Dr Johanna M. Vos

Postdoctoral Fellow
American Museum of Natural History
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Professional Appointments

Postdoctoral Fellow 2018–Present
Department of Astrophysics, American Museum of Natural History

PhD Candidate & Principal's Career Development Scholar 2014-2018
Royal Observatory of Edinburgh, University of Edinburgh

Education

Institute for Astronomy, University of Edinburgh 2014–2018
PhD in Astronomy
Thesis: "Characterising Weather and Rotation on Substellar Worlds"
Advisor: Prof. Beth A. Biller
2018 Winton Astronomy Thesis Prize

Trinity College Dublin 2010–2014
BA (Mod) Physics with Astrophysics
Undergraduate Thesis: "Sunspots and Solar Flares: The Role of Flows"
Advisor: Prof. Peter T. Gallagher
Graduated with First Class Honours (I.I)

Grants & Awards

Research Support Summary: $900,000 total, $400,000 as PI

Hubble Space Telescope General Observer Grant, $102,000, **PI** 2021
NASA Keck Data Award, $15,500, **PI** 2021
TESS Cycle 3 Guest Investigator Small Program, $50,000, Co-I 2020
Hubble Space Telescope General Observer Grant, $171,000, **PI** 2019
TESS Cycle 2 Guest Investigator Small Program, $50,000, Co-I 2019
NASA Exoplanets Research Program (XRP), $400,000, Co-I 2019
Other Worlds Lab, UC Santa Cruz, *Heising-Simons Foundation*, $1,000 2019
Cool Stars 20 Conference Grant, *Boston University*, $500 2018
Winton Thesis Prize, *University of Edinburgh*, $1,400 2018
Principal's Go Abroad Fund, *University of Edinburgh*, $1,000 2018
Exoclipse Conference Grant, *Boise State University*, $2,000 2017
Principal's Career Development Scholarship, *U of Edinburgh*, $100,000 2014
First Class Book Prize, *Trinity College Dublin* 2011, 2012, 2013
Entrance Exhibition Scholarship, *Trinity College Dublin* 2010

Teaching Experience

Subject Matter Expert, *NASA Community College Network* 2022–2023
Partnership with community college instructors and their students

Guest Lecturer, *Stanford University* 2021
Peering into Darkness: Research Practices in Contemporary Art & Astrophysics

Instructor, *American Museum of Natural History* 2019–2020
Designed and delivered "Stars" course for After School Program

Head Teaching Assistant, *University of Edinburgh* 2016–2018
Physics 1B Experimental Lab
Observational Astronomy Lab

Teaching Assistant, *University of Edinburgh* 2014–2018
Maths for Physics 1
Introductory Astrophysics
Discovering Astronomy

Research Advising

11 Undergraduate/Master's Students
Everett MacArthur, *Columbia University*
Mohammad Refat, *Baruch College, CUNY*
Jose Adorno, *Queens College, CUNY* → *University of Miami*
Allison McCarthy, *University of Alabama* → *Boston University*
+ 7 students as co-mentor

12 High–School Students, Science Research Mentoring Program, AMNH

BL Cadet, *Uncommon Prep Charter School*	2021–2022
Amelia Lobo-Jost, *Humanities Preparatory Academy High School*	2021–2022
Omar Piron, *Washington Heights Expeditionary Learning School*	2021–2022
Azul Ruiz Diaz, *Brooklyn Technical High School*	2020–2021
ai Glazer, *The Dalton School*	2020–2021
Sophia Ameneyro, *University Neighborhood High School*	2020–2021
Izzy Lapidus, *Fiorello H. LaGuardia High School of Performing Arts*	2019–2020
Otis McCallum, *The Beacon School*	2019–2020
William McCartney, *New Explorations Into Science and Technology + Math*	2019–2020
Elko Gerville–Reache, *School of the Future*	2018–2019
Raunak Amanna, *Brooklyn Technical High School*	2018–2019
Nima Brivanlou, *Lycée Français de New York*	2018–2019

Selected Telescope Time

South African Large Telescope, 35 hrs, **PI**	2022
Gemini/IGRINS Fast Turnaround Program, 4.4 hrs, **PI**	2022
NASA Keck/NIRSPEC, 0.5 nights, **PI**	2022
Hubble Space Telescope (6 orbits), **PI**	2021
James Webb Space Telescope Cycle 1, (24.6 hr), Co-I	2021
Gemini-S/IGRINS, (21 hr), **PI**	2021
Gemini-N/GNIRS & Gemini-S/IGRINS (13 hr), **PI**	2020
Gemini-S/IGRINS, 31 hr, **PI**	2020
Hubble Space Telescope (16 orbits) & Very Large Array (27.6 hr), **PI**	2019
Spitzer Space Telescope Director's Discretionary Time, 33.1 hr, **PI**	2019
Spitzer Space Telescope Medium Program, 70 hr, **PI**	2018
James Webb Space Telescope Early Release Science, 39 hr, Collaborator	2017
Spitzer Space Telescope (30.8 hr) & Very Large Array (33 hr), Co-I	2016–2018
Hubble Space Telescope (5 orbits) & Spitzer Space Telescope (17.6 hr), Co-I	2016
ESO New Technology Telescope, 29 nights, **PI**	2014–2017

Service

Scientific Organizing Committee, Cloud Two Con, Ringberg Castle, Germany	2023
Telescope TAC Panelist, *NASA Keck, TESS*	2019–Present
Journal Referee, *ApJ, ApJL, AJ, JURP*	2018–Present
Scientific Organizing Committee, Cloud Nine Con, Virtual	2021
External reviewer for Swiss National Science Foundation	2020
American Astronomical Society Chambliss Poster Judge	2020, 2021
Astrophysics Seminar Organizer, American Museum of Natural History	2018–2020
Astronomy Representative, Postgraduate Forum, University of Edinburgh	2017–2018
Astronomy Postgraduate Committee Member, University of Edinburgh	2015–2016

Selected Talks & Seminars

⋆ indicates invited or plenary talks

⋆ Invited Talk, Exoplanets in the Era of JWST Splinter Session, Exoplanets IV	2022
⋆ Colloquium, Carnegie Earth and Planets Laboratory	2022
⋆ Colloquium, Queens College, City University of New York	2022
Contributed Talk, CHAMPS Exoplanet Early Career Highlight Seminar	2022
Contributed Talk, AAS Meeting 239 (cancelled due to Covid-19)	2022
Contributed Talk, Gotham Fest 2021, New York, NY	2021
⋆ Colloquium, University of California, Santa Cruz	2021
⋆ Colloquium, University of Texas at Austin	2021
⋆ Colloquium, Center for Space and Habitability, University of Bern	2021
⋆ Colloquium, Trinity College Dublin	2021
Contributed Talk, American Astronomical Society Meeting 237	2021
⋆ Colloquium, Center for Computational Astrophysics, Flatiron Institute	2020
Contributed Talk, Exo-Webb Seminar Series	2020
⋆ Colloquium, NASA Goddard Space Flight Center	2020
Contributed Talk, American Astronomical Society Meeting 235, Honolulu, HI	2020
Contributed Talk, Gotham Fest 2019, New York, NY	2019
⋆ Colloquium, Dublin Institute for Advanced Studies	2019
Contributed Talk, Other Worlds Laboratory, UC Santa Cruz, CA	2019
⋆ Review Talk, BDEXOCON, University of Delaware	2019
⋆ Colloquium, American Museum of Natural History	2019
Dissertation Talk, American Astronomical Society Meeting 233, Seattle, WA	2019
⋆ Plenary Talk, Cool Stars 20, Boston, MA	2018
Contributed Talk, Scottish Exoplanet and Brown Dwarf Meeting	2017
⋆ Colloquium, Royal Observatory of Edinburgh	2017
⋆ Seminar, European Southern Observatories, Santiago, Chile	2017
Contributed Talk, Exoclipe, Boise, ID	2017
Contributed Talk, Scottish Exoplanet and Brown Dwarf Meeting	2015
⋆ Seminar, Max Planck Institute for Solar System Research	2014

Selected Outreach

Speaker, Holy Faith Secondary School Clontarf, Dublin	2022
Featured Scientist, 100DIGITS Campaign	2022
Speaker, About Us Festival UK 2022	2021–2022
Speaker, Science Alliance, AMNH Youth Initiatives	2021
Question Moderator, AMNH Astronomy Live Online Programs	2020–2021
Speaker, STEM to SHTEM Internship Program, Stanford University	2020
Featured Scientist, Million STEM	2020
Speaker, Harlem Academy High School	2020
Speaker, Westport Astronomical Society	2019
Speaker, BridgeUP: STEM Internship Program	2019
Speaker, Royal Observatory of Edinburgh Winter Talk Series	2018
Speaker, Pint of Science Festival, Edinburgh UK	2017
Contributor, Edinburgh University Sci Magazine & Women are Boring	2017–2018
Speaker, Loreto College Dublin	2016
Speaker, Royal Observatory of Edinburgh Doors Open Day	2015–2017
Workshop leader, University of Edinburgh Kickstart Program	2015–2016
Speaker, Preston Lodge High School, Edinburgh	2015
Event Assistant, Edinburgh International Science Festival	2015
STEM Ambassador, StemEast	2014–2018
Mentor, Transition Year Physics Experience Program, Trinity College Dublin	2012

Recent Media/Press

The LIUniverse Podcast	2022
Planetary Radio Podcast, The Planetary Society	2022
California Academy of Sciences Universe Update	2022
NASA Jet Propulsion Laboratory Press Release	2022
AAS 239 Winter Meeting Press Conference	2022
Irish Times Research Lives Interview	2020
NRAO's 2020 Astronomy Highlights with Phil Plait	2020
Space.com Science & Astronomy Interview	2020
NASA Jet Propulsion Laboratory Press Release	2020

First Author Publications

⋆ indicates equal author contribution

1. Let The Great World Spin: Revealing the Turbulent, Stormy Nature of Giant Planet Analogs with the Spitzer Space Telescope
   Vos, J. M.; Faherty, J. K.; Gagné J.; Marley, M.; Metchev, S.; Gizis, J.; Rice, E., L.; Cruz, K. *The Astrophysical Journal*, 924, 68, 2022.
2. A measurement of the wind speed on a brown dwarf
   ⋆Allers, K. N.; ⋆**Vos, J. M.**; ⋆Biller, B. A.; ⋆Williams, P. K.G. *Science,* 368, 6487, 169–172, 2020.
3. Spitzer Variability Properties of Young Giant Planet Analogs
   Vos, J. M.; Biller, B. A.; Allers, K. N.; Faherty, J. K.; Liu, Michael C.; Eriksson, S.; Best, W. M. J.; Metchev, S.; Radigan, J.; Allers, K. N.; Janson, M.; Buenzli, E.; Dupuy, T. J.; Bonnefoy, M.; Manjavacas, E.; Brandner, W.; Crossfield, I.; Deacon, N.; Henning, T.; Homeier, D.; Schlieder, J., *The Astronomical Journal,* 160(1):38, 2020.
4. A search for variability in exoplanet analogues and low–gravity brown dwarfs
   Vos, J. M.; Biller, B. A.; Bonavita, M.; Eriksson, S.; Liu, Michael C.; Best, W. M. J.; Metchev, S.; Radigan, J.; Allers, K. N.; Janson, M.; Buenzli, E.; Dupuy, T. J.; Bonnefoy, M.; Manjavacas, E.; Brandner, W.; Crossfield, I.; Deacon, N.; Henning, T.; Homeier, D.; Kopytova, T. Schlieder, J., *Monthly Notices of the Royal Astronomical Society,* 483:480–502, 2019.
5. Variability of the lowest mass objects in the AB Doradus moving group.
   Vos, J. M.; Allers, K.. N.; Biller, B. A.; Liu, M. C.; Dupuy, T. J.; Gallimore, J. F.; Adenuga, I. J.; Best, W. M. J., *Monthly Notices of the Royal Astronomical Society*, 474(1):1041–1053, 2018.
6. The Viewing Geometry of Brown Dwarfs Influences Their Observed Colors and Variability Amplitudes
   Vos, J. M.; Allers, K. N.; Biller, B. A., *The Astrophysical Journal*, 842(2):78, 2017.

Second Author Publications

7. On The Detection of Exomoons Transiting Isolated Planetary-Mass Objects
   Limbach, M. A.; **Vos, J. M.**; Winn, J. N.; Heller, R.; Mason, J.; Schneider, A.; Dai, F., *The Astrophysical Journal Letters*, 918, L25, 2021.
8. Simultaneous Multiwavelength Variability Characterization of the Free–floating Planetary–mass Object PSO J318.5—-22.
   Biller, B. A.; **Vos, J. M.**; Buenzli, E.; Allers, K.; Bonnefoy, M.; Charnay, B.; Bézard, B.; Allard, F.; Homeier, D.; Bonavita, M.; Brandner, W.; Crossfield, I.; Dupuy, T.; Henning, T.; Kopytova, T.; Liu, M. C.; Manjavacas, E.; Schlieder, J., *The Astronomical Journal*, 155(2):95, 2018.
9. Variability in a Young, L/T Transition Planetary–Mass Object
   Biller, B. A.; **Vos, J. M.**; Bonavita, M.; Buenzli, E.; Baxter, C.; Crossfield, I. J. M.; Allers, K.; Liu, M. C.; Bonnefoy, M.; Deacon, N.; Brandner, W.; Schlieder, J.

E.; Dupuy, T.; Kopytova, T.; Manjavacas, E.; Allard, F.; Homeier, D.; Henning, T., *The Astrophysical Journal Letters*, 813(2):1–6, 2015.

Co–Author Publications

10. Tracing the Top-of-the-atmosphere and Vertical Cloud Structure of a fast-rotating late T-dwarf
Manjavacas, E.; Karalidi, T.; Tan, X.; **Vos, J. M.**; Lew, B. W. P.; Biller, B. A.; Oliveros-Gómez, N. L;, submitted to *The Astrophysical Journal*

11. Binaries or Variables? Disentangling the Signatures of L/T Transition Blended-Light Atmospheres
Ashraf, A.; Bardalez Gagliuffi, D.; Manjavacas, E.; **Vos, J. M.**; Faherty, J. K., submitted to *The Astrophysical Journal*

12. The Perkins INfrared Exosatellite Survey (PINES) I. Survey Overview, Reduction Pipeline, and Early Results
Tamburo, P.; Muirhead, P. S.; McCarthy, A.; Hart, M.; Gracia, D.; **Vos, J. M.**; Radigan, J.; Bardalez Gagliuffi, D.; Faherty, J. K.; Theissen, C.; Agol, E.; Skinner, J.; Sagear, S., *The Astrophysical Journal*, 168 (6), 253, 2022.

13. A Wide Planetary Mass Companion Discovered Through the Citizen Science Project Backyard Worlds: Planet 9
Faherty, J. K.; Gagné, J.; Popinchalk, M.; **Vos, J. M.**; Burgasser, A. J.; Schümann, J.; Schneider, A. C.; Davy Kirkpatrick, J.; Meisner, A. M.; Kuchner, M. J.; Bardalez Gagliuffi, D. C.; Marocco, F.; Caselden, D.; Gonzales, E.; Rothermich, A.; Casewell, S.; Debes, J. H.; Aganze, C.; Ayala, A.; Hsu, C.; Cooper, W.; Smart, R. L.; Gerasimov, R.; Theissen, C. and The Backyard Worlds Collaboration, *The Astrophysical Journal*, 923 (1), 48, 2021.

14. Revealing the Vertical Cloud Structure of an AB Pictoris b Analog through Keck I/MOSFIRE spectro–photometric variability
Manjavacas, E.; Karalidi, T.; **Vos, J. M.**; Biller, B. A.; Lew, B. W. P, *The Astronomical Journal*, 162 (5), 179, 2021.

15. Longitudinally Resolved Spectral Retrieval (ReSpect) of WASP–43b
Cubillos, P. E.; Keating, D.; Cowan, N. B.; **Vos, J. M.**; Burningham, B.; Ygouf, M.; Karalidi, T.; Zhou, Y.; Gonzales, E. C., *The Astrophysical Journal*, 915, 45, 2021.

16. A High–Contrast Search for Variability in HR 8799bc with VLT–SPHERE
Biller, B. A.; Apai, D.; Bonnefoy, M.; Desidera, S.; Gratton, R.; Kasper, M.; Kenworthy, M.; Lagrange, A.; Lazzoni, C.; Mesa, D.; Vigan, A.; **Vos, J. M.**; Wagner, K.; Zurlo, A., *Monthly Notices of the Royal Astronomical Society*, 503(1):743–767, 2021.

Selected White Papers & Research Notes

17. The L/T Transition
Vos, J. M. et al., White Paper for Decadal Survey on Astronomy and Astrophysics 2020 by the National Academy of Science, Engineering and Medicine, *Bulletins of the American Astronomical Society*, 2019.

18. A Tool and Workflow for Radio Astronomical "Peeling" in CASA
Williams, P. K. G.; Allers, K. N.; Biller, B. A.; **Vos, J. M.**, *Research Notes of the American Astronomical Society*, 3, 110, 2019.

19. Mapping Ultracool Atmospheres: Time–domain Observations of Brown Dwarfs and Exoplanets
Apai, D. et al., incl **Vos, J. M.**, White Paper for Decadal Survey on Astronomy and Astrophysics 2020 by the National Academy of Science, Engineering and Medicine, *Bulletins of the American Astronomical Society*, 2019.

20. Brown Dwarfs and Directly Imaged Exoplanets in Young Associations
Faherty, J. et al., incl. **Vos, J. M.**, White Paper for Decadal Survey on Astronomy and Astrophysics 2020 by the National Academy of Science, Engineering and Medicine, *Bulletins of the American Astronomical Society*, 2019.

21. High–Resolution Spectroscopic Surveys of Ultracool Dwarf Stars & Brown Dwarfs
Burgasser, A. et al., incl. **Vos, J. M.**, White Paper for Decadal Survey on Astronomy and Astrophysics 2020 by the National Academy of Science, Engineering and Medicine, *Bulletins of the American Astronomical Society*, 2019.

22. Fundamental Physics with Brown Dwarfs: The Mass–Radius Relation
Burgasser, A. et al., incl. **Vos, J. M.**, White Paper for Decadal Survey on Astronomy and Astrophysics 2020 by the National Academy of Science, Engineering and Medicine, *Bulletins of the American Astronomical Society*, 2019.

23. IDEAS: Immersive Dome Experiences for Accelerating Science
Faherty, J. et al., incl. **Vos, J. M.**, White Paper for Decadal Survey on Astronomy and Astrophysics 2020 by the National Academy of Science, Engineering and Medicine, *Bulletins of the American Astronomical Society*, 2019.