Colorado State University
Department of Atmospheric Science
3915 Laporte Ave
Fort Collins, CO 80521
(206) 890-8299
aaron.hill@colostate.edu
ahill818.github.io

Aaron Hill

Curriculum Vitae

Education

2019 **Ph.D., Geosciences**, *Texas Tech University*.
Dissertation: Demonstration of ensemble sensitivity-based targeted observing for convective-scale applications: Perfect-model experiments

2014 **M.S., Atmospheric Sciences**, *Texas Tech University*.
Thesis: Mesoscale data assimilation and ensemble sensitivity analysis towards improved predictability of dryline convection

2012 **B.S., Atmospheric Sciences**, *University of Washington*.
Minor: Applied Mathematics

Research Experience

2019-present **Postdoctoral Research Fellow**, *Colorado State University*.
Advisor: Dr. Russ Schumacher

2012 - 2019 **Graduate Research Assistant**, *Texas Tech University*.
Advisors: Drs. Chris Weiss and Brian Ancell

July - Sep 2018 **Graduate Student Visitor**, *Mesoscale and Microscale Meteorology Laboratory, National Center for Atmospheric Research*.
Sponsor: Dr. Glen Romine

2011-2012 **Undergraduate Research Assistant**, *University of Washington*.
Advisor: Dr. Robert Houze, Jr.

Teaching Experience

Instructor of Record

Summer 2016 and 2017 ATMO 1300: Introduction to Atmospheric Science, Texas Tech University

Guest Lecturer

2019 ATMO 3316: Severe and Hazardous Weather

2015 ATMO 1300: Introduction to Atmospheric Science

2014 ATMO 2301: Weather, Climate, and Human Activities

Other

2020 **Co-Instructor:** Department of Atmospheric Science Machine Learning Workshop, Colorado State University

2017-2018, 2015 **Writing Tutor:** Graduate Student Writing Center, Texas Tech University

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

Publications

2021 **Hill, A. J.**, C. C. Weiss, and D. C. Dowell, 2021: Influence of a portable near-surface observing network on experimental ensemble forecasts of deep convection during VORTEX-SE. Weather and Forecasting, in review.

2020 **Hill, A. J.**, C. C. Weiss, and B. C. Ancell, 2020: Factors influencing ensemble sensitivity-based targeted observing prediction at convection-allowing resolutions. Monthly Weather Review, 148, 4497-4517, doi:10.1175/MWR-D-20-0015.1.

2020 **Hill, A. J.**, G. R. Herman, and R. S. Schumacher, 2020: Forecasting severe weather with random forests. Monthly Weather Review, 148, 2136-2161, doi:10.1175/MWR-D-19-0344.1.

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.

In Preparation

2021 Schumacher, R. S., **A. J. Hill**, M. Klein, J. Nelson, M. Erickson, and G. R. Herman, 2021: From random forests to flood forecasts: A research to operations success story. In preparation for submittion to Bulletin of the American Meteorology Society.

2021 **Hill, A. J.** and R. S. Schumacher, 2021: Forecasting excessive rainfall with random forests and a deterministic convection-allowing model. In preparation for submission to Weather and Forecasting.

Recent Lead-Author Presentations

Full presentation list: `https://ahill818.github.io/full_preslist.html`

2021 **Hill, A. J.** and R. S. Schumacher, 2021: Medium-range severe weather forecasts with random forests, 20th Conference on Artificial Intelligence for Environmental Science, 3.2.

Hill, A. J. and R. S. Schumacher, 2021: Short-term excessive rainfall forecasts using random forests and a deterministic convection-allowing model, 20th Conference on Artificial Intelligence for Environmental Science, joint 12.8.

2020 (invited) **Hill, A. J.**, 2020: Machine learning for convection hazard forecasts. NWS Southern Region Science and Technology Services Division Science Circle.

(invited) **Hill, A. J.**, 2020: Forecasting our future: machine learning and AI for high-impact weather. National Weather Association Annual Meeting.

(invited) **Hill, A. J.**, 2020: Statistical tools for high-impact weather. Naval Postgraduate School, Monterey, CA.

Hill, A. J. and R. S. Schumacher, 2020: Heavy precipitation and flash flood forecasts using random forests and convection-allowing models. 30th Conference on Weather and Forecasing / 26th Conference on Numerical Weather Prediction, Boston, MA., J71.2

Hill, A. J. and R. S. Schumacher, 2020: Random-Forest Severe Guidance from the GEFS. Storm Prediction Center Fall Forecaster Training.

Hill, A. J., R. S. Schumacher, M. Klein, J. Nelson, and M. Erickson, 2020: First-guess excessive rainfall outlooks from machine learning models. Hydrometeorological Testbed Flash Flood and Intensive Rainfall Experiment.

Hill, A. J., C. C. Weiss, and D. C. Dowell, 2020: Assimilating near-surface observations from a portable mesoscale network of StickNet platforms during VORTEX-SE with the High Resolution Rapid Refresh Ensemble. Severe Local Storms Symposium, Boston, MA., 950

Hill, A. J., C. C. Weiss, and B. C. Ancell, 2020: Factors influencing ensemble sensitivity-based targeted observing predictions at convection-allowing resolutions. 24th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface, Boston, MA., 10.4

2018 (invited) **Hill, A. J.**, 2018: 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: 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 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.

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.

Funding Support

Co-Principle Investigator (PI: Russ Schumacher): "Medium-range excessive rainfall forecasts with machine learning models", National Oceanic and Atmospheric Administration Joint Technology Transfer Initiative, ∼$338,000, 8/21-7/23, PENDING.

Co-Principle Investigator (PI: Brian Ancell, PI: Kristen Rasmussen, PI Yonggang Wang): "Collaborative Research: Mesoscale Predictability Across Climate Regimes", National Science Foundation, $393,173, 4/21-3/24, PENDING.

Co-Principle Investigator (PI: Russ Schumacher): "Generating calibrated forecast guidance for severe weather beyond day 1", National Oceanic and Atmospheric Administration Joint Technology Transfer Initiative, $433,209, 9/20-8/22.

Doctoral Dissertation Completion Fellowship: one year of salary ($24,000), 9/1/18-8/31/19.

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, $550, January 2017.

Synergistic Activities

2020-present **Associate Editor:** Monthly Weather Review

2020-present **Chair:** AMS 31st Conference on WAF/27th Conference on NWP Program Committee

2016-present **Reviewed Manuscripts for:** Weather and Forecasting, Monthly Weather Review, Journal of Atmospheric Sciences, Journal of Applied Meteorology and Climatology, JGR-Atmospheres, Geophysical Research Letters, Weather and Climate Dynamics, Meteorological Applications, Energies, and Journal of Operational Meteorology

2019-present **Member:** AMS Scientific and Technological Activities Commission, Committee on Weather Analysis and Forecasting

2021 **Session Co-Chair:** Special Symposium on Global and Mesoscale Models: Updates and Center Overviews: Utilization and Development of Rapidly Updating Mesoscale Models for Impact-Based Decision Support Services, AMS Annual Meeting 2021

2019-2020 **Member:** AMS 30th Conference on WAF/26th Conference on NWP Program Committee, Conference Session Chair

2019, 2020 **Participant:** Hydrometeorological Testbed (NOAA) Flash Flooding and Intense Rainfall Experiment

2019 **Participant:** Workshop: Increasing Inclusivity in the Engineering Classroom

2013-2019 **Team Manager:** WxChallenge Competition, Texas Tech University

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

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

Rapporteur: 2017 NOAA R2O meeting and 2018 AMS Community Meeting

2014, 2018 **Participant:** Hazardous Weather Testbed (NOAA) Spring Forecast Experiment

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

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

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

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

2019 Targeted Observations by Radars and UAS of Supercells (**TORUS**): Assisted fieldwork operations and led numerous forecast discussions.

2013-2019 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

2019-2020 WxChallenge Category 1 cumulative winner, runner-up in Cold Bay, AK and Cheyenne, WY

2017 WxChallenge final-four finalist in 2017 end-of-year tournament

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

Interviews

9/24/18 Daily Toreador newspaper regarding severe storm research in the Texas Tech Atmospheric Sciences Group

2/24/17 Texas Tech University Communications for the VORTEX-SE 2017 field program

3/16/16 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

12/15 Texas Living Magazine (online) regarding Texas weather

Memberships

2017-present American Geophysical Union

2012-present American Meteorological Society

Technical skills

* indicates proficiency

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

Meteorological Software: WRF*, DART*