

Jeffrey M. Freedman, Esq., PhD
4 Sundance Drive
Saratoga Springs NY 12866
jfreedman.albany@gmail.com
+1 (518) 265-4154

EDUCATION

BS, Meteorology and Oceanography, Polytechnic University, Brooklyn, New York, June 1981
JD, New York Law School, June 1984
MS, Atmospheric Science, University at Albany, State University of New York, May 1995
PhD., Atmospheric Science, University at Albany, State University of New York, May 2000

PROFESSIONAL EXPERIENCE

Atmospheric Sciences Research Center
Research Associate, September 2013 - present

AWS Truepower, LLC
Lead Research Scientist, 2011 – July 2013
Senior Research Scientist, 2009 – 2011

AWS Truewind, LLC
Research Scientist, 2007 – 2009

Atmospheric Information Services
Principal and Consulting Meteorologist, March 2000 - present

EnviroLaw
Legal and Regulatory Consultant, August 2002 - present

Research Foundation, State University of New York
Post-Doctorate Research Assistant, Atmospheric Sciences Research Center, January 2000 – September 2000

New York City Department of Environmental Protection (NYCDEP)
Assistant Counsel, August 1985 - January 1993

Professional Societies

American Meteorological Society, American Geophysical Union, American Wind Energy Association, New York State Bar Association

PROFESSIONAL LICENSES AND CERTIFICATIONS

Admitted to the New York State Bar, Appellate Division, 2nd Department, March 1985
Certified Consulting Meteorologist (#606), American Meteorological Society, February 2002

SELECTED PUBLICATIONS

- Elena, A., L. Bianco, I. V. Djalalova, J. M. Wilczak, J. Olson, **J. Freedman**, C. Finley, J. Cline, 2019: Measuring the Impact of Additional Instrumentation on the Skill of Numerical Weather Prediction Models at Forecasting Wind Ramp Events during the first Wind Forecast Improvement Project (WFIP), *Wind Energy*. 2019; 1– 13. <https://doi.org/10.1002/we.2332>.
- Wilczak, J. M., J. B. Olson, I. Djalalova, L. Bianco, L. K. Berg, W. J. Shaw, R. L. Coulter, R. M. Eckman, **J. Freedman**, C. Finley, and J. Cline, 2019: Data Assimilation Impact of In Situ and Remote Sensing Meteorological Observations on Wind Power Forecasts during the First Wind Forecast Improvement Project (WFIP). *Wind Energy*, accepted for publication.
- Freedman, J. M.**, and D. R. Fitzjarrald, 2017: Mechanisms Responsible for the Observed Structure in a Convective Boundary Layer Over the Hudson Valley of New York. *Boundary-Layer Meteorol.*, **164**, 89 - 106. doi:10.1007/s10546-017-0241-6.
- Zhang, J., M. Cui, B.M. Hodge, A. Florita, and **J. Freedman**, 2017: Ramp forecasting performance from improved short-term wind power forecasting over multiple spatial and temporal scales. *Energy*, **122**, 528-541. <http://dx.doi.org/10.1016/j.energy.2017.01.104>.
- Xia, G. M., Cervarich, S.B. Baidya. L. Zhou, J. Minder J., **J. M. Freedman** and P.A. Jiménez, 2017: Simulating impacts of real-world wind farms on land surface temperature using WRF model: Validation with MODIS observations. *Mon. Weather Rev.* **145**, 4813 - 4836, <https://doi.org/10.1175/MWR-D-16-0401.1>
- Bianco, L., I. V. Djalalova, J. M. Wilczak, J. Cline, S. Calvert, E. Konopleva-Akish, C. Finley, and **J. Freedman**, 2016: A wind energy ramp tool and metric for measuring the skill of numerical weather prediction models. *Weather and Forecasting*, **31**, 1137–1156, doi:10.1175/WAF-D-15-0144.1. <http://journals.ametsoc.org/doi/abs/10.1175/WAF-D-15-0144.1>.
- Xia, G., L. Zhou, **J. Freedman**, S. Roy, R. Harris, and M. Cervarich, 2016: A case study of effects of atmospheric boundary layer turbulence, wind speed, and stability on wind farm induced temperature changes using observations from a field campaign. *Clim Dynam*, **46**, 2179–2196, doi:10.1007/s00382-015-2696-9.
- Wilczak, J., and Coauthors (**J. Freedman**), 2015: The Wind Forecast Improvement Project (WFIP): A public-private partnership addressing wind energy forecast needs. *Bull. Amer. Meteor. Soc.*, **96**, 1699–1718, <https://doi.org/10.1175/BAMS-D-14-00107.1>.
- Orwig, K., Ahlstrom, M.; Banunarayanan, V.; Sharp, J.; Wilczak, J.; **Freedman, J.**; Haupt, S.; Cline, J.; Bartholomy, O.; Hamann, H.; Hodge, B.; Finley, C.; Nakafuji, D.; Peterson, J.; Maggio, D.; Marquis, M., 2015: Recent Trends in Variable Generation Forecasting and Its Value to the Power System. *Sustainable Energy, IEEE Transactions on*, vol.PP, no.99, pp.1-10
- Freedman, J. M.**, and J. W. Zack, 2012: Identifying and Forecasting Ramp Events, *North Amer. Wind Power*, May 2012.
- Freedman, J. M.**, and K. E. Moore, 2012: Wind Shear And Why It Matters, *North Amer. Wind Power*. June 2012
- Freedman, J. M.**, K. T. Waight, and P. B. Duffy, 2009: Does Climate Change Threaten Wind

Resources? *North Amer. Wind Power*, **6**, 49 - 53.

Freedman, J. M., D. R. Fitzjarrald, 2001: Postfrontal Airmass Modification. *J. Hydromet.* **2**, 419-437.

Freedman, J.M., Fitzjarrald, D.R., Moore, K.E. and Sakai, R.K. 2001: Boundary layer clouds and vegetation–atmosphere feedbacks. *J. Climate*, **14**, 180–97.

RECENT RESEARCH ACTIVITIES

- New York State Energy Research and Development Authority (2018 - 2020), \$569K: “Development of a Wind Extremes Forecast System.” Partnering with MESO, Inc., this project will develop the Wind Extreme Forecast System (WEFS), which will produce forecasts 15 min - 120 hr forecasts of threshold wind speeds and wind gusts that may produce power outages at county to sub-county scales (transmission down to distribution lines). This will enable utilities and other stakeholders (e.g. emergency management services) to plan for and deploy necessary resources to minimize power outage impacts, resulting in improvements to reliability and resiliency of the power distribution system.
- New York State Energy Research and Development Authority (2017 - 2019), \$629K: “Effects of Climate Change on Renewable Energy Production in New York State.” In collaboration with Dr. Aiguo Dai (DAES), Dr. Richard Perez (ASRC), and private sector partners UL-AWS Truepower and ManoNano Technologies, this project’s primary focus is on developing a quantified, probability-based study of the redistribution of New York’s renewable energy resources (wind, solar, and hydro) to provide a clearer path for adaptation strategies necessary to ensure energy resiliency during the state’s shift to a non-fossil fuel economy amid a changing climate.
- Center of Excellence in Atmospheric Sciences and Weather Enterprise (2017, \$23K): “Future Trends in Surface Temperature, Winds, Irradiance, and Cloud Cover.” A collaborative effort with Dr. Aiguo Dai (DAES) and UL-AWS Truepower, this project’s objective is to support renewable energy planning through an analysis of the forecasted (2020 - 2050) rate of change of temperature, near-surface wind speed, global horizontal irradiance, and mean cloud cover.
- State University of New York, Arts and Humanities (2016 - 2017), \$25K: “Feedback – Future Feed.” Lead PI: Dr. Andrea Frank, SUNY New Paltz, co-PIs Dr. Emily Puthoff (New Paltz), Dr. Joyce Huang (UBuffalo). The focus of this project is to develop a holistic plan for facilitating the Village and Town of New Paltz obtaining 100% of their energy needs from renewables. My role is to provide technical support and participate in workshops seeking potential pathways for the community to achieve energy sustainability.
- National Aeronautics and Space Administration (NASA, 2016 - 2019), \$568K: “The role of soil moisture in weather predictability.” Lead PI: Dr. Craig Ferguson, co-PIs Dr. Lance Bosart (DAES), and Dr. David Turner (NOAA NSSL). The principal goal of this project is to investigate how incorporating NASA’s high-resolution (9-km) Soil Moisture Active-Passive (SMAP) data will refine modeled land-atmosphere coupling over the Great Plains and lead to improvements in short-term (6-30hr) weather and wind energy forecasts. My role is to quantify improvements in wind energy forecasts for a select group of wind farms in the

Southern Plains.

- Department of Energy - *Wind Forecast Improvement Project (2011 - 2014)*; field and modeling study to improve short-term wind energy forecasting total funding: \$3.5 million. Lead PI (with AWS Truepower) and Project Manager for work involving seven partners (including the Electric Reliability Council of Texas, NREL, Texas Tech University, Oklahoma University, North Carolina State University, MESO, Inc., and ICF International).
- Hawaiian Electric Companies (HECO) - *Integration of an observation network with renewable energy forecasts (2011 - 2014)*. Lead PI (with AWS Truepower) on work with utilities in the Hawaiian Islands to deploy the Solar and Wind Integrated Forecast Tool (SWIFT); total funding: \$1.2 million. This work included deployment of a network of remote sensing instrumentation to support SWIFT and utility integration of renewables on HECO's electric grid.
- California Energy Commission, Co-Principal Investigator, *Temporal Analysis of Solar Forecasting on Utility PV Plants, 2010 - 2013*. Contract #500-10-1057 under the Public Interest Energy Research Program (PIER); total funding: \$547K. Project to develop utility-scale solar forecasting system.
- California Energy Commission/Lawrence Livermore National Lab – *The potential effects of climate change on wind energy resources in California (2007 - 2009)*. Downscaled climate change study over Tehachapi at 15 km and 4 km resolution, CA; total funding: \$500K; Co-PI (with AWS Truewind) on effort to investigate the potential effects of climate change on wind energy resources in California.

AWARDS

2015 Utility Variable Integration Group Achievement Award: for contributions to improve wind energy forecasts through the USDOE/NOAA Wind Forecast Improvement Project

2000 University at Albany's Gokhale Award: for Achievement in Atmospheric Science

SERVICE

UAlbany and ASRC

Member, UAlbany Council on Research (CoR; 2018 - 2020)

Chair, CoR Committee on Centers, Institutes, and Specialized Research Laboratories

Member, CoR Faculty Research Awards Program

Member, ASRC Spring Falconer Lecture Series Coordination Committee (2017)

Search Committees

DAES Faculty Position (2014)

New York State Mesonet Program Manager (2014)

Atmospheric Sciences and Energy

Co-chair American Meteorological Society's (AMS) Renewable Energy Committee (2019 - 2021)

Member, AMS Energy Committee (2018 - 2020)

Member ex officio, AMS Board on Global Strategies (2019 - 2021)

Member, American Wind Energy Association Working Group on US Offshore Wind Standards (2019 - 2021)

Member, NYSERDA, Jobs & Supply Chain Technical Working Group (2018 - present)

Member, NYSERDA, Port Infrastructure Technical Working Group Meeting (2018 - present)