Craig Steven Schwartz

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Curriculum Vitae
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PROFESSIONAL EXPERIENCE

The National Center for Atmospheric Research (NCAR), Boulder, CO
Mesoscale and Microscale Meteorology (MMM) Laboratory

- Project Scientist II, 2017-present
- Project Scientist I, 2016-2017
- Associate Scientist III, 2011-2016
- Associate Scientist II, 2009-2011

The University of Oklahoma and National Severe Storms Laboratory, Norman, OK

- Graduate Research Assistant, 2007-2009

The National Weather Service, Juneau, AK

- Summer hire, May-July 2007
- Worked operational shifts

The Storm Prediction Center and National Severe Storms Laboratory, Norman, OK

- NOAA Ernest F. Hollings Scholarship Internship, Summer 2006

The Ocean Prediction Center, Camp Springs, MD

- Summer internship, 2002

EDUCATION

The University of Maryland, College Park, MD

- Ph.D., Atmospheric and Oceanic Science, December 2021
- Dissertation: *An evaluation of convection-allowing ensemble forecast sensitivity to initial conditions*
- Dissertation Advisor: Jonathan Poterjoy

The University of Oklahoma, Norman, OK

- Master's of Science in Meteorology, May 2009
- Thesis: *An assessment of convection-allowing WRF-ARW configurations: Utility as next-day guidance and sensitivity to resolution and physical parameterizations*
- Thesis Advisor: John S. Kain

The Pennsylvania State University, University Park, PA

- Bachelor of Science in Meteorology, May 2007
- Bachelor of Music, Composition Option, with Honors, May 2007
- Graduated with Highest Distinction
- The Schreyer Honors College

The Kentucky Institute for International Studies

- Studied in Salzburg, Austria for five weeks, May-June 2005

TECHNICAL SKILLS

- WRFDA, GSI, DART, JEDI data assimilation systems
- WRF and MPAS numerical weather prediction models
- Fortran, NCL, python programming languages
- Unix scripting (csh, bash, ksh)

UNIVERSITY TEACHING EXPERIENCE

- Guest lecturer, Department of Atmospheric & Oceanic Science, The University of Maryland, 2020 (synoptic meteorology)
- Teaching Assistant, School of Meteorology, The University of Oklahoma, 2009 (general meteorology course for majors)
- Teaching Assistant, Department of Meteorology, The Pennsylvania State University, 2006 (general meteorology course for non-majors)

HONORS AND AWARDS

American Meteorological Society (AMS)

- Editor's Award for *Weather and Forecasting*, 2015
- Graduate Fellowship, 2007-2008
- The District of Columbia Chapter of the AMS Scholarship Recipient, 2003

National Center for Atmospheric Research (NCAR)

- MMM Paper of the Year Award, 2022
- MMM Special Recognition Award, 2020
- MMM Special Recognition Award, 2018
- MMM Special Recognition Award, 2014

National Oceanic and Atmospheric Administration (NOAA)

- Ernest F. Hollings Scholarship, 2005-2007
- Best Student Presentation, NOAA/EPP Forth Education and Science Forum, Tallahassee, FL, 2006

The University of Oklahoma

- Yoshi Sasaki Award for Best M.S. Student Publication, 2009

Astronaut Scholarship Foundation

- Scholarship recipient, 2008 — awarded nationally to ~25 students

The Pennsylvania State University

- Meteorological Honors and Awards:
  - John A. Dutton Award in Atmospheric Dynamics, 2007
  - Dr. Joel and Peggy Myers Scholarship in Meteorology, 2006-2007
  - Charles and Anna Hosler Scholarship in Meteorology, 2004-2006
  - John and Elizabeth Holmes Teas Scholarship in Earth and Mineral Sciences, 2004-2006

- University Honors and Awards:
  - John W. White Graduate Fellowship, 2007
  - Evan Pugh (Senior) Scholar Award for Academic Achievement, 2006-2007
  - Evan Pugh (Junior) Scholar Award for Academic Achievement, 2005-2006
  - President Sparks Award for Academic Excellence, 2004-2005
  - President's Freshman Award for Academic Excellence, 2003-2004
  - Schreyer Honors College Academic Excellence Scholarship, 2003-2007

- Music Honors and Awards:
  - College of Arts and Architecture Creative Achievement Award, 2007
  - College of Arts and Architecture Alumni Scholarship, 2006-2007
  - College of Arts and Architecture Reuben and Gladys Golumbic Scholarship for Humanistic Achievement in the Arts, 2005
  - Eleanor Beene Memorial Scholarship in Music, 2004-2005
  - School of Music Scholarship, 2003-2007

Miscellaneous

- Outstanding Editor Award, *Advances in Atmospheric Sciences*, 2022
- Editor's Award, *Advances in Atmospheric Sciences*, 2018

COMMUNITY SERVICE

Journal Editorships and Peer Review

- Associate Editor in Chief for *Advances in Atmospheric Sciences*, Jan. 1, 2020-present
- Associate Editor for *Weather and Forecasting*, Jan. 1, 2014-present
- Associate Editor for *Monthly Weather Review*, Jan. 1, 2016-present
- Reviewer for *Journal of Geophysical Research—Atmospheres*
- Reviewer for the *Bulletin of the American Meteorological Society*
- Reviewer for *Journal of Atmospheric Sciences*

- Reviewer for *Geoscientific Model Development*
- Reviewer for *Journal of Hydrometeorology*
- Reviewer for *Journal of Applied Meteorology and Climatology*
- Reviewer for *Quarterly Journal of the Royal Meteorological Society*
- Reviewer for *Theoretical and Applied Climatology*
- Reviewer for *Aerosol and Air Quality Research*
- Reviewer for *Atmospheric Research*
- Reviewer for the *Central European Journal of Geosciences*
- Reviewer for *Meteorology and Atmospheric Physics*
- Reviewer for *Remote Sensing*
- Reviewer for *Journal of Advances in Modeling Earth Systems*
- Reviewer for *Geophysical Research Letters*
- Reviewer for *Atmospheric Chemistry and Physics*
- Reviewer for *Journal of Meteorological Research*
- Reviewer for *International Journal of Remote Sensing*
- Reviewer for *Atmospheric Pollution Research*
- Reviewer for *Atmospheric Science Letters*
- Reviewer for *Journal of Environmental Management*
- Reviewer for *Atmospheric Environment*
- Reviewer for *Scientific Online Letters on the Atmosphere*
- Reviewer for *Meteorologische Zeitschrift*
- Reviewer for *Advances in Space Research*
- Reviewer for *Journal of Atmospheric and Solar-Terrestrial Physics*
- Reviewer for *Atmosphere*
- Reviewer for *Meteorological Applications*

Grant proposal review

- National Science Foundation
- University of Wisconsin–Milwaukee
- Austrian Science Fund
- United Arab Emirates University
- Poland National Science Centre

Conference Committees

- Program Committee for the 2023 AMS WAF/NWP conferences
- Program Committee for the 2022 AMS WAF/NWP conferences
- Organizing committee for the System for Integrated Modeling of the Atmosphere (SIMA) Community Workshop, Virtual conference, 2020
- Science committee for the 6th International Symposium on Data Assimilation, Munich, Germany, 2018

Internal UCAR/NCAR Service

- MMM representative to NCAR's Advanced Study Program, 2022-present
- MMM Diversity and Inclusion Committee, 2017-present
- UCAR Awards Jury, 2016, 2017
- Various hiring committees

Field Projects and Experiments

- CONCH (Coordinated Observations of Northeast Colorado Hail), Boulder, CO, 2021: Forecaster
- Front Range Air Pollution and Photochemistry Experiment (FRAPPE), Boulder, CO, 2014: Forecaster
- Mesoscale Prediction Experiment (MPEX), Boulder, CO, 2013: Lead forecaster
- Deep Convective Clouds and Chemistry (DC3), Salina, KS, 2012: Lead forecaster
- Vortex2, 2009: Participant (mobile mesonets)
- NOAA Hazardous Weather Testbed Spring Forecasting Experiment, 2008, 2009, 2018, 2019, 2020, 2021, 2022: Participant

Student Mentoring/Advising

- Austin Coleman (Texas Tech University; PhD committee)
- Paola Corrales (University of Buenos Aires; mentoring)
- Mouhamet Diallo (French Guiana University; mentoring)
- Thomas Gowan (University of Utah; mentoring)
- Kenta Kurosawa (University of Maryland; mentoring)
- Marika Koukoula (University of Connecticut; PhD committee)
- Xiaoshi Qiao (Nanjing University of Information Science and Technology; mentoring)
- Malcolm Wilson (Cornell University; mentoring through NCAR's SOARS program)

Educational Outreach

- K–12 science fair judge:
    - GLOBE International Virtual Science Symposium, March 2018; April 2019, 2021
    - New Vista High School, Boulder, CO, April 2015, 2019, 2020
    - Eisenhower Elementary School, Boulder, CO, February 2015
    - Peak to Peak High School, Lafayette, CO, January 2011, 2012
    - Boulder Valley School District, Boulder, CO, February 2010, 2011, 2012, 2013, 2015, 2016, 2018, 2019, 2020, 2021; March 2017
    - Oklahoma Mesonet Science Fair, Norman, OK, March 2008, February 2009

- UCAR and NCAR:
    - Instructor for GSI Tutorial for Thailand Weather Forecasters, June 2017
    - WRF Data Assimilation Tutorial instructor, July 2011, 2012, 2013, 2014, 2017, 2019; August 2015, 2016; October 2017

- "Super Science Saturday" volunteer, October 2009, 2011; November 2015, 2017, 2018
- Judge for summer internship program's poster session, July 2014, 2015, 2016, 2017

- American Meteorological Society:
  - Student conference presenter: "Conversations with Professionals", 92nd Annual Meeting, January 2012
  - Judge for student conference poster session, 92nd Annual Meeting, January 2012
  - Judge for WAF/NWP conference student presentations, January 2020, 2022

- American Geophysical Union:
  - Judge for student posters, Annual Fall Meeting, December 2016, 2018, 2020

- University of Colorado:
  - Selection committee for Astronaut Scholarship Foundation nominees, February 2018, March 2019, 2020, 2021, 2022

- National Oceanic and Atmospheric Administration (NOAA):
  - Reviewer for Ernest F. Hollings Scholarship, February 2018, 2020, 2022

The Pennsylvania State University Campus Weather Service
- Penn State's Campus Weather Service is the largest student-run forecasting organization in the United States of America
- President, 2006-2007
- Shift leader, 2004-2007
- Forecaster and radio broadcaster, 2003-2007

PROFESSIONAL MEMBERSHIPS

American Meteorological Society
American Geophysical Union

RESEARCH GRANTS

13. Probabilistic medium-range hazards guidance with an FV3-based convection-allowing ensemble and machine learning (PI), National Oceanographic and Atmospheric Administration Award Number NA22OAR4590533, $737,258, 2022–2025.

12. Informing UFS-based Rapid Refresh Forecast System (RRFS) ensemble development through evaluation of analysis uncertainty representation methods (Co-PI), National Oceanographic and Atmospheric Administration Award Number NA22OAR4590524, $749,045, 2022–2025.

11. Adapting machine learning-based convective hazard guidance to use the HRRR/RRFS (Co-PI), National Oceanographic and Atmospheric Administration Award Number NA21OAR4590163, $575,846, 2021–2023.

10. Diagnosing synoptic progressiveness forecast errors within the UFS MRWA (Co-PI), National Oceanographic and Atmospheric Administration Award Number NA21OAR4590184, $552,819, 2021–2023.

9. A collaboration between NCAR and WindBorne (PI), WindBorne Systems, $231,066, 2021–2022.

8. Using convective mode information for hazard prediction with convection-allowing models (Co-PI), National Oceanographic and Atmospheric Administration Award Number NA19OAR4590128, $731,555, 2019–2022.

7. Enhanced tools for high-resolution ensemble development and verification (Co-PI), National Oceanographic and Atmospheric Administration Award Number NA19OAR4590232, $571,997, 2019–2021.

6. forecast system development activities toward a convective-scale HRRR ensemble (Co-PI), National Oceanographic and Atmospheric Administration Award Number NA17OAR4590182, $530,134, 2017–2019.

5. Use of NWP models to identify convective outflows for fire weather forecasting (Co-PI), Joint Fire Science Program, JFSP Project No. 17-1-05-5, $344,397, 2017–2019.

4. Demonstration of a rapid update convection-permitting ensemble forecast system to improve flash flood and winter weather prediction (Co-PI), National Oceanographic and Atmospheric Administration Award Number NA17OAR4590122, $293,080, 2017–2019.

3. Demonstration of a rapid update convection-permitting ensemble forecast system to improve hazardous weather prediction (Co-PI), National Oceanographic and Atmospheric Administration Award Number NA17OAR4590114, $285,593, 2017–2019.

2. Resolution dependence of simulated convective storms in the Southeast United States (Co-PI), National Oceanographic and Atmospheric Administration Award Number NA15OAR4590238, $206,685, 2015–2017.

1. Convection-permitting ensemble forecast system for prediction of extreme weather (Co-PI), National Oceanographic and Atmospheric Administration Award Number NA15OAR4590191, $247,208, 2015–2017.

PEER-REVIEWED PUBLICATIONS

52. Corrales, P. B., V. Galligani, J. Ruiz, L. Sapucci, M. E. Dillon, Y. G. Skabar, M. Sacco, **C. S. Schwartz**, S. W. Nesbitt, 2022: Hourly assimilation of different sources of observations including satellite radiances in a mesoscale convective system case during RELAMPAGO campaign. *Atmos. Res.*, In press.

51. Chien, T.-Y., S.-Y. Chen, C.-Y. Huang, C.-P. Shih, **C. S. Schwartz**, Z. Liu, J. Bresch, and J.-Y. Lin, 2022: Impacts of radio occultation data on typhoon forecasts as explored by the global MPAS-GSI system. *Atmosphere*, **13**, 1353, doi:10.3390/atmos13091353.

50. **Schwartz, C. S.**, J. Poterjoy, G. S. Romine, D. C. Dowell, J. R. Carley, and J. Bresch, 2022: Short-term convection-allowing ensemble precipitation forecast sensitivity to resolution of initial condition perturbations and central initial states. *Wea. Forecasting*, **37**, 1259–1286, doi:10.1175/WAF-D-21-0165.1.

49. **Schwartz, C. S.**, J. Poterjoy, J. R. Carley, D. C. Dowell, G. S. Romine, and K. Ide, 2022: Comparing partial and continuously cycling ensemble Kalman filter data assimilation systems for convection-allowing ensemble forecast initialization. *Wea. Forecasting*, **37**, 85–112, doi:10.1175/WAF-D-21-0069.1.

48. Koukoula, M., **C. S. Schwartz**, E. I. Nikolopoulos, and E. N. Anagnostou, 2021: Understanding the impact of soil moisture on precipitation under different climate and meteorological conditions: A numerical sensitivity study over the CONUS. *J. Geophys. Res. Atmos.*, **126**, e2021JD035096, doi:10.1029/2021JD035096.

47. Koukoula, M., **C. S. Schwartz**, E. I. Nikolopoulos, and E. N. Anagnostou, 2021: Evaluation of soil state representation in the NCAR ensemble analysis system. *Journal of Hydrology*, **601**, 126617, doi:10.1016/j.jhydrol.2021.126617.

46. Bresch, J. F., J. G. Powers, **C. S. Schwartz**, R. A. Sobash, and J. L. Coen, 2021: Objective identification of thunderstorm gust fronts in numerical weather prediction models for fire weather forecasting. *International Journal of Wildland Fire*, **30**, 513–535, doi:10.1071/WF20059.

45. **Schwartz, C. S.**, G. S. Romine, and D. C. Dowell, 2021: Toward unifying short-term and next-day convection-allowing ensemble forecast systems with a continuously-cycling 3-km ensemble Kalman filter over the entire conterminous United States. *Wea. Forecasting*, **36**, 379–405, doi:10.1175/WAF-D-20-0110.1.

44. Sobash, R. A., G. S. Romine, and **C. S. Schwartz**, 2020: A comparison of neural-network and surrogate-severe probabilistic convective hazard guidance derived from a convection-allowing model. *Wea. Forecasting*, **35**, 1981–2000, doi:10.1175/WAF-D-20-0036.1.

43. Qiao, X., S. Wang, **C. S. Schwartz**, Z. Liu, and J. Min, 2020: A method for probability matching based on the ensemble maximum for quantitative precipitation forecasts. *Mon. Wea. Rev.*, **148**, 3379–3396, doi:10.1175/MWR-D-20-0003.1.

42. **Schwartz, C. S.**, M. Wong, G. S. Romine, R. A. Sobash, and K. R. Fossell, 2020: Initial conditions for convection-allowing ensembles over the conterminous United States. *Mon. Wea. Rev.*, **148**, 2645–2669, doi:10.1175/MWR-D-19-0401.1.

41. Choi, Y., S.-H. Chen, C.-C. Huang, K. Earl, C.-Y. Chen, **C. S. Schwartz**, and T. Matsui, 2020: Evaluating the impact of assimilating aerosol optical depth observations on dust forecasts over North Africa and the East Atlantic using different data assimilation methods. *Journal of Advances in Modeling Earth Systems*, **12**, e2019MS001890, doi:10.1029/2019MS001890.

40. **Schwartz, C. S.**, and R. A. Sobash, 2019: Revisiting sensitivity to horizontal grid spacing in convection-allowing models over the central and eastern United States. *Mon. Wea. Rev.*, **147**, 4411–4435, doi:10.1175/MWR-D-19-0115.1.

39. Yang, J., M. Astitha, and **C. S. Schwartz**, 2019: Assessment of storm wind speed prediction using gridded Bayesian regression applied to historical events with NCAR's real-time ensemble forecast system. *J. Geophys. Res. Atmos.*, **124**, 9241–9261, doi:10.1029/2018JD029590.

38. Sobash, R. A., **C. S. Schwartz**, G. S. Romine, and M. L. Weisman, 2019: Next-day prediction of tornadoes using convection-allowing models with 1-km horizontal grid spacing. *Wea. Forecasting*, **34**, 1117–1135, doi:10.1175/WAF-D-19-0044.1.

37. **Schwartz, C. S.**, 2019: Medium-range convection-allowing ensemble forecasts with a variable-resolution global model. *Mon. Wea. Rev.*, **147**, 2997–3023, doi:10.1175/MWR-D-18-0452.1.

36. **Schwartz, C. S.**, G. S. Romine, R. A. Sobash, K. R. Fossell, and M. L. Weisman, 2019: NCAR's real-time convection-allowing ensemble project. *Bull. Amer. Meteor. Soc.*, **100**, 321–343, doi:10.1175/BAMS-D-17-0297.1.

35. Gowan, T. M., W. J. Steenburgh, and **C. S. Schwartz**, 2018: Validation of mountain precipitation forecasts from the convection-permitting NCAR Ensemble and operational forecast systems over the Western United States. *Wea. Forecasting*, **33**, 739–765, doi:10.1175/WAF-D-17-0144.1.

34. Zhang, X., E. N. Anagnostou, and **C. S. Schwartz**, 2018: NWP-based adjustment of IMERG precipitation for flood-inducing complex terrain storms: Evaluation over CONUS. *Remote Sensing*, **10**, 642, doi:10.3390/rs10040642.

33. **Schwartz, C. S.**, and R. A. Sobash, 2017: Generating probabilistic forecasts from convection-allowing ensembles using neighborhood approaches: A review and recommendations. *Mon. Wea. Rev.*, **145**, 3397–3418, doi:10.1175/MWR-D-16-0400.1.

32. **Schwartz, C. S.**, G. S. Romine, K. R. Fossell, R. A. Sobash, and M. L. Weisman, 2017: Toward 1-km ensemble forecasts over large domains. *Mon. Wea. Rev.*, **145**, 2943–2969, doi:10.1175/MWR-D-16-0410.1.

31. Powers, J. G., J. B. Klemp, W. C. Skamarock, C. A. Davis, J. Dudhia, D. O. Gill, J. L. Coen, D. J. Gochis, R. Ahmadov, S. E. Peckham, G. A. Grell, J. Michalakes, S. Trahan, S. G. Benjamin, C. R. Alexander, G. J. DiMego, W. Wang, **C. S. Schwartz**, G. S. Romine, Z. Liu, C. Snyder, F. Chen, M. J. Barlage, W. Yu, and M. G. Duda, 2017: The Weather Research and Forecasting (WRF) Model: Overview, system efforts, and future directions. *Bull. Amer. Meteor. Soc.*, **98**, 1717–1737, doi:10.1175/BAMS-D-15-00308.1.

30. **Schwartz, C. S.**, 2017: A comparison of methods used to populate neighborhood-based contingency tables for high-resolution forecast verification. *Wea. Forecasting*, **32**, 733–741, doi:10.1175/WAF-D-16-0187.1.

29. Sobash, R. A., G. S. Romine, **C. S. Schwartz**, D. J. Gagne, and M. L. Weisman, 2016: Explicit forecasts of low-level rotation from convection-allowing models for next-day tornado prediction. *Wea. Forecasting*, **31**, 1591–1614, doi:10.1175/WAF-D-16-0073.1.

28. Romine, G. S., **C. S. Schwartz**, R. D. Torn, and M. L. Weisman, 2016: Impact of assimilating dropsonde observations from MPEX on ensemble forecasts of severe weather events. *Mon. Wea. Rev.*, **144**, 3799–3823, doi:10.1175/MWR-D-15-0407.1.

27. **Schwartz, C. S.**, 2016: Improving large-domain convection-allowing forecasts with high-resolution analyses and ensemble data assimilation. *Mon. Wea. Rev.*, **144**, 1777–1803, doi:10.1175/MWR-D-15-0286.1.

26. Sobash, R. A., **C. S. Schwartz**, G. S. Romine, K. R. Fossell, and M. L. Weisman, 2016: Severe weather prediction using storm surrogates from an ensemble forecasting system. *Wea. Forecasting*, **31**, 255–271, doi:10.1175/WAF-D-15-0138.1.

25. **Schwartz, C. S.**, G. S. Romine, R. A. Sobash, K. R. Fossell, and M. L. Weisman, 2015: NCAR's experimental real-time convection-allowing ensemble prediction system. *Wea. Forecasting*, **30**, 1645–1654, doi:10.1175/WAF-D-15-0103.1.

24. **Schwartz, C. S.**, G. S. Romine, M. L. Weisman, R. A. Sobash, K. R. Fossell, K. W. Manning, and S. B. Trier, 2015: A real-time convection-allowing ensemble prediction system initialized by mesoscale ensemble Kalman filter analyses. *Wea. Forecasting*, **30**, 1158–1181, doi:10.1175/WAF-D-15-0013.1.

23. **Schwartz, C. S.**, Z. Liu, and X.-Y. Huang, 2015: Sensitivity of limited-area hybrid variational-ensemble analyses and forecasts to ensemble perturbation resolution. *Mon. Wea. Rev.*, **143**, 3454–3477, doi:10.1175/MWR-D-14-00259.1.

22. Newman, K. M., **C. S. Schwartz**, Z. Liu, H. Shao, and X.-Y. Huang, 2015: Evaluating forecast impact of assimilating Microwave Humidity Sensor (MHS) radiances with a

regional ensemble Kalman filter data assimilation system. *Wea. Forecasting*, **30**, 964–983, doi:10.1175/WAF-D-14-00091.1.

21. Weisman, M. L., R. J. Trapp, G. S. Romine, C. Davis, R. Torn, M. Baldwin, L. Bosart, J. Brown, M. Coniglio, D. Dowell, A. C. Evans, T. J. Galarneau Jr., J. Haggerty, T. Hock, K. Manning, P. Roebber, P. Romashkin, R. Schumacher, **C. S. Schwartz**, R. Sobash, D. Stensrud, and S. Trier, 2015: The Mesoscale Predictability Experiment (MPEX). *Bull. Amer. Meteor. Soc.*, **96**, 2127–2149, doi:10.1175/BAMS-D-13-00281.1.

20. Romine, G. S., **C. S. Schwartz**, J. Berner, K. R. Fossell, C. S. Snyder, J. L. Anderson, and M. L. Weisman, 2014: Representing forecast error in a convection-permitting ensemble system. *Mon. Wea. Rev.*, **142**, 4519–4541, doi:10.1175/MWR-D-14-00100.1.

19. **Schwartz, C. S.**, G. S. Romine, K. R. Smith, and M. L. Weisman, 2014: Characterizing and optimizing precipitation forecasts from a convection-permitting ensemble initialized by a mesoscale ensemble Kalman filter. *Wea. Forecasting*, **29**, 1295–1318, doi:10.1175/WAF-D-13-00145.1.

18. Chen, D., Z. Liu, **C. S. Schwartz**, H.-C. Lin, J. D. Cetola, Y. Gu, and L. Xue, 2014: The impact of aerosol optical depth assimilation on aerosol forecasts and radiative effects during a wild fire event over the United States. *Geosci. Model Dev.*, **7**, 2709–2715, doi:10.5194/gmd-7-2709-2014.

17. Pagowski, M., Z. Liu, G. A. Grell, M. Hu, H.-C. Lin, and **C. S. Schwartz**, 2014: Implementation of aerosol assimilation in Gridpoint Statistical Interpolation (v. 3.2) and WRF-Chem (v. 3.4.1). *Geosci. Model Dev.*, **7**, 1621–1627, doi:10.5194/gmd-7-1621-2014.

16. **Schwartz, C. S.**, Z. Liu, H.-C. Lin, and J. D. Cetola, 2014: Assimilating aerosol observations with a "hybrid" variational-ensemble data assimilation system. *J. Geophys. Res. Atmos.*, **119**, doi:10.1002/2013JD020937.

15. **Schwartz, C. S.**, 2014: Reproducing the September 2013 record-breaking rainfall over the Colorado Front Range with high-resolution WRF model forecasts. *Wea. Forecasting*, **29**, 393–402, doi:10.1175/WAF-D-13-00136.1.

14. **Schwartz, C. S.**, and Z. Liu, 2014: Convection-permitting forecasts initialized with continuously-cycling limited-area 3DVAR, ensemble Kalman filter, and "hybrid" variational-ensemble data assimilation systems. *Mon. Wea. Rev.*, **142**, 716–738, doi:10.1175/MWR-D-13-00100.1.

13. Saide, P. E., G. R. Carmichael, Z. Liu, **C. S. Schwartz**, H.-C. Lin, A. M. da Silva, and E. Hyer, 2013: Aerosol optical depth assimilation for a size-resolved sectional model: impacts of observationally constrained, multi-wavelength and fine mode retrievals on regional scale analyses and forecasts. *Atmos. Chem. Phys.*, **13**, 10425–10444, doi:10.5194/acp-13-10425-2013.

12. **Schwartz, C. S.**, Z. Liu, X.-Y. Huang, Y.-H. Kuo, and C.-T. Fong, 2013: Comparing limited-area 3DVAR and hybrid variational-ensemble data assimilation methods for

typhoon track forecasts: Sensitivity to outer loops and vortex relocation. *Mon. Wea. Rev.*, **141**, 4350–4372, doi:10.1175/MWR-D-13-00028.1.

11. Jiang, Z., Z. Liu, T. Wang, **C. S. Schwartz**, H.-C. Lin, and F. Jiang, 2013: Probing into the impact of 3DVAR assimilation of surface PM_{10} observations over China using process analysis. *J. Geophys. Res.*, **118**, 6738–6749, doi:10.1002/jgrd.50495.

10. Romine, G. S., **C. S. Schwartz**, C. Snyder, J. L. Anderson, and M. L. Weisman, 2013: Model bias in a continuously cycled assimilation system and its influence on convection-permitting forecasts. *Mon. Wea. Rev.*, **141**, 1263–1284, doi:10.1175/MWR-D-12-00112.1.

9. **Schwartz, C. S.**, Z. Liu, H.-C. Lin, and S. A. McKeen, 2012: Simultaneous three-dimensional variational assimilation of surface fine particulate matter and MODIS aerosol optical depth. *J. Geophys. Res.*, **117**, D13202, doi:10.1029/2011JD017383.

8. Liu, Z., **C. S. Schwartz**, C. Snyder, and S.-Y. Ha, 2012: Impact of assimilating AMSU-A radiances on forecasts of 2008 Atlantic tropical cyclones initialized with a limited-area ensemble Kalman filter. *Mon. Wea. Rev.,* **140**, 4017–4034, doi:10.1175/MWR-D-12-00083.1.

7. **Schwartz, C. S.**, Z. Liu, Y. Chen, and X.-Y. Huang, 2012: Impact of assimilating microwave radiances with a limited-area ensemble data assimilation system on forecasts of typhoon Morakot. *Wea. Forecasting*, **27**, 424–437, doi:10.1175/WAF-D-11-00033.1.

6. Liu, Z., Q. Liu, H.-C. Lin, **C. S. Schwartz**, Y.-H. Lee, and T. Wang, 2011: Three-dimensional variational assimilation of MODIS aerosol optical depth: Implementation and application to a dust storm over East Asia. *J. Geophys. Res.*, **116**, D23206, doi:10.1029/2011JD016159.

5. Brooks, H. E., P. T. Marsh, A. M. Kowaleski, P. Groenemeijer, T. E. Thompson, **C. S. Schwartz**, C. M. Shafer, A. Kolodziej, N. Dahl, and D. Buckey, 2011: Evaluation of European Storm Forecast Experiment (ESTOFEX) forecasts. *Atmos. Res.*, **100**, 538–546, doi:10.1016/j/atmosres.2010.09.004.

4. Kain, J. S., M. Xue, M. C. Coniglio, S. J. Weiss, F. Kong, T. L. Jensen, B. G. Brown, J. Gao, K. Brewster, K. W. Thomas, Y. Wang, **C. S. Schwartz**, and J. J. Levit, 2010: Assessing advances in the assimilation of radar data and other mesoscale observations within a collaborative forecasting–research environment. *Wea. Forecasting*, **25**, 1510–1521, doi:10.1175/2010WAF2222405.1.

3. **Schwartz, C. S.**, J. S. Kain, S. J. Weiss, M. Xue, D. R. Bright, F. Kong, K. W. Thomas, J. J. Levit, M. C. Coniglio, and M. S. Wandishin, 2010: Toward improved convection-allowing ensembles: Model physics sensitivities and optimizing probabilistic guidance with small ensemble membership. *Wea. Forecasting*, **25**, 263–280, doi:10.1175/2009WAF2222267.1.

2. **Schwartz, C. S.**, J. S. Kain, S. J. Weiss, M. Xue, D. R. Bright, F. Kong, K. W. Thomas, J. J. Levit, and M. C. Coniglio, 2009: Next-day convection-allowing WRF model guidance:

A second look at 2 vs. 4 km grid spacing. *Mon. Wea. Rev.*, **137**, 3351–3372, doi:10.1175/2009MWR2924.1.

1. Kain, J. S., S. J. Weiss, D. R. Bright, M. E. Baldwin, J. J. Levit, G. W. Carbin, **C. S. Schwartz**, M. L. Weisman, K. K. Droegemeier, D. B. Weber, and K. W. Thomas, 2008: Some practical considerations regarding horizontal resolution in the first generation of operational convection-allowing NWP. *Wea. Forecasting*, **23**, 931–952, doi:10.1175/WAF2007106.1.

NON-REFEREED PUBLICATIONS (IF FIRST AUTHOR, ALSO ORAL PRESENTATION)

13. **Schwartz, C. S.**, J. Bresch, J. F. Bresch, J. Creus-Costa, B. Ancell, and T. Hutchinson, 2022: The impact of assimilating specialized rawinsonde observations over the North Pacific Ocean. Preprints, *26th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface*, Virtual, American Meteorological Society, 5A.2.

12. Bresch, J. F., J. G. Powers, **C. S. Schwartz**, and J. L. Coen, 2019: Supporting fire weather forecasting through a tool to identify convective outflows in numerical weather prediction models. Proceedings, *6th Intl Fire Behavior and Fuels Conference*, Albuquerque, NM, The International Association of Wildland Fire, May 2019.

11. Descombes, G., T. D. Auligne, H.-C. Lin, D. Xu, **C. S. Schwartz**, and F. Vandenberghe, 2014: Multi-sensor Advection Diffusion nowCast (MADCast) for cloud analysis and short-term prediction. NCAR Technical Note NCAR/TN-509+STR, 21 pp, doi: 10.5065/D62V2D37.

10. **Schwartz, C. S.**, Z. Liu, X.-Y. Huang, and Y.-H. Kuo, 2014: A limited-area dual-resolution hybrid-variational ensemble data assimilation system for the WRF model. Preprints, *15th WRF Users' Workshop*, Boulder, CO, National Center for Atmospheric Research, 6A.3.

9. **Schwartz, C. S.**, and Z. Liu, 2012: Bias correction and assimilation of microwave radiance measurements over the Antarctic. Preprints, *16th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans and Land Surface*, New Orleans, LA, Amer. Meteor. Soc., 10.1.

8. **Schwartz, C. S.**, and Z. Liu, 2011: Assimilating satellite microwave radiance measurements over the Antarctic. Preprints, *12th WRF Users' Workshop*, Boulder, CO, National Center for Atmospheric Research, 7B.1.

7. Liu, Z., Q. Liu, H.-C. Lin, **C. S. Schwartz**, and Y.-H. Lee, 2011: Assimilating MODIS aerosol optical depth using WRF/Chem and GSI: Application to a Chinese dust storm. Preprints, *12th WRF Users' Workshop*, Boulder, CO, National Center for Atmospheric Research, 8A.4.

6. **Schwartz, C. S.**, Z. Liu, Y. Chen, and X.-Y. Huang, 2011: Satellite radiance data assimilation with a limited-area ensemble Kalman filter and 3D-Var analysis system.

Preprints, *15th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans and Land Surface*, Seattle, WA, Amer. Meteor. Soc., 5.5.

5. **Schwartz, C. S.**, Z. Liu, Y. Chen, and X.-Y. Huang, 2010: Studying typhoon Morakot with a coupled WRFDA-DART system. Preprints, *11th WRF Users' Workshop*, Boulder, CO, National Center for Atmospheric Research, 3A.11.

4. Kain, J. S., S. J. Weiss, M. C. Coniglio, M. Xue, F. Kong, M. L. Weisman, M. Pyle, R. A. Sobash, **C. S. Schwartz**, D. R. Bright, J. J. Levit, and G. W. Carbin, 2009: New developments in applied research for severe weather convection forecasting in the Hazardous Weather Testbed, Norman, OK, U.S.A. Preprints, *5th European Conference on Severe Storms*, Landshut, Germany, O05-20.

3. **Schwartz, C. S.**, J. S. Kain, S. J. Weiss, M. Xue, D. R. Bright, F. Kong, K. W. Thomas, J. J. Levit, M. C. Coniglio, and M. S. Wandishin, 2009: Optimizing probabilistic high resolution ensemble guidance for hydrologic prediction. Preprints, *23rd Conference on Hydrology*, Phoenix, AZ, Amer. Meteor. Soc., 9.4.

2. Kain, J. S., S. J. Weiss, S. R. Dembek, J. J. Levit, D. R. Bright, J. L. Case, M. C. Coniglio, A. R. Dean, R. A. Sobash, and **C. S. Schwartz**, 2008: Severe-weather forecast guidance from the first generation of large domain convection-allowing models: Challenges and opportunities. Preprints, *24th Conference on Severe Local Storms*, Savannah, GA, Amer. Meteor. Soc., 12.1.

1. **Schwartz, C. S.**, J. S. Kain, S. J. Weiss, M. Xue, D. R. Bright, F. Kong, K. W. Thomas, J. J. Levit, M. C. Coniglio, and M. S. Wandishin, 2008: Toward improved convection-allowing ensembles: Model physics sensitivities and optimizing probabilistic guidance with small ensemble membership. Preprints, *24th Conference on Severe Local Storms*, Savannah, GA, Amer. Meteor. Soc., 11A.5.

SELECTED FIRST-AUTHORED PRESENTATIONS

53. **Schwartz, C. S.**, 2022: Improving initial conditions for high-resolution ensembles with high-resolution data assimilation and "blending". *NCAR/MMM Seminar Series*, Boulder, CO.

52. **Schwartz, C. S.**, J. Poterjoy, J. R. Carley, D. C. Dowell, G. S. Romine, and K. Ide, 2022: Comparing partial and continuously cycling ensemble Kalman filter data assimilation systems for convection-allowing ensemble forecast initialization. *19th Annual Meeting*, Virtual, Asia Oceania Geosciences Society, AS59-A002.

51. **Schwartz, C. S.**, G. S. Romine, and D. C. Dowell, 2022: Toward unifying short-term and next-day convection-allowing ensemble forecast systems with a continuously cycling 3-km ensemble Kalman filter over the entire conterminous United States. *19th Annual Meeting*, Virtual, Asia Oceania Geosciences Society, AS21-A005.

50. **Schwartz, C. S.**, 2022: Some thoughts about ensembles. *2022 Summer Community Meeting*, Boulder, CO, American Meteorological Society, Panel Discussion 11. (**invited**)

49. **Schwartz, C. S.**, J. Poterjoy, G. S. Romine, D. Dowell, J. R. Carley, and J. Bresch, 2022: Short-term convection-allowing ensemble forecast sensitivity to the resolution of initial condition perturbations and central initial states. *31st Conference on Weather Analysis and Forecasting/27th Conference on Numerical Weather Prediction*, Virtual, American Meteorological Society, 13B.2.

48. **Schwartz, C. S.**, J. K. Wolff, B.-J. Jung, J. Bresch, J. Powers, and C. Snyder, 2022: Incorporating observation error uncertainty into verifying global forecasts of clouds. *27th Conference on Probability and Statistics*, Virtual, American Meteorological Society, J2.5.

47. **Schwartz, C. S.**, G. S. Romine, and D. C. Dowell, 2021: Experiments with a continuously cycling 3-km ensemble Kalman filter over the entire conterminous United States for convection-allowing ensemble initialization. *The First Joint WCRP-WWRP Symposium on Data Assimilation and Reanalysis*, Virtual, O5-4A.

46. **Schwartz, C. S.**, J. Poterjoy, and G. S. Romine, 2021: Comparing convection-allowing ensemble forecasts initialized from partial and continuously cycling ensemble Kalman filter data assimilation systems. *25th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface*, Virtual, American Meteorological Society, 10.2.

45. **Schwartz, C. S.**, G. S. Romine, and D. C. Dowell, 2020: Experiments with a continuously-cycling 3-km ensemble Kalman filter over the entire conterminous United States. *American Geophysical Union Fall Meeting*, Virtual, American Geophysical Union, A250-01.

44. **Schwartz, C. S.**, and R. A. Sobash, 2020: Precipitation forecast sensitivity to horizontal grid spacing in convection-allowing models over the central–eastern United States. *Northeast Regional Operational Workshop XXI*, Virtual, National Weather Service and University at Albany, Session B.

43. **Schwartz, C. S.**, G. Romine, R. Sobash, K. Fossell, and M. Weisman, 2020: Convection-allowing ensemble research at NCAR. *4th Convective Scale Modelling Workshop,* Boulder, CO, 10b. (**invited**)

42. **Schwartz, C. S.**, G. S. Romine, and J. Bresch, 2020: Experiments with a 3-km ensemble Kalman filter data assimilation system over the entire conterminous United States. *24th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface*, Boston, MA, American Meteorological Society, 13.5.

41. **Schwartz, C. S.**, and R. A. Sobash, 2020: Revisiting sensitivity to horizontal grid spacing in convection-allowing models over the central-eastern United States using a large dataset. *30th Conference on Weather Analysis and Forecasting/26th Conference on Numerical Weather Prediction*, Boston, MA, American Meteorological Society, 8C.6.

40. **Schwartz, C. S.**, and R. A. Sobash, 2020: Convection-allowing medium-range severe weather guidance from a variable-resolution global ensemble. *Severe Local Storms Symposium*, Boston, MA, American Meteorological Society, 4.3.

39. **Schwartz, C. S.**, and R. A. Sobash, 2020: Clarifying applications of neighborhood approaches to high-resolution forecasts. *26th Conference on Probability and Statistics*, Boston, MA, American Meteorological Society, 2.3.

38. **Schwartz, C. S.**, 2019: Medium-range convection-allowing ensemble forecasts with a variable-resolution global model. *18th Conference on Mesoscale Processes*, Savannah, GA, American Meteorological Society, 4.5.

37. **Schwartz, C. S.**, 2019: Convection-allowing data assimilation over large domains. *China Meteorological Administration Institute of Urban Meteorology*, Beijing, China. (**invited**)

36. **Schwartz, C. S.**, 2019: Recent progress and challenges in high-resolution ensemble development over the United States. *China Meteorological Administration Institute of Urban Meteorology*, Beijing, China. (**invited**)

35. **Schwartz, C. S.**, and R. A. Sobash, 2019: Revisiting sensitivity to horizontal grid spacing in convection-allowing models over the central–eastern United States using a large dataset. *Joint WRF/MPAS Users' Workshop*, Boulder, CO, National Center for Atmospheric Research, 6.5.

34. **Schwartz, C. S.**, 2018: Thoughts about ensemble forecast verification. *Taiwan Central Weather Bureau*, Taipei, Taiwan. (**invited**)

33. **Schwartz, C. S.**, and R. A. Sobash, 2018: Global convection-allowing ensemble forecasts with MPAS. *Joint WRF/MPAS Users' Workshop*, Boulder, CO, National Center for Atmospheric Research, 10.5.

32. **Schwartz, C. S.**, G. S. Romine, R. A. Sobash, K. R. Fossell, and M. Wong, 2018: Evaluating the NCAR Ensemble's initialization approach. *29th Conference on Weather Analysis and Forecasting/25th Conference on Numerical Weather Prediction*, Denver, CO, American Meteorological Society, 15B.1.

31. **Schwartz, C. S.**, G. S. Romine, K. R. Fossell, R. A. Sobash, and M. L. Weisman, 2018: Recent progress in high-resolution ensemble development over the United States. *WRF-GRAPES workshop*. Boulder, CO, National Center for Atmospheric Research. (**invited**)

30. **Schwartz, C. S.**, G. S. Romine, and K. R. Fossell, 2018: How does covariance inflation impact EnKF-initialized convection-allowing ensemble forecasts? *6th International Symposium on Data Assimilation*, Munich, Germany, Ludwig-Maximilians University, 7.1.

29. **Schwartz, C. S.**, G. S. Romine, K. R. Fossell, R. A. Sobash, and M. L. Weisman, 2017: Comparing 3- and 1-km probabilistic forecasts from WRF model ensembles over the United States. *NCAS/NCAR WRF Tutorials and Workshop*, Durham, England.

28. **Schwartz, C. S.**, 2017: Ensemble forecast verification. *18th WRF Users' Workshop*, Boulder, CO, National Center for Atmospheric Research. (**invited**)

27. **Schwartz, C. S.**, G. S. Romine, K. R. Fossell, R. A. Sobash, and M. L. Weisman, 2017: Toward 1-km ensemble forecasts over large domains. *18th WRF Users' Workshop*, Boulder, CO, National Center for Atmospheric Research, 3.1.

26. **Schwartz, C. S.**, and R. A. Sobash, 2017: Generating probabilistic forecasts from convection-allowing ensembles using neighborhood approaches: A review and recommendations. *7th International Verification Methods Workshop*, Berlin, Germany, World Meteorological Organization, PROB ENS-5.

25. **Schwartz, C. S.**, G. S. Romine, R. A. Sobash, and K. R. Fossell, 2016: NCAR's experimental real-time convection-allowing ensemble prediction system. *American Geophysical Union Fall Meeting*, San Francisco, CA, American Geophysical Union, IN31F-02.

24. **Schwartz, C. S.**, G. S. Romine, R. A. Sobash, and K. R. Fossell, 2016: Toward operational convection-allowing ensembles over the United States. *Northeast Regional Operational Workshop XVII*, Albany, NY, National Weather Service and University at Albany, Session F.

23. **Schwartz, C. S.**, 2016: Can high-resolution ensemble forecasts improve wind flow modeling? *Wind Resource & Project Energy Assessment Conference 2016*, Minneapolis, MN, American Wind Energy Association. (**invited**)

22. **Schwartz, C. S.**, 2016: Ensemble forecast verification. "*Ensemble prediction with the WRF model" mini-tutorial*, Boulder, CO, National Center for Atmospheric Research. (**invited**)

21. **Schwartz, C. S.**, G. S. Romine, R. A. Sobash, and K. R. Fossell, 2016: An update on NCAR's experimental real-time convection-allowing ensemble prediction system. *17th WRF Users' Workshop*, Boulder, CO, National Center for Atmospheric Research, 9.4.

20. **Schwartz, C. S.**, G. S. Romine, R. A. Sobash, and K. R. Fossell, 2016: NCAR's experimental real-time convection-allowing ensemble prediction system. *Second annual NCAR Day of Networking and Discovery*, Boulder, CO.

19. **Schwartz, C. S.**, 2016: Toward unified convection-allowing analysis and forecast systems over large domains. *NCAR/MMM Seminar Series*, Boulder, CO.

18. **Schwartz, C. S.**, 2015: The future of weather forecasting: high-resolution ensembles. University of Connecticut, Department of Civil & Environmental Engineering, Storrs, CT. (**invited**)

17. **Schwartz, C. S.**, 2015: Practical applications of hybrid variational-ensemble data assimilation approaches. *IMAGe Theme of the Year—Frontiers in Ensemble Data Assimilation*

for Geoscience Applications, Boulder, CO, National Center for Atmospheric Research. (**invited**)

16. **Schwartz, C. S.**, 2015: Toward large-domain high-resolution continuously cycling data assimilation systems. *16th WRF Users' Workshop*, Boulder, CO, National Center for Atmospheric Research, 4A.2.

15. **Schwartz, C. S.**, and Z. Liu, 2014: Convection-permitting forecasts initialized with continuously cycling limited-area 3DVAR, ensemble Kalman filter, and "hybrid" variational-ensemble data assimilation systems. *1st World Weather Open Science Conference*, Montreal, Quebec, World Meteorological Organization, SCI-PS103.02.

14. **Schwartz C. S.**, 2014: Some best practices for WRFDA. *15th WRF Users' Workshop*, Boulder, CO, National Center for Atmospheric Research. (**invited**)

13. **Schwartz, C. S.**, and Z. Liu, 2013: Convection-permitting forecasts initialized with continuously cycling limited-area 3DVAR, ensemble Kalman filter, and "hybrid" variational-ensemble data assimilation systems. *15th Conference on Mesoscale Processes*, Portland, OR, Amer. Meteor. Soc., 9.6.

12. **Schwartz, C. S.**, Z. Liu, X.-Y. Huang, Y.-H. Kuo, and C.-T. Fong, 2013: Comparing limited-area 3DVAR and hybrid variational-ensemble data assimilation methods for typhoon track forecasts: Sensitivity to outer loops and vortex relocation. *14th WRF Users' Workshop*, Boulder, CO, National Center for Atmospheric Research, 5A.1.

11. **Schwartz, C. S.**, Z. Liu, and H.-C. Lin, 2013: Ensemble and variational data assimilation of surface particulate matter and MODIS aerosol optical depth. *17th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans and Land Surface*, Austin, TX, Amer. Meteor. Soc., 3.3.

10. **Schwartz, C. S.**, and Z. Liu, 2013: Comparing variational, ensemble, and "hybrid" variational/ensemble data assimilation techniques for limited-area tropical cyclone forecasts. *17th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans and Land Surface*, Austin, TX, Amer. Meteor. Soc., 11.2.

9. **Schwartz, C. S.**, Z. Liu, H.-C. Lin, and S. A. McKeen, 2012: Simultaneous Three-dimensional Variational Assimilation of Surface Fine Particulate Matter and MODIS Aerosol Optical Depth. *13th WRF Users' Workshop*, Boulder, CO, National Center for Atmospheric Research, 7.2.

8. **Schwartz, C. S.**, Z. Liu, C. Snyder, and S.-Y. Ha, 2012: Sensitivity of tropical cyclone forecasts to microwave radiance data assimilation with a limited-area ensemble Kalman filter. *16th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans and Land Surface*, New Orleans, LA, Amer. Meteor. Soc., 12.4.

7. **Schwartz, C. S.**, and Z. Liu, 2011: Assimilating satellite microwave radiance measurements over the Antarctic. *Workshop on Polar Simulations with the WRF Model*, Columbus, OH.

6. **Schwartz, C. S.**, M. L. Weisman, and W. Wang, 2011: When can high-resolution NWP model forecasts be trusted? Using error characteristics of the initial conditions to evaluate the likelihood of accurate forecasts. *24th Conference on Weather and Forecasting/20th Conference on Numerical Weather Prediction*, Seattle, WA, Amer. Meteor. Soc., 11B.1.

5. **Schwartz, C. S.**, 2010: Using error characteristics of the initial conditions to evaluate the likelihood of accurate forecasts. *Developmental Testbed Center Verification Workshop,* Boulder, CO. (**invited**)

4. **Schwartz, C. S.**, M. L. Weisman, and W. Wang, 2010: When can high-resolution NWP model forecasts be trusted? Using error characteristics of the initial conditions to evaluate the likelihood of accurate forecasts. *25th Conference on Severe Local Storms*, Denver, CO, Amer. Meteor. Soc., 13B.4.

3. **Schwartz, C. S.**, Z. Liu, Y. Chen, and X.-Y. Huang, 2010: Radiance data assimilation with an EnKF. *8th JCSDA Workshop on Satellite Data Assimilation*, Baltimore, MD.

2. **Schwartz, C. S.**, 2009: Verifying ensemble forecasts using a "neighborhood" approach. *Developmental Testbed Center Verification Workshop,* Boulder, CO.

1. **Schwartz, C. S.**, 2009: Assessing real-time convection-allowing WRF-ARW forecasts from research and operational perspectives: Lessons learned from the 2007 and 2008 NOAA Hazardous Weather Testbed Spring Experiments. *NCAR/MMM Seminar Series*, Boulder, CO.