

Dr Johanna M. Vos

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Professional Appointments	Department of Astrophysics, American Museum of Natural History <i>Postdoctoral Fellow</i>	2018 – Present
Education	Institute for Astronomy, University of Edinburgh <i>PhD in Astronomy</i> Thesis: “Characterising Weather and Rotation on Substellar Worlds” Advisor: Dr Beth A. Biller	2014-2018
	Trinity College Dublin, Ireland <i>BA (Mod) Physics with Astrophysics</i> Graduated with First Class Honours	2010-2014
Research Interests	Atmospheres of brown dwarfs and extrasolar planets Isolated planetary-mass brown dwarfs 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 Conference Grant, <i>Uppsala University</i>	2018
	Winton Astronomy 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
Telescope Time	The Young and the Restless: Constraining the Viewing Angles of Young, Cloudy Brown Dwarfs <i>Gemini-N/GNIRS & Gemini-S/IGRINS (1.5 n), PI</i>	2020
	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>	2019-2020
	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
	Wind Speeds on Extrasolar Worlds <i>Spitzer Space Telescope (30.8 hr) & Very Large Array (33 hr), Co-I</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
Selected Invited / Conference Talks	Let The Great World Spin: Revealing the Turbulent, Stormy Atmospheres of Giant Planet Analogs <i>Seminar, Center for Computational Astrophysics, Flatiron Institute, NY, USA</i>	2020
	Probing Cloudy Atmospheres: Lessons for the JWST Era <i>Contributed Talk, Exo-Webb Seminar Series</i>	2020
	Characterising Cool Atmospheres with Variability Monitoring <i>Seminar, NASA/Goddard Space Flight Center, MD, USA</i>	2020
	Young L Dwarf Variability in the Mid-IR <i>Contributed talk, American Astronomical Society Meeting 235, Honolulu, HI, USA</i>	2020
	Probing the Turbulent Atmospheres of Young Giant Planet Analogs <i>Invited Talk, BDEXOCN, University of Delaware, USA</i>	2019
	Weather and Rotation on Substellar Worlds <i>Seminar, Dublin Institute for Advanced Studies, Ireland</i>	2019
	Variability on Young Brown Dwarfs <i>Contributed Talk, Other Worlds Laboratory, UC Santa Cruz, CA, USA</i>	2019
	Weather and Rotation on Substellar Worlds <i>Seminar, American Museum of Natural History, NY, USA</i>	2019
	Detecting Weather Patterns on Low-Gravity Brown Dwarfs <i>Dissertation Talk, American Astronomical Society Meeting 233, Seattle, WA, USA</i>	2019
	Weather Patterns on Exoplanet Analogs <i>Plenary Talk, Cool Stars 20, Boston, MA, USA</i>	2018
	The Viewing Angle of Exoplanet Analogues Influences Their Observed Colours and Amplitudes <i>Contributed Talk, Exoclipe, Boise, ID, USA</i>	2017
	Testing the Effect of Viewing Angle on the Observed Properties of Brown Dwarfs and Exoplanet Analogues <i>Contributed Talk, Scottish Exoplanet and Brown Dwarf Meeting, University of Edinburgh, UK</i>	2017
	The First Search for Weather Patterns on Exoplanet Analogues <i>Invited Talk, European Southern Observatories, Santiago, Chile</i>	2017
Teaching & Mentoring	AstroCom NYC, City University of New York <i>Advising: Jose Adorno (Queen's College, City University of New York '21)</i>	2020
	NSF Research Experiences for Undergraduates (REU), AMNH <i>Advised: Allison McCarthy (University of Alabama '20)</i> <i>Current position: Graduate student at Boston University</i>	2019

	Science Research Mentoring Program, AMNH	2019-Present
	<i>Research mentor for three high-school students each year</i>	
	After School Program, AMNH	2019-2020
	<i>Astronomy Instructor</i>	
	University of Edinburgh	2014-2018
	<i>Teaching Assistant</i>	2014-2016
	Maths for Physics 1	
	Introductory Astrophysics	
	<i>Head Teaching Assistant</i>	2016-2018
	Physics 1B Experimental Lab	
	Observational Astronomy Lab	
Service	<i>Referee</i>	2019-Present
	ApJ, ApJL, AJ	
	<i>Telescope Proposal Reviewer</i>	2019-Present
	Ground and space-based missions	
	<i>Astrophysics Seminar Organizer</i>	2018-2020
	American Museum of Natural History	
	<i>Astronomy Representative</i>	2017-2018
	Postgraduate Forum, The University of Edinburgh	
	<i>Astronomy Postgraduate Committee Member</i>	2015-2016
	The University of Edinburgh	
Selected Outreach Activities	AMNH Astronomy Online Programs	2020
	<i>Live Chat Moderator</i>	
	STEM to SHTM Summer Internship Program, Stanford University	2020
	<i>Speaker</i> , “Let The Great World Spin: Revealing the Turbulent, Stormy Nature of Brown Dwarf Atmospheres”	
	Westport Astronomical Society	2019
	<i>Speaker</i> , “The Brown Dwarf - Exoplanet Connection”	
	BridgeUP: STEM, AMNH	2019
	<i>Speaker</i> , “Weather and Rotation on Extrasolar Worlds”	
	StemEast, UK & Ireland	2014-2018
	<i>STEM Ambassador</i>	
	Royal Observatory of Edinburgh Winter Talk Series	2018
	<i>Speaker</i> , “The Exoplanet - Brown Dwarf Connection”	
	Women are Boring	2018
	<i>Contributor</i> , “Searching for Weather Patterns on Free-Floating Worlds”	
	Pint of Science Festival	2017
	<i>Speaker</i> , “Whatever the Weather”	
	Edinburgh University Science Magazine	2017
	<i>Contributor</i> , “Fingerprints From the Birth of the Universe”	
	Kickstart Summer Programme	2015-2016
	<i>Workshop Leader</i>	

**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. *Science*, 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.; 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.
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., *Monthly Notices of the Royal Astronomical Society*, 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., *Monthly Notices of the Royal Astronomical Society*, 474(1):10411053, 2018.
5. 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.

**Co-Author
Publications**

6. 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, submitted to *The Astronomical Journal*
7. 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., submitted to *The Astrophysical Journal*
8. 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 to *Monthly Notices of the Royal Astronomical Society*
9. 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.
10. 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.

White Papers & Research Notes

11. 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.
12. 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., Astro2020 Science White Paper, *Bulletins of the American Astronomical Society*, 2019.
13. MAPPING ULTRACOOOL 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., Astro2020 Science White Paper, *Bulletins of the American Astronomical Society*, 2019.
14. 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.**, Astro2020 Science White Paper, *Bulletins of the American Astronomical Society*, 2019.
15. HIGH-RESOLUTION SPECTROSCOPIC SURVEYS OF ULTRACOOOL 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.**, Astro2020 Science White Paper, *Bulletins of the American Astronomical Society*, 2019.
16. 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.**, Astro2020 Science White Paper, *Bulletins of the American Astronomical Society*, 2019.
17. IDEAS: IMMERSIVE DOME EXPERIENCES FOR ACCELERATING SCIENCE
Faherty, Ja.; SubbaRao, M.; Wyatt, R.; Ynnerman, A.; de Grasse Tyson, N.; Geller, A.; Weber, M.; Rosenfield, P.; Steffen, W.; Stoeckle, G.; Weiskopf, D.; Magnor, M.; Williams, P. K. G.; Abbott, B.; Marchetti, L.; Jarrett, T.; Fay, J.; Peek, J.; Graur, O.; Durrell, P. H.; Derek, P.; Heather; Mller, T.; **Vos, J. M.**; Brown, David; Giorla Godfrey, P.; Rice, E.; Bardalez Gagliuffi, D.; Bock, A., Astro2020 Science White Paper, *Bulletins of the American Astronomical Society*, 2019.