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Short Curriculum Vitae

Professor Bryan N. Lawrence

Citizenship: New Zealand (UK permanent resident)

University of Reading: Professor of Weather and Climate Computing
National Centre of Atmospheric Science: Director of Models and Data

Brief Description of Current Role (from 2017)

I am the one of the senior management in the National Centre for Atmospheric Science. In this role I am responsible for a multi-million pound annual budget, including:

1. Managing the provision of HPC for the NERC community (developing strategy, liaising with providers/government/Europe, managing the HPC budget, etc);
2. Delivering the JASMIN supercomputer (at the Science and Technology Facilities Council, STFC) for NERC (technical direction, overall governance, setting goals; fostering development projects etc).
3. Delivery of the NCAS Computational Modelling Services (CMS) unit which provides user support, software engineering, training and future computing research (technical direction, staff management, etc);

I have a University Chair in Weather and Climate Computing held jointly between the Departments of Meteorology and Computer Science. In this role I am expected to

4. Foster research into next generation weather and climate computing, utilising high resolution climate simulation, and covering (some of): coding for simulation on future architectures, tools for managing storage, access, and workflows for petascale and exascale data, cloud computing applicable to environmental science, understanding/developing/improving analysis big data analysis techniques in environmental science, environmental information management systems, and taking part in, and where necessary, leading relevant European activities.
5. Supervise Ph.D. students (one underway, previous student completed 2017) and provide leadership for the Advanced Computing for Environmental Sciences (ACES) research group.

To facilitate management of activities at the STFC, I hold a formal STFC Visiting Scientist position.

Previously

- 2011-2017: Similar role, employed by both the University of Reading and the STFC in a split position (including management of the Centre for Environmental Data Analysis, CEDA, the transition to one employer in 2017 was to allow more time on HPC and research);
- 2000-2011: Director CEDA, Employed by STFC alone, with no responsibility for HPC, and no research requirement.
- 1996-2000: Lecturer than Senior Lecturer in Physics at the University of Canterbury, NZ.
- 1990-1996: Post-Doc University of Oxford, then Joint Research Fellow with University of Oxford, Lady Margaret Hall, and the Rutherford Appleton Laboratory.
- Ph.D. 1990.

Four Selected Highlights from the last six years.

- Expert team member for the procurement of ARCHER (2012/13, resulting system entered the Top500 at #19) and for ARCHER2 (2019/20, new system due June 2020).
- Led successful procurement and installation of a world-class data analysis system (JASMIN) in 2012, followed by acquisition of funding for enhancement phases in five out of the last six years, taking it to a world-leadership position.
- Took part in the 2018 international science advisory panel review of activities at the Barcelona Supercomputer Centre.
- Awarded the Leptoukh Lecture by the American Geophysical Union for significant contributions to informatics, computational, or data sciences (December 2014)

Ten Selected Recent Publications

A full publication list is available at https://www.bnlawrence.net/publications/, See also my google scholar profile.

1. Senior, C.A., C.G Jones, R.A. Wood, A. Sellar, S. Belcher, A Klein-Tank, R. Sutton, J. Walton, **B.N. Lawrenc**e, T. Andrews, and J.P. Mulcahy (2020). UK Community Earth System Modelling for CMIP6. *J. Adv. Mod. Earth. Sys*, to appear.
2. Pascoe, C., **B.N. Lawrence**, E. Gjuilyardi, M. Jkcukes and K.E. Taylor (2020). Documenting numerical experiments in support of CMIP6. *Geosci. Mod. Dev*. To appear.
3. **Lawrence, B. N**., Rezny, M., Budich, R., Bauer, P., Behrens, J., Carter, M., … Wilson, S. (2018). Crossing the Chasm: How to Develop Weather and Climate Models for next Generation Computers? *Geosci. Mod. Dev.*, *11*(5), 1799–1821. doi:10.5194/gmd-11-1799-2018
4. Hassell, D., J. Gregory, J. Blower, **B.N. Lawrence**, and K.E. Taylor (2017). A Data Model of the Climate and Forecast Metadata Conventions (CF-1.6) with a Software Implementation (Cf-Python v2.1). *Geosci. Mod. Dev.*, *10*(12), 4619–4646. doi:10.5194/gmd-10-4619-2017

5. Balaji, V., E. Maisonnave, N. Zadeh, **B. Lawrence**, J. Biercamp, U. Fladrich, G. Aloisio, R. Benson, A. Caubel, J. Durachta, M.-A. Foujols, G. Lister, S. Mocavero, S. Underwood, and G. Wright: CPMIP: Measurements of Real Computational Performance of Earth System Models. *Geosci. Mod. Dev*., 10, 19-34, 2017. doi:10.5194/gmd-10-19-2017
6. Osprey, A., Riley, G. D., Manjunathaiah, M., & **Lawrence, B. N**. (2014). The Development of a Data-Driven Application Benchmarking Approach to Performance Modelling. In *2014 International Conference on High Performance Computing Simulation (HPCS)* (pp. 715–723). https://doi.org/10.1109/HPCSim.2014.6903760
7. **Lawrence, B.N**. , V.L. Bennett, J. Churchill, M. Juckes, P. Kershaw, S. Pascoe, S. Pepler, M. Pritchard, and A. Stephens. Storing and manipulating environmental big data with JASMIN. *Proceedings of IEEE Big Data, 2013,* 10.1109/BigData.2013.6691556
8. **B. Lawrence**, S. Pepler, C. Jones, B. Matthews, and Callaghan, S, Citation and Peer Review of Data: Moving Towards Formal Data Publication. *International Journal of Digital Curation*, vol. 6, no. 2, 2011. doi:10.2218/ijdc.v6i2.205
9. **B.N. Lawrence**, R. Lowry, P. Miller, H. Snaith, and A. Woolf (2009): Information in environmental data grids. *Phil. Trans. R. Soc. A,* 367, 1003 – 1014. doi:10.1098/rsta.2008.0237
10. Dean, S.M., and J. Flowerdew, **B.N. Lawrence** and S.D. Eckermann, 2006: Parameterisation of Orographic Cloud Dynamics in a GCM. *Climate Dynamics*, 28, pp581-597. doi:10.1007/s00382-006-0202-0

Five Selected Grants

1. ESIWACE2: European Centre of Excellence in Weather and Climate Computing. (European Commission, from January 2019 – and predecessor, ESIWACE)
2. IS-ENES3: Infrastructure for the European Network for Earth System Modelling – Project Lead Scientist (European Commission, from January 2019 – and predecessor, ISENES2)
3. GRAPE: Global retrieval of ATSR cloud parameters and evaluation (completed 2007).
4. UK-HIGEM: a national programme in 'Grand Challenge' high resolution modelling of the global environment (completed 2007).
5. NDG and NDG2: The NERC DataGrid, and the NERC DataGrid and Associated Toolkit (finished 2006, 2007).

Community Service

Currently:

1. UKRI Excalibur: Steering Committee and EPSRC first round review panel
2. HPC acquisition: Procurement team for ARCHER2 (project working group) (and previously requirements and architecture working groups for EuroHPC, and procurement team for ARCHER).
3. Chair: JASMIN/CEDA Board.
4. Chair: NERC HPC Strategy Committee.
5. Science Advisory Board: Barcelona Supercomputer Centre
6. Independent Advisory Panel: Computational and Information Systems Laboratory, NCAR, USA (Chair from 2019).
7. Independent Advisory Panel: Deep South National Science Challenge, NZ.
8. Board Member, and member of HPC and Data Task forces for European Network for Earth System Modelling (ENES).
9. Governance Committee member of the Climate-Forecasts Conventions.

Previously

10. Member of the WGCM Information Panel.
11. Committee member and Deputy Chair of the NERC Information Strategy Group.
12. Recent institutional reviews for Helmholtz Association (KIT, DKRZ)
13. Editorial Board of the *International Journal of Digital Curation* (Publisher: UK Digital Curation Centre)
14. Editorial Board of *Scientific Data* (Publisher: Nature)
15. One of eight principle investigators of the Global Organisation for Earth System Science Portals (http://go-essp.gfdl.noaa.gov/).
16. Member of the Programme Development Group for the NERC Centre for Ecology and Hydrology (CEH).
17. Member of the UK Engineering and Physical Sciences (EPSRC) Strategic Advisory Team on infrastructure.

Five Significant Talks

See also https://www.bnlawrence.net/talks/

1. Exeter, June 2019: Challenges facing the modelling community.
2. Julich, September 2018: Beating data bottlenecks in Weather and Climate Science.
3. London, March 2018: Opportunities and Challenges for Data Science in (Big) Environmental Science.
4. Barcelona, January, 2015: Bringing Compute to Data, Big Data and Extreme-scale Computing, BDEC, 2015.
5. San Francisco, December, 2014: Trends in Computing for Climate Research, AGU Fall Meeting 2014.