Peter E. Hamlington

Assistant Professor
Vogel Faculty Fellow
Department of Mechanical Engineering
University of Colorado, Boulder
Boulder, CO 80309-0427

Email: *peter.hamlington@colorado.edu*
Phone (work): *(303) 492-0555*
Phone (cell): *(734) 709-2788*

Education

- PhD, Aerospace Science, University of Michigan, 2004-2009. Dissertation title: *Physics-Based Turbulence Anisotropy Closure Including Nonlocal and Nonequilibrium Effects in Turbulent Flows*. Advisor: Dr. Werner J.A. Dahm,
- M.S., Aerospace Science, University of Michigan, 2004-2005.
- B.A., Physics (Departmental and General Honors), University of Chicago, 2000-2004.

Honors

- Herb and Karen Vogel Faculty Fellowship, Department of Mechanical Engineering, University of Colorado, Boulder, 2013.
- Outstanding Graduate Educator Award, Department of Mechanical Engineering, University of Colorado, Boulder, 2013.
- College of Engineering Distinguished Achievement Award, Aerospace Engineering, University of Michigan, 2009.
- Karen and Paul Van Weelden Fellowship, Rackham Graduate School, University of Michigan, 2006.
- Tau Beta Pi Engineering Honor Society, University of Michigan, 2006.
- Dean's List, University of Chicago, 2000 – 2004.
- University Scholar Award (merit scholarship), University of Chicago, 2000 – 2004.
- University of Chicago National Merit Scholarship, 2000 – 2004 (awarded in 2000).

Professional Experience

- Assistant Professor, Department of Mechanical Engineering, University of Colorado, Boulder, CO, August 2012 – Present.
- Assistant Research Professor, Department of Aerospace Engineering Sciences, University of Colorado, Boulder, CO, September 2011 – August 2012.
- National Research Council Postdoctoral Research Associate, Laboratories for Computational Physics and Fluid Dynamics, Naval Research Laboratory, Washington, DC, September 2009 – August 2011.
- Graduate Research/Teaching Assistant, Laboratory for Turbulence and Combustion, Department of Aerospace Engineering, University of Michigan, Ann Arbor, MI, September 2004 – August 2009.
- Undergraduate Research Assistant, Kavli Institute for Cosmological Physics, University of Chicago, Chicago, IL, July 2002 – July 2004.

Research Interests

Turbulent flows, geophysical fluid dynamics, ocean and wind renewable energy, reacting flows, combustion, computational fluid dynamics, propulsion.

Papers in Journals (Refereed)

1) Hamlington, P.E., Schumacher, J., and Dahm, W.J.A. (2008), Local and nonlocal strain rate fields and vorticity alignment in turbulent flows. Physical Review E, Vol. 77, 026303 (8 pages).

2) Hamlington, P.E. and Dahm, W.J.A. (2008), Reynolds stress closure for nonequilibrium effects in turbulent flows. Physics of Fluids, Vol. 20, 115101 (18 pages).

3) Hamlington, P.E., Schumacher, J., and Dahm, W.J.A. (2008), Direct assessment of vorticity alignment with local and nonlocal strain rates in turbulent flows. Physics of Fluids, Vol. 20, 111703 (4 pages).

4) Hamlington, P.E. and Dahm, W.J.A. (2009), Frequency response of periodically sheared homogeneous turbulence. Physics of Fluids, Vol. 21, 055107 (11 pages).

5) Hamlington, P.E. and Dahm, W.J.A. (2009), Nonlocal form of the rapid pressure-strain correlation in turbulent flows. Physical Review E, Vol. 80, 046311 (10 pages).

6) Hamlington, P.E., Poludnenko, A.Y., and Oran, E.S. (2011), Interactions between turbulence and flames in premixed reacting flows. Physics of Fluids, Vol. 23, 125111 (19 pages).

7) Hamlington, P.E., Krasnov, D., Boeck, T., and Schumacher, J. (2012), Statistics of the energy dissipation rate and local enstrophy in turbulent channel flow. Physica D: Nonlinear Phenomena, Vol. 241, pp. 169-177.

8) Van Roekel, L.P., Fox-Kemper, B., Sullivan, P.P., Hamlington, P.E., and Haney, S.R. (2012), The form and orientation of Langmuir cells for misaligned winds and waves. Journal of Geophysical Research, Vol. 117, C05001, doi:10.1029/2011JC007516 (22 pages).

9) Hamlington, P.E., Krasnov, D., Boeck, T. and Schumacher, J. (2012), Local dissipation scales and energy dissipation statistics in turbulent channel flow. Journal of Fluid Mechanics, V. 701, pp. 419-429.

10) Hamlington, P.E., Poludnenko, A.Y., and Oran, E.S. (2012), Intermittency in premixed turbulent reacting flows. Physics of Fluids, Vol. 24, 075111 (25 pages).

11) Hamlington, P.E. and Ihme, M. (2014), Modeling of Non-Equilibrium Homogeneous Turbulence in Rapidly Compressed Flows. Flow, Turbulence, and Combustion, Vol. 93 (1), pp. 93-124.

12) Hamlington, P.E., Van Roekel, L.P., Fox-Kemper, B., Julien, K., and Chini, G.P. (2014), Langmuir-Submesoscale Interactions: Descriptive Analysis of Multiscale Frontal Spin-Down Simulations. Journal of Physical Oceanography, Vol. 44 (9), pp. 2249-2272, http://dx.doi.org/10.1175/JPO-D-13-0139.1.

Papers in Journals (Refereed) – Submitted and In Preparation

1) McCaffrey, K., Fox-Kemper, B., Hamlington, P.E., and Thomson, J. (2014) Characterization of Turbulence Anisotropy, Coherence, and Intermittency at a Prospective Tidal Energy Site: Observational Data Analysis. Submitted to Renewable Energy.

2) Hamlington, B.D. and Hamlington, P.E., Collins, S.G., Alexander, S.R., and Kim, K.-Y. (2014) Effect of Climate Oscillations on Wind Resource Variability in the United States. Submitted to Geophysical Research Letters.

3) Towery, C.A.Z, Poludnenko, A.Y., and Hamlington, P.E. (2014) Spectral energy dynamics in premixed turbulent combustion. In preparation, to be submitted to Physics of Fluids.

4) King, R.N. and Hamlington, P.E. (2014) Local dissipation scales in turbulent shear flows. In preparation, to be submitted to Physics of Fluids.

5) Alexander, S.R. and Hamlington, P.E. (2014) Numerical Modeling of Ocean Current Turbines in a Tidal Strait. In preparation, to be submitted to the Journal of Renewable and Sustainable Energy.

Conference Papers

1) Hamlington, P.E., Szwalek, J., and Dahm, W.J.A. (2005) Scale-by-scale assessments of the approach to isotropy. In Proceedings of the ITI Conference on Turbulence, 25-28 September 2005, Bad Zwischenahn, Germany.

2) Dahm, W.J.A., Lapsa, A.P., and Hamlington, P.E. (2006) Inside-out rotary ramjet turbogenerator. AIAA Paper No. AIAA-2006-4169, Session EC-12 (Brayton Cycle II), AIAA 4th International Energy Conversion Engineering Conference, 26-29 June 2006, San Diego, CA.

3) Hamlington, P.E. and Dahm, W.J.A. (2007) A new physically-based fully realizable nonequilibrium Reynolds stress closure for turbulent flow RANS modeling. AIAA Paper No. AIAA-2007-5573, 43rd AIAA Joint Propulsion Conference & Exhibit, 8-11 June 2007, Cincinnati, OH.

4) Hamlington, P.E. and Dahm, W.J.A. (2009) Computational validation of new Reynolds stress closure for nonequilibrium effects in turbulent flows. AIAA Paper No. AIAA-2009-1323, 47th AIAA Aerospace Sciences Meeting, 5-8 January 2009, Orlando, FL.

5) Hamlington, P.E. and Dahm, W.J.A. (2009) Reynolds stress closure including nonlocal and nonequilibrium effects in turbulent flows. AIAA Paper No. AIAA-2009-4162, 39th AIAA Fluid Dynamics Conference, 22-25 June 2009, San Antonio, TX.

6) Hamlington, P.E., and Oran, E.S. (2010) Signatures of turbulence in atmospheric laser propagation. Proc. SPIE, Vol. 7687, 76870M, SPIE Active and Passive Signatures Conference, 8 April 2010, Orlando, FL. (Invited)

7) Hamlington, P.E., Poludnenko, A.Y., and Oran, E.S. (2010) Turbulence and scalar gradient dynamics in premixed reacting flows. AIAA Paper No. AIAA-2010-5027, 40th AIAA Fluid Dynamics Conference, 28 June - 1 July 2010, Chicago, IL.

8) Hamlington, P.E., Poludnenko, A.Y., and Oran, E.S. (2011) Intermittency and premixed turbulent reacting flows. AIAA Paper No. AIAA-2011-0113, 49th AIAA Aerospace Sciences Meeting, 4-7 January 2011, Orlando, FL.

9) Hamlington, P.E., Krasnov, D., Boeck, T., and Schumacher, J. (2011) Dissipation-scale fluctuations in the inner region of turbulent channel flow. J. Phys.: Conf. Ser., Vol. 318, 042019, 13th European Turbulence Conference, 12-15 September 2011, Warsaw, Poland.

10) Van Roekel, L.P., Hamlington, P.E., and Fox-Kemper, B. (2012) Multiscale simulations of Langmuir cells and submesoscale eddies using XSEDE resources. Proceedings of the 1st Conference of the Extreme Science and Engineering Discovery Environment: Bridging from the eXtreme to the campus and beyond. Article 20, XSEDE12, 16-20 July 2012, Chicago, IL.

11) Alexander, S.R. and Hamlington, P.E. (2014) Study of turbulence statistics in large-eddy simulations of ocean current turbine environments. OMAE Paper No. OMAE2014-24527, 33rd ASME International Conference on Ocean, Offshore, and Arctic Engineering, 8-13 June 2014, San Francisco, CA.

12) Towery, C.A.Z., Smith, K., Van Schoor, M., and Hamlington, P.E. (2014) Analysis and Modeling of Turbulent Flow Effects in Rotating Detonation Engines. AIAA Paper No. AIAA-2014-3031, 44th AIAA Fluid Dynamics Conference, 16-20 June 2014, Atlanta, GA.

Conference Papers – Accepted and Submitted

1) King, R.N., Dahm, W.J.A., and Hamlington, P.E. (2014) Autonomic Subgrid-Scale Closure for Large Eddy Simulations. Accepted for the 53rd AIAA Aerospace Sciences Meeting, 5-9 January 2015, Kissimmee, FL.

Conference Presentations and Abstracts

1) Hamlington, P.E. and Dahm, W.J.A. (2005) Scale by scale assessment of the approach to isotropy in a turbulent shear flow. 58th Annual Meeting, Division of Fluid Dynamics, American Physical Society, Chicago, IL, 20-22 November 2005; abstract in Bull. Am. Phys. Soc. Vol. 50, No. 9, p. 80 (abstract only).

2) Hamlington, P.E. and Dahm, W.J.A. (2007) A new physically-based fully realizable nonequilibrium Reynolds stress closure for turbulent flow RANS modeling. 43rd AIAA Joint Propulsion Conference & Exhibit, 8-11 June 2007, Cincinnati, OH.

3) Hamlington, P.E., Schumacher, J., and Dahm, W.J.A. (2008) Vorticity alignment with local and nonlocal strain rate eigenvectors in turbulent flows. 61st Annual Meeting, Division of Fluid Dynamics, American Physical Society, San Antonio, TX, 23-25 November 2008; abstract in Bull. Am. Phys. Soc. Vol. 53, No. 14, p. 61 (abstract only).

4) Hamlington, P.E. and Dahm, W.J.A. (2009) Computational validation of new Reynolds stress closure for nonequilibrium effects in turbulent flows. 47th AIAA Aerospace Sciences Meeting, 5-8 January 2009, Orlando, FL.

5) Hamlington, P.E. and Dahm, W.J.A. (2009) Reynolds stress closure including nonlocal and nonequilibrium effects in turbulent flows. 39th AIAA Fluid Dynamics Conference, 22-25 June 2009, San Antonio, TX.

6) Hamlington, P.E., and Oran, E.S. (2010) Signatures of turbulence in atmospheric laser propagation. SPIE Active and Passive Signatures Conference, 8 April 2010, Orlando, FL. (Invited)

7) Hamlington, P.E., Poludnenko, A.Y., and Oran, E.S. (2010) Turbulence and scalar gradient dynamics in premixed reacting flows. 40th AIAA Fluid Dynamics Conference, 28 June - 1 July 2010, Chicago, IL.

8) Hamlington, P.E., Poludnenko, A.Y., and Oran, E.S. (2010) Vorticity, strain rate, and scalar gradient dynamics in premixed reacting flows. 63rd Annual meeting, Division of Fluid Dynamics, American Physical Society, Long Beach, CA, 21-23 November 2010; abstract in Bull. Am. Phys. Soc. Vol. 55, No. 16, p. 384 (abstract only).

9) Schumacher, J., Hamlington, P.E., Krasnov, D., and Boeck, T. (2010) Statistics of the energy dissipation rate and local enstrophy in turbulent channel flow. 63rd Annual meeting, Division of Fluid Dynamics, American Physical Society, Long Beach, CA, 21-23 November 2010; abstract in Bull. Am. Phys. Soc. Vol. 55, No. 16, p. 205 (abstract only).

10) Hamlington, P.E., Poludnenko, A.Y., and Oran, E.S. (2011) Intermittency and premixed turbulent reacting flows. 49th AIAA Aerospace Sciences Meeting, 4-7 January 2011, Orlando, FL.

11) Hamlington, P.E., Poludnenko, A.Y., and Oran, E.S. (2011) Intermittency in Premixed Turbulent Reacting Flows. 64th Annual meeting, Division of Fluid Dynamics, American Physical Society, Baltimore, MD, 20-22 November 2011; abstract in Bull. Am. Phys. Soc. Vol. 56, No. 18, p. 98 (abstract only).

12) Green, M., Hamlington, P., Poludnenko, A., and Oran, E. (2011) Using LCS to study coherent structures in reacting flows. 64th Annual meeting, Division of Fluid Dynamics, American Physical Society, Baltimore, MD, 20-22 November 2011; abstract in Bull. Am. Phys. Soc. Vol. 56, No. 18, p. 98 (abstract only).

13) Hamlington, P.E., Van Roekel, L., Sullivan, P.P., and Fox-Kemper, B. (2012) Langmuir-Submesoscale Interactions: Multiscale Simulations with the Craik-Leibovich Equations. 2012 Ocean Sciences Meeting, 19-24 February 2012, Salt Lake City, UT (abstract only).

14) Fox-Kemper, B., Hamlington, P.E., Van Roekel, L., and Sullivan, P.P. (2012) Parameterization of submesoscale and Langmuir-scale processes and interactions. 2012 Ocean Sciences Meeting, 19-24 February 2012, Salt Lake City, UT (abstract only).

15) Van Roekel, L.P., Fox-Kemper, B., Sullivan, P.P., Hamlington, P.E., and Haney, S.R. (2012) The form and orientation of Langmuir cells for misaligned wind and waves. 2012 Ocean Sciences Meeting, 19-24 February 2012, Salt Lake City, UT (abstract only).

16) Hamlington, P.E., Poludnenko, A.Y., and Oran, E.S. (2012) Vorticity dynamics in variable density flows. 65th Annual meeting, Division of Fluid Dynamics, American Physical Society, San Diego, CA, 18-20 November 2012; abstract in Bull. Am. Phys. Soc. Vol. 57, No. 17 (abstract only).

17) Hamlington, P.E., Van Roekel, L.P., Fox-Kemper, B., and Julien, K. (2012) Interactions between Langmuir turbulence and submesoscale eddies. American Geophysical Union Fall Meeting, 3-7 December 2012, San Francisco, CA (abstract only).

18) Hamlington, P.E., Fox-Kemper, B., Julien, K., and Van Roekel, L.P. (2012) Descriptive analysis of Langmuir-submesoscale interactions using multiscale simulations of the Craik-Leibovich equations.

Frontiers in Computational Physics: Modeling the Earth System, 16-20 December 2012, Boulder, CO (abstract only).

19) Ordonez, A.C., Fox-Kemper, B., and Hamlington, P.E. (2013) Energy Extraction from Ocean Currents and Waves: Mapping the Most Promising Locations. 11th Symposium on the Coastal Environment, American Meteorological Society, 5-10 January, 2013, Austin, TX (abstract only).

20) King, R.N., Lundquist, J.K., and Hamlington, P.E. (2013) Development and Application of a Wind Energy Computational Testbed in OpenFOAM. First Symposium on OpenFOAM in Wind Energy, 20-21 March, 2013, Oldenburg, Germany (abstract only).

21) Hamlington, P.E. (2013) Local dissipation scales in turbulent shear flows. 66th Annual meeting, Division of Fluid Dynamics, American Physical Society, Pittsburgh, PA, 24-26 November 2013; abstract in Bull. Am. Phys. Soc. Vol. 58, No. 18 (abstract only).

22) McCaffrey, K., Fox-Kemper, B., and Hamlington, P.E. (2013) Characterizing Turbulent Events at a Tidal Energy Site from Acoustic Doppler Velocity Observations. 66th Annual meeting, Division of Fluid Dynamics, American Physical Society, Pittsburgh, PA, 24-26 November 2013; abstract in Bull. Am. Phys. Soc. Vol. 58, No. 18 (abstract only).

23) Hamlington, P.E., Alexander, S., and Fox-Kemper, B. (2013) Properties and Effects of Langmuir Turbulence in the Upper Ocean. American Geophysical Union Fall Meeting, 9-13 December 2013, San Francisco, CA (invited, abstract only).

24) Hamlington, P.E., Alexander, S.R., Fox-Kemper, B., and Lovenduski, N. (2014) Distributions and Dynamics of Biogeochemical Reactive Tracers in the Oceanic Mixed Layer. 2014 Ocean Sciences Meeting, 23-28 February 2014, Honolulu, HI.

25) Alexander, S. and Hamlington, P. (2014) Study of Turbulence Statistics in Large-Eddy Simulation of Ocean Current Turbine Environments. American Physical Society March Meeting, 3-7 March 2014, Denver, CO.

26) King, R. and Hamlington, P. (2014) Local Dissipation Scales in Homogeneous Sheared Turbulence. American Physical Society March Meeting, 3-7 March 2014, Denver, CO.

27) Towery, C., Smith, K., Van Schoor, M., and Hamlington, P. (2014) Modeling the Effects of Turbulence in Rotating Detonation Engines. American Physical Society March Meeting, 3-7 March 2014, Denver, CO.

28) Alexander, S. and Hamlington, P. (2014) Study of Turbulence Statistics in Large-Eddy Simulation of Ocean Current Turbine Environments. 33rd ASME International Conference on Ocean, Offshore, and Arctic Engineering, 8-13 June 2014, San Francisco, CA.

29) Towery, C., Smith, K., Van Schoor, M., and Hamlington, P. (2014) Examination of Turbulent Flow Effects in Rotating Detonation Engines. 44th AIAA Fluid Dynamics Conference, 16-20 June 2014, Atlanta, GA.

Conference Presentations and Abstracts – Upcoming and Submitted

1) Hamlington, P.E. and Ihme, M. (2014) Modeling of non-equilibrium turbulence in rapidly compressed flows. Accepted for the iTi Conference on Turbulence, 21-24 September 2014, Bertinoro, Italy.

2) King, R.N., Dahm, W.J.A., and Hamlington, P.E. (2014) Autonomic Closure for Large Eddy Simulations. Submitted to the 67th Annual meeting, Division of Fluid Dynamics, American Physical Society, San Francisco, CA, 23-25 November 2014.

3) Smith, K.M., Alexander, S.R., Van Roekel, L.P., Fox-Kemper, B., and Hamlington, P.E. (2014) Effects of Submesoscale Turbulence on Tracer Evolution in the Oceanic Mixed Layer. Submitted to the 67th Annual meeting, Division of Fluid Dynamics, American Physical Society, San Francisco, CA, 23-25 November 2014.

4) Towery, C.A.Z., Poludnenko, A.Y., and Hamlington, P.E. (2014) Spectral Kinetic Energy Transfer Through a Premixed Flame Brush. Submitted to the 67th Annual meeting, Division of Fluid Dynamics, American Physical Society, San Francisco, CA, 23-25 November 2014.

5) Wimer, N., Churchfield, M., and Hamlington, P.E. (2014) Effects of Offshore Wind Turbines on Ocean Waves. Submitted to the 67th Annual meeting, Division of Fluid Dynamics, American Physical Society, San Francisco, CA, 23-25 November 2014.

Conference Posters

1) Ordonez, A., Fox-Kemper, B., and Hamlington, P. (2012) Energy extraction from ocean currents and waves: Mapping the most promising locations. Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) National Conference, 10-14 October 2012, Seattle, WA.

2) Ordonez, A., Hamlington, P., and Fox-Kemper, B. (2012) Energy extraction from ocean currents and waves: Mapping the most promising locations. American Geophysical Union Fall Meeting, 3-7 December 2012, San Francisco, CA.

3) Hamlington, P.E., Alexander, S.R., and Fox-Kemper, B. (2013) Interactions Between Small-Scale Langmuir Turbulence and Submesoscale Eddies. 33rd Los Alamos Center for Nonlinear Studies (CNLS) Annual Conference: Ocean Turbulence, 3-7 June 2013, Santa Fe, NM.

4) Alexander, S.R., Hamlington, P.E., and McCaffrey, K. (2013) Simulation of Realistic Ocean Turbulence in Large-Eddy Simulations of Ocean Current Turbines. 33rd Los Alamos Center for Nonlinear Studies (CNLS) Annual Conference: Ocean Turbulence, 3-7 June 2013, Santa Fe, NM.

5) Hamlington, P.E., Alexander, S.R., and Fox-Kemper, B. (2013) Properties of Small-Scale Langmuir Turbulence in the Presence of Submesoscale Eddies. 19th Conference on Atmospheric and Oceanic Fluid Dynamics, American Meteorological Society, 17-21 June 2013, Newport, RI.

6) McCaffrey, K., Hamlington, P., and Fox-Kemper, B. (2013) Characterizing Turbulent Events at a Tidal Energy Site from ADCP Data. 19th Conference on Atmospheric and Oceanic Fluid Dynamics, American Meteorological Society, 17-21 June 2013, Newport, RI.

7) Alexander, S.R., Hamlington, P.E., and McCaffrey, K. (2013) Large-Eddy Simulation of Ocean Current Turbines in the Presence of Realistic Ocean Turbulence. 19th Conference on Atmospheric and Oceanic Fluid Dynamics, American Meteorological Society, 17-21 June 2013, Newport, RI.

Departmental Seminars and Lectures

1) "Nonlinear eddy viscosity models and nonequilibrium turbulence." Guest Lecture for graduate course in Turbulent Flows (Aero 525), University of Michigan, Ann Arbor, MI, April 2007.

2) "Vorticity-strain dynamics in turbulent flows." Seminar, Ilmenau University of Technology, Ilmenau, Germany, March 2008.

3) "Vorticity-strain dynamics in turbulent flows and nonequilibrium turbulence anisotropy." Seminar for Geophysical Turbulence group, National Center for Atmospheric Research (NCAR), Boulder, CO, September 2008.

4) "Reynolds stress closure for nonequilibrium effects in turbulent flows." Computational Aero Sciences Seminar, University of Michigan, Ann Arbor, MI, October 2008.

5) "Reynolds stress closure for nonlocal and nonequilibrium effects in turbulent flows." Seminar, Ilmenau University of Technology, Ilmenau, Germany, June 2009.

6) "Local and nonlocal strain rate fields and vorticity dynamics in turbulent flows." Fluid Dynamics Review Seminar of the Burgers Program, University of Maryland, College Park, April 2010.

7) "Anisotropy modeling for computational simulations of turbulent flows." Guest colloquium, Ilmenau University of Technology, Ilmenau, Germany, October 2010.

8) "Langmuir-Submesoscale Interactions: Multiscale Simulations with the Craik-Leibovich Equations." NCAR IMAGe Theme of the Year Conference, University of Colorado, Boulder, CO, May 2012.

9) "Beyond Curve Fitting: Turbulence Physics and Parameterization." Seminar for MCEN 5027, Department of Mechanical Engineering, University of Colorado, Boulder, CO, August 2012.

10) "The Non-Normality of Nature: Intermittency in Turbulent Flows." Seminar for CVEN 6393, Department of Civil, Environmental, and Architectural Engineering, University of Colorado, Boulder, CO, January 2013.

11) "Vorticity Dynamics in Variable Density Flows." Center for Turbulence Research (CTR) Tea Seminar, Stanford University, August 2013.

12) "The Fluid Dynamics of Sports." Seminar for MCEN 5027, Department of Mechanical Engineering, University of Colorado, Boulder, CO, September 2013.

13) "Numerical Modeling of Pulsed and Rotating Detonation Engines." Boulder Fluid Dynamics Seminar, University of Colorado, Boulder, October 2013.

14) "Langmuir Turbulence in the Oceanic Mixed Layer." Oceanography Seminar, Department of Atmospheric and Oceanic Sciences, University of Colorado, Boulder, October 2013.

15) "Vorticity dynamics in variable density flows." Dynamical Systems Seminar, Department of Applied Mathematics, University of Colorado, Boulder, December 2013.

16) "Numerical Modeling of Rotating and Pulsed Detonation Engines." Seminar for MCEN 5027, Department of Mechanical Engineering, University of Colorado, Boulder, CO, January 2014.

17) "Effects of Submesoscale Turbulence on Tracer Evolution in the Oceanic Mixed Layer." Hydrology and Water Resources Seminar for CVEN 6393, Department of Civil, Environmental, and Architectural Engineering, University of Colorado, Boulder, CO, October 2014.

Research Grants

1) "Wind Turbine Recycling and Systems Engineering," Alliance Partner University Program (APUP), Subcontract with the National Renewable Energy Laboratory (NREL), November 2012 – Present. Total to CU: $262,868.

2) "Collaborative Research: Reacting Tracers in a Turbulent Mixed Layer." P.E. Hamlington (CU PI), N.S. Lovenduski (CU Co-I), and B. Fox-Kemper (Brown PI). Proposal Number 1258995, Physical Oceanography Program, National Science Foundation (NSF). June 2013 – Present. Total awarded: $671,973. Total to CU: $401,386 ($281,391 to Hamlington).

3) "Modeling and Optimizing Turbines for Unsteady Flow," P.E. Hamlington (CU PI), Midé Technology (Industry Partner), Defense Advanced Research Projects Agency (DARPA) Small Business Technology Transfer (STTR), Phase 1. July 2013 – May 2014. Total to CU: $40,000.

4) "Analysis and Modeling of Multi-Scale Interactions in High-Speed Turbulent Reacting Flows," P.E. Hamlington (PI), Air Force Office of Scientific Research (AFOSR), Energy Conversion and Combustion Sciences (Program Manager: Dr. Chiping Li). Recommend for funding. Total to CU: $159,740.

Computer Time Proposals

1) "Special Assessment of Frontogenesis, Advanced Computing Resources for CMG: Multiscale Modeling of the Coupling between Langmuir Turbulence and Submesoscale Variability in the Oceanic Mixed Layer," B. Fox-Kemper, J. McWilliams, P. Sullivan, P. Hamlington, and L. Van Roekel. Accelerated Scientifc Discovery (ASD) for Yellowstone, National Center for Atmospheric Research (NCAR), August – November 2012. Total computer hours: 16,000,000.

2) "Reactive Tracers in a Turbulent Mixed Layer," P. Hamlington, Research Computing, University of Colorado, Boulder, February 2013 – Present. Total computer hours: 1,000,000 on the Janus supercomputer.

3) "Reacting Tracers in a Turbulent Mixed Layer," P. Hamlington, B. Fox-Kemper, and N. Lovenduski. Computational & Information Systems Laboratory (CISL), National Center for Atmospheric Research (NCAR), May 2013 – May 2016. Total computer hours: 1,200,000.

Graduate Teaching

1) Professor, MCEN 5021: Introduction to Fluid Dynamics (cross-listed with ASEN 5051: Fluid Mechanics), graduate course, Department of Mechanical Engineering, University of Colorado, Boulder, Fall 2012 (54 students).

2) Professor, MCEN 7221: Turbulence (cross-listed with ASEN 6037: Turbulent Flows), graduate course, Department of Mechanical Engineering, University of Colorado, Boulder, Spring 2013 (25 students).

3) Professor, MCEN 5027: Graduate Seminar, Department of Mechanical Engineering, University of Colorado, Boulder, Spring 2013 (78 students).

4) Professor, MCEN 6228 / ASEN 6519: Reacting Flows, Department of Mechanical Engineering, University of Colorado, Boulder, Fall 2013 (17 students).

5) Professor, MCEN 5027: Graduate Seminar, Department of Mechanical Engineering, University of Colorado, Boulder, Fall 2013 (83 students).

6) Professor, MCEN 5228 / ASEN 5519: Fluid Dynamics of Renewable Energy Systems, Department of Mechanical Engineering, University of Colorado, Boulder, Spring 2014 (20 students).

7) Professor, MCEN 5041: Advanced Fluid Mechanics I, graduate course, Department of Mechanical Engineering, University of Colorado, Boulder, Fall 2014 (29 students).

Undergraduate Teaching

1) Graduate Student Instructor, Aero 225: Introduction to Gas Dynamics, undergraduate course, Department of Aerospace Engineering, University of Michigan, Fall 2004.

2) Graduate Student Instructor, Aero 325: Aerodynamics, undergraduate course, Department of Aerospace Engineering, University of Michigan, Winter 2005.

3) Graduate Student Instructor, Aero 305: Aerospace Engineering Laboratory I, undergraduate lab course, Department of Aerospace Engineering, University of Michigan, Winter 2007.

4) Professor, MCEN 3021: Fluid Mechanics, undergraduate course, Department of Mechanical Engineering, University of Colorado, Boulder, Fall 2014 (82 students).

Independent Study Supervision

1) Hinaman, M., "Introduction to Reservoir Engineering." MCEN 5898: Independent Study, Department of Mechanical Engineering, University of Colorado, Boulder, Spring 2013.

2) Berger, J., "Introduction to Turbulent Combustion." MCEN 5898: Independent Study, Department of Mechanical Engineering, University of Colorado, Boulder, Summer 2013.

3) Burns, M., "Experimental Fluid Mechanics." MCEN 5898: Independent Study, Department of Mechanical Engineering, University of Colorado, Boulder, Spring 2014.

Undergraduate Research Supervision

1) Chen, O., September 2007 – April 2008. Topic: "Vorticity Alignment with Background Strain Eigenvectors in Turbulent Flows." (supervised with Prof. Werner Dahm at the University of Michigan)

2) Ordonez, A., May 2012 – August 2012. Topic: "Energy extraction from ocean currents and waves: mapping the most promising locations." Co-mentored with Prof. Baylor Fox-Kemper at the University of Colorado, Boulder as part of the UCAR Significant Opportunities in Atmospheric Research and Science (SOARS) program.

3) Collins, S., August 2013 – Present. Topic: "Multi-Scale Analysis of Marine Renewable Energy Systems." Discovery Learning Apprenticeship (DLA) Program, University of Colorado, Boulder.

Mentoring and Teacher Training

1) Graduate Student Mentor, Center for Research on Learning and Teaching in Engineering (formerly CRLT-North), University of Michigan, Winter and Fall 2005, Fall 2007.

2) Session Presenter, Research on Best Practices in College Teaching, Graduate Student Instructor Teacher Training (GSITT), College of Engineering, University of Michigan, Winter and Fall 2008.

Conference Service

1) Session convener, "Vortex IV", 65th Annual meeting, Division of Fluid Dynamics, American Physical Society, 18-20 November 2012, San Diego, CA.

2) Co-chair, "Physics and Biogeochemisty of Submesoscale Processes III Posters," Co-chair with G. Badin, American Geophysical Union Fall Meeting, 3-7 December 2012, San Francisco, CA.

3) Member of Advisory Panel and Session Chair, 2nd Symposium on OpenFOAM in Wind Energy, 19-21 May 2014, Boulder, CO.

4) Session chair, "Detonations and Supersonic Combustion," 44th AIAA Fluid Dynamics Conference, 16-20 June 2014, Atlanta, GA.

Journal and Proposal Reviews

Physics of Fluids, *Physical Review E*, *Physical Review Letters, Physica D, European Journal of Mechanics, Combustion and Flame, National Science Foundation.*

Dissertation Committee Service

1) Haney, S., PhD Committee, Department of Atmospheric and Oceanic Sciences, University of Colorado, Boulder, 2012 – Present.

2) McCaffrey, K., PhD Committee, Department of Atmospheric and Oceanic Sciences, University of Colorado, Boulder, 2012 – Present.

3) Reckinger, S., PhD Committee, Department of Mechanical Engineering, University of Colorado, Boulder, Defense: November 2012.

4) Westfall, J., PhD Committee, Department of Aerospace Engineering Sciences, University of Colorado, Boulder, Defense: August 2013.

5) Soltys, M., PhD Committee, Department of Civil, Environmental and Architectural Engineering, University of Colorado, Boulder, Defense: November 2013.

6) Masson, N., MS Thesis Committee, Department of Mechanical Engineering, University of Colorado, Boulder, Defense: November 2013.

7) Shoaei, F., PhD Committee, Department of Civil, Environmental and Architectural Engineering, University of Colorado, Boulder, 2013 – Present.

8) Vanderwende, B., PhD Committee, Department of Atmospheric and Oceanic Science, University of Colorado, Boulder, 2014 – Present.

9) Turner, M., PhD Committee, Department of Mechanical Engineering, University of Colorado, Boulder, 2014 – Present.

10) Guan, Q., PhD Committee, Department of Mechanical Engineering, University of Colorado, Boulder, 2014 – Present.

11) Worsnop, R., PhD Committee, Department of Atmospheric and Oceanic Science, University of Colorado, Boulder, 2014 – Present.

12) Boyle, L., PhD Committee, Department of Mechanical Engineering, University of Colorado, Boulder, 2014 – Present.

13) Kasimov, N., PhD Committee, Department of Mechanical Engineering, University of Colorado, Boulder, 2014 – Present.

14) Mati, N., MS Thesis Committee, Department of Aerospace Engineering Sciences, University of Colorado, Boulder, Defense: July 2014.

Students Advised

1) PhD: *Ryan King* (2012 – Present), *Katherine Smith* (2013 – Present), *Colin Towery* (2012 – Present).

2) Masters: *Joel Berger* (2012 – 2013), *Spencer Alexander* (2013 – 2014), *Prateek Shrestha* (2012 – 2014), *Nicholas Wimer* (2013 – Present), *Michelle Burns* (2014 – Present).

3) Undergraduate: *Sean Collins* (2013 – 2014).

4) High School: *Allison Leonard* (2013 – 2014).

Outreach

1) Co-Instructor: *Climate Science Education for Under-represented Students Through Collaboration with CABPES* (Colorado Association of Black Professional Engineers and Scientists), 2012. (NASA ROSES proposal educational supplement, PI: Robert Leben)

Other

1) Organizer and Founder: *Boulder Fluid Dynamics Seminar Series*, June 2013 – Present.

2) Faculty Advisor: *Graduate Engineering Annual Research and Recruiting Symposium (GEAR^{2}S)*, 2014.

3) Participant at 2014 Center for Turbulence Research Summer Program.