Han Wang

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RESEARCH INTERESTS

Physical Oceanography and Fluid Dynamics
- Wave-mean interactions and disentanglement
- Submesoscale ocean dynamics
- Statistical fluid mechanics
- Deep learning

EDUCATION

2011 - 2015, **University of Science and Technology of China (USTC)**
B.S. Atmospheric Sciences
Dissertation advisor: Rui Li

2015 - 2020, **Courant Institute, New York University (NYU)**
Ph.D. Atmosphere-Ocean Science and Mathematics
Dissertation advisor: Oliver Bühler

WORK EXPERIENCE

2020/09 - 2022/03, Postdoctoral Researcher
Department of Physics, University of Toronto
Supervised by Nicolas Grisouard

2022/04 - 2024/09, Postdoctoral Research Associate
School of Mathematics, University of Edinburgh
Supervised by Jacques Vanneste and William R. Young

2024/09 - present ,Research Assistant (Project Leader)
Institute of Oceanography, University of Hamburg

REFEREED ARTICLES

1. **Wang, H.** and Bühler, O. (2020). *Ageostrophic corrections for power spectra and wave–vortex decomposition.* Journal of Fluid Mechanics, 882. [manuscript]
   – Highlighted in Focus on Fluids
2. **Wang, H.** and Bühler, O. (2021). *Anisotropic statistics of Lagrangian structure functions and Helmholtz decomposition.* Journal of Physical Oceanography, 51(5), 1375-1393. [manuscript]
3. Khatri, H., Griffies, S. M., Uchida, T., **Wang, H.**, and Menemenlis, D. (2021). *Role of mixed-layer instabilities in the seasonal evolution of eddy kinetic energy spectra in a global submesoscale permitting simulation.* Geophysical Research Letters, 48(18), e2021GL094777. [manuscript]
4. **Wang, H.**, Grisouard, N., Salehipour, H., Nuz, A., Poon, M., and Ponte, A. L. (2022). *A deep learning approach to extract internal tides scattered by geostrophic turbulence*. Geophysical Research Letters, 49(11), e2022GL099400. [ESSOAR]
5. **Wang, H.**, Bôas, A.B.V., Young, W.R. and Vanneste J. (2023). *Scattering of swell by currents*. Journal of Fluid Mechanics, 975. [arXiv]
6. **Wang, H.**, Bôas, A.B.V., Vanneste J. and Young, W.R. *Scattering of surface waves by ocean currents: the U2H map*. Journal of Fluid Mechanics, 964. [arXiv]
7. **Wang, H.**, Bôas, A.B.V., Vanneste J. and Young, W.R. *The U2H map explains the effect of (sub)mesoscale turbulence on significant wave height statistics*. Submitted to Journal of Physical Oceanography. [arXiv]

TEACHING

- Substitute lecturer: Industrial Mathematics [2022-2023 SEM1]
- Workshop tutor (University of Edinburgh): Mathematics in Action B (Fluid Dynamics) [2022-2023 SEM2]
- Undergraduate recitation leader (Courant Institute): Vector Analysis [MATH-UA.0224-001, Spring 2018]
- Graduate course grader (Courant Institute): Methods of Applied Maths, Applied Stochastic Analysis, Fluid Dynamics

RESEARCH MENTORSHIP

- MSc project supervision : Sole supervisor of Simin Wang for Computational and Applied Mathematics MSc, University of Edinburgh, 2023/06 - 2023/08
- PhD project supervision: Jeff Uncu, University of Toronto, 2022/10 – 2024/08
- Undergraduate students: Kerryn Van Rooyen, University of Toronto, 2022/05-2022/08; Lingxiao Guan, University of Michigan, 2021/07-2021/11

SELECTED CONFERENCE PRESENTATIONS

- "Imprint of Currents on Surface Waves". WISE Zoominar on Waves over spatial inhomogeneity, virtual, Oct 2023
- "Dynamical insights from frequency-filtered Lagrangian structure functions". TRR 181 Eddy-Wave Meeting, virtual, Feb 2023
- "Imprint of ocean currents on significant wave height." 103rd American Meteorological Society Annual Meeting (23rd Conference on Air-Sea Interaction), virtual, Jan 2023
- "A deep learning approach to extract surface internal tidal signals scattered by geostrophic turbulence." Oberwolfach Workshop 2238 - Multiscale Wave-Turbulence Dynamics in the Atmosphere and Ocean, Oberwolfach, Germany, Sep 2022
- "Internal tidal extraction: challenges from scatterings by vortices, and hopes for a deep learning solution", Surface Water and Ocean Topography (SWOT) Science Team Meeting, virtual, Jun 2022
- "Extraction of tidal signals from a machine learning approach", The challenge of understanding rapidly changing small-scale ocean dynamics: preparation for SWOT, Ocean Sciences Meeting, virtual, Apr 2022
- "Generalizing the "BCF14" method to anisotropic cases". Meeting on eddies and internal waves with TRR Mercator fellows, TRR 181, virtual, Mar 2021
- "Anisotropic Helmholtz decomposition of Lagrangian Tracer Data". Poster session for Mesoscale and Submesoscale Ocean Dynamics, 22nd Conference on Atmospheric and Oceanic Fluid Dynamics, Maine, USA, Jun 2019
- "Wave-Vortex Decomposition of 1D ship-track data with weak nonlinearity in the balanced flow". Poster session for Theoretical Advances in AOFD, 21st Conference on Atmospheric and Oceanic Fluid Dynamics, Oregon, USA Jun 2017

HONORS

- MacCracken Fellowship, five-year graduate student award at NYU, 2015-2020

SERVICE

- Journal Referee: Nature Communications, Geophysical Research Letters, Journal of Fluid Mechanics, Journal of Physical Oceanography, Quarterly Journal of the Royal Meteorological Society, Journal of Advances in Modeling Earth Systems, Journal of Atmospheric and Oceanic Technology
- Organizer: 2-week workshop on Theoretical and Practical Perspectives in Geophysical Fluid Dynamics (ICTS, India in May 2024, funded by ICTS and TRR181) (Workshop funding application and various organizational tasks.); various regular local seminars at Courant Institute and University of Edinburgh.
- Outreach: Courant cSplash lecturer (2019/04); collaboration with ICMS visiting fellow in music (2022/10-2023/10); presentation at an outreach session in Ocean Sciences meeting (2024/02).

Updated in May, 2025