CRISTINA LOZEJ ARCHER

Curriculum Vitae

University of Delaware
Integrated Science and Engineering Laboratory (ISELab), #371
221 Academy Street, Newark, DE 19716
+1 302 831 6640
carcher@udel.edu
http://www.ceoe.udel.edu/our-people/profiles/carcher
@WindLady

Research interests

Meteorology, renewable energy, wind power, climate change, air pollution, numerical modeling of atmospheric processes, computational fluid dynamics.

Education

2004	Doctor of Philosophy (Ph.D.) in Civil and Environmental Engineering Stanford University, Stanford, California, USA
1998	Master of Science (M.S.) in Meteorology San Jose State University, San Jose, California, USA
1995	Master of Science (M.S.) in Civil and Environmental Engineering Politecnico di Milano, Milan, Italy

Appointments

2011–present	**Professor** (tenured in 2015, promoted to Full in 2018) Program of Physical Ocean Science and Engineering (70%) -and- Department of Geography (30%) College of Earth, Ocean, and Environment, University of Delaware
2018–present	**Wind Power Associate Director** Center for Research in Wind (CReW), University of Delaware
2011– 2013	**Visiting Scientist** (June–July 2011; June–August 2012; July–August 2013) National Center for Atmospheric Research, Boulder (Colorado)
2008 – 2011	**Assistant Professor** Department of Geological and Environmental Sciences, California State University - Chico
2005 – 2011	**Consulting Assistant Professor** Department of Civil and Environmental Engineering, Stanford University
2007 – 2008	**Research Associate** Department of Global Ecology, Carnegie Institution for Science, Stanford (California)
2005 – 2007	**Atmospheric Modeler** Bay Area Air Quality Management District, San Francisco (California)

2004 – 2005 **Post-Doctoral Scholar**
Department of Civil and Environmental Engineering, Stanford University

Publications

H-index: 23
Number of citations: 3149

Following is a complete list of all my scientific contributions. Links to websites are shown in blue. My authorship is shown in **bold** and my student and postdoc co-authors are shown with a star superscript (*).

Journal articles

43. Yan*, C., Y. Pan*, and **C. L. Archer**, 2019: A general method to estimate wind farm power using artificial neural networks. *Wind Energy*, 22(11), 1421–1432, doi: 10.1002/we.2379. [pdf]

42. **Archer, C. L.**, and A. Vasel-Be-Hagh*, 2019: Wake steering via yaw control in multi-turbine wind farms: Recommendations based on large-eddy simulation. *Sustainable Energy Technologies and Assessments*, 33, 34–43, doi: 10.1016/j.seta.2019.03.002. [pdf]

41. **Archer, C. L.**, S. Wu*, A. Vasel-Be-Hagh*, J. F. Brodie*, R. Delgado, A. St. P, S. Oncley, and S. Semmer, 2019: The VERTEX field campaign: Observations of near-ground effects of wind turbine wakes. *Journal of Turbulence*, 20(1), 64–92, doi: 10.1080/14685248.2019.1572161. [pdf]

40. **Archer, C. L.**, J. F. Brodie*, and S. Rauscher, 2019: Global warming will aggravate ozone pollution in the U.S. Mid-Atlantic. *Journal of Applied Meteorology and Climatology*, 58(6), 1267–1278, doi: 10.1175/JAMC-D-18-0263.1. [pdf]

39. Golbazi*, M., and **C. L. Archer**, 2019: Methods to estimate surface roughness length for offshore wind energy. *Advances in Meteorology*, 2019, 5695481, 15 pp., doi: 10.1155/2019/5695481. [pdf]

38. **Archer, C. L.**, A. Vasel-Be-Hagh*, C. Yan*, S. Wu*, Y. Pan*, J. F. Brodie*, and A. E. Maguire, 2018: Review and evaluation of wake loss models for wind energy applications. *Applied Energy*, 226, 1187–1207, doi: 10.1016/j.apenergy.2018.05.085. [pdf]

37. Pan*, Y., and **C. L. Archer**, 2018: Precipitation reduction during Hurricane Harvey with simulated offshore wind farms. *Environmental Research Letters*, 13(8), 084007, doi: 10.1088/1748-9326/aad245. [pdf]

36. Pan*, Y., and **C. L. Archer**, 2018: A hybrid wind farm parameterization for mesoscale and climate models. *Boundary-Layer Meteorology*, 168, 469–495, doi: 10.1007/s10546-018-0351-9. [pdf]

35. Moghani*, M., **C. L. Archer**, and A. Mirzakhalili, 2018: The importance of transport to ozone pollution in the U.S. Mid-Atlantic. *Atmospheric Environment*, 191, 420–431, doi: 10.1016/j.atmosenv.2018.08.005. [pdf]

34. Yan*, C., and **C. L. Archer**, 2017: Assessing compressibility effects on the performance of large horizontal-axis wind turbines. *Applied Energy*, 212, 33–45, doi: 10.1016/j.apenergy.2017.12.020. [pdf]

33. Vasel-Be-Hagh*, A., and **C. L. Archer**, 2017: Wind farm hub height optimization. *Applied Energy*,195, 905–921, doi: 10.1016/j.apenergy.2017.03.089. [pdf]

32. Ghaisas*, N., **C. L. Archer**, S. Xie*, S. Wu*, and E. Maguire, 2017: Evaluation of layout and atmospheric stability effects in wind farms using large-eddy simulation. *Wind Energy*, 20(7), 1227–1240, doi: 10.1002/we.2091. [pdf]

31. Xie*, S., and **C. L. Archer**, 2017: A numerical study of wind turbine wakes for three atmospheric stability conditions. *Boundary-Layer Meteorology*, 165(1), 87–112, doi: 10.1007/s10546-017-0259-9. [pdf]

30. Noel*, L., J. F. Brodie*, W. Kempton, **C. L. Archer**, and C. Budischack, 2017: Cost minimization of generation, storage, and new loads, comparing costs with and without externalities. *Applied Energy*, 189, 110–121, doi: 10.1016/j.apenergy.2016.12.060. [pdf]

29. Santos-Alamillos*, **C. L. Archer**, L. Noel*, C. Budischak, and W. Facciolo*, 2017: Assessing the economic feasibility of the gradual decarbonization of a large electric power system. *Journal of Cleaner Production*, 147, 130–141, doi: 10.1016/j.jclepro.2017.01.097. [pdf]

28. Simão, H. P., W. B. Powell, **C. L. Archer**, and W. Kempton, 2017: The challenge of integrating offshore wind power in the U.S. electric grid. Part II: Simulation of electricity market operations. *Renewable Energy*, 103, 418–431, doi: 10.1016/j.renene.2016.11.049. [pdf]

27. **Archer, C. L.**, H. P. Simão, W. Kempton, W. B. Powell, and M. J. Dvorak, 2017: The challenge of integrating offshore wind power in the U.S. electric grid. Part I: Wind forecast error. *Renewable Energy*, 103, 346–360, doi: 10.1016/j.renene.2016.11.047. [pdf]

26. Vasel-Be-Hagh*, A., and **C. L. Archer**, 2016: Wind farms with counter-rotating wind turbines. *Sustainable Energy Technologies and Assessments*, 24, 19–30, doi: 10.1016/j.seta.2016.10.004. [pdf]

25. **Archer, C. L.**, B. A. Colle, D. L. Veron, F. Veron, and M. J. Sienkiewicz, 2016: On the predominance of unstable atmospheric conditions in the marine boundary layer offshore of the U.S. northeastern coast. *Journal of Geophysical Research - Atmospheres*, 121(15), 8869–8885, doi: 10.1002/2016JD024896.[pdf]

24. Colle, B. A., M. J. Sienkiewicz, **C. L. Archer**, D. L. Veron, F. Veron, W. Kempton, and J. E. Mak, 2016: Improving the Mapping and Prediction of Offshore Wind Resources (IMPOWR): Experimental overview and first results. *Bulletin of the American Meteorological Society*, 97(8), 1377–1390, doi: 10.1175/BAMS-D-14-00253.1. [pdf]

23. Xie*, S., **C. L. Archer**, N. Ghaisas*, and C. Meneveau, 2016: Benefits of collocating vertical-axis and horizontal-axis wind turbines in large wind farms. *Wind Energy*, 20(1), 45–62, doi: 10.1002/we.1990. [pdf]

22. Ghaisas*, N., and **C. L. Archer**, 2016: Geometry-based models for studying the effects of wind farm layout. *Journal of Atmospheric and Oceanic Technology*, 33, 481–501, doi: 10.1175/JTECH-D-14-00199.1. [pdf]

21. Firestone, J., **C. L. Archer**, M. P. Gardner, J. A. Madsen, A. K. Prasad, and D. E. Veron, 2015: Opinion: The time has come for offshore wind power in the United States. *Proceedings of the National Academy of Sciences*, 112(39), 11985–11988, doi: 10.1038/nclimate2120. [pdf]

20. Xie*, S., N. Ghaisas*, and **C. L. Archer**, 2015: Sensitivity issues in finite-difference large-eddy simulations of the atmospheric boundary layer with dynamic subgrid scale models. *Boundary-Layer Meteorology*, 157(3), 421–445, doi: 10.1007/s10546-015-0071-3. [pdf]

19. Xie*, S., and **C. L. Archer**, 2015: Self-similarity and turbulence characteristics of wind turbine wakes via large-eddy simulation. *Wind Energy*, 18(10), 1815–1838, doi: 10.1002/we.1792. [pdf]

18. Jacobson, M. Z., **C. L. Archer**, and W. Kempton, 2014: Taming hurricanes with arrays of offshore wind turbines. *Nature Climate Change*, 4, 195–200, doi: 10.1038/nclimate2120. [pdf]

17. **Archer, C. L.**, L. Delle Monache, and D. Rife, 2014: Airborne Wind Energy: Optimal locations and variability. *Renewable Energy*, 64, 180–186, doi: 10.1016/j.renene.2013.10.044.[pdf]

16. **Archer, C. L.**, B. A. Colle, L. Delle Monache, M. J. Dvorak, J. Lundquist, B. H. Bailey, P. Beaucage, M. J. Churchfield, A. C. Fitch, B. Kosovic, S. Lee, P. J. Moriarty, H. Simão, R. J. A. M. Stevens, D. Veron, J. and Zack, 2014: Meteorology for coastal/offshore wind energy in the United States: Recommendations and research needs for the next 10 years, *Bulletin of the American Meteorological Society*, 95(4), 515–519, doi: 10.1175/BAMS-D-13-00108.1.[pdf]

15. **Archer, C. L.**, and M. Z. Jacobson, 2013: Geographical and seasonal variability of the global "practical" wind resources. *Applied Geography*, 45, 119–130, doi: 10.1016/j.apgeog.2013.07.006.[pdf]

14. **Archer, C. L.**, S. Mirzaeisefat*, and S. Lee, 2013: Quantifying the sensitivity of wind farm performance to array layout options using large-eddy simulation. *Geophysical Research Letters*, 40(18), 4963–4970, doi: 10.1002/grl.50911.[pdf]
13. Jacobson, M. Z., and **C. L. Archer**, 2012: Saturation wind power potential and its implications for wind energy. *Proceedings of the National Academy of Sciences*, 109(39), 15679–15684, doi: 10.1073/pnas.1208993109. [pdf]
12. Dvorak, M. J., E. D. Stoutenburg, **C. L. Archer**, W. Kempton, and M. Z. Jacobson, 2012: Where is the ideal location for a US East Coast offshore grid? *Geophysical Research Letters*, 39(6), doi: 10.1029/2011GL050659.[pdf]
11. Mason, J. E., and **C. L. Archer**, 2011: Baseload electricity from wind via Compressed Air Energy Storage (CAES). *Renewable and Sustainable Energy Reviews*, 16(2), 1099–1109, doi: 10.1016/j.rser.2011.11.009.[pdf]
10. Dvorak, M. J., **C. L. Archer**, and M. Z. Jacobson, 2010: California offshore wind energy potential. *Renewable Energy*, 35(6), 1244–1254, doi: 10.1016/j.renene.2009.11.022. [pdf]
9. **Archer, C. L.**, and K. Caldeira, 2009: Global assessment of high-altitude wind power. *Energies*, 2(2), 307–319, doi: 10.3390/en20200307.[pdf]
8. Jiang, Q., J. D. Doyle, T. Haack, M. J. Dvorak, **C. L. Archer**, and M. Z. Jacobson, 2008: Exploring wind energy potential off the California coast. *Geophysical Research Letters*, 35(20), doi: 10.1029/2008GL034674. [pdf]
7. **Archer, C. L.** and K. Caldeira, 2008: Historical trends in the jet streams. *Geophysical Research Letters*, 35(8), doi: 10.1029/2008GL033614. [pdf]
6. **Archer, C. L.**, and M. Z. Jacobson, 2007: Supplying baseload power and reducing transmission requirements by interconnecting wind farms. *Journal of Applied Meteorology and Climatology*, 46(11), 1701–1717, doi: 10.1175/2007JAMC1538.1. [pdf]
5. Kempton, W., **C. L. Archer**, A. Dhanju, R. W. Garvine, and M. Z. Jacobson, 2007: Large CO2 reductions via offshore wind power matched to inherent storage in energy end-uses. *Geophysical Research Letters*, 34(2), doi: 10.1029/2006GL028016. [pdf]
4. **Archer, C. L.**, M. Z. Jacobson, and F. L. Ludwig, 2005: The Santa Cruz Eddy. Part 1: Observations and statistics. *Monthly Weather Review*, 133(4), 767–782, doi: 10.1175/MWR2885.1.[pdf]
3. **Archer, C. L.**, and M. Z. Jacobson, 2005b: The Santa Cruz Eddy. Part 2: Mechanisms of formation. *Monthly Weather Review*, 133(8), 2387–2405, doi: 10.1175/MWR2979.1.[pdf]
2. **Archer, C. L.**, and M. Z. Jacobson, 2005a: Evaluation of global wind power. *Journal of Geophysical Research*, 110(D12), doi: 10.1029/2004JD005462. [pdf]
1. **Archer, C. L.**, and M. Z. Jacobson, 2003: Spatial and temporal distributions of U.S. winds and wind power at 80 m derived from measurements. *Journal of Geophysical Research*, 108(D9), doi: 10.1029/2002JD002076.[pdf]

Book chapters

3. **Archer, C. L.**, and A. F. Blumberg, 2016: Coastal protection via offshore wind farms: A transformative idea. *Blue dunes – Climate change by design*, J. M. Keenan and C. Weisz, Eds., Columbia Books, ISBN 9781941332153, 118–120.
2. **Archer, C. L.**, 2013: Chapter 5 - An introduction to meteorology for airborne wind energy. *Airborne wind energy - Fundamentals and applications*, U. Ahrens, M. Diehl, and R. Schmehl, Eds., Springer, ISBN 978-3-642-39964-0, 81–94. [pdf]

1. Rogner, H. H., R. F. Aguilera, **C. L. Archer**, R. Bertani, S. C. Bhattacharya, M. B. Dusseault, L. Gagnon, H. Haberl, M. Hoogwijk, A. Johnson, M. L. Rogner, H. Wagner, and V. Yakushev, 2012: Chapter 7 - Energy resources and potentials. *Global Energy Assessment - Towards a sustainable future*, H. H. Rogner, Ed., Cambridge University Press, 423–512. [pdf]

Scientific commentaries and discussions

Short publications (4-5 pages) in either peer-reviewed journals or peer-reviewed online discussions that underwent a less rigorous peer-review than journal papers, generally by the journal editor only.

8. Brodie*, J. F., **C. L. Archer**, and S. A. Rauscher, 2017: Ozone pollution in Delaware: How does climate change influence ozone-related health? *Delaware Journal of Public Health*, 3(6), 6-11. [pdf]
7. Fitch, A. C., J. B. Olson, J. K. Lundquist, J. Dudhia, A. K. Gupta, J. Michalakes, I. Barstad, and **C. L. Archer**, 2013: Corrigendum – Local and mesoscale impacts of wind farms as parameterized in a mesoscale NWP model. *Monthly Weather Review*, 141(4), 1395–1395, doi: 10.1175/MWR-D-12-00341. 1. [pdf]
6. **Archer, C. L.**, M. Z. Jacobson, and M. R. V. Santa Maria, 2010a: Comment on "Problem of the second wind turbine - a note on a common but flawed wind power estimation method," by Gans et al. (2010). *Earth System Dynamics Discussions*.
5. **Archer, C. L.**, M. Z. Jacobson, and M. R. V. Santa Maria, 2010b: Reply to authors' response to Comment on "Problem of the second wind turbine - a note on a common but flawed wind power estimation method" by Gans et al. (2010). *Earth System Dynamics Discussions*.
4. Jacobson, M. Z., and **Archer, C. L.**, 2010: Comment on "Estimating maximum global land surface wind power extractability and associated climatic consequences," by L. M. Miller, F. Gans, and A. Kleidon. *Earth System Dynamics Discussions*.
3. **Archer, C. L.**, and K. Caldeira, 2008: Reply to comment by Courtenay Strong and Robert E. Davis on "Historical trends in the jet streams". *Geophysical Research Letters*, 35, L24807, doi: 10.1029/2008GL035114.[pdf]
2. **Archer, C. L.**, and M. Z. Jacobson, 2006: Comment on "Evaluation of a wind power parameterization using tower observations" by Steven M. Lazarus and Jennifer Bewley. *Journal of Geophysical Research*, 111(D10), doi: 10.1029/2005JD006098. [pdf]
1. **Archer, C. L.**, and M. Z. Jacobson, 2004: Correction to "Spatial and temporal distributions of U.S. winds and wind power at 80 m derived from measurements". *Journal of Geophysical Research*, 109(D20), doi: 10.1029/2004JD005099. [pdf]

Conference proceedings

Short publications (max 6-11 pages) in conference proceedings that underwent a less rigorous peer-review process than journal papers. Each conference proceeding is associated with an oral presentation.

8. Golbazi*, M., and **C. L. Archer**, 2019: Surface roughness for offshore wind energy. *NAWEA Windtech 2019*, North American Wind Energy Association (NAWEA), University of Massachusetts Amherst (MA), 14–16 October, 11 pp.
7. Moghani*, M., and **C. L. Archer**, 2017: The importance of transport to ozone pollution in Delaware. *Guideline on Air Quality Models: The Changes*, Air and Waste Management Association (AWMA), Chapel Hill (NC), 14–16 November, 6 pp.
6. Yan*, C., and **C. L. Archer**, 2017: An assessment of compressibility effects for large wind turbines using the blade element momentum method. *International Conference of Numerical Analysis and Applied Mathematics (ICNAAM 2017)*, Thessaloniki (Greece), 25–30 September, 5 pp.

5. Pan*, Y., and **C. L. Archer**, 2017: Analysis of the role of large wind farms in reducing the impact of hurricanes near the coast of New Orleans. *International Conference of Numerical Analysis and Applied Mathematics (ICNAAM 2017)*, Thessaloniki (Greece), 25–30 September, 5 pp.

4. **Archer, C. L.**, and K. Caldeira, 2008: Historical trends in the jet streams. *20th Conference on Climate Variability and Change*, American Meteorological Society, New Orleans (LA), 20–24 January, 6 pp.

3. **Archer, C. L.**, P. T. Martien, S.-T. Soong, and S. Tanrikulu, 2006: Comparison of simulated ozone generated with growth-and-control vs. uniformly-reduced emission inventories in California. *14th Joint Conference on the Applications of Air Pollution Meteorology with the Air and Waste Management Association*, American Meteorological Society, Atlanta (GA), 29 January – 2 February, 7 pp.

2. Soong, S.-T., P. T. Martien, **C. L. Archer**, S. Tanrikulu, J.-W. Bao, J. M. Wilczak, S. A. Michelson, Y. Jia, and C. Emery, 2006: Comparison of WRF/CAMx and MM5/CAMx simulations for an ozone episode in California. *14th Joint Conference on the Applications of Air Pollution Meteorology with the Air and Waste Management Association*, American Meteorological Society, Atlanta (GA), 29 January – 2 February, 7 pp.

1. **Archer, C. L.**, and M. Z. Jacobson, 2001: The Santa Cruz Eddy: Observations and numerical simulations. *Ninth Conference on Mesoscale Processes*, American Meteorological Society, Fort Lauderdale (FL), 29 July – 2 August, 7 pp.

Conference abstracts

Abstracts (300-500 words) published in conferences proceedings about my research. Each abstract is associated with an oral presentation (default) or a poster (when specified). In general, oral presentations are more prestigious than posters, especially when invited.

44. Moghani*, M., and **C. L. Archer**, 2019: The impacts of emissions and climate change on the future U.S. ozone. 18^{th} CMAS Conference, Community Modeling and Analysis System (CMAS), Chapel Hill (NC), 21–23 October 2019 (poster).

43. **Archer, C. L.**, C. Yan*, and Y. Pan *, 2019: A two-dimensional power curve from artificial neural networks to predict wind farm power. 6^{th} International Conference Energy and Meteorology, Technical University of Denmark, Copenhagen (Denmark), 25–27 June 2019 (poster).

42. Wu*, S., and **C. L. Archer**, 2019: On the lack of enhanced vertical mixing near the ground under the wake of a wind turbine during the 2016 VERTEX field campaign. 10^{th} Conference on Weather, Climate, and the New Energy Economy, 99^{th} Annual Meeting of the American Meteorological Society (AMS), Phoenix (AZ), 6–10 January 2019.

41. Moghani*, M., and **C. L. Archer**, 2019: Ozone transport in the U.S. Mid-Atlantic, 21^{st} Conference on Atmospheric Chemistry, 99^{th} Annual Meeting of the American Meteorological Society (AMS), Phoenix, 6–10 January 2019.

40. St. Pé, A., M. Sperling, A. Choukulkar, **C. L. Archer**, and R. Delgado, 2018: Evaluating wind power prediction uncertainty using scanning Doppler wind lidar. Ninth Conference on Weather, Climate, and the New Energy Economy, 98^{th} Annual Meeting of the American Meteorological Society (AMS), Austin (TX), 7–11 January 2018.

39. Pan*, Y., and **C. L. Archer**, 2017: Impacts of a large array of offshore wind farms on precipitation during hurricane Harvey. Fall Meeting of the American Geophysical Union (AGU), New Orleans (LA), 11–15 December 2017.

38. **Archer, C. L.**, and F. Santos-Alamillos*, 2017: Lowest-cost decarbonization of a large electricity system by adding wind farms and high-voltage transmission lines. Fourth International Conference on Energy and Meteorology (ICEM), Bari (Italy), 27–29 June 2017.

37. Brodie*, J. F., **C. L. Archer**, and S. A. Rauscher, 2017: Understanding climate change impacts on ozone concentrations in Delaware. Delaware Climate and Health Conference, Dover (DE), 6 June 2017. (invited)

36. **Archer, C. L.**, W. Kempton, H. P. Simão, and W. B. Powell, 2017: Integration of large amounts of offshore wind power in the U.S. electric grid. Windfarms 2017 Conference, Universidad Pontificia Comillas, Madrid (Spain), May 31–June 2, 2017.

35. **Archer, C. L.**, 2017: IMPOWR: Improving the Mapping and Prediction of Offshore Wind Resources with aircraft and in-situ observations. 2017 International Offshore Wind Partnering Forum, Annapolis (MD), 19–21 April 2017. (invited)

34. Pan*, Y., and **C. L. Archer**, 2016: A hybrid wind farm parameterization for mesoscale and climate models. 2016 Fall Meeting of the American Geophysical Union (AGU), San Francisco (CA), 12–16 December 2016. (poster)

33. Vasel-Be-Hagh*, A., and **C. L. Archer**, 2016: Hub height optimization to increase energy production of wind farms. 2016 Fall Meeting of the American Geophysical Union (AGU), San Francisco (CA), 12–16 December 2016.

32. **Archer, C. L.**, and C. Yan*, 2016: Compressibility effects in wind turbine wakes. Windfarms 2016, University of Texas at Dallas, 23–25 May 2016. (invited)

31. Yan*, C., and **C. L. Archer**, 2015: A Non-Incompressible Non-Boussinesq (NINB) framework for studying atmospheric turbulence. 2015 Fall Meeting of the American Geophysical Union (AGU), San Francisco (CA), 14–18 December 2015.

30. **Archer, C. L.**, W. Kempton, H. P. Simão, and W. B. Powell, 2015: The importance of wind forecast errors for integrating offshore wind power into the electric grid. Third International Conference on Energy and Meteorology (ICEM), Boulder (CO), 22–26 June 2015.

29. **Archer, C. L.**, B. A. Colle, D. Veron, M. J. Sienkiewicz, F. Veron, and J. F. Brodie, 2015: Improving the Mapping and Prediction of Offshore Wind Resources (IMPOWR): Validation of ensembles with historical field data. Third International Conference on Energy and Meteorology (ICEM), Boulder (CO), 22–26 June 2015.

28. Colle, B. A., M. J. Sienkiewicz, **C. L. Archer**, and D. Veron, 2015: The IMPOWR (Improving the Mapping and Prediction of Offshore Wind Resources) project: Evaluation of WRF PBL schemes. 2015 Symposium of the North American Wind Energy Academy (NAWEA), Virginia Tech, Blacksburg (VA), 9–11 June 2015.

27. **Archer, C. L.**, S. Xie*, N. S. Ghaisas*, and C. Meneveau, 2015: Benefits of vertically-staggered wind turbines from theoretical analysis and Large-Eddy Simulations. 2015 Symposium of the North American Wind Energy Academy (NAWEA), Virginia Tech, Blacksburg (VA), 9–11 June 2015.

26. **Archer, C. L.**, 2015: Wind turbine wakes and turbulence from fine to global scale. Symposium on carbon management, Yale University, New Haven (CT), 2 May 2015. (invited)

25. **Archer, C. L.**, and N. S. Ghaisas*, 2015: Optimizing wind farm layout via geometry-based models inclusive of wind direction and atmospheric stability effects. 2015 General Assembly of the European Geosciences Union (EGU), Vienna, Austria, 12–17 April 2015.

24. Xie*, S., **C. L. Archer**, and N. Ghaisas*, 2014: Finite-difference large-eddy simulations of atmospheric turbulence using a Lagrangian scale-dependent sub-grid scale model. 2014 Fall Meeting of the American Geophysical Union (AGU), San Francisco (CA), 15–19 December 2014.

23. **Archer, C. L.**, and N. S. Ghaisas*, 2014: Atmospheric stability effects on wind farm performance using large-eddy simulation. 2014 Fall Meeting of the American Geophysical Union (AGU), San Francisco (CA), 15–19 December 2014. (invited)

22. Ghaisas*, N. S., and **C. L. Archer**, 2014: A geometry-based approach for optimizing wind turbine layout. 67th Annual Meeting of the American Physical Society's Division of Fluid Dynamics, San Francisco (CA), 23–25 November 2014.

21. **Archer, C. L.**, 2014: Forecast error models and offshore wind integration. 2014 Offshore Conference of the American Wind Energy Association, Atlantic City (NJ), 7 October 2014.

20. Brodie*, J. F., D. E. Veron, **C. L. Archer**, and F. Veron, 2014: Modeling offshore wind farm configurations in a mesoscale atmospheric model to optimize power production. 2014 Ocean Science Meeting, Honolulu (HI), 23–28 February 2014 (poster).

19. **Archer, C. L.**, S. Mirzaeisefat*, S. Lee, and S. Xie*, 2013: Quantifying array losses due to spacing and staggering in offshore wind farms. 2013 Fall Meeting of the American Geophysical Union (AGU), San Francisco (CA), 9–13 December 2013. (invited)

18. Xie*, S. and **C. L. Archer**, 2013: Self-similarity and turbulence characteristics of wind turbine wakes via large-eddy simulation. 2013 Fall Meeting of the American Geophysical Union (AGU), San Francisco (CA), 9–13 December 2013. (invited)

17. Jacobson, M. Z., **C. L. Archer**, and W. Kempton, 2013: Taming hurricanes with arrays of offshore wind turbines that simultaneously reduce global warming and air pollution and provide normal electric power. 2013 Fall Meeting of the American Geophysical Union (AGU), San Francisco (CA), 9–13 December 2013. (invited)

16. **Archer, C. L.**, 2013: Optimal locations for airborne wind energy. Airborne Wind Energy Conference (AWEC) 2013, Berlin (Germany), 10–11 September 2013.

15. **Archer, C. L.**, 2013: Why wind energy? Goldschmidt 2013, Florence (Italy), 25–30 August 2013. (invited)

14. **Archer, C. L.**, L. Delle Monache, and D. L. Rife, 2013: Global distributions and temporal variations of low-level jets for Airborne Wind Energy applications. 93rd Annual Meeting of the American Meteorological Society, Austin (TX), 6–10 January 2013 (poster).

13. **Archer, C. L.**, and M. Z. Jacobson, 2012: World, land, and high-altitude saturation wind power potentials. 2012 Fall Meeting of the American Geophysical Union (AGU), San Francisco (CA), 3–7 December 2012 (poster).

12. Brodie*, J. F., D. E. Veron, **Archer, C. L.**, and F. Veron, 2012: Investigation of turbine spacing on turbulent wake effects and power output using a mesoscale atmospheric model. American Wind Energy Association (AWEA) Offshore WINDPOWER Conference and Exposition, Virginia Beach (VA), 9–11 October 2012.

11. **Archer, C. L.**, 2012: Global distributions and temporal variations of low-level wind speed maxima for airborne wind energy applications. Airborne Wind Energy Conference 2012, National Institute of Aerospace, Hampton (VA), 11–12 September 2012.

10. **Archer, C. L.**, 2012: Geographical and seasonal variability of the global "practical" wind power potential. Airborne Wind Energy Conference 2012, National Institute of Aerospace, Hampton (VA), 11–12 September 2012.

9. **Archer, C. L.**, and M. Z. Jacobson, 2010: Seasonal and annual variability of the global on-shore and off-shore wind power resource at 100 m. 2010 Fall Meeting of the American Geophysical Union (AGU), San Francisco, California, 13–17 December 2010.

8. **Archer, C. L.**, M. Sloggy*, E. Liebig*, and A. Rhoades*, 2010: Integrating wind energy in the electricity grid in the US. 2010 General Assembly of the European Geosciences Union, Vienna, 3–7 May 2010.

7. Liebig*, E. C., A. Rhoades*, M. Sloggy*, D. Mills, and **C. L. Archer**, 2009: On the integration of wind and solar energy to provide a total energy supply in the U.S. 2009 Fall Meeting of the American Geophysical Union (AGU), San Francisco, California, 14–18 December 2009 (poster).

6. **Archer, C. L.**, and K. Caldeira, 2008: Global assessment of high-altitude wind power. 2008 Fall Meeting of the American Geophysical Union (AGU), San Francisco, California, 15–19 December 2008.

5. **Archer, C. L.**, and M. Z. Jacobson, 2007: Supplying reliable electricity and reducing transmission requirements by interconnecting wind farms. 2007 Fall Meeting of the American Geophysical Union (AGU), San Francisco, California, 10–14 December 2007.

4. Dvorak, M. J., M. Z. Jacobson, and **C. L. Archer**, 2007: California offshore wind energy potential. Windpower 2007 Conference and Exhibition, June 1–6 2007, Los Angeles, California.

3. **Archer, C. L.**, and M. Z. Jacobson, 2005: Evaluation of global wind power and interconnected wind farms. 2005 Fall Meeting of the American Geophysical Union (AGU), San Francisco, California, 5–9 December 2005.

2. **Lozej, C.**, and R. D. Bornstein, 1999: Comparison of nesting techniques within a meteorological model. Air Pollution 99, Stanford University, Stanford, California, 27–29 July 1999.

1. **Lozej, C.**, and R. D. Bornstein, 1999: Comparison of nesting techniques within MM5: application to a precipitation event over the Western US. Pacific Northwest Weather Workshop, Seattle, Washington, 26–27 February 1999.

Invited presentations

Guest lectures (outside of UD), presentations, seminars, or panels that I was invited to.

55. Research roadmap for wind conditions and climatic effects. Panel session, 6^{th} International Conference Energy and Meteorology (ICEM), Technical University of Denmark, Copenhagen (Denmark), 25–27 June 2019.

54. On wind farms and hurricanes, Newark-Lewes Colloquia, School of Marine Science and Policy (SMSP), University of Delaware, 19 October 2018.

53. From observations to numerical simulations to machine learning: Many techniques are needed to address tough wind energy issues. University of Trento (Italy), 14 June 2018.

52. From observations to numerical simulations to machine learning: Many techniques are needed to address tough wind energy issues. Danish Technical University (DTU), Ris (Denmark), 16 May 2018.

51. Wind energy, turbulence, and hurricanes: How to save lives and money with meteorology. University of Trento (Italy), 10 April 2018.

50. Wind energy, atmospheric turbulence, and hurricanes: How to save lives and money with wind turbine wakes. Highlight Seminar Series of the Andlinger Center for Energy and the Environment, Princeton University, Princeton (NJ), 21 September 2017.

49. The importance of weather forecasting for high penetration of wind power. Panel Session on High Penetration Scenarios, ICEM 2017, Bari (Italy), 27 June 2017.

48. Wind energy, turbulence, and hurricanes: How to save lives and money with wind turbine wakes. Department of Geography Seminar Series, University of Delaware, Newark (DE), 24 March 2017.

47. From wind turbines to kites: Numerical simulations of wind flows for multi-scale geophysical applications. Department of Mechanical Engineering and Engineering Science, University of North Carolina Charlotte, Charlotte (NC), 10 November 2016.

46. PowerBooster platform: Technical description, Shanghai, China, 23 August 2016.

45. How to reduce wake losses in wind farms: from CFD to simpler methods. Wind Energy Science, Energy, and Policy (WESEP), Iowa State University, 12 November 2015 (webinar).

44. Wind forecast error and offshore wind power integration. Mid-Atlantic Wind Integration and Transmission (MAOWIT) workshop, University of Delaware, Newark (DE), 25 September 2015.

43. Wind turbine wakes and turbulence from fine to global scale. Energy Education Workshop, University of Delaware, Lewes (DE), 31 July 2015.

42. Wind energy applications for commercialization. Meeting to establish possible collaboration China/UD, Kunming Dianchi Water Treatment (DCWT), Kunming, China, 27 March – 4 April 2015.

41. Air quality improvements in California, Delaware, and US. Meeting to establish possible collaboration China/UD, Kunming Dianchi Water Treatment (DCWT), Kunming, China, 27 March – 4 April 2015.

40. Numerical simulations of wind turbine wakes for multi-scale geophysical applications. Center for Environmental and Applied Fluid Mechanics (CEAFM), Johns Hopkins University, Baltimore (MD), 6 February 2015.

39. Atmosphere and Energy Research Group (AERG). High-Performance Computing symposium, University of Delaware, Newark (DE), 28 January 2015.

38. Why wind energy? Princeton University Program in Science, Technology and Environmental Policy (STEP) seminar series, Princeton University, Princeton (NJ), 8 December 2014.

37. Wind turbines and turbulence: A complex relationship with unexpected benefits. Physical Ocean Science and Engineering (POSE) seminar series, University of Delaware, Newark (DE), 24 October 2014.

36. Wind turbines and turbulence: A complex relationship with unexpected benefits. Mechanical Engineering seminar series, University of Texas at San Antonio, San Antonio (TX), 17 October 2014.

35. On wind turbine wakes and their interactions with the atmosphere. International Centre for Theoretical Physics, Trieste, Italy, 29 July 2014.

34. Emerging research needs in offshore wind power. UD Energy Institute Annual Symposium, Newark, Delaware, 14 May 2014.

33. Wind energy, turbulence, and hurricanes: How to save lives and money with wind turbine wakes. School of Marine and Atmospheric Sciences, Stony Brook University, Stony Brook, New York, 2 April 2014.

32. What wind turbine wakes can do for you. Center for Carbon-free Power Integration, University of Delaware, Newark (DE), 10 March 2014.

31. Protecting urban coasts from hurricanes with offshore wind farms. Rebuild By Design's Science Colloquia, World Trade Center, New York, 27 January 2014.

30. Recent activities of the Center for Carbon-free Power Integration. UD Energy Institute Annual Symposium, Newark, Delaware, 15 May 2013.

29. The concept of "saturation" as a geophysical limit to wind power potential. Energy Sciences Institute Symposium (inaugural), Yale University, New Haven, Connecticut, 26 April 2013.

28. Why wind energy? Department of Environmental Sciences, Rutgers University, New Brunswick, New Jersey, 15 February 2013.

27. Wind power is abundant and does not cause global warming. MARACOOS annual meeting, Baltimore, Maryland, 1 November 2012.

26. Challenges in assessing the global wind power potentials. Environmental Research Interdisciplinary Colloquium, University of South Florida, Tampa, Florida, 24 October 2012.

25. Highlights of past and current AWE. Airborne Wind Energy Conference 2012, National Institute of Aerospace, Hampton (VA), 11–12 September 2012 (opening keynote).

24. Wind projects. Annual Symposium of the University of Delaware Energy Institute, Newark, Delaware, 6 June 2012.

23. Challenges of wind power assessment and integration. Environmental Engineering Seminar, University of Delaware, Newark, Delaware, 16 March 2012.

22. Assessing global and local high-altitude wind power resources. International workshop on new wind power technology development, University of Beijing, Beijing, China, 30 November 2010.
21. On the challenges on a wind-based energy system. Computer Science, California Institute of Technology, Pasadena, California, 20 October 2010.
20. Mitigating wind power intermittency via the transmission grid. Third Southern California Smart Grid Research Symposium, University of Southern California, Los Angeles, California, 5 October 2010.
19. On the challenges on a wind-based energy system. College of Earth, Ocean, and Environment, University of Delaware, Newark, Delaware, 12 August 2010.
18. Wind energy: a bridge between energy and environment. Department of Control and Computer Engineering, Politecnico di Torino, Torino, Italy, 4 June 2010.
17. Wind power: a bridge between Energy and Environment. Civil and Environmental Engineering seminar series, Stanford University, Stanford, California, 8 February 2010.
16. Integrating wind and solar for a total energy supply in the US. Environmental Engineering Seminar Series, University of California Berkeley, Berkeley, California, 5 February 2010.
15. The importance of wind power in a clean and renewable future. California Institute of Technology, Pasadena, California, 11 November 2009.
14. On wind power in 2020. Next Agenda conference, San Francisco, California, 17 September 2009.
13. The importance of wind power in a clean and renewable future. Research Applications Laboratory, National Center for Atmospheric Research, Boulder, Colorado, 20 May 2009.
12. Big Wind: Harvesting energy from the sea, the land, and the sky. This Way to Sustainability conference, Chico, California, 6–9 November 2008
11. Wind power: a bridge between Energy and Environment. Energy Resources Engineering seminar series, Stanford University, Stanford, California, 19 September 2008.
10. The importance of wind power in a clean and renewable future. Energy seminar, Woods Institute for the Environment, Stanford University, Stanford, California, 16 April 2008.
9. A quantification of the offshore wind power resource in the Middle Atlantic Bight. Naval Research Laboratory, Monterey, California, 19 July 2007.
8. How to mitigate wind intermittency? Atmospheric Group seminar series, Stanford University, Stanford, California, 30 January 2007.
7. Evaluation of global wind power. Climate change series, Bay Area Air Quality Management District, San Francisco, California, 1 August 2006.
6. Air quality issues in California. Environmental Fluid Mechanics and Hydrology seminar, Stanford University, California, 27 February 2006.
5. Evaluation of global and interconnected wind power. NASA Ames, Moffett Field, California, 12 January 2006.
4. Evaluation of global wind power. Meteorology Department, San Jose State University, San Jose, California, 5 October 2005.
3. Eddy formation in stratified flow past topography: the Santa Cruz Eddy case. Department of Mechanical Engineering, Santa Clara University, Santa Clara, California, 2 February 2005.
2. (Cool) data analysis techniques for (hot) atmospheric applications. Lawrence Livermore National Laboratory, Livermore, California, 10 September 2004.
1. A proposed modeling study of the Santa Cruz Eddy. Naval Research Laboratory, Monterey, California, 1 December 2000.

Other articles

These are scientific articles for the general public that were not peer-reviewed.

4. Ali, S. H., J. Firestone, and **C. L. Archer**, 2017: Why the U.S. Environmental Protection Agency reflects patriotism, National Geographic Voices, February 2017.
3. Null, J., and **C. L. Archer**, 2008: Wind: the ultimate renewable energy source. *Weatherwise*, July-August, 34–40. [pdf]
2. **Lozej, C.**, 1997: The modeling tool. The Ozone Pollution, I Manuali, 29, Fondazione Lombardia per l'Ambiente, Milano (Italy), 197–205 (in Italian).
1. **Lozej, C.**, 1997: The urban landscape impact on photochemical pollution. The Ozone Pollution, I Manuali, 29, Fondazione Lombardia per l'Ambiente, Milano (Italy), 217–219 (in Italian).

Teaching

Courses taught

S and F denote Spring and Fall semesters; UD is University of Delaware and CSUC is California State University Chico.

1. Energy on Earth (ENSC 370); UD; F19.
2. Air Pollution Meteorology (MAST/GEOG/CIEG 415/615); UD; S13, S14, S15, S16, S17, S19.
3. Wind Power Meteorology (MAST/GEOG 413/613); UD; S12, F13, F14, F16, F18.
4. Earth Systems: Science and Policy (ENSC/ENVR 300); UD; S16.
5. Physical Ocean Science and Engineering (POSE) Seminar (MAST 882); UD; S12.
6. Air Pollution Meteorology (GEOS 502); CSUC; S11.
7. Energy in the Human Environment (GEOS 370); CSUC; S09, S10, S11.
8. Earth System Science (GEOS 300); CSUC; F08, F09, F10.
9. Science and Ethics (GEOS 354); CSUC; S09.
10. Environmental Science (GEOS 330); CSUC; S10, S11.
11. Environment I: Principles and Practices (GEOS 165); CSUC; F10.
12. Environment II: Atmosphere, Water and Soils (GEOS 265); CSUC; F10.

New courses developed

- ENSC 370 – Energy on Earth
  The goals of this course are: 1) to understand energy issues relevant to us humans and 2) to understand the consequences of energy choices (i.e., recognize and quantify the impacts of your own energy choices). I introduce the class to energy sources available on Earth (including coal, petroleum, natural gas, nuclear, geothermal, hydro, wind, solar, wave, tidal, and biomass), energy end-uses (e.g., electricity, transportation, etc.), energy resource assessments, energy conversions, energy system impacts on the environment, and future energy scenarios.
- MAST/GEOG/CIEG 415/615 – Air Pollution Meteorology
  This course is an introduction to meteorological processes that affect air pollution, such as diffusion, atmospheric stability, and turbulence, with a focus on the atmospheric boundary layer. The class includes a hands-on project in which the students, both graduate and undergraduate, use a real

air quality model recommended by the U.S. Environmental Protection Agency to simulate a real air pollution case.

- MAST/GEOG 413/613 – Wind Power Meteorology
  This class explores the fundamental concepts of meteorology that are needed to understand onshore, offshore, and airborne wind energy. Topics include: forces affecting winds; terrain and land-use effects; air turbulence; numerical modeling; wind power and energy from turbines; and wind measurement technologies. The class also requires a hands-on project in which the students, both graduate and undergraduate, use available data from the National Renewable Energy Laboratory to identify an ideal location for a wind farm and calculate and compare at least two layout options (such as: wind turbine type, number of wind turbines, spacing, efficiencies).
- ENSC/ENVR 300 – Earth Systems: Science and Policy
  This class is meant to provide an interdisciplinary framework necessary to understand the Earth system approach to environmental science and its intersection with environmental policy and management. Mandatory for all Environmental Science and Environmental Studies undergraduate students, the class was introduced in Spring 2016 for the first time as part of a general revision of the curricula taught by the Department of Geography.