

COREY K. POTVIN

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PRESENT POSITION

Research Meteorologist at the NOAA/OAR/National Severe Storms Laboratory (NSSL) specializing in convective-scale analysis, prediction, and predictability.

EDUCATION

Ph.D. Meteorology	University of Oklahoma (OU)	Aug 2010
M.S. Meteorology	OU	Aug 2006
B.S. Meteorology	Lyndon State College (LSC)	May 2004
B.S. Mathematics	LSC	May 2004
A.S. Computer Science	LSC	May 2004

POSITIONS HELD

Feb 2019 – present	Research Meteorologist, NSSL
Sept 2014 – present	Adjunct/Affiliate Faculty, OU School of Meteorology
Oct 2012 – Feb 2019	Research Scientist, CIMMS/NSSL
Oct 2010 – Sept 2012	National Research Council Postdoctoral Research Associate, NSSL
Aug 2010 – Oct 2010	Postdoctoral Research Associate, CIMMS
Aug 2004 – Aug 2010	Graduate Research Assistant, OU School of Meteorology

SERVICE AND LEADERSHIP

Editor, *Artif. Intell. Earth Syst.* (2023 – present)
Editor, *Wea. and Forecasting* (2022 – present)
NOAA Artificial Intelligence Working Group (2022 – present; Co-Chair 2023 – present)
NOAA Modeling Board, Observations Working Group (2022 – present)
OU School of Meteorology Graduate Admissions Committee (2021 – present)
NSSL representative, Quantitative Observing System Assessment Program (2021 – present)
UFS CAM Application Team (2019 – present)
Associate Editor, *Mon. Wea. Rev.* (2018 – 2023)
Team Leader, NSSL Forecast Research & Development Division (2018 – 2022)
Participant, NOAA Hazardous Weather Testbed Spring Experiments (2011–2013, 2016–2018, 2020–2023)

Associate Editor, *Wea. and Forecasting* (2016 – 2021)
Scientific Steering Committee, VORTEX-SE (2016 – 2020)
AMS STAC Committee on Severe Local Storms (2015-2020)
Program Committee, 28th and 29th Severe Local Storms Conferences (2016, 2018)
Program Committee, Workshop on Uncertainty in Radar Retrievals, Model Parameterizations, Assimilated Data and In-Situ Observations: Implications for the Predictability of Weather (2018)
National Weather Center (NWC) Research Experiences for Undergraduates (REU) Selection Committee (2014 – 2017)
Coordinated NSSL 10-year science strategic plan revision (2014)

AWARDS AND HONORS

2014 Presidential Early Career Award for Scientists and Engineers (PECASE; awarded 2017)
National Research Council Postdoctoral Fellowship (2010-2012)
OU School of Meteorology Outstanding Performance as a Graduate Student Award (2010)
OU College of Atmospheric and Geographic Sciences David James Shellberg Memorial Scholarship (2010)

FORMAL SUPERVISORY ROLES

Graduate Committee Chair: Samuel Varga (M.S., 2022 – present); Chad Wiley (M.S., graduated 2023); Montgomery Flora (Ph.D., graduated 2020; M.S., graduated 2017)
Graduate Committee Co-Chair: Tobias Schmidt (M.S., graduated 2023); Joshua Gebauer (Ph.D., graduated 2020)
Postdoctoral Supervisor: Montgomery Flora (2021 – 2022); William Miller (2019 – 2020); John Lawson (2018 – 2020); Derek Stratman (2016 – 2017)
Postdoctoral Co-supervisor: Nathan Dahl (2017 – 2019)
Graduate Committee member: Amanda Murphy (Ph.D., graduated 2023); Elisa Murillo (M.S., graduated 2018); Thea Sandmael (M.S., graduated 2017); Stefan Rahimi (M.S., graduated 2014)
Graduate Thesis/Dissertation Panelist: Alejandro Hermoso (Ph.D., graduated 2021)
REU Mentor/Co-Mentor: Brina Lemke (2023), Noah Lang (2022), Nathan Erickson (2021), Elisa Murillo (2015), Montgomery Flora (2014)

PUBLICATIONS

Heinselman, P. L., and Coauthors, 2023: Warn-on-Forecast System: From Vision to Reality. *Wea. Forecasting*, in press.

- Britt, K. C., P. S. Skinner, P. L. Heinselman, **C. K. Potvin**, M. L. Flora, B. Matilla, K. H. Knopfmeier, and A. E. Reinhart, 2023: Verification of Quasi-Linear Convective Systems Predicted by the Warn-on-Forecast System (WoFS). *Wea. Forecasting*, in press.
- Flora, M. L., **C. K. Potvin**, A. McGovern, and S. Handler, 2023: A Machine Learning Explainability Tutorial for Atmospheric Sciences. *Artif. Intell. Earth Syst.*, in press.
- McGovern, A., R. J. Chase, M. Flora, D. J. Gagne, R. Lagerquist, **C. K. Potvin**, N. Snook, and E. Loken, 2023: A Review of Machine Learning for Convective Weather. *Artif. Intell. Earth Syst.*, **2**, e220077.
- Clark, A. J., and Coauthors, 2023: The Third Real-Time, Virtual Spring Forecasting Experiment to Advance Severe Weather Prediction Capabilities. *Bull. Amer. Meteor. Soc.*, **104**, E456–E458.
- Brook, J. P., A. Protat, **C. K. Potvin**, J. S. Soderholm, and H. McGowan, 2023: The Effects of Spatial Interpolation on a Novel, Dual-Doppler 3D Wind Retrieval Technique. *J. Atmos. Oceanic Technol.*, in press.
- Bunkers, M., and Coauthors, 2023: Advantages to Writing Shorter Articles. *Wea. Forecasting*, **38**, 389–390.
- Bunkers, M., and Coauthors, 2023: Comment–Reply Exchanges: Trends and Suggestions. *Wea. Forecasting*, **38**, 633–636.
- Potvin, C. K.**, and Coauthors, 2022: An iterative storm identification and classification algorithm for convection-allowing models and gridded radar analyses. *J. Atmos. Oceanic Technol.*, **39**, 999–1013.
- Potvin, C. K.**, C. Broyles, P. S. Skinner, H. E. Brooks, 2022: Improving estimates of U.S. tornado frequency by accounting for unreported and underrated tornadoes. *J. Appl. Meteor. Climatol.*, **61**, 909–930.
- Miller, W., **C. K. Potvin**, M. L. Flora, B. Gallo, L. Wicker, T. Jones, P. Skinner, B. Matilla, and K. Knopfmeier, 2022: Exploring the usefulness of downscaling free forecasts from the Warn-on-Forecast System. *Wea. Forecasting*, **37**, 181–203.
- Stratman, D. R., and **C. K. Potvin**, 2022: Testing the Feature Alignment Technique (FAT) in an ensemble-based data assimilation and forecast system with multiple-storm scenarios. *Mon. Wea. Rev.*, **150**, 2033–2054.
- Gebauer, J. G., A. Shapiro, **C. K. Potvin**, N. A. Dahl, M. I. Biggerstaff, and A. Alford, 2022: Evaluating vertical velocity retrievals from vertical vorticity constrained dual-Doppler analysis of real, rapid-scan radar data. *J. Atmos. Oceanic Technol.*, **39**, 1591–1610.
- Clark, A. J., and Coauthors, 2022: The 2nd real-time, virtual Spring Forecasting Experiment to advance severe weather prediction. *Bull. Amer. Meteor. Soc.*, **103**, E1114–1116.
- Clark, A. J., and Coauthors, 2022: The 3rd real-time, virtual Spring Forecasting Experiment to advance severe weather prediction capabilities. *Bull. Amer. Meteor. Soc.*, Early Online Release.

- Flora, M. L., **C. K. Potvin**, P. S. Skinner, S. Handler, and A. McGovern, 2021: Using machine learning to generate storm-scale probabilistic guidance of severe weather hazards in the Warn-on-Forecast System. *Mon. Wea. Rev.*, **149**, 1535-1557.
- Lawson, J. R., **C. K. Potvin**, P. S. Skinner, and A. E. Reinhart, 2021: The vice and virtue of increased horizontal resolution in ensemble forecasts of tornadic thunderstorms in low-CAPE, high-shear environments. *Mon. Wea. Rev.*, **149**, 921-944.
- Shapiro, A., J. G. Gebauer, N. A. Dahl, D. J. Bodine, A. Mahre, and **C. K. Potvin**, 2021: Spatially variable advection correction of Doppler radial velocity data. *J. Atmos. Sci.*, **78**, 167-188.
- Potvin, C. K.**, P. S. Skinner, K. A. Hoogewind, M. C. Coniglio, J. A. Gibbs, A. J. Clark, M. L. Flora, A. E. Reinhart, J. R. Carley, and E. N. Smith, 2020: Assessing systematic impacts of PBL schemes on storm evolution in the NOAA Warn-on-Forecast System. *Mon. Wea. Rev.*, **148**, 2567-2590.
- Homeyer, C. R., T. N. Sandmael, **C. K. Potvin**, and A. Murphy, 2020: Distinguishing characteristics of tornadic and nontornadic supercell storms from composite mean analyses of radar observations. *Mon. Wea. Rev.*, **148**, 5015-5040.
- Jackson, R., S. Collis, T. Lang, **C. K. Potvin**, and T. Munson, 2020: PyDDA: A Pythonic direct data assimilation framework for wind retrievals. *Journal of the Operational Research Society*, **8**.
- Lawson, J. R., Gallus, W. A., and **C. K. Potvin**, 2020: Sensitivity of a bowing mesoscale convective system to horizontal grid spacing in a convection-allowing ensemble. *Atmosphere*, **11**.
- Potvin, C. K.**, J. R. Carley, A. Clark, L. J. Wicker, P. S. Skinner, A. E. Reinhart, B. T. Gallo, J. S. Kain, G. Romine, E. Aligo, K. A. Brewster, D. C. Dowell, L. M. Harris, I. L. Jirak, F. Kong, T. A. Supinie, K. W. Thomas, X. Wang, Y. Wang, and M. Xue, 2019: Systematic comparison of convection-allowing models during the 2017 NOAA HWT Spring Forecasting Experiment. *Wea. Forecasting*, **34**, 1395-1416.
- Potvin, C. K.**, C. Broyles, P. S. Skinner, H. E. Brooks, and E. Rasmussen, 2019: A Bayesian hierarchical modeling framework for correcting reporting bias in the U.S. tornado database. *Wea. Forecasting*, **34**, 15-30.
- Dahl, N. A., A. Shapiro, **C. K. Potvin**, A. Theisen, J. G. Gebauer, A. D. Schenkman, and M. Xue, 2019: High-resolution, rapid-scan dual-Doppler retrievals of vertical velocity in a simulated supercell. *J. Atmos. Oceanic Technol.*, **36**, 1477-1500.
- Flora, M. L., P. S. Skinner, **C. K. Potvin**, A. E. Reinhart, T. A. Jones, N. Yussouf, and K. H. Knopfmeier, 2019: Object-based verification of short-term, storm-scale probabilistic mesocyclone guidance from an experimental Warn-on-Forecast system. *Wea. Forecasting*, **34**, 1721-1739.
- Flora, M. L., **C. K. Potvin**, and L. J. Wicker, 2018: Supercell predictability: Exploring ensemble forecast sensitivity to initial condition spread. *Mon. Wea. Rev.*, **146**, 2361-2379.

- Stratman, D. R., **C. K. Potvin**, and L. J. Wicker, 2018: Correcting storm displacement errors in ensembles using the Feature Alignment Technique (FAT). *Mon. Wea. Rev.*, **146**, 2125-2145.
- Wienhoff, Z. B., H. B. Bluestein, L. J. Wicker, J. C. Snyder, A. Shapiro, **C. K. Potvin**, J. B. Houser, and D. W. Reif, 2018: Applications of a spatially variable advection correction technique for temporal correction of dual-Doppler analyses of tornadic supercells. *Mon. Wea. Rev.*, **146**, 2949-2971.
- Belik, Pavel, B. Dahl, D. Dokken, **C. K. Potvin**, K. Scholz, and Mikhail Shvartsman, 2018: Possible implications of self-similarity for tornadogenesis and maintenance. *AIMS Mathematics*, **3**, 365-390.
- Potvin, C. K.**, E. M. Murillo, M. L. Flora, and D. M. Wheatley, 2017: Sensitivity of supercell simulations to initial-condition resolution. *J. Atmos. Sci.*, **74**, 5-26.
- McGovern, A., **C. K. Potvin**, and R. A. Brown, 2017: Using large-scale machine learning to improve our understanding of the formation of tornadoes. *Large-scale Machine Learning in the Earth Sciences*, A. N. Srivastava, R. Nemani, K. Steinhäuser, Eds., CRC Press, 95–112.
- North, K. W., M. Oue, P. Kollias, S. E. Giangrande, S. M. Collis, and **C. K. Potvin**, 2017: Vertical air motion retrievals in deep convective clouds using the ARM scanning radar network in Oklahoma during MC3E. *Atmos. Meas. Tech.*, **10**, 2785-2806.
- Dokken, D., P. Belik, **C. K. Potvin**, K. Scholz, and M. Shvartsman, 2017: Applications of vortex gas models to tornadogenesis and maintenance. *Open Journal of Fluid Dynamics*, **7**, 596-622.
- DiGangi, E. A., D. R. MacGorman, C. L. Ziegler, D. Betten, M. Biggerstaff, M. Bowlan, and **C. K. Potvin**, 2016: An overview of the 29 May 2012 Kingfisher supercell during DC3: Observations of the 29 May 2012 DC3 case. *J. Geo. Res.*, **121**, 14316-14343.
- Potvin, C. K.**, and M. L. Flora, 2015: Sensitivity of idealized supercell simulations to horizontal grid spacing: Implications for Warn-On-Forecast. *Mon. Wea. Rev.*, **143**, 2998-3024.
- Thompson, T. E., L. J. Wicker, X. Wang, and **C. K. Potvin**, 2015: A comparison between the local ensemble transform Kalman filter and the ensemble square root filter for the assimilation of radar data in convective-scale models. *Quart. J. Roy. Meteor. Soc.*, **141**, 1163-1176.
- Skinner, P. S., C. C. Weiss, L. J. Wicker, **C. K. Potvin**, and D. C. Dowell, 2015: Forcing mechanisms for an internal rear-flank downdraft momentum surge in the 18 May 2010 Dumas, Texas supercell. *Mon. Wea. Rev.*, **143**, 4305-4330.
- Shapiro, A., S. Rahimi, **C. K. Potvin**, and L. Orf, 2015: On the use of advection correction in trajectory calculations. *J. Atmos. Sci.*, **72**, 4261-4280.
- Potvin, C. K.**, 2013: A variational method for detecting and characterizing intense vortices in Cartesian wind fields. *Mon. Wea. Rev.*, **141**, 3102-3115.
- Potvin, C. K.**, and L. J. Wicker, 2013a: Correcting fast-mode pressure errors in storm-scale ensemble Kalman filter analyses. *Advances in Meteorology*, **2013**, 1-14.

- Potvin, C. K.**, and L. J. Wicker, 2013b: Assessing ensemble forecasts of low-level supercell rotation within an OSSE framework. *Wea. and Forecasting*, **28**, 940-960.
- Potvin, C. K.**, L. J. Wicker, D. Betten, M. I. Biggerstaff, and A. Shapiro, 2013: Comparison between dual-Doppler and EnKF storm-scale wind analyses: The 29-30 May 2004 Geary, Oklahoma, supercell thunderstorm. *Mon. Wea. Rev.*, **141**, 1612-1628.
- Lakshmanan, V., K. Hondl, **C. K. Potvin**, and D. Preignitz, 2013: An improved method to compute radar echo top heights. *Wea. and Forecasting*, **28**, 481-488.
- Stensrud, D. J., L. J. Wicker, M. Xue, D. T. Dawson II, N. Yussouf, D. M. Wheatley, T. E. Thompson, N. A. Snook, T. M. Smith, A. D. Schenkman, **C. K. Potvin**, E. R. Mansell, T. Lei, K. M. Kuhlman, Y. Jung, T. A. Jones, J. Gao, M. C. Coniglio, H. E. Brooks, and K. A. Brewster, 2013: Progress and challenges with Warn-on-Forecast. *Atmos. Res.*, **123**, 2-16.
- Potvin, C. K.**, and L. J. Wicker, 2012: Comparison between dual-Doppler and EnKF storm-scale wind analyses: Observing system simulation experiments with a supercell thunderstorm. *Mon. Wea. Rev.*, **140**, 3972-3991.
- Potvin, C. K.**, D. Betten, L. J. Wicker, K. L. Elmore, and M. I. Biggerstaff, 2012a: 3DVAR vs. traditional dual-Doppler wind retrievals of a simulated supercell thunderstorm. *Mon. Wea. Rev.*, **140**, 3487-3494.
- Potvin, C. K.**, L. J. Wicker, and A. Shapiro, 2012b: Assessing errors in variational dual-Doppler wind syntheses of supercell thunderstorms observed by storm-scale mobile radars. *J. Atmos. Oceanic Technol.*, **29**, 1009-1025.
- Potvin, C. K.**, A. Shapiro, and M. Xue, 2012c: Impact of a vertical vorticity constraint in variational dual-Doppler wind analysis: Tests with real and simulated supercell data. *J. Atmos. Oceanic Technol.*, **29**, 32-49.
- Potvin, C. K.**, A. Shapiro, M. I. Biggerstaff, and Joshua M. Wurman, 2011: The VDAC technique: A variational method for detecting and characterizing convective vortices in multiple-Doppler radar data. *Mon. Wea. Rev.*, **139**, 2593-2613.
- Shapiro, A., K. M. Willingham, and **C. K. Potvin**, 2010: Spatially variable advection correction of radar data. Part I: Theoretical considerations. *J. Atmos. Sci.*, **67**, 3445-3456.
- Shapiro, A., K. M. Willingham, and **C. K. Potvin**, 2010: Spatially variable advection correction of radar data. Part II: Test results. *J. Atmos. Sci.*, **67**, 3457-3470.
- Potvin, C. K.**, K. L. Elmore, and S. J. Weiss, 2010: Assessing the impacts of proximity sounding criteria on the climatology of significant tornado environments. *Wea. Forecasting*, **25**, 921-930.
- Shapiro, A., **C. K. Potvin**, and J. Gao, 2009: Use of a vertical vorticity equation in variational dual-Doppler wind analysis. *J. Atmos. Oceanic Technol.*, **26**, 2089-2106.
- Potvin, C. K.**, A. Shapiro, T.-Y. Yu, J. Gao, and M. Xue, 2009: Using a low-order model to detect and characterize tornadoes in multiple-Doppler radar data. *Mon. Wea. Rev.*, **137**, 1230-1249.