Samson A. Johnson

CONTACT INFO

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PRINCIPAL INTERESTS

Exoplanet detection through microlensing, microlensing degeneracies, and exoplanet demographics. Roman Space Telescope Galactic Bulge Time Domain Survey design and preparations, combining Roman and Kepler exoplanet demographics

CAREER TRAJECTORY

NASA Postdoctoral Fellow 2022-Present
Jet Propulsion Laboratory, Pasadena, California

Ph.D. Astronomy 2022
The Ohio State University, Columbus, Ohio
Advisor: Prof. B. Scott Gaudi
Dissertation: Toward a New Era of Exoplanet Microlensing

B.A. Physics, High Honors 2015
B.A. Mathematics, High Honors 2015
Davidson Honors College, University of Montana, Missoula, Montana

SERVICE & LEADERSHIP

- Exoplanet Program Analysis Group - Executive Committee member 2023-2026
- ExoPAG Science Interest Group Co-Chair #2 2023-Present
- NASA ExoPAG Science Interest Group #2, contributing member 2021-2023
- Roman Microlensing Scienct Investigation Team member 2018-2022
- ExoExplorer, NASA ExEP, and ExoPAG Executive Secretary, 2021
- Referee for ApJ, MNRAS, A&A., Reviewer for XRP 2022
- Election Committee, OSU Astronomy Graduate Student Representative, 2021
- Assistant in graduate admissions interviews, Ohio State, spring 2019-2022
- Lead grad. student organizer of graduate admissions, Ohio State, spring 2019
- Led grad. student feedback in astronomy faculty search, Ohio State, spring 2018

CAREER TRAINING

- Flipped Classrooms, Teaching - CalTech Spring 2023
- Inclusive Leadership - JPL Fall 2022
- Microagressions 101 & 102: recognition and intervention - OSU Fall 2021
- Course Design Institute - OSU Summer 2020
- Mentorship Training - OSU Summer 2019

SELECTED OUTREACH

- Polaris Mentor, five students mentored over three years 2019-2022
  -Group enhancing retention of URM undergrads in physics/astronomy.
- Academic facilitator for URSA, course designer 2020
  -Undergraduate early arrival program associated with Polaris.
- Mentor for new astronomy graduate students at Ohio State University 2019-2021
- Council of Grad. Students, Committee on Diversity and Inclusion, OSU 2017-2018
- Breakfast of Science Champions, coordinator and volunteer 2017-2020
- Ohio Supercomputer Center Summer Institute, high school mentor 07/2017

SELECTED AWARDS

- Roman Project Infrastructure Team - Co-Investigator 2023-2028
- NASA Postdoctoral Program Fellowship 2022-2024
- Anne S. Tuttle Citizenship Award 2021
- OSU Dean's Distinguished University Fellowship 2016-2018,2021
- Montana University System Honors Scholarship 2011-2015
- Horatio Alger Montana State Scholarship 2011-2015

ADVISING

Aiden Zelakiewicz (undergrad.), The Ohio State University, 2021-present:
Refined code to create extinction and differential reddening maps towards the Galactic Center using infrared, ground based microlensing survet conducted by UKIRT. Manuscript in preparation.
Rachel Slaybaugh (undergrad.), 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 (undergrad.), The Ohio State University, 2019-2021:
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 scheduling of KELT transiting planet candidates. Presented at national science fairs.

MENTORING/ TEACHING

- Ohio State, Polaris Mentor of undergraduates S. Petz & C. Roper (2019-2020), A. Cooper (2020-2021), D. Crocker & E. Meyer (2021-2022)
- Ohio State, URSA Early Arrival Program Academic Facilitator: Course Design and Lecturer (2021)
- 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)

EMPLOYMENT

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 the Roman GBTDS.

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 UKIRT microlensing survey.

Research Assistant, Harvard-Smithsonian CfA 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.

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.

OBSERVING EXPERIENCE

- MINERVA, Mt Hopkins, Arizona - 4x0.7 meter, 9 weeks on site, including robotic programming of observatory and 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

PUBLICATIONS

Citations (First Author) : 382 (124)
h-index (First Author): 11 (3)

FIRST AUTHOR ARTICLES

5. *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.
4. *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
2. *On the Progenitor of the Type Ibc Supernova 2012fh*
   Johnson, S. A., Kochanek, C. S., Adams, S. M., 2017, MNRAS, 472, 3115
1. *The Radial Velocity of OGLE-2015-BLG-0966S*
   Johnson, S. A., Yee, J. C., 2017, PASP, 129, 074401

COAUTHOR ARTICLES

13. *Another Shipment of Six Short-Period Giant Planets from TESS*
    Rodriguez, J. E., Quinn, S. N., Vanderburg, A., et al. 2023, MNRAS, 521, 2765.
12. *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.
11. *OGLE-2019-BLG-0960Lb: The Smallest Microlensing Planet*
    Yee, J. C., Zang, W., Udalski, A., et al. 2021, AJ, 162, 180.
10. *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
9. *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
8. *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

6. *Minerva-Australis. I. Design, Commissioning, and First Photometric Results*
Addison, B., Wright, D. J., Wittenmyer, R. A., et al. 2019, PASP, 131, 115003

5. *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

4. *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

3. *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

2. *KELT-20b: A giant planet with a period of P∼3.5 days transiting the...early A star HD 185603*
Lund, M. B., Rodriguez, J. E., Zhou, G., et al. 2017, AJ, 154, 194

1. *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 ARTICLES

3. *Enabling Exoplanet Demographics Studies with Standardized Exoplanet Survey Meta-Data*
Prepared by the ExoPAG SIG #2 on Exoplanet Demographics,
Christiansen, J. L., et al. 2023, arXiv:2304.12442.

2. *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

1. *The Scientific Context of WFIRST, Microlensing in the 2020s*
Yee, J. et al, Astro2020 Decadal Survey White Paper

MEDIA

- *From growing up in Big Sky Country to studying exoplanets*, Further Together, the ORAU Podcast interview, 2023
- *NASA's Roman Mission Will Probe Galaxy's Core for Hot Jupiters, Brown Dwarfs*, nasa.gov feature on published work, EurakAlert, 2022
- *The Rogue Planets That Wander the Galaxy Alone*, The Atlantic, 2020
- *Unveiling Rogue Planets With NASA's Roman Space Telescope*, nasa.gov feature

Conferences & Meetings

- Predictions of the Roman GBTDS: Constraints on the Frequency of Earth-Analogs, 26th International Microlensing Conference
- Science Interest Group #2 on Exoplanet Demographics Update, ExoPAG 29 Meeting, 01/2024, 20 min talk
- GBTDS Simulation Group, Roman Microlensing Project Infrastructure Team Meeting, 09/2023
- Predictions of the Roman GBTDS: Constraints on the Frequency of Earth-Analogs, 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