

# Samson A. Johnson

## Curriculum Vitae

Pronouns: he/him | +1(406)2411457 | [samson.a.johnson@jpl.nasa.edu](mailto:samson.a.johnson@jpl.nasa.edu) | [samsonajohnson.github.io](https://samsonajohnson.github.io)

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## Education

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### PhD in Astronomy

2016-2022

Advisor: B. Scott Gaudi, The Ohio State University

Columbus, Ohio

Thesis: Toward a New Era of Exoplanet Microlensing

- Dean's Distinguished University Fellowship - Ann S. Tuttle Citizenship Award - NASA ExoExplorer 2021

- Roman Galactic Bulge Time Domain Survey Science Investigation Team - NSF GRFP Honorable Mention 2016

### Physics BA, Mathematics BA, High Honors

2011-2015

Advisor: Nathan McCrady, University of Montana, Davidson Honors College

Missoula, Montana

Thesis: Dispatch Scheduling to Maximize Exoplanet Yield

- MT University System Honors Scholarship - Horatio Alger MT Scholarship - Jack and Isabel Haynes Scholarship

- Cail Physical/Bio-Sciences Scholarship - Shallenberger/Alumni Association Scholarship in Physics

## Employment

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### NASA Postdoctoral Fellow, Jet Propulsion Laboratory

Aug. 2022-Current

Building a framework to combine exoplanet demographic statistics from multiple detection methods and further the survey design and make predictions for Roman Galactic Bulge Time Domain Survey.

### Summer Research Intern, Jet Propulsion Laboratory

May-Aug. 2019

Constructed a two dimensional map of differential reddening and extinction towards the Galactic Center using data from the infrared, ground-based microlensing survey conducted by UKIRT.

### Research Assistant, Harvard-Smithsonian Center for Astrophysics

Aug. 2015-July 2016

Refined site operation software for MINERVA robotic exoplanet detection telescope array. Developed software for automation of precision RV spectrograph, monitored daily operations, contributed to proposals.

### Research Assistant, University of Montana

June 2014-June 2015

Designed and tested dispatch scheduling software/simulation for use with MINERVA. Integrated simulations into forward modeling code to optimize exoplanet survey strategy.

### Laboratory Assistant, University of Montana

Winter 2011, Summer 2013

Assisted with developing space science instrument to measure ISM passing through the heliopause. Assembled vacuum chambers, handled vacuum specific hardware. Designed, constructed framework for vacuum pumps and chambers

### Deli Staff, Good Food Store, Missoula, MT

April 2012-Oct. 2014

Customer service, teamwork, task management. Received multiple commendations on helpfulness and safety.

### Warehouse Picker, The Huckleberry People, Missoula, MT

Sept. 2011-April 2012

Production based job working in warehouse environment. Time management, order assembly, manual dexterity.

### Supervisor, Papa Murphy's Pizza, Missoula, MT

July 2009-Sept. 2011

Delegated tasks to crews of 5-10 members. Customer service, problem solving, conflict resolution.

## Advising

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**Aiden Zelakiewicz (undergraduate), The Ohio State University, 2021-present:** Refined code to create extinction and differential reddening maps towards the Galactic Center using infrared, ground based microlensing survey conducted by UKIRT.

**Rachel Slaybaugh (undergraduate), The Ohio State University, 2021-present:** Adapted microlensing simulations for Roman to be used for constraining the fraction of the Galactic Halo's mass made up by primordial black holes through a microlensing survey toward M31.

**Abigail Aronica (undergraduate), The Ohio State University, 2019-present:** Developing an in-house Galactic population synthesis model for use in microlensing survey simulations. Modular and open source.

**Kit Fieldhouse (high school), University of Montana, 2014-2015:** Developed software to automate follow-up observation scheduling of KELT transiting planet candidates. Presented at national science fairs.

## Outreach

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- **Polaris** Mentor 2019-2021 (group enhancing retention of underrepresented undergrads in physics/astronomy)
- Academic Facilitator for URSA 2021 (undergraduate early arrival program associated with Polaris)
- Mentor for new astronomy graduate students at Ohio State University (2019-2020)
- Star Party guest observer assistant, Astronomical Society at OSU, 2 nights
- Council of Graduate Students, Committee on Diversity and Inclusion, member, 2017-2018, Columbus, Ohio
- Breakfast of Science Champions, coordinator and volunteer, 2017-2020 - Columbus, Ohio
- Science Olympiad, Astronomy portion exam proctor, 04/2017 - Columbus, Ohio
- Ohio Supercomputer Center Summer Institute 07/2017, high school mentor - Columbus, Ohio
- Astronomy on Tap lecture, 2017 - Columbus, Ohio
- Blue Mountain Observatory public viewing nights, assistant for 4 nights, 2014 - Missoula, Montana

## Teaching/Mentoring

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- Ohio State, Polaris Mentor of undergraduates S. Petz & C. Roper (2019-2020), A. Cooper (2020-2021), D. Crocker & E. Meyer (2021-2022)
- Ohio State, Methods of Astronomical Observation & Data Analysis (Astron 3350, GTA 2018)
- Ohio State, Life in the Universe (Astron 1141, GTA 2019)
- Ohio State, From Planets to the Cosmos: Lab Section (Astron 1150, GTA 2019)

## Service

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- Referee for ApJ, MNRAS. Reviewer for XRP 2022
- NASA ExoPAG Science Interest Group #2, contributing member
- ExoExplorer, NASA Exoplanet Exploration Program and ExoPAG Executive Secretary, 2021
- Election Committee, OSU Astronomy Graduate Student Representative, summer 2021
- Assistant in graduate admissions, Ohio State, spring 2020
- Lead graduate student organizer of graduate admissions, Ohio State, spring 2019
- Lead graduate student organizer for feedback in astronomy faculty search, Ohio State, spring 2018
- Graduate Order of Magnitude group, co-founder, 2017-2019, Columbus, Ohio

## Observing Experience

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- MINERVA, Mt Hopkins, Arizona - 4x0.7 meter, 9 weeks on site, including spectrograph commissioning
- CTIO, La Serena, Chile, - SMARTS 1.3 meter, 14 nights of microlensing observing
- Large Binocular Telescope, Mt Graham, Arizona - 2x8.4 meter, 10 nights queue
- Tillinghast Telescope, Mt Hopkins, Arizona - 1.5 meter, 2 nights queue

## Conferences and Workshops

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**Predictions of the Roman GBTDS: Constraints on the Frequency of Earth-Analogs** “\*” - invited

Exploring the Transient Universe with the Nancy Grace Roman Space Telescope, 02/2022, 15 min talk

**Exoplanet microlensing studies with the Roman Galactic Exoplanet Survey: Optimization and Yield**

Roman Science Team Community Briefing, 11/2021, 20 min talk

**Science Enabled by the Roman Galactic Exoplanet Survey\***

Exoplanet Explorers Science Series, 02/2021, 30 min invited talk, [link to recording](#)

**Insights into Exoplanet Demographics from the Roman Galactic Exoplanet Survey\***

Yale University Exoplanets and Stars Seminar, 01/2021, invited seminar

**The Roman Galactic Exoplanet Survey: Prospects for Constraining the Frequency of Earth-Analogs**

American Astronomical Society 235 Meeting, 01/2021, 5 min talk

**The Roman Galactic Exoplanet Survey: Prospects for Constraining the Frequency of Earth-Analogs\***

KIPAC Tea Talk, 11/2020, invited 15 min talk

**The Roman Galactic Exoplanet Survey: Predictions for the Free-Floating Planet Detection Rate**

NExScI Exoplanet Demographics, 11/2020, 15 min talk, [link to recording](#)

**The Roman Galactic Exoplanet Survey: Prospects for Constraining the Frequency of Earth-Analogs**

Harvard-Smithsonian Center for Astrophysics GCSP Seminar, 09/2020, 20 min talk, [link to recording](#)

**The Roman Galactic Exoplanet Survey: Prospects for Constraining the Frequency of Earth-Analogs**

Bay Area Exoplanet Meeting 34, 09/2020, 20 min talk

**The WFIRST Microlensing Survey: Constraints on the frequency of Earth-analogs**

Exoplanets III, 08/2020, 15 min talk

**Sagan Summer Workshop: Astrobiology for Astronomers**

NASA Exoplanet Science Institute, 07/2019, Attendee

**The WFIRST Microlensing Survey: Predictions of the Free Floating Planet Detection Rate**

Science in Our Own Backyard: Exploring the Galaxy...with WFIRST, 06/2019, 15 min talk

**The WFIRST microlensing survey: mission updates and predictions of the free-floating planet yield**

23rd International Microlensing Conference, 01/2019, 15 min talk

**Measuring the abundance of free floating planets with WFIRST**

Emerging Researchers in Exoplanet Science IV, Penn State, 08/2018, 15 minute talk

**Sagan Summer Workshop: Microlensing in the Era of WFIRST**

NASA Exoplanet Science Institute, 07/2017, Attendee

**Synopsis of the MINiature Exoplanet Radial Velocity Array (MINERVA),**

Emerging Researchers in Exoplanet Science III, Yale University, 07/2017, 15 minute talk

**Dispatch Scheduling to Maximize Exoplanet Detection,**

SPIE Astronomical Telescopes + Instrumentation, 07/2016, 15 minute talk

**Dispatch Scheduling to Maximize Exoplanet Detection,**

American Astronomical Society 227 Meeting, poster

**Optimization of the MINERVA Exoplanet Search Strategy via Simulations,**

American Astronomical Society 225 Meeting, poster

## Publications ([ADS Library](#))

h-index (first author): 10 (3) – citations (first author): 275 (82)

### First Author

1. [A Multi-Parameter Degeneracy in Microlensing Events with Extreme Finite Source Effects](#)  
Johnson, S. A., Penny, M. T., Gaudi, B. S., 2022, ApJ, 927, 63.
2. [Predictions of the Nancy Grace Roman Space Telescope Galactic Exoplanet Survey II: Free-Floating Planet Detection Rates](#)  
Johnson, S. A., Penny, M. T., Gaudi, B. S., et al. 2020, AJ, 160, 123  
**Media:** [nasa.gov](#) feature, [CNN](#), [EurekAlert](#), [Forbes](#), [Smithsonian Magazine](#)
3. [The Quiescent Progenitors of Type II Supernovae](#)  
Johnson, S. A., Kochanek, C. S., Adams, S. M., 2018, MNRAS, 480, 1696
4. [On the Progenitor of the Type Ibc Supernova 2012fh](#)  
Johnson, S. A., Kochanek, C. S., Adams, S. M., 2017, MNRAS, 472, 3115
5. [The Radial Velocity of OGLE-2015-BLG-0966S](#)  
Johnson, S. A., Yee, J. C., 2017, PASP, 129, 074401

### Coauthor

1. [Precision measurement of a brown dwarf mass in a binary system in the microlensing event. OGLE-2019-BLG-0033/MOA-2019-BLG-035](#)  
Herald, A., Udalski, A., Bozza, V., et al. 2022, A&A, 663, A100.
2. [Another Shipment of Six Short-Period Giant Planets from TESS](#)  
Rodriguez, J. E., Quinn, S. N., Vanderburg, A., et al. 2022, arXiv:2205.05709
3. [OGLE-2019-BLG-0960Lb: The Smallest Microlensing Planet](#)  
Yee, J. C., Zang, W., Udalski, A., et al. 2021, AJ, 162, 180.

4. Systematic KMTNet Planetary Anomaly Search. I. OGLE-2019-BLG-1053Lb, a Buried Terrestrial Planet  
Zang, W., Hwang, K.-H., Udalski, A., et al. 2021, AJ, 162, 163
5. Revealing Short-period Exoplanets and Brown Dwarfs in the Galactic Bulge using the Microlensing Xallarap Effect with the Nancy Grace Roman Space Telescope  
Miyazaki, S., Johnson, S. A., Sumi, T., et al. 2021, ApJ, 161, 84.  
**Media:** [nasa.gov feature](#), [EurekAlert](#)
6. The HD 217107 Planetary System: Twenty Years of Radial Velocity Measurements  
Giovinazzi, M. R., Blake, C. H., Eastman, J. D., et al. 2020, Astronomische Nachrichten, 1, 9
7. A Full Implementation of Spectro-Perfectionism for Precise Radial Velocity Exoplanet Detection: A Test Case With the MINERVA Reduction Pipeline  
Cornachione, M. A., Bolton, A. S., Eastman, J. D., et al, 2019, PASP, 131, 124503
8. Minerva-Australis. I. Design, Commissioning, and First Photometric Results  
Addison, B., Wright, D. J., Wittenmyer, R. A., et al. 2019, PASP, 131, 115003
9. First Radial Velocity Results From the MINiature Exoplanet Radial Velocity Array (MINERVA)  
Wilson, M. L., Eastman, J. D., Cornachione, M. A., et al. 2019, PASP, 131, 115001
10. KELT-22Ab: A Massive, Short-Period Hot Jupiter Transiting a Near-solar Twin  
Labadie-Bartz, J., Rodriguez, J. E., Stassun, K. G., et al. 2019, ApJS, 240, 13
11. KELT-19Ab: A...Hot Jupiter Transiting a Likely Am Star with a Distant Stellar Companion  
Siverd, R. J., Collins, K. A., Zhou, G., et al. 2018, AJ, 155, 35
12. KELT-20b: A giant planet with a period of  $P \sim 3.5$  days transiting the...early A star HD 185603  
Lund, M. B., Rodriguez, J. E., Zhou, G., et al. 2017, AJ, 154, 194
13. The Mysterious Dimmings of the T Tauri Star V1334 Tau  
Rodriguez, J. E., Zhou, G., Cargile, P. A., et al. 2017, ApJ, 836, 209

## Non-Refereed

1. Measurement of the Free-Floating Planet Mass Function with Simultaneous Euclid and WFIRST Microlensing Parallax Observations  
Penny, M. T., Bachelet, E., Johnson, S. A., et al., Astro2020 Decadal Survey White Paper
2. The Scientific Context of WFIRST, Microlensing in the 2020s  
Yee, J. et al, Astro2020 Decadal Survey White Paper