

Catherine Walsh

Curriculum Vitae

Employment

- 09/16 - present **University Academic Fellow** *School of Physics and Astronomy, University of Leeds, Leeds, LS2 9JT, UK*
PI of STFC-funded research programme titled “Probing the composition of planet-building material with ALMA” (£280,000)
- 09/13 - 08/16 **NWO Veni Fellow** *Leiden Observatory, Leiden University, P.O. Box 9513, 2300 RA Leiden, The Netherlands*
PI of NWO-funded research programme titled “From molecules to planets: exploring the chemical heritage of solar systems” (€250,000)
- 11/12 - 08/13 **Postdoctoral Research Fellow** *Leiden Observatory, Leiden University, P.O. Box 9513, 2300 RA Leiden, The Netherlands*
Research area: ALMA studies of star and planet formation
- 11/09 - 11/12 **Postdoctoral Research Fellow** *Astrophysics Research Centre, School of Mathematics and Physics, Queen’s University Belfast, Belfast BT7 1NN, UK*
Research area: Astrochemistry of star and planet formation and exoplanetary atmospheres

Education

- 09/06 - 05/10 **PhD in Astrophysics** *Astrophysics Research Centre, School of Mathematics and Physics, Queen’s University Belfast, Belfast, UK, BT7 1NN*
Thesis title: “The chemical structure of protoplanetary disks” (supervised by Professor T. J. Millar)
- 09/02 - 06/06 **MSci in Applied Mathematics and Physics (1st class honours: 88%)** *School of Mathematics and Physics, Queen’s University Belfast, Belfast, UK, BT7 1NN*
Thesis title: “A quantum mechanical model of water” (supervised by Professors A. T. Paxton and J. Kohanoff)

Research Interests

I have a diverse range of interests with the overarching motivation to investigate the origin of chemical complexity in the local universe, from dark clouds, through protoplanetary disks, to planetary systems, and beyond.

- Astrochemistry: modelling fundamental chemical processes across the spectrum of interstellar and circumstellar molecular sources
- Chemistry and physico-chemical structure of protoplanetary disks
- Probing the connection between disks and (exo)planetary atmospheres
- ALMA observations of chemistry and dust structure in gas-rich protoplanetary disks
- Observing signatures of planet formation at high spatial resolution with ALMA
- Modelling chemical complexity and the origin of complex molecules
- Complex organic molecules in planet-forming disks and the link with prebiotic chemistry in planetary systems

- Interpretation and modelling of molecular observations from near-IR to sub(mm) wavelengths

Grants, Fellowships, Awards, and Prizes

- 2017 **STFC New Applicant's Grant**
Funding for research project "Probing the composition of planet-building material with ALMA" (\approx £300,000)
- 2013 **NWO Veni Fellowship**
Early career fellowship awarded by NWO (De Nederlandse Organisatie voor Wetenschappelijk Onderzoek) for a three-year research project titled "From molecules to planets: exploring the chemical heritage of solar systems" (\approx €250,000)
- 2011 **IAU280 "On to ALMA" Session Prize**
Awarded by a judging panel for a 5 minute talk summarising a mock observing proposal for 10 hours of ALMA time
- 2009 **JSPS Short-term Fellowship**
Awarded by the Japan Society for the Promotion of Science to work for one month at Kyoto University, Japan
- 2006 **Winner of the John Geddes Prize, 2006**
Awarded by the School of Maths and Physics at Queen's University Belfast for the most lauded MSci research project

Observing Runs

- 07/2018 **The chemistry of planet formation** *Atacama Large Millimeter Array (ALMA), Cycle 6 Large Programme, ranked "A"*
Approximately 100 hours awarded (Co-P.I. C. Walsh with K. I. Öberg, V. V. Guzman, E. A. Bergin, & Y. Aikawa)
- 08/2016 **Determining the chemical origin of gas-phase methanol in the TW Hya protoplanetary disk** *Atacama Large Millimeter Array (ALMA), Cycle 4, ranked "A"*
Approximately 10 hours awarded (P.I. C. Walsh)
- 08/2016 **Chemical tracers of the protoplanet-carved gas gap at 50 AU in the disk around HD100546** *Atacama Large Millimeter Array (ALMA), Cycle 4, ranked "C"*
Approximately 5.3 hours awarded (P.I. C. Walsh)
- 04/2014 **Probing the complex organic reservoir in protoplanetary disks** *Atacama Large Millimeter Array (ALMA), Cycle 2, ranked "B"*
Approximately 6.6 hours awarded (P.I. C. Walsh)
- 09/2011 **Tracing the dust destruction zone in protoplanetary disks via SiO rotational line emission** *Atacama Large Millimeter Array (ALMA), Cycle 0, ranked "highest priority"*
Approximately 4.5 hours awarded (P.I. C. Walsh)
- 05/2010 **A hydrocarbon chain survey in protostars and dense cloud cores** *Onsala 20m telescope*
160 hours awarded (P.I. M. Cordiner), approximately 50% of which I observed
I am Co-I of \sim 35 additional ALMA observing programmes spanning Cycles 2 to 6.

Publications

Reviews

Cuppen, H., Walsh, C., Lamberts., T., et al. *Grain-surface models and data for astrochemistry*, 2017, Space Sci. Rev., in press

Millar, T. J., Walsh, C., & Field, T. *Negative ions in space*, 2017, Chem. Rev., 117, 1725

Thrower, J., Ioppolo, S., & Walsh, C. *Highlights from Faraday Discussion 168: Astrochemistry of Dust, Gas, and Ice*, 2014, Chem. Comm., 50, 13636

First Author

Walsh, C., Daley, C., Facchini, S., & Juhász, A., *CO emission tracing a warp or radial flow within ~ 100 au in the HD 100546 protoplanetary disk*, 2017, A&A, 607, A114

Walsh, C., Juhász, A., Meeus, G., Dent, W. R. F., Millar, T. J., & Nomura, H. *ALMA reveals the anatomy of the mm-sized dust and molecular gas in the HD 97048 disk*, 2016, ApJ, 831, 200

Walsh, C., Loomis, R., Öberg, K. I., Kama, M., van 't Hoff, M. L. R., Millar, T. J., Aikawa, Y., Herbst, E., Widicus Weaver, S., & Nomura, H. *First detection of gas-phase methanol in a protoplanetary disk*, 2016, ApJL, 823, L10

Walsh, C., Nomura, H., & van Dishoeck, E. F. *The molecular composition of the planet-forming regions of protoplanetary disks across the luminosity regime*, 2015, A&A, 582, A88

Walsh, C., Juhász, A., Pinilla, P., Harsono, D., Mathews, G. S., Dent, W. R. F., Hogerheijde, M. R., Birnstiel, T., Meeus, G., Nomura, H., Aikawa, Y., Millar, T. J., & Sandell, G. *ALMA hints at the presence of two companions in the disk around HD 100546*, 2014, ApJ, 791, L6

Walsh, C., Millar, T. J., Nomura, H., Herbst, E., Widicus Weaver, S., Aikawa, Y., Laas, J. C., & Vasyunin, A. *Complex organic molecules in protoplanetary disks*, 2014, A&A, 563, A33

Walsh, C., Herbst, E., Nomura, H., Millar, T. J. & Widicus Weaver, S. *Complex organic molecules along the accretion flow in isolated and externally irradiated protoplanetary disks*, 2014, Faraday Discussion, 168, 389

Walsh, C., Nomura, H., & Millar, T. J. *Molecular line emission from a protoplanetary disk irradiated externally by a nearby massive star*, 2013, ApJ, 766, L23

Walsh, C., Nomura, H., Aikawa, Y. & Millar, T. J. *Chemical processes in protoplanetary disks II: on the importance of photochemistry and X-ray ionisation*, 2012, ApJ, 747, 114

Walsh, C., Millar, T. J. & Nomura, H. *Chemical processes in protoplanetary disks*, 2010, ApJ, 722, 1607

Walsh, C., Harada, N., Herbst, E. & Millar, T. J. *The effects of molecular anions on the chemistry of dark clouds*, 2009, ApJ, 700, 752

Joint Author

Pontoppidan, K. M., Salyk, C., Banzatti, A., Blake, G. A., Walsh, C., Lacy, J. H., & Richter, M. J. *The nitrogen carrier in protoplanetary disks*, 2019, ApJ, in press

Carney, M. T., Hogerheijde, M. R., Guzmán, V. V., Walsh, C.; Öberg, K. I., Fayolle, E. C., Cleeves, L. I., Carpenter, J. M., & Qi, C. *Upper limits on CH₃OH in the HD 163296 protoplanetary disk: evidence for a low gas-phase CH₃OH/H₂CO ratio*, 2019, A&A, in press

Wei, C.-E., Nomura, H., Lee, J.-E., Ip, W.-H., Walsh, C., & Millar, T. J. *The effect of carbon grain destruction on the chemical structure of protoplanetary disks*, 2019, ApJ, 870, 129

- Jankovic, M. R., Haworth, T. J., Ilee, J. D., Forgan, D. H., Cyganowski, C. J., Walsh, C., Brogan, C. L., Hunter, T. R., & Mohanty, S. *Observing substructure in circumstellar discs around massive young stellar objects*, 2019, MNRAS, 482, 4673
- Eistrup, C. & Walsh, C. *Formation of cometary O₂ ice and related ice species on grain surfaces in the midplane of the pre-Solar nebula*, 2018, A&A, 621, A75
- Bosman, A. D., Walsh, C., & van Dishoeck, E. F. *CO destruction in protoplanetary disk midplanes: inside versus outside the CO snow surface*, 2018, A&A, 618, A182
- Taquet, V., van Dishoeck, E. F., Swayne, M., Harsono, D., Jørgensen, J. K., Maud, L., Ligterink, N. F. W., Müller, H. S. P., Codella, C., Altwegg, K., Bieler, A., Coutens, A., Drozdovskaya, M. N., Furuya, K., Persson, M. V., van 't Hoff, M. L. R., Walsh, C., & Wampfler, S. F. *Linking interstellar and cometary O₂: a deep search for ¹⁶O¹⁸O in the solar-type protostar IRAS 16293+2422*, 2018, A&A, 618, A11
- Loomis, R. A., Cleaves, L. I., Öberg, K. I., Aikawa, Y., Bergner, J., Furuya, K., Guzmán, V. V., & Walsh, C. *The distribution and excitation of CH₃CN in a solar nebula analog*, 2018, ApJ, 859, 131
- Allen, V., van der Tak, F. F. S., & Walsh, C. *Complex cyanides as chemical clocks in hot cores*, 2018, A&A, 616, A67
- Carney, M. T., Fedele, D., Hogerheijde, M. R., Favre, C., Walsh, C., Bruderer, S., Miotello, A., Murillo, N. M., Klaassen, P. D., Henning, Th., van Dishoeck, E. F. *Probing midplane CO abundance and gas temperature with DCO⁺ in the protoplanetary disk around HD 169142*, 2018, A&A, in press
- Eistrup, C., Walsh, C., & van Dishoeck, E. F. *Molecular abundances and C/O ratios in chemically evolving planet-forming disk midplanes*, 2018, A&A, 613, A14
- Ligterink, N. F. W., Walsh, C., Bhui, R. G., Vissapragada, S., Terwisscha van Scheltinga, J., & Linnartz, H. *Methanol ice co-desorption as a mechanism to explain cold methanol in the gas-phase*, 2018, A&A, 612, A88
- Loomis, R. A., Öberg, K. I., Andrews, S. M., Walsh, C., Czekala, I., Huang, J., & Rosenfeld, K. A. *Detecting weak spectral lines in interferometric data through matched filtering*, 2018, AJ, 155, 182
- Booth, A., Walsh, C., Kama, M., Loomis, R. A., Maud, L. T., & Juhász, A. *Sulphur monoxide exposes a potential molecular disk wind from the planet-hosting disk around HD 100546*, 2018, A&A, 611, A16
- Arulanantham, N., France, K., Hoadley, K., Manara, C. F., Schneider, P. C., Alcalá, J. M., Banzatti, A., Gunther, H. M., Miotello, A., van der Marel, N., van Dishoeck, E. F., Walsh, C., Williams, J. P. *A UV-NIR study of molecular gas in the transitional disk around RY Lupi*, 2018, ApJ, 855, 98
- Notsu, S., Nomura, H., Walsh, C., Honda, M., Hirota, T., Akiyama, E., & Millar, T. J. *Candidate water vapor lines to locate the H₂O snowline through high-dispersion spectroscopic observations. III: Sub-millimeter H₂⁶O and H₂¹⁸O lines*, 2018, ApJ, 855, 62
- Hsieh, T.-H., Murillo, N. M., Belloche, A., Hirano, N., Walsh, C., van Dishoeck, E. F., & Lai, S.-P. *Probing episodic accretion in very low luminosity objects*, 2018, ApJ, 854, 15
- Penteado, E., Walsh, C., & Cuppen, H. *Sensitivity analysis of grain surface chemistry to binding energies of ice species*, 2017, ApJ, 844, 71

Fedele, D., Carney, M., Hogerheijde, M. R., Walsh, C., Miotello, A., Klaassen, P., Bruderer, S., Henning, Th., & van Dishoeck, E. F. *ALMA unveils rings and gaps in the protoplanetary system HD 169142*, 2017, A&A, 600, A72

van 't hof, M. R., Walsh, C., Kama, M., Facchini, S., & van Dishoeck, E. F. *Robustness of N_2H^+ as tracer of the CO snowline*, 2017, A&A, 599, A101

Notsu, S., Nomura, H., Ishimoto, D., Walsh, C., Honda, M., Hirota, T., & Millar, T. J. *Candidate water vapor lines to locate the H_2O snowline through high-dispersion spectroscopic observations II. The case of a Herbig Ae star*, 2017, ApJ, 836, 118

Palau, A., Walsh, C., Sánchez-Monge, Á., Girart, J. M., Cesaroni, R., Jiménez-Serra, I., Fuente, A., Zapata, L. A., & Neri, R. *Complex organic molecules tracing shocks along the outflow cavity in IRAS 20126+4104*, 2017, MNRAS, 467, 2723

Furuya, K., Drozdovskaya, M. N., Visser, R., van Dishoeck, E. F., Walsh, C., Harsono, D., Hincelin, U., & Taquet, V. *Water delivery from cores to disks: deuteration as a probe of prestellar inheritance of H_2O* , 2017, A&A, 599, A40

Eistrup, C., Walsh, C., & van Dishoeck, E. F. *Setting the volatile composition of (exo)planet-building material: does chemical evolution in disk midplanes matter?*, 2016, A&A, 595, A83

Taquet, V., Furuya, K., Walsh, C., & van Dishoeck, E. F. *A primordial origin for molecular oxygen in comets: a chemical kinetics study of the the formation and survival of O_2 from clouds to disks*, 2016, MNRAS, 462, S99

Drozdovskaya, M. N., Walsh, C., van Dishoeck, E. F., Furuya, K., Marboeuf, U., Thiabaud, A., Harsono, D., & Visser, R. *Cometary ices in forming protoplanetary disc midplanes*, 2016, MNRAS, 462, 977

Notsu, S., Nomura, H., Ishimoto, D., Walsh, C., Honda, M., Hirota, T., & Millar, T. J. *Candidate water vapor lines to locate the H_2O snowline through high-dispersion spectroscopic observations I. The case of a T Tauri star*, 2016, ApJ, 827, 113

Decin, L., Richards, A. M. S., Millar, T. J., Baudry, A., De Beck, E., Homan, W., Smith, N., Van de Sande, M., & Walsh, C. *ALMA-resolved salt emission traces the chemical footprint and inner wind morphology of VY CMa*, 2016, A&A, 592, A76

Tsukagoshi, T., Nomura, H., Muto, T., Kawabe, R., Ishimoto, D., Kanagawa, K. D., Okuzumi, S., Ida, S., Walsh, C., & Millar, T. J. *A gap with a deficit of large grains in the protoplanetary disk around TW Hya*, 2016, ApJL, 829, L35

Nomura, H., Tsukagoshi, T., Kawabe, R., Ishimoto, D., Okuzumi, S., Muto, T., Kanagawa, K. D., Ida, S., Walsh, C., Millar, T. J., & Bai, X.-N. *ALMA observations of a gap and a ring in the protoplanetary disk around TW Hya*, 2016, ApJL, 819, L7

Li, X., Millar, T. J., Heays, A. N., Walsh, C., & van Dishoeck, E. F. *The chemistry and distribution of daughter species in the circumstellar envelopes of O-rich AGB stars*, 2015, A&A, 588, A4

Bieler, A., Altwegg, K., Balsiger, H., Bar-Nun, A., Berthelier, J.-J., Bochsler, P., Briois, C., Calmonte, U., Combi, M., De Keyser, J., van Dishoeck, E. F., Fiethe, B., Fuselier, S. A., Gasc, S., Gombosi, T. I., Hansen, K. C., Hässig, M., Jäckel, A., Kopp, E., Korth, A., Le Roy, L., Mall, U., Maggiolo, R., Marty, B., Mousis, O., Owen, T., Rème, H., Rubin, M., Sémon, T., Tzou, C.-Y., Waite, J. H., Walsh, C., & Wurz, P. *Abundant molecular oxygen in the coma of comet 67P/Churyumov-Gerasimenko*, 2015, Nature, 526, 678

- Pinilla, P., Birnstiel, T., & Walsh, C. *Sequential planet formation in the HD 100546 protoplanetary disk?*, 2015, A&A, 580, A105
- Wright, C. M., Madison, S. T., Wilner, D. J., Burton, M. G., Lommen, D., van Dishoeck, E. F., Pinilla, P., Bourke, T. L., Menard, F., & Walsh, C. *Resolving structure of the disk around HD 100546 at 7 mm with ATCA*, 2015, MNRAS, 453, 414
- Drozdovskaya, M. N., Walsh, C., Visser, R., Harsono, D., & van Dishoeck, E. F. *The complex chemistry of outflow cavity walls exposed*, 2015, MNRAS, 451, 3836
- Murillo N. M., Bruderer, S., van Dishoeck, E. F., Walsh, C., Harsono, D., & Lai, S.-P. *A low-mass protostar's disk-envelope interface: disk-shadowing evidence from ALMA DCO⁺ observations of VLA1623*, 2015, A&A, 579, A114
- Arasa, C., Koning, J., Kroes, G.-J., Walsh, C., & van Dishoeck, E. F. *Photodesorption of H₂O, HDO, and D₂O ice its impact on fractionation*, 2015, A&A, 575, A121
- Schmalzl, M., Visser, R., Walsh, C., Albertsson, T., Kristensen, L. .E., Mottram, J. C., & van Dishoeck, E. .F. *Water in low-mass star-forming regions with Herschel: the link between water gas and ice*, 2014, A&A, 572, A81
- Drozdovskaya, M. N., Walsh, C., Visser, R., Harsono, D., & van Dishoeck, E. F. *Methanol along the path from envelope to protoplanetary disc*, 2014, MNRAS, 445, 913
- Li, X., Millar, T. J., Walsh, C., Heays, A. N., & van Dishoeck, E. F. *Photodissociation and chemistry of N₂ in the circumstellar envelope of carbon-rich AGB stars*, 2014, A&A, 568, A111
- McElroy, D., Walsh, C., Markwick, A. J., Cordiner, M. A. Smith, K., & Millar, T. J. *The UMIST database for astrochemistry 2012*, 2013, A&A, 550, A36
- Woods, P. M., Walsh, C., Cordiner, M. A. & Kemper, F. *The chemistry of extragalactic carbon stars*, 2012, MNRAS, 426, 2689
- Heinzeller, D., Nomura, H., Walsh, C. & Millar, T. J. *Chemical evolution of protoplanetary disks: the effects of viscous accretion, turbulent mixing and disk winds*, 2011, ApJ, 731, 115
- Suutarinen, A., Geppert, W. D., Harju, J., Heikkilä, A., Hotzel, S., Juvela, M., Millar, T. J., Walsh, C. & Wouterloot, J. G. A. *CH abundance gradient in TMC-1*, 2011, A&A, 531, A121
- Cordiner, M. A., Charnley, S. B., Buckle, J. V., Walsh, C. & Millar, T. J. *Discovery of interstellar anions in Cepheus and Auriga*, 2011, ApJ, 730, L18
- Vigren, E., Hamberg, M., Zhaunerchyk, V., Kamińska, M., Thomas, R. D., Zhang, M., Kashperka, I., Ugglas, M. af, Walsh, C., Wester, R., Semaniak, J., Larsson, M. & Geppert, W. D. *Dissociative recombination of the acetaldehyde Cation, CH₃CHO⁺*, 2010, PCCP, 12, 11670
- Vigren, E., Hamberg, M., Zhaunerchyk, V. and, Kamińska, M., Semaniak, J., Larsson, M., Thomas, R. D., Ugglas, M. af, Kashperka, I., Millar, T. J., Walsh, C., Roberts, H., & Geppert, W. D. *Dissociative recombination of protonated formic acid: implications for molecular cloud and cometary chemistry*, 2010, ApJ, 709, 1429

- Vigren, E., Hamberg, M., Zhaunerchyk, V. and, Kamińska, M., Thomas, R. D., Larsson, M., Millar, T. J., Walsh, C. & Geppert, W. D.** *The dissociative recombination of protonated acrylonitrile, CH_2CHCNH^+ , with implications for the nitrile chemistry in dark molecular clouds and the upper atmosphere of Titan*, 2009, ApJ, 695, 317
- Kamińska, M., Vigren, E., Zhaunerchyk, V., Geppert, W. D., Roberts, H., Walsh, C., Millar, T. J., Danielsson, M., Hamberg, M., Thomas, R. D., Larsson, M., af Ugglas, M. & Semaniak, J.** *Dissociative recombination of D_3S^+ : product branching fractions and absolute cross sections*, 2008, ApJ, 681, 1717
- Millar, T. J., Walsh, C., Cordiner, M. A., Ní Chuimín, R. & Herbst, E.** *Hydrocarbon anions in interstellar clouds and circumstellar envelopes*, 2007, ApJ, 662, L87

Published Conference Proceedings

- Walsh, C., Vissapragada, S., & McGee, H.** *Formation of methanol in TW Hya and future prospects for detecting larger complex molecules in disks with ALMA*, 2018, IAUS, 332, 395
- Cuppen, H. M., Fredon, A., Lamberts, T., Penteado, E. M., Simons, M., & Walsh, C.** , *Surface astrochemistry: a computational chemistry perspective*, 2018, IAUS, 332, 293
- Taquet, V., Furuya, K., Walsh, C., & van Dishoeck, E. F.** , *On the origin of O_2 and other volatile species in comets*, 2018, IAUS, 332, 187
- Notsu, S., Nomura, H., Walsh, C., Honda, M., Hirota, T., Akiyama, E., & Millar, T. J.** , *Possibility to locate the position of the H_2O snowline in protoplanetary disks through spectroscopic observations*, 2018, IAUS, 332, 113
- Eistrup, C., Walsh, C., & van Dishoeck, E. F.** , *Chemical evolution in planet-forming regions. Impact on volatile abundances and C/O ratios of planet-building material*, 2018, IAUS, 332, 69
- Walsh, C.** *Chemical complexity in protoplanetary disks in the era of ALMA and Rosetta*, 2015, EAS, 75-76, 315
- Nomura, H., Walsh, C., Heinzeller, D., & Millar, T. J.** *Water in protoplanetary disks*, 2014, IAU, 293, 235
- Juanola-Parramon, R., Savini, G., Fenech, D., & Walsh, C.** *An end-to-end Far-infrared Interferometer Instrument Simulator (FIInS)*, 2014, in Proceedings of the SPIE, 9143
- Rimmer, P., Walsh, C. & Helling, C.** *Cosmic rays, UV photons, and haze formation in the upper atmospheres of hot Jupiters*, 2014, IAU, 299, 303
- Ishimoto, D., Nomura, H., Heinzeller, D., Walsh, C., Millar, T. J., & Saigo, K.** *The influence of disk winds on chemical evolution of protoplanetary disks*, 2013, ASPC, 476, 393
- Nomura, H., Walsh, C., Millar, T. J., & Aikawa, Y.** *Diagnosing gas dispersal processes in protoplanetary disks*, 2013, ASPC, 476, 209
- Nomura, H., Walsh, C., Heinzeller, D., & Millar, T. J.** *Hot core chemistry in young stellar objects: protoplanetary disks and outflows*, 2012, EAS, 52, 229
- Cordiner, M. A., Millar, T. J., Walsh, C., Herbst, E., Lis, D. C., Bell, T. A., & Roueff, E.** *Organic molecular anions in interstellar and circumstellar environments*, 2008, IAU, 251, 157

Teaching Experience

- 2018 **Lecturer** *University of Leeds*
Level 1 module "Waves and Vibrations"
- 2016 - present **Lecturer** *University of Leeds*
Level 3 module "Star and planet formation"
- 2016 - present **Tutor** *University of Leeds*
Level 1 module "Physics I"
- 10/2015 **Lecturer** *Leiden Observatory*
I was invited to deliver a lecture on the general topic of "Astrochemistry" as part of a BSc module titled "Modern Astronomical Research".
- 09/2014 **Lecturer** *Nordic Network of Astrobiology Summer School on "Exoplanets"*
I was invited to lecture and to design and deliver a practical computer course on "Modelling of exoplanet atmospheres".
- 06/2013 **Lecturer** *Nordic Summer School on "Molecules in Space", Onsala*
I was invited to lecture on the topic of "Exoplanet atmospheres".
- 06/2009 **Lecturer** *Nordic-NASA Astrobiology Summer School, Iceland*
I was invited to lecture and to design and deliver a one-day practical computer course on "Model calculations of water formation in dark clouds".
- 2008 - 2009 **Level 1 Computational Physics Demonstrator** *Queen's University Belfast*
I provided assistance to students on writing and executing computer programs written in C.
- 2007 - 2008 **Level 1 Laboratory Physics Demonstrator** *Queen's University Belfast*
I provided assistance to level 1 students on performing and writing up laboratory experiments.

Student Mentoring/Supervision

PhD supervision

- 2016 - present **A. Booth** *University of Leeds*
Thesis title: "Exploring the impact of planet formation on disk chemistry with ALMA".
- 2014 - 2018 **Dr. C. Eistrup** *Leiden Observatory*
Thesis title: "From midplane to planets: the chemical fingerprint of a disk". Currently an Origins research fellow in the Department of Astronomy at the University of Virginia, USA.
- 2012 - 2016 **Dr. M. R. Drozdovskaya** *Leiden Observatory*
Thesis title: "Origin and distribution of complex organic molecules in protostars". Currently a CSH research fellow in the Centre for Space and Habitability at the University of Bern, Switzerland.
- 2015 - 2016 **M. R. van 't Hoff (day-to-day supervision)** *Leiden Observatory*
Thesis title: "Chemistry in embedded disks: setting the stage for planet formation".
- 2012 - 2015 **Dr. X. Li (day-to-day supervision)** *Leiden Observatory*
Thesis title: "Molecules during stellar formation and death". Currently an EACOA research fellow at ASIAA/NAOC in Taiwan/China.

MSc/MPhys supervision

- 2018 - 2019 **N. Maple** *University of Leeds*
Project title: "Characterising the complex organic chemistry of the most massive young stars".
- 2018 - 2019 **E. McDonagh** *University of Leeds*
Project title: "ALMA studies of the molecular composition of Herbig Ae/Be protoplanetary disks".
- 2017 - 2018 **J. Carter** *University of Leeds*
Project title: "Methanol ice in space: a molecular dynamics study".
- 2017 - 2018 **A. Healey** *University of Leeds*
Project title: "An exploration of Earth-like exoplanet atmospheres".

- 2017 - 2018 **M. Zilinskas** *University of Leeds*
Project title: "An exploration of Earth-like exoplanet atmospheres".
- 2017 - 2018 **I. Bainbridge** *University of Leeds*
Project title: "Formation and survival of glycine in planet-forming disks".
- 2016 - 2017 **H. McGee** *University of Leeds*
Project title: "Climbing the ladder of complexity: complex organic molecules in disks with ALMA".
- 2013 - 2014 **M. R. van 't Hoff** *Leiden Observatory*
Thesis title: "Tracing the CO snow line in protoplanetary disks with ALMA". Currently a PhD student at Leiden Observatory.
- 2013 - 2014 **A. Bosman** *Leiden Observatory*
Thesis title: "Cosmic-ray induced photodissociation". Currently a PhD student at Leiden Observatory.

Summer research project supervision

- 2016 **D. Carr** *University of Leeds*
Project title: "Building a comet".
- 2016 **C. Daley** *Leiden Observatory*
Project title: "Probing the kinematics of protoplanetary disks with ALMA observations".
- 2016 **S. Vissapragada** *Leiden Observatory*
Project title: "Investigating complex organic molecule formation and survival in the planet-forming regions of protoplanetary disks". Currently a PhD student in planetary science at Caltech, USA.
- 2014 **A. Benge** *Leiden Observatory*
Project title: "Molecular anions in photon-dominated regions".

PhD Committees

- 03/2018 **Internal examiner for Mr. M. G. Evans** *University of Leeds*
Thesis title: "Gravitational instabilities in a protosolar-like disc".
- 12/2017 **"Opposition Committee" for Dr. N. F. W. Ligterink** *Leiden Observatory*
Thesis title: "The astrochemical factory: a solid base for interstellar reactions".
- 10/2017 **"Manuscript Committee" for Dr. V. N Salinas** *Leiden Observatory*
Thesis title: "Linking simple molecules and grain evolution across planet-forming disks".
- 09/2016 **"Manuscript Committee" for Dr. E. Penteado** *Radboud Universiteit Nijmegen*
Thesis title: "Probing the chemistry of molecular clouds and young stellar objects: combining models with observational data".
- 06/2016 **"Opposition Committee" for Dr. D. Paardekooper** *Leiden Observatory*
Thesis title: "Shining light on interstellar matter".
- 06/2015 **"Opposition Committee" for Dr. I. San José García** *Leiden Observatory*
Thesis title: "Paving the path between low- and high-mass star formation".
- 05/2015 **"Opposition Committee" for Dr. T. Lamberts** *Leiden Observatory*
Thesis title: "Unravelling the surface formation of regular and deuterated water in space".
- 02/2015 **"Opposition Committee" for Dr. X. Li** *Leiden Observatory*
Thesis title: "Molecules during stellar formation and death".
- 12/2014 **"Opposition Committee" for Dr. G. Fedoseev** *Leiden Observatory*
Thesis title: "Atom addition reactions in interstellar ice".

Outreach, Conference Organisation, Press, and Other Activities

Upcoming

- 02/2019 **Realising Aspirations 2019** *Ashton Sixth Form College, Aston-under-Lyne, UK*
School talk.

- 03/2019 **Be Curious 2019** *University of Leeds, UK*
Interactive presentation aimed at the general public.
- 03/2019 **British Science Week 2019** *Garforth Academy, Leeds, UK*
School talk.
- Previous*
- 12/2018 **UCL Chemical and Physical Society** *London, UK*
Public talk.
- 11/2018 **Press Interview** *The Gryphon*
Interview for a special series on women working in science at the University of Leeds by Olivia Maskill.
- 10/2018 **Rosetta: the story continues** *European Space Agency*
Contribution to a video produced by ESA on the legacy of the Rosetta mission.
- 09/2018 **Doncaster Astronomical Society** *St George's Minster, Doncaster, UK*
Public talk aimed at amateur astronomers.
- 06/2018 **Rosetta lives on** *European Space Agency*
Contribution to a sound bite video produced by ESA summarising the key results of the Rosetta mission.
- 03/2018 **Open Science Lectures** *Bradford Grammar School, Bradford, UK*
Public talk.
- 03/2018 **Be Curious 2018** *University of Leeds, UK*
Interactive presentation aimed at the general public in collaboration with Dr Joslin McKinney.
- 01/2018 **Wakefield and District Astronomical Society** *Wakefield, UK*
Public talk aimed at amateur astronomers.
- 12/2017 **COST Action "Our Astrochemical History"** *Cuidad Real, Spain*
Member of the LOC/SOC for a workshop on "Gas-phase cold chemistry of COMs: a challenge for experiments, theory, and modeling".
- 11/2017 **Ingenuity and Beyond** *University Technical College, Leeds, UK*
Talk aimed at secondary-school-age students studying STEM subjects.
- 11/2017 **Press Interview** *Tages Anzeiger and De Bund*
Interview during the World Conference of Science Journalists entitled "Spezialistin für Chemie im kalten Universum" (Specialist in Chemistry in the Cold Universe, by Barbara Reye).
- 11/2017 **The 2017 Bolton Lecture in Astronomy** *University of Leeds, UK*
Public lecture aimed at secondary-school-age students to bring current developments in astronomy to a wider audience.
- 11/2017 **Meet the Scientist** *Science and Media Museum, Bradford, UK*
Short talks aimed at primary and secondary-school-age children for them to meet real scientists.
- 10/2017 **10th World Conference of Science Journalists** *San Francisco, USA*
Panel member for discussion session entitled "Astronomy's Next Big Things".
- 10/2017 **Cleveland and Darlington Astronomical Society** *Stockton-on-Tees, UK*
Public talk aimed at amateur astronomers.
- 10/2017 **SoapBox Art and Science** *University of Leeds in collaboration with STFC*
Interactive presentation during Leeds Light Night at which female scientists directly address the public on soapboxes in high footfall areas. In collaboration with Dr Joslin McKinney.
- 09/2017 **LATES:SPACE** *Science and Media Museum, Bradford, UK*
Lightning talk during an evening event to celebrate the arrival of the Soyuz capsule that brought UK astronaut, Tim Peake, back to Earth.
- 07/2017 **Workshop** *Kamerlingh Onnes Building, Leiden*
Joint scientific organiser (with J. Tobin and D. Harsono) for a workshop on "Protoplanetary disk formation and evolution: setting the stage for planet formation".

- 05/2017 **Press Interview** *Astrobiology Magazine*
Interview for an article entitled "Methanol detected for first time around young star" by Charles Q Choi
- 05/2017 **Pint of Science** *University of Leeds*
Talk during a public outreach event in local pubs in Leeds.
- 04/2017 **Press Release** *ALMA/INAF*
Release titled "Ritratto di sistema planetario in formazione" and can be found here, <http://www.media.inaf.it/2017/04/03/ritratto-di-sistema-planetario-in-formazione/>
- 09/2016 **Press Release** *ALMA/NAOJ*
Release titled "ALMA Spots Possible Formation Site of Icy Giant Planet" and can be found here, <http://www.almaobservatory.org/en/press-room/press-releases/1015-alma-spots-possible-formation-site-of-icy-giant-planet>
- 06/2016 **Press Release** *ALMA/ESO*
Release titled "First Detection of Methyl Alcohol in a Planet-Forming Disc" and can be found here, <http://www.eso.org/public/usa/news/eso1619/>
- 06/2016 **Press Interview** *Voice of America*
Interview for an article entitled "Scientists Discover Building Blocks of Life Around Forming Planets" by JoEllen McBride
- 2013 - 2015 **Astrochem Seminar Organiser** *Leiden Observatory*
For 2.5 years I was organiser of the Astrochem Seminar series at Leiden Observatory. This involved canvassing for speakers (both internal and external), bookings rooms, and promotion (via e-mail alerts and an online calendar).
- 11/2015 **Press Interview** *Leidsch Dagblad and de Volkskrant*
I was interviewed for two newspaper articles on the detection of molecular oxygen in comet 67P/Churyumov-Gerasimenko, the latter of which can be found here <http://www.volkskrant.nl/wetenschap/rosetta-komeet-ademt-zuurstof-uit-a4172877/>.
- 2014 **LEAPS Coordinator** *Leiden/ESA Astrophysics Programme for Summer Students*
I was co-organiser of a 10-11 week summer research programme for undergraduate and MSc students held at Leiden Observatory. Duties included advertisement of the programme to both project supervisors and students, selection of candidates, and organisation of travel, accommodation, facilities, and activities for the duration of the programme. I, and my co-organiser, also adopted a pastoral role during the summer school.
- 07/2014 **Lorentz Centre Workshop** *Lorentz Centre*
I was a scientific organiser for the Lorentz Centre workshop "Grain-surface networks and data for astrochemistry".
- 03/2014 **Press Interview** *NASA Astrobiology Magazine*
I was interviewed for an online article on my recent publication on "Complex organic molecules in protoplanetary disks" which can be found here: <http://www.astrobio.net/news-exclusive/a-stars-early-chemistry-shapes-life-friendly-atmospheres>.
- 01/2012 **Jupiter Watch** *Queen's University Belfast in participation with BBC's Stargazing Live*
I supervised a public event in collaboration with the Irish Astronomical Association, which invited members of the public to observe Jupiter and its moons.
- 11/2011 **Lab Coats and Lace** *Queen's University Belfast in collaboration with WITS (Women in Technology and Science)*
I gave a presentation on my experience as a woman working in science and participated in a Q&A session for secondary-level students interested in pursuing a career in science or technology.

Referee/TAC Experience/Committees

- 2017 - 2019 **UK-SKA (Square Kilometer Array) Science Committee member**
- 2017 - 2018 **Co-Chair of Working Group 1 for COST Action Our Astrochemical History**
- ALMA Proposal Review panel member**

Royal Astronomical Society
Nature Astronomy
The Astrophysical Journal
The Astrophysical Journal Letters
Astronomy & Astrophysics
NASA grants review panel member

Invited Presentations

Upcoming

- 03/2019 **Invited seminar** *University of Warwick, UK*
- 03/2019 **Protoplanetary Disk Workshop in celebraton of Professor Antonella Natta** *Villa Vigoni, Italy*
- 05/2019 **Invited seminar** *University of Central Lancashire, UK*
- 05/2019 **Invited seminar** *Queen's University Belfast, UK*
- 05/2019 **First General Assembly of the European Astrobiology Institute** *Liblice Castle, Prague, Czech Republic*
- 06/2019 **From Stars to Planets II** *Gothenburg, Sweden*

Previous

- 02/2019 **Invited seminar** *Imperial College London, UK*
- 01/2019 **Invited seminar** *University of Hertfordshire, UK*
- 12/2018 **UCL Chemical and Physical Society Guest Lecture** *UCL, UK*
- 11/2018 **Astrochemistry Roundtable (remote)** *National Academy of Sciences, USA*
- 10/2018 **LabAstro2018** *Hamberg, Germany*
- 10/2018 **Far-IR Science Interest Group (remote)** *Webinar, USA*
- 08/2018 **STFC Summer School 2018** *Queen's University Belfast, UK*
- 07/2018 **25th Interational Symposium on Gas-Phase Kinetics and Related Phenomena (plenary speaker)** *Lille, France*
- 07/2018 **Astrochemistry: Past, Present, and Future in celebration of Professor Ewine van Dishoeck** *Pasadena, USA*
- 05/2018 **Rosetta Science Workshop and SWT 49 meeting** *Rhodes, Greece*
- 04/2018 **EWASS/NAM 2018:SS5 - Complex organic molecules in the Universe: current understanding and perspectives** *Liverpool, UK*
- 01/2018 **From Qualitative to Quantitative: Exploring the Early Solar System by Connecting Comet Composition and Protoplanetary Disk Models** *International Space Science Institute, Bern, Switzerland*
- 12/2017 **COST WG Meeting "Surface Chemistry of COMs"** *Cuidad Real, Spain*
- 10/2017 **Invited seminar** *University of Exeter, UK*
- 09/2017 **A Celebration of David Williams' 80th birthday** *University College London, UK*
- 08/2017 **254th ACS National Meeting: Molecules in Space - Linking the interstellar medium to (exo)planets** *Washington D. C., USA*
- 07/2017 **Kavli ExoFrontiers 2017 Symposium** *University of Cambridge, UK*
- 06/2017 **230th AAS Meeting: Laboratory Astrophysics Division** *Austin, USA*
- 06/2017 **EWASS: Science with ALMA** *Prague, Czech Republic*
- 05/2017 **Invited seminar** *Liverpool John Moores University, UK*
- 05/2017 **Invited seminar** *University of Cambridge, UK*

- 04/2017 **Atmospheres of Disks and Planets: Chemistry, Dynamics, and Observations** *Ringberg Castle, Germany*
- 01/2017 **Invited seminar** *Queen Mary University London, UK*
- 12/2016 **From Qualitative to Quantitative: Exploring the Early Solar System by Connecting Comet Composition and Protoplanetary Disk Models** *International Space Science Institute, Bern, Switzerland*
- 11/2016 **Invited seminar** *University of Leicester, UK*
- 10/2016 **Missing Links from Disks to Planets: Konkoly/MPIA workshop 2016** *Budapest, Hungary*
- 10/2016 **Ice Age - The Era of the James Webb Space Telescope** *Lorentz Centre workshop, Leiden, The Netherlands*
- 05/2016 **Astrochemistry on Small Scales** *Manchester, UK*
- 05/2016 **Invited seminar** *Max Planck Institute for Solar System Research, Germany*
- 04/2016 **From Star and Planet Formation to Early Life** *Vilnius, Lithuania*
- 03/2016 **Invited seminar** *DIAS, Ireland*
- 03/2016 **Protoplanetary Discussions** *Edinburgh, UK*
- 02/2016 **Invited seminar** *University of Cambridge, UK*
- 01/2016 **Rosetta/ROSINA Col meeting** *Gruyères, Switzerland*
- 01/2016 **Astrochemistry as a Diagnostic of Star and Planet Formation** *Bordeaux Observatory, France*
- 11/2015 **Invited seminar** *Harvard University, USA*
- 10/2015 **From Clouds to Protoplanetary Disks: the astrochemical link** *Berlin, Germany*
- 09/2015 **The 6th Zermatt ISM Symposium: Conditions and Impact of Star Formation: from Lab to Space** *Zermatt, Switzerland*
- 08/2015 **Goldschmidt2015** *Prague, Czech Republic*
- 03/2015 **Icy Grain Chemistry for Formation of Complex Organic Molecules: From Molecular Clouds to Protoplanetary Disks, Comets and Meteorites** *Tokyo, Japan*
- 01/2015 **Invited seminar** *KU Leuven, Belgium*
- 01/2015 **Chemical Diagnostics of Star and Planet Formation with Cycle 3 ALMA** *MPE/MPIA, Garching, Germany*
- 10/2014 **Exoplanets Summer School** *La Palma, Spain*
- 08/2014 **40th COSPAR Scientific Assembly: It's a Dusty Universe** *Moscow, Russia*
- 07/2014 **Lorentz Centre Workshop: Grain-surface Networks and Databases for Astrochemistry** *Leiden University, The Netherlands*
- 05/2014 **Invited seminar** *University of Bern, Switzerland*
- 04/2014 **Faraday Discussion FD168** *Leiden, The Netherlands*
- 03/2014 **247th ACS National Meeting: Chemistry in the interstellar medium - new frontiers in laboratory, theory, and observations** *Dallas, USA*
- 11/2013 **Leiden University Science Faculty "Discovery" Series** *Leiden University, The Netherlands*
- 10/2013 **Invited seminar** *Radboud University, Nijmegen, The Netherlands*
- 09/2013 **Sterrewacht Science Day 2013** *Leiden Observatory, The Netherlands*
- 07/2013 **Molecules in Space: Nordic-NASA Workshop on Astrobiology** *Onsala, Sweden*
- 06/2013 **222nd AAS Meeting: Laboratory Astrophysics Division** *Indianapolis, USA*

- 10/2012 **Molecular Spectroscopy in the Era of Far-IR Astronomy** *Emory University, Atlanta, USA*
- 09/2012 **Invited seminar** *St. Andrew's University, UK*
- 06/2012 **The Hot and Warm Universe: Astrochemistry at intermediate and high temperatures** *Tallinn, Estonia*
- 05/2012 **International Workshop on Protoplanetary Disks** *Kyoto University, Japan*
- 02/2012 **Invited seminar** *Leiden Observatory, The Netherlands*

Conferences

Oral Contributions

- 32/2017 **IAUS 332: Astrochemistry VII** *Puerto Varas, Chile*
- 02/2015 **Photodissociation in Astrochemistry Workshop** *Oegstgeest, The Netherlands*
- 11/2013 **NOVA Network II Meeting** *University of Amsterdam, The Netherlands*
- 09/2013 **Dutch Astrochemistry Network Meeting: gas-phase group** *Leiden Observatory, The Netherlands*
- 01/2013 **Dust, Gas, and Astrochemistry** *Queen's University Belfast, UK*
- 01/2012 **Large Molecules in Space** *Nottingham University, UK*
- 09/2011 **Lorentz Centre Workshop: Challenges in Modelling the Reaction Chemistry of Interstellar Dust** *Lorentz Centre, Leiden University, The Netherlands*
- 06/2011 **IAU 280: The Molecular Universe** *Toledo, Spain*
- 01/2011 **Exploring Connections with Plasma Chemistry** *Eindhoven University of Technology, The Netherlands*
- 09/2010 **The Transient Universe: From exoplanets to hypernovae** *Royal Irish Academy, Dublin, Republic of Ireland*
- 03/2010 **Submillimeter and THz Astrochemistry** *University of Tokyo, Japan*
- 01/2010 **Astrochemistry at High Resolution** *University of Manchester, UK*
- 03/2009 **Chemical Diagnostics of Star and Planet Formation** *University of Tokyo, Japan*
- 09/2007 **Young Researchers Meeting in Astrochemistry** *Cardiff University, UK*

Poster Contributions

- 09/2015 **The 6th Zermatt ISM Symposium: Conditions and Impact of Star Formation: from Lab to Space** *Zermatt, Switzerland*
- 07/2013 **Protostars & Planets VI** *Heidelberg, Germany*
- 06/2010 **Faraday Discussion 147: Chemistry of the planets** *Saint Jacut de la Mer, France*
- 06/2009 **Anions - from the Lab to the Stars** *Bad Honnef, Germany*
- 01/2009 **Computational Astrochemistry** *University College London, UK*
- 03/2008 **National Astronomy Meeting** *Queen's University Belfast, UK*
- 03/2008 **High Temperature Astrochemistry** *NUI Galway, Ireland*
- 01/2007 **Dust, Gas and Chemistry in Space** *Queen's University Belfast, UK*

Attended

- 09/2010 **ExoClimes: Exploring the diversity of planetary atmospheres** *Exeter, UK*
- 08/2009 **42nd IUPAC Congress: Chemistry solutions** *Glasgow, UK*
- 09/2008 **Molecular Universe FP6: Final network meeting** *Boppard, Germany*
- 06/2007 **New Astronomical Challenges for Surface Science** *Heriot Watt University, UK*

05/2007 **Molecules in Space and the Laboratory** *Paris, France*

09/2006 **Young Researchers Meeting in Astrochemistry** *University College London, UK*