

# R. O. Parke Loyd

Postdoctoral Research Scholar  
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## Education

- PhD Astrophysics and Planetary Science**, University of Colorado, Boulder August **2017**  
Thesis: *The Volatility of Far-Ultraviolet Radiation from Low-Mass Stars and Planetary Implications*  
Advisor: Kevin France
- BS Aerospace Engineering**, Virginia Tech December **2009**  
summa cum laude  
minors in astronomy, mathematics, and physics  
Thesis: *Actively Tunable Vibration Isolation using FFMC Tubes*  
Advisor: Michael Philen

## Employment History

2017 Oct - Present: Postdoctoral Research Scholar, Arizona State University

## Research Interests

1. Stellar flares and coronal mass ejections and their impact on exoplanetary atmospheres
2. Habitability of extrasolar planets
3. Detection and characterization of exoplanets

## Publications

Please note that databases like ADS sometimes ingest my last name as "Parke Loyd" rather than the correct "Loyd."  
ORCID: [0000-0001-5646-6668](https://orcid.org/0000-0001-5646-6668) | [ADS](#) | [Google](#)

### Stats

from NASA ADS, refereed papers only  
published first author papers 6, all papers 20, first author citations 135, all citations 589, h-index 11

### First Author

- Loyd, R. O. Parke et al. "Current Population Statistics Do Not Favor Photoevaporation over Core-Powered Mass Loss as the Dominant Cause of the Exoplanet Radius Gap" 2019 ApJ in press **2019**
- Loyd, R. O. Parke et al. "HAZMAT. IV. Flares and Superflares on Young M Stars in the Far Ultraviolet" 2018 ApJ 867:70 **2018**
- Loyd, R. O. Parke et al. "The Muscles Treasury Survey. V. FUV Flares on Active and Inactive M Dwarfs" 2018 ApJ 867:71 **2018**

- Loyd, R. O. Parke et al. “Ultraviolet C II And Si III Transit Spectroscopy And Modeling Of The Evaporating Atmosphere Of GJ436b” 2017 ApJL 834:17 **2017**
- Loyd, R. O. Parke et al. “The MUSCLES Treasury Survey. III. X-Ray to Infrared Spectra of 11 M and K Stars Hosting Planets” 2016 ApJ 824:102 **2016**
- Loyd, R. O. Parke; France, Kevin “Fluctuations and Flares in the Ultraviolet Line Emission of Cool Stars: Implications for Exoplanet Transit Observations” 2014 ApJS 211:9 **2014**

### **Coauthor**

- Schneider, Adam et al. “Lyman- $\alpha$  Observations of High Radial Velocity Low-Mass Stars Ross 1044 and Ross 825” 2019 ApJ in press, 4th author **2019**
- Froning, Cynthia et al. “A Hot Ultraviolet Flare on the M Dwarf Star GJ 674” 2019 ApJL 871:26, 4th author **2019**
- France, Kevin et al. “Far-Ultraviolet Activity Levels of F, G, K, and M dwarf Exoplanet Host Stars” 2018 ApJS 239:16, 5th author **2018**
- Howard, Ward et al. “The First Naked-eye Superflare Detected from Proxima Centauri” 2018 ApJL 860:30, 5th author **2018**
- Hoadley, Keri et al. “Signatures of Hot Molecular Hydrogen Absorption from Protoplanetary Disks. I. Non-thermal Populations” 2017 ApJ 846:6, 4th author **2017**
- Kruczek, Nicholas et al. “H<sub>2</sub> Fluorescence in M Dwarf Systems: A Stellar Origin” 2017 ApJ 845:3, 4th author **2017**
- Youngblood, Allison et al. “The MUSCLES Treasury Survey. IV. Scaling Relations for Ultraviolet, Ca II K, and Energetic Particle Fluxes from M Dwarfs” 2017 ApJ 843:31, 3rd author **2017**
- Airapetian, Vladimir et al. “How Hospitable Are Space Weather Affected Habitable Zones? The Role of Ion Escape” 2017 ApJ 836:L3, 4th author **2016**
- Million, Chase et al. “gPhoton: The Galex Photon Data Archive” 2016 ApJ 833:292, 5th author **2016**
- Youngblood, Allison et al. “The MUSCLES Treasury Survey. II. Intrinsic Ly $\alpha$  and Extreme Ultraviolet Spectra of K and M Dwarfs with Exoplanets” 2016 ApJ 824:101, 3rd author **2016**
- France, Kevin et al. “The MUSCLES Treasury Survey. I. Motivation and Overview” 2016 ApJ 820:89, 2nd author **2016**
- Gomez de Castro, Ana I et al. “Protoplanetary Disk Shadowing by Gas Infalling onto the Young Star AK Sco” 2016 ApJ 818L:17, 2nd author **2016**
- France, Kevin; Linsky, Jeffrey L.; Loyd, R. O. Parke “The ultraviolet radiation environment in the habitable zones around low-mass exoplanet host stars” 2014 Ap&SS 354:3, 3rd author **2014**
- Kulow, Jennifer R.; France, Kevin; Linsky, Jeffrey L.; Loyd, R. O. Parke “Ly $\alpha$  Transit Spectroscopy and the Neutral Hydrogen Tail of the Hot Neptune GJ 436b” 2014 ApJ 786:132, 4th author **2014**

## **Awarded Grants and Observations**

### **Principal Investigator**

- HST* Archival Research, “Constraining CME Masses on the Active K Star and Planet Host Epsilon Eridani” Program 15803 **2019**
- HST* General Observer, “Investigating an SPI and Measuring Baseline FUV Variability in the GJ 436 Hot-Neptune System” Program 15174 **2017**

## Co-Investigator

<i>HST</i> General Observer, “The K Dwarf Advantage: Assessing the Habitability of Planets Orbiting K Stars” Program 15955, PI T. Richey-Yowell	2019
<i>HST</i> General Observer, “The Origin and Impact of Flares in the Closest Planetary System - Proxima Centauri” Program 15651, PI M. MacGregor	2018
<i>HST</i> General Observer, “Benchmark Multi-Wavelength Flare Spectra of M Dwarfs” Program 15463, PI A. Youngblood	2017
<i>HST</i> General Observer, “Unobstructed Observations of the Intrinsic Lyman-alpha Emission of Low-mass Stars” Program 15286, PI A. Schneider	2017
<i>HST</i> General Observer, “The Mega-MUSCLES Treasury Survey: Measurements of the Ultraviolet Spectral Characteristics of Low-mass Exoplanetary Systems” Program 15071, PI C. Froning	2017
<i>HST</i> Archival Research, “Model Atmospheres and Spectral Irradiance Library of the Exoplanet Host Stars Observed in the MUSCLES Survey” Program 15038, PI J. Linsky	2017
<i>HST</i> Director’s Discretionary, “The most detailed high-energy picture of Proxima Centauri, our nearest extrasolar neighbor” Program 14860, PI C. Schneider	2016
<i>HST</i> Snapshot Program, “A SNAP UV Spectroscopic Study of Star-Planet Interactions” Program 14633, PI K. France	2016
<i>HST</i> General Observer, “A Direct Imaging Experiment to Determine the Origin of H <sub>2</sub> Emission from M dwarf Exoplanetary Systems” Program 14100, PI K. France	2016
<i>HST</i> General Observer, “The MUSCLES Treasury Survey: Measurements of the Ultraviolet Spectral Characteristics of Low-mass Exoplanetary Systems” Program 13650, PI K. France	2015

## Conference Presentations

### Talks

HAZMAT. IV. Flares and Superflares on Young M Stars in the Far Ultraviolet AAS 233, M Dwarfs Magnetic Activities and Flares Session, Seattle, Washington	2019
FUV Flares on M Stars, Active and Inactive, Old and Young ExoPAG 18 Meeting, Boston, Massachusetts	2018
The FUV Flares of Active and Inactive M Dwarfs Know Thy Star -- Know Thy Planet, Pasadena, California	2017
Cool Stars Provide Erratic Environments for Photochemistry AbGradCon, Boulder, Colorado	2016
FUV Emission Line Flares on M and K Dwarfs in the MUSCLES Survey Cool Stars 19, Uppsala, Sweden	2016

### Posters

Planets are Shaped by their Past: Reconstructing the Early XUV Emission of Exoplanet Host Stars Extreme Solar Systems IV, Reykjavik, Iceland	2019
HAZMAT. IV. Flares and Superflares on Young M Stars in the Far Ultraviolet Cool Stars 20, Boston, Massachusetts	2018
An Ultraviolet Spectral Examination of “Quiescent” M dwarf Exoplanet Host Flares IAUS 320, Honolulu, Hawaii	2015
The Radiation Environment of Habitable Zone Planets Orbiting Low Mass Stars Emerging Researchers in Exoplanet Science, State College, Pennsylvania	2015
Astrophysical Noise and a Search for Star-Planet Interactions in Ultraviolet Time-Series Towards Other Earths, Porto, Portugal	2014
Fluctuations and Flares in Stellar UV Emission Observed by HST and GALEX Cool Stars 18, Flagstaff, Arizona	2014

## Code

Please see my [GitHub profile](https://github.com/parkus) (github.com/parkus) for my publicly-shared codes, including

- spectralPhoton: handling spectrally-resolved photon lists (namely from *HST* COS and STIS)
- emd: empirical mode decomposition
- flaiil: Flare identification in intermittent lightcurves
- ffd: flare frequency distribution fitting
- fiducial\_flare: generator of template stellar flares for use in exoplanet modeling

## Teaching Experience

<b>Co-creator and Instructor of Wilderness Astronomy</b> , SES 494, intensive outdoor learning experience, see <a href="#">ASU website</a>	spring 2019 & 2020
<b>Instructor of Record</b> , ASTR 2600, Computational Techniques student ratings: instructor overall 5.5/6, course overall 4.9/6	summer 2015
<b>Mentor</b> , Boulder Valley School District: Science Research Seminar student	academic year 2013
<b>Teaching Assistant</b> , ASTR 1200, Stars and Galaxies	fall 2011 fall 2012
<b>Teaching Assistant</b> , ASTR 1000, The Solar System	spring 2012

## Recent Service

<b>Outreach with local Boy Scout troop</b>	2020
<b>Grant Allocation Committee</b> for prominent space telescopes	2018 & 2019
<b>Member of sponsor group</b> for Burmese refugee family relocated to Boulder	2012 - 2016
<b>Committee member:</b> colloquium speaker graduate student lunch series	2014/2015
<b>Committee member:</b> graduate comprehensive exam	2013/2014
<b>Committee member:</b> graduate concerns	2012/2013

# Expeditionary Credentials

I include these in the hope of one day finding opportunities for scientific expeditions or other adventuresome and intellectual work.

## **Aviation**

### **Private Pilot License**

December 2016

Instructor: Ben Pinnell

- 408.2 h total
  - 201.6 h Maule MX-7 (tailwheel)
  - 163.5 h Cessna 172s
  - 29.3 h Cessna 182
  - 13.8 other aircraft
  - 236.2 h cross country
  - 119.2 h solo
  - 330.9 PIC
  - 747 (270 tailwheel) takeoffs and landings
- high performance endorsement
- mountain flying checkout
- high altitude chamber hypoxia training
- spin training
- tailwheel endorsement

May 2017  
September 2017  
October 2017  
November 2017  
March 2018

## **Engine and vehicle repair**

2004 Maule MX-7-180AC, tailwheel aircraft, 180 hp Lycoming 4 cyl

- 50 h inspections (oil change, exhaust, spark plugs, engine mounts, air filter change, etc.)
- Replaced fuel sump drains
- Replaced attitude indicator

1980 Land Cruiser, diesel 4 cyl

- Valve adjustment
- Replaced tie rod end
- Replaced locks and door seals
- Adjusted fuel mixture and idle speed
- Replaced glow plugs
- Replaced water pump, flushed radiator, replaced all hoses
- Replaced brake line
- Repaired stuck odometer

1975 Yamaha DT250 2-Stroke Motorcycle

- Serviced front shocks
- Repaired electrical (horn, lights)
- Disassembled and cleaned carburetor

2005 Chevrolet Equinox SUV, gasoline 6 cyl

- Replaced airbag front collision sensor

## **Electronics repair**

- Built two desktop computers
- Replaced iPhone batteries
- Replaced macBook cooling fan
- Replaced capacitors on computer monitor and router

### ***Navigational skills***

- Extensive experience off-trail backpacking in mountainous, forested, and canyon terrain
- Proficient with map and compass
- Proficient with terrain-based navigation
- Proficient in celestial navigation
- Proficient with radio-based navigation in aircraft

### ***Related Work Experience***

**Summer 2011** Biology Field Technician, salmon fry distribution study, Fish and Wildlife Service, Alaska

**2010** Energy Resource Surveyor, SNP Patagonia Sur, remote valdivian rainforests of Chile

### ***Selected Adventures***

Backpacking trip in Death Valley, 3 days	<b>2020</b>
Climbed Kasparov Traverse, Coyote Tower, The Proposal, Mt. Emerson, Touched by an Angel	<b>2019</b>
Backpacking trips in Kanab Creek, Grand Canyon NP, San Juan Mts, John Muir Wilderness, 2-4 days	<b>2019</b>
Led group of 8 students on 1-week backpacking trip in Arizona Superstition Mountain Wilderness	<b>2019</b>
Backpacked in Smoky Mountain NP, Sierra Nevada Mountains, San Juan Mountains 2-3 days	<b>2018</b>
Backpacked in Joshua Tree NP, Superstition Mountain Wilderness 2 and 3 days	<b>2017</b>
Ran an ~50 mi loop that included traversing Great Sand Dunes National Park in ~16 h	<b>2017</b>
Lived in Ranomafana, Madagascar, two stints of 1 month each	<b>2015, 2018</b>
Backpacked and packrafted through Canyonlands National Park, Island in the Sky and Maze Districts, 9 days	<b>2015</b>
Climbed Grand Teton; Lone Eagle Peak, Castleton Tower, Black Canyon of the Gunnison (Russian Arete)	<b>2015</b>
Ran the Four Pass Loop (7700 ft cumulative gain, 28 mi)	<b>2015</b>
Backpacked between Berber villages in the Atlas Mountains, 1 week	<b>2014</b>
Backpacked the Grand Canyon Escalante Route in extreme summer heat, 3 days	<b>2014</b>
Ran the Desert RATS trail marathon, Fruita, CO	<b>2013</b>
Backpacked in Gates of the Arctic National Park, exited by canoeing the Koyukuk River, 16 days	<b>2013</b>
Lived in Neno, Malawi, 1 month	<b>2012</b>