Thomas M. Gowan

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Education

Ph.D., Atmospheric Sciences, *University of Utah* *2017 – Present*
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, deep learning, big data processing, data mining, distributed computing, ensembles, uncertainty quantification, statistical post-processing, data visualization, large-eddy simulations, probabilistic verification, precipitation processes, boundary layer and mountain meteorology

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

Tools Keras, Tensorflow, scikit-learn, xarray, Dask | HPC, Slurm, MPI | WRF, CM1 modeling

Professional Experience

Graduate Research Assistant, *University of Utah* *2015 – Present*

- Idealized modeling of lake-effect and orographic precipitation systems in large-eddy simulations [presentation]
- Deep learning (CNNs, FCNs, and GANs) to identify, downscale, and enhance spatial lake-effect forecasts from the HRRR
- Quantile mapping bias correction, probability matched mean post-processing, and probabilistic validation of high-resolution ensemble numerical weather model precipitation forecasts [paper]
- *C-band Doppler On Wheels (DOW) radar operator*, RELAMPAGO field campaign [nytimes], *Córdoba, Argentina*
- *Co-PI,* Outreach and Radar Education in Orography (OREO) field campaign [media], *Northern Utah*
- *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*

- 2019: Developed 5-year training dataset of lake-effect events in HRRR forecasts and MRMS precipitation analyses. Began initial training of deep neural networks on NCAR's GPU nodes.
- 2018: Collaborated with cross-disciplinary group of scientists to improve idealized large-eddy simulations of lake-effect
- 2017: Determined experimental NCAR Ensemble weather model performed well deterministically, but produced probabilistic forecasts that were too sharp. Collaborated with and presented results to NCAR Ensemble team

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*

- Developed methodology for using profiling tools to identify bottlenecks in climate models on NCAR's supercomputer
- Evaluated the performance of a climate model as a function of node usage and placement [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

- 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*
- Schreyer Honors College Academic Excellence Scholarship (The Pennsylvania State University) *2011-2015*

Publications

Gowan, T. M., W .J. Steenburgh, and J. R. Minder, 2020: Downstream Evolution and Coastal-to-Inland Transition of Landfalling Lake-Effect Systems. *Mon. Wea. Rev.* **(submitted)**.

Gowan, T. M., W. J. Steenburgh, and J. R. Minder, 2020: Orographic Effects of Landfalling Lake-Effect Systems. **(in prep.)**.

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.

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