

Lei Wang, Ph.D.

Assistant Professor, Purdue University

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RESEARCH INTERESTS

I am an atmospheric dynamist. My research focuses on the fundamental dynamics and variability of mid-latitude atmospheric waves, especially high-impact extreme weather and climate events. I lead the Purdue Weather and Climate Dynamics (WCD) Laboratory, and I am also an affiliated faculty member on the Computational Interdisciplinary Graduate Program (CIGP) and Ecological Sciences and Engineering (ESE) at Purdue.

EDUCATION

The University of Chicago, Chicago, IL, U.S.A. December 2016

Ph.D., Geophysical Sciences

- Dissertation: Periodic Behavior of Finite-amplitude Wave Activity in the Southern Hemisphere Storm Track
- Advisory committee: Drs. [Noboru Nakamura](#) (chair), Douglas MacAyeal, Malte Jansen, Tiffany Shaw, Edwin Gerber (external committee, New York University)

Ocean University of China, Qingdao, China June 2010

B.S., Atmospheric Sciences

- Graduated with highest honor in college as *Wenyuan Award* (0.06% of the graduation class)
- Thesis: The Response of ENSO under the Impact of Pacific Decadal Oscillation.
- Advisor: Dr. [Lixin Wu](#)

RESEARCH ACTIVITIES

Harvard University, Cambridge, MA

Post-doctoral Fellow, Department of Earth and Planetary Sciences 2017 – 2020

The University of Chicago, Chicago, IL

Research Assistant, Atmospheric and environmental fluid dynamics group, 2010 - 2017

Research Assistant, Dave Fultz Memorial Laboratory for Hydrodynamics, Autumn 2013

National Center for Atmospheric Research, Boulder, CO

Short-term Visiting Scholar, Climate and Global Dynamics Laboratory, June 2016

Woods Hole Oceanographic Institution, Woods Hole, MA

Guest Student Appointment, Physical Oceanography Department, June-August 2014

PROFESSIONAL ACTIVITIES

Chair, Faculty Committee on Academic Progress and Records (APR), Purdue University.
2021-2024

Organizer for Harvard Climate Seminar series, Harvard ClimaTea Seminar series, Harvard

Climate Modeling Workshops, Harvard Crimson Climate workshop. 2018 - 2020

Committee Member on the Atmospheric and Oceanic Fluid Dynamics (AOFD) Committee, American Meteorological Society. 2014 – 2016

Reviewer for *US National Science Foundation*; *Journal of the Atmospheric Sciences*; *Climate Dynamics*; *Journal of Climate*; *Geophysical Research Letters*; *AMS Glossary of Meteorology*; *AGU Book Proposal Review*; *Remote Sensing of Environment*; *Journal of Nonlinear Science*; *Journal of Meteorological Research*; *Quarterly Journal of the Royal Meteorological Society*.

Primary Convener for session “[The Dynamics of the Large Scale Atmospheric Circulation in Present and Future Climates: Jet Streams, Storm Tracks, Stationary Waves, and Monsoons](#)” in the 2017, 2018, 2019, 2020, 2021 AGU Fall Meeting

Convener and Chair for session “Extratropical Large-Scale Atmospheric Circulation: Dynamics, Variability, and Impacts on Extreme Weather” in the 2022 AMS Annual Meeting

Session Chair for “[Storm Tracks and Jets](#)” in 21st Conference on Atmospheric and Oceanic Fluid Dynamics

Organizer for [Rosshypalooza 2016](#), the inaugural year of a week-long NSF-funded workshop and summer school bringing together 60 graduate students and postdocs from climate science and statistics for a lecture series and a hackathon on geophysical data analysis, July 2016

Member of American Meteorological Society (AMS), American Geophysical Union (AGU), and Mathematics and Climate Research Network (MCRN)

AWARDS

Purdue IMPACT faculty learning community (FLC) Fellow, Fall 2021

Purdue IMPACT Data Science Education Fellow, Fall 2021

Purdue Course-based Research Experience (CURE-Purdue) Fellow, Summer 2021

Purdue Teaching for Tomorrow Junior Faculty Fellowship, 2021-2022

HeldFest Scholarship, Princeton University, 2018

Selected as alternate awardee for the 2017 NOAA Climate and Global Change fellowship

Geophysical Science Chair’s Travel Grant, The University of Chicago, 2015

Wenyuan Fellowship and Presidential Fellowship, Ocean University of China, 2010; **National Fellowship**, Ministry of Education of China. Awarded three times, 2008, 2009, 2010

PUBLICATIONS

2021 **Wang, Lei** and Zhiming Kuang: Evidence against a general positive eddy feedback in atmospheric blocking *Geophysical Research Letters* (in revision)

- 2021 **Wang, Lei** et al: Polar Amplification in CESM is Dominated by Extra-Polar Forcing and Resultant Feedback *Geophysical Research Letters* (in revision)
- 2021 Kleiner, N., Chan, P. W., **Wang, Lei**, Ma, D., & Kuang, Z. (2021). Effects of climate model mean-state bias on blocking underestimation. *Geophysical Research Letters*
- 2021 **Wang, Lei** and Jian Lu: Uniform warming as the main cause of the robust increase of the intra-seasonal variability in a warming climate (submitted)
- 2018 Coumou, Dim, Giorgia Di Capua, Stephen Vavrus, **Lei Wang**, and Simon Wang: The Influence of Arctic Amplification on Mid-Latitude Summer Circulation. *Nature Communication*
<https://doi.org/10.1038/s41467-018-05256-8> (an invited review article)
- 2018 **Wang, Lei**, Jian Lu, and Zhiming Kuang: A robust increase of the intra-seasonal periodic behavior of the precipitation and eddy kinetic energy in a warming climate. *Geophysical Research Letters*
 DOI: <https://doi.org/10.1029/2018GL078495>
- 2016 **Wang, Lei**, and Noboru Nakamura: Covariation of finite-amplitude wave activity and the zonal mean flow in the mid-latitude troposphere. Part 2: Eddy forcing spectra and the periodic behavior in the Southern Hemisphere summer. *Journal of Atmospheric Sciences*.
 DOI: <http://dx.doi.org/10.1175/JAS-D-16-0091.1>
- 2016 **Wang, Lei**, and Sukyoung Lee: The role of fast eddies on poleward jet shift of non-advective mean flow. *Journal of Atmospheric Sciences*. DOI: <http://dx.doi.org/10.1175/JAS-D-16-0082.1>
- 2016 **Wang, Lei**, Malte Jansen, and Ryan Abernathy: Eddy phase speeds in a two-layer model of quasigeostrophic baroclinic turbulence with applications to ocean observations. *Journal of Physical Oceanography*. DOI: <http://dx.doi.org/10.1175/JPO-D-15-0192.1>
- 2015 **Wang, Lei**, and Noboru Nakamura: Covariation of finite-amplitude wave activity and the zonal mean flow in the midlatitude troposphere. Part 1: Theory and application to the Southern Hemisphere summer, *Geophysical Research Letters*. DOI: [10.1002/2015GL065830](https://doi.org/10.1002/2015GL065830)
- 2013 Nakamura, Noboru, and **Lei Wang**: On the Thickness Ratio in the Quasigeostrophic Two-Layer Model of Baroclinic Instability. *Journal of Atmospheric Sciences*.
 DOI: <http://dx.doi.org/10.1175/JAS-D-12-0344.1>

GRANTS

PI: PCCRC Seed Grant “Assessing the role of climate in the re-emergence of hemorrhagic septicemia in wild animals and domestic livestock” (\$24,958; with Dr. Beauvais)

Co-PI: PCCRC Seed Grant “Understanding and Predicting the Tropical-Extratropical Relaying Pathways to Arctic Amplification” (\$25,000; with Drs. Di, Tung, and Garrison)

PI: PCCRC Seed Grant “A Physical and Social-Economic Atlas of Extreme Weather Events in a Changing Climate”(\$10,000)

PI: COVID Research Disruption Fund “Physics-Informed Machine Learning to Improve the Predictability of Extreme Weather Events” (\$7,360)

Co-PI: Instructional Equipment Grant entitled: "Flexible, Portable Kit-Based Laboratory instruction in Atmospheric Science" (\$14,962, internal to Purdue with Drs. Tanamachi, Johnson, Dawson, Chavas)

PENDING GRANTS

PI: Ralph W. and Grace M. Showalter Research Trust “Predicting the future public health impacts of amoebic diseases in the US” (\$75,000.00; with Dr. Beauvais)

Lead-PI: NSF Paleo Perspectives on Climate Change (P2C2) “Collaborative Research: Connecting warming patterns of the paleo-ocean to our future” (\$556,854.89; with Dr. Huber and Dr. Zhang from TAMU)

Lead-PI: NOAA Climate Program Office (CPO) “Upscale Impact of Tropical Pacific Diabatic Heating on Central US extreme precipitation at subseasonal to seasonal timescale” (\$790,501.00; with Drs. Tung and Chavas)

PhD Student Supervised

- Zhaoyu Liu, EAPS Ph.D., awarded Frederick N. Andrews Fellowship, began 08/2021, Ph.D. expected 05/2026

Undergraduate Student Supervised

- Joe Poccia, Atmospheric Sciences. Project: Atmospheric Blocking
- Jonathan Brunton, Planetary Sciences. Project: Two-layer Quasi-geostrophic Model
- Isaiah Kasper, Atmospheric Sciences. Project: Snowfall over Appalachian Mountains
- David Messmer, Atmospheric Science. Project: Numerical Modeling
- Ethan Ritchie, Environmental Geoscience. Project: Bomb Cyclones
- Emily Coffin, Environmental Geoscience. Project: Social-economic impacts of Heatwaves
- Rthvik Raviprakash, Mahdi Buali, Jonathan Buchanan, Computer Science. DURi Project: Physics-Informed Machine Learning to Improve the Predictability of Extreme Weather Events
- Tyler Riggles, Atmospheric Science. Project: Atmospheric Dynamics of Cold Spells
- Alex Lara, Atmospheric Sciences. Project: Two-layer Quasi-geostrophic Model
- Elliot Grant, Physics. Project: Atmospheric Blocking as a solution to the Nonlinear Schrödinger equation
- Jeremy Chen, Web Design and Programming of Purdue Polytechnic Institute. Project: Constructing an Extreme Weather Events Atlas
- Valentina Castañeda Amaya, Civil Engineering of Universidad Nacional de Colombia, as part of Columbia Purdue Partnership’s UREP-C program. Project: Atmospheric Dynamics of Heat Waves. Valentina will continue her PhD program at Purdue EAPS under advisory of Dr. Wang.

Teaching experience

- EAPS 32000 Physics of Climate
Spring 2021, Spring 2022