

CURRICULUM VITAE - PROFESSOR MARK SAUNDERS

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Mark Saunders is Professor of Climate Prediction in the Department of Space and Climate Physics (Mullard Space Science Laboratory) at University College London (UCL). He has a strong track record of research into climate variability, global weather extremes and of applying and commercialising the results of such research extending back 20 years. His current main research foci are tropical storms worldwide, UK windstorms and Southeast Asia flooding. He has performed a range of innovative research on the monitoring, modelling and prediction of these and other weather extremes worldwide. This has led to the commercialisation of several new products, the winning of prestigious industry awards and the wide use of his team's developments by humanitarian organisations. Professor Saunders research was graded 4* (outstanding) for impact in the 2014 REF, and he and his team achieved the runner-up accolade for the inaugural NERC International Impact award in 2015. He has published over 300 scientific research papers and articles, including lead-author papers in *Nature*.

Education/Qualifications:

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| 1978 | BSc (1st Class Honours) in Geophysical Sciences, Southampton University, UK. |
| 1982 | PhD in Space Plasma Physics, Imperial College London, UK. |
| 1982 | Diploma of Imperial College London, UK. |

Professional History:

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| 1981 - 1983 | SERC Research Assistant in Magnetospheric Physics, Imperial College London, UK. |
| 1983 - 1985 | ESA Research Fellow, Institute of Geophysics and Planetary Physics, University of California, Los Angeles, USA. |
| 1985 - 1986 | SERC Research Assistant in Magnetospheric Physics, Imperial College London, UK. |
| 1986 | SERC Advanced Fellow in Space Physics, Blackett Laboratory, Imperial College London. |
| 1986 - 1993 | Royal Society 1983 University Research Fellow in Space Physics, Blackett Laboratory, Imperial College London, UK. |
| 1993 - 1998 | Lecturer in Earth Observation (1993 - 1996) and Climate Physics (1996 - 1998), Department of Space and Climate Physics, University College London, UK. |
| 1998 - 2005 | Senior Lecturer in Climate Physics, Department of Space and Climate Physics, University College London, UK. |
| 2005 - now | Professor of Climate Prediction, Department of Space and Climate Physics, University College London, UK. |

Achievements and Awards:

- Winner, British Insurance Award for London Market Innovation of the Year 2004 (Royal Albert Hall).*
- Winner, British Insurance Award for Risk Management 2006 (Royal Albert Hall).*
- Runner-Up inaugural NERC International Impact Award 2015.
- Instigated and led the development of the TSR tropical-storm tracker which helped to save many lives from cyclone Sidr's devastating impact on Bangladesh in November 2007** and contributed to lives saved from tropical storm Mahasen which struck Bangladesh in May 2013.
- Instigated and led the development of innovative extreme weather services which have achieved substantive commercial impacts. Since January 2008 these impacts include: £1.385 million of income generated by two commercial services called 'EuroTempest Ltd' (launched in 2007) and 'Tropical Storm Risk Business' (launched in 2009); incorporation of data into the commercial products of 22 international organisations; 10 million web hits and 24,000 storm alert and seasonal forecast subscribers generated by a public web-based warning service.

- Instigated and led the development of innovative “UK 100m resolution windstorm data” which comprises three products and offers UK-wide data at a spatial resolution over 40 times better than the current state-of-the-art. Independent tests by a leading UK insurer find that the “UK 100m resolution windstorm data” are significantly more predictive of UK claims frequency than is the company’s current preferred model.
- * The Tropical Storm Risk (TSR) venture, which I have led since its creation in 2000, won these prestigious awards in front of an audience of 1800 guests at the Royal Albert Hall in London. In each case TSR beat off stiff competition from many international companies. It is the first occasion either award has been won by an academic. The British Insurance Awards are the Oscars for the Insurance Industry.
- ** Elish Majumber, Central Manager for the HEED (Health, Education, Economic, Development) Bangladesh’s Disaster Management Programme, said: “The UCL tropical storm tracker played a crucial role the day before Sidr struck, in alerting our volunteers in the Barguna and Patuakhali districts in southern Bangladesh to mobilise people to get into the cyclone shelters in time. Based on media warnings, our staff had previously decided not to mobilise people due to the risk of giving false information, but this decision was changed by the UCL/TSR warning. It proved accurate and helped to save many lives.”

Membership of Advisory Bodies and Consultancies:

I have held advisory body roles with SERC, Royal Society, European Geophysical Society, Benfield UCL Hazard Research Centre, Tropical Storm Risk, EuroTempest, Risk Management Solutions and Tokio Millennium Re. I have undertaken consultancies for Benfield, TSUNAMI-Initiative, Groupama, Kiln Associates, St Paul Reinsurance. Risk Management Solutions, Deutsche Bank, British Petroleum, Reuters Alert Net, United Nations World Food Programme, REN (Portuguese Power Supply Company), Aegis Insurance Company, Tokio Millennium Re, Sutton and East Surrey Water, Catlin Insurance Company and Blue Planet Odyssey (Round the World Sailing Event).

Academic Supervision:

Full-time supervisor of 12 research assistants (since 1994) and 11 PhD students (since 1993) relating to weather and climate extremes worldwide.

Most Significant Six Publications/Professional Output:

1. Saunders, M.A., C.T. Russell and N. Sckopke, Flux transfer events: scale size and interior structure, *Geophys. Res. Lett.*, **11**, 131-134, 1984. (244 citations).
2. Saunders, M.A., Origin of the cusp Birkeland currents, *Geophys. Res. Lett.*, **16**, 151-155, 1989. (70 citations).
3. Saunders, M.A., B. Qian and B. Lloyd-Hughes, Summer Snow Extent Heralding of the Winter North Atlantic Oscillation, *Geophys. Res. Lett.*, **30**(7), 1378, doi:10. 1029/2002GL016832, 2003. (Highlighted by *Geophys. Res. Lett.* and the subject of a News Story in Science: Kerr, R.A., WEATHER FORECASTING: Can Northern Snow Foretell Next Winter's Weather?, *Science*, **300**, 1865-1866, 2003.)
4. Saunders, M.A., F.P. Roberts and P.C. Yuen, Global Tropical Storm Tracker, www.tropicalstormrisk.com, 2004. Winner of the British Insurance Award 2004 for London Market Innovation of the Year (presented at the Royal Albert Hall). Selected to provide emergency alert feeds to several organizations including *Reuters AlertNet*, the global humanitarian news portal, and the *United Nations World Food Programme*. Used by Bangladeshi humanitarian and government organizations to help save thousands of lives from Cyclone Sidr’s devastating impact in November 2007.
5. Saunders, M.A. and A.S. Lea, Seasonal prediction of US landfalling hurricane activity from 1 August, *Nature*, **434**, 1005-1008, 2005. (90 citations).
Hurricanes rank as the United States’ most expensive natural disaster For over two decades scientists have been attempting – with little success – to deliver seasonal predictions of hurricane activity reaching the coast of the United States. This study is the first to offer forecast precision which is high enough to be practically useful.
6. Saunders, M.A. and A.S. Lea, Large contribution of sea surface warming to recent increase in Atlantic hurricane activity, *Nature*, **451**, 557-560, 2008. (182 citations).
The study is the first to quantify how much of the recent increase in North Atlantic hurricane activity/frequency is due to warming sea surface temperatures. The current sensitivity of hurricane

activity to sea surface warming is large with a 0.5°C increase in sea surface temperature being associated with a ~40% increase in activity. The story was covered by over 100 national/international media outlets.

Selected Other Publications:

- Fletcher, C. G and M. A. Saunders, Winter North Atlantic Oscillation hindcast skill: 1900-2001, *J. Climate*, **19**, 5762-5776, 2006.
- Gale, E. L. and Saunders, M. A., The 2011 Thailand flood: climate causes and return periods, *Weather*, **68**, 233-237, 2013.
- Jagger, T. H., Elsner, J. B. and Saunders, M. A., Forecasting U.S. insured hurricane losses. Chapter 10 (pp 189-208) in *Climate Extremes and Society*, edited by Henry F. Diaz and Richard J. Murnane, Cambridge University Press, 348pp, 2008.
- Lloyd-Hughes, B. and M. A. Saunders, A drought climatology for Europe, *International Journal of Climatology*, **22**, 1571-1592, 2002. (745 citations).
- Lloyd-Hughes, B., Saunders, M. A. and Rockett, P., A consolidated CLIPER model for improved August-September ENSO prediction skill, *Weather and Forecasting*, **19**, 1089-1105, 2004.
- Pielke, Jr., R. A., J. Gratz, C. W. Landsea, D. Collins, M. A. Saunders and R. Musulin, Normalized hurricane damages in the United States: 1900-2005, *Natural Hazards Review*, **9**, 29-42, 2008. (819 citations).
- Qian, B. and M.A. Saunders, Seasonal predictability of wintertime storminess over the North Atlantic, *Geophys. Res. Lett.*, **30**(13), 1698, doi:10.1029/2003GL017401, 2003.
- Saunders, M. A., Chandler, R. E., Merchant, C. J. and Roberts, F. P., Atlantic hurricanes and NW Pacific typhoons: ENSO spatial impacts on occurrence and landfall, *Geophys. Res. Lett.*, **27**(8), 1147-1150, 2000. (118 citations).
- Saunders, M. A. and A. S. Lea, The 2005/06 UK and European winter: the UCL forecast and its assessment against observations, *Weather*, **61**, 347-352, 2006.
- Saunders, M. A., Klotzbach, P. J. and Lea, A. S. R., Replicating annual North Atlantic hurricane activity 1878-2012 from environmental variables, *J. Geophys. Res. Atmos.*, **122**, doi:10.1002/2017JD026492, 2017.

Most Significant Research Grants:

1. £102,000 awarded to M. A. Saunders. Statistical predictability of North Atlantic sea surface temperatures. Awarded by the UK Natural Environment Research Council (NERC) (grant GR3/R9925). Award period: 2000-2003.
2. £1,160,000 awarded to M. A. Saunders. To support underpinning research to develop and maintain the Tropical Storm Risk extreme weather forecasting and warning services. Awarded by the Benfield Group, Royal & SunAlliance and Crawford & Company. Award period: 2000-2012.
3. £206,000 awarded to M. A. Saunders. To support underpinning research to develop a European windstorm live tracker and to develop EuroTempest Ltd. Awarded by the Benfield Group and Royal & SunAlliance. Award period: 2004-2007.
4. £100,000 awarded to M. A. Saunders. To develop state-of-the-art European extreme wind climatology comprising extreme wind and gust speed exceedance probability distributions for various locations and levels of spatial resolution across Europe. This work will assist the European insurance industry further understand the basis risk from severe windstorms. Awarded by NERC. Award-period: 2011-2013.
5. £270,000 awarded to M. A. Saunders to use eight state-of-the-art dynamical ensemble forecasts to quantify the uncertainty and improve the skill of UK/European high wind speed forecasts out to two weeks ahead. This study also assesses how well uncertainty is represented by the ensemble output from each model. Awarded by NERC. Award-period: 2012-2015.

Signed:



Professor Mark A. Saunders

Date: 20th November, 2017.