

Elizabeth H. Camp

E-mail: betsy.h.camp@gmail.com Portland, OR

EDUCATION	<p>Portland State University, Portland, OR Ph.D. Mechanical Engineering, March 2018 <i>Advisor & Dissertation Committee Chair:</i> Raúl Bayoán Cal <i>Dissertation Committee:</i> Murat Tutkun, Mark Weislogel, Gerald Recktenwald, Stephen Solovitz, Stefan Talke</p> <p>Portland State University, Portland, OR B.S. Mechanical Engineering, <i>Cum Laude</i>, June 2012</p> <p>University of Pennsylvania, Philadelphia, PA M.S. Chemistry, August 2006</p> <p>Oregon State University, Corvallis, OR B.S. Chemistry, <i>Cum Laude</i>, June 2004</p>
EXPERIENCE	<p>Adjunct Research Associate, Portland State University, Portland, OR 2018-present Research Area: Data mining in fluid mechanics of turbulent flows</p> <p>Graduate Research Assistant, Portland State University, Portland, OR 2012-2018 Research Area: Experimental fluid mechanics of turbulent flows & analysis</p> <ul style="list-style-type: none">• Turbulent wakes in model wind farms using Stereo-PIV• Influence of freestream turbulence on side-by-side cylinders using Stereo-PIV <p>Visiting Researcher, U. Oslo/Institute for Energy Technology, Oslo, Norway 7/2016-10/2016 Research Area: Experimental fluid mechanics of multiphase flows & analysis</p> <ul style="list-style-type: none">• Index matched droplet sedimentation through a liquid-liquid interface using simultaneous Time Resolved PIV & LIF <p>Undergraduate Research Assistant, Portland State University, Portland, OR 2010-2012 Research Area: Experimental fluid mechanics of turbulent flows & analysis</p> <p>Teacher (NYC Teaching Fellow), Harry S. Truman High School, Bronx, NY 2006-2009 Chemistry & Physics instruction and curriculum development for Regents and AP courses</p> <p>Graduate Research Assistant, University of Pennsylvania, Philadelphia, PA 2005-2006 Research Area: Organometallic catalysis development</p> <p>Undergraduate Research Assistant, Oregon State University, Corvallis, OR 2002-2004 Research Area: Organic synthesis & novel synthetic methods</p>
SKILLS	<p>Laboratory-related skills: Stereo and Planar Particle Image Velocimetry (low frame rate and time resolved), hot wire anemometry, laser induced fluorescence, strain gages (installation and measurement), thermometry with thermocouples & RTDs, mechanical design and manufacturing of experimental equipment.</p> <p>Software skills: Python (NumPy, Pandas, Scipy, Statsmodels, Scikit-learn, Matplotlib), MATLAB, R, Git, LabView, LaVision DaVis Flowmaster Suite, L^AT_EX, STAR-CCM+, SolidWorks, Adobe Creative Suite, Microsoft Office Suite, Windows and Linux (Ubuntu).</p>
PH.D. DISSERTATION	<p>E.H. Camp. Wind energy and wind-energy-inspired turbulent wakes: Modulation of structures, mechanisms and flow regimes. Portland State University, 2018</p>

REFEREED
JOURNAL
PUBLICATIONS

1. **E.H. Camp** and R.B. Cal. Side-by-side cylinders in crossflow with freestream turbulence: Part 1. Time-averaged velocity statistics and statistical approach to vortex characterization. *In preparation*.
2. **E.H. Camp** and R.B. Cal. Side-by-side cylinders in crossflow with freestream turbulence: Part 2. Averaging of recurrent events via the proper orthogonal decomposition. *In preparation*.
3. **E.H. Camp** and R.B. Cal. Low dimensional representations and anisotropy of model rotor versus porous disk wind turbine arrays. *Physical Review Fluids* (under review).
4. H. Kadum, S. Friedman, **E.H. Camp** and R.B. Cal. Development and scaling of a vertical axis wind turbine wake. *J. Wind Engineering & Industrial Aerodynamics*, 174: 303–311, 2018.
5. **E.H. Camp** and R.B. Cal. Mean kinetic energy transport and event classification in a model wind turbine array versus an array of porous disks: energy budget and octant analysis. *Physical Review Fluids*, 1(4): 044404, 2016.
6. S. Rockel, **E.H. Camp**, J. Schmidt, J. Peinke, R.B. Cal. Experimental study on the influence of pitch motion on the wake of a floating wind turbine model. *Energies*, 7(4):1954–1985, 2014.
7. B.O. Ashburn, L.K. Rathbone, **E.H. Camp**, R.G. Carter. A Diels-Alder approach to biaryls (DAB): synthesis of the western portion of TMC-95. *Tetrahedron*, 64(5):856–865, 2008.
8. J.G. Kim, **E.H. Camp**, P.J. Walsh. Catalytic asymmetric methallylation of ketones with an (H8-BINOLate)/Ti-based catalyst. *Organic Letters*, 8(20):4413–4416, 2006.

CONFERENCE
CONTRIBUTIONS

1. **E. Camp** and R. Cal. Anisotropic character and low dimensional representations of a model wind turbine array versus an array of porous disks. In: *70th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, November 19–21, 2017.
2. **E. Camp** and R. Cal. Low dimensional representations and anisotropy of a model wind turbine array versus an array of Porous Disks. In: *WindTech 2017*, October 24–26, 2017.
3. **E. Camp** and R. Cal. Low dimensional representations of side-by-side cylinders in cross-flow subject to varying freestream turbulence. In: *69th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, November 20–22, 2016.
4. **E.H. Camp** and R.B. Cal. Influence of freestream turbulence intensity on wakes of side-by-side cylinders in cross flow. In: *International Congress of Theoretical and Applied Mechanics*, August 22–26, 2016.
5. **E.H. Camp** and R.B. Cal. Mean kinetic energy budget of wakes within model wind farms: comparison of an array of model wind turbines and porous discs. In: *American Geophysical Union Fall Meeting*, December 14–18, 2015.
6. S. Solovitz, K.K. Roberts, G. Freedland, **E.H. Camp**, R.B. Cal, L.G. Mastin. Entrainment of air into vertical jets in a crosswind. In: *American Geophysical Union Fall Meeting*, December 14–18, 2015.
7. **E.H. Camp** and R.B. Cal. Proper orthogonal decomposition of wakes within a model wind turbine array and a matched array of porous discs. In: *68th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, November 22–24, 2015.
8. R.B. Cal and **E.H. Camp**. Mean kinetic energy budget of wakes within and array of model wind turbines and porous discs. In: *68th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, November 22–24, 2015.

9. H. Kadum, S. Friedman, **E. Camp**, R. Cal. Wake development of a model vertical axis wind turbine. In: *68th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, November 22–24, 2015.
10. **E.H. Camp**, V. Vuppuluri, R.B. Cal. Boundary layer development over a large array of porous-disk-modeled wind turbines via stereo particle image velocimetry. In: *67th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, November 23–25, 2014.
11. V. Vuppuluri, **E.H. Camp**, R.B. Cal. Comparison of differences between model wind turbine array and porous disk array boundary layer measurements. In: *67th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, November 23–25, 2014.
12. **E.H. Camp**, M. Tutkun, R.B. Cal. Thermal stratification effects on a 4×3 wind turbine array boundary layer. In: *65th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, November 18–20, 2012.
13. C.D. McKeon, J. Sullivan, **E. Camp**, M. Melius, D. Delucia, R.B. Cal, L. Castillo. Flow development comparison in two-bladed and three-bladed model wind turbine arrays. In: *65th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, November 18–20, 2012.
14. M. Tutkun, **E. Camp**, R.B. Cal. Effect of turbulence intensity on power generation in a 4×3 wind turbine array. In: *65th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, November 18–20, 2012.
15. Z. Wilson, **E. Camp**, M. Melius, and R.B. Cal. Flow field and power measurements on a stratified atmospheric wind turbine boundary layer. In: *EuroMech Colloquium 528: Wind energy and the impact of turbulence on the conversion process*, February 22–24, 2012.
16. Z. Wilson, **E. Camp**, and R.B. Cal. A 3×3 wind turbine array under stratified conditions. In: *50th AIAA Aerospace Sciences Meeting*, January 9–12, 2012.
17. **E. Camp**, Z. Wilson, R.B. Cal. Development of a wind turbine array boundary layer under thermally stratified conditions. In: *64th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, November 20–22, 2011.
18. M. Melius, Z. Wilson, **E. Camp**, R.B. Cal. Identification of flow structures in a stratified wind turbine array boundary layer. In: *64th Annual Meeting of the American Physical Society Division of Fluid Dynamics*, November 20–22, 2011.

- INVITED TALKS
1. E. Camp. New insights on fluid flow through wind farms from wind tunnel experiments: mean kinetic energy transport event classification. *Smith College, Picker Engineering Program*, April 7, 2016.
 2. E. ("B.") Camp. Mean kinetic energy budget and conditional averaging in a model wind turbine array versus an array of porous disks *University of Massachusetts–Amherst, Dept. of Mechanical Engineering*, April 8, 2016.

AWARDS	ICTAM 2016 Travel Fellow, U.S. Nat'l Committee of Theoretical & Applied Mechanics	2016
	Outstanding Student Paper Award, American Geophysical Union Fall Meeting	2015
	Maseeh Fellowship, PSU College of Engineering	2013-14
	Dean's Fellowship, PSU College of Engineering	2012-13
	End-of-the-Year Teaching Award, Harry S. Truman High School	2008
	URISC Research Fellowship, Oregon State University	2003-04
	Colleen Spurgeon Scholarship, Oregon State University Dept. of Chemistry	2003
	URISC Summer Research Fellowship, Oregon State University	2002
	Longman Award, Oregon State University Dept. of Chemistry	2002