Dr. Aaron Hill

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Education

Ph.D. in Geosciences — Lubbock, TX
Texas Tech University — *Jan. 2015 – Aug. 2019*

M.S. in Atmospheric Science — Lubbock, TX
Texas Tech University — *Aug. 2012 – Dec. 2014*

B.S. in Atmospheric Science — Seattle, WA
University of Washington, Minor in Applied Mathematics — *Sep. 2008 – June 2012*

Experience

Postdoctoral Research Fellow — July 2019 – Present
Colorado State University, Advisor: Dr. Russ Schumacher — *Fort Collins, CO*

- Postprocessing convection-allowing and global numerical weather prediction (NWP) models for improved probabilistic prediction of weather hazards
- Developing random forest (RF) models for excessive rainfall and severe weather hazard forecasts
- Evaluating machine learning (ML)-based forecast skill and model performance for ill-defined and rare events

Graduate Research Assistant — Aug. 2012 – Aug. 2019
Texas Tech University, Advisor: Dr. Christopher Weiss — *Lubbock, TX*

- Simulated high-impact weather events with WRF model and DART data assimilation software
- Applied statistical methods to test targeted-observation theory for high-impact weather forecasts
- Organized a large-scale field campaign, modifying observation instrumentation and designing an online workflow for real-time analyses and display

Funded Research Projects

Severe Weather Forecasts with Machine Learning | *Python, scikit-learn* — Sep. 2020 – present

- Developing a probabilistic forecast system to forecast severe weather out to eight days
- Postprocessing NOAA FV3-GEFS/R forecast output as inputs to RF models
- Producing forecasts in netCDf and grib2 formats analogous to operational outlook products
- Examining new severe storm labels defined by probabilistic verification dataset

Flash Flood Forecasting | *Python, scikit-learn, WRF, grib* — July 2019 – present

- Examining RF model forecast performance using various definitions of excessive rainfall
- Leveraging convection-allowing NWP model output for enhanced rainfall predictions
- Operationalizing ML products for Weather Prediction Center forecasters

Select Journal Publications

- **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
- 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 submission to Bulletin of the American Meteorological Society
- **Hill, A. J.**, G. R. Herman, and R. S. Schumacher, 2020: Forecasting severe weather with random forests. Monthly Weather Review, **148**, 2136-2161

Technical Skills

Languages and File Formats: Python, shell, Fortran, HTML/CSS/PHP, netCDF, grib
Meteorological Software: WRF, DART
Developer Tools: Git, GitHub, Asana
Libraries: scikit-Learn, xarray, pandas, NumPy, Matplotlib, ncks
Machine Learning Models: Random Forests, Neural Networks