

# Curriculum Vitae: Dr. John Lawson

**Post-doctoral Research Assistant;** CIMMS/NSSL, Norman, Oklahoma, USA

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## Overview

I am a creative and philosophical researcher with a wide range of interests, currently based at a renowned federal laboratory at the National Weather Center (USA). I have lead-authored 11 peer-reviewed papers and made 27 conference presentations. While my projects have focussed on applied atmosphere science, I am branching out into the fields of *information theory* and *complex adaptive systems*. I have proficiency in *python* and *Fortran* computer languages; I speak French, German, Latin, and my mother tongue (British English). I ran my own cloud-computing forecasting company before my post-doc, led three grant proposals and chaired a conference session, and carried out mentorship and leadership roles during graduate school. This demonstrates my drive and aptitude for working independently or in teams.

## Education

**Ph.D.**, Meteorology, 2016, Iowa State University, Ames, United States.

Dissertation Title: *Butterflies and Bow Echoes: Addressing Poor Forecasts with Ensemble Simulations*.

**M.S.**, Meteorology, 2013, University of Utah, Salt Lake City, United States. <sup>1</sup>

Dissertation Title: *Analysis and Predictability of the 1 December 2011 Wasatch Windstorm*.

**MMet**, Meteorology (with a year in Oklahoma), 2011, University of Reading, United Kingdom. <sup>2</sup>

Dissertation Title: *Analysis of Frontal Passages over Wales using MST Radar Data*. (**Supervisor:** Prof. Daniel Kirshbaum)

## Employment and training

- Postdoctoral research associate, 2018–2020, Cooperative Institute for Mesoscale Meteorological Studies (CIMMS)/National Severe Storms Laboratory (NOAA/NSSL), Norman, Oklahoma, USA
  - *Supervisor:* Dr. Corey K. Potvin
- Postdoctoral research associate, 2016–2017, CIMMS/NOAA/NSSL, Norman, Oklahoma, USA
  - *Supervisors:* Drs. Nusrat Yussouf and John D. Kain
- Founder and Director, Bolt Forecast Limited (reg. in England and Wales), 2014–2016
- Research Assistant/Ph.D candidate, 2013–2016, Department of Geological and Atmospheric Sciences, Iowa State University, USA (also **teaching assistant** and **undergraduate advisor**)
  - *Supervisor:* Prof. William A. Gallus, Jr
- Research Assistant/M.S. candidate, 2011–2013, Department of Meteorology, University of Utah, USA
  - *Supervisor:* Prof. John D. Horel
- Research Assistant, Summers of 2009 and 2010, Centre for Atmospheric Science, University of Manchester, United Kingdom
  - *Supervisor:* Prof. David Schultz

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<sup>1</sup> I initially began as a PhD student, and passed the preliminary exam at the doctoral level, but chose to leave early (completing an M.S.) due to a family issue.

<sup>2</sup> This degree had a top-up graduate year to turn a Bachelor of Science into a Master of Meteorology.

### Awards and Invitations

- Invited as author to the special issue of Atmosphere (MDPI) entitled “Thunderstorm Morphology Evolution and Forecasts of Thunderstorm System Rainfall”
- Invited paper coming in Atmosphere (MDPI) assessing surprise removal using information theory.
- The inaugural Tim Samaras award for best student oral presentation at the 19th Annual NWA Severe Storms and Doppler Radar Conference.
- Twice recipient of “highly commended” for best student presentation at conference sessions.
- Student winner of national weather forecasting competition in 2015 (using only a bespoke simple automated statistical algorithm without subjective adjustment just to annoy my colleagues).

Complete publication and presentation list (peer-reviewed papers also listed at the following URL: <https://scholar.google.com/citations?hl=en&user=hDAU8eQAAAAJ>)

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### In preparation or review (journal ranking quartile listed)

**Lawson, J.R.,** Potvin, C.K., Skinner, P.S., and Reinhart, A.E., 2020: The vice and virtue of increased horizontal resolution in ensemble forecasts of tornadic thunderstorms in low-CAPE, high-shear environments. *Monthly Weather Review* (conditionally accepted). (Q1)

**Lawson, J.R.,** Nelson, K., and Potvin, C.K.: Optimising forecasts of rare weather events: surprise removal and information flow. *MDPI-Atmosphere* (in preparation; invited publication). (Q2)

**Lawson, J.R.,** Potvin, C.K., Skinner, P.S., Flora, M.L., Stratman, D.R.: Information gain of forecasts: a scale-aware framework. *Monthly Weather Review* (in preparation) (Q1)

### Peer-reviewed Publications (journal ranking quartile listed)

**Lawson, J. R.,** Gallus, Jr., W.A., and Potvin, C.K., 2020: Sensitivity of a mesoscale convective system to horizontal grid spacing in a convection-allowing ensemble. (Invited publication) *MDPI-Atmosphere* (Q2)

**Lawson, J.R.,** 2019: Predictability of idealized thunderstorms in buoyancy–shear space. *Journal of the Atmospheric Sciences*, **76** (9), 2653–2672 (Q1)

**Lawson, J.R.,** J.S. Kain, N. Yussouf, D.C. Dowell, D.M. Wheatley, K.H. Knopfmeier, and T.A. Jones, 2018: Advancing from Convection-Allowing NWP to Warn-on-Forecast: Evidence of Progress. *Weather and Forecasting*, **33**, 599–607 (Q1)

**Lawson, J. R.,** and Gallus Jr, W.A., 2016.: Adapting the SAL method to evaluate reflectivity forecasts of summer precipitation in the central United States. *Atmospheric Science Letters*, **17** (10), 524–530. (Q2)

**Lawson, J.,** and Gallus Jr, W.A., 2016: On contrasting ensemble simulations of two Great Plains bow echoes. *Weather and Forecasting*, **31**, 787–810. (Q1)

**Lawson, J.,** and Horel, J. D., 2015: Ensemble forecast uncertainty of the 1 December 2011 Wasatch downslope windstorm. *Weather and Forecasting*, **30**, 1749–1761. (Q1)

**Lawson, J.,** and Horel, J. D., 2015: Analysis of the 1 December 2011 Wasatch downslope windstorm. *Weather and Forecasting*, **30**, 115–135. (Q1)

**Lawson, J.**, Schultz, D.M., Vaughan, G., and Kirshbaum, D., 2013: Multiple bands near fronts in VHF wind-profiling radar and radiosonde data. *Atmospheric Science Letters*, **14**, 146-152 (Q2)

**Lawson, J.**, Vaughan, G., and Schultz, D.M., 2011: Classifying fronts in data from a VHF wind-profiling radar. *Atmospheric Science Letters*, **12**, 375-380 (Q2)

**Lawson, J.**, 2011: Snow and Gales in eastern England from a North Sea polar low: 6/7 January 2010. *Weather*, **66**, 10-13 (Q3)

### **Conference Presentations**

Derek Stratman and **John R. Lawson**, 2021: (*upcoming American Meteorology Society presentation on my development of stochastic perturbations*).

**John R. Lawson**, Corey K. Potvin, Patrick S. Skinner, and Antony E. Reinhart, 2020: Vice and Virtue of Increased Resolution of Thunderstorm Objects. *The 100th AMS Annual Meeting, Boston, MA, United States*, American Meteorological Society.

**John R. Lawson**, 2020: Conditional Predictability of Idealized Thunderstorms in CAPE–Shear Space. *The 100th AMS Annual Meeting, Boston, MA, United States*, American Meteorological Society.

**John R. Lawson**, Corey K. Potvin, Patrick S. Skinner, and Montgomery L. Flora, 2020: The Information Gain of NWP Models, 2020. *The 100th AMS Annual Meeting, Boston, MA, United States*, American Meteorological Society.

**John R. Lawson**, Corey K. Potvin, Nusrat Yussouf, John S. Kain, 2020: Single-Suite Stochasticity for Thunderstorms: Can It Beat a Mixed-Physics Suite? *The 100th AMS Annual Meeting, Boston, MA, United States*, American Meteorological Society.

**John R. Lawson**, Corey K. Potvin, Patrick S. Skinner, and Antony E. Reinhart, 2019: Effect of increased horizontal resolution on thunderstorm objects. *Joint VORTEX-SE/NWA 2019 session, Huntsville, Alabama, United States*, National Weather Association and VORTEX-SE.

**John R. Lawson**: Estimating Thunderstorm Predictability Horizons in Strongly Forced, Straight-Shear Environments, 2019. *The 18th Conference on Mesoscale Processes, Savannah, Georgia, United States*, American Meteorological Society.

**John R. Lawson**, Corey K. Potvin, Nusrat Yussouf, John S. Kain, 2019: Stochasticity, Thunderstorms, and a Call for Creativity. *The 18th Conference on Mesoscale Processes, Savannah, Georgia, United States*, American Meteorological Society.

**John R. Lawson** and C. K. Potvin, 2018: Impact of Increased Resolution on Ensemble Forecasts of Thunderstorm Objects in the US Southeast. *29th Conference on Severe Local Storms, Stowe, Vermont, United States*, American Meteorological Society.

**John R. Lawson**, C. K. Potvin and M. L. Flora, 2018: Information, Predictability, and Verification at the

Thunderstorm Scale. *29th Conference on Severe Local Storms, Stowe, Vermont, United States*, American Meteorological Society.

**John R. Lawson**, J. S. Kain, N. Yussouf, D. C. Dowell, D. M. Wheatley, K. H. Knopfmeier, and T. A. Jones, 2018: Evidence of Progress: Precipitation Forecasts from the Warn-on-Forecast Ensemble System. *29th Conference on Severe Local Storms, Stowe, Vermont, United States*, American Meteorological Society.

Patrick S. Skinner, K. H. Knopfmeier, J. J. Choate, B. T. Gallo, **J. R. Lawson**, A. E. Reinhart, T. A. Jones, N. Yussouf, D. C. Dowell, K. A. Wilson, L. J. Wicker, and P. L. Heinselman, 2018: Development of Verification Techniques for the NSSL Experimental Warn-on-Forecast System for Ensembles (NEWS-e). *29th Conference on Severe Local Storms, Stowe, Vermont, United States*, American Meteorological Society.

**John R. Lawson**, N. Yussouf and J. Kain, 2018: Uncertainty<sup>2</sup>: Stochastic Perturbations in a Convective-Scale Ensemble. *25th Conference on Numerical Weather Prediction, Denver, Colorado, United States*, American Meteorological Society.

**John R. Lawson** and C. K. Potvin, 2018: Impact of Increased Resolution on Storm-Scale Ensemble Performance in the US Southeast. *25th Conference on Numerical Weather Prediction, Denver, Colorado, United States*, American Meteorological Society.

**Lawson, J. R.**, and Gallus, Jr., W. A., 2017: On the sensitivity of bow-echo ensemble forecasts to grid spacing. *The 97th AMS Annual Meeting, Seattle, WA, United States*, American Meteorological Society.

**Lawson, J. R.**, and Gallus, Jr., W. A., 2017: Adaptation of an object-based verification method for moist convection. *The 97th AMS Annual Meeting, Seattle, WA, United States*, American Meteorological Society.

Schoonover, M. R., Crown, G., and **Lawson, J. R.**, 2017: Breaking the cap: using Amazon Web Services and modern Web practices in an operational weather-forecasting framework. *The 97th AMS Annual Meeting, Seattle, WA, United States*, American Meteorological Society.

**Lawson, J. R.**, 2017: A Python-driven workflow to automate and process many numerical simulations. *The 97th AMS Annual Meeting, Seattle, WA, United States*, American Meteorological Society.

**Lawson, J. R.**, Yussouf, N., Kain, J., and Clark, A., 2016: NEWS-e: Evaluation of real-time Warn-on-Forecast precipitation forecasts. *The 28th Conference on Severe Local Storms, Portland, Oregon, United States*, American Meteorological Society.

**Lawson, J. R.**, and Gallus, Jr., W. A., 2016: Mapping the convective watersheds: Assessing the predictability of convective evolution with idealized numerical simulations. *The 28th Conference on Severe Local Storms, Portland, Oregon, United States*, American Meteorological Society.

Gallus, Jr., W.A., **Lawson, J.**, Squitieri, B., 2016: On the sensitivity of convective system structure and propagation in convection-allowing runs to horizontal grid spacings. *The European Geosciences Union General Assemble 2016, Vienna, Austria*, European Geosciences Union. <sup>2</sup>

Gallus, Jr., W.A., **Lawson, J.**, Squitieri, B., 2016: On the predictability of mesoscale convective systems: Experiences of the Plains Elevated Convection At Night (PECAN) forecasting team. *The 96th AMS Annual*

*Meeting, New Orleans, LA, United States, American Meteorological Society.* <sup>2</sup>

**Lawson, J.**, Gallus, Jr., W. A., and Krocak, M., 2015: Butterflies and Bow Echoes: Addressing Poor Forecasts with Ensemble Simulations. *The 27th Conference on Weather Analysis and Forecasting, Chicago, IL, United States, American Meteorological Society.*

Gallus, Jr., W. A., and **Lawson, J.**, 2015: On the predictability of convective mode in high resolution WRF ensembles. *European Geosciences Union General Assembly 2015, Vienna, Austria, European Geosciences Union.* <sup>3</sup>

**Lawson, J.**, and Gallus, Jr., W. A., 2015: It's not you, it's me: the difficulty of forecasting bowing structures within mesoscale convective systems. *The 19th Annual NWA Severe Storms and Doppler Radar Conference, Ankeny, IA, United States, Central Iowa NWA Chapter* <sup>4</sup>

**Lawson, J.**, and Gallus, Jr., W. A., 2014: Sensitivity of bow-echo forecasts to ensemble and model configuration. *The 27th Conference on Severe Local Storms, Madison, Wisconsin, United States, American Meteorological Society.*

**Lawson, J.**, and Horel, J. D., 2014: Using Python to pre- and post-process GEFS/WRF ensembles. *The 94th AMS Annual Meeting, Atlanta, GA, United States, American Meteorological Society.*

**Lawson, J.**, and Gallus, Jr., W. A., 2014: Simulating convective mode of mesoscale phenomena with a WRF-GEFS ensemble. *The 94th AMS Annual Meeting, Atlanta, GA, United States, American Meteorological Society.*

**Lawson, J.**, and Horel, J.D., 2014: Predictability and error growth in medium-range forecasts of the 1 December 2011 Wasatch Windstorm. *The 16th Conference of Mountain Meteorology, San Diego, CA, United States, American Meteorological Society.* <sup>5</sup>

**Lawson, J.**, and Horel, J. D., 2014: Analysis and Predictability of the Wasatch Windstorm of 1 December 2011. *The 94th AMS Annual Meeting, Atlanta, GA, United States, American Meteorological Society.* <sup>6</sup>

**Lawson, J.**, and Horel, J., 2012: Wasatch Windstorm of 1 December 2011. *The 15th Conference of Mountain Meteorology, Steamboat Springs, CO, United States, American Meteorological Society.*

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<sup>3</sup> Presentation given by Prof. Gallus.

<sup>4</sup> Winner of the inaugural Tim Samaras award for best student oral presentation.

<sup>5</sup> Presentation given by Prof. Horel.

<sup>6</sup> Awarded "Honorable Mention" in the Outstanding Poster Presentation category for the NWP/WAF conference.