Thomas M. Gowan

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Education

Ph.D., Atmospheric Sciences, *University of Utah* — *2017 – 2021*
M.S., Atmospheric Sciences, *University of Utah* — *2015 – 2017*
B.S., Meteorology, *The Pennsylvania State University* — *2011 – 2015*
- Schreyer Honors College Scholar - Graduated with High Distinction; GPA: 3.93
- *Minor*: Energy Business and Finance (EBF)

Technical Skills

Areas   numerical weather prediction, machine learning, ensemble modeling, large-eddy simulations, verification, distributed computing, visualization, uncertainty quantification, statistical post-processing, precipitation and cloud microphysics, boundary layer and mountain meteorology

Languages   *Skilled*: Python [GitHub] | *Competent*: Fortran | *Familiar with*: R, C-Shell, BASH, SQL, MATLAB

Tools   WRF, UFS/FV3, MPAS, CM1 modeling | Keras, scikit-learn, xarray, Dask | HPC, Slurm, MPI

Professional Experience

Weather Modeler/NWP Scientist, *Spire Global* — *2021 – Present*
- Regional and global weather model development, verification, and operational deployment
- Developed and operationally deployed software (Python) and NWP model components (Fortran) that improve the skill and increase the capabilities of Spire's forecast and analysis products

Graduate Research Assistant, *University of Utah* — *2015 – 2021*
- Idealized modeling of lake-effect and orographic precipitation systems in large-eddy simulations [presentation]
- Deep learning (CNNs and GANs) to downscale and enhance spatial lake-effect forecasts from the HRRR
- Verification of high-resolution ensemble and deterministic precipitation forecasts [paper]
- *Co-Founder and Co-President*, Python Users' Group, University of Utah Atmospheric Sciences Department

Visiting Scientist, *The National Center for Atmospheric Research (NCAR), Boulder CO* — *Summer 2017 – 2019*
- Three summers of collaboration with NCAR scientists on using ML to improve HRRR lake-effect forecasts, running idealized large-eddy simulations of lake-effect, and probabilistic verification of the 3-km NCAR Ensemble

President, *Utah Ski Weather* [forecast blog] — *2017 – 2018*
- Organized and led team of 9 graduate students in producing daily weather forecasts for the mountains of Utah
- Implemented a focus on public outreach in forecasts and gained a large following [twitter]

Intern, *NCAR Computational and Information Science Laboratory, Boulder CO* — *Summer 2014*
- Evaluated the computational performance of a climate model (CESM) on NCAR's supercomputer [presentation]

Undergraduate Researcher, *The Pennsylvania State University* — *2013 – 2015*
- Performed WRF sensitivity analysis on the effects of wind shear and sea-surface temp. on hurricanes [honor's thesis]

Awards

- Edward J. Zipser Award for Excellence in Graduate Research (The University of Utah) — *2021*
- 2nd Place Oral Presentation, 19th AMS Conference on Mountain Meteorology, (*virtual*) — *2020*
- Outstanding Oral Presentation, 30th AMS Conference on Weather Analysis and Forecasting, *Boston, MA* — *2020*
- 1st Place Oral Presentation, 18th AMS Conference on Mesoscale Processes, *Savannah, GA* — *2019*
- 1st Place Poster Presentation, 18th AMS Conference on Mountain Meteorology, *Santa Fe, NM* — *2018*
- 1st Place Poster Presentation, 24th AMS Conference on Numerical Weather Prediction, *Seattle, WA* — *2017*
- The John A. Dutton Award in Atmospheric Dynamics (The Pennsylvania State University) — *2015*

Publications

Gowan, T. M., W. J. Steenburgh, D. J. Gagne, and R. J. Chase, 2023: Improving Spatial Lake-Effect Precipitation Forecasts Using Deep Learning. (in prep)

Gowan, T. M., W. J. Steenburgh, and J. R. Minder, 2022: Orographic Effects on Landfalling Lake-Effect Systems. *Mon. Wea. Rev.* 150, 2013-2031, https://doi.org/10.1175/MWR-D-21-0314.1.

Gowan, T. M., W.J. Steenburgh, and J.R. Minder, 2021: Downstream Evolution and Coastal-to-Inland Transition of Landfalling Lake-Effect Systems. *Mon. Wea. Rev.* 149, 1023-1040, https://doi.org/10.1175/MWR-D-20-0253.1.

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, https://doi.org/10.1175/WAF-D-17-0144.1.