

Dr Johanna M. Vos

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Professional Appointments	Postdoctoral Fellow Department of Astrophysics, American Museum of Natural History Advisor: Dr Jacqueline Faherty	2018 – Present
Education	Institute for Astronomy, University of Edinburgh <i>PhD in Astronomy</i> Thesis: “Characterising Weather and Rotation on Substellar Worlds” Advisor: Prof. Beth A. Biller	2014-2018
	Trinity College Dublin <i>BA (Mod) Physics with Astrophysics</i> Thesis: “Sunspots and Solar Flares: The Role of Flows” Advisor: Prof. Peter T. Gallagher Graduated with First Class Honours	2010-2014
Research Interests	Atmospheres of brown dwarfs and extrasolar planets Spectroscopic variability monitoring from ground and space Disentangling clouds, aurorae and magnetic atmospheric phenomena	
Grants & Awards	A case study for JWST: Disentangling Auroral and Cloud Variability <i>Hubble Space Telescope General Observer Grant, STSci, PI</i>	2019
	A Search for Transiting Exoplanets and Exomoons Orbiting L and T Dwarfs <i>NASA Exoplanets Research Program (XRP), Co-I</i>	2019
	Other Worlds Lab, UC Santa Cruz, <i>Heising-Simons Foundation</i>	2019
	Cool Stars 20 Conference Grant, <i>Boston University</i>	2018
	Winton Thesis Prize, <i>University of Edinburgh</i>	2018
	Principal’s Go Abroad Fund, <i>University of Edinburgh</i>	2018
	Exoclipse Conference Grant, <i>Boise State University</i>	2017
	Principal’s Career Development Scholarship, <i>University of Edinburgh</i>	2014
	First Class Book Prize, <i>Trinity College Dublin</i>	2011, 2012, 2013
Invited Talks and Seminars	Exometeorology: Probing Weather in Substellar Atmospheres <i>Invited Colloquium, Trinity College Dublin</i>	2021
	The Young and the Restless: Stormy Atmospheres of Giant Planet Analogs <i>Invited Colloquium, University of Texas at Austin</i>	2021
	Let The Great World Spin: Revealing the Turbulent, Stormy Atmospheres of Giant Planet Analogs <i>Invited Colloquium, Center for Computational Astrophysics, Flatiron Institute</i>	2020
	Characterising Cool Atmospheres with Variability Monitoring <i>Invited Colloquium, NASA/Goddard Space Flight Center</i>	2020
	Probing the Turbulent Atmospheres of Young Giant Planet Analogs <i>Invited Talk, Brown Dwarf to Exoplanet Connection, University of Delaware</i>	2019

	Weather and Rotation on Substellar Worlds <i>Invited Colloquium, Dublin Institute for Advanced Studies</i>	2019
	Weather and Rotation on Substellar Worlds <i>Invited Colloquium, American Museum of Natural History</i>	2019
	Exometeorology: Characterising Weather on Substellar Worlds <i>Invited Colloquium, Royal Observatory of Edinburgh</i>	2017
	The First Search for Weather Patterns on Exoplanet Analogues <i>Invited Talk, European Southern Observatories, Santiago, Chile</i>	2017
Conference Talks	Let The Great World Spin: Revealing the Turbulent, Stormy Atmospheres of Giant Planet Analogs <i>Contributed Talk, American Astronomical Society Meeting 237</i>	2021
	Probing Cloudy Atmospheres: Lessons for the JWST Era <i>Contributed Talk, Exo-Webb Seminar Series</i>	2020
	Young L Dwarf Variability in the Mid-IR <i>Contributed talk, American Astronomical Society Meeting 235, Honolulu, HI</i>	2020
	Variability on Young Brown Dwarfs <i>Contributed Talk, Other Worlds Laboratory, UC Santa Cruz, CA</i>	2019
	Detecting Weather Patterns on Low-Gravity Brown Dwarfs <i>Dissertation Talk, American Astronomical Society Meeting 233, Seattle, WA</i>	2019
	Weather Patterns on Exoplanet Analogs <i>Plenary Talk, Cool Stars 20, Boston, MA</i>	2018
	The Viewing Angle of Exoplanet Analogues Influences Their Observed Colours and Amplitudes <i>Contributed Talk, Exoclipe, Boise, ID</i>	2017
	The Effect of Viewing Angle on the Observed Properties of Brown Dwarfs <i>Contributed Talk, Scottish Exoplanet and Brown Dwarf Meeting</i>	2017
Workshops Attended	Tackling the Complexities of Substellar Objects <i>Lorentz Centre, Universiteit Leiden</i>	2020
	Other Worlds Laboratory Summer Program <i>University of California Santa Cruz</i>	2019
	Multi-Dimensional Characterization of Distant Worlds <i>University of Michigan</i>	2019
Selected Telescope Time	The Young and the Restless: Constraining the Viewing Angles of Young, Cloudy Brown Dwarfs <i>Gemini-N/GNIRS & Gemini-S/IGRINS (30 hr), PI</i>	2020-2021
	A case study for JWST: Disentangling auroral and cloud variability in early L dwarfs <i>Hubble Space Telescope (16 orbits) & Very Large Array (27.6 hr), PI</i>	2019
	Mapping Atmospheric Structures in Brown Dwarfs <i>Gemini/IGRINS, 31 hr, PI</i>	2019-2021
	Spatial Cloud Map of a Planetary-Mass Companion <i>Spitzer Space Telescope Director's Discretionary Time, 33.1 hr, PI</i>	2019
	Weather and Rotation of Young Brown Dwarfs <i>Spitzer Space Telescope Medium Program, 70 hr, PI</i>	2018
	High Contrast Imaging of Exoplanets and Exoplanetary Systems with JWST <i>James Webb Space Telescope Early Release Science, 39 hr, Collaborator</i>	2017

	Rotational Velocities of Exoplanet Analogs <i>Gemini/GNIRS and IRTF/iSHELL program, 10 nights, PI</i>	2016-2018
	Exometeorology: Characterising Weather on a Young, Free-Floating Planet <i>Hubble Space Telescope (5 orbits) & Spitzer Space Telescope (17.6 hr), Co-I</i>	2016
	The First Search for Exoplanet Weather <i>ESO New Technology Telescope, 29 nights, PI</i>	2014-2017
Teaching	Instructor Stars - After School Program, AMNH	2019-2020
	Research Mentor Science Research Mentoring Program, AMNH	2018-present
	Head Teaching Assistant Physics 1B Experimental Lab, University of Edinburgh Observational Astronomy Lab, University of Edinburgh	2016-2018
	Teaching Assistant Maths for Physics 1, University of Edinburgh Introductory Astrophysics, University of Edinburgh	2014-2018
Research Mentoring	Undergraduate Students	
	Jose Adorno (Queen's College, now at NASA Goddard)	2020
	Allison McCarthy (University of Alabama, now at Boston University)	2019
	High-school students	
	Azul Ruiz Diaz (Brooklyn Technical High School)	2020
	Jai Glazer (The Dalton School)	2020
	Sophia Ameneyo Fourcade (University Neighborhood High School)	2020
	Izzy Lapidus (Fiorello H. LaGuardia High School)	2019
	Otis McCallum (The Beacon School)	2019
	William McCartney (New Explorations Into Science and Technology + Math)	2019
	Elko Gerville-Reache (School of The Future)	2018
	Raunak Amanna (Brooklyn Technical High School)	2018
	Nima Brivanlou (Lycée Français de New York)	2018
Service	Journal Referee <i>ApJ, ApJL, AJ</i>	2019-Present
	External reviewer for national grant allocation	2021
	Time Allocation Committee member for space-based observatory	2020
	Time Allocation Committee member for ground-based observatory	2019-2020
	Scientific Organizing Committee member, CloudCon, U of Heidelberg	2021
	Astrophysics Seminar Organizer, American Museum of Natural History	2018-2020
	Astronomy Representative, Postgraduate Forum, U of Edinburgh	2017-2018
Selected Outreach Activities	Question Moderator, AMNH Astronomy Online Programs	2020-2021
	Speaker, STEM to SHTeM Internship Program, Stanford University	2020
	Featured Scientist, Million STEM	2020
	Speaker, Harlem Academy	2020
	Speaker, Westport Astronomical Society	2019
	Speaker, BridgeUP: STEM, AMNH	2019
	Speaker, Royal Observatory of Edinburgh Winter Talk Series	2018

	Contributor, Women are Boring	2018
	Speaker, Pint of Science Festival, Edinburgh UK	2017
	Contributor, Edinburgh University Science Magazine	2017
	Speaker, Loreto College Dublin	2016
	Speaker, Royal Observatory of Edinburgh Open Day	2016
	Workshop leader, University of Edinburgh Kickstart Program	2015-2016
	Speaker, Women in Physics Event, 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
Selected Media/Press	Irish Times Research Lives Interview	2020
	Brown dwarf stars: What's the weather like up there?	
	NRAO's 2020 Astronomy Highlights with Phil Plait	2020
	Measuring the Wind Speed of a Brown Dwarf a Quadrillion Miles Away	
	Space.com Science & Astronomy Interview	2020
	How the brown dwarf blows: Wind speed of a 'failed star' measured for 1st time	
	New Scientist Space Research Highlights	2015
	Molten metal storms rage on orphan planet that lost its star	
First Author Publications	* denotes equal author contribution	
	1. A MEASUREMENT OF THE WIND SPEED ON A BROWN DWARF Allers*, K. N.; Vos* , J. M.; Biller*, B. A.; Williams*, P. K.G. <i>Science</i> , 368, 6487, 169-172, 2020.	
	2. SPITZER VARIABILITY PROPERTIES OF YOUNG GIANT PLANET ANALOGS Vos, J. M. ; Biller, B. A.; Allers, K. N.; Faherty, J. K.; Liu, Michael C.; Eriks- son, 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.; Cross- field, I.; Deacon, N.; Henning, T.; Homeier, D.; Schlieder, J., <i>The Astronomical Journal</i> , 160(1):38, 2020.	
	3. 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., <i>Monthly Notices of the Royal Astronomical Society</i> , 483:480-502, 2019.	
	4. 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., <i>Monthly Notices of the Royal Astronomical Society</i> , 474(1):10411053, 2018.	
	5. THE VIEWING GEOMETRY OF BROWN DWARFS INFLUENCES THEIR OB- SERVED COLORS AND VARIABILITY AMPLITUDES Vos, J. M. ; Allers, K. N.; Biller, B. A., <i>The Astrophysical Journal</i> , 842(2):78, 2017.	

**Co-Author
Publications**

6. 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., accepted for publication in *Monthly Notices of the Royal Astronomical Society*
7. 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.
8. 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):16, 2015.

**Selected White
Papers &
Research Notes**

9. ASTRO2020 SCIENCE WHITE PAPER: THE L/T TRANSITION
Vos, J. M.; Allers, K.; Apai, D.; Biller, B.; Burgasser, A. J.; Faherty, J.; Gagne, J.; Helling, C.; Morley, C.; Radigan, J.; Showman, A.; Tan, .; Tremblin, P., *Bulletins of the American Astronomical Society*, 2019.
10. 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.
11. ASTRO2020 SCIENCE WHITE PAPER: MAPPING ULTRACOOL ATMOSPHERES: TIME-DOMAIN OBSERVATIONS OF BROWN DWARFS AND EXOPLANETS
Apai, D.; Biller, B.; Burgasser, A.; Girard, J. H.; Gizis, J. E.; Karalidi, T.; Kraus, Ad. L.; Lew, B. W. P.; Manjavacas, E.; Marley, M.; Miles-Paez, P. A.; Morley, C. V.; Radigan, J.; **Vos, J. M.**; Zhou, Y., *Bulletins of the American Astronomical Society* 2019.
12. ASTRO2020 SCIENCE WHITE PAPER: HIGH-RESOLUTION SPECTROSCOPIC SURVEYS OF ULTRACOOL DWARF STARS & BROWN DWARFS
Burgasser, A.; Apai, D.; Bardalez Gagliuffi, D.; Blake, C.; Gagne, J.; Konopacky, Q.; Martin, E.; Metchev, S.; Plavchan, P.; Reiners, A.; Schlawin, E.; Sousa-Silva, C.; **Vos, J. M.**, *Bulletins of the American Astronomical Society* 2019.
13. ASTRO2020 SCIENCE WHITE PAPER: BROWN DWARFS AND DIRECTLY IMAGED EXOPLANETS IN YOUNG ASSOCIATIONS
Faherty, J.; Allers, Katelyn; Bardalez Gagliuffi, D.; Burgasser, A. J.; Gagne, J.; Gizis, J.; Kirkpatrick, J. D.; Riedel, A.; Schneider, A.; **Vos, J. M.**, *Bulletins of the American Astronomical Society* 2019.
14. ASTRO2020 SCIENCE WHITE PAPER: FUNDAMENTAL PHYSICS WITH BROWN DWARFS: THE MASS-RADIUS RELATION
Burgasser A.; Baraffe I.; Browning M. ; Burrows A.; Chabrier G.; Creech-Eakman M.; Demory B.; Dieterich S.; Faherty J.; Huber D.; Lodieu N.; Plavchan P.; Michael Rich R.; Saumon D.; Stassun K.; Triaud A.; van Belle G.; Van Grootel V.; **Vos, J. M.**; Yadav, R., *Bulletins of the American Astronomical Society* 2019.