
Jared A. Lee
Project Scientist I



National Center for Atmospheric Research
Research Applications Laboratory
Weather Systems and Assessment Program
P.O. Box 3000, Boulder, CO 80307

Office phone: 303.497.8485 • Email: jaredlee@ucar.edu
Website: <https://staff.ucar.edu/users/jaredlee>
ORCID ID: <https://orcid.org/0000-0002-8841-0738>
Publons ID: <https://publons.com/a/1277688>

RESEARCH INTERESTS

Numerical weather prediction, ensemble prediction, ensemble configuration, wind energy forecasting, solar energy forecasting, surface transportation/road weather forecasting, boundary layer meteorology, atmospheric transport & dispersion forecasting, atmospheric data assimilation, fire weather, climate statistics

EDUCATION

The Pennsylvania State University – University Park, PA

- Ph.D., Meteorology, Aug 2012
 - Dissertation topic: Using objective statistical post-processing techniques to configure a numerical weather prediction ensemble for low-level wind forecasting
 - Advisor: Sue Ellen Haupt
- M.S., Meteorology, Aug 2007
 - Thesis topic: Studying the influence of numerical weather prediction uncertainty on atmospheric transport & dispersion uncertainty
 - Advisors: L. Joel Peltier and Sue Ellen Haupt

Gustavus Adolphus College – Saint Peter, MN

- B.A., *cum laude*, Physics, May 2005

Monash University – Clayton, VIC, Australia

- Study abroad student, took three atmospheric science courses, Jul–Nov 2004

Minnesota State University, Mankato – Mankato, MN

- Took two atmospheric science courses, Jun–Dec 2003

RESEARCH EXPERIENCE

- **Project Scientist I**, Research Applications Laboratory, National Center for Atmospheric Research (Boulder, CO). May 2014–present (Branko Kosović, supervisor). Applying NWP, data assimilation, and post-processing techniques to a number of research applications, including wind/solar energy forecasting and resource assessment, road weather forecasting, and cloud microphysics. Assumed leadership for modeling and analysis on several projects (including as an official science lead and task lead). I have also served as a co-PI on multiple submitted proposals.
- **Postdoctoral Research Scientist**, Research Applications Laboratory, National Center for Atmospheric Research (Boulder, CO). Oct 2013–May 2014. Using ensemble data assimilation for state estimation of parameters in the WRF NWP model that are relevant for marine boundary layer and offshore wind energy forecasting (Luca Delle Monache, advisor).
- **National Research Council Research Associate**, Department of Meteorology, Naval Postgraduate School (Monterey, CA). Oct 2012–Sep 2013. Used ensemble data assimilation to estimate the value of an empirical parameter governing land-atmosphere coupling in the WRF NWP model (Joshua Hacker, advisor.)
- **Graduate Research Assistant**, Research Applications Laboratory, National Center for Atmospheric Research (Boulder, CO). Jun 2011–Sep 2012. Completed my Ph.D. research under Sue Ellen Haupt. Also contributed to other RAL projects, including applying Bayesian model averaging to real-time renewable energy forecasts (Jim Cowie, PI).
- **Visiting Scientist**, Research Applications Laboratory, National Center for Atmospheric Research (Boulder, CO). Dec 2010–May 2011. I moved from PSU to NCAR to continue my Ph.D. research when my advisor, Sue Ellen Haupt, moved from PSU to NCAR in 2010.
- **Graduate Research Assistant**, Applied Research Laboratory and Department of Meteorology, The Pennsylvania State University (University Park, PA). Jun 2006–May 2011. Performed research for my M.S. thesis and Ph.D. dissertation.

PUBLICATIONS & PRESENTATIONS

Book Chapters:

- Haupt, S. E., B. Kosović, J. A. Lee, and P. A. Jiménez, 2018: Mesoscale modeling of the atmosphere. *Wind power modelling: Atmosphere and wind plant flow*, P. Veers, Ed., IET Publishing, Stevenage, UK. Manuscript in preparation, to be submitted by 30 Nov 2017.
- Haupt, S. E., P. A. Jiménez, J. A. Lee, and B. Kosović, 2017: Principles of meteorology and numerical weather prediction. *Renewable energy forecasting: From models to applications*, G. Kariniotakis, Ed., Woodhead Publishing (Elsevier), Cambridge, UK, doi:[10.1016/B978-0-08-100504-0.00001-9](https://doi.org/10.1016/B978-0-08-100504-0.00001-9).

Journal Articles:

- Haupt, S. E., B. Kosović, T. Jensen, J. K. Lazo, J. A. Lee, P. A. Jiménez, J. Cowie, G. Weiner, T. C. McCandless, M. Rogers, S. Miller, M. Sengupta, Y. Xie, L. Hinkelman, P. Kalb, and J. Heiser, 2017: Building the Sun4Cast system: Improvements in solar power forecasting. *Bull. Amer. Meteor. Soc.*, in press, doi:[10.1175/BAMS-D-16-0221.1](https://doi.org/10.1175/BAMS-D-16-0221.1).
- Lee, J. A., S. E. Haupt, P. A. Jiménez, M. A. Rogers, S. D. Miller, and T. C. McCandless, 2017: Solar irradiance nowcasting case studies near Sacramento. *J. Appl. Meteor. Climatol.*, **56**, 85–108, doi:[10.1175/JAMC-D-16-0183.1](https://doi.org/10.1175/JAMC-D-16-0183.1).

- Lee, J. A., J. P. Hacker, L. Delle Monache, B. Kosović, A. Clifton, F. Vandenberghe, and J. Sanz Rodrigo, 2017: Improving wind predictions in the marine atmospheric boundary layer through parameter estimation in a single column model. *Mon. Wea. Rev.*, **145**, 5–24, doi:[10.1175/MWR-D-16-0063.1](https://doi.org/10.1175/MWR-D-16-0063.1).
- Jiménez, P. A., S. Alessandrini, S. E. Haupt, A. Deng, B. Kosović, J. A. Lee, and L. Delle Monache, 2016: The role of unresolved clouds on short-range global horizontal irradiance predictability. *Mon. Wea. Rev.*, **144**, 3099–3107, doi:[10.1175/MWR-D-16-0104.1](https://doi.org/10.1175/MWR-D-16-0104.1).
- Lee, J. A., S. E. Haupt, and G. S. Young, 2016: Down-selecting numerical weather prediction multi-physics ensembles with hierarchical cluster analysis. *J. Climatol. Wea. Forecast.*, **4**, 156, doi:[10.4172/2332-2594.1000156](https://doi.org/10.4172/2332-2594.1000156).
- Reen, B. P., K. J. Schmehl, G. S. Young, J. A. Lee, S. E. Haupt, and D. R. Stauffer, 2014: Uncertainty in contaminant concentration fields resulting from uncertainty in the planetary boundary layer depth. *J. Appl. Meteor. Climatol.*, **53**, 2610–2626, doi:[10.1175/JAMC-D-13-0262.1](https://doi.org/10.1175/JAMC-D-13-0262.1).
- Lee, J. A., W. C. Kolczynski, T. C. McCandless, and S. E. Haupt, 2012: An objective methodology for configuring and down-selecting an NWP ensemble for low-level wind prediction. *Mon. Wea. Rev.*, **140**, 2270–2286, doi:[10.1175/MWR-D-11-00065.1](https://doi.org/10.1175/MWR-D-11-00065.1).
- Peltier, L. J., S. E. Haupt, J. C. Wyngaard, D. R. Stauffer, A. Deng, J. A. Lee, K. J. Long, and A. J. Annunzio, 2010: Parameterizing mesoscale wind uncertainty for dispersion modeling. *J. Appl. Meteor. Climatol.*, **49**, 1604–1614, doi:[10.1175/2010JAMC2396.1](https://doi.org/10.1175/2010JAMC2396.1).
- Lee, J. A., L. J. Peltier, S. E. Haupt, J. C. Wyngaard, D. R. Stauffer, and A. Deng, 2009: Improving SCIPUFF dispersion forecasts with NWP ensembles. *J. Appl. Meteor. Climatol.*, **48**, 2305–2319, doi:[10.1175/2009JAMC2171.1](https://doi.org/10.1175/2009JAMC2171.1).

Technical Notes:

- Haupt, S. E., B. Kosovic, T. Jensen, J. A. Lee, P. A. Jiménez, and Coauthors, 2016: The SunCast™ Solar Power Forecasting System: The results of the Public-Private-Academic Partnership to Advance Solar Power Forecasting. *NCAR Tech. Note NCAR/TN-526+STR*, 307 pp., doi:[10.5065/D6N58JR2](https://doi.org/10.5065/D6N58JR2).

Ph.D. Dissertation:

- Lee, J. A., 2012: Techniques for down-selecting numerical weather prediction ensembles. Ph.D. dissertation, The Pennsylvania State University, 131 pp., doi:[10.13140/RG.2.2.29268.81280](https://doi.org/10.13140/RG.2.2.29268.81280).

M.S. Thesis:

- Lee, J. A., 2007: Improving predictions of contaminant dispersion with SCIPUFF using meteorological ensemble uncertainty. M.S. thesis, The Pennsylvania State University, 129 pp.

Conference presentations (presenter in bold):

2017

- **Brasseur, J. G.**, A. W. Lavelly, T. Nandi, G. Vijayakumar, B. Jayaraman, S. E. Haupt, J. A. Lee, and J. Keller, 2017: Wind turbine response across scales: Simulation and experiment. *International Conf. for Future Technologies in Wind Energy (WindTech 2017)*, Boulder, CO. [Available online at <http://windtechconferences.org/wp-content/uploads/2017/10/Brasseur-James-Abstract.pdf>.]

- **Lee, J. A.**, T. Eidhammer, and G. Thompson, 2017: Addressing a high-altitude cirrus deficit in the Thompson & Eidhammer aerosol-aware microphysics scheme. *28th Conf. on Weather Analysis and Forecasting / 24th Conf. on Numerical Weather Prediction*, Seattle, WA, Amer. Meteor. Soc., 4B.1. [Available online at <https://ams.confex.com/ams/97Annual/webprogram/Paper313156.html>.]
- Vigh, J. L., C. M. Ammann, **J. A. Lee**, and P. Naveau, 2017: The NCAR Climate Risk Management Engine (CRMe). *12th Symp. On Societal Applications: Policy, Research, and Practice*, Seattle, WA, Amer. Meteor. Soc., 3.5. [Available online at <https://ams.confex.com/ams/97Annual/webprogram/Paper315972.html>.]
- **Hacker, J.**, R. Lorente-Plazas, N. Collins, and J. A. Lee, 2017: An approach to reduce systematic representativeness errors of surface observations in ensemble data assimilation. *21st Conf. on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface*, Seattle, WA, Amer. Meteor. Soc., 4.2. [Available online at <https://ams.confex.com/ams/97Annual/webprogram/Paper309206.html>.]

2016

- **Jayaraman, B.**, J. G. Brasseur, S. E. Haupt, and J. A. Lee, 2016: Deviations from equilibrium in daytime atmospheric boundary layer turbulence arising from nonstationary mesoscale forcing. *69th Annual Meeting of the APS Division of Fluid Dynamics*, Portland, OR, Amer. Phys. Soc. [Available online at <http://meetings.aps.org/link/BAPS.2016.DFD.M13.3>.]
- **Lee, J. A.**, S. E. Haupt, P. A. Jiménez, M. A. Rogers, S. D. Miller, and T. C. McCandless, 2016: Nowcasting case studies with Sun4Cast™. *Utility Variable-Generation Integration Group 2016 Forecasting Workshop*, Denver, CO.
- **Lee, J. A.**, T. Eidhammer, and G. Thompson, 2016: Investigating cloud ice nucleation in the Thompson aerosol-aware microphysics scheme. *17th WRF Users' Workshop*, Boulder, CO. [Available online at: http://www2.mmm.ucar.edu/wrf/users/workshops/WS2016/short_abstracts/8.4.pdf.]
- **Lorente-Plazas, R.**, J. Hacker, and J. A. Lee, 2016: Bias estimation for near-surface observations in ensemble Kalman filter with WRF model over complex terrain. *19th Joint Conf. on the Applications of Air Pollution Meteorology with the A&WMA*, New Orleans, LA, Amer. Meteor. Soc., 10.4. [Available online at: <https://ams.confex.com/ams/96Annual/webprogram/Paper289209.html>.]
- Brown, B. G., M. Billmire, N. French, J. D. Horel, N. Lucke, J. Wang, J. Zeng, **A. R. S. Anderson**, J. A. Lee, L. Sturges, and P. Pisano, 2016: Experimental applications of mobile vehicle observations: Scientific and technical challenges associated with the utilization of vehicle probe data. *32nd Conf. on Environmental Information Processing Technologies*, New Orleans, LA, Amer. Meteor. Soc., 11B.2. [Available online at: <https://ams.confex.com/ams/96Annual/webprogram/Paper290760.html>.]
- **Anderson, A. R. S.**, J. A. Lee, B. G. Brown, G. Weiner, S. Linden, L. Sturges, R. Patterson, and P. Pisano, 2016: Using mobile vehicle observations to improve numerical weather prediction forecasts. *20th Conf. on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS)*, New Orleans, LA, Amer. Meteor. Soc., 5.3. [Available online at: <https://ams.confex.com/ams/96Annual/webprogram/Paper287459.html>.]
- **Lee, J. A.**, S. E. Haupt, P. A. Jiménez, T. C. McCandless, M. A. Rogers, S. D. Miller, and X. Zhong, 2016: Nowcasting case studies with SunCast. *7th Conf. on Weather, Climate, Water, and the New Energy Economy*, New Orleans, LA, Amer. Meteor. Soc., 1.2. [Available online at: <https://ams.confex.com/ams/96Annual/webprogram/Paper288480.html>.]

2015

- **Lee, J. A.**, S. E. Haupt, P. A. Jiménez, T. C. McCandless, M. A. Rogers, and S. D. Miller, 2015: Solar energy nowcasting case studies near Sacramento. *27th Conf. on Weather Analysis and Forecasting/23rd Conf. on Numerical Weather Prediction*, Chicago, IL, Amer. Meteor. Soc., 16A.2. [Available online at: <https://ams.confex.com/ams/27WAF23NWP/webprogram/Paper273565.html>.]
- Anderson, A. R. S., **J. A. Lee**, B. G. Brown, G. M. Weiner, S. D. Drobot, P. Pisano, and L. Sturges, 2015: Connected vehicles: Filling in the observation gap for data assimilation. *27th Conf. on Weather Analysis and Forecasting/23rd Conf. on Numerical Weather Prediction*, Chicago, IL, Amer. Meteor. Soc., 5A.8. [Available online at: <https://ams.confex.com/ams/27WAF23NWP/webprogram/Paper273566.html>.]
- Anderson, A. R. S., **J. A. Lee**, B. G. Brown, G. M. Weiner, S. D. Drobot, P. Pisano, and L. Sturges, 2015: Connected vehicles: Filling in the observation gap for data assimilation. *16th WRF Users' Workshop*, Boulder, CO. [Available online at: http://www2.mmm.ucar.edu/wrf/users/workshops/WS2015/short_abstracts/6a.5.pdf.]
- **Anderson, A. R. S.**, J. A. Lee, S. D. Drobot, and P. Pisano, 2015: Using connected vehicle data to fill in the observations gap for data assimilation. *19th Conf. on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS)*, Phoenix, AZ, Amer. Meteor. Soc., TJ7.2. [Available online at: <https://ams.confex.com/ams/95Annual/webprogram/Paper267813.html>.]
- **Lee, J. A.**, S. E. Haupt, P. Jimenez, T. C. McCandless, M. Rogers, and S. Miller, 2015: Comparison of solar energy nowcasting techniques. *6th Conf. on Weather Climate, and the New Energy Economy*, Phoenix, AZ, Amer. Meteor. Soc., 4.3. [Available online at: <https://ams.confex.com/ams/95Annual/webprogram/Paper264080.html>.]
- **Delle Monache, L.**, J. P. Hacker, B. Kosovic, J. A. Lee, F. Vandenberghe, Y. Wu, A. Clifton, S. Hawkins, J. N. Nissen, and D. Rostkier-Edelstein, 2015: Investigating marine boundary layer parameterizations for improved off-shore wind predictions by combining observations with models via state estimation. *6th Conf. on Weather, Climate, and the New Energy Economy*, Phoenix, AZ, Amer. Meteor. Soc., 7.7. [Available online at: <https://ams.confex.com/ams/95Annual/webprogram/Paper263145.html>.]
- **Gagne, D. J.**, S. E. Haupt, J. K. Williams, A. McGovern, J. A. Lee, and T. C. McCandless, 2015: Scaling machine learning models to produce high resolution gridded solar power forecasts. *13th Conf. on Artificial Intelligence/31st Conf. on Environmental Information Processing Technologies/Special Symposium on Model Postprocessing and Downscaling*, Phoenix, AZ, Amer. Meteor. Soc., TJ1.1. [Available online at: <https://ams.confex.com/ams/95Annual/webprogram/Paper269813.html>.]

2014

- Delle Monache, L., **J. P. Hacker**, J. A. Lee, B. Kosovic, F. Vandenberghe, Y. Wu, A. Clifton, S. Hawkins, J. Nissen, and D. Rostkier-Edelstein, 2014: Towards improved off-shore wind predictions by combining observations with models through state estimation – An analysis of marine boundary layer parameterizations. *2014 AGU Fall Meeting*, San Francisco, CA, Amer. Geophys. Union, GC41H-08. [Available online at: <https://agu.confex.com/agu/fm14/meetingapp.cgi#Paper/14173>.]
- **Lee, J. A.**, L. Delle Monache, J. P. Hacker, B. Kosovic, F. Vandenberghe, Y. Wu, A. Clifton, S. Hawkins, J. Nissen, and D. Rostkier-Edelstein, 2014: Using data assimilation and state estimation in marine boundary layer parameterizations to improve offshore wind energy

prediction. *15th WRF Users' Workshop*, Boulder, CO. [Available online at:

<http://www2.mmm.ucar.edu/wrf/users/workshops/WS2014/abstracts/3.4.pdf>.]

- Delle Monache, L., **J. P. Hacker**, B. Kosovic, J. A. Lee, F. Vandenberghe, Y. Wu, A. Clifton, S. Hawkins, J. Nissen, and D. Rostkier-Edelstein, 2014: Investigating marine boundary layer parameterizations for improved off-shore wind predictions by combining observations with models via state estimation. *European Geophysical Union General Assembly 2014*, Vienna, Austria, 15003. [Available online at: <http://meetingorganizer.copernicus.org/EGU2014/EGU2014-15003.pdf>.]
- **Lee, J. A.** and J. P. Hacker, 2014: Using DART and state augmentation to update a surface layer parameter in WRF. *26th Conference on Weather Analysis and Forecasting/22nd Conference on Numerical Weather Prediction/18th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface*, Atlanta, GA, Amer. Meteor. Soc., J5.3. [Available online at: <https://ams.confex.com/ams/94Annual/webprogram/Paper239153.html>.]

2013

- **Lee, J. A.**, S. E. Haupt, and G. S. Young, 2013: Investigating seasonal impacts on clustering and ensemble down-selection. *11th Conference on Artificial and Computational Intelligence and its Applications to the Environmental Sciences*, Austin, TX, Amer. Meteor. Soc., 3.4. [Available online at: <https://ams.confex.com/ams/93Annual/webprogram/Paper222060.html>.]
- **Myers, W.**, J. Cowie, T. C. McCandless, and J. A. Lee, 2013: Probabilistic forecasts based on statistically-improved forecasts. *11th Conference on Artificial and Computational Intelligence and its Applications to the Environmental Sciences*, Austin, TX, Amer. Meteor. Soc., 2.1. [Available online at: <https://ams.confex.com/ams/93Annual/webprogram/Paper224564.html>.]

2012

- Lee, J. A., **S. E. Haupt**, G. S. Young, W. C. Kolczynski, and T. C. McCandless, 2012: Evaluating methods for down-selecting NWP multiphysics ensembles for wind prediction. *10th Conference on Artificial Intelligence*, New Orleans, LA, Amer. Meteor. Soc., 1.1. [Available online at: <https://ams.confex.com/ams/92Annual/webprogram/Paper199939.html>.]

2011

- **Lee, J. A.**, S. E. Haupt, G. S. Young, W. C. Kolczynski, and T. C. McCandless, 2011: Statistical post-processing methods for down-selecting numerical weather prediction multiphysics ensembles for wind forecasting. *2011 AGU Fall Meeting*, San Francisco, CA, Amer. Geophys. Union.

2010

- Lee, J. A., W. C. Kolczynski, **T. C. McCandless**, S. E. Haupt, D. R. Stauffer, and A. Deng, 2010: Evaluating NWP ensemble configurations for AT&D applications. *14th GMU Conf. on Atmospheric Transport & Dispersion Modeling*, Fairfax, VA.
- **Lee, J. A.**, W. C. Kolczynski, T. C. McCandless, K. J. Long, S. E. Haupt, D. R. Stauffer, and A. Deng, 2010: Evaluating NWP ensemble configurations for AT&D applications. *16th Conference on Air Pollution*, Atlanta, GA, Amer. Meteor. Soc., 12.3. **Best Overall Presentation**. [Available online at: <https://ams.confex.com/ams/pdfpapers/162494.pdf>.]

2009

- **Long, K. J.**, S. E. Haupt, M. Hendrickson, J. Keay, D. Miller, M. Coslo, J. A. Lee, and L. M. Rodriguez, 2009: Smoke plume characterization using photogrammetry techniques. *13th GMU Conf. on Atmospheric Transport & Dispersion Modeling*, Fairfax, VA.
- **Lee, J. A.**, S. E. Haupt, D. R. Stauffer, L. J. Peltier, A. Deng, B. J. Gaudet, and J. C. Wyngaard, 2009: Toward an NWP ensemble configuration for AT&D applications. *13th GMU Conf. on Atmospheric Transport & Dispersion Modeling*, Fairfax, VA.
- **Haupt, S. E.**, J. C. Wyngaard, K. J. Long, J. A. Lee, D. R. Stauffer, A. Deng, and F. Zajackowski, 2009: Modeling the stable boundary layer for dispersion. *13th GMU Conf. on Atmospheric Transport & Dispersion Modeling*, Fairfax, VA.
- **Lee, J. A.**, L. J. Peltier, S. E. Haupt, J. C. Wyngaard, D. R. Stauffer, and A. Deng, 2009: Impacts on dispersion prediction resulting from different types of NWP ensembles. *11th Conference on Atmospheric Chemistry*, Phoenix, AZ, Amer. Meteor. Soc., 8.5. **Third Place Student Oral Presentation.** [Available online at: https://ams.confex.com/ams/89annual/techprogram/paper_150267.htm.]

2008

- **Lee, J. A.**, L. J. Peltier, S. E. Haupt, J. C. Wyngaard, D. R. Stauffer, and A. Deng, 2008: Impact of types of NWP ensembles on dispersion prediction. *Chemical & Biological Defense Physical Science & Technology Conf.*, New Orleans, LA.
- **Lee, J. A.**, L. J. Peltier, S. E. Haupt, J. C. Wyngaard, D. R. Stauffer, and A. Deng, 2008: Improving SCIPUFF dispersion forecasts with meteorological ensemble uncertainty information. *12th GMU Conf. on Atmospheric Transport & Dispersion Modeling*, Fairfax, VA.
- Peltier, L. J., **S. E. Haupt**, J. C. Wyngaard, D. R. Stauffer, A. Deng, and J. A. Lee, 2008: Parameterization of NWP uncertainty for dispersion modeling. *15th Joint Conf. on the Applications of Air Pollution Meteorology with the A&WMA*, New Orleans, LA, Amer. Meteor. Soc., 8.1. [Available online at: https://ams.confex.com/ams/88Annual/techprogram/paper_133385.htm.]

2007

- **Lee, J. A.**, L. J. Peltier, S. E. Haupt, J. C. Wyngaard, D. R. Stauffer, A. Deng, and J. R. Zielonka, 2007: Using NWP ensembles to improve dispersion forecasts using SCIPUFF. *11th GMU Conf. on Atmospheric Transport & Dispersion Modeling*, Fairfax, VA.
- **Peltier, L. J.**, J. C. Wyngaard, S. E. Haupt, D. R. Stauffer, A. Deng, J. A. Lee, and B. P. Reen, 2007: Assessing the impact of meteorological model uncertainty on SCIPUFF AT&D predictions. *2007 Chemical Biological Information Systems Conf. & Exhibition*, Austin, TX.

Seminars and other presentations:

2015

- “SunCast case studies near Sacramento.” Presentation at the NCAR/RAL Retreat, Boulder, CO, 7 Dec 2015.
- “From ‘The Hill’ to the Foothills: My early career as an atmospheric scientist.” Invited seminar, Gustavus Adolphus College Sigma Pi Sigma Induction Banquet, Saint Peter, MN, 4 May 2015.

2014

- “What Do Atmospheric Scientists Do? An Overview of Research at NCAR.” Presentation given at the Arvada Estates retirement home for World Meteorological Day, Arvada, CO, 22 Mar 2014.

2012

- “Exploring Techniques for Down-selecting NWP Ensembles.” Seminar given at the National Center for Atmospheric Research, Research Applications Laboratory, Boulder, CO, 20 Sep 2012.
- “Exploring Techniques for Down-selecting NWP Ensembles.” Seminar given at Naval Postgraduate School, Monterey, CA, 6 Sep 2012.

2010

- "Down-Selection of NWP Ensemble Configurations." Seminar given at The Centre for Australian Weather and Climate Research, Docklands, VIC, Australia, 12 Aug 2010.
- "Down-Selection of NWP Ensemble Configurations." Seminar given at The University of Melbourne, Parkville, VIC, Australia, 11 Aug 2010.
- "Down-Selection of NWP Ensemble Configurations." Seminar given at Monash University, Clayton, VIC, Australia, 6 Aug 2010.
- "Quantifying Uncertainty for a Numerical Weather Prediction Ensemble." Seminar given at PSU Applied Research Lab/Garfield Thomas Water Tunnel, University Park, PA, 30 Jul 2010.

2009

- Research presentation to Maj. Gen. Randy Manner (Deputy Director, Defense Threat Reduction Agency) and Ms. Joan Pierre (Director, Defense Threat Reduction Agency Basic and Applied Sciences Directorate), University Park, PA, 23 Oct 2009.

Selected poster presentations:

2017

- Mitchell, M. J., B. Ancell, J. A. Lee, S. Haupt, and L. Delle Monache, 2017: Development of statistical post-processing techniques for improved low-level wind speed forecasts in west Texas. *28th Conf. on Weather Analysis and Forecasting / 24th Conf. on Numerical Weather Prediction*, Seattle, WA, Amer. Meteor. Soc., 1211. [Available online at <https://ams.confex.com/ams/97Annual/webprogram/Paper305882.html>.]

2016

- Vigh, J. L., C. M. Ammann, and J. A. Lee, 2016: An efficient workflow environment to support the collaborative development of actionable climate information using the NCAR Climate Risk Management Engine (CRMe). *2016 AGU Fall Meeting*, San Francisco, CA, Amer. Geophys. Union, A13I-0400. [Available online at <https://agu.confex.com/agu/fm16/meetingapp.cgi/Paper/197594>.]

2014

- Hacker, J. P., J. A. Lee, and L. Lei, 2014: Parameter estimation in ensemble data assimilation to characterize model errors in surface-layer schemes over complex terrain. *European Geosciences Union General Assembly 2014*, Vienna, Austria. [Available online at: <http://meetingorganizer.copernicus.org/EGU2014/EGU2014-14216.pdf>.]

2013

- Lee, J. A. and J. P. Hacker, 2013: Using data assimilation and state augmentation to update a numerical weather prediction model parameter. *2013 AGU Fall Meeting*, San Francisco, CA, Amer. Geophys. Union. [Available online at: <http://abstractsearch.agu.org/meetings/2013/FM/sections/A/sessions/A11F/abstracts/A11F-0121.html>.]

2011

- Lee, J. A., W. C. Kolczynski, T. C. McCandless, S. E. Haupt, D. R. Stauffer, A. Deng, and K. J. Schmehl, 2011: Down-selection of NWP ensemble configurations. *24th Conf. on Weather Analysis and Forecasting/20th Conf. on Numerical Weather Prediction*, Seattle, WA, Amer. Meteor. Soc., 129. [Available online at: <https://ams.confex.com/ams/91Annual/webprogram/Paper182877.html>.]
- Schmehl, K. J., B. P. Reen, A. J. Annunzio, J. A. Lee, and S. E. Haupt, 2011: Impact of uncertainty in planetary boundary layer depth on concentration predictions. *9th Conf. on Artificial Intelligence and its Applications to the Environmental Sciences*, Seattle, WA, Amer. Meteor. Soc., 260. [Available online at: <https://ams.confex.com/ams/91Annual/webprogram/Paper185399.html>.]

2010

- Lee, J. A., W. C. Kolczynski, T. C. McCandless, S. E. Haupt, D. R. Stauffer, A. Deng, and K. J. Schmehl, 2010: Down-selecting NWP ensemble configurations for AT&D applications. *Chemical & Biological Defense Physical Science & Technology Conf.*, Orlando, FL.

2009

- Lee, J. A., S. E. Haupt, D. R. Stauffer, W. C. Kolczynski, L. J. Peltier, A. Deng, and J. C. Wyngaard, 2009: Sources of uncertainty in an NWP ensemble for AT&D applications. *Chemical & Biological Defense Physical Science & Technology Conf.*, Dallas, TX.
- Lee, J. A., S. E. Haupt, L. J. Peltier, D. R. Stauffer, J. C. Wyngaard, and A. Deng, 2009: Impacts of NWP model configurations on atmospheric transport & dispersion predictions. *PSU Graduate Exhibition*, University Park, PA.
- Lee, J. A., S. E. Haupt, L. J. Peltier, D. R. Stauffer, J. C. Wyngaard, and A. Deng, 2009: Impacts of NWP model configurations on atmospheric transport & dispersion predictions. *PSU Institute for CyberScience Day*, University Park, PA.

2007

- Lee, J. A., L. J. Peltier, S. E. Haupt, J. C. Wyngaard, D. R. Stauffer, and A. Deng, 2007: Improving contaminant dispersion and concentration predictions using SCIPUFF. *PSU Graduate Exhibition*, University Park, PA.

2006

- Lee, J. A., A. E. Goss, L. J. Peltier, S. E. Haupt, and J. C. Wyngaard, 2006: Dispersion uncertainty from meteorological sources. *PSU EMS Graduate Student Poster Exhibition*, University Park, PA.
- Lee, J. A., A. E. Goss, L. J. Peltier, S. E. Haupt, and J. C. Wyngaard, 2006: Dispersion uncertainty from meteorological sources. *10th GMU Conf. on Atmospheric Transport & Dispersion Modeling*, Fairfax, VA.

AWARDS AND SCHOLARSHIPS

- **2016 NCAR Research Applications Laboratory Scientific & Technical Achievement Award**, team member, Sun4Cast Solar Power Forecasting System.
- Nominated for **Gustavus Adolphus College First Decade Award** for early career achievement, awarded to one male and one female annually. Nominated in Oct 2014.
- **National Research Council Research Associateship Award**. Postdoctoral research fellowship at the Naval Postgraduate School in Monterey, California, 22 Oct 2012 – 25 Sep 2013.
- **NSF Student Travel Fellowship/NCAR Field Student Position** to participate in the DYNAMO (Dynamics of the Madden-Julian Oscillation) field project as a student assistant for sounding operations on the Indian Ocean island of Diego Garcia, 25 Oct – 23 Nov 2011.
- **Exploratory & Foundational Program Fellowship**, Penn State University Applied Research Laboratory, Jan 2008 – May 2011.
- **DTRA Student Travel Scholarship** to attend the Chemical & Biological Defense Physical Science & Technology Conference, Orlando, FL, 15–19 Nov 2010.
- **Best Overall Presentation**, 16th Conference on Air Pollution Meteorology at the 90th AMS Annual Meeting, Atlanta, GA, 18–21 Jan 2010.
- **Third Place Student Oral Presentation**, 11th Conference on Atmospheric Chemistry at the 89th AMS Annual Meeting, Phoenix, AZ, 11–15 Jan 2009.
- **Chi Epsilon Pi Travel Award**, to attend the 89th AMS Annual Meeting, Phoenix, AZ, 11–15 Jan 2009.
- **DTRA Student Travel Scholarship** to attend the Chemical & Biological Defense Physical Science & Technology Conference, New Orleans, LA, 17–21 Nov 2008.

TEACHING EXPERIENCE

- **Technical Tailored Short Course on Renewable Energy Forecasting**, Aug 2017, NCAR, for four visitors from Kuwait. Co-organized the 2.5-week workshop and taught sessions on the WRF model and case studies for solar energy forecasting.
- **Graduate Teaching Assistant**, Aug 2005 – May 2006, The Pennsylvania State University Course: METEO 003 – Introduction to Meteorology (Lab portion)
- **Lab Assistant**, Feb 2004 - May 2004, Gustavus Adolphus College Course: PHY 171 - General Physics II Laboratory
- **Lab Assistant**, Sep 2003 - Dec 2003, Gustavus Adolphus College Course: PHY 121 - General Physics I Laboratory

CONTRIBUTIONS TO COMMUNITY MODELS/SOFTWARE

- **WRF v3.8.1**, Thompson-Eidhammer aerosol-aware microphysics scheme: “A set of changes to ice initiation, particularly removal of Phillips parameterization and return to DeMott et al. (2010) dust scheme, trying to improve near-tropopause ice clouds for RAP/HRRR” (<http://www2.mmm.ucar.edu/wrf/users/wrfv3.8/updates-3.8.1.html>).
- **NCL v6.4.0**, provided a script to identify a bug in the cd_string function (http://ncl.ucar.edu/current_release.shtml#DateConversionsBugsFixed6.4.0).

CONTRIBUTIONS TO UNIVERSITY EDUCATION

- **Provided an NWP ensemble dataset** for Dr. George Young's undergraduate METEO 474 (Computer Methods of Meteorological Analysis and Forecasting) class at Penn State University, to illustrate various issues with verification and ensemble calibration. Fall 2016.

FIELD RESEARCH EXPERIENCE

- **NCAR Student Assistant for Sounding Operations** for the Dynamics of the Madden-Julian Oscillation (DYNAMO) field project on the island of Diego Garcia in British Indian Ocean Territory, 25 Oct–23 Nov 2011. Responsibilities included launching radiosondes every three hours, logging observations, and monitoring the scientific equipment. (Supervisors William Brown and Heather McIntyre, NCAR/EOL.)
- **Photographer** for a project led by Sue Ellen Haupt and Janice Key of the PSU Applied Research Lab, using photogrammetry techniques to estimate the concentration of plumes from smoke grenades, spring 2009.

PRIMARY PROGRAMMING LANGUAGE EXPERIENCE

- NCL
- Python
- Fortran 90
- Bash
- C-shell
- R
- Matlab

ATMOSPHERIC MODELING AND COMPUTING EXPERIENCE

- Numerical weather prediction: WRF-ARW (compiling/debugging; modifying source code; configuring, initializing, and executing model runs), WPS. Completed the WRF Tutorial in Jan 2008.
- Contributed changes to the Thompson-Eidhammer aerosol-aware microphysics scheme that were released in WRF v3.8.1 in fall 2016
- Data assimilation: DART (WRF-DART), NCAR RT-FDDA, OBSGRID
- Transport and dispersion: SCIPUFF
- Graphing packages: NCL, RIP, Matlab, TecPlot
- Assimilation or verification observation formats: LITTLE_R, MADIS, ASCII, DART
- Verification tools: Codes and scripts written in several languages (see above)
- Cluster queuing systems: PBS, LSF

PROFESSIONAL MEMBERSHIPS

- American Geophysical Union, joined Aug 2011
- American Meteorological Society, joined Sep 2006
- Chi Epsilon Pi (meteorology), joined Mar 2006
- Sigma Pi Sigma (physics), joined May 2005

JOURNAL ARTICLE REVIEWS

- Reviewer, *Atmosphere*, 2017
- Reviewer, *Bulletin of the American Meteorological Society*, 2008
- Reviewer, *International Journal of Climate*, 2016
- Reviewer, *Journal of Applied Meteorology and Climatology*, 2013, 2017
- Reviewer, *Journal of Atmospheric and Oceanic Technology*, 2017
- Reviewer, *Journal of Geophysical Research*, 2011
- Reviewer, *Monthly Weather Review*, 2012, 2013 (x2), 2014 (x3), 2017
- Reviewer, *Solar Energy*, 2017 (x2)
- Reviewer, *Weather and Forecasting*, 2016 (x2)
- Reviewer, *Wind Energy*, 2017

JOURNAL ARTICLE TECHNICAL EDITING SERVICES

- Yano, J.-I., and B. Jakubiak, 2016: Wavelet-based verification of the quantitative precipitation forecast. *Dynamics of Atmospheres and Oceans*, **74**, 14–29. doi:[10.1016/j.dynatmoce.2016.02.001](https://doi.org/10.1016/j.dynatmoce.2016.02.001).

LEADERSHIP, VOLUNTEER, AND OUTREACH ACTIVITIES

Project Leadership:

- **Science Lead**, NCAR/RAL, Solar Power Forecasting for New York, Phase I (EPRI), Aug–Nov 2017. Led modeling and analysis, and also led writing NCAR’s section of the final report.
- **Task Lead**, NCAR/RAL, Renewable Energy Forecasting for Kuwait (KISR), Aug 2017 – present. Leading a task on case studies and resource assessment. Co-led a task on organizing the technical tailored short course to start the project (Aug 2017).

Academic:

- **AMS Planning Commission**, Member, Oct 2017–Jan 2020
- **M.S. Thesis Committee Member**, Meghan Mitchell (Texas Tech University), Aug 2017
- **SOARS Mentor**, NCAR, Summer 2016 (Meghan Mitchell) (<https://soars.ucar.edu/>)
- **Chair**, Graduate Advisory Council, PSU Department of Meteorology, May 2010 – Nov 2010
- **Grad Student Representative**, PhD Candidacy Exam Implementation Subcommittee, Graduate Academic Program, PSU Department of Meteorology, Oct 2009
- **Liaison to the Faculty**, Graduate Advisory Council, PSU Department of Meteorology, May 2009 – May 2010
- **Undergraduate Academic Program Representative**, Graduate Advisory Council, PSU Department of Meteorology, Aug 2008 – Jul 2009
- **Tutor** (several courses), Chi Epsilon Pi (PSU chapter), Sep 2006 – May 2009
- **Secretary/Historian**, Chi Epsilon Pi (PSU chapter), May 2006 – May 2007

Non-academic/Service:

- **Church Elder**, Broomfield CO, Jun 2016 – present
- **Church pianist/keyboardist/vocalist**, State College PA, Boulder CO, & Broomfield CO, Sep 2006 – present

- **Reading/Homework Tutor for Refugee Children**, K-12 children from the Karen and Kareni ethnic groups (Burma/Myanmar), Lafayette CO, Oct 2017 – present
- **Super Science Saturday “NCAR Wizard”**, Boulder CO, Nov 2017
- **Science fair judge at Ryan Elementary School**, Lafayette CO, annually spring 2012, 2014 – present
- **Weather & Climate Q&A via FaceTime with 6th graders at Cumberland Middle School**, Cumberland WI, annually Jan 2016 – present
- **Presentation to Ryan Elementary School “Summer Explorers Club” students at NCAR Mesa Lab**, 30 Jul 2014
- **Presentation about atmospheric science at senior center**, Arvada CO, 22 Mar 2014
- **Mentor to two high school students**, Boulder CO, Feb 2012 – Jun 2012
- **President**, Penn State Christian Grads, May 2007 – Jul 2010
- **Hurricane Katrina clean-up** in Louisiana with church group, Mar 2007
- **Campus Weather Service volunteer**, behind the scenes for the public TV show “Weather World”, PSU Department of Meteorology, Sep 2005 – Dec 2006

PHOTOGRAPHY CREDITS

- Bellware, D., and Dr. Richard Gardiner, 2014: The Genesis of the Memorial Day Holiday in America. Columbus State University, Columbus, GA, 194 pp. [Photo by Jared Lee on p. 113, of a Memorial Day sign in Boalsburg, PA.]
- Photos of a railroad tie fire in Longmont, CO, published by 9News Denver, both on television and the Internet. 16 Apr 2014. News story available at: <http://www.9news.com/story/news/local/2014/04/16/railroad-tie-fire-visible-from-i-25/7805763/>.
- Franck, Karen A., and Teresa von Sommaruga Howard, 2010: Design through Dialogue: A Guide for Clients and Architects. John Wiley & Sons, Ltd., Chichester, West Sussex, United Kingdom. 208 pp. [Photos by Jared Lee on pp. 176 and 194, of Te Papa Tongarewa (The National Museum of New Zealand), located in Wellington, New Zealand.]

VIDEOGRAPHY CREDITS

- Seven seconds of footage by Jared Lee from a sporting event (George Mason at Penn State men’s basketball game, NIT First Round, 17 Mar 2009) was used in a 30-second PSA for Big Ten Conference Men’s Basketball entitled “Magic Number.” This PSA aired during television broadcasts of Big Ten games throughout the 2009-10 basketball season on multiple networks, including CBS, ESPN, and BTN. The PSA can be viewed at this URL: <http://www.youtube.com/watch?v=H5oZ3wMAvtY>.