Stanford



Nicholas Ouellette

Professor of Civil and Environmental Engineering

Curriculum Vitae available Online

CONTACT INFORMATION

- **Administrator**

  Jack Chiueh - Administrative Associate

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Bio

BIO

Nick Ouellette is a Professor of Civil and Environmental Engineering at Stanford University and leads the Environmental Complexity Lab. He is broadly interested in the behavior of complex systems far from equilibrium, with a particular focus on dynamical self-organization. He seeks both to understand the physical principles governing the spontaneous emergence of low-dimensional structure in high-dimensional systems and to harness this self-organization for engineering applications. His research interests include turbulent flows in two and three dimensions (in both homogeneous and stratified fluids); the transport of inertial, anisotropic, and active particles in turbulence; fluid-driven erosion of granular beds and sediment transport; quantitative measurements of collective behavior in insect swarms and bird flocks; and emergent, self-organized structure and dynamics in cities.

Ouellette is a Fellow of the American Physical Society. Before joining the Stanford faculty, he spent seven years on the faculty in Mechanical Engineering and Materials Science at Yale University. He earned a B.A. in Physics and Computer Science from Swarthmore College and a Ph.D. in Physics from Cornell University, and held postdoctoral positions at the Max Planck Institute for Dynamics and Self-Organization (with Eberhard Bodenschatz) and in the Physics Department at Haverford College (with Jerry Gollub). He teaches courses in fluid mechanics and nonlinear dynamics, and has won teaching awards at both Stanford and Yale.

ACADEMIC APPOINTMENTS

- Professor, Civil and Environmental Engineering
- Member, Bio-X
- Member, Wu Tsai Neurosciences Institute

HONORS AND AWARDS

- Fellow, American Physical Society (2022)
- Tau Beta Pi Teaching Honor Roll, Stanford University School of Engineering (2020)
- Outstanding Referee Award, American Physical Society (2019)
- Young Scientist Prize, Euromech (2015)
- Provost's Teaching Prize, Yale University (2014)

PROFESSIONAL EDUCATION

- Ph.D., Cornell University , Physics (2006)
- M.S., Cornell University , Physics (2005)
- B.A., Swarthmore College , Physics and Computer Science (2002)

LINKS

- Environmental Complexity Lab: http://web.stanford.edu/~nto

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

The Environmental Complexity Lab studies self-organization in a variety of complex systems, ranging from turbulent fluid flows to granular materials to collective motion in animal groups. In all cases, we aim to characterize the macroscopic behavior, understand its origin in the microscopic dynamics, and ultimately harness it for engineering applications. Most of our projects are experimental, though we also use numerical simulation and mathematical modeling when appropriate. We specialize in high-speed, detailed imaging and statistical analysis.

Our 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; quantitative measurements of collective behavior in insect swarms and bird flocks; the stability of ocean ecosystems; neural signal processing; and uncovering the natural, self-organized spatiotemporal scales in urban systems.

Teaching

COURSES

2026-27

- Introduction to PHD Studies in Civil and Environmental Engineering: CEE 379A (Aut)
- Mechanics of Fluids: CEE 101B (Aut)
- Nonlinear Dynamics: CEE 201E (Spr)

2025-26

- Chaos and Turbulence: CEE 363B (Spr)

2024-25

- Mechanics of Fluids: CEE 101B (Aut)
- Nonlinear Dynamics: CEE 201E (Spr)
- Topics in Fundamental Turbulence: CEE 363D (Win)

2023-24

- Chaos and Turbulence: CEE 363B (Spr)
- Mechanics of Fluids: CEE 101B (Aut)
- Seminar in Fluid Mechanics: ENGR 298 (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Lexi Arlen, Nicholas Bachand, Jun Geng, Brooke Pauken

Doctoral Dissertation Advisor (AC)

Sophie Bodek, Maya Eley

Master's Program Advisor

Thomas Gregory, Brett Kelley, Ali Miltenberger, Hongrun Wang

Doctoral (Program)

Sophie Bodek, Maya Eley, Shana Hartwick, Elias Mathews, Milo Van Mooy, Lingchun Yan

Publications

PUBLICATIONS

- **Anisotropic Stress History Effects in Erodible Sediment Beds** *JOURNAL OF GEOPHYSICAL RESEARCH-EARTH SURFACE*
  Bodek, S., Wang, D., Shattuck, M. D., O'hern, C. S., Ouellette, N. T.
  2026; 131 (1)
- **Settling of actively buoyant particles** *JOURNAL OF FLUID MECHANICS*
  Macdonald, E. S., Ouellette, N. T.
  2025; 1024
- **Transport of rod-shaped particles in a canopy flow with a buoyant plume** *INTERNATIONAL JOURNAL OF MULTIPHASE FLOW*
  Sunberg, L. K. C., Chung, H., MacDonald, E. S., Ouellette, N. T., Koseff, J. R.
  2025; 191
- **Expected correlation in time-series analysis.** *Physical review. E*
  MacMillan, T., Hilditch, J. P., Ouellette, N. T.
  2025; 111 (2-1): 024121
- **How will AI affect patent disclosures?** *Nature biotechnology*
  Ouellette, L. L., Fang, V., Ouellette, N. T.
  2025; 43 (1): 26-28
- **Nonballistic transport of particles in a canopy-plume system** *Physical Review Fluids*
  MacDonald, E. S., Chung, H., Sunberg, L. K., Ouellette, N. T., Koseff, J. R.
  2025; 10
- **Dispersion of inertial particles in turbulent canopy flows with buoyant and nonbuoyant plumes** *PHYSICAL REVIEW FLUIDS*
  Chung, H., Sunberg, L. K. C., MacDonald, E., Ouellette, N. T., Koseff, J. R.
  2024; 9 (9)
- **Spectral energy transfer on complex networks: a filtering approach.** *Scientific reports*
  MacMillan, T., Ouellette, N. T.
  2024; 14 (1): 20691
- **Parametric Study of the dispersion of inertial ellipsoidal particles in a wave-current flow** *Physical Review Fluids*
  Sunberg, L. K., DiBenedetto, M. H., Ouellette, N. T., Koseff, J. R.
  2024; 9
- **Quantifying the pedestrian access potential of suburban street network retrofits** *ENVIRONMENT AND PLANNING B-URBAN ANALYTICS AND CITY SCIENCE*
  Aras, R. L., Ouellette, N. T., Jain, R. K.
  2023
- **Swarm formation as backward diffusion.** *Physical biology*
  Reynolds, A. M., Ouellette, N.
  2023

- **Non-uniform spatial sampling by individuals in midge swarms.** *Journal of the Royal Society, Interface*
  Feng, Y., Ouellette, N. T.
  2023; 20 (199): 20220521
- **A barrier too far: Understanding the role of intersection crossing distance on bicycle rider behavior in Chicago** *ENVIRONMENT AND PLANNING B-URBAN ANALYTICS AND CITY SCIENCE*
  Aras, R. L., Ouellette, N. T., Jain, R. K.
  2023
- **Dispersion of finite-size, non-spherical particles by waves and currents** *JOURNAL OF FLUID MECHANICS*
  Clark, L. K., DiBenedetto, M. H., Ouellette, N. T., Koseff, J. R.
  2022; 954
- **Velocity correlations in jackdaw flocks in different ecological contexts.** *Physical biology*
  O'Coin, D., Mclvor, G. E., Thornton, A., Ouellette, N. T., Ling, H.
  2022; 20 (1)
- **Linking multiple stressor science to policy opportunities through network modeling** *MARINE POLICY*
  Wedding, L. M., Green, S. J., Reiter, S., Arrigo, K. R., Hazen, L., Ruckelshaus, M., van der Grient, J. A., Bailey, R. M., Cameron, M. A., Leape, J., Levi, M., Merkl, A., Mills, et al
  2022; 146
- **Extracting free-surface expressions of underwater features** *EXPERIMENTS IN FLUIDS*
  Gakhar, S., Koseff, J. R., Ouellette, N. T.
  2022; 63 (9)
- **Stochastic modelling of bird flocks: accounting for the cohesiveness of collective motion.** *Journal of the Royal Society, Interface*
  Reynolds, A. M., Mclvor, G. E., Thornton, A., Yang, P., Ouellette, N. T.
  2022; 19 (189): 20210745
- **Formation and dissolution of midge swarms.** *Physical review. E*
  Patel, M. L., Ouellette, N. T.
  2022; 105 (3-1): 034601
- **Directional strengthening and weakening in hydrodynamically sheared granular beds** *PHYSICAL REVIEW FLUIDS*
  Galanis, M., Shattuck, M. D., O'Hern, C. S., Ouellette, N. T.
  2022; 7 (1)
- **A physics perspective on collective animal behavior.** *Physical biology*
  Ouellette, N.
  1800
- **Lagrangian scale decomposition via the graph Fourier transform** *PHYSICAL REVIEW FLUIDS*
  MacMillan, T., Ouellette, N. T.
  2022; 7 (12)
- **On the interaction between oncoming internal waves and a dense gravity current in a two-layer stratification** *JOURNAL OF FLUID MECHANICS*
  Tanimoto, Y., Ouellette, N. T., Koseff, J. R.
  2021; 932
- **Spectral condensation in laboratory two-dimensional turbulence** *PHYSICAL REVIEW FLUIDS*
  Fang, L., Ouellette, N. T.
  2021; 6 (10)
- **Onset of grain motion in eroding subaqueous bimodal granular beds** *PHYSICAL REVIEW FLUIDS*
  Galanis, M., Wang, P., Shattuck, M. D., O'Hern, C. S., Ouellette, N. T.
  2021; 6 (9)
- **Extending the reach of Lagrangian analysis in turbulence** *JOURNAL OF FLUID MECHANICS*

Ouellette, N. T.
2021; 924

- **Goals and Limitations of Modeling Collective Behavior in Biological Systems** *FRONTIERS IN PHYSICS*
  Ouellette, N. T., Gordon, D. M.
  2021; 9
- **Secondary generation of breaking internal waves in confined basins by gravity currents** *JOURNAL OF FLUID MECHANICS*
  Tanimoto, Y., Ouellette, N. T., Koseff, J. R.
  2021; 917
- **Shear response of granular packings compressed above jamming onset** *PHYSICAL REVIEW E*
  Wang, P., Zhang, S., Tuckman, P., Ouellette, N. T., Shattuck, M. D., O'Hern, C. S.
  2021; 103 (2): 022902
- **An equation of state for insect swarms.** *Scientific reports*
  Sinhuber, M., van der Vaart, K., Feng, Y., Reynolds, A. M., Ouellette, N. T.
  2021; 11 (1): 3773
- **Assessing the information content of complex flows** *PHYSICAL REVIEW E*
  Fang, L., Ouellette, N. T.
  2021; 103 (2)
- **Automated identification of urban substructure for comparative analysis.** *PloS one*
  Aras, R. L., Ouellette, N. T., Jain, R. K.
  2021; 16 (1): e0245067
- **Detection of evolving Lagrangian coherent structures: A multiple object tracking approach** *PHYSICAL REVIEW FLUIDS*
  MacMillan, T., Ouellette, N. T., Richter, D. H.
  2020; 5 (12)
- **Settling of inertial nonspherical particles in wavy flow** *PHYSICAL REVIEW FLUIDS*
  Clark, L. K., DiBenedetto, M. H., Ouellette, N. T., Koseff, J. R.
  2020; 5 (12)
- **Temporal dynamics of the alignment of the turbulent stress and strain rate** *PHYSICAL REVIEW FLUIDS*
  Ballouz, J. G., Johnson, P. L., Ouellette, N. T.
  2020; 5 (11)
- **On the surface expression of bottom features in free-surface flow** *JOURNAL OF FLUID MECHANICS*
  Gakhar, S., Koseff, J. R., Ouellette, N. T.
  2020; 900
- **Disentangling resolution, precision, and inherent stochasticity in nonlinear systems** *PHYSICAL REVIEW RESEARCH*
  Fang, L., Balasuriya, S., Ouellette, N. T.
  2020; 2 (2)
- **Vorticity gradient stretching in the direct enstrophy transfer process of two-dimensional turbulence** *PHYSICAL REVIEW FLUIDS*
  Zhou, Z., Fang, L., Ouellette, N. T., Xu, H.
  2020; 5 (5)
- **Interaction between an inclined gravity current and a pycnocline in a two-layer stratification** *JOURNAL OF FLUID MECHANICS*
  Tanimoto, Y., Ouellette, N. T., Koseff, J. R.
  2020; 887
- **Geometric constraints on energy transfer in the turbulent cascade** *PHYSICAL REVIEW FLUIDS*
  Ballouz, J. G., Ouellette, N. T.
  2020; 5 (3)
- **Similarities between insect swarms and isothermal globular clusters** *PHYSICAL REVIEW RESEARCH*
  Gorbonos, D., van der Vaart, K., Sinhuber, M., Puckett, J. G., Reynolds, A. M., Ouellette, N. T., Gov, N. S.

2020; 2 (1)

- **Environmental perturbations induce correlations in midge swarms.** *Journal of the Royal Society, Interface*
  van der Vaart, K., Sinhuber, M., Reynolds, A. M., Ouellette, N. T.
  2020; 17 (164): 20200018
- **Synergistic interactions among growing stressors increase risk to an Arctic ecosystem.** *Nature communications*
  Arrigo, K. R., van Dijken, G. L., Cameron, M. A., van der Grient, J., Wedding, L. M., Hazen, L., Leape, J., Leonard, G., Merkl, A., Micheli, F., Mills, M. M., Monismith, S., Ouellette, et al
  2020; 11 (1): 6255
- **Pair formation in insect swarms driven by adaptive long-range interactions.** *Journal of the Royal Society, Interface*
  Gorbonos, D. n., Puckett, J. G., van der Vaart, K. n., Sinhuber, M. n., Ouellette, N. T., Gov, N. S.
  2020; 17 (171): 20200367
- **Comparison of shear and compression jammed packings of frictional disks** *GRANULAR MATTER*
  Xiong, F., Wang, P., Clark, A. H., Bertrand, T., Ouellette, N. T., Shattuck, M. D., O'Hern, C. S.
  2019; 21 (4)
- **Collective turns in jackdaw flocks: kinematics and information transfer.** *Journal of the Royal Society, Interface*
  Ling, H., McIvor, G. E., Westley, J., van der Vaart, K., Yin, J., Vaughan, R. T., Thornton, A., Ouellette, N. T.
  2019; 16 (159): 20190450
- **Nonlinear dynamics captures brain states at different levels of consciousness in patients anesthetized with propofol.** *PloS one*
  Eagleman, S. L., Chander, D., Reynolds, C., Ouellette, N. T., MacIver, M. B.
  2019; 14 (10): e0223921
- **Interaction of a downslope gravity current with an internal wave** *JOURNAL OF FLUID MECHANICS*
  Ouillon, R., Meiburg, E., Ouellette, N. T., Koseff, J. R.
  2019; 873: 889–913
- **Modeling Environmental DNA Transport in the Coastal Ocean Using Lagrangian Particle Tracking** *FRONTIERS IN MARINE SCIENCE*
  Andruszkiewicz, E. A., Koseff, J. R., Fringer, O. B., Ouellette, N. T., Lowe, A. B., Edwards, C. A., Boehm, A. B.
  2019; 6
- **The Most Active Matter of All** *MATTER*
  Ouellette, N. T.
  2019; 1 (2): 297–99
- **Local interactions and their group-level consequences in flocking jackdaws.** *Proceedings. Biological sciences*
  Ling, H., McIvor, G. E., van der Vaart, K., Vaughan, R. T., Thornton, A., Ouellette, N. T.
  2019; 286 (1906): 20190865
- **Mechanical spectroscopy of insect swarms.** *Science advances*
  van der Vaart, K., Sinhuber, M., Reynolds, A. M., Ouellette, N. T.
  2019; 5 (7): eaaw9305
- **Transport across a bathymetric interface in quasi-two-dimensional flow** *PHYSICAL REVIEW FLUIDS*
  Fang, L., Ouellette, N. T.
  2019; 4 (6)
- **Costs and benefits of social relationships in the collective motion of bird flocks** *NATURE ECOLOGY & EVOLUTION*
  Ling, H., McIvor, G. E., van der Vaart, K., Vaughan, R. T., Thornton, A., Ouellette, N. T.
  2019; 3 (6): 943–48
- **Three-dimensional time-resolved trajectories from laboratory insect swarms** *SCIENTIFIC DATA*
  Sinhuber, M., van der Vaart, K., Ni, R., Puckett, J. G., Kelley, D. H., Ouellette, N. T.
  2019; 6
- **Orientation dynamics of nonspherical particles under surface gravity waves** *PHYSICAL REVIEW FLUIDS*
  DiBenedetto, M. H., Koseff, J. R., Ouellette, N. T.

2019; 4 (3)

- **Response of insect swarms to dynamic illumination perturbations.** *Journal of the Royal Society, Interface*
  Sinhuber, M., van der Vaart, K., Ouellette, N. T.
  2019; 16 (150): 20180739
- **Flowing crowds** *SCIENCE*
  Ouellette, N. T.
  2019; 363 (6422): 27–28
- **Local linearity, coherent structures, and scale-to-scale coupling in turbulent flow** *PHYSICAL REVIEW FLUIDS*
  Fang, L., Balasuriya, S., Ouellette, N. T.
  2019; 4 (1)
- **Behavioural plasticity and the transition to order in jackdaw flocks.** *Nature communications*
  Ling, H. n., McIvor, G. E., Westley, J. n., van der Vaart, K. n., Vaughan, R. T., Thornton, A. n., Ouellette, N. T.
  2019; 10 (1): 5174
- **Computational and Structural Advantages of Pairwise Flocking**
  Nagy, G., Thornton, A., Ling, H., McIvor, G., Ouellette, N. T., Vaugha, R.
  edited by Sabattini, L.
  IEEE.2019: 133–35
- **Preferential orientation of spheroidal particles in wavy flow** *JOURNAL OF FLUID MECHANICS*
  DiBenedetto, M. H., Ouellette, N. T.
  2018; 856: 850–69
- **Simultaneous measurements of three-dimensional trajectories and wingbeat frequencies of birds in the field** *JOURNAL OF THE ROYAL SOCIETY INTERFACE*
  Ling, H., McIvor, G. E., Nagy, G., MohaimenianPour, S., Vaughan, R. T., Thornton, A., Ouellette, N. T.
  2018; 15 (147)
- **Do Complexity Measures of Frontal EEG Distinguish Loss of Consciousness in Geriatric Patients Under Anesthesia?** *Frontiers in neuroscience*
  Eagleman, S. L., Vaughn, D. A., Drover, D. R., Drover, C. M., Cohen, M. S., Ouellette, N. T., MacIver, M. B.
  2018; 12: 645
- **Probing the strain-rotation balance in non-Newtonian turbulence with inertial particles** *PHYSICAL REVIEW FLUIDS*
  Sinhuber, M., Ballouz, J. G., Ouellette, N. T.
  2018; 3 (8)
- **Critical scaling near the yielding transition in granular media** *PHYSICAL REVIEW E*
  Clark, A. H., Thompson, J. D., Shattuck, M. D., Ouellette, N. T., O'Hern, C. S.
  2018; 97 (6)
- **Generalized Lagrangian coherent structures** *PHYSICA D-NONLINEAR PHENOMENA*
  Balasuriya, S., Ouellette, N. T., Rypina, I. I.
  2018; 372: 31–51
- **Critical scaling near the yielding transition in granular media.** *Physical review. E*
  Clark, A. H., Thompson, J. D., Shattuck, M. D., Ouellette, N. T., O'Hern, C. S.
  2018; 97 (6-1): 062901
- **Remifentanil and Nitrous Oxide Anesthesia Produces a Unique Pattern of EEG Activity During Loss and Recovery of Response** *FRONTIERS IN HUMAN NEUROSCIENCE*
  Eagleman, S. L., Drover, C. M., Drover, D. R., Ouellette, N. T., MacIver, M.
  2018; 12: 173
- **Shoaling internal waves may reduce gravity current transport** *ENVIRONMENTAL FLUID MECHANICS*
  Hogg, C. A. R., Egan, G. C., Ouellette, N. T., Koseff, J. R.
  2018; 18 (2): 383–94

- **Transport of anisotropic particles under waves** *JOURNAL OF FLUID MECHANICS*
  DiBenedetto, M. H., Ouellette, N. T., Koseff, J. R.
  2018; 837: 320–40
- **Influence of lateral boundaries on transport in quasi-two-dimensional flow** *CHAOS*
  Fang, L., Ouellette, N. T.
  2018; 28 (2): 023113
- **Tensor geometry in the turbulent cascade** *JOURNAL OF FLUID MECHANICS*
  Ballouz, J. G., Ouellette, N. T.
  2018; 835: 1048–64
- **Determining the onset of hydrodynamic erosion in turbulent flow** *PHYSICAL REVIEW FLUIDS*
  Salevan, J. C., Clark, A. H., Shattuck, M. D., O'Hern, C. S., Ouellette, N. T.
  2017; 2 (11)
- **Characterizing free-surface expressions of flow instabilities by tracking submerged features** *EXPERIMENTS IN FLUIDS*
  Mandel, T. L., Rosenzweig, I., Chung, H., Ouellette, N. T., Koseff, J. R.
  2017; 58 (11)
- **Multiple stages of decay in two-dimensional turbulence** *PHYSICS OF FLUIDS*
  Fang, L., Ouellette, N. T.
  2017; 29 (11)
- **Phase Coexistence in Insect Swarms** *PHYSICAL REVIEW LETTERS*
  Sinhuber, M., Ouellette, N. T.
  2017; 119 (17): 178003
- **Are midge swarms bound together by an effective velocity-dependent gravity?** *EUROPEAN PHYSICAL JOURNAL E*
  Reynolds, A. M., Sinhuber, M., Ouellette, N. T.
  2017; 40 (4)
- **Role of grain dynamics in determining the onset of sediment transport** *PHYSICAL REVIEW FLUIDS*
  Clark, A. H., Shattuck, M. D., Ouellette, N. T., O'Hern, C. S.
  2017; 2 (3)
- **Hyperbolic neighbourhoods as organizers of finite-time exponential stretching** *JOURNAL OF FLUID MECHANICS*
  Balasuriya, S., Kalampattel, R., Ouellette, N. T.
  2016; 807: 509-545
- **Advection and the Efficiency of Spectral Energy Transfer in Two-Dimensional Turbulence.** *Physical review letters*
  Fang, L., Ouellette, N. T.
  2016; 117 (10): 104501-?
- **Long-range acoustic interactions in insect swarms: an adaptive gravity model** *NEW JOURNAL OF PHYSICS*
  Gorbonos, D., Ianconescu, R., Puckett, J. G., Ni, R., Ouellette, N. T., Gov, N. S.
  2016; 18
- **Concentration effects on turbulence in dilute polymer solutions far from walls.** *Physical review. E*
  de Chaumont Quitry, A., Ouellette, N. T.
  2016; 93 (6): 063116-?
- **Stretching and folding in finite time.** *Chaos*
  Ma, T., Ouellette, N. T., Bollt, E. M.
  2016; 26 (2): 023112-?
- **Correlating Lagrangian structures with forcing in two-dimensional flow** *PHYSICS OF FLUIDS*
  Ouellette, N. T., Hogg, C. A., Liao, Y.
  2016; 28 (1)

- **Swarm dynamics may give rise to Lévy flights.** *Scientific reports*
  Reynolds, A. M., Ouellette, N. T.
  2016; 6: 30515-?
- **On the tensile strength of insect swarms.** *Physical biology*
  Ni, R., Ouellette, N. T.
  2016; 13 (4): 045002-?
- **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*
  Cheng, K., Park, H., Tetteh, A. O., Zheng, D., Ouellette, N. T., Nadeau, K. C., Hildemann, L. M.
  2016; 50 (8): 835-845
- **Velocity correlations in laboratory insect swarms** *EUROPEAN PHYSICAL JOURNAL-SPECIAL TOPICS*
  Ni, R., Ouellette, N. T.
  2015; 224 (17-18): 3271-3277
- **Optimal directional volatile transport in retronasal olfaction** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Ni, R., Michalski, M. H., Brown, E., Ngoc Doan, N., Zinter, J., Ouellette, N. T., Shepherd, G. M.
  2015; 112 (47): 14700-14704
- **Onset and cessation of motion in hydrodynamically sheared granular beds** *PHYSICAL REVIEW E*
  Clark, A. H., Shattuck, M. D., Ouellette, N. T., O'Hern, C. S.
  2015; 92 (4)
- **Onset and cessation of motion in hydrodynamically sheared granular beds.** *Physical review. E, Statistical, nonlinear, and soft matter physics*
  Clark, A. H., Shattuck, M. D., Ouellette, N. T., O'Hern, C. S.
  2015; 92 (4): 042202
- **Intrinsic Fluctuations and Driven Response of Insect Swarms** *PHYSICAL REVIEW LETTERS*
  Ni, R., Puckett, J. G., Dufresne, E. R., Ouellette, N. T.
  2015; 115 (11)
- **Correlations between the instantaneous velocity gradient and the evolution of scale-to-scale fluxes in two-dimensional flow.** *Physical review. E, Statistical, nonlinear, and soft matter physics*
  Liao, Y., Ouellette, N. T.
  2015; 92 (3): 033017
- **Time-Frequency Analysis Reveals Pairwise Interactions in Insect Swarms** *PHYSICAL REVIEW LETTERS*
  Puckett, J. G., Ni, R., Ouellette, N. T.
  2015; 114 (25)
- **Long-range ordering of turbulent stresses in two-dimensional flow** *PHYSICAL REVIEW E*
  Liao, Y., Ouellette, N. T.
  2015; 91 (6)
- **Long-range ordering of turbulent stresses in two-dimensional flow.** *Physical review. E, Statistical, nonlinear, and soft matter physics*
  Liao, Y., Ouellette, N. T.
  2015; 91 (6): 063004
- **Empirical questions for collective-behaviour modelling** *PRAMANA-JOURNAL OF PHYSICS*
  Ouellette, N. T.
  2015; 84 (3): 353-363
- **Measurements of the coupling between the tumbling of rods and the velocity gradient tensor in turbulence** *JOURNAL OF FLUID MECHANICS*
  Ni, R., Kramel, S., Ouellette, N. T., Voth, G. A.
  2015; 766

- **Determining asymptotically large population sizes in insect swarms** *JOURNAL OF THE ROYAL SOCIETY INTERFACE*
  Puckett, J. G., Ouellette, N. T.
  2014; 11 (99)
- **Extracting turbulent spectral transfer from under-resolved velocity fields** *PHYSICS OF FLUIDS*
  Ni, R., Voth, G. A., Ouellette, N. T.
  2014; 26 (10)
- **Searching for effective forces in laboratory insect swarms** *SCIENTIFIC REPORTS*
  Puckett, J. G., Kelley, D. H., Ouellette, N. T.
  2014; 4
- **Impact fragmentation of model flocks** *PHYSICAL REVIEW E*
  Miller, P. W., Ouellette, N. T.
  2014; 89 (4)
- **Geometry of scale-to-scale energy and enstrophy transport in two-dimensional flow** *PHYSICS OF FLUIDS*
  Liao, Y., Ouellette, N. T.
  2014; 26 (4)
- **Direct observation of Kelvin waves excited by quantized vortex reconnection** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
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