Luis Welbanks

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MAJOR FIELDS OF INTEREST

Characterization of exoplanet atmospheres. Data science, astrostatistics, Bayesian statistical analysis, inference problems, radiative transfer, computational physics, atmospheric chemistry.

APPOINTMENTS

Assistant Professor (2025-present)
School of Earth and Space Exploration
Arizona State University

51 Pegasi b Fellow & Presidential Postdoctoral Fellow (2024-2025)
School of Earth and Space Exploration
Arizona State University

NASA Sagan Postdoctoral Fellow (2021-2024)
School of Earth and Space Exploration
Arizona State University

EDUCATION

PhD, Astronomy
Institute of Astronomy, University of Cambridge, United Kingdom (2017-2021)
Characterization of exoplanet atmospheres using novel retrieval techniques and forward models. Supervisor: Dr. Nikku Madhusudhan

Master of Science, Physics and Astronomy (Astrophysics)
University of Calgary, Canada (2015-2017)
Specialty: Astroparticle Physics. Supervisor: Dr. Rachid Ouyed

Bachelor of Science with Honours, Double Major (Physics & Astrophysics)
University of Calgary, Canada (2011-2015)
GPA 3.89/4.00, equivalent to 97.25/100. Ranked first in class.

RESEARCH TEAM – Exoteric Lab

- Students: Yoav Rotman (PhD, 4th year), Finnegan Keller (PhD, 1st year, Presidential Graduate Assistantship), Biruk Nardos Abebe (PhD, 1st year), Isabel Kahn (Undergraduate, ASU/NASA Space Grant Research Intern 2025-2026)
- Postdocs: Dr. Matthew Nixon (51 Pegasi b Fellow), Dr. Sagnick Mukherjee (51 Pegasi b Fellow).

PUBLICATIONS
Total: 72 refereed. 7 First author, 1 student led†, 5 under review, 1 in prep, 4000+ citations. **h-index=34.** Full list of publications included at the end of this document.

HONOURS & AWARDS

2024 **51 Pegasi b Fellowship.** The Heising-Simons Foundation.
2024 Presidential Postdoctoral Fellowship. Arizona State University.
2021 **Sagan Fellow, NASA Hubble Fellowship**
With <6% acceptance rate, the NHFP is the highlight of NASA's pursuit of excellence in astrophysics. The program enables outstanding postdoctoral scientists to pursue independent research in any area of NASA Astrophysics, using theory, observations, simulations, experimentation, or instrument development.
2020 Murdin Prize, Institute of Astronomy, University of Cambridge
Joint award for the best published journal paper produced by a current PhD student.
2020 Selected as part of the Top 75 Alumni by Tecnológico de Monterrey (ITESM) Mexico
2017 **Gates Cambridge Scholar**, University of Cambridge.
0.3% of applicants accepted
First physics and astronomy scholar from Mexico
2016 Scholarship for Graduate International Research, Mexican Education Ministry (SEP)
2015 National Council for Science and Technology (CONACyT, Mexico) Scholar
2015-16 College Scholar, University of Calgary
2015 President's Award, University of Calgary.
Awarded for academic achievement and outstanding contributions to the university. 1 of 5 awards amongst all graduating students both graduate and undergraduate, in 2015.
2015 Department Scholarship, University of Calgary
2015 International Student Scholarship, University of Calgary
2015,13 Dr. Cal Waddell Award, University of Calgary
2014,13 Fujda Family Scholarship in Astrophysics, University of Calgary
2014-11 Centre for International Students and Study Abroad (CISSA) Undergraduate Awards for International Students. University of Calgary
2013 P.U.R.E. (Program for Undergraduate Research Experience) Awards, University of Calgary
2013 Scholars Academy Program, University of Calgary
2013 Silver Medal at the University Physics Competition, sponsored by the American Physical Society and the American Astronomical Society

GRANTS & OBSERVING PROPOSAL AWARDS

Awarded over $4,100,000 USD total in competitive funding (2.4M in Research/Observing grants as PI/Co-PI/Co-I, 0.9M recruiting prize fellows, 0.8M in personal fellowships)

- NASA Exoplanets Research Program ($722,053 USD)
  - Title: Let the data speak for itself. Understanding the limits of current exoplanetary atmospheric models and their missing physics in a data-driven era.
  - NASA received 110 compliant proposals in response to XRP in ROSES-23 and has selected 23 of those proposals for funding
- James Webb Space Telescope ($1.6M USD, 725 hrs)
  - PI – Program 8017 (18.6 hrs)
  - Co-PI – Program 5959 (154.2 hrs, largest allocation for Exoplanets in C3)
  - Co-PI – Program 5311 (51.1 hrs)

- Co-PI – Program AR 6388 (AR=Archival Research).
- Co-I – Program AR 7358, 6347, 5275, 3273 (AR=Archival Research).
- Co-I – Programs 9101, 9025, 8696, 8597, 7407, 6932, 5863, 5634, 4938, GTO-4536, 4098, 4082, 3969 (>500 hrs)
- Co-PI – Program 3818. 7.3 hrs (Program withdrawn)

- High-Resolution Spectroscopy of Exoplanets & Ground Based Observations
  - Principal Investigator 30+hrs. GEMINI Observatory (IGRINS, IGRINS-2). GN-2025A-FT-101, GS-2024A-FT-102, GS-2023B-Q-129, GS-2023B-Q-227, GS-2023A-FT-203
  - Co-Principal Investigator 54 hrs. NASA Infrared Telescope Facility (IRTF). 2025B024.
  - Co-Investigator. 210+ hrs. Las Cumbres Observatory (Sinistro). LCO2024B-007, LCO2024B-010.
  - Co-Investigator 150+ hrs in GEMINI Observatories (IGRINS, IGRINS-2, MAROON-X), Magellan/MIKE
- ESA CHEOPS. Co-Investigator. 45 orbits. Fresh out of the oven: A comprehensive survey of transiting young sub-Neptune planets.
- XMM-Newton. Co-Investigator. 72 ks.
- Hubble Space Telescope
  - Co-I – Program 17613 (24 orbits).
  - Co-I – Program 17585 – Director's Discretionary (DD) time (12 orbits).
  - Co-I – Program 15814 (26 orbits).
- 51 Pegasi b Fellowship ($0.4M USD)
  - Unifying theory and modelling to bridge the gap between exoplanet atmospheric observations and their interpretation.
- NASA Hubble Fellowship ($0.4M USD)
  - High-Definition Exo-Atmospheric Characterization with Transit Spectroscopy. Space Telescope Science Institute Grant. NASA Hubble Fellowship Program.
- Theory & Computing grants
  - The Computing Grand Challenge – Lawrence Livermore National Lab. Tier 1 Compute Allocation. 22.4M Core Hours "The Next Generation of Exoplanet Atmospheric Models for the James Webb Space Telescope and Beyond". Co-Investigator
  - Other Worlds Laboratory Mini-Grant ($5K) to establish the EXOMINTS - Exoplanet Model Interrogation and New Techniques Sprint.
  - The Exoplanet Modelling and New Techniques AI Framework – 2024 and 2025 Innovation Challenge. Open AI and Arizona State University.
  - NVIDIA Academic Grant. Accelerating Exoplanetary-Atmospheric Characterization with GPUs. Principal Investigator. 500 gpu-hours.

TALKS & SEMINARS

2024 Manipur Technical University, India
2024 Max Planck Institute for Astronomy. Heidelberg.
2024 Jet Propulsion Lab. NASA
2024 University of Virginia. Department of Astronomy.
2024 Institute for Astronomy, University of Hawai`i at Mānoa.
2024 Penn State University Department of Astronomy & Astrophysics.
2024 University of Illinois Urbana-Champaign. Department of Astronomy
2024 Carnegie Science Observatories in Pasadena.
2024 University of California, Los Angeles. The Department of Earth, Planetary, and Space Sciences
2024 Lawrence Livermore National Laboratory.

2024 Planetary Lunch Seminar at UC Santa Cruz.
2023 McGill University. Trottier Space Institute.
2023 University of Wisconsin-Madison. Department of Astronomy.
2023 University of Arizona. Origins Seminar. Astronomy & Steward Observatory
2023 University of Colorado at Boulder. Department of Astrophysical and Planetary Sciences
2023 American Museum of National History.
2022 Carnegie Earth & Planets Laboratory.
2022 NYU Abu Dhabi. The Center for Astrophysics and Space Science.
2021 Tel Aviv University. Department of Astrophysics. (remote)
2021 Exoplanet Journal Club at NASA Jet Propulsion Laboratory.
2021 Exoplanet Presentation at Harvard Center for Astrophysics.
2020 Planetary Lunch Seminar at UC Santa Cruz.
2020 Caltech exoplanet group meeting.
2020 University of Exeter. Astronomy Seminar. The Physics and Astronomy department.

CONFERENCE CONTRIBUTIONS AND TALKS

2025 Exoplanets by the Lake III: Atmospheres and Beyond. **Lecturer.** Lake Ammer (Ammersee) Germany
2025 Vatican Observatory Summer School. **Guest lecturer.** VOSS 2025: Exploring the Universe with JWST - The First Three Years
2025 51 Pegasi b Symposium. **Talk**. The search for life in other planets.
2025 International Space Science Institute. **Invited participant.** Breakthrough Workshop. Life Beyond Earth: the missing link.
2025 ESO Workshop "Towards New Frontiers: The Astrochemical Journey from Young Stellar Nurseries to Exoplanets". **Invited Review Talk.**
2025 Know Thy Star, Know Thy Planet 2 Conference. **Invited Talk.** Learning about the planet and star with atmospheric inference methods.
2024 MIRI Science Conference. **Talk**. MIRI LRS for confirming chemical detections in exoplanet atmospheres.
2024 51 Pegasi b Symposium. **Talk**. Understanding the nature of a popcorn planet with JWST.
2024 Challenge Accepted: Linking Planet Formation with Present-Day Atmospheres. **Talk.** Deciphering the broadband transmission spectra of exoplanets with JWST and their connection to planet formation
2024 Exoplanets 5. **Talk.** Finding signatures of every major element reservoir and chemical disequilibrium on an exoplanet atmosphere.
2024 Exoplanets 5. **Talk**. The 2.5 to 25-micron transmission spectrum of HD 189733b with JWST NIRCam and MIRI MRS
2024 Extreme Solar Systems V. **Talk.** The first full broadband transmission spectrum of an exoplanet. The chemistry of WASP-39b revealed from 0.5 to 12 μm with JWST
2023 Ninth Annual Giant Magellan Telescope Community Science Meeting. **Invited Review Talk.** Assessing the chemical inventory of exoplanet atmospheres over the next two decades
2023 NASA Hubble Fellowship Program (NHFP) Fellows Symposium. **Talk.** Swimming Through New Chemical Species in Exoplanetary Atmospheres with JWST
2023 The First Year of JWST Science Conference. **Talk.** The MANATEEs Year-Long Journey: Swimming Through New Chemical Species in Exo-Atmospheres with JWST.
2023 Bay Area Exoplanet Meeting #43. **Talk**. Dude, where is my methane? A search for chemical species with JWST by the MANATEE GTO.

2023 241st Meeting of the American Astronomical Society (AAS 241). **Talk**. Revealing the Chemical Inventory of WASP-39b with JWST - A joint modelling effort.
2023 241st Meeting of the American Astronomical Society (AAS 241). **Talk**. Is that really an atmospheric detection? Assessing Atmospheric Inference Sensitivity to data with Bayesian Cross Validation.
2022 Max Planck Institute for Astronomy. Celebrating JWST's first six months of exoplanet data conference at Ringberg Castle. **Talk.** Model Synthesis for the Transiting Exoplanet ERS Program.
2022 University of Maryland, College Park. Exoplanet journal club. **Talk.** Multidimensional retrievals and model advancements for the JWST Era.
2022 NASA Hubble Fellowship Program (NHFP) Fellows Symposium. **Talk.** Model Advancements for the JWST Era. Are we ready?
2022 Bay Area Exoplanet Meeting #41. **Talk.** Model Advancements for the JWST Era. Are we ready?
2022 Exoplanets 4. **Poster.** On the robustness of atmospheric inferences. Estimating the predictive accuracy of atmospheric models for transmission spectra of transiting exoplanets.
2022 Exoplanet Early Career Highlight Seminar. **Talk.** Towards Generalized Characterization of Exoplanet Atmospheres with Transit Spectroscopy.
2021 Cloud Nine Conference Online. **Talk.** Blind spots in treatment of clouds in atmospheric retrievals
2021 UK exoplanet community meeting. University of Birmingham Online. **Talk.** Aurora: A Generalised Retrieval Framework for Exoplanetary Transmission Spectra.
2021 American Astronomical Society meeting #237. **Talk.** Considerations for next-generation retrievals of exoplanetary transmission spectra.
2020 Europlanet Science Congress 2020. **Talk.** Mass-Metallicity Trends in Transiting Exoplanets.
2020 Exoplanets 3. **Poster.** Mass-Metallicity Trends in Transiting Exoplanets. (virtual COVID-19)
2020 Astronomy and Astrophysics Seminars from the Instituto de Astrofísica de Canarias (IAC). **Talk.** Mass-Metallicity Trends in Transiting Exoplanets.
2020 Cloud Academy II. Les Houches School of Physics. Postponed due to COVID-19.
2020 Churchill College. University of Cambridge. **Talk.** Understanding the atmosphere of alien worlds.
2019 NASA Goddard Space Flight Center. Rocky Exoplanets in the Era of JWST: Theory and Observation. **Poster and flash talk.** Degeneracies in retrievals of transmission spectra.
2019 Digital Exoplanets Workshop. Charles University, Prague. **Talk.** Chemical detections using optical transmission spectra of exoplanets.
2019 University of Cambridge, Institute of Astronomy. Wednesday Seminar. **Talk.** Challenges in interpreting transmission spectra of exoplanets
2019 UK exoplanet community meeting. Imperial College London. **Poster.** Degeneracies in retrievals of transmission spectra
2018 Exoplanets II, Cambridge UK. **Poster.** New chemical detections using atmospheric retrievals.
2016 Compact Stars in the QCD phase diagram conference. L'Aquila, Italy. **Talk.** The quark-nova and the mechanism behind double-humped superluminous supernovae

TEACHING & MENTORING EXPERIENCE

2025 SES 191: Exploring SESE.

2022-24 Guest lecturer. Arizona State University. Exoplanet Atmospheres (SES 494/598) Astro-Statistics (SES 494/598). Lectures on Advancements in Exoplanetary Sciences, Transmission Spectroscopy, Bayesian Statistics, and Importance Sampling.

2021 Guest Lecturer for the James Webb Space Telescope Early Release Science (ERS) Program, Pre-Launch Theory Webbinar. Key Aspects of Atmospheric Retrievals.

2019 Tutorials for Structure and Evolution of Stars, IoA University of Cambridge, UK.

2016-17 Physics MCAT course instructor, The Princeton Review, Canada.

2015-17 Teaching Assistant, Physics Department University of Calgary, Canada. Physics 323: Optics and Electromagnetism. Astrophysics 213: Introduction to Astrophysics. Physics 397: Applied Physics Laboratory I

2012-17 Peer Assisted Study Sessions Leader, University of Calgary, Canada.

2012-14 Physics and Mathematics Tutor, Mentor for refugee students, University of Calgary, Canada.

Advisor Yoav Rotman (PhD, 4th year), Finnegan Keller (PhD, 1st year, Presidential Graduate Assistantship), Biruk Nardos Abebe (PhD, 1st year), Isabel Kahn (Undergraduate, ASU/NASA Space Grant Research Intern 2025-2026)

Mentor Part of the advising team for Lindsey Wiser, Peter Smith, Jorge A. Sanchez, Krishna Kanumalla, and Lana Tilke. PhD Students under the principal advising of M. Line

Undergraduate Senior Thesis co-advising. Paulina Padilla López. Universidad Autónoma de Sinaloa.

SERVICE & PROFESSIONAL AFFILIATIONS

Professional Exoclimes VII Science Organizing Committee

Professional Panel Chair for NASA Keck Time Allocation Committee

Professional Subject-matter expert reviewer in a NASA peer review.

Professional Panelist for NASA Keck Time Allocation Committee

Professional Panelist for NASA JWST Time Allocation Committee

Professional Panelist for NASA HST Time Allocation Committee

Professional Panelist for NOIRLab Time Allocation Committee

Professional Panelist for NASA Inclusion Plan Evaluation Panel

Professional Reviewer for the Swiss National Science Foundation

Professional Reviewer for NASA James Webb Space Telescope Time Allocation Committee (Director Discretionary Time)

Professional Reviewer for the Canadian Time Allocation Committee (CanTAC) for the Canada-France-Hawaii Telescope (CFHT)

Professional Referee for American Astronomical Society Journals (ApJ, AJ, ApJL), Astronomy & Astrophysics (A&A), Monthly Notices of the Royal Astronomical Society (MNRAS), Space Science Reviews (SSRv), Nature (Nat)

Professional Member of NASA ExoPAG Study Analysis Group 21. Report: arXiv:2201.09905

Professional Member of the Canadian Association of Physicists (CAP), the American Astronomical Society (AAS), Fellow of the Cambridge Philosophical Society, Fellow of the Royal Astronomical Society

Department Co-President of the Arizona State University School of Earth and Space Exploration Postdoctoral Committee (2022-2023)

Department Member of the Computing Users' Committee. University of Cambridge, UK. (2018-2021)

Outreach	Founder of the Astronomy on Tap: Valley of the Sun Official Satellite in 2025. Serving Phoenix, Mesa, Chandler, Gilbert, Glendale, Scottsdale, Peoria, Tempe, and Surprise.
Outreach	2025- Subject Matter Expert serving the Schiele Museum of Natural History and Planetarium in Gastonia, North Carolina.
Outreach	Subject Matter Expert for NASA's Universe of Learning (2023-present).
Outreach	Scientific Public Outreach. Arizona and US. (2024-present). Lectures for local and national astronomy clubs (Prescott, Phoenix, Tempe, Arizona, Omaha Nebraska)
Outreach	Scientific Public Outreach. University of Cambridge, UK. (2017-2021) inc. Astro on Tap
Outreach	Scientific Outreach talks for the Instituto Politécnico Nacional (IPN). The National Polytechnic Institute in Mexico. (2021)
Outreach	Scientific Outreach talks for grades 1-6 and high school students (2014-2021)
Outreach	RISE Leadership Institute 2025. Speaker.
Community	NASA Hubble Fellowship Program Mentorship Initiative (2022-2024)
Community	Member of the Committee for Diversity in Astronomy & Geophysics (CDAG). Royal Astronomical Society (RAS) (2020-2024)
Community	Director of Membership. Gates Cambridge Alumni Association. (2022-2024)
Community	Logistics organizer. XVII Symposium of Mexican Studies and Students in the UK. (2019)
Community	Member of the Equality and Diversity Committee. IoA, University of Cambridge, UK. (2018-2021)
Community	President and founder of the Latin American Students' Association (LASA). University of Calgary, Canada. (2012-2017)

PRESS RELEASES & MEDIA

2025	Interviewed for New York Times, CNN, Big Think, and other media to discuss the research presented in "The Challenges of Detecting Gases in Exoplanet Atmospheres" 2025, Nature Astronomy
2025	ASU forges strategic partnership to solve the mystery of planet formation. Press release by Arizona State University in coordination with Lawrence Livermore National Lab and Michigan State University.
2024	ASU Scientists Contribute to Discovery of Unique "Steam-World" Exoplanet GJ 9827 d. Press release by Arizona State University in coordination with University of Montreal.
2024	More to munch on: The popcorn planet WASP-107b unveils new atmospheric details. Press release by Arizona State University in coordination with University of Arizona
2024	NASA's Webb Cracks Case of Inflated Exoplanet. Press release by Space Telescope Science Institute.
2024	Astronomers sniff out pungent exoplanet using James Webb Space Telescope. Press release by Arizona State University in coordination with Johns Hopkins University.
2024	ASU researchers contribute to groundbreaking discovery on exoplanet formation. Press release by Arizona State University in coordination with University of Wisconsin.
2023	James Webb Space Telescope observes methane in exoplanet's atmosphere. Press release by Arizona State University in coordination with the NASA Goddard Space Flight Center.
2022	Carbon dioxide observed in exoplanet atmosphere by James Webb Space Telescope. Press release by Arizona State University in coordination with the Space Telescope Science Institute.

2020 Large exoplanet could have the right conditions for life. Press release by The University of Cambridge.
2019 Water common – yet scarce – in exoplanets. Press release by The University of Cambridge.
2019 Aluminium oxide found in an Ultra Hot Jupiter. Press release by the Instituto de Astrofísica de Canarias.
2018 Multiple metals – and possible signs of water – found in unique exoplanet. Press release by The University of Cambridge.

PUBLICATIONS

Total: 72 refereed, 7 First author, 1 student led†, 5 under review, 1 in prep, 4000+ citations

h-index = 34

First-author publications

1. **Welbanks, L.** & Nixon, M., et al. "The Challenges of Detecting Gases in Exoplanet Atmospheres" 2025, Nature Astronomy, In Press.
2. **Welbanks, L.**; Bell, T. J.; Beatty, T. G.; Line, M. R.; Ohno, K.; et al. "A high internal heat flux and large core in a warm Neptune exoplanet" 2024. Nature, 630, 8018, 836-840.
3. **Welbanks, L.**; McGill, P.; Line, M.; Madhusudhan, N. "On the Application of Bayesian Leave-one-out Cross-validation to Exoplanet Atmospheric Analysis" 2023. The Astronomical Journal, 165, 3, 112.
4. **Welbanks, L.**; Madhusudhan, N. "On Atmospheric Retrievals of Exoplanets with Inhomogeneous Terminators" 2022. The Astrophysical Journal, 933, 1, 79.
5. **Welbanks, L.**; Madhusudhan, N. "Aurora: A Generalized Retrieval Framework for Exoplanetary Transmission Spectra" 2021. The Astrophysical Journal, 913, 2, 114.
6. **Welbanks, L.**; et al. "Mass-Metallicity Trends in Transiting Exoplanets from Atmospheric Abundances of H_2O, Na, and K" 2019. The Astrophysical Journal, 887, 1, L20.
7. **Welbanks, L.**; Madhusudhan, N. "On Degeneracies in Retrievals of Exoplanetary Transmission Spectra" 2019. The Astronomical Journal, 157, 5, 206.

Second/Third-author publications

8. Seager, S.; **Welbanks, L.**; Ellerbroek, L.; Bains, W.; Petkowski, J.J. "Prospects for Detecting Signs of Life on Exoplanets in the JWST Era" 2025. Proceedings of the National Academy of Sciences. In Press
9. Rotman, Y†.; **Welbanks, L.**; Line, M. R.; McGill, P.; Radica, M.; et al. "Enabling Robust Exoplanet Atmospheric Retrievals with Gaussian Processes" 2025. The Astrophysical Journal, 989, 2, 201.
10. Murphy, M. M.; Beatty, T. G.; **Welbanks, L.**; Fu, G. "HST Transmission Spectra of the Hot Neptune HD 219666 b: Detection of Water and the Challenge of Constraining Both Water and Methane" 2025. The Astronomical Journal, 169, 6, 286.
11. Fu, G.; **Welbanks, L.**; Deming, D.; Inglis, J.; Zhang, M.; et al. "Hydrogen sulfide and metal-enriched atmosphere for a Jupiter-mass exoplanet" 2024. Nature, 632, 752-756.
12. Wiser, L. S.; Line, M. R.; **Welbanks, L.**; Mansfield, M.; Parmentier, V.; et al. "Lessons from Hubble and Spitzer: 1D Self-consistent Model Grids for 19 Hot Jupiter Emission Spectra" 2024. The Astrophysical Journal, 971, 1, 33.
13. Beatty, T. G.; **Welbanks, L.**; Schlawin, E.; Bell, T. J.; Line, M. R.; et al. "Sulfur Dioxide and Other Molecular Species in the Atmosphere of the Sub-Neptune GJ 3470 b" 2024. The Astrophysical Journal, 970, 1, L10.
14. Nixon, M. C.; **Welbanks, L.**; McGill, P.; Kempton, E. M. -R. "Methods for Incorporating Model Uncertainty into Exoplanet Atmospheric Analysis" 2024. The Astrophysical Journal, 966, 2, 156.
15. Sun, Q.; Wang, S. X.; **Welbanks, L.**; Teske, J.; Buchner, J. "A Revisit of the Mass-Metallicity Trends in Transiting Exoplanets" 2024. The Astronomical Journal, 167, 4, 167.
16. Challener, R. C.; **Welbanks, L.**; McGill, P. "Bringing 2D Eclipse Mapping out of the Shadows with Leave-one-out Cross Validation" 2023. The Astronomical Journal, 166, 6, 251.

17. Bell, T. J.; **Welbanks, L.**; Schlawin, E.; Line, M. R.; Fortney, J. J.; et al. "Methane throughout the atmosphere of the warm exoplanet WASP-80b" 2023. Nature, 623, 709-712.
18. Taylor, J.; Radica, M.; **Welbanks, L.**; MacDonald, R. J.; Blecic, J.; et al. "Awesome SOSS: atmospheric characterization of WASP-96 b using the JWST early release observations" 2023. Monthly Notices of the Royal Astronomical Society, 524, 1, 817-834.
19. Radica, M.; **Welbanks, L.**; Espinoza, N.; Taylor, J.; Coulombe, L.; et al. "Awesome SOSS: transmission spectroscopy of WASP-96b with NIRISS/SOSS" 2023. Monthly Notices of the Royal Astronomical Society, 524, 1, 835-856.
20. Feinstein, A. D.; Radica, M.; **Welbanks, L.**; Murray, C. A.; Ohno, K.; et al. "Early Release Science of the exoplanet WASP-39b with JWST NIRISS" 2023. Nature, 614, 670-675.
21. Sheppard, K. B.; **Welbanks, L.**; Mandell, A. M.; Madhusudhan, N.; Nikolov, N.; et al. "The Hubble PanCET Program: A Metal-rich Atmosphere for the Inflated Hot Jupiter HAT-P-41b" 2021. The Astronomical Journal, 161, 2, 51.
22. Colón, K. D.; Kreidberg, L.; **Welbanks, L.**; Line, M. R.; Madhusudhan, N.; et al. "An Unusual Transmission Spectrum for the Sub-Saturn KELT-11b Suggestive of a Subsolar Water Abundance" 2020. The Astronomical Journal, 160, 6, 280.
23. Cabot, S. H. C.; Madhusudhan, N.; **Welbanks, L.**; Piette, A.; Gandhi, S. "Detection of neutral atomic species in the ultra-hot Jupiter WASP-121b" 2020. Monthly Notices of the Royal Astronomical Society, 494, 1, 363-377.
24. Madhusudhan, N.; Nixon, M. C.; **Welbanks, L.**; Piette, A. A. A.; Booth, R. A. "The Interior and Atmosphere of the Habitable-zone Exoplanet K2-18b" 2020. The Astrophysical Journal, 891, 1, L7.
25. von Essen, C.; Mallonn, M.; **Welbanks, L.**; Madhusudhan, N.; Pinhas, A.; et al. "An optical transmission spectrum of the ultra-hot Jupiter WASP-33 b. First indication of aluminum oxide in an exoplanet" 2019. Astronomy and Astrophysics, 622, A71.
26. Chen, G.; Pallé E.; **Welbanks, L.**; Prieto-Arranz, J.; Madhusudhan, N.; et al. "The GTC exoplanet transit spectroscopy survey. IX. Detection of haze, Na, K, and Li in the super-Neptune WASP-127b" 2018. Astronomy and Astrophysics, 616, A145.
27. Rezaei, M.; George, J.; **Welbanks, L**.; Moazzen-Ahmadi, N. “Fundamental and Combination Bands of CO_2-C_2H_2 and CO_2-C_2D_2 in the Mid-Infrared Region” 2014. Journal of Molecular Physics, 112:18, 2445-2450.

Co-authored publications

28. Challener, R., et al. including **Welbanks, L.** “Horizontal and vertical exoplanet thermal structure from a JWST spectroscopic eclipse map” 2025. Nature Astronomy. In Press.
29. Wiser, L., et al. including **Welbanks, L.** “A Panchromatic Emission Spectrum of WASP-80 b: A Warm Gas Giant Around A Low-Mass Star” 2025. Proceedings of the National Academy of Sciences. In Press.
30. Oza, A. V., et al. including **Welbanks, L.** “Volcanic Satellites Tidally Venting Na, K, SO_2 in Optical & Infrared Light” 2025. Monthly Notices of the Royal Astronomical Society. In Press.
31. Weisserman, D., et al. including **Welbanks, L.** "Aligned Stellar Obliquities for Two Hot Jupiter-hosting M Dwarfs Revealed by MAROON-X: Implications for Hot Jupiter Formation" 2025. Monthly Notices of the Royal Astronomical Society. In Press.
32. Panwar, V., et al. including **Welbanks, L.** "The Roasting Marshmallows Program with IGRINS on Gemini South III: Seeing deeper into the metal depleted atmosphere of a gas-giant on the cusp of the hot to ultra-hot Jupiter transition" 2025. Monthly Notices of the Royal Astronomical Society.
33. Murphy, M. M., et al. including **Welbanks, L.** "A Panchromatic Characterization of the Evening and Morning Atmosphere of WASP-107 b: Composition and Cloud Variations, and Insight into the Effect of Stellar Contamination" 2025. The Astronomical Journal, 170, 1, 61.

34. Fu, G., et al. including **Welbanks, L.** "Statistical Trends in JWST Transiting Exoplanet Atmospheres" 2025. The Astrophysical Journal, 986, 1, 1.
35. Ahrer, E., et al. including **Welbanks, L.** "Escaping Helium and a Highly Muted Spectrum Suggest a Metal-enriched Atmosphere on Sub-Neptune GJ 3090 b from JWST Transit Spectroscopy" 2025. The Astrophysical Journal, 985, 1, L10.
36. Mukherjee, S., et al. including **Welbanks, L.** "A JWST Panchromatic Thermal Emission Spectrum of the Warm Neptune Archetype GJ 436b" 2025. The Astrophysical Journal, 982, 2, L39.
37. Bello-Arufe, A., et al. including **Welbanks, L.** "Evidence for a Volcanic Atmosphere on the Sub-Earth L 98-59 b" 2025. The Astrophysical Journal, 980, 2, L26.
38. Bartelt, D., et al. including **Welbanks, L.** "A Measurement of the Water Abundance in the Atmosphere of the Hot Jupiter WASP-43b with High-resolution Cross-correlation Spectroscopy" 2025. The Astronomical Journal, 169, 2, 101.
39. Ohno, K., et al. including **Welbanks, L.** "A Possible Metal-dominated Atmosphere below the Thick Aerosols of GJ 1214 b Suggested by Its JWST Panchromatic Transmission Spectrum" 2025. The Astrophysical Journal, 979, 1, L7.
40. Murphy, M. M., et al. including **Welbanks, L.** "Evidence for morning-to-evening limb asymmetry on the cool low-density exoplanet WASP-107 b" 2024. Nature Astronomy, 8, 1562-1574.
41. Thao, P. C., et al. including **Welbanks, L.** "The Featherweight Giant: Unraveling the Atmosphere of a 17 Myr Planet with JWST" 2024. The Astronomical Journal, 168, 6, 297.
42. Masuda, K., et al. including **Welbanks, L.** "A Fourth Planet in the Kepler-51 System Revealed by Transit Timing Variations" 2024. The Astronomical Journal, 168, 6, 294.
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