NICHOLAS T. OUELLETTE

Professor
Department of Civil
and Environmental Engineering
Stanford University

Jerry Yang and Akiko Yamazaki
Environment and Energy Building
Room 153
473 Via Ortega
Stanford, CA 94305
Tel: (650) 723-4860
Fax: (650) 725-9720
nto@stanford.edu
http://web.stanford.edu/~nto

EDUCATION

2006 Ph.D. in Physics, Cornell University
2005 M.S. in Physics, Cornell University
2002 B.A. with High Honors in Physics and Computer Science, Swarthmore College

ACADEMIC POSITIONS

2014–Present **Stanford University**
Professor (2020–Present)
Associate Professor (2015–2020)
Kenneth and Barbara Oshman Faculty Scholar (2018–Present)
Visiting Associate Professor (2014–2015)
Department of Civil and Environmental Engineering

Woods Institute for the Environment, Affiliated Faculty
Urban Studies Program, Affiliated Faculty
Bio-X, Affiliated Faculty
Wu Tsai Neurosciences Institute, Affiliated Faculty

2008–2015 **Yale University**
Associate Professor (2013–2015)
Assistant Professor (2008–2013)
Department of Mechanical Engineering & Materials Science

2011–2012 **University of Maryland, College Park**
Visiting Assistant Professor
Institute for Research in Electronics and Applied Physics

2007–2008 **Haverford College**
Visiting Assistant Professor and HHMI Postdoctoral Research Fellow
Department of Physics
with Professor Jerry Gollub

2006 **Max Planck Institute for Dynamics and Self-Organization**
Postdoctoral Fellow
with Professor Eberhard Bodenschatz

RESEARCH INTERESTS

I am broadly interested in the behavior of complex systems far from equilibrium. In particular, a running theme in my research is dynamical self-organization. I seek both to understand the physical principles that govern the spontaneous emergence of low-dimensional structure in high-dimensional systems and to harness this self-organization for engineering applications. I primarily conduct experimental research, but also augment my experiments with numerical simulations and theoretical modeling.

My current research includes studies of turbulence in two and three dimensions, with a focus on coherent structures and the geometry of turbulence; the transport of inertial, anisotropic, and active particles in turbulence; the erosion of granular beds by fluid flows and subsequent sediment transport; mixing in stratified flows; the collective behavior of animal groups; the stability of ocean ecosystems; neural signal processing; and uncovering the natural, self-organized spatiotemporal scales in urban systems.

AWARDS, HONORS, AND FELLOWSHIPS

2020 Tau Beta Pi Teaching Honor Roll, Stanford University School of Engineering
2019 American Physical Society Outstanding Referee Award
2018 Kenneth and Barbara Oshman Faculty Scholar, Stanford University
2015 Terman Faculty Fellowship, Stanford University
2015 Euromech Young Scientist Prize
2014 Provost's Teaching Prize, Yale University
2011 Junior Faculty Fellowship, Yale University
2008 Winner (with Jerry Gollub) of the APS GSNP Gallery of Nonlinear Images
2005 Jayesh Prize for Outstanding Student Talk, Cornell Fluid Dynamics Seminar
2002 Elmore Prize in Physics, Swarthmore College
2002 Phi Beta Kappa
2002 Sigma Xi

PEER-REVIEWED JOURNAL PUBLICATIONS

113. M. L. Patel and N. T. Ouellette, "Formation and dissolution of midge swarms," *in preparation*.

112. Z. Zhou, P.-F. Yang, N. T. Ouellette, and H. Xu, "Intermittent and non-intermittent ranges in two-dimensional turbulence," *in preparation.*

111. N. T. Ouellette, "A physics perspective on collective animal behavior," *in preparation.*

110. L. Fang and N. T. Ouellette, "Assessing the information content of complex flows," *in preparation.*

109. J. G. Ballouz, P. L. Johnson, and N. T. Ouellette, "Temporal dynamics of the alignment of the turbulent stress and strain rate," *in preparation.*

108. T. MacMillan, N. T. Ouellette, and D. H. Richter, “Detection of evolving Lagrangian coherent structures: a multiple object tracking approach,” *submitted.*

107. L. K. Clark, M. H. DiBenedetto, N. T. Ouellette, and J. R. Koseff, “Settling of inertial non-spherical particles in wavy flow,” *submitted.*

106. R. L. Aras, N. T. Ouellette, and R. K. Jain, “Automated identification of urban substructure for comparative analysis,” *submitted*.

105. L. M. Wedding, S. Green, S. Reiter, K. R. Arrigo, K. Gjerde, L. Hazen, M. Ruckelshaus, J. M. A. van der Grient, R. M. Bailey, M. A. Cameron, J. Leape, M. Levi, A. Merkl, M. M. Mills, S. Monismith, N. T. Ouellette, G. van Dijken, and F. Micheli, “Adaptive management in a new ocean frontier: Linking multiple stressor science to policy action in the changing Arctic,” *submitted*.

104. Y. Tanimoto, N. T. Ouellette, and J. R. Koseff, “Secondary generation of breaking internal waves in confined basins by gravity currents,” *submitted*.

103. M. Sinhuber, K. van der Vaart, Y. Feng, A. M. Reynolds, and N. T. Ouellette, “An equation of state for insect swarms,” *submitted*.

102. K. R. Arrigo, G. L. van Dijken, M. A. Cameron, J. van der Grient, L. M. Wedding, L. Hazen, J. Leape, G. Leonard, A. Merkl, F. Micheli, M. M. Mills, S. Monismith, N. T. Ouellette, A. Zivian, M. Levi, and R. M. Bailey, “Synergistic interactions among growing stressors increase risk to an Arctic ecosystem,” *submitted.*

101. D. Gorbonos, J. G. Puckett, K. van der Vaart, M. Sinhuber, N. T. Ouellette, and N. S. Gov, “Pair formation in insect swarms driven by adaptive long-range interactions,” *submitted.*

100. S. Gakhar, J. R. Koseff, and N. T. Ouellette, “On the surface expression of bottom features in free-surface flow,” *Journal of Fluid Mechanics* **900**, A41 (2020).

99. L. Fang, S. Balasuriya, and N. T. Ouellette, “Disentangling resolution, precision, and inherent stochasticity in nonlinear systems,” *Physical Review Research* **2**, 023343 (2020).

98. Z. Zhou, L. Fang, N. T. Ouellette, and H. Xu, “Vorticity gradient stretching in the direct enstrophy transfer process of two-dimensional turbulence,” *Physical Review Fluids* **5**, 054602 (2020).

97. K. van der Vaart, M. Sinhuber, A. M. Reynolds, and N. T. Ouellette, “Environmental perturbations induce correlations in midge swarms,” *Journal of the Royal Society Interface* **17**, 20200018 (2020).

96. J. G. Ballouz and N. T. Ouellette, “Geometric constraints on energy transfer in the turbulent cascade,” *Physical Review Fluids* **5**, 034603 (2020).

95. D. Gorbonos, K. van der Vaart, M. Sinhuber, J. G. Puckett, A. M. Reynolds, N. T. Ouellette, and N. S. Gov, "Similarities between insect swarms and isothermal globular clusters," *Physical Review Research* **2**, 013271 (2020).

94. Y. Tanimoto, N. T. Ouellette, and J. R. Koseff, "Interaction between an inclined gravity current and a pycnocline in a two-layer stratification," *Journal of Fluid Mechanics* **887**, A8 (2020).

93. H. Ling, G. E. McIvor, J. Westley, K. van der Vaart, R. T. Vaughan, A. Thornton, and N. T. Ouellette, "Behavioural plasticity and the transition to order in jackdaw flocks," *Nature Communications* **10**, 5174 (2019).

92. S. L. Eagleman, D. Chander, C. Reynolds, N. T. Ouellette, and M. B. MacIver, "Nonlinear dynamics captures brain states at different levels of consciousness in patients anesthetized with propofol," *PLoS ONE* **14**, e0223921 (2019).

91. F. Xiong, P. Wang, A. H. Clark, T. Bertrand, N. T. Ouellette, M. D. Shattuck, and C. S. O'Hern, "Comparison of shear and compression jammed packings of frictional disks," *Granular Matter* **21**, 109 (2019).

90. H. Ling, G. E. McIvor, J. Westley, K. van der Vaart, J. Yin, R. T. Vaughan, A. Thornton, and N. T. Ouellette, "Collective turns in jackdaw flocks: kinematics and information transfer," *Journal of the Royal Society Interface* **16**, 20190450 (2019).

89. E. A. Andruszkiewicz, J. R. Koseff, O. B. Fringer, N. T. Ouellette, A. B. Lowe, C. A. Edwards, and A. B. Boehm, "Modeling environmental DNA transport in the coastal ocean using Lagrangian particle tracking," *Frontiers in Marine Science* **6**, 477 (2019).

88. K. van der Vaart, M. Sinhuber, A. M. Reynolds, and N. T. Ouellette, "Mechanical spectroscopy of insect swarms," *Science Advances* **5**, eaaw9305 (2019).

87. H. Ling, G. E. McIvor, K. van der Vaart, R. T. Vaughan, A. Thornton, and N. T. Ouellette, "Local interactions and their group-level consequences in flocking jackdaws," *Proceedings of the Royal Society B* **286**, 20190865 (2019).

86. R. Ouillon, E. Meiburg, N. T. Ouellette, and J. R. Koseff, "Interaction of a downslope gravity current with an internal wave," *Journal of Fluid Mechanics* **873**, 889-913 (2019).

85. L. Fang and N. T. Ouellette, "Transport across a bathymetric interface in quasi-two-dimensional flow," *Physical Review Fluids* **4**, 064501 (2019).

84. H. Ling, G. E. McIvor, K. van der Vaart, R. T. Vaughan, A. Thornton, and N. T. Ouellette, "Costs and benefits of social relationships in the collective motion of bird flocks," *Nature Ecology and Evolution* **3**, 943-948 (2019).

83. M. H. DiBenedetto, J. R. Koseff, and N. T. Ouellette, "Orientation dynamics of non-spherical particles under surface gravity waves," *Physical Review Fluids* **4**, 034301 (2019). *Chosen as an Editors' Suggestion.*

82. M. Sinhuber, K. van der Vaart, R. Ni, J. G. Puckett, D. H. Kelley, and N. T. Ouellette, "Three-dimensional time-resolved trajectories from laboratory insect swarms," *Scientific Data* **6**, 190036 (2019).

81. M. Sinhuber, K. van der Vaart, and N. T. Ouellette, "Response of insect swarms to dynamic illumination perturbations," *Journal of the Royal Society Interface* **16**, 20180739 (2019).

80. L. Fang, S. Balasuriya, and N. T. Ouellette, "Local linearity, coherent structures, and scale-to-scale coupling in turbulent flow," *Physical Review Fluids* **4**, 014501 (2019).

79. H. Ling, G. McIvor, G. Nagy, S. MohaimenianPour, R. T. Vaughan, A. Thornton, and N. T. Ouellette, "Simultaneous measurements of three-dimensional trajectories and wingbeat frequencies of birds in the field," *Journal of the Royal Society Interface* **15**, 20180653 (2018).

78. M. H. DiBenedetto and N. T. Ouellette, "Preferential orientation of spheroidal particles in wavy flow," *Journal of Fluid Mechanics* **856**, 850-869 (2018).

77. S. L. Eagleman, D. A. Vaughn, D. R. Drover, C. M. Drover, M. S. Cohen, N. T. Ouellette, and M. B. MacIver, "Do complexity measures of frontal EEG distinguish loss of consciousness in geriatric patients under anesthesia?" *Frontiers in Neuroscience* **12**, 645 (2018).

76. M. Sinhuber, J. G. Ballouz, and N. T. Ouellette, "Probing the strain-rotation balance in non-Newtonian turbulence with inertial particles," *Physical Review Fluids* **3**, 082602(R) (2018).

75. A. H. Clark, J. D. Thompson, M. D. Shattuck, N. T. Ouellette, and C. S. O'Hern, "Critical scaling near the yielding transition in granular media," *Physical Review E* **97**, 062901 (2018).

74. S. L. Eagleman, C. M. Drover, D. R. Drover, N. T. Ouellette, and M. B. MacIver, "Remifentanil and nitrous oxide anesthesia produces a unique pattern of EEG activity during loss and recovery of response," *Frontiers in Human Neuroscience* **18**, 173 (2018).

73. S. Balasuriya, N. T. Ouellette, and I. I. Rypina, "Generalized Lagrangian coherent structures," *Physica D* **372**, 31-51 (2018).

72. C. A. R. Hogg, G. C. Egan, N. T. Ouellette, and J. R. Koseff, "Shoaling internal waves may reduce gravity current transport," *Environmental Fluid Mechanics* **18**, 383-394 (2018).

71. L. Fang and N. T. Ouellette, "Influence of lateral boundaries on transport in quasi-two-dimensional flow," *Chaos* **28**, 023113 (2018). *Chosen as a Featured Article, and summarized in an AIP Scilight article.*

70. M. H. DiBenedetto, N. T. Ouellette, and J. R. Koseff, "Transport of anisotropic particles under waves," *Journal of Fluid Mechanics* **837**, 320-340 (2018).

69. J. G. Ballouz and N. T. Ouellette, “Tensor geometry in the turbulent cascade,” *Journal of Fluid Mechanics* **835**, 1048-1064 (2018).

68. J. C. Salevan, A. H. Clark, M. D. Shattuck, C. S. O’Hern, and N. T. Ouellette, “Determining the onset of hydrodynamic erosion in turbulent flow,” *Physical Review Fluids* **2**, 114302 (2017).

67. M. Sinhuber and N. T. Ouellette, “Phase coexistence in insect swarms,” *Physical Review Letters* **119**, 178003 (2017). *Highlighted in Nature Physics.*

66. T. L. Mandel, I. Rosenzweig, H. Chung, N. T. Ouellette, and J. R. Koseff, “Characterizing free-surface expressions of flow instabilities by tracking submerged features,” *Experiments in Fluids* **58**, 153 (2017).

65. L. Fang and N. T. Ouellette, “Multiple stages of decay in two-dimensional turbulence,” *Physics of Fluids* **29**, 111105 (2017).

64. A. M. Reynolds, M. Sinhuber, and N. T. Ouellette, “Are midge swarms bound together by an effective velocity-dependent gravity?” *European Physical Journal E* **40**, 46 (2017). *Cover article, and chosen as an EPJ E Highlight.*

63. A. H. Clark, M. D. Shattuck, N. T. Ouellette, and C. S. O’Hern, “Role of grain dynamics in determining the onset of sediment transport,” *Physical Review Fluids* **2**, 034305 (2017).

62. W. M. Lord, J. Sun, N. T. Ouellette, and E. M. Bollt, “Inference of causal information flow in collective animal behavior,” *IEEE Transactions on Molecular, Biological and Multi-Scale Communication* **2**, 107-116 (2016).

61. S. Balasuriya, R. Kalampattel, and N. T. Ouellette, “Hyperbolic neighbourhoods as organizers of finite-time exponential stretching,” *Journal of Fluid Mechanics* **807**, 509-545 (2016).

60. L. Fang and N. T. Ouellette, “Advection and the efficiency of spectral energy transfer in two-dimensional turbulence,” *Physical Review Letters* **117**, 104501 (2016).

59. R. Ni and N. T. Ouellette, “On the tensile strength of insect swarms,” *Physical Biology* **13**, 045002 (2016). *Selected as a Physical Biology Highlight of 2016.*

58. A. M. Reynolds and N. T. Ouellette, “Swarm dynamics may give rise to Lévy flights,” *Scientific Reports* **6**, 30515 (2016).

57. D. Gorbonos, R. Ianconescu, J. G. Puckett, R. Ni, N. T. Ouellette, and N. S. Gov, “Long-range acoustic interactions in insect swarms: An adaptive gravity model,” *New Journal of Physics* **18**, 073042 (2016).

56. K.-C. Cheng, H.-K. Park, A. O. Tetteh, D. Zheng, N. T. Ouellette, K. C. Nadeau, and L. M. Hildemann, “Mixing and sink effects of air purifiers on indoor PM2.5 concentrations: A pilot study of eight residential homes in Fresno, California,” *Aerosol Science and Technology* **50**, 835-845 (2016).

55. A. de Chaumont Quitry and N. T. Ouellette, “Concentration effects on turbulence in dilute polymer solutions far from walls,” *Physical Review E* **93**, 063116 (2016).

54. T. Ma, N. T. Ouellette, and E. M. Bollt, “Stretching and folding in finite time,” *Chaos* **26**, 023112 (2016).

53. N. T. Ouellette, C. A. R. Hogg, and Y. Liao, “Correlating Lagangian structures with forcing in two-dimensional flow,” *Physics of Fluids* **28**, 015105 (2016).

52. R. Ni and N. T. Ouellette, “Velocity correlations in laboratory insect swarms,” *European Physical Journal Special Topics* **224**, 3271-3277 (2015).

51. R. Ni, M. H. Michalski, E. Brown, N. Doan, J. Zinter, N. T. Ouellette, and G. M. Shepherd, “Optimal directional volatile transport in retronasal olfaction,” *Proceedings of the National Academy of Sciences of the USA* **112**, 14700-14704 (2015).

50. A. H. Clark, M. D. Shattuck, N. T. Ouellette, and C. S. O’Hern, “Onset and cessation of motion in hydrodynamically sheared granular beds,” *Physical Review E* **92**, 042202 (2015).

49. Y. Liao and N. T. Ouellette, “Correlations between the instantaneous velocity gradient and the evolution of scale-to-scale fluxes in two-dimensional flow,” *Physical Review E* **92**, 033017 (2015).

48. R. Ni, J. G. Puckett, E. R. Dufresne, and N. T. Ouellette, “Intrinsic fluctuations and driven response of insect swarms,” *Physical Review Letters* **115**, 118104 (2015).

47. J. G. Puckett, R. Ni, and N. T. Ouellette, “Time-frequency analysis reveals pairwise interactions in insect swarms,” *Physical Review Letters* **114**, 258103 (2015).

46. Y. Liao and N. T. Ouellette, “Long-range ordering of turbulent stresses in two-dimensional flow,” *Physical Review E* **91**, 063004 (2015).

45. N. T. Ouellette, “Empirical questions for collective-behaviour modelling,” *Pramana–Journal of Physics* **84**, 353-363 (2015).

44. R. Ni, S. Kramel, N. T. Ouellette, and G. A. Voth, “Measurements of the coupling between the tumbling of rods and the velocity gradient tensor in turbulence,” *Journal of Fluid Mechanics* **766**, 202-225 (2015).

43. R. Ni, G. A. Voth, and N. T. Ouellette, “Extracting turbulent spectral transfer from under-resolved velocity fields,” *Physics of Fluids* **26**, 105107 (2014).

42. J. G. Puckett and N. T. Ouellette, “Determining asymptotically large population sizes in insect swarms” *Journal of the Royal Society Interface* **11**, 20140710 (2014).

41. J. G. Puckett, D. H. Kelley, and N. T. Ouellette, “Searching for effective forces in laboratory insect swarms,” *Scientific Reports* **4**, 4766 (2014).

40. P. W. Miller and N. T. Ouellette, “Impact fragmentation of model flocks,” *Physical Review E* **89**, 042806 (2014). *Selected for a Synopsis in Physics.*

39. Y. Liao and N. T. Ouellette, “Geometry of scale-to-scale energy and enstrophy transport in two-dimensional flow,” *Physics of Fluids* **26**, 045103 (2014).

38. E. Fonda, D. P. Meichle, N. T. Ouellette, S. Hormoz, and D. P. Lathrop, “Direct observation of Kelvin waves excited by quantized vortex reconnection,” *Proceedings of the National Academy of Sciences of the USA* **111**, 4707-4710 (2014). *Cover article.*

37. R. Ni, N. T. Ouellette, and G. A. Voth, “Alignment of vorticity and rods with Lagrangian fluid stretching in turbulence,” *Journal of Fluid Mechanics* **743**, R3 (2014).

36. N. Khurana and N. T. Ouellette, “Stability of model flocks in turbulent-like flow,” *New Journal of Physics* **15**, 095015 (2013).

35. D. H. Kelley, M. R. Allshouse, and N. T. Ouellette, “Lagrangian coherent structures separate dynamically distinct regions in fluid flow,” *Physical Review E* **88**, 013017 (2013).

34. M. Wilczek, H. Xu, N. T. Ouellette, R. Friedrich, and E. Bodenschatz, “Generation of Lagrangian intermittency in turbulence by a self-similar mechanism,” *New Journal of Physics* **15**, 055015 (2013).

33. Y. Liao and N. T. Ouellette, “Spatial structure of spectral transport in two-dimensional flow,” *Journal of Fluid Mechanics* **725**, 281-298 (2013).

32. R. M. Lee, D. H. Kelley, K. N. Nordstrom, N. T. Ouellette, and W. Losert, “Quantifying stretching and rearrangement in epithelial sheet migration,” *New Journal of Physics* **15**, 025036 (2013). *Selected as an NJP Highlight of 2013.*

31. D. H. Kelley and N. T. Ouellette, “Emergent dynamics of laboratory insect swarms,” *Scientific Rep*orts **3**, 1073 (2013).

30. N. T. Ouellette, “On the dynamical role of coherent structures in turbulence,” *Comptes Rendus Physique* **13**, 866-877 (2012).

29. N. Khurana and N. T. Ouellette, “Interactions between active particles and dynamical structures in chaotic flow,” *Physics of Fluids* **24**, 091902 (2012).

28. Y. Liao, D. H. Kelley, and N. T. Ouellette, “Effects of forcing geometry on two-dimensional weak turbulence,” *Physical Review E* **86**, 036306 (2012).

27. D. H. Kelley and N. T. Ouellette, “Spatiotemporal persistence of spectral fluxes in two-dimensional weak turbulence,” *Physics of Fluids* **23**, 115101 (2011). *Selected as a Research Highlight.*

26. N. T. Ouellette, E. Bodenschatz, and H. Xu, “Path lengths in turbulence,” *Journal of Statistical Physics* **145**, 93-101 (2011).

25. T. P. Sapsis, N. T. Ouellette, J. P. Gollub, and G. Haller, “Neutrally buoyant particle dynamics in fluid flows: Comparison of experiments with Lagrangian stochastic models,” *Physics of Fluids* **23**, 093304 (2011).

24. A. de Chaumont Quitry, D. H. Kelley, and N. T. Ouellette, “Mechanisms driving shape distortion in two-dimensional flow,” *EPL* **94**, 64006 (2011).

23. N. Khurana, J. Blawzdziewicz, and N. T. Ouellette, “Reduced transport of swimming particles in chaotic flow due to hydrodynamic trapping,” *Physical Review Letters* **106**, 198104 (2011).

22. S. Parsa, J. S. Guasto, M. Kishore, N. T. Ouellette, J. P. Gollub, and G. A. Voth, “Rotation and alignment of rods in two-dimensional chaotic flow,” *Physics of Fluids* **23**, 043302 (2011). *Cover article.*

21. D. H. Kelley and N. T. Ouellette, “Onset of three-dimensionality in electromagnetically driven thin-layer flows,” *Physics of Fluids* **23**, 045103 (2011).

20. D. H. Kelley and N. T. Ouellette, “Separating stretching from folding in fluid mixing,” *Nature Physics* **7**, 477-480 (2011).

19. D. H. Kelley and N. T. Ouellette, “Using particle tracking to measure flow instabilities in an undergraduate laboratory experiment,” *American Journal of Physics* **79**, 267-273 (2011). *Cover article.*

18. D. H. Kelley and N. T. Ouellette, “Scale-local velocity fields from particle-tracking data,” *Chaos* **20**, 041106 (2010).

17. S. T. Merrifield, D. H. Kelley, and N. T. Ouellette, “Scale-dependent statistical geometry in two-dimensional flow,” *Physical Review Lett*ers **104**, 254501 (2010).

16. N. T. Ouellette, H. Xu, and E. Bodenschatz, “Bulk turbulence in dilute polymer solutions,” *Journal of Fluid Mechanics* **629**, 375-385 (2009).

15. N. T. Ouellette and J. P. Gollub, “Detecting topological features of chaotic fluid flow,” *Chaos* **18**, 041102 (2008). *Cover article.*

14. N. T. Ouellette, P. J. J. O'Malley, and J. P. Gollub, “Transport of finite-sized particles in chaotic flow,” *Physical Review Letters* **101**, 174504 (2008). *Chosen as an Editor’s Selection paper.*

13. N. T. Ouellette and J. P. Gollub, “Dynamic topology in spatiotemporal chaos,” *Physics of Fluids* **20**, 064104 (2008).

12. A. Arnèodo, R. Benzi, J. Berg, L. Biferale, E. Bodenschatz, A. Busse, E. Calzavarini, B. Castaing, M. Cencini, L. Chevillard, R. T. Fisher, R. Grauer, H. Homann, D. Lamb, A. S. Lanotte, E. Lèvèque, B. Lüthi, J. Mann, N. Mordant, W.-C. Müller, S. Ott, N. T. Ouellette, J.-F. Pinton, S. B. Pope, S. G. Roux, F. Toschi, H. Xu, and P. K. Yeung, “Universal intermittent properties of particle trajectories in highly turbulent flows,” *Physical Review Letters* **100**, 254504 (2008).

11. L. Biferale, E. Bodenschatz, M. Cencini, A. S. Lanotte, N. T. Ouellette, F. Toschi, and H. Xu, “Lagrangian structure functions in turbulence: A quantitative comparison between experiment and direct numerical simulation,” *Physics of Fluids* **20**, 065103 (2008).

10. H. Xu, N. T. Ouellette, and E. Bodenschatz, "Evolution of geometric structures in intense turbulence," *New Journal of Physics* **10**, 013102 (2008). *Selected as an IOP Select paper.*

9. H. Xu, N. T. Ouellette, D. Vincenzi, and E. Bodenschatz, "Acceleration correlations and pressure structure functions in high-Reynolds number turbulence," *Physical Review Letters* **99**, 204501 (2007).

8. N. T. Ouellette and J. P. Gollub, "Curvature fields, topology, and the dynamics of spatiotemporal chaos," *Physical Review Letters* **99**, 194502 (2007).

7. H. Xu, N. T. Ouellette, and E. Bodenschatz, "Curvature of Lagrangian trajectories in turbulence," *Physical Review Letters* **98**, 050201 (2007).

6. N. T. Ouellette, H. Xu, M. Bourgoin, and E. Bodenschatz, "An experimental study of turbulent relative dispersion models," *New Journal of Physics* **8**, 109 (2006).

5. N. T. Ouellette, H. Xu, M. Bourgoin, and E. Bodenschatz, "Small-scale anisotropy in Lagrangian turbulence," *New Journal of Physics* **8**, 102 (2006).

4. H. Xu, N. T. Ouellette and E. Bodenschatz, "Multifractal dimension of Lagrangian turbulence," *Physical Review Letters* **96**, 114503 (2006).

3. M. Bourgoin, N. T. Ouellette, H. Xu, J. Berg, and E. Bodenschatz, "The role of pair dispersion in turbulent flow," *Science* **311**, 835-838 (2006).

2. H. Xu, M. Bourgoin, N. T. Ouellette, and E. Bodenschatz, "High order Lagrangian velocity statistics in turbulence," *Physical Review Letters* **96**, 024503 (2006).

1. N. T. Ouellette, H. Xu, and E. Bodenschatz, "A quantitative study of three-dimensional Lagrangian particle tracking algorithms," *Experiments in Fluids* **40**, 301-313 (2006).

CONFERENCE PROCEEDINGS, BOOK CHAPTERS, AND OTHER WRITING

13. N. T. Ouellette, "The most active matter of all," *Matter* **1**, 297-299 (2019).

12. G. Nagy, A. Thornton, H. Ling, N. T. Ouellette, and R. Vaughan, "Computational and structural advantages of pairwise flocking," *IEEE International Symposium on Multi-Robot and Multi-Agent Systems* (2019).

11. N. T. Ouellette, "Flowing crowds," *Science* **363**, 27-28 (2019).

10. N. T. Ouellette, "Toward a "thermodynamics" of collective behavior," *SIAM News* **50**, November 2017.

9. C. A. R. Hogg, V. Pietrasz, G. C. Egan, N. T. Ouellette, and J. R. Koseff, "The influence of a shoaling internal gravity wave on a dense gravity current," *8th International Symposium on Stratified Flows* (2016).

8. N. T. Ouellette, "Turbulence in two dimensions," *Physics Today* **65**, 68-69 (2012). Also translated into Japanese and published as *Parity* **28**, 34-36 (2013).

7. N. T. Ouellette, “Particle-based measurement techniques for soft matter,” in *Experimental and Computational Techniques in Soft Condensed Matter Physics*, ed. J. Olafsen, pp. 180-208 (Cambridge University Press, Cambridge, 2010).

6. H. Xu, N. T. Ouellette, and E. Bodenschatz, “Multi-particle statistics–Lines, shapes, and volumes in high Reynolds number turbulence,” *Proceedings of the 5th International Conference on Nonlinear Mechanics*, ed. W.-Z. Chien, pp. 1155-1161 (2007).

5. H. Xu, N. T. Ouellette, H. Nobach, and E. Bodenschatz, “Experimental measurements of Lagrangian statistics in intense turbulence,” *Advances in Turbulence XI: Proceedings of the 11th EUROMECH European Turbulence Conference*, ed. J. M. L. M. Palma and A. Silva Lopes, pp. 1-10 (2007).

4. N. T. Ouellette, H. Xu, and E. Bodenschatz, “Measuring Lagrangian statistics in intense turbulence,” in *Springer Handbook of Experimental Fluid Dynamics*, ed. C. Tropea, A. L. Yarin, and J. F. Foss, pp. 789-799 (Springer-Verlag, Berlin, 2007).

3. N. T. Ouellette, H. Xu, K. Chang, and E. Bodenschatz, “Statistical geometry in intensely turbulent flow,” *Proceedings of the 12th International Symposium on Flow Visualization*, ed. I. Grant, paper 167 (2006).

2. K. Chang, N. T. Ouellette, H. Xu, and E. Bodenschatz, “Lagrangian particle tracking in high Reynolds number turbulence,” *EUROMECH Colloquium 477: Particle-Laden Flow: from Geophysical to Kolmogorov Scales* (2006).

1. H. Nobach, N. T. Ouellette, E. Bodenschatz, and C. Tropea, “Full-field correlation-based image processing for PIV,” *Proceedings of the 6th International Symposium on Particle Image Velocimetry* (2005).

RESEARCH FUNDING

Current Support

2020–2021 National Science Foundation OCE-2022930
The Interaction between Breaking Internal Waves and Gravity Currents on Inclined Slopes
$110,937
with PI Jeffrey Koseff, Stanford Civil and Environmental Engineering

2017–2021 National Science Foundation CBET-1706586
Transport of Non-Spherical Particles in Wavy Flows
$343,513
with PI Jeffrey Koseff, Stanford Civil and Environmental Engineering

2017–2021 National Science Foundation CBET-1706950
Geometric Structure of the Turbulent Cascade
$336,975

2017–2021 Human Frontier Science Program RGP0049/2017

Collective Behaviour and Information Transmission in Heterogeneous Societies
$1,050,000 (Stanford share: $431,426)
with PI Alex Thornton, University of Exeter, and Co-PI Richard Vaughan, Simon Fraser University

2017–2020 Army Research Office W911NF-17-1-0164
Strengthening and Armoring of Sheared Granular Beds
$483,742 (Stanford share: $220,857)
with PI Corey O'Hern, Yale Mechanical Engineering and Materials Science

Prior Support

2016–2020 National Science Foundation OCE-1634389
Effects of Internal Waves on Mixing and Transport by Gravity Currents
$348,379
with PI Jeffrey Koseff, Stanford Civil and Environmental Engineering

2016–2020 Army Research Office W911NF-16-1-0185
Macroscopic Properties and Microscopic Interactions in Insect Swarms
$360,000

2016–2020 National Science Foundation CMMI-1563489
Toward the Design and Control of Dynamical Transport Barriers in Nonlinear Flow
$345,000

2017–2019 Stanford Catalyst for Collaborative Solutions
Harnessing the Data Revolution to Secure the Future of the Oceans
$650,000
with PI Fio Micheli and Co-PIs Jim Leape, Kevin Arrigo, Stephen Monismith, Stefano Ermon, and Margaret Levi, Stanford University

2017–2018 Stanford Department of Anesthesiology FIDL Grant
Quantifying Anesthetic Depth
$91,138
with PI Bruce MacIver and Co-PI David Drover, Stanford Anesthesiology

2014–2017 National Science Foundation CBET-1436423/CBET-1600292
Bulk Turbulence in Polymer Solutions: Beyond Friction Drag Reduction
$279,774

2013–2016 Army Research Office W911NF-14-1-0005
Determining the Essential Elements of Hydrodynamic Erosion of Granular Beds
$360,000
with Co-PI Corey O'Hern, Yale Mechanical Engineering and Materials Science

2013–2015	Army Research Office W911NF-13-1-0426 Laboratory and Modeling Studies of Insect Swarms $145,352
2012–2015	National Science Foundation DMS-1211952 Collaborative Research: Theories and Experiments on Scalar Mixing in Chaotic Flows $93,056
2012–2015	National Science Foundation DMR-1206399 Linking Spatial and Spectral Transport in Two-Dimensional Fluid Flow $330,000
2013–2014	Yale Endowed Postdoctoral Fellowship in the Biological Sciences $50,545
2012–2013	Army Research Office W911NF-12-1-0517 Characterization and Modeling of Insect Swarms Using Tools from Fluid Dynamics $50,000
2009–2012	National Science Foundation DMR-0906245 Connecting Dynamical Structure and Statistical Analysis in Quasi-2D Fluid Flow $320,000

STUDENTS AND POSTDOCS SUPERVISED

Current

- **Patricia Yang** (postdoc, 2019–present): Bird flocks.
- **Sarah Eagleman** (postdoc, 2017–present): EEG signal analysis and anesthetic depth. *Co-advised with Prof. Bruce MacIver, Stanford University*.
- **Yukinobu Tanimoto** (Ph.D. student, 2017–present, Civil and Environmental Engineering, Stanford): Waves and gravity currents. *Co-advised with Prof. Jeffrey Koseff, Stanford University*.
- **Marios Galanis** (Ph.D. student, 2017–present, Civil and Environmental Engineering, Stanford): Hydrodynamic erosion of granular materials.
- **Saksham Gakhar** (Ph.D. student, 2018–present, Civil and Environmental Engineering, Stanford): Surface expression of subsurface turbulence. *Co-advised with Prof. Jeffrey Koseff, Stanford University.*
- **Laura Clark** (Ph.D. student, 2018–present, Civil and Environmental Engineering, Stanford): Waves, gravity currents, and particle transport. *Co-advised with Prof. Jeffrey Koseff, Stanford University.*

- **Rohan Aras** (Ph.D. student, 2018–present, Civil and Environmental Engineering, Stanford): Self-organized scales for distributed infrastructure in cities. *Co-advised with Prof. Rishee Jain, Stanford University.*
- **Yenchia Feng** (Ph.D. student, 2019–present, Civil and Environmental Engineering, Stanford): Insect swarms.
- **Jennifer Yin** (Ph.D. student, 2019–present, Civil and Environmental Engineering, Stanford): Stratified turbulence. *Co-advised with Prof. Stephen Monismith, Stanford University.*
- **Michael Yang** (undergraduate, 2019–present, Math and Computational Biology, Stanford): Ant foraging. *Co-advised with Prof. Deborah Gordon, Stanford University.*

Former (with last known position)

- **Hangjian Ling** (postdoc, 2017–2019): Bird flocks.
  Assistant Professor of Mechanical Engineering at the University of Massachusetts, Dartmouth
- **Mary Cameron** (postdoc, 2017–2019): Health and stability of ocean ecosystems.
  Data Scientist at Hivemapper
- **Kasper van der Vaart** (postdoc, 2017–2019): Insect swarms, bird flocks.
  Postdoc at University of Twente
- **Michael Sinhuber** (postdoc, 2016–2019): Insect swarms, non-Newtonian turbulence.
  Postdoc at Max Planck Institute for Dynamics and Self-Organization
- **Abram Clark** (postdoc, 2014–2017): Hydrodynamic erosion of granular materials.
  Assistant Professor of Physics at the Naval Postgraduate School
- **Charlie Hogg** (postdoc, 2015–2017): Gravity currents and internal waves; coherent structures in 2D flow.
  Data Scientist at Aruba
- **Rui Ni** (postdoc, 2013–2015): Particle transport in turbulence; insect swarms.
  Assistant Professor of Mechanical Engineering at Johns Hopkins University
- **James Puckett** (postdoc, 2012–2014): Insect swarms; advection-reaction-diffusion systems.
  Associate Professor of Physics at Gettysburg College
- **Douglas Kelley** (postdoc, 2009–2012): 2D fluid flow; insect swarms.
  Associate Professor of Mechanical Engineering at the University of Rochester
- **Joseph Ballouz** (Ph.D. 2020, Civil and Environmental Engineering, Stanford): Geometric alignment in turbulence.
- **Lei Fang** (Ph.D. 2020, Civil and Environmental Engineering, Stanford): 2D turbulence.
  Assistant Professor of Civil and Environmental Engineering at the University of Pittsburgh

- **Michelle DiBenedetto** (Ph.D. 2019, Civil and Environmental Engineering, Stanford; Andreas Acrivos Dissertation Award winner, American Physical Society): Transport of microplastics in wavy flows.
  Postdoc at Woods Hole Oceanographic Institution
- **J. C. Salevan** (Ph.D. 2018, Mechanical Engineering, Yale): Hydrodynamic erosion of granular materials.
  Research Analyst at the Yale University Office of Institutional Research
- **Alexandre de Chaumont Quitry** (Ph.D. 2016, Mechanical Engineering, Yale): Turbulence in complex fluids.
  Research engineer at Visby
- **Yang Liao** (Ph.D. 2015, Mechanical Engineering, Yale): 2D turbulence.
  Assistant Scientist in Geology & Geophysics at Woods Hole Oceanographic Institution
- **Nidhi Khurana** (Ph.D. 2013, Mechanical Engineering, Yale): Active particles in chaotic flow.
  Researcher at the Centers for Disease Control
- **Manisha Patel** (B.S. 2019, Physics, Stanford): Light cues in insect swarms.
- **Pearson Miller** (B.S. 2014, Physics, Yale): Fragmentation of model flocks.
  Ph.D. student in Physics at MIT
- **Benjamin Green** (B.S. 2014, Physics and Mathematics, Yale): Network analysis of insect swarms.
  Ph.D. student in Engineering and Applied Sciences at Harvard
- **Jerry Wang** (B.S. 2013, Physics and Mechanical Engineering, Yale; McCrosky Prize winner): Anisotropic particles in 2D flow.
  Assistant Professor of Civil and Environmental Engineering at Carnegie Mellon University
- **Courtney Engle** (B.S. 2012, Mechanical Engineering, Yale): Turbidity currents.
  In industry
- **Kevin Shen** (B.S. 2011, Chemical Engineering, Yale): Active particles in synthetic flows.
  Ph.D. student in Chemical Engineering at Caltech
- **Sophia Merrifield** (B.S. 2010, Physics and Mechanical Engineering, Yale; Lichty & Waters Prize winner): Shape statistics in 2D flow.
  Postdoc at Scripps Institution of Oceanography

INVITED PRESENTATIONS

2020
- Applied and Computational Mathematics Seminar, University of Wisconsin, Madison
- Stanford Fluids Seminar, Stanford University
- Physics of Behavior Virtual Workshop, hosted by Emory University, Vrije Universiteit, and Okinawa Institute of Science and Technology

2019
• Workshop on Autonomous Vehicles, Nanoscale Prototyping Laboratory Affiliate Program, Stanford University
• Workshop on Statistical Mechanics of Swarming Behaviour, La Plata, Argentina
• International Symposium: From Pattern Formation to Turbulence, Kloster Banz, Bavaria, Germany
• Department of Mechanical Engineering, University of California, Santa Barbara
• Institute for Geophysics and Planetary Physics Seminar, University of California, Santa Cruz
• APS March Meeting, Boston

2018
• Fluid Mechanics Seminar, University of California, San Diego
• Department of Mechanical Engineering, University of Rochester
• 10th European Solid Mechanics Conference, Bologna, Italy
• MRS Spring Meeting, Phoenix
• "Distributed, Collective Computation in Biological and Artificial Systems," Howard Hughes Medical Institute, Janelia Research Campus
• "Fundamental Problems in Active Matter," Aspen Center for Physics
• Department of Physics, Naval Postgraduate School

2017
• Department of Civil and Environmental Engineering, Duke University
• Department of Applied Physical Sciences, University of North Carolina, Chapel Hill
• 5th Collective Intelligence Conference, New York University
• SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah
• APS March Meeting, New Orleans
• "Transport in Unsteady Flows: from Deterministic Structures to Stochastic Models and Back Again," Banff, Canada

2016
• Berkeley Fluids Seminar, University of California, Berkeley
• Army Research Office Workshop on "Characterizing the Dynamics of Geo-Surface Materials: Modeling and Simulation Challenges and Opportunities"
• AmeriMech Symposium on Fluid Transport and Nonlinear Dynamics, Woods Hole Oceanographic Institution
• "Two-Phase Continuum Models for Geophysical Particle-Fluid Flows," Max Planck Institute for Physics of Complex Systems, Dresden, Germany
• Department of Physics, Emory University
• "Geometric and Graph-based Approaches to Collective Motion," Schloss Dagstuhl, Wadern, Germany

2015
• Department of Aerospace Engineering and Mechanics, University of Minnesota
• Center for Nonlinear Dynamics, Department of Physics, University of Texas at Austin

• Stanford Fluids Seminar, Stanford University
• EquaDiff 2015, Lyon, France
• Okinawa Institute of Science and Technology, Okinawa, Japan
• Environmental Multiphase Flow Workshop, Huazhong University of Science Technology, Wuhan, China
• Department of Thermal Engineering, Tsinghua University, China
• SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah
• "Collective Dynamics and Model Verification: Connecting Kinetic Modeling to Data," Arizona State University
• Environmental Fluid Mechanics and Hydrology Seminar, Department of Civil and Environmental Engineering, Stanford University
• APS Editorial Office Colloquium
• Department of Physics, University of California at Merced
• CIRF Seminar, Department of Mechanical Engineering, University of California at Santa Barbara

2014
• AGU Fall Meeting, San Francisco
• Combustion Research Facility, Sandia National Laboratory, Livermore, CA
• Center for the Ecological Study of Perception and Action, Department of Psychology, University of Connecticut
• Department of Physics, University of Massachusetts, Amherst
• Department of Mechanical Engineering, Arizona State University
• School of Mathematical and Statistical Sciences, Arizona State University
• Department of Civil and Environmental Engineering, Stanford University
• "Interaction and Collective Movement Processing," Schloss Dagstuhl, Wadern, Germany
• APS March Meeting, Denver
• Department of Physics, Duke University
• Department of Mechanical Engineering, Stanford University
• "Mixing, Transport and Coherent Structures," Mathematisches Forschungsinstitut Oberwolfach, Germany
• "Yale–Weizmann Encounter in the Biological, Physical, and Engineering Sciences," Weizmann Institute of Science, Israel

2013
• "Nonlocality in Turbulence," Wolfgang Pauli Institut, Vienna, Austria
• "Fluid-Mediated Particle Transport in Geophysical Flows," Kavli Institute for Theoretical Physics, University of California at Santa Barbara
• "Uncovering Transport Barriers in Geophysical Flows," Banff, Canada
• "Perspectives in Nonlinear Dynamics 2013," Hyderabad, India
• SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah
• Max Planck Institute for Dynamics and Self-Organization, Göttingen, Germany
• Department of Mechanical Engineering, University of Pennsylvania

2012
• Center for Nonlinear Studies Colloquium, Los Alamos National Lab

• Widely Applied Mathematics Seminar, Harvard University
• SIAM Conference on Nonlinear Waves and Coherent Structures, Seattle
• "Particles in Turbulence," Lorentz Center, Leiden, the Netherlands
• "Lagrange versus Euler for Turbulent Flows," Wolfgang Pauli Institut, Vienna, Austria
• Department of Physics, James Madison University
• "New Directions in Turbulence," Kavli Institute for Theoretical Physics China, Beijing

2011 • Applied Dynamics Seminar, University of Maryland, College Park
• Stanford Fluids Seminar, Stanford University
• "Nonlinear Dynamics and Fluid Instabilities in the 21st Century," Haverford College
• "Coherent Structures in Dynamical Systems," Lorentz Center, Leiden, the Netherlands
• CIRF Seminar, Department of Mechanical Engineering, University of California at Santa Barbara
• "The Nature of Turbulence," Kavli Institute for Theoretical Physics, University of California at Santa Barbara
• MMEC Seminar, Department of Mechanical Engineering, MIT

2010 • Department of Physics, Bucknell University

2009 • "Chaos/Xaoc 2009," Woods Hole, MA
• Applied Mathematics Laboratory, Courant Institute, New York University
• Department of Geology & Geophysics, Yale University

2008 • Department of Physics and Astronomy, Swarthmore College
• Department of Mechanical Engineering, City College of New York
• "Dynamics of Inertial Particles: From Ocean and Atmosphere to Planets," Max Planck Institute for Physics of Complex Systems, Dresden, Germany
• Department of Physics, University of Pennsylvania
• James Franck Institute, University of Chicago

2007 • Department of Mechanical Engineering, Yale University
• Department of Physics, Wesleyan University
• Department of Physics, Haverford College

2005 • Max Planck Institute for Dynamics and Self-Organization, Göttingen, Germany
• Cornell Fluid Dynamics Seminar, Cornell University

2003 • Department of Wind Energy, Risø National Laboratory, Denmark

CONTRIBUTED PRESENTATIONS

2019 • APS Division of Fluid Dynamics Meeting, Seattle *(author on 6 talks)*
• 17th European Turbulence Conference, Torino, Italy

2018 • APS Division of Fluid Dynamics Meeting, Atlanta *(author on 4 talks)*
• 18th HFSP Awardees Meeting, Toronto

2017 • APS Division of Fluid Dynamics Meeting, Denver *(author on 6 talks)*
• 16th European Turbulence Conference, Stockholm, Sweden *(author on 2 talks)*

2016 • APS Division of Fluid Dynamics Meeting, Portland *(author on 3 talks)*

2015 • APS Division of Fluid Dynamics Meeting, Boston *(author on 3 talks)*
• 15th European Turbulence Conference, Delft, the Netherlands
• 9th European Solid Mechanics Conference, Madrid, Spain
• APS March Meeting, San Antonio *(author on 3 talks)*

2014 • APS Division of Fluid Dynamics Meeting, San Francisco *(author on 4 talks)*
• 10th AIMS Conference on Dynamical Systems, Differential Equations, and Applications, Madrid, Spain
• 17th US National Congress of Theoretical and Applied Mechanics, Michigan State University
• "Dynamics of Particles in Flows: Fundamentals and Applications," NORDITA, Stockholm, Sweden

2013 • APS Division of Fluid Dynamics Meeting, Pittsburgh *(author on 4 talks)*
• 14th European Turbulence Conference, Lyon, France
• 25th IUPAP International Conference on Statistical Physics, Seoul, South Korea
• APS March Meeting, Baltimore *(author on 5 talks)*
• Dynamics Days 2013, Denver *(author on 4 presentations*)

2012 • APS Division of Fluid Dynamics Meeting, San Diego *(author on 6 talks)*
• APS March Meeting, Boston

2011 • APS Division of Fluid Dynamics Meeting, Baltimore *(author on 5 talks)*
• APS March Meeting, Dallas
• Dynamics Days 2011, Chapel Hill *(author on 2 talks)*

2010 • APS Division of Fluid Dynamics Meeting, Long Beach *(author on 5 talks)*
• 3rd Conference on Nonlinear Science and Complexity, Ankara, Turkey *(2 talks)*
• 16th US National Congress of Theoretical and Applied Mechanics, Pennsylvania State University
• 2nd COST Action Workshop on Experiments in Turbulence, Zugspitze, Germany
• APS March Meeting, Portland *(author on 3 talks)*

2009 • APS Division of Fluid Dynamics Meeting, Minneapolis *(author on 3 talks)*

2008 • APS Division of Fluid Dynamics Meeting, San Antonio
• APS March Meeting, New Orleans

2007 • APS March Meeting, Denver

2006 • APS Division of Fluid Dynamics Meeting, Tampa Bay
• 12th International Symposium on Flow Visualization, Göttingen, Germany

	• Stirring and Mixing European Research Training Network Meeting, Leiden, the Netherlands • APS March Meeting, Baltimore
2005	• APS Division of Fluid Dynamics Meeting, Chicago
2004	• APS Division of Fluid Dynamics Meeting, Seattle • Stirring and Mixing European Research Training Network Meeting, Nice, France

TEACHING

Stanford University	CEE 6 / URBANST 109: Physics of Cities *Spring 2017, Spring 2018, Spring 2019, Spring 2020* CEE 101B/162A: Mechanics of Fluids *Autumn 2015, Autumn 2016* CEE 201E: Nonlinear Dynamics *Autumn 2019* CEE 262A: Hydrodynamics *Autumn 2017, Autumn 2018, Winter 2020, Autumn 2020* CEE 363B: Chaos and Turbulence *Spring 2016, Winter 2017, Winter 2018, Winter 2019* CEE 363D: Topics in Fundamental Turbulence *Winter 2021* CEE 379: Introduction to PhD Studies in CEE *Autumn 2020* LAW 682D: Science and the Law *Spring 2018 (with L. L. Ouellette)*
Yale University	MENG 361: Mechanical Engineering II: Fluid Mechanics *Fall 2012, Fall 2013* MENG 363: Fluid Mechanics and Thermodynamics Laboratory *Spring 2010, Spring 2011, Spring 2013* MENG 463 / ENAS 704: Theoretical Fluid Dynamics *Spring 2009, Fall 2010* ENAS 789: Turbulence *Spring 2010, Spring 2014* SCIE 198: Perspectives on Science and Engineering *Fall 2008, Spring 2009*
Haverford College	Physics 212: Laboratory in Quantum Physics *Spring 2008*
Cornell University	Physics 101: General Physics I

	Fall 2002 (Teaching assistant)
	Physics 102: General Physics II *Spring 2003 (Teaching assistant)*
Swarthmore College	Physics 50: Mathematical Methods *Spring 2001 (Teaching assistant)*

SERVICE

- Departmental and University Service
    - Research Continuity Working Group on Labs, Libraries, and Shared Facilities, Stanford University, 2020
    - Stanford University Committee on Research, 2019–2022
    - Director of Graduate Studies, Civil & Environmental Engineering, Stanford University, 2019–Present
    - Co-Chair, Committee to Renew the Civil Engineering Major, 2019–2020
    - Environmental Engineering Graduate Admissions Committee, Stanford University, 2018–Present
    - Organizer, Stanford Fluid Mechanics Seminar, Winter 2017
    - Program Advisor, Undergraduate Minor in Environmental Systems Engineering, Stanford University, 2016–Present
    - Pre-Major Advisor, Stanford University, 2016–2018
    - Civil & Environmental Engineering Undergraduate Curriculum Committee, Stanford University, 2016–Present
    - Civil & Environmental Engineering Vision Committee, Stanford University, 2016–Present
    - Chair, Graduate Admissions Committee, Department of Mechanical Engineering & Materials Science, Yale University, 2009–2014
    - Yale College Fulbright Grants Committee, 2012–2013
    - Freshman and Sophomore Advisor, Davenport College, Yale University, 2008–2014
- American Physical Society Topical Group on Statistical and Nonlinear Physics Executive Board, Member-At-Large, 2018–2021
- American Physical Society Division of Fluid Dynamics Acrivos Dissertation Award Selection Committee, 2017–2018
- American Physical Society Dissertation Award in Statistical and Nonlinear Physics Selection Committee, 2017–2019

- Full conferences co-organized:
    - "Transport in Unsteady Flows: from Deterministic Structures to Stochastic Models and Back Again," Banff International Research Station, 2017
    - "Mixing, Transport and Coherent Structures," Mathematisches Forschungsinstitut Oberwolfach, 2014
    - "Nonlinear Dynamics and Fluid Instabilities in the 21st Century," Haverford College, 2011
    - 38th New England Complex Fluids Workshop, Yale University, 2009
- Conference sessions co-organized
    - Focus Session on "Probing Multi-Scale Flows by Coarse-Graining," APS Division of Fluid Dynamics Meeting, 2019
    - Focus Session on "Collective Dynamics: Fluid Physics of Life," APS March Meeting, 2017
    - Focus Session on "Sediment Transport, Geological Flows, and Avalanches," APS March Meeting, 2016
- Grant reviewer for:
    - National Science Foundation *(Fluid Dynamics; Controls, Dynamics, and Sensing Diagnostics; Condensed Matter Physics; Earth Science Instrumentation and Facilities; Physical Oceanography; MRSEC; Particulate and Multiphase Processes; Cognitive Neuroscience)*
    - Army Research Office
    - ACS Petroleum Research Fund
    - Templeton Foundation
    - Israel Science Foundation
    - Swiss National Science Foundation
    - Netherlands Organisation for Scientific Research
    - Icelandic Research Fund
- Peer reviewer for:
    - *American Journal of Physics*
    - *Behavioral Ecology and Sociobiology*
    - *Bioinspiration & Biomimetics*
    - *Chaos*
    - *Chaos, Solitons and Fractals*
    - *Computers and Fluids*
    - *Computing in Science and Engineering*
    - *European Journal of Mechanics B*
    - *European Physical Journal B*
    - *European Physical Journal Special Topics*

- *Europhysics Letters*
- *Experiments in Fluids*
- *Flow, Turbulence and Combustion*
- *Granular Matter*
- *International Journal of Multiphase Flow*
- *Journal of Atmospheric and Oceanic Technology*
- *Journal of Fluid Mechanics*
- *Journal of Geophysical Research - Oceans*
- *Journal of Physical Oceanography*
- *Journal of the Royal Society Interface*
- *Journal of Theoretical Biology*
- *Journal of Turbulence*
- *Limnology and Oceanography*
- *Measurement Science and Technology*
- *Nature Communications*
- *Nature Ecology & Evolution*
- *Nature Physics*
- *New Journal of Physics*
- *Physica A*
- *Physica D*
- *Physical Biology*
- *Physics of Fluids*
- *Physical Review E*
- *Physical Review Fluids*
- *Physical Review Letters*
- *Physical Review X*
- *PLoS Biology*
- *PLoS ONE*
- *Proceedings of the National Academy of Sciences*
- *Proceedings of the Royal Society B*
- *Review of Scientific Instruments*
- *Science*
- *Science Advances*
- *Scientific Reports*
- *Water Resources Research*