

Aaron Hill

Curriculum Vitae

Texas Tech University
Department of Geosciences
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Research Interests

Predictability of severe convection via ensemble prediction systems, ensemble-based sensitivity analysis, observation targeting, and mesoscale data assimilation

Research to operational-forecasting environments to aid in the prediction of severe storms

Unmanned Aerial Systems (UASs) to observe the near-surface and near-storm environments of severe thunderstorms

Observational instrumentation (e.g., StickNet platforms)

Python programming language in the atmospheric sciences

Education

- projected 2019 **Ph.D., Geosciences, Texas Tech University.**
Advisors: Drs. Christopher Weiss and Brian Ancell
Dissertation: Towards improved mesoscale forecasts of dryline convection through ensemble-based targeted observing
- 2014 **M.S., Atmospheric Sciences, Texas Tech University.**
Advisors: Drs. Christopher Weiss and Brian Ancell
Thesis: Mesoscale data assimilation and ensemble sensitivity analysis towards improved predictability of dryline convection
- 2012 **B.S., Atmospheric Sciences, University of Washington.**
Advisor: Dr. Robert Houze, Jr.
Minor: Applied Mathematics

Experience

- 2012-present **Graduate Research Assistant, Texas Tech University.**
- July - Sep 2018 **Graduate Student Visitor, Mesoscale and Microscale Meteorology Laboratory, National Center for Atmospheric Research.**
Mentor: Glen Romine
- 2017-2018, 2015 **Writing Tutor, Texas Tech University.**
Graduate Student Writing Center
- Summer 2016 and 2017 **Instructor, Texas Tech University.**
Introduction to Atmospheric Science
- 2011-2012 **Undergraduate Research Assistant, University of Washington.**

Publications and Presentations

Publications

- 2018 **Hill, A. J.,** C. C. Weiss, and B. C. Ancell, 2018: An evaluation of the ensemble sensitivity-based observation targeting algorithm for three cases of dryline convection in the Southern Plains. In preparation for submission to Monthly Weather Review.
- 2016 **Hill, A. J.,** C. C. Weiss, and B. C. Ancell, 2016: Ensemble sensitivity analysis for mesoscale forecasts of dryline convection initiation. Monthly Weather Review, 144, 4161-4182. doi:10.1175/MWR-D-15-0338.1.
- 2014 Rasmussen, K. L., **A. J. Hill,** V. E. Toma, M. D. Zuluaga, P. J. Webster, and R. A. Houze, Jr., 2014: Multiscale analysis of three consecutive years of anomalous flooding in Pakistan. Quart. J. Roy. Meteor. Soc., 141, 1259-1276. doi:10.1002/qj.2433.

Presentations

* indicates upcoming

- 2018 *Ancell, B. C., A. A. Coleman, and **A. J. Hill**, 2018: Ensemble sensitivity-based subsetting overview and evaluation activities at the 2018 NOAA HWT. American Geophysical Union Fall Meeting, Washington, D.C.
- Ancell, B. C., A. A. Coleman, **A. J. Hill**, and C. C. Weiss, 2018: Ensemble sensitivity-based subsetting overview and evaluation activities at the 2018 NOAA HWT. 29th Conference on Severe Local Storms, Stowe, VT, paper 3A.4.
- Hill, A. J.**, C. C. Weiss, and B. C. Ancell, 2018: Towards improving forecasts of severe convection along the dryline through targeted observing with ensemble sensitivity analysis. 29th Conference on Severe Local Storms, Stowe, VT, paper 14.2.
- Hill, A. J.**, C. C. Weiss, and D. C. Dowell, 2018: Exploring the utility of assimilating observations from a mesoscale network of StickNet platforms during VORTEX-SE with the High Resolution Rapid Refresh Ensemble. 29th Conference on Severe Local Storms, Stowe, VT, paper 74.
- Weiss, C. C., D. C. Dowell, **A. J. Hill**, J. McDonald, E. C. Bruning, and J. Dahl, 2018: An update on VORTEX-SE activities at Texas Tech University. 29th Conference on Severe Local Storms, Stowe, VT, paper 3B.1.
- Hill, A. J.**, 2018: (invited) The utility of ensemble-sensitivity analysis for targeted observing, ensemble subsetting, and investigating environmental controls on storm characteristics. Cooperative Institute for Research in the Atmosphere, Fort Collins, CO.
- Hill, A. J.**, C. C. Weiss, and B. C. Ancell, 2018: Ensemble-sensitivity analysis based observation targeting experiments for mesoscale convection forecasts and factors influencing observation-impact prediction. 22nd Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface, Austin, TX, paper 613.
- Weiss, C. C., D. C. Dowell, **A. J. Hill**, and N. Yussouf, 2018: Ensemble sensitivity analysis of controls on storm-scale vertical vorticity for two southeastern U.S. tornado events. 22nd Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface, Austin, TX, paper 610.
- 2017 **Hill, A. J.**, C. C. Weiss, and B.C. Ancell, 2017: Ensemble-sensitivity analysis based observation targeting for mesoscale convection forecasts and factors influencing observation-impact prediction. American Geophysical Union Fall Meeting, New Orleans, LA, paper NG31A-0157.
- Weiss, C. C., E. C. Bruning, J. Dahl, D. C. Dowell, C. R. Alexander, **A. J. Hill**, and V. C. Chmielewski, 2017: Preliminary results from the 2016 and 2017 VORTEX-SE project. 9th European Conference on Severe Storms, Pula, Croatia, paper ECSS2017-155.
- Kenyon, A. and **A. J. Hill**, 2017: Using Python to process and visualize real-time atmospheric data during VORTEX-SE. Scipy 2017: Scientific Computing with Python, Austin, TX.
- Hill, A. J.**, C. C. Weiss, and B. C. Ancell, 2017: Ensemble sensitivity-based observation targeting experiments for Southern Plains dryline convection. 21st Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface, Seattle, WA, paper 15.5.
- Weiss, C. C., D. C. Dowell, **A. J. Hill**, and N. Yussouf, 2017: Ensemble sensitivity analysis of controls on updraft rotation for two southeastern US tornado events. 21st Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface, Seattle, WA, paper 11.6.
- Weiss, C. C., E. C. Bruning, J. Dahl, D. C. Dowell, C. R. Alexander, **A. J. Hill**, and V. C. Chmielewski, 2017: An overview of Texas Tech operations during VORTEX-SE 2016. Special Symposium on Severe Local Storms: Observation Needs to Advance Research, Prediction, and Communication, Seattle, WA, paper 939.
- 2016 Bruning, E. C., V. C. Chmielewski, C. C. Weiss, J. Dahl, **A. J. Hill**, C. J. Schultz, and J. Bailey, 2016: Flash size distributions characterized by mobile LMA deployments during VORTEX-SE. 28th Conference on Severe Local Storms, Portland, OR, paper 9.4.
- Hill, A. J.**, C. C. Weiss, and B. C. Ancell, 2016: Ensemble sensitivity-based observation targeting experiments for Southern Plains dryline convection. 28th Conference on Severe Local Storms, Portland, OR, paper 7B.6.
- Weiss, C. C., E. C. Bruning, J. Dahl, D. C. Dowell, C. R. Alexander, **A. J. Hill**, and V. C. Chmielewski, 2016: An overview of Texas Tech operations during VORTEX-SE 2016. 28th Conference on Severe Local Storms, Portland, OR, paper 3.5.

Weiss, C. C., D. C. Dowell, **A. J. Hill**, and N. Yossouf, 2016: Ensemble sensitivity analysis of controls on updraft rotation for the 27 April 2011 Tornado Outbreak. 28th Conference on Severe Local Storms, Portland, OR, paper 137.

Ancell, B. C., **A. J. Hill**, and B. Burghardt, 2016: The TTU WRF ensemble prediction system. 2nd Ensemble Design Workshop for Convection Allowing Models, College Park, Maryland. MD.

Hill, A. J., C. C. Weiss, and B. C. Ancell, 2016: Ensemble sensitivity-based observation targeting OSSEs for Southern Plains dryline convection. 20th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface, New Orleans, LA, paper J7.7.

- 2015 **Hill, A. J.**, B. Burghardt, and B. C. Ancell, 2015: Advanced ensemble techniques for improved predictability of storm-scale features. 1st Ensemble Design Workshop for Storm-Scale Ensembles, Boulder, CO.

Ancell, B. C., **A. J. Hill**, and B. Burghardt, 2015: The use of ensemble-based sensitivity with observations to improve predictability of severe convective events. 27th Conference on Weather Analysis and Forecasting / 23rd Conference on Numerical Weather Prediction, Chicago, IL, paper 8B.5.

Hill, A. J., C. C. Weiss, and B. C. Ancell, 2015: Mesoscale ensemble sensitivity and observation targeting of dryline convection. Preprints, 19th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface, Phoenix, AZ, paper 9.3.

Ancell, B. C., **A. J. Hill**, and B. Burghardt, 2015: The use of ensemble-based sensitivity with observations to improve predictability of severe convective events. Preprints, 19th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface, Phoenix, AZ, paper 9.1.

- 2014 Ancell, B. C., **A. J. Hill**, and B. Burghardt, 2014: The use of ensemble-based sensitivity and observations to improve predictability of severe convective events. American Geophysical Union Fall Meeting, San Francisco, CA, NG31B-3798.

Hill, A. J., C. C. Weiss, and B. C. Ancell, 2014: Mesoscale ensemble sensitivity of dryline convective initiation. Preprints, 27th Conference on Severe Local Storms, Madison, WI, paper 8B.4.

Hill, A. J., C. C. Weiss, and B. C. Ancell, 2014: Application of mesoscale ensemble-based sensitivity analysis to observation targeting. 26th Conference on Weather Analysis and Forecasting / 22nd Conference on Numerical Weather Prediction, Atlanta, GA, paper 610.

- 2013 **Hill, A. J.**, C. C. Weiss, and B. C. Ancell, 2013: Utilizing ensemble sensitivity for data denial experiments of the 4 April 2012 Dallas, Texas dryline-initiated convective outbreak using West Texas Mesonet observations and WRF-DART data assimilation. Preprints, 15th Conference on Mesoscale Processes, Portland, OR, paper 11.

Houze, R. A., Jr., K. L. Rasmussen, **A. J. Hill**, and M. D. Zuluaga, 2013: Using TRMM Precipitation Radar to understand the Pakistan and India floods of 2010-2012. American Geophysical Union Fall Meeting, San Francisco, CA.

Houze, R. A., Jr., K. L. Rasmussen, and **A. J. Hill**, 2013: TRMM insights into recent floods in Pakistan. PMM Science Team Meeting, Annapolis, MD.

Professional Leadership and Service

begins 2019 **Student Member:** AMS Committee on Weather Analysis and Forecasting

2013-present **Team Manager:** WxChallenge Competition, Texas Tech
Final-four finalist in 2017 End-of-Year Tournament

2017-2018 **Program Committee Member:** AMS 29th Conference on WAF/25th Conference on NWP

2017-2018 **Student Member:** Texas Tech University College of Arts and Sciences Committee on Academic Programs

2015-2016 **Planning Committee Member:** 15th AMS Student Conference
Poster Session Subcommittee and Session Chair

2014-2015 **Planning Committee Member:** 14th AMS Student Conference

2013-2015 **Secretary:** American Meteorological Society Student Chapter, Texas Tech University

2015 **Guest Speaker:** 6th Grade Science Class, Tahoka Middle School, Tahoka, TX

2015 **Guest Lecturer:** Atmospheric Science 1300: Introduction to Atmospheric Science

2014 **Guest Lecturer:** Atmospheric Science 2301: Weather, Climate, and Human Activities

2013, 2014 **Reviewer:** Texas Tech University Undergraduate Research Conference

2012-2013 **President:** American Meteorological Society Student Chapter, Texas Tech University

2011-2012 **President:** American Meteorological Society Student Chapter, University of Washington

Fieldwork Participation

- 2018-present Real-time deployments of observational assets using ensemble sensitivity-based observation targeting methods to improve prediction of high-impact weather.
- 2013-present Deploying mobile radars for interceptions of outflow boundaries, tornadoes, and mesoscale convective systems for the Texas Tech University Severe Storm Research Group.
 - 2018 National Robotics Initiative: Assisted fieldwork operations with two mobile Ka-band radars to support unmanned aircraft flights in and around supercell thunderstorms.
 - 2017 Rivers of Vorticity in Supercells (**RiVorS**): Assisted fieldwork operations with a mobile Ka-band radar to observe vorticity rivers.
- 2016-2017 Verification of the Origins of Rotation in Tornadoes Experiment-Southeast (**VORTEX-SE**): Student technician responsible for: integrating solar panel hardware into the Texas Tech StickNet observing platforms; altering existing hardware and software; maintaining stationary observing sites; developing web display; and producing analysis graphics.
- 2014-2015 Air Force Office of Scientific Research (**AFOSR**) project: Assisted fieldwork operations with mobile Ka-band radars to adaptively sample baroclinic boundaries near supercells. Contributed to development of computer processing techniques and communications for real-time dual-doppler analyses.
 - 2013 Assisted in the rebuilding of TTU StickNet data acquisition systems in support of the TTU Hurricane Research Team.

Honors and Awards

- 2018-present **Doctoral Dissertation Completion Fellowship**: Nominated by graduate advisor and department
- 2017 **Student Travel Award**: In recognition of an outstanding abstract for the 20th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface
- 2013 **TTU Geoscience Scholarship**: Awarded to graduate students nominated by their respective department
- 2012 **Jurica Fellowship**: Awarded to new, incoming graduate students nominated by their prospective department
- 2012 **Atmospheric Sciences Achievement Award**: Graduating seniors in the Department of Atmospheric Sciences (Washington) who have achieved a GPA of 3.5 or higher in degree courses
- 2012 **Phil Church Award**: Graduating senior in the Department of Atmospheric Sciences (Washington) with the most outstanding record of scholarship, leadership, and service
- 2010-2012 **Naval Weather Service Association Scholar**: Proven academic achievement and student community leadership

Synergistic Activities

- Reviewed manuscripts for: Journal of Operational Meteorology, Weather and Forecasting, and Monthly Weather Review
- Contributed to NOAA and NSF research proposals and progress reports
- Rapporteur for NOAA R2O meeting and 2018 AMS Community Meeting
- 9/24/28 Interview with Daily Treador regarding severe storm research in Texas Tech Atmospheric Sciences Group
- 2014, 2018 Hazardous Weather Testbed (NOAA) Spring Forecast Experiment participant
- 2/24/17 Interview with Texas Tech University Communications for the VORTEX-SE 2017 field program
- 3/16/16 Interview with Alabama Public Radio for Texas Tech involvement with the VORTEX-SE field program
- 2/11/16 Texas Tech University Climate Science Center Videos for Science series: (<https://www.youtube.com/watch?v=0-KN-QTGPsM>)
- 12/15 Interview with Texas Living Magazine (online) regarding Texas weather

Memberships

- 2017-present American Geophysical Union
- 2012-present American Meteorological Society

Technical skills

Programming Languages: Python*, shell*, Fortran, NCL, LabVIEW, HTML/CSS/PHP

Meteorological Software: WRF*, DART*

(* indicates proficiency)

Meetings Attended

- 2014, 2016, 2018 AMS Severe Local Storms
- 2018 AMS Summer Community Meeting
- 2011, 2013-2018 AMS Annual Meeting
- 2017 AGU Fall Meeting
- 2017 NOAA: Building a Weather-Ready Nation Workshop
- 2015, 2016 Storm-Scale Ensemble Workshop
- 2016 VORTEX-SE Planning Meeting
- 2013 AMS Mesoscale Conference
- 2013 SciPy: Scientific Computing with Python