

ISLA SIMPSON

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Research Interests

My research interests lie in the use of global climate models of varying levels of complexity to understand dynamical mechanisms involved in the climate system. I am interested in understanding the current climate and its variability, at scales ranging from the planetary to the regional, as well as determining the robust responses to climate change and their implications, through a deeper understanding of the processes and mechanisms involved. I am also interested in the biases that occur in global climate models, how they may be alleviated and what the implications of these biases are for our ability to predict the future of the climate system. To date there has been a focus on the coupled stratosphere-troposphere system, the dynamics of the tropospheric mid-latitude circulation and its response to forcings, longitudinal variations in the mid-latitude circulation response to anthropogenic forcings and the importance of topography for the climate of the Mediterranean region.

Education

2005-2009 PhD in Atmospheric Physics, Department of Physics, Imperial College London, UK

2001-2005 MPhys in Astrophysics, 1st class honours, School of Physics and Astronomy, University of St Andrews, UK

Research Experience and Employment

2019-.... **Scientist 2** Climate and Global Dynamics Laboratory, National Center for Atmospheric Research, USA.

2015-2019 **Scientist 1** Climate and Global Dynamics Laboratory, National Center for Atmospheric Research, USA.

2014-2015 **Associate Research Scientist** Lamont-Doherty Earth Observatory, Columbia University, USA.

2012-2014 **Postdoctoral Fellow**. Lamont-Doherty Earth Observatory, Columbia University, USA.

Supervisors: Prof Richard Seager and Prof Tiffany Shaw (Lamont-Doherty Earth Observatory)

Synopsis: I was awarded a Lamont-Doherty Earth Observatory postdoctoral fellowship to perform research into mid-latitude climate change. I investigated longitudinal variations in the mid-latitude circulation response to anthropogenic forcing and the robust predicted circulation responses on the regional scale. I analyzed the longitudinally varying momentum budget of predicted future changes in model output from the Coupled Model Intercomparison Project, phase 5, and demonstrated robust stationary wave responses to climate change with important implications for regional scale climate. I then focused on the understanding the mechanisms involved in the stationary wave response over North America and the implications of this for North American hydroclimate. In addition to this, I worked on understanding the role of relatively small scale topography in the climate of the Mediterranean region and on determining the regional response to sudden stratospheric warmings and the mechanisms involved. Each of these involve idealized experiments with comprehensive global climate models.

2009-2012 **Postdoctoral Fellow**. Department of Physics, University of Toronto, Canada.

Supervisor: Prof Ted Shepherd (Department of Physics, University of Toronto)

Synopsis: I designed and performed experiments using a comprehensive general circulation model (the Canadian Middle Atmosphere Model) to gain a deeper understanding of the dynamical mechanisms involved in mid-latitude atmospheric circulation variability and its biases in models as well as mechanisms in stratosphere-troposphere coupling. In particular, I made use of nudging and bias correction techniques in the model to pull apart the relevant processes that govern Southern Annular Mode variability and its bias in models. I also performed model experiments to determine the dynamics behind the lower stratospheric circulation response to ENSO variability.

- 2010 **Sessional lecturer in advanced atmospheric dynamics.** Department of Physics, University of Toronto, Canada.
I gained experience in teaching through a sessional lecturer position at the University of Toronto in which I taught a semester long (2 hours per week) graduate course in advanced atmospheric dynamics. This involved developing and delivering graduate level lectures, the preparation of problem sets, exams and the marking of research projects. For this course, the students rated my teaching ability with an average of 4.8 out of 5.
- 2005-2009 **PhD in Atmospheric Physics.** Imperial College London, UK.
Thesis title: Solar Influence on Stratosphere-Troposphere Dynamical Coupling
Supervisors: Prof Joanna Haigh (Department of Physics, Imperial College London) and Dr. Mike Blackburn (Department of Meteorology, University of Reading)
Synopsis: My PhD research involved the use of a simplified general circulation model to investigate the mechanisms whereby lower stratospheric temperature perturbations influence the tropospheric circulation. I proposed a mechanism whereby stratospheric heating perturbations result in a latitudinal shift of the mid-latitude westerlies through an influence on the propagation of synoptic scale atmospheric eddies. This is relevant for various climate forcings such as the 11 year solar cycle, ozone depletion and increased anthropogenic emissions of greenhouse gases. For this work I was awarded the Winton prize for the best PhD thesis in the physics department of Imperial College in 2009.
- Pre-2005 In summer 2003 I undertook a research project investigating the accretion of material from the protoplanetary discs around young stars along their magnetic fields and for this work I was awarded the Cormack undergraduate astronomy research prize which led to me presenting my work at the Royal Society of Edinburgh. In summer 2004 I investigated the possible use of laser light scattering spectroscopy for the non-invasive early diagnosis of cervical cancer and I wrote an MPhys thesis on the use of Optical Gravitational Lensing to determine exoplanetary systems.

Publications

- **Simpson, I. R.**, McKinnon, K. A., Davenport, F. V., Tingley, M., Lehner, F., Al Fahad, A. and Chen, D. (2021) Emergent constraints on the large scale atmospheric circulation and regional hydroclimate: do they still work in CMIP6 and how much can they actually constrain the future? *In press*, *J. Clim*
- McKinnon, K. A., Poppick, A., **Simpson, I. R.** (2021) Hot extremes have become drier in the US southwest, *In Press*, *Nature Climate Change*
- Anstey, J. A., **Simpson, I. R.**, Richter, J. H. (+ 26 QBOi co-authors): Teleconnections of the quasi-biennial oscillation in a multi-model ensemble of QBO resolving models, *QJRMS*, *In Press*
- Haynes, P., Hitchcock, P., Hitchman, M., Yoden, S., Hendon, H., Kiladis, G., Kodera, K. **Simpson, I. R.** (2021) The influence of the stratosphere on the tropical troposphere, *J. Met. Soc. Japan*, 99
- Fu, R., Hoell, A., Mankin, J., Sheffield, A. and **Simpson, I.**: Tackling challenges of a drier, hotter, more fire-prone future, *EOS*
- Banerjee, A., Butler, A. H., Polvani, L. M., Robock, A., **Simpson I. R.**, Sun, L. (2021) Robust winter warming over Eurasia under stratospheric sulfate geoengineering - the role of stratospheric dynamics, *ACPD*, *Accepted*
- Bacmeister, J. T., Hannay, C., Medeiros, B., Gettelman, A., Neale, R., Fredriksen, H.-B., Lipscomb, W. H., **Simpson, I. R.**, Bailey, D. A., Holland, M. M., Lindsay, K., Otto-Bliesner, B. L. (2020) CO2 increase experiments using the Community Earth System Model (CESM): Relationship to climate sensitivity and comparison of CESM1 to CESM2, *JAMES*, doi:10.1029/2020GL089470
- Visioni, D., MacMartin, D. G., Kravitz, B., Lee, W., **Simpson, I. R.**, Richter, J. H. (2020) Reduced Poleward Transport Due to Stratospheric Heating Under Stratospheric Aerosols Geoengineering, *Geophys. Res. Lett.*, doi:10.1029/2020GL089470
- Chen, R., **Simpson, I. R.**, Deser, C., Wang, B. (2020) Model Biases in the Simulation of the Springtime North Pacific ENSO Teleconnection, *J. Clim.*, 33, 9985-10002

- Deser, C., Phillips, A. S., **Simpson, I. R.**, Rosenbloom, N., Coleman, D., Lehner, F., Pendergrass, A. G. (2020), Isolating the Evolving Contributions of Anthropogenic Aerosols and Greenhouse Gases: A New CESM1 Large Ensemble Community Resource, *J. Clim.*, 33, 7835-7858.
- Kim, H., Caron, J. M., Richter, J. H. and **Simpson, I. R.**, QBO-MJO connection in CMIP6 models (2020), *Geophys. Res. Lett.*, 47, doi:10.1029/2020GL087295
- **Simpson, I. R.**, Bacmeister, J., Neale, R. B., Hannay, C., Gettelman, A., Garcia, R. R., Lauritzen, P. H., Marsh, D. R., Mills, M. J., Medeiros, B., Richter, J. H., An evaluation of the large scale atmospheric circulation and its variability in the Community Earth System Model 2 (CESM2) and other CMIP models (2020), *J. Geophys. Res.*, 125, doi:10.1029/2020JD032835
- Ayarzagüena, B., Charlton-Perez, A. J., Butler, A. H., Hitchcock, P., Simpson, I. R., Polvani, L. M., Butchart, N., Gerber, E. P., Gray, L., Hassler, B., Lin, P., Lott, F., Manzini, E., Mizuta, R., Orbe, C., Osprey, S., Saint-Martin, D., Sigmond M., Taguchi, M., Volodin, E. M., Watanabe, S., Unvertainty in the response of sudden stratospheric warmings and stratosphere-troposphere coupling to quadrupled CO₂ concentrations in CMIP6 models, *J. Geophys. Res.*, doi:10.1029/2019JD032345
- Richter, J. H., Anstey, J., Butchart, N., Kawatani, Y., Meehl, G., Osprey, S., Simpson, I. R. Progress in simulating the Quasi-biennial Oscillation in CMIP models, *J. Geophys. Res.*, 125, doi:10.1029/2019JD032362
- Chen, R., **Simpson, I. R.**, Deser, C., Wang, B., Model biases in the simulation of the springtime North Pacific ENSO teleconnection, *Submitted to J. Clim.*
- Michel, C., Li, C., **Simpson, I. R.**, Bethke, I., King, M. P. and Sobolowski, S., The change in the ENSO teleconnection under a low global warming scenario and the uncertainty due to internal variability, *submitted to J. Clim*
- Maycock, A. C., Masukwedza, G. I. T., Hitchcock, P. and **Simpson, I. R.**, A regime perspective on the North Atlantic eddy-driven jet response to sudden stratospheric warmings, *Submitted to J. Clim.*
- Deser, C., Lehner, F., Rodgers, K. B., Ault, T., Delworth, T. L., DiNezio, P. N., Fiore, A., Frankignoul, C., Fyfe, J. C., Horton, D. E., Kay, J. E., Knutti, R., Lovenduski, N. S., Marotzke, J., McKinnon, K. A., Minobe, S., Randerson, J., Screen, J. A., **Simpson, I. R.** and Ting, M., Insights from Earth system model initial-condition large ensembles and future prospects, *Nat. Clim. Change*, In Press
- Domiesen, D. I.V., Butler, A. H., Charlton-Perez, A. J., Ayarzagüena, B., Baldwin, M. P., Dunn-Sigouin, E., Furtado, J. C., Garfinkel, C. I., Hitchcock, P., Karpechko, A. Y., Kim, H., Knight, J., Lang, A. L., Lim, E.-P., Marshall, A., Roff, G., Schwartz, C., **Simpson, I. R.**, Son, S.-W., Taguchi, M (2020)., The role of the stratosphere in subseasonal to seasonal prediction. Part 1: predictability of the stratosphere, *JGR Atmospheres*, <https://doi.org/10.1029/2019JD030920>.
- Domiesen, D. I.V., Butler, A. H., Charlton-Perez, A. J., Ayarzagüena, B., Baldwin, M. P., Dunn-Sigouin, E., Furtado, J. C., Garfinkel, C. I., Hitchcock, P., Karpechko, A. Y., Kim, H., Knight, J., Lang, A. L., Lim, E.-P., Marshall, A., Roff, G., Schwartz, C., **Simpson, I. R.**, Son, S.-W., Taguchi, M. (2020), The role of the stratosphere in subseasonal to seasonal prediction. Part 2: predictability arising from stratosphere-troposphere coupling, *JGR Atmospheres*, 125, <https://doi.org/10.1029/2019JD030923>.
- **Simpson, I. R.**, Tilmes, S., Richter, J. H., Kravitz, B., MacMartin, D. G., Mills, M. J., Fasullo, J. T. and Pendergrass, A. G. The regional hydroclimate response to stratospheric sulfate geoengineering and the role of stratospheric heating, *JGR Atmospheres*, 124, 12587-12616
- Wu, Y, **Simpson, I. R.** and Seager, R. Inter-model spread in the Northern Hemisphere stratospheric polar vortex response to climate change in the CMIP5 models (2019), *Geophys. Res. Lett.*, 46, 13290-13298
- Jiang, J., MacMartin, D. G., **Simpson, I. R.**, Kravitz, B., Cheng, W., Visioni, D., Tilmes, S., Richter, J. H., Mills, M. J. (2019) Stratospheric Sulfate Geoengineering Could Alter the High-Latitude Seasonal Cycle, *Geophys. Res. Lett.*, 46, 14153-14163
- Cheng, W., MacMartin, D. G., Dagon, K., Kravitz, B., Tilmes, S., Richter, J. H., Mills, M. J., **Simpson, I. R.**, Soil moisture and other hydrological changes in a stratospheric aerosol geoengineering large ensemble, *JGR-Atmospheres*, 124, 12773-12793

- Richter, J. H., Butchart, N., Kawatani, Y., Bushell, A. C., Holt, L., Serva, F., Anstey, J., **Simpson, I. R.**, Osprey, S., Hamilton, K., Braesicke, P., Cagnazzo, C., Chen, Chih-Chieh, Garcia, R. R., Gray, L. J., Kerzenmacher, T., Lott, F., McLandress, C., Naoe, H., Scinocca, J., Stockdale, T. N., Versick, S., Watanabe, S., Yoshida, K., Yukimoto, S. (2020), Response of the quasi-biennial oscillation to a warming climate in global climate models, *QJRM*, doi:10.1002/qj.3749
- Pendergrass, A. G. and Coleman, D. B. and Deser, C. and Lehner, F. and Rosenbloom, N. and **Simpson, I. R.** (2019) Nonlinear Response of Extreme Precipitation to Warming in CESM1, *Geophys. Res. Lett.*, 46, 10551-10560
- Butler, A. H., Charlton-Perez, A., Domiesen, D. I. V., **Simpson, I. R.** and Sjoberg, J., Predictability of Northern Hemisphere final stratospheric warmings and their surface impacts (2019), *Geophys. Res. Lett.*, 46, 10578-10588
- **Simpson, I. R.**, Yeager, S. G., McKinnon, K. A. and Deser, C.: Decadal predictability of late winter precipitation in western Europe through an ocean-jet stream connection, *Nature Geoscience*, 12, 613-619
- Seager, R., Osborn, T. J., Kushner, Y., **Simpson, I. R.**, Nakamura, J. and Liu, H. (2019): Climate variability and change in Mediterranean-type climates. *J. Clim.*, 32, 2887-2915
- Gettelman, A., Truesdale, J. E., Bacmeister, J. T., Caldwell, P. M., Neale, R. B., Bogenschutz, P. A. and **Simpson, I. R.** (2019): The Single Column Atmosphere Model version 6 (SCAM6): Not a Scam but a Tool for Model Evaluation and Development, *JAMES*, 11, 1381-1401
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- Butler, A., Charlton-Perez, A., Domeisen, D. I. V., Garfinkel, C., Gerber, E. P., Hitchcock, P., Karpetchko, A. Y., Maycock, A. C., Sigmund, M., **Simpson, I. R.** and Son, S.-W (2019) Sub seasonal predictability and the stratosphere. *Chapter in "The Gap Between Weather and Climate Forecasting"*, pp223-241, <https://doi.org/10.1016/B978-0-12-811714-9.00011-5>
- Tilmes, S., Richter, J. H., Kravitz, B., MacMartin, D. G., Mills, M. J., **Simpson, I. R.**, Glanville, A. S., Fasullo, J., Phillips, A. S., Lamarque, J.-F., Trippia, J., Edwards, J., Mickelson, S., Ghosh, S. (2018) CESM1(WACCM) Stratospheric Aerosol Geoengineering Large Ensemble (GLENS) Project, *Bull. Amer. Met. Soc.*, 99, 23610-2371
- Fasullo, J. T., Tilmes, S., Richter, J. H., Kravitz, B., MacMartin, D. G., Mills, M. J., and **Simpson, I. R.** (2018) Persistent polar ocean warming in a strategically geoengineered climate, *Nat. Geos.*, 11, 910-914
- Adam, O., Grise, K. M., Staten, P., **Simpson, I. R.**, Davis, S. M., Davis, N. A., Waugh, D. W. and Birner, T. (2018): The TropD software package: Standardized methods for calculating tropical width diagnostics, *Geosci. Model Dev.*, 11, 4339-4357
- **Simpson, I. R.**, Deser, C., McKinnon, K. A. and Barnes, E. A.: Modelled and observed multidecadal variability in the North Atlantic jet stream and its connection to sea surface temperatures (2018), *J. Clim.*, 31, 8313-8338
- Zhang, P., Wu, Y., **Simpson, I. R.**, Smith, K. L., Zhang, X., De, B. and Callaghan, P. (2018): A stratospheric pathway linking a colder Siberia to Barents-Kara sea ice loss, *Science Advances*, 4, doi: 10.1126/sciadv.aat6025
- **Simpson, I. R.**, Hitchcock, P., Seager, R., Wu, Y. and Callaghan, P. (2018) The downward influence of uncertainty in the Northern Hemisphere stratospheric polar vortex response to climate change, *J. Clim.*, 31, 6371-6391
- **Simpson, I. R.** (2018) Natural variability in the width of the tropics, *USClivar Variations*, 16(2), 14-20, doi:10.5065/D69Z92QF
- Waugh, D. W., Grise, K. M., Seviour, W. J. M., Davis, S. M., Davis, N., Adam, O., Son, W.-W., **Simpson, I. R.**, Staten, P. W., Maycock, A. C., Ummenhofer, C. C., Birner, T. and Ming, A. (2018) Revisiting the Relationship among Metrics of Tropical Expansion, *J. Clim.*, 31, 7565-7581
- Richter, J. H., Tilmes, S., Glanville, A., Kravitz, B., MacMartin, D. G., Mills, M. J., **Simpson, I. R.**, Vitt, F., Tribbia, J. J., Lamarque, J.-F. (2018) Stratospheric response in the first geoengineering simulation meeting multiple surface climate objectives, *J. Geophys. Res.*, 123, doi:10.1029/2018JD028285

- Tilmes, S., Richter, J. H., Kravitz, B., MacMartin, D. G., Milles, M. J., **Simpson, I. R.**, Glanville, A. S., Fasullo, J., Phillips, A. S., Lamarque, J.-F., Tribbia, J., Edwards, J., Mickelson, S., Ghosh, S. (2018) CESM1(WACCM) Stratospheric Aerosol Geoengineering Large Ensemble (GLENS) Project, Bull. Amer. Met. Soc., 99, 2361-2371
- Deser, C., **Simpson, I. R.**, Phillips, A. S. and McKinnon, K. A., How well do we know ENSO's climate impacts over North America and how do we evaluate models accordingly? J. Clim., 31, 4991-5041
- **Simpson, I. R.**, Bacmeister, J. T., Sandu, I., Rodwell, M. J. (2018) Why do modelled and observed surface wind stress climatologies differ in the trade wind regions? J. Clim. 31, 491-513
- Barnes, E. A. and **Simpson, I. R.** (2017) Seasonal sensitivity of the Northern Hemisphere jet-streams to Arctic temperatures on subseasonal timescales, J. Clim., 30, 10117-10137
- Deser, C., **Simpson, I. R.**, McKinnon, K. A. and Phillips, A. S. (2017) The Northern Hemisphere extra-tropical atmospheric circulation response to ENSO: How well do we know it and how do we evaluate models accordingly? J. Clim., 30, 5059–5082.
- Polvani, L. M., Clement, A. C., Medeiros, B., Benedict, J. J. and **Simpson, I. R.** (2017) Opening the Door to Simpler Climate Models in the Community Earth System Model Project, EOS, 98.
- Seager, R. and **Simpson, I. R.** (2016) Western boundary currents and climate change. J. Geophys. Res. Oceans, 121 *Perspective Article*
- Hitchcock, P. and **Simpson, I. R.** (2016) Quantifying eddy feedbacks and forcings in the tropospheric response to stratospheric sudden warmings. J. Atmos. Sci., 73, 3641-3657.
- Shaw, T. A., Baldwin, M., Barnes, E. A., Caballero, R., Garfinkel, C. I., Hwang, Y.-T., Li, C., O’Gorman, P., Riviere, G., **Simpson, I. R.** and Voigt, A. (2016) Storm track processes and the opposing influences of climate change. Nature Geoscience, 9, 656-664
- **Simpson, I. R.** and Polvani, L. M. (2016) Revisiting the relationship between jet position, forced response and annular mode variability in the southern mid-latitudes. Geophys. Res. Lett., 43, 2896–2903
- **Simpson, I. R.** (2016) Climate change predicted to lengthen transatlantic travel times. Env. Res. Lett., 11, 024008 *Perspective Article*
- **Simpson, I. R.**, Seager, R., Ting, M. and Shaw, T. A. (2015) Causes of change in Northern Hemisphere winter meridional winds and regional hydroclimate. Nature Climate Change, 6, 65-70
- **Simpson, I. R.**, Seager, R., Shaw, T. A. and Ting, M. (2015) Mediterranean summer climate and the importance of Middle East Topography. J. Clim., 27, 7921-7948
- Seager, R., Neelin, D., **Simpson, I. R.**, Liu, H., Henderson, N., Shaw, T. A., Kushnir, Y., Ting, M., Cook, B. (2014) Dynamical and thermodynamical causes of large-scale changes in the hydrological cycle over North America in response to global warming. J. Clim., 27, 7921–7948
- Hitchcock, P. and **Simpson, I. R.** (2014), The Downward Influence of Stratospheric Sudden Warmings. J. Atmos. Sci., 71, 3856–3876
- Seager, R., Liu, H., Henderson, N., **Simpson, I. R.**, Kelley, C., Shaw, T. A., Kushnir, Y., Ting, M. (2014) Causes of increasing aridification of the Mediterranean in response to rising greenhouse gases. J. Clim., 27, 4655–4676, 4655–4676
- **Simpson, I. R.**, Shaw, T. A. and Seager, R. (2014) A diagnosis of the seasonally and zonally varying mid-latitude circulation response to global warming. J. Atmos. Sci., 71, 2489–2515
- **Simpson, I. R.**, Shepherd, T. G., Hitchcock, P. and Scinocca, J. F. (2013) Southern Annular Mode dynamics in observations and models, part 2: eddy feedbacks, J. Clim., 26, 5220-5241
- **Simpson, I. R.**, Hitchcock, P., Shepherd, T. G. and Scinocca, J. F. (2013) Southern Annular Mode dynamics in observations and models, part 1: the influence of climatological zonal wind biases in a comprehensive GCM, J. Clim., 26, 3953-3967

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- **Simpson, I. R.**, Hitchcock, P., Shepherd, T. G. and Scinocca, J. F. (2011) Stratospheric variability and tropospheric annular mode timescales. *Geophys. Res. Lett.*, 38, L20806
- **Simpson, I. R.**, Shepherd, T. G. and Sigmond, M. (2011) Dynamics of the lower stratospheric circulation response to ENSO. *J. Atmos. Sci.*, 68, 2537-2556
- **Simpson, I. R.**, Blackburn, M., Haigh, J. D. and Sparrow, S. N. (2010) The impact of the state of the troposphere on the response to stratospheric heating in a simplified GCM. *J. Clim.*, 23, 6166-6185
- **Simpson, I. R.**, Blackburn, M. and Haigh, J. D. (2009) The role of eddies in driving the tropospheric response to stratospheric heating perturbations. *J. Atmos. Sci.*, 66, 1347-1365
- Gregory, S. G., Jardine M., **Simpson, I** and Donati, J.-F. (2006) Mass accretion onto T Tauri stars. *Mon. Not. Roy. Astron. Soc.*, 371

Grants and Fellowships

PI on NOAA award NA20OAR4310413: An improved understanding of the interacting factors that influence the evolution and severity of droughts in the USA in present and future climates (509 960USD)

Co-PI on NSF award 2004575: Cyberinfrastructure for streamlining coupled, simplified climate modeling within the Community Earth System Model (599 969USD)

Co-PI (Karen McKinnon PI) on NSF award 1939988: The factors governing the daily near-surface air temperature variability over land (619 945 USD)

PI on NSF award 000057-00414: Extending the atmospheric model hierarchy within CESM (274,091USD)

PI on NSF Large Scale Dynamics award AGS-1317469: Stratospheric and Tropical influences on the mid-latitude circulation response to global warming (661,453USD)

Lamont-Doherty Earth Observatory Postdoctoral Fellowship

Awards

Editors award, *Journal of Climate*, 2019

Editors citation for excellent in refereeing, *Geophysical Research Letters*, 2018

Outstanding reviewer award, *Environmental Research Letters*, 2018

Editors citation for excellence in refereeing, *Geophysical Research Letters*, 2014

Winton prize for best PhD thesis in Physics, Imperial College London.

Miller prize for highest degree mark in faculty of science, University of St Andrews.

Royal Society of Edinburgh, Cormack undergraduate astronomy research prize.

University of St Andrews Class medals in 1st, 2nd, 3rd and 4th year Astrophysics, 1st year Maths and 2nd year Physics, William David Brodie prize for Junior Honours Physics, Scott Lang Prize for proficiency in Astrophysics, JF Allen prize for 2nd level Physics, Margaret Stewart Prize for 1st year Astronomy and Astrophysics

Invited talks and seminars

Cornell University seminar series, Feb 2021

Lamont-Doherty Earth Observatory seminar series, Feb 2021

NCAR-USACE meeting on Earth System Model selection, Feb 2021

AGU, invited presentation, Dec 2020

University of Washington, Atmospheric sciences colloquium, Oct 2020

Stanford university seminar, June 2020

Imperial college london seminar, June 2020

University of Reading seminar series, June 2020

USClivar webinar on simpler models within CESM, May 2020

WCRP/SPARC SATIO-TCS stratosphere-troposphere coupling in the tropics workshop, Kyoto, Japan, Feb 22nd

CSU Atmospheric science seminar series, Jan 2020

UT Austin Institute of Geophysics seminar series, Jan 2020

AGU Fall meeting 2019 Centennial speaker
AGU Fall meeting 2019
FSU Earth, Oceanic and Atmospheric sciences colloquium, November 2019
Harvard EPS colloquium, September 2019
CMIP6 session, USCLivar summit, Aug 2019 (presented remotely)
Panelist on National Academies meeting for geoengineering report, Aug 2019
ACSIS summer science meeting, Plenary Speaker, Cambridge UK, July 2019
NYU, CAOS colloquium March 2019
Workshop on high resolution modelling, Feb 2019, (presented remotely)
Heldfest, Oct 2018
Stormtracks workshop, Stockholm, Sept 2018
University of Utah, Department of Atmospheric Science seminar series, Feb 2018
AGU Fall meeting, Dec 2017
ASPEN Global Change Institute workshop on Earth System Model Evaluation, Aug 2017
ESIP summer meeting, Invited plenary speaker and panelist, July 2017
Denver-Boulder Chapter of the American Meteorological Society, monthly meeting March 2017
Geophysical Fluid Dynamics Laboratory Seminar, Dec 2016
University of Toronto, Brewer Atmospheric Physics Seminar, Sept 2016
ECMWF workshop on drag processes and their role in the large scale circulation, Sept 2016
NOAA physical sciences division seminar series, July 2016
EGU general assembly, April 2016
Regional climate change workshop, University of Reading, April 2016
AGU Fall meeting, Dec 2015
Colorado State University, Department of Atmospheric Science colloquium, Dec 2015
University of Reading, Workshop on Atmospheric Angular Momentum Budgets, April 2014
Yale University, AOCD seminar series, Jan 2015
Stony Brook University, TAOS seminar series, May 2014
Massachusetts Institute of Technology, Dec 2013, EAPS MASS seminar series
Cornell University, Earth and Atmospheric Sciences, Sept 2013, seminar
NASA GISS, May 2013, seminar
Princeton University/GFDL, May 2013, seminar
SPARC DynVar workshop, April 2013, invited speaker
Australian Meteorological and Oceanographic Society Annual Meeting, Feb 2013, invited plenary speaker
Lamont-Doherty Earth Observatory, Jan 2013, OCP seminar
McGill University, Atmospheric and Oceanic Sciences, August 2012, seminar
University of Cambridge, DAMTP, April 2012, seminar
University of Oxford, AOPP, April 2012, seminar
University of Reading, Department of Meteorology, April 2012, NCAS seminar
Columbia University, October 2009, Applied Mathematics Colloquium
MOCA-09, July 2009, invited speaker
University of Toronto, Dec 2008, seminar
University of Oxford, AOPP, November 2008, seminar
ETH Zürich, August 2008, seminar
PMOD-WRC, August 2008, seminar
UK Met Office, July 2008, seminar
University College London, Department of Mathematics, May 2008, seminar
Massachusetts Institute of Technology, April 2008, EAPS, Mass seminar series
Royal Meteorological Society, March 2008, Postgraduate student evening
University of Reading, Department of Meteorology, May 2007, Strat-hour seminar series

Synergistic Activities

Co-chair of CESM climate variability and change working group (2021-present)
Co-lead of NOAA drought task force 4 (2020-present)
Editor, Journal of Climate (2020-present)
Member of the NOAA CPO/EESM council (2020-present)
AMS Haurwitz lecturer selection committee (2020)

Member of SPARC strategy task team
Section editor, Current Climate Change Reports on “Advances and future directions in Earth System Modelling”, 2020
Program chair, Climate Variability and Change, AMS 2020
Organizing committee member of USClivar CMIP6 hackathon, 2019
Conference organizing committee member, USClivar workshop on large ensembles, 2019
Contributing author to Mediterranean Assessment Report 1 (MAR1) 2019
Section editor, Current Climate Change Reports on “Mid-latitude processes and climate change”, 2019
Lead CESM tutorials at AGU 2018 and AMS 2019
Reviewer on NSF panel
Associate editor, Journal of Climate
Member of the SPARC Stratospheric Network for the Assessment of Predictability (SNAP) committee
Member of US Clivar working group on the expansion of the tropical belt
Member of US Clivar working group on large ensembles
Member of AMS Atmospheric and Oceanic Fluid Dynamics Committee
Member of AMS Climate Variability and Change Committee
Convenor of AGU sessions, 2015, 2016, 2017, 2018, 2019
Member of the Scientific Organizing Committee for SPARC workshop on storm track processes, 2015
Editor of the Stratospheric Processes and their Role in Climate (SPARC) newsletter, autumn 2010
NSF panel reviewer
Reviewer for J. Clim., J. Atmos. Sci., Clim. Dyn., GRL, ERL, Atmospheric Science Letters, QJRMS, JAMES, JGR, Nature, Nature Geoscience, Nature Climate Change, Nature Scientific Reports, Science, Science Advances

Other skills and experience

Highly proficient at Fortran 77/90, IDL and NCL programming languages, UNIX, Windows and LaTeX.
Departmental seminar series organizer (Imperial College, LDEO and NCAR).
Teaching assistant in 2nd year undergraduate physics.
Attended the Geophysical and Environmental Fluid Dynamics summer school, University of Cambridge, UK
Attended the European Research Course on Atmospheres, Université Joseph Fourier, Grenoble, France