JACOB K. LUHN

CURRICULUM VITAE

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Irvine, CA
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EDUCATION

THE PENNSYLVANIA STATE UNIVERSITY

PhD	Astronomy & Astrophysics	Aug. 2021
MS	Astronomy & Astrophysics	2018

THE OHIO STATE UNIVERSITY

BS	Physics and Astronomy & Astrophysics double major, *magna cum laude* Honors Research Distinction in Astronomy Thesis: *"Circumbinary Planets via Microlensing"* (Advisor: B. Scott Gaudi)	May 2015

RESEARCH INTERESTS

- Discovery of exoplanets through high-precision radial velocity (RV) observations
- Characterization of stellar variability and its impact on RV planet detections
- Stellar evolution and its effects on planetary systems

RESEARCH POSITIONS

POSTDOCTORAL SCHOLAR, University of California, Irvine — 2021–present
Dr. Paul Robertson

NATIONAL SCIENCE FOUNDATION GRADUATE RESEARCH FELLOW, Penn State University — 2016–2021
Dr. Jason Wright, Dr. Fabienne Bastien

UNDERGRADUATE RESEARCHER, Ohio State Department of Astronomy — 2014–2015
Summer Undergraduate Research Program (SURP) 2014
Dr. B. Scott Gaudi, Dr. Matthew Penny

FELLOWSHIPS/SCHOLARSHIPS

Pennsylvania Space Grant Consortium Graduate Research Fellow	2020–2021
Center for Exoplanets and Habitable Worlds small grant travel assistance	2019
Zaccheus Daniel Fellowship	2017, 2019
Stephen B. Brumbach Graduate Fellowship in Astrophysics	2017
Sagan Summer Workshop Travel Assistance	2016
National Science Foundation Graduate Research Fellow	2016–present
Homer F. Braddock/Nellie H. and Oscar L. Roberts Fellow	2015–2016
Ohio State Undergraduate Research Scholarship	2014
Leo Yassenoff Scholarship	2013
Ohio State University Maximus Scholarship	2011–2015

AWARDS/HONORS

Poster Competition Winner – Extremely Precise Radial Velocities (EPRV) Conference V	
Poster Competition Winner – EPRV Conference IV	Mar. 2019
Poster Competition Winner – Cools Stars 20 Workshop	Aug. 2018
Poster Honorable Mention – EPRV Conference III	Aug. 2017
Honors Undergraduate Research Thesis	2015
Outstanding Poster in the Field – NMS prize	Mar. 2015
Ohio State Dean's List – 8 terms	2011–2015
Helen Cowan Book Award (Ohio State Freshman Physics Award)	2012

TEACHING POSITIONS

INSTRUCTOR — Fall 2020
Astronomy 297 – "Astronomy Communication"

ROOFTOP OBSERVING/PLANETARIUM TEACHING ASSISTANT — Spring 2016

Led nightly rooftop observing and planetarium shows for various intro Astro courses

LAB INSTRUCTOR Fall 2015
Astronomy 11 – "Elementary Astronomy Laboratory" [instructor of record]

INSTRUCTIONAL AIDE Spring 2015
Astronomy 1141 – "Life in the Universe" [Dr. Donald Terndrup, Dr. Wayne Schlingman]

SELECTED OBSERVING PROGRAMS

1. UC Observatory/Keck Observatory Keck Planet Finder — *1.75 nights* 2023
   CHARACTERIZING THE SPECTRAL EFFECTS OF SOLAR-LIKE P-MODE OSCILLATIONS
2. UC Observatory/Keck Observatory Keck Planet Finder — *2.1 nights* 2023
   A PANCHROMATIC VIEW OF STELLAR ACTIVITY IN TWO BENCHMARK STARS USING THE KPF
3. UC Observatory/Lick Observatory Automated Planet Finder Telescope — *43.1 nights* 2022–present
   EXTENDING THE RETIRED A-STAR LEGACY WITH TAILORED APF OBSERVATIONS TO MITIGATE STELLAR VARIABILITY
4. NASA Exoplanet NOIRLAB NEID proposal — *0.7 nights* 2021
   2 FINGERS ON THE PULSE: SIMULTANEOUSLY RESOLVING P-MODE OSCILLATIONS WITH NEID AND TESS
5. NASA *K2* Guest Observer Cycle 6, ($30K Research Grant) 2018
   DEVELOPING PREDICTORS OF RADIAL VELOCITY JITTER FROM K2 LIGHT CURVES [Administrative PI: F. Bastien]
6. NASA *K2* Guest Observer Cycle 5, ($30K Research Grant) 2017
   DEVELOPING PREDICTORS OF RADIAL VELOCITY JITTER FROM K2 LIGHT CURVES [Administrative PI: F. Bastien]

TELESCOPE OBSERVING EXPERIENCE

10 m Keck I/KPF — California Planet Search observer — 3 *nights* 2023–present

REFEREED PUBLICATIONS [6 first-author, 7 co-author]

1. *IMPACT OF CORRELATED NOISE ON THE MASS PRECISION OF EARTH-ANALOG PLANETS IN RADIAL VELOCITY SURVEYS*
   Luhn, J. K.; Ford, E. B.; Guo, Z.; Gilbertson, C.; [+9 coauthors], 2023, AJ, 165, 98
2. *NEID REVEALS THAT THE YOUNG WARM NEPTUNE TOI-2076 B HAS A LOW OBLIQUITY*
   Frazier, R. C.; Stefánsson, G.; Mahadevan, S.; Yee, S. W.; Cañas, C. I.; Winn, J. N.; **Luhn, J.K.** [+23 coauthors] 2023, AJ, 944, 41
3. *DETECTION OF P-MODE OSCILLATIONS IN HD 35833 WITH NEID AND TESS*
   Gupta, A. F.; **Luhn, J. K.**; Wright, J. T.; Mahadevan S.; Ford, E. B. [+13 coauthors] 2022, AJ, 164, 264
4. *HD 166620: PORTRAIT OF A STAR ENTERING A GRAND MAGNETIC MINIMUM*
   Luhn, J. K.; Wright, J. T.; Henry, G. W.; Saar, S. H.; Baum, A. C., 2022, ApJL, 936L, 23
5. *GJ 3929: HIGH PRECISION PHOTOMETRIC AND DOPPLER CHARACTERIZATION OF AN EXO-VENUS AND ITS HOT, MINI-NEPTUNE-MASS COMPANION*
   Beard, C.; Robertson, P.; Kanodia, S.; [+31 coauthors, including **Luhn, J. K.**], 2022, ApJ, 936, 55
6. *OBSERVING THE SUN AS A STAR: DESIGN AND EARLY RESULTS FROM THE NEID SOLAR FEED*
   Lin, A. S. J.; Monson, A.; Mahadevan, S.; Ninan, J. P.; Halverson, S.; Nitroy, C.; Bender, C. F.; Logsdon, S.; Kanodia, S.; Terrien, R. C.; Roy, A.; **Luhn, J. K.**; Gupta, A. [+17 coauthors], 2022, AJ, 163, 184
7. *FIVE DECADES OF CHROMOSPHERIC ACTIVITY IN 55 SUNLIKE STARS*
   Baum, A. C; Wright, J. T.; **Luhn, J. K.**; Isaacson, H., 2022 AJ, 163, 183
8. *TARGET PRIORITIZATION AND OBSERVING STRATEGIES FOR THE NEID EARTH TWIN SURVEY*
   Gupta, A. F.; Wright, J. T.; Mahadevan, S.; Robertson, P.; Halverson, S.; **Luhn, J. K.** [+14 coauthors], 2021, AJ, 161, 130
9. *PROPERTIES OF F STARS WITH STABLE RADIAL VELOCITY TIMESERIES: A USEFUL METRIC FOR SELECTING LOW JITTER F STARS*
   Luhn, J. K.; Wright, J. T.; Isaacson, H., 2020, AJ, 159, 236
10. *ASTROPHYSICAL INSIGHTS INTO RADIAL VELOCITY JITTER FROM AN ANALYSIS OF 600 PLANET-SEARCH STARS*
    Luhn, J. K.; Wright, J. T.; Howard, A. W.; Isaacson, H., 2020, AJ, 159, 235

11. *RETIRED A STARS AND THEIR COMPANIONS VIII: 15 NEW PLANETARY SIGNALS AROUND SUBGIANTS AND TRANSIT PARAMETERS FOR CALIFORNIA PLANET SEARCH PLANETS WITH SUBGIANT HOSTS*
    Luhn, J. K.; Bastien, F. A.; Wright, J. T.; Johnson, J. A.; Howard, A. W.; Isaacson, H, 2019, AJ, 157, 149
12. *THE FIRST CIRCUMBINARY PLANET FOUND BY MICROLENSING: OGLE-2007-BLG-349L(AB)C*
    Bennett, D. P.; Rhie, S. H.; Udalski, A.; Gould, A.; Tsapras, Y.; Kubas, D.; Bond, I. A.; Greenhill, J.; Cassan, A.; Rattenbury, N. J.; Boyajian, T. S.; **Luhn, J. K.**; Penny, M. T.; Anderson, J. [+73 coauthors], 2016, AJ, 152, 125
13. *CAUSTIC STRUCTURES AND DETECTABILITY OF CIRCUMBINARY PLANETS IN MICROLENSING*
    Luhn, J. K.; Penny, M. T.; Gaudi, B. S., 2016, ApJ, 827, 61

NON-REFEREED/PUBLICATIONS IN PROGRESS [2 co-author]

14. *THE DEATH OF VULCAN: NEID REVEALS THE PLANET CANDIDATE ORBITING HD 26965 IS STELLAR ACTIVITY*
    Burrows, A.; Halverson, S.; Siegel, J. C.; Gilbertson, C.; **Luhn, J. K.**; [+15 coauthors], [under review]
15. *A FOURIER-BASED METHOD FOR SIMULATING RADIAL VELOCITY TIME SERIES: STELLAR GRANULATION AND OSCILLATIONS*
    Guo, Z.; Ford, E. B.; Stello, D.; Grundah, F.; **Luhn, J. K.**; Mahadevan, S.; Gupta, A. F.; Yu, J., 2022

INVITED COLLOQUIA/SEMINARS

NASA EPRV Research Coordination Network Colloquium [virtual]	Oct. 26, 2023
University of Cambridge Exoplanet Centre Seminar [virtual]	Nov. 17th, 2020
Carnegie Institute of Washington Earth & Planets Laboratory Astronomy Seminar [virtual]	Nov. 6th, 2020
Yale University Exoplanet/Stellar Seminar [virtual]	Oct. 27th, 2020
University of Exeter Astrophysics Seminar [virtual]	Oct. 21st, 2020
Center for Astrophysics, Harvard & Smithsonian Stars and Planets Seminar [virtual]	Sep. 21st, 2020
University of Chicago Exoplanet Seminar [virtual]	July 20th, 2020
Penn State Astronomy Board of Visitors talk	Apr. 27th, 2019

INVITED TALKS

1. **PLENARY:** *PUSHING THE CONVECTIVE ENVELOPE: LEVERAGING P-MODE OSCILLATIONS IN SUBGIANTS TO IMPROVE RV PRECISION*
   Jacob K. Luhn, Paul Robertson, Howard Isaacson, Brad Holden
   - Extremely Precise Radial Velocities (EPRV) V, Santa Barbara, CA [poster prize talk] Mar. 30th, 2023
2. **PLENARY:** *NEW ASTROPHYSICAL INSIGHTS INTO RADIAL VELOCITY JITTER*
   Jacob K. Luhn, Fabienne A. Bastien, Jason T. Wright
   - Extremely Precise Radial Velocities (EPRV) IV, Grindelwald, Switzerland [poster prize talk] Mar. 21st, 2019
   - Cool Stars 20 Workshop, Boston, MA [poster prize talk] Aug. 3rd, 2018

CONTRIBUTED TALKS

1. *THE EVOLUTION OF STELLAR RADIAL VELOCITY JITTER: TOWARD AN ASTROPHYSICALLY MOTIVATED PREDICTOR OF STELLAR RV JITTER*
   Jacob K. Luhn, Jason T. Wright
   - 237th American Astronomical Society (AAS) Meeting [virtual] Jan. 13th, 2021
2. *AN ASTROPHYSICALLY-MOTIVATED PREDICTOR OF STELLAR RADIAL VELOCITY JITTER*
   Jacob K. Luhn, Angie Wolfgang, Jason T. Wright
   - Exoplanet Program Analysis Group (ExoPAG) 22 [virtual] June 19th, 2020
3. *"RETIRED" A STARS AND THEIR COMPANIONS: PROSPECTS FOR CATCHING LONG-PERIOD RV PLANETS IN TRANSIT WITH TESS*
   Jacob K. Luhn, Fabienne A. Bastien, Jason T. Wright, John A. Johnson, Andrew W. Howard, Howard Isaacson
   - Chesapeake Bay Area Exoplanet (CHEXO) Meeting, University of Maryland Feb. 15th, 2019
   - 233rd American Astronomical Society (AAS) Meeting, Seattle, WA Jan. 10th, 2019
4. *NEW ASTROPHYSICAL INSIGHTS INTO RV JITTER*
   Jacob K. Luhn, Fabienne A. Bastien, Jason T. Wright
   - Lunch Talk, Penn State University Dec. 3rd, 2019

- Emerging Researchers in Exoplanet Science (ERES) IV, Penn State University — June 21st, 2018

5. *RADIAL VELOCITIES OF SUBGIANT STARS AND NEW ASTROPHYSICAL INSIGHTS INTO RV JITTER*
Jacob K. Luhn, Fabienne A. Bastien, Jason T. Wright
- 231st American Astronomical Society (AAS) Meeting, National Harbor, MD — Jan. 12th, 2018

6. *THE FLICKER-JITTER RELATION AND PLANETS AROUND SUBGIANTS*
Jacob K. Luhn, Fabienne A. Bastien, Jason T. Wright
- Emerging Researchers in Exoplanet Science (ERES) III, Yale University — June 12th, 2017

7. *FLICKER, JITTER, AND "RETIRED" A-STARS*
Jacob K. Luhn, Fabienne A. Bastien, Jason T. Wright
- Lunch Talk, Penn State University — Apr. 14th, 2017

8. *CIRCUMBINARY PLANETS IN MICROLENSING*
Jacob K. Luhn, Matthew T. Penny, B. Scott Gaudi
- Lunch Talk, Penn State University — Feb. 18th, 2016
- Ohio State Astronomical Society, The Ohio State University — Oct. 14th, 2014
- SURP Symposium, The Ohio State University — Aug. 29th, 2014

POSTERS

1. *PUSHING THE CONVECTIVE ENVELOPE: LEVERAGING P-MODE OSCILLATIONS IN SUBGIANTS TO IMPROVE RV PRECISION*
Jacob K. Luhn, Eric B. Ford
- EPRV V, Santa Barbara, CA [Competition Winner] — Mar. 26–30, 2023

2. *STELLAR VARIABILITY IN ISOLATION: TWO CASE STUDIES OF TIME-RESOLVED STELLAR SIGNALS WITH EPRV INSTRUMENTS*
Jacob K. Luhn, Eric B. Ford
- EPRV V, Santa Barbara, CA — Mar. 26–30, 2023

3. *THE IMPACT OF CORRELATED NOISE ON THE MASS PRECISION OF EARTH-ANALOG PLANETS IN RADIAL VELOCITY SURVEYS*
Jacob K. Luhn, Eric B. Ford
- Exoplanets IV, Las Vegas, NV — May 1–6, 2022
- Emerging Researchers in Exoplanet Science VII, Penn State University — Aug. 1–3, 2022

4. *NEW ASTROPHYSICAL INSIGHTS INTO RADIAL VELOCITY JITTER*
Jacob K. Luhn, Fabienne A. Bastien, Jason T. Wright
- 335th American Astronomical Society (AAS) Meeting, Honolulu, HI — Jan. 7th, 2020
- Extreme Solar Systems IV, Reykjavik, Iceland — Aug. 19–23, 2019
- Extremely Precise Radial Velocities IV, Grindelwald, Switzerland [Competition Winner] — Mar. 18–21, 2019
- Cool Stars 20, Boston, MA [Competition Winner] — July 30–Aug. 3, 2018

5. *RVS WITH K2: JITTER, NEW PLANETS, AND TRANSIT PROBABILITIES FOR SUBGIANTS*
Jacob K. Luhn, Fabienne A. Bastien, Jason T. Wright
- Extremely Precise Radial Velocities (EPRV) III, Penn State University [Honorable Mention] — Aug. 14–17, 2017
- Kepler-K2 Science Conference IV, NASA Ames Research Center, Mountainview, CA — June 19–23, 2017

6. *EXAMINING THE FLICKER-JITTER RELATION OF K2 STARS: THE DEPENDENCE ON CHROMOSPHERIC ACTIVITY*
Jacob K. Luhn, Fabienne A. Bastien, Jason T. Wright
- 229th American Astronomical Society (AAS) Meeting, Grapevine, TX — Jan. 4th, 2017

7. *FINDING CIRCUMBINARY PLANETS VIA MICROLENSING*
Jacob K. Luhn, Matthew T. Penny, B. Scott Gaudi
- 2016 Sagan Exoplanet Summer Workshop, NExScI, Caltech — July 18th, 2016
- Emerging Researchers in Exoplanet Science (ERES) II, Cornell University — June 13th, 2016
- Denman Undergraduate Research Forum, The Ohio State University — Mar. 25th, 2015
- Natural and Mathematical Sciences (NMS) forum, The Ohio State University [Competition Winner] — Mar. 6th, 2015
- 225th American Astronomical Society (AAS) Meeting, Seattle, WA — Jan. 8th, 2015

PROFESSIONAL ACTIVITIES

Member:

- NASA ExoPAG Study Analysis Group 22 — 2020–present
- American Astronomical Society — 2016–present
- Center for Exoplanets and Habitable Worlds, Penn State University — 2015–present

Referee:

- Astronomy & Astrophysics — 2020–present

Funding Review Panelist

- NASA funding panel — July, 2023

Scientific Organizing Committee:

- Emerging Researchers in Exoplanet Science (ERES) IV, Penn State University — June 21–22, 2018

Local Organizing Committee:

- The First Penn State SETI Symposium, Penn State University — July 6–9, 2020
- Emerging Researchers in Exoplanet Science (ERES) IV, Penn State University — June 21–22, 2018

SERVICE

Penn State Astronomy & Astrophysics Department Climate and Diversity Committee — Aug. 2019–present
Penn State University Eberly College of Science Climate and Diversity Committee — Aug. 2018–2020
Co-organizer & panelist for Grad School Information Panel for Undergraduates — Sep. 9th, 2020

OUTREACH

Recurring Involvement:

Astronomy on Tap State College Co-Founder & Co-Organizer [45 total events] — Apr. 2017–2021
Penn State AstroFest Volunteer [yearly 4-night outreach event] — July 2016, '18, '19
Penn State AstroNight Volunteer [yearly 1-night outreach event] — Oct. 2015, '16, '17, '18, '19
Ohio State Society of Physics Students (SPS) Member — 2011–2015
Ohio State Astronomical Society Member — 2011–2015

Onetime Events/Talks:

Astronomy on Tap on the Couch talk – *"GRAVITATIONAL LENSES: THE UNIVERSE'S LARGEST TELESCOPES"* — Apr. 9th, 2020
Science U Life in Space Camp Ask a Scientist Volunteer — July 25th, 2019
Apollo 11 50th Anniversary Celebration – Volunteer Exhibitor, Astronomy on Tap — July 21st, 2019
Apollo 11 50th Anniversary Rocket Launch – Volunteer Exhibitor, Astronomy on Tap — July 16th, 2019
Astronomy on Tap State College #17 talk – *"STARS: HOW MUCH CAN WE LEARN FROM PINPRICKS OF LIGHT?"* — Sep. 24th, 2018
Astronomy on Tap State College #12 talk – *"USING MICROLENSING TO FIND EXTRAGALACTIC PLANETS?"* — Mar. 19th, 2018
Astronomy on Tap State College #4 talk – *"ECLIPSE ACROSS AMERICA"* — July 24th, 2017

PROGRAMMING LANGUAGES

Advanced: IDL, LaTeX **Proficient:** Python, Julia, C++