

Lei Fang Ph.D.

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EDUCATION

2017 - 2020 **Stanford University, Stanford, California**

Ph.D., Civil and Environmental Engineering

Ph.D. minor, Computational and Mathematical Engineering

2015 - 2017 **Stanford University, Stanford, California**

M.S., Civil Engineering and Environmental Engineering

2012 - 2015 **Colorado State University, Fort Collins, Colorado**

B.S., *cum laude*, *First Place in the Department*, Environmental Engineering

PEER-REVIEWED JOURNAL PUBLICATIONS (students are underlined)

- 2021 Si, Xinyu and **Fang, Lei**. "Toward the modeling of social distanced crowds: a new social distance term and the sidewall effect at bottlenecks," Accepted by Scientific Reports.
- 2021 **Fang, Lei** and Nicholas T. Ouellette. "Spectral condensation in laboratory two-dimensional turbulence," Physical Review Fluids 6, 104605 (2021).
- 2021 Si, Xinyu and **Fang, Lei**. "Preferential alignment and heterogeneous distribution of active non-spherical swimmers near Lagrangian coherent structures," Physics of Fluids 33, no. 7 (2021): 073303. **Chosen as Editor's Picks.**
- 2021 **Fang, Lei** and Nicholas T. Ouellette. "Assessing the information content of complex flows," Physical Review E 103, 023301 (2021).
- 2020 **Fang, Lei**, Sanjeeva Balasuriya, and Nicholas T. Ouellette. "Disentangling resolution, precision, and inherent stochasticity in nonlinear systems," Physical Review Research 2, 023343 (2020).
- 2020 Zhou, Zeyou, **Fang, Lei**, Nicholas T. Ouellette, and Haitao Xu. "Vorticity gradient stretching in the direct enstrophy transfer process of two-dimensional turbulence," Physical Review Fluids 5, 054602 (2020).
- 2019 **Fang, Lei**, S. Balasuriya, and Nicholas T. Ouellette. "Local linearity, coherent structures, and scale-to-scale coupling in turbulent flow," Physical Review Fluids 4, 014501 (2019).
- 2019 **Fang, Lei** and Nicholas T. Ouellette. "Transport across a bathymetric interface in quasi-two-dimensional flow," Physical Review Fluids 4, 064501 (2019).

- 2018 **Fang, Lei** and Nicholas T. Ouellette. “Influence of lateral boundaries on transport in quasi-two-dimensional flow,” *Chaos* 28, 023113 (2018). **Chosen as a Featured paper in Chaos**, and summarized in an **AIP Scilight**.
- 2017 **Fang, Lei** and Nicholas T. Ouellette. “Multiple stages of decay in two-dimensional turbulence,” *Physics of Fluids* 29, 111105 (2017).
- 2016 **Fang, Lei** and Nicholas T. Ouellette. “Advection and the efficiency of spectral energy transfer in two-dimensional turbulence,” *Phys. Rev. Lett.* 117, 104501 (2016).

CONFERENCE AND ACADEMIC PRESENTATIONS

- 2019 **Fang, Lei** and Nicholas T. Ouellette. “Enhanced Spectral Transfer in Weakly Mixing Regions of a Turbulent Flow,” The 72nd Annual Meeting of the APS Division of Fluid Dynamics, November 23-26, Seattle, Washington, USA
- 2019 Nicholas T. Ouellette, **Fang, Lei** and Sanjeeva Balasuriya. “Disentangling Resolution, Precision, and Inherent Stochasticity in Fluid Mixing,” The 72nd Annual Meeting of the APS Division of Fluid Dynamics, November 23-26, Seattle, Washington, USA
- 2018 **Fang, Lei**, Nicholas T. Ouellette and Sanjeeva Balasuriya. “Local linearity, coherent structures, and scale-to-scale coupling in turbulent flow,” The 71st Annual Meeting of the APS Division of Fluid Dynamics, November 18-20, Atlanta, Georgia, USA
- 2017 **Fang, Lei** and Nicholas T. Ouellette. “Multiple stages of decay in two-dimensional turbulence,” The 70th Annual Meeting of the APS Division of Fluid Dynamics, November 19-21, Denver, Colorado, USA
- 2016 Nicholas T. Ouellette and **Fang, Lei**. “Advection and the efficiency of spectral energy transfer in two-dimensional turbulence,” The 69th Annual Meeting of the APS Division of Fluid Dynamics, November 20-22, Portland, Oregon, USA

INVITED TALKS

- 2021 **Fang, Lei**. “Preferential alignment and heterogeneous distribution of active non-spherical swimmers near Lagrangian coherent structures,” Department of Civil and Environmental Engineering, Carnegie Mellon University, October 10, Pennsylvania, USA
- 2020 **Fang, Lei**. “Preferential alignment and heterogeneous distribution of active non-spherical swimmers near Lagrangian coherent structures,” Department of Mechanical Engineering, University of Massachusetts, Dartmouth, March 26, Massachusetts, USA
- 2020 **Fang, Lei**. “Preferential alignment and heterogeneous distribution of active non-spherical swimmers near Lagrangian coherent structures,” Depart-

ment of Mechanical Engineering, University of New Hampshire, December 11, Durham, New Hampshire, USA

2020 **Fang, Lei.** “Coherent Dynamics in Model Geophysical Flows,” Rowland Institute at Harvard, January 30, Cambridge, Massachusetts, USA

2020 **Fang, Lei.** “Coherent Dynamics in Model Geophysical Flows,” Department of Civil and Environmental Engineering, University of Pittsburgh, January 9, Pittsburgh, Pennsylvania, USA

2019 **Fang, Lei.** “Coherent Dynamics in Model Geophysical Flows,” Department of Mechanical Engineering, University of California, Berkeley, October 25, Berkeley, California, USA

ACADEMIC POSITIONS

2020 - present **Assistant Professor (tenure track)**
Civil and Environmental Engineering, University of Pittsburgh

2016 - 2020 **Graduate Research Assistant**
Civil and Environmental Engineering, Stanford University
Advisor: Prof. Nicholas T. Ouellette
supported by the U.S. NSF under Grant No. CMMI-1563489

2014 Summer **Research Assistant**
Colorado State University, Engineering Research Center

RESEARCH EXPERIENCES AND INTERESTS

Coherent transport in geophysical flows

Two-dimensional turbulence dynamics

Active matter in complex flows

Fluid mechanics of disease transmission

Crowd dynamics

Developing physical tools for flow structure probing (Linear Neighborhood and Dynamical Linear Neighborhood)

COURSES TAUGHT

Introduction to Water Resources Engineering
Fluid Mechanics

MENTORSHIPS

2021 Jamison Beveridge, Undergraduate student, University of Pittsburgh

Mentoring Content: Jamison Beveridge is a undergraduate student who received Mascaro Center for Sustainable Innovation (MCSI) summer research

grant. I mentor her to study the transport of non-spherical swimmers in the ocean flows.

2019 Zeyou Zhou, Ph.D. student, Tsinghua University

Mentoring Content: Filter space technique

Resulting Publication: Z. Zhou L. Fang, H. Xu, and N. T. Ouellette, “Vorticity gradient stretching is the possible physical mechanism of two-dimensional direct enstrophy transfer,” *Physical Review Fluids* 5, 054602 (2020).

2018 Yalin Mao, M.S. student, University of California, Los Angeles

Mentoring Content: Machine learning algorithms

2017 Marios Galanis, M.S. student, Stanford University

Mentoring Content: Probing flow structures using hyperbolic neighborhood (HN)

PROFESSIONAL MEMBERSHIPS

2016 - 2019 **Member**, American Physical Society

2021 - present **Member**, American Geophysical Union

2017 - 2018 **Seminar Coordinator**, The Bob and Norma Street Environmental Fluid Mechanics Laboratory, Stanford University

PROFESSIONAL MEMBERSHIPS

2019 - present **Peer Reviewer:**

Journal of Fluid Mechanics

Physics of Fluids

International Journal of Multiphase Flow

Experimental Thermal and Fluid Science

Journal of Fluid Engineering

Journal of Hydraulic Research

Journal of Geophysical Research - Oceans

2021 Primary convener for American Geophysical Union Fall Meeting Session OS013-I-I. Non-spherical Swimmers in the Ocean

RESEARCH FUNDING

2021 - 2022 **University of Pittsburgh Momentum Fund (\$16,000)**

2021 - 2026 **Department of Defense** Testing & Evaluation for Soldier-device Teaming Compatibility, Vulnerability, and Durability in Emergent Situations (**\$1,175,000**, equally shared with Prof. Amin Rahimian)

AWARDS AND HONORS

- 2015 **Environmental Engineering Achievement Award**, Colorado State University
- 2015 **Graduate with Distinction, 1st place in the department**, Colorado State University
- 2013 - 2015 **Dean's Lists (five times)**, Colorado State University
- 2012 - 2015 **Colorado State University International Excellence Scholarship (total amount: \$24,000)**, Colorado State University
- 2012 - 2014 **Coca-Cola Water Scholars Program, Coca-Cola full scholarship (total amount: \$50,000)**, Colorado State University

COMPUTER SKILLS

- Advanced C++ (with CUDA, OpenMP, MPI project experiences), MATLAB, Python, R
- Intermediate JAVA, ArcGIS, HEC-RAS, ANSYS Fluent, AutoCAD, Julia

SOCIAL SERVICES

- 2018 - 2019 **Co-President**, Stanford Christian Students Club, Stanford University
- 2017 - 2019 **Coordinator and Volunteer**, Stanford New International Student Airport Pick up Program, Stanford University and The Church in Mountain View
- 2012 - 2013 **Officer**, Association of Chinese Students and Scholars, Colorado State University