

**Jeffrey D. Duda**  
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### **Employment history**

- Research Scientist I **2018-present**  
Cooperative Institute for Research in Environmental Sciences; University of Colorado
  
- Post-doctoral research fellow **2016-2017**  
University of Oklahoma School of Meteorology
  
- Graduate research assistant **2011-2016**  
University of Oklahoma School of Meteorology and Center for Analysis and Prediction of storms
  
- Graduate research assistant **2009-2011**  
Iowa State University

### **Education**

- PhD, meteorology – University of Oklahoma **2016**  
Dissertation title: *Optimal Design of a Convection-Allowing Ensemble from a Model Error Perspective*
  
- M.S., meteorology – Iowa State University **2011**  
Thesis title: *WRF Simulations of Mesoscale Convective Systems at Convection-Allowing Resolutions*
  
- B.S., meteorology and mathematics – Iowa State University, graduated *Summa Cum Laude* **2009**  
Thesis: *A Climatology of Severe Weather Reports as a Function of Storm Morphology*

### **Experience**

- Participant in NOAA Hazardous Weather Testbed spring forecast experiment and Flash-Flood and Intense Rainfall experiment
- Experience with Gridpoint Statistical Interpolation cloud analysis, a form of 3-dimensional variational data assimilation
- 7 years of experience running the WRF at convection-allowing grid spacings; deep understanding of the structure and theory of multiple microphysics and land-surface parameterization schemes (Thompson, Morrison, Milbrandt-Yau, WSM-6, WDM-6, Eta/Ferrier, Noah, Noah-MP, RUC, Pleim-Xiu); experience adding code to output additional microphysics process rates and energy-flux partitions; also experienced using stochastic-kinetic energy backscatter scheme
- Experience using statistical and common verification methods to analyze NWP ensemble forecast performance; particularly experienced verifying (P)QPFs using neighborhood-based verification metrics and the Method of Object-Based Diagnostic Evaluation
- Experience with signal processing of base-band Doppler radar data; wrote a storm-tracking algorithm in MATLAB; wrote two guides for understanding radar meteorology, one for non-meteorologists, one for meteorologists
- Wrote a mock grant proposal for a radar meteorology course on monitoring wildfires using X-, W-, and Ka-band radar

### **Skills**

- Proficient in FORTRAN, MATLAB, and GrADS; also experienced with Python, NCL, HTML, and PHP

- Experience constructing simple websites using HTML and PHP; one website features storm chasing accounts since 2007; another site features custom made forecast graphics from the 4-km NAM CONUS nest and time-lagged ensemble products from GFS control forecasts
- 7 years of experience working in a UNIX programming environment, including C-shell scripting and various software such as nano and emacs
- 10+ years of experience with Microsoft Office products (Word, Excel, and PowerPoint)

### **Peer-reviewed publications**

#### Lead author

- Duda, J. D., X. Wang, Y. Wang, and J. Carley, 2019: Comparing the Assimilation of Radar Reflectivity Using the Direct GSI based Ensemble-Variational (EnVar) and Indirect Cloud Analysis Methods in Convection-Allowing Forecasts over the Continental US. *Mon. Wea. Rev.*, in press.
- Duda, J. D., X. Wang, and M. Xue, 2017: Sensitivity of convection-allowing forecasts to land-surface model perturbations and implications for ensemble design. *Mon. Wea. Rev.*, 2001–2025. doi: <https://doi.org/10.1175/MWR-D-16-0349.1>.
- —, —, F. Kong, M. Xue, and J. Berner, 2016: Impact of a stochastic kinetic energy backscatter scheme on warm season convection-allowing ensemble forecasts. *Mon. Wea. Rev.*, 1887–1908. doi: <http://dx.doi.org/10.1175/MWR-D-15-0092.1>.
- —, —, —, and —, 2014: Using varied microphysics to account for uncertainty in warm-season qpf in a convection-allowing ensemble. *Mon. Wea. Rev.*, **142**, 2198–2219. doi: <http://dx.doi.org/10.1175/MWR-D-13-00297.1>.
- — and W. A. Gallus, 2013: The impact of large-scale forcing on skill of simulated convective initiation and upscale evolution with convection-allowing grid spacings in the WRF. *Wea. Forecasting*, **28**, 994–1018. doi: <http://dx.doi.org/10.1175/WAF-D-13-00005.1>.
- — and —, 2010: Spring and summer Midwestern severe weather reports in supercells compared to other morphologies. *Wea. Forecasting*, **25**, 190–206. doi: <http://dx.doi.org/10.1175/2009WAF2222338.1>.

#### Other publications

- Contributing author to *The Geoscience Handbook, 5<sup>th</sup> Ed.*, American Geosciences Institute. Contributed material includes introductory radar meteorology material. Contribution made in 2015.

### **Conference presentations/posters**

- Duda, J., D. Dowell, C. Alexander, X. Wang, and Y. Wang, 2018: The Future of the HRRR: Data Assimilation Advances for Version 4. 29th Conf. on Severe Local Storms, Stowe, VT, Amer. Meteor. Soc., Poster 69.
- Duda, J., X. Wang, and J. R. Carley, 2017: Using the NAMRR Cloud Analysis in a Cycled Radar Data Assimilation Forecast of the 26 December 2015 Texas Tornado Event. 28th Conf. on Weather Analysis and Forecasting/24th Conf. on Numerical Weather Prediction, Seattle, WA, Amer. Meteor. Soc., 621.
- Duda, J., X. Wang, and M. Xue, 2017: Sensitivity of Convection-Allowing Forecasts to Land-Surface Model Perturbations and Implications for Ensemble Design. 28th Conf. on Weather Analysis and Forecasting/24th Conf. on Numerical Weather Prediction, Seattle, WA, Amer. Meteor. Soc., 9A.4.
- Duda, J. and X. Wang, 2015: Addressing land-surface model uncertainty in convective-scale ensemble forecasts. 4th Int. Symp. on Earth-Science Challenges, Norman, OK, Advanced Radar Research Center, 31. [Also presented at the National Weather Association's 40<sup>th</sup> annual meeting as poster AP-70.]
- —, —, F. Kong, M. Xue, and J. Berner, 2014: Impact of a stochastic kinetic energy backscatter scheme on warm-season convection-allowing ensemble forecasts. 27th Conf. on Severe Local Storms, Madison, WI, Amer. Meteor. Soc., 5.4. [Available online at <https://ams.confex.com/ams/27SLS/webprogram/Paper255474.html>.]
- —, —, —, and —, 2013: Using varied microphysics to account for uncertainty in warm-season QPF in a convection-allowing ensemble. 3rd Int. Symp. on Earth-Science Challenges, Uji, Kyoto, Japan, Kyoto University, O32.
- —, —, —, and —, 2012: Toward improving representation of model microphysics errors in a convection-allowing ensemble: Evaluation and diagnosis of mixed-microphysics and perturbed microphysics parameter ensembles in the 2011 HWT spring experiment. 2012 Warn-on-Forecast and High Impact Weather Workshop, Norman, OK, National Severe Storms Laboratory. [Available online at [https://www.nssl.noaa.gov/projects/wof/documents/workshop2012/Session%205/Duda\\_WoF\\_HIWW.pptx](https://www.nssl.noaa.gov/projects/wof/documents/workshop2012/Session%205/Duda_WoF_HIWW.pptx).]
- — and W. A. Gallus, 2011: Comparison of convective initiation and evolution in 3 km WRF simulations with and without the Kain-Fritsch scheme. Extended abstract, 24th Conf. on Wea. Forecasting/20th Conf. on Num. Wea. Prediction, Seattle, WA, Amer. Meteor. Soc., 13B.1. [Available online at <https://ams.confex.com/ams/91Annual/webprogram/Paper182082.html>.]

- — and —, 2009: A climatology of storm reports as a function of convective morphology in the central U.S. 13th Annual Severe Storms and Doppler Radar Conf., Des Moines, IA, Natl. Wea. Assoc. [Also presented at the 3rd annual Undergraduate Research Symposium at Iowa State University in 2009 and the 16th annual Iowa State University Atmospheric Science Undergraduate Research Symposium in 2008.]

### **Awards and honors**

- Third place for best student oral presentation, 27<sup>th</sup> Conference on Severe Local Storms, 2014
- Phi Beta Kappa – Zeta chapter of Iowa, inducted in 2009
- Ethan and Allen Murphy Endowed Memorial Undergraduate Scholarship from the American Meteorological Society, 2009
- Runner-up Senior Thesis Award, Department of Geological and Atmospheric Sciences, Iowa State University, 2008
- UCAR/NCAR Undergraduate Leadership Workshop, attended in 2008

### **Teaching experience**

- Course instructor, *Severe and Hazardous Weather*, University of Oklahoma **2014**  
 Taught a non-major sophomore-level science general-education course.  
 Taught course in two halves: first half on fundamentals of meteorology, second half on convective storms. Created most materials, including assignments and exams, from scratch.
- Teaching assistant, *Dynamic Meteorology*, University of Oklahoma **2013**  
 Graded quizzes and homework assignments. Also guest lectured and wrote a quiz and two MATLAB assignments.
- Guest lecturer, *Introduction to Meteorology*, Iowa State University **2011**  
 Led a lecture on precipitation measurement using rain gauges and radar.
- Tutor, Iowa State University **2006-2007**  
 Tutored small groups of students in calculus and differential equations.

### **Professional memberships**

- American Meteorological Society **Since 2006**
- National Weather Association **2007-2016**
- American Geophysical Union **2008-2016**