

Rohini Giles

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Experience

2023–present **Senior Research Scientist**, *Southwest Research Institute*, San Antonio, USA.

2020–2023 **Research Scientist**, *Southwest Research Institute*, San Antonio, USA.

2019–2020 **Postdoctoral Researcher**, *Southwest Research Institute*, San Antonio, USA.

Instrument support work:

- Member of the instrument team for the TEXES mid-infrared spectrograph, a visitor instrument at NASA IRTF and Gemini North: supporting telescope proposals and observation planning for a wide range of collaborators and working with NASA IPAC to archive the historic 20-year TEXES dataset
- Member of the instrument team for the UVS instruments on the Juno, JUICE and Europa Clipper missions: pre-flight and in-flight performance testing and calibration work

Research projects:

- First detection of the Transient Luminous Events in Jupiter's atmosphere
- Constraining hydrocarbon abundances in Jupiter's stratosphere from reflected sunlight observations from Juno/UVS
- Radiative transfer modeling of the atmospheres of Jupiter and Venus to study thermal waves
- Tracking the evolution of Io's atmospheric density

2017–2019 **NASA Postdoctoral Program Fellow**, *NASA Jet Propulsion Laboratory*, Pasadena, USA.

- Ground-based near-infrared observations in support of the Juno mission
- Radiative transfer modeling of Jupiter's ammonia distribution
- Member of the instrument team for the TEXES mid-infrared spectrograph

Education

2013–2017 **PhD in Planetary Physics**, *University of Oxford*, Oxford, UK.

Supervisors: Leigh Fletcher & Patrick Irwin

- Radiative transfer modeling of Jupiter's atmosphere using the NEMESIS code
- Data reduction and analysis of 5-micron observations from both spacecraft and ground-based telescopes
- Cloud scattering properties and the three-dimensional cloud structure in Jupiter's atmosphere
- Latitudinal distribution of disequilibrium species in Jupiter's troposphere
- H_3^+ emission from Jupiter's ionosphere

2009–2013 **MPhys in Physics**, *University of Oxford*, Oxford, UK.

- Specialized in Astrophysics and Atmospheric Physics
- Ranked second in a class of ~180 students

Awards & Scholarships

- 2023 Early Career Achievement Medal (NASA)
- 2017-2019 NPP Fellowship (NASA)
- 2017 Keith Runcorn Prize for best UK doctoral thesis in geophysics, runner up (Royal Astronomical Society)
- 2014-2016 Graduate Scholarship (University of Oxford)
- 2013-2016 Fully-funded PhD Studentship (Royal Society)
- 2013 Gibbs Prize for Physics Finals (University of Oxford)
- 2010-2013 Undergraduate Scholarship (University of Oxford)
- 2010 Tanner Prize for Physics Prelims (University of Oxford)

Observing

- Member of the observing team for TEXES, a mid-infrared spectrograph that is a visitor instrument at both the IRTF and Gemini North. Extensive experience (>180 nights) running observations of both Solar System bodies (Jupiter, Saturn, Neptune, Venus, Io, Titan) and non-Solar System targets.
- Remote observing with IRTF/SpeX and IRTF/iSHELL
- PI/Co-I on successful proposals to use: IRTF/TEXES, Gemini-N/TEXES, Gemini-N/NIRI, IRTF/SpeX, Subaru/COMICS

Publications

49 publications, 12 as first author

- 2024 **RS Giles**, JR Spencer, CCC Tsang, TK Greathouse, E Lellouch, and MA López-Valverde. Seasonal and longitudinal variability in io's SO₂ atmosphere from 22 years of IRTF/TEXES observations. *Icarus*, 418:116151, 2024.
- 2024 B Benmahi, B Bonfond, B Benne, D Grodent, V Hue, GR Gladstone, G Gronoff, J Liliensten, G Sicorello, LA Head, et al. Energy mapping of Jupiter's auroral electrons from Juno/UVS data using a new H₂ UV emission model. *Astronomy & Astrophysics*, 685:A26, 2024.
- 2023 JA Sinclair, TK Greathouse, **RS Giles**, J Lacy, J Moses, V Hue, D Grodent, B Bonfond, C Tao, T Cavalié, et al. A high spatial and spectral resolution study of Jupiter's mid-infrared auroral emissions and their response to a solar wind compression. *The Planetary Science Journal*, 4(4):76, 2023.
- 2023 JA Sinclair, R West, JM Barbara, C Tao, GS Orton, TK Greathouse, **RS Giles**, D Grodent, LN Fletcher, and PGJ Irwin. Long-term variability of Jupiter's northern auroral 8- μ m CH₄ emissions. *Icarus*, 406:115740, 2023.
- 2023 V Hue, GR Gladstone, CK Louis, TK Greathouse, B Bonfond, JR Szalay, A Moirano, **RS Giles**, JA Kammer, M Imai, et al. The Io, Europa and Ganymede auroral footprints at Jupiter in the ultraviolet: positions and equatorial lead angles. *Journal of Geophysical Research: Space Physics*, 128(5):e2023JA031363, 2023.

- 2023 **RS Giles**, V Hue, TK Greathouse, GR Gladstone, JA Kammer, MH Versteeg, B Bonfond, DC Grodent, JC Gérard, JA Sinclair, et al. Enhanced C₂H₂ absorption within Jupiter's southern auroral oval from Juno UVS observations. *Journal of Geophysical Research: Planets*, 128(2):e2022JE007610, 2023.
- 2023 GW Fuchs, D Witsch, E Döring, TF Giesen, JH Lacy, **RS Giles**, and TK Greathouse. Late-type stars seen at high spectral resolution at mid-infrared wavelengths. In *Astrophysics and Space Science Proceedings*, volume 59, pages 95–100. Springer, 2023.
- 2023 LN Fletcher, T Cavalié, D Grassi, R Hueso, LM Lara, Y Kaspi, E Galanti, TK Greathouse, PM Molyneux, M Galand, et al. Jupiter science enabled by ESA's Jupiter Icy Moons Explorer. *Space Science Reviews*, 219(7):53, 2023.
- 2023 T Encrenaz, TK Greathouse, **RS Giles**, T Widemann, B Bézard, M Lefèvre, and W Shao. HDO and SO₂ thermal mapping on Venus. VI. Anomalous SO₂ behavior during late 2021. *Astronomy & Astrophysics*, 674:A199, 2023.
- 2022 PM Molyneux, TK Greathouse, GR Gladstone, MH Versteeg, V Hue, J Kammer, MW Davis, SJ Bolton, **RS Giles**, JEP Connerney, et al. Ganymede's UV reflectance from Juno-UVS data. *Geophysical Research Letters*, 49(23):e2022GL099532, 2022.
- 2022 V Hue, JR Szalay, TK Greathouse, B Bonfond, S Kotsiaros, CK Louis, AH Sulaiman, G Clark, F Allegrini, GR Gladstone, et al. A comprehensive set of Juno in situ and remote sensing observations of the Ganymede auroral footprint. *Geophysical Research Letters*, 49(7):e2021GL096994, 2022.
- 2022 TK Greathouse, GR Gladstone, PM Molyneux, MH Versteeg, V Hue, JA Kammer, MW Davis, SJ Bolton, **RS Giles**, JEP Connerney, et al. UVS observations of Ganymede's aurora during Juno orbits 34 and 35. *Geophysical Research Letters*, 49(23):e2022GL099794, 2022.
- 2022 **RS Giles**, TK Greathouse, PGJ Irwin, T Encrenaz, and AS Brecht. Three-dimensional structure of thermal waves in Venus' mesosphere from ground-based observations. *Icarus*, 387:115187, 2022.
- 2022 MW Davis, KD Retherford, PM Molyneux, GR Gladstone, N Eloriaga, **RS Giles**, TK Greathouse, U Raut, TJ Veach, S Ferrell, et al. Europa Clipper ultraviolet spectrograph: ground calibration results. In *Space Telescopes and Instrumentation 2022: Ultraviolet to Gamma Ray*, volume 12181, pages 803–816. SPIE, 2022.
- 2021 V Hue, **RS Giles**, GR Gladstone, TK Greathouse, MW Davis, JA Kammer, and MH Versteeg. Updated radiometric and wavelength calibration of the Juno ultraviolet spectrograph. *Journal of Astronomical Telescopes, Instruments, and Systems*, 7(4):044003, 2021.
- 2021 V Hue, TK Greathouse, GR Gladstone, B Bonfond, JC Gérard, MF Vogt, DC Grodent, MH Versteeg, JA Kammer, GB Clark, RW Ebert, **RS Giles**, MW Davis, K Haewsantati, SJ Bolton, SM Levin, and JEP Connerney. Detection and characterization of circular expanding UV-emissions observed in Jupiter's polar auroral regions. *Journal of Geophysical Research: Space Physics*, 126(3):e2020JA028971, 2021.

- 2021 K Haewsantati, B Bonfond, S Wannawichian, GR Gladstone, V Hue, MH Versteeg, TK Greathouse, DC Grodent, ZH Yao, W Dunn, JC Gérard, **RS Giles**, JA Kammer, R Guo, and MF Vogt. Morphology of Jupiter's polar auroral bright spot emissions via Juno-UVS observations. *Journal of Geophysical Research: Space Physics*, 126(2):e2020JA028586, 2021.
- 2021 T Greathouse, R Gladstone, M Versteeg, V Hue, J Kammer, **RS Giles**, M Davis, S Bolton, S Levin, J Connerney, et al. Local time dependence of Jupiter's polar auroral emissions observed by Juno UVS. *Journal of Geophysical Research: Planets*, 126(12):e2021JE006954, 2021.
- 2021 **RS Giles**, TK Greathouse, JA Kammer, GR Gladstone, B Bonfond, V Hue, DC Grodent, JC Gérard, MH Versteeg, SJ Bolton, JEP Connerney, and SM Levin. Detection of a bolide in Jupiter's atmosphere with Juno UVS. *Geophysical Research Letters*, 48(5):e2020GL091797, 2021.
- 2021 **RS Giles**, TK Greathouse, V Hue, GR Gladstone, H Melin, LN Fletcher, PGJ Irwin, JA Kammer, MH Versteeg, B Bonfond, DC Grodent, SJ Bolton, and SM Levin. Meridional variations of C₂H₂ in Jupiter's stratosphere from Juno UVS observations. *Journal of Geophysical Research: Planets*, 126(8):e2021JE006928, 2021.
- 2021 JC Gérard, L Gkouvelis, B Bonfond, DC Grodent, GR Gladstone, V Hue, TK Greathouse, JA Kammer, MH Versteeg, and **RS Giles**. Variability and hemispheric symmetry of the Pedersen conductance in the Jovian aurora. *Journal of Geophysical Research: Space Physics*, 126(4):e2020JA028949, 2021.
- 2021 B Bonfond, ZH Yao, GR Gladstone, DC Grodent, JC Gérard, J Matar, B Palmaerts, TK Greathouse, V Hue, MH Versteeg, JA Kammer, **RS Giles**, C Tao, MF Vogt, A Mura, A Adriani, WS Kurth, BH Mauk, and SJ Bolton. Are Dawn Storms Jupiter's auroral substorms? *AGU Advances*, 2(1):e2020AV000275, 2021.
- 2021 B Benmahi, T Cavalié, TK Greathouse, V Hue, **RS Giles**, S Guerlet, A Spiga, and RG Cosentino. Mapping the zonal winds of Jupiter's stratospheric equatorial oscillation. *Astronomy & Astrophysics*, 652:A125, 2021.
- 2020 F Tabataba-Vakili, JH Rogers, G Eichstädt, GS Orton, CJ Hansen, TW Momary, JA Sinclair, **RS Giles**, MA Caplinger, MA Ravine, et al. Long-term tracking of circumpolar cyclones on Jupiter from polar observations with JunoCam. *Icarus*, 335:113405, 2020.
- 2020 JR Szalay, F Allegrini, F Bagenal, SJ Bolton, B Bonfond, G Clark, JE Connerney, RW Ebert, DJ Gershman, **RS Giles**, et al. Alfvénic acceleration sustains Ganymede's footprint tail aurora. *Geophysical Research Letters*, 47(3):e2019GL086527, 2020.
- 2020 JA Sinclair, GS Orton, LN Fletcher, M Roman, I de Pater, T Encrenaz, HB Hammel, **RS Giles**, T Velusamy, JI Moses, PGJ Irwin, TW Momary, N Rowe-Gurney, and F Tabataba-Vakili. Spatial structure in Neptune's 7.90- μ m stratospheric CH₄ emission, as measured by VLT-VISIR. *Icarus*, 345:113748, 2020.
- 2020 JA Sinclair, TK Greathouse, **RS Giles**, A Antuñaño, JI Moses, T Fouchet, B Bézard, C Tao, JM Torres, GB Clark, DC Grodent, GS Orton, V Hue, LN Fletcher, and PGJ Irwin. Spatial variations in the altitude of the CH₄ homopause at Jupiter's mid-to-high latitudes, as constrained from IRTF-TEXES spectra. *Planetary Science Journal*, 1(3):85, 2020.

- 2020 **RS Giles**, TK Greathouse, RG Cosentino, GS Orton, and JH Lacy. Vertically-resolved observations of Jupiter's quasi-quadrennial oscillation from 2012 to 2019. *Icarus*, 350:113905, 2020.
- 2020 **RS Giles**, TK Greathouse, B Bonfond, GR Gladstone, JA Kammer, V Hue, D Grodent, JC Gérard, MH Versteeg, MH Wong, SJ Bolton, JEP Connerney, and SM Levin. Possible Transient Luminous Events observed in Jupiter's upper atmosphere. *Journal of Geophysical Research: Planets*, 125(11):e2020JE006659, 2020.
- 2020 T Encrenaz, TK Greathouse, E Marcq, T Widemann, B Bézard, T Fouchet, **RS Giles**, H Sagawa, J Greaves, and C Sousa-Silva. A stringent upper limit of the PH₃ abundance at the cloud top of Venus. *Astronomy & Astrophysics*, 643:L5, 2020.
- 2020 T Encrenaz, TK Greathouse, E Marcq, H Sagawa, T Widemann, B Bézard, T Fouchet, F Lefèvre, S Lebonnois, SK Atreya, YJ Lee, **RS Giles**, S Watanabe, W Shao, X Zhang, and C Bierson. HDO and SO₂ thermal mapping on Venus. V. Evidence for a long-term anti-correlation. *Astronomy & Astrophysics*, 639:A69, 2020.
- 2020 MW Davis, GR Gladstone, **RS Giles**, TK Greathouse, PM Molyneux, U Raut, KD Retherford, S Baldor, MH Versteeg, M Freeman, KB Persson, and SC Persyn. Ground calibration results of the JUICE ultraviolet spectrograph. In *Space Telescopes and Instrumentation 2020: Ultraviolet to Gamma Ray*, volume 11444, page 1144404. International Society for Optics and Photonics, 2020.
- 2020 RG Cosentino, TK Greathouse, AA Simon, **RS Giles**, R Morales-Juberías, LN Fletcher, and GS Orton. The effects of waves on the meridional thermal structure of Jupiter's stratosphere. *Planetary Science Journal*, 1(3):63, 2020.
- 2019 J Sinclair, G Orton, J Fernandes, Y Kasaba, T Sato, T Fujiyoshi, C Tao, M Vogt, D Grodent, B Bonfond, JI Moses, TK Greathouse, W Dunn, **RS Giles**, F Tabataba-Vakili, LN Fletcher, and PG Irwin. A brightening of Jupiter's auroral 7.8- μ m CH₄ emission during a solar-wind compression. *Nature Astronomy*, 3:607–613, 2019.
- 2019 **RS Giles**, GS Orton, AW Stephens, MH Wong, PG Irwin, JA Sinclair, and F Tabataba-Vakili. Wave activity in Jupiter's North Equatorial Belt from near-infrared reflectivity observations. *Geophysical Research Letters*, 46(3):1232–1241, 2019.
- 2019 T Encrenaz, TK Greathouse, E Marcq, H Sagawa, T Widemann, B Bezard, T Fouchet, F Lefevre, S Lebennois, SK Atreya, YJ Lee, **RS Giles**, and S Watanabe. HDO and SO₂ thermal mapping of Venus. IV. Statistical analysis of the SO₂ plumes. *Astronomy & Astrophysics*, 623:A70, 2019.
- 2019 A Antuñano, LN Fletcher, GS Orton, H Melin, S Milan, J Rogers, T Greathouse, J Harrington, PT Donnelly, and **RS Giles**. Jupiter's atmospheric variability from long-term ground-based observations at 5 microns. *The Astronomical Journal*, 158(3), 2019.
- 2018 H Melin, L Fletcher, P Donnelly, T Greathouse, J Lacy, G Orton, **RS Giles**, J Sinclair, and P Irwin. Assessing the long-term variability of acetylene and ethane in the stratosphere of Jupiter. *Icarus*, 305(1):301–313, 2018.
- 2017 J Sinclair, G Orton, T Greathouse, L Fletcher, C Tao, G Gladstone, A Adriani, W Dunn, J Moses, V Hue, PGJ Irwin, H Melin, and **RS Giles**. Independent evolution of stratospheric temperatures in Jupiter's northern and southern auroral regions from 2014 to 2016. *Geophysical Research Letters*, 44(11):5345–5354, 2017.

- 2017 **RS Giles**, LN Fletcher, and PGJ Irwin. Latitudinal variability in Jupiter's tropospheric disequilibrium species: GeH₄, AsH₃ and PH₃. *Icarus*, 289:254–269, 2017.
- 2017 **RS Giles**, LN Fletcher, PG Irwin, GS Orton, and JA Sinclair. Ammonia in Jupiter's troposphere from high-resolution 5 μm spectroscopy. *Geophysical Research Letters*, 44(21):10838–10844, 2017.
- 2017 LN Fletcher, GS Orton, JH Rogers, **RS Giles**, AV Payne, PGJ Irwin, and M Vedovato. Moist convection and the 2010-2011 revival of Jupiter's South Equatorial Belt. *Icarus*, 286:94–117, 2017.
- 2017 LN Fletcher, GS Orton, JA Sinclair, P Donnelly, H Melin, JH Rogers, TK Greathouse, Y Kasaba, T Fujiyoshi, TM Sato, J Fernandes, PGJ Irwin, and **RS Giles**. Jupiter's North Equatorial Belt expansion and thermal wave activity ahead of Juno's arrival. *Geophysical Research Letters*, 44(14):7140–7148, 2017.
- 2016 **RS Giles**, LN Fletcher, PG Irwin, H Melin, and TS Stallard. Detection of H₃⁺ auroral emission in Jupiter's 5-micron window auroral emission in Jupiter's 5-micron window. *Astronomy & Astrophysics*, 589:A67, 2016.
- 2016 LN Fletcher, TK Greathouse, GS Orton, JA Sinclair, **RS Giles**, PGJ Irwin, and T Encrenaz. Mid-infrared mapping of Jupiter's temperatures, aerosol opacity and chemical distributions with IRTF/TEXES. *Icarus*, 278:128–161, 2016.
- 2016 JK Barstow, PG Irwin, LN Fletcher, **RS Giles**, and C Merlet. Probing Saturn's tropospheric cloud with Cassini/VIMS. *Icarus*, 271:400–417, 2016.
- 2015 **RS Giles**, LN Fletcher, and PG Irwin. Cloud structure and composition of Jupiter's troposphere from 5-μm Cassini VIMS spectroscopy. *Icarus*, 257:457–470, 2015.
- 2015 LN Fletcher, PGJ Irwin, JA Sinclair, GS Orton, **RS Giles**, J Hurley, N Gorius, RK Achterberg, BE Hesman, and GL Bjoraker. Seasonal evolution of Saturn's polar temperatures and composition. *Icarus*, 250:131–153, 2015.
- 2014 LN Fletcher, TK Greathouse, GS Orton, PG Irwin, O Mousis, JA Sinclair, and **RS Giles**. The origin of nitrogen on Jupiter and Saturn from the ¹⁵N/¹⁴N ratio. *Icarus*, 238:170–190, 2014.

Conference Presentations

- 2024 **RS Giles**, TK Greathouse, RW Ebert, MF Vogt, B Bonfond, D Grodent, V Hue, C Paranicas, WS Kurth, JEP Connerney, SJ Bolton. Understanding the relationship between the size variations of Jupiter's magnetosphere, auroral brightness and solar wind pressure using Juno observations. Magnetospheres of the Outer Planets Meeting, Minneapolis, USA
- 2023 **RS Giles**, JR Spencer, CCC Tsang, TK Greathouse. Seasonal variability in Io's atmosphere from 22 years of mid-infrared observations. Texas Area Planetary Science Meeting, San Antonio, USA
- 2023 **RS Giles**, TM Becker, TK Greathouse, KD Retherford, PM Molyneux, JA Kammer, V Hue, MW Davis, U Raut, GR Gladstone, SA Stern. UVS: a seventh-generation ultraviolet spectrograph for a future Uranus mission. Uranus Flagship 2023 Meeting, Pasadena, USA

- 2022 **RS Giles**, TK Greathouse, V Hue, GR Gladstone, JA Kammer, MH Versteeg, H Melin, LN Fletcher, PGJ Irwin, JA Sinclair, B Bonfond, DC Grodent, SJ Bolton, and SM Levin. C₂H₂ in Jupiter's atmosphere from Juno UVS observations: latitudinal distribution and localized enhancement within auroral ovals. American Geophysical Union Fall Meeting, Chicago, USA
- 2020 **RS Giles**, TK Greathouse, B Bonfond, GR Gladstone, JA Kammer, V Hue, DC Grodent, J-C Gérard, MH Versteeg, MH Wong, SJ Bolton, JEP Connerney and SM Levin. Transient Luminous Events observed in Jupiter's upper atmosphere. American Geophysical Union Fall Meeting, Online
- 2020 **RS Giles**, TK Greathouse, B Bonfond, GR Gladstone, JA Kammer, V Hue, DC Grodent, J-C Gérard, MH Versteeg, MH Wong, SJ Bolton, JEP Connerney and SM Levin. Transient Luminous Events observed in Jupiter's upper atmosphere. 52nd Meeting of the Division for Planetary Science, Online
- 2019 **RS Giles**, GR Gladstone, TK Greathouse, MH Versteeg, V Hue, JA Kammer, MW Davis, SJ Bolton, S Levin. Mapping of ultraviolet reflected sunlight from Jupiter using Juno/UVS observations. American Geophysical Union Fall Meeting, San Francisco, USA
- 2018 **RS Giles**, GS Orton, A Stephens, TW Momary and JA Sinclair. High-resolution near-infrared mapping of Jupiter's clouds in support of the Juno mission. American Geophysical Union Fall Meeting, Washington DC, USA
- 2018 **RS Giles**, GS Orton, A Stephens, TW Momary and JA Sinclair. Wave activity in Jupiter's North Equatorial Belt from near-infrared reflectivity observations. 50th Meeting of the Division for Planetary Science, Knoxville, USA
- 2017 **RS Giles**, GS Orton, LN Fletcher, PGJ Irwin and JA Sinclair. Ammonia in Jupiter's troposphere: a comparison of ground-based 5- μ m high-resolution spectroscopy and Juno MWR observations. American Geophysical Union Fall Meeting, New Orleans, USA
- 2017 **RS Giles**, LN Fletcher, PGJ Irwin, GS Orton and JA Sinclair. Ammonia in Jupiter's troposphere from high-resolution 5-micron spectroscopy. 49th Meeting of the Division for Planetary Science, Provo, USA
- 2016 **RS Giles**, LN Fletcher and PGJ Irwin. Latitudinal variability of arsine, germane and phosphine in Jupiter's troposphere. 48th Meeting of the Division for Planetary Science, Pasadena, USA
- 2016 **RS Giles**, LN Fletcher, PGJ Irwin, H Melin and TS Stallard. Detection of H₃⁺ auroral emission in Jupiter's 5-micron window. National Astronomy Meeting, Nottingham, UK
- 2015 **RS Giles**, LN Fletcher and PGJ Irwin. Jupiter's tropospheric composition and cloud structure from high-resolution ground-based spectroscopy. 47th Meeting of the Division for Planetary Science, National Harbor, USA
- 2014 **RS Giles**, LN Fletcher and PGJ Irwin. Cloud structure of Jupiter's troposphere from Cassini VIMS. 46th Meeting of the Division for Planetary Science, Tucson, USA
- 2013 **RS Giles**, LN Fletcher, PGJ Irwin, GS Orton and JH Rogers. The 2010-2011 revival of Jupiter's South Equatorial Belt. European Planetary Science Congress, London, UK