| 2019 | <b>STScI Data Science Innovation Initiative Grant</b> , Director's Discretionary Research Fund call for projects with a focus on data science and interesting computational problems | Baltimore, MD  |
| 2015 | <b>Tufts Summer Scholar Grant</b> , call for summer long independent research projects   | Somerville, MA |
| 2015 | <b>Tufts Center for Stem Diversity Grant</b> , grant to create the first collegiate queer science speaker series   | Somerville, MA |

### AWARDS

- 2016 **Tufts University Pride on the Hill**, for contributions to LGBT+ climate  
 2015 **Tufts Multicultural Service Award**, for contributions to diversity efforts

*Somerville, MA*  
*Somerville, MA*

## Committees

- 2019 **Inclusive Astronomy II**, member of the Science Organizing Committee *Baltimore, MD*  
 2019 **STScI/AURA Exoplanet Astronomer hiring committee**, member *Baltimore, MD*  
 2019 **STScI Information Technology Head hiring committee**, member *Baltimore, MD*  
 2018 **AAS Committee for Sexual and Gender Minorities in Astronomy (SGMA)**, member  
 2016 **out in STEM (oSTEM) @ Tufts**, president and founder *Somerville, MA*  
 2015 **Tufts Society of Physics Students**, president *Somerville, MA*  
 2014 **Tufts Queer Students Association**, treasurer *Somerville, MA*

## Teaching

### Software Carpentry at the AAS

*Seattle, WA*

INSTRUCTOR

*Jan. 2019*

- Taught astronomy focused **Python** and **bash** at the 233RD AAS meeting.

### Software Carpentry at the New York Academy of Sciences

*New York, NY*

INSTRUCTOR

*Jan. 2019*

- Taught general science focused **Python** and **Git** at NYAS.

### Tufts University Concepts of the Cosmos

*Somerville, MA*

CLASS TA

*Spring 2016*

- Class TA for the introductory/general education astronomy seminar.

### Tufts University Physics 1 & Physics 11

*Somerville, MA*

LAB TA

*Fall 2015*

- Lab TA for the introductory mechanics courses with and without calculus.

## Publications and Presentations

### PUBLICATIONS

#### Disentangling the Planet from the Star in Late-Type M Dwarfs: A Case Study of TRAPPIST-1g

WAKEFORD, H. R.; LEWIS, N. K.; **FOWLER, J.**; BRUNO, G.; WILSON, T. J.; MORAN, S. E.; VALENTI, J.; BATALHA, N. E.; FILIPPAZZO, J.; BOURRIER, V.; HÖRST, S. M.; LEDERER, S. M.; DE WIT, J.  
 The Astronomical Journal, Volume 157, Issue 1, article id. 11, 14 pp. (2019)

#### WFC3/UVIS Gain Stability Results for Cycles 24 and 25

**FOWLER, J.**

Instrument Science Report WFC3 2018-17, 24 pages

#### The Cosmic Ray That Wouldn't Quit: Correcting Cosmic Rays in Overscan Pixels

**FOWLER, JULIA**

Instrument Science Report WFC3 2017-12, 7 pages

#### Monitoring the WFC3/UVIS Relative Gain with Internal Flatfields

**FOWLER, J.**; BAGGETT, S.

Instrument Science Report WFC3 2017-08, 17 pages

#### The Betelgeuse Project: constraints from rotation

WHEELER, J. CRAIG; NANCE, S.; DIAZ, M.; SMITH, S. G.; HICKEY, J.; ZHOU, L.; KOUTOULAKI, M.; SULLIVAN, J. M.; **FOWLER, J. M.**  
 Monthly Notices of the Royal Astronomical Society, Volume 465, Issue 3, p.2654-2661, (2017)

#### Analysis of Dragon's Breath and Scattered Light Detector Anomalies on WFC3/UVIS

**FOWLER, JULIA**; MARKWARDT, LARISSA; BOURQUE, MATTHEW; ANDERSON, JAY

Instrument Science Report WFC3 2017-02 (v.1), 14 pages

## PRESENTATIONS

### Standardizing Exoplanet Analysis with the Exoplanet Characterization Tool Kit (ExoCTK)

*talk*

**FOWLER, J.**; STEVENSON, KEVIN B.; LEWIS, NIKOLE K.; FRAINE, JONATHAN D.; PUEYO, LAURENT; BRUNO, GIOVANNI;  
FILIPPAZZO, JOE; HILL, MATTHEW; BATALHA, NATASHA; WAKEFORD, HANNAH; BUSHRA, RAFIA  
American Astronomical Society, AAS Meeting #232

*summer, 2018*

### Advances on Hubble Wide Field Camera 3 Grism Calibration and Slitless Spectroscopy Analysis

*poster*

**FOWLER, JULIA**; BRAMMER, GABRIEL; RYAN, RUSSELL; DEUSTUA, SUSANA; PIRZKAL, NOR  
American Astronomical Society, AAS Meeting #231, id. 355.19

*winter, 2018*

### The Exoplanet Characterization ToolKit (ExoCTK)

*poster*

STEVENSON, KEVIN; **FOWLER, JULIA**; LEWIS, NIKOLE K.; FRAINE, JONATHAN; PUEYO, LAURENT; VALENTI, JEFF; BRUNO,  
GIOVANNI; FILIPPAZZO, JOSEPH; HILL, MATTHEW; BATALHA, NATASHA E.; BUSHRA, RAFIA  
American Astronomical Society, AAS Meeting #231, id. 148.14

*winter, 2018*

### Do Radio Jets Contribute to Driving Ionized Gas Outflows in Moderate Luminosity Type 2 AGN?

*poster*

**FOWLER, JULIA**; SAJINA, ANNA; LACY, MARK

American Astronomical Society, AAS Meeting #227, id.243.08

*winter, 2016*