

# **XINFENG LIANG**

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## **EDUCATION**

Ph.D. Physical Oceanography, Columbia University, New York, 2012

M.A. Physical Oceanography, Columbia University, New York, 2009

B.S. Marine Sciences, Ocean University of China, Qingdao, 2003

## **PROFESSIONAL EXPERIENCE**

2022/09- Associate Professor, University of Delaware, Lewes, DE

2019/08–2022/08 Assistant Professor, University of Delaware, Lewes, DE

2016/01–2019/07 Assistant Professor, University of South Florida, Tampa, FL

2012/12–2015/12 Postdoctoral Associate, MIT, Cambridge, MA

## **RESEARCH INTERESTS**

Roles of Ocean in the Climate System, Changes and Variability in the Global Ocean, Exchange and Coupling of the Upper and Deep Oceans, Ocean Mixing and Related Dynamical Processes

## **HONORS AND AWARDS**

2018 Sloan Research Fellowship in Ocean Sciences

2017 NASA New (Early Career) Investigator Award in Earth Science

## **CONTRACTS AND GRANTS**

### **- CURRENT**

2021-2024 **NSF/OCE**: Collaborative Research: The Zonal Overturning Circulation

2022-2026 **NASA/OSST**: Inferring the Water Cycle Change from Interbasin Differences in Salinity, Surface Freshwater Flux, and Ocean Bottom Pressure

2023-2025 **NASA/PO**: Quantifying Interannual Changes in Global Ocean Heat Uptake

### **- COMPLETED**

2018-2022 **Sloan Research Fellowship**

2018-2021 **NASA/NIP**: Using Satellite and Deep Ocean Measurements to Investigate the Influence of Mesoscale Eddies on Deep Ocean Internal Waves

2018-2021 **NASA/NESSF**: Examining the Global Ocean Vertical Salt Transport with a Dynamically Consistent Ocean State Estimate

2017-2021 **NOAA/OSTST**: Analysis of Kinetic Energy and Structure Functions from Along-track and Crossover Altimeter Data

- 2017-2021 **NSF/OCE**: The Evaluation of Ocean Reanalyses in Their Determining Trends in Global Ocean Heat Content with a Novel Method
- 2018-2020 **GOMRI**: Effects of Mesoscale Eddies on Three-Dimensional Oil Dispersion: Data Integration, Interpretation and Implications for Oil Spill Models

**- PENDING**

- 2023-2026 **NSF/OCE**: Collaborative Research: The Influence of Mesoscale Eddies on Deep-Sea Dynamics and Implications for Larval Connectivity along Mid-Ocean Ridges

**REFEREED JOURNAL ARTICLES** (\*student or †postdoc from the Liang Lab)

Google Scholar **h-index=16, i10-index=21, citations=1225** 02/10/2023

**- UNDER REVIEW/REVISION**

1. \*Liu, C., **X. Liang**, R. Ponte and D. Chambers, Global Ocean Salinity Products Have Some Serious Issues After 2015, *J. Climate*, under revision
2. †Zhu, Y. and **X. Liang**: Near-Inertial Oscillations in the Deep Gulf of Mexico, *J. Phys. Oceanogr*, under revision
3. \*Pan, L., **X. Liang**: Variability and Long-Term Changes in Global Upper-Ocean Stratification from a Dynamically Consistent Ocean State Estimate, *J. Geophys. Res.*, under revision

**- PUBLISHED**

1. \*Huang, M., Y. Yang and **X. Liang**, 2023: Seasonal Eddy Variability in the Northwestern Tropical Atlantic Ocean, *J. Phys. Oceanogr*, doi: 10.1175/JPO-D-22-0200.1
2. †Zhu, Y., and **X. Liang**, 2022: Characteristics of Eulerian Mesoscale Eddies in the Gulf of Mexico, *Front. Mar. Sci.*, doi: 10.3389/fmars.2022.1087060
3. †Liao, F., **X. Liang**, Y. Li and M. Spall, 2022: Hidden Upwelling Associated with Major Western Boundary Currents, *J. Geophys. Res.*, doi: 10.1029/2021JC017649
4. †Zhu, Y., G. Mitchum, K. Doran, D. Chambers, and **X. Liang**, 2021: Distinguishing between Regression Model Fits to Global Mean Sea Level Reconstructions, *J. Geophys. Res.*, doi: 10.1029/2021JC017347
5. **Liang, X.**, \*C. Liu, R. Ponte, and D. Chambers, 2021: Variability and Changes in Global Ocean Heat Content from Multiple Gridded Argo Products, *J. Climate*, doi: 10.1175/JCLI-D-20-0794.1
6. \*Zhang, Y., D. Chambers and **X. Liang**, 2021: Regional Trends in Southern Ocean Eddy Kinetic Energy, *J. Geophys. Res.*, doi: 10.1029/2020JC016973
7. Ponte, R., Q. Sun, \*C. Liu and **X. Liang**, 2021: How Salty is the Global Ocean: Weighting It All or Tasting It a Sip at a Time? *Geophys. Res. Lett*, 48, doi: 10.1029/2021GL092935
8. \*Huang, M., **X. Liang**, Y. Zhu, Y. Liu, and R. H. Weisberg, 2021: Eddies Connect the Tropical Atlantic Ocean and the Gulf of Mexico, *Geophys. Res. Lett*, doi:10.1029/2020GL091277

9. Wang, S., A. Cao, **X. Liang**, X. Chen, and J. Meng, 2021: Impact of Background Geostrophic Currents with Vorticity on Resonant Triad Interaction over Mid-Ocean Ridges, *J. Geophys. Res*, doi: 10.1029/2021JC017227
10. †Zhu, Y., and **X. Liang**, 2020: Coupling of the Surface and Near-bottom Currents in the Gulf of Mexico, *J. Geophys. Res*, doi: 10.1029/2020JC016488
11. \*Liu, C., **X. Liang**, D. P. Chambers, and R. M. Ponte, 2020: Global Patterns of Spatial and Temporal Variability in Salinity from Multiple Gridded Argo Products, *J. Climate*, doi: 10.1175/JCLI-D-20-0053.1.
12. \*Liu, C., **X. Liang**, R. M. Ponte, N. Vinogradova and O. Wang, 2019: Vertical redistribution of the global oceanic salt content. *Nat. Commun*, 10:3445, doi: 10.1038/s41467-019-11436-x
13. Sun, H., Q. Yang, S. Cai, **X. Liang** and J. Tian, 2019: Estimating four-dimensional internal wave spectrum in the northern South China Sea. *J. Atmospheric Ocean. Technol.*, 1199-1216.
14. **Liang, X.**, M. Spall, and C. Wunsch, 2017: Global ocean vertical velocity from a dynamically consistent ocean state estimate. *J. Geophys. Res*, doi: 10.1002/2017JC012985
15. **Liang, X.**, C. Piecuch, R. Ponte, G. Forget, C. Wunsch and P. Heimbach, 2017: Change of the global ocean vertical heat transport over 1993-2010. *J. Clim*, 30, 5319-5327, doi: 10.1175/JCLI-D-16-0569.1
16. Yang, Q., W. Zhao, **X. Liang**, J. Dong, J. Tian, 2017: Elevated mixing in the periphery of mesoscale eddies in the South China Sea, *J. Phys. Oceanogr*, 47, 895-907, doi: 10.1175/JPO-D-16-0256.1
17. **Liang, X.**, and L. Yu, 2016: Variations of the global net air–sea heat flux during the “Hiatus” period (2001–10). *J. Clim*, 29, 3647–3660, doi:10.1175/JCLI-D-15-0626.1.
18. Sun, H., Q. Yang, W. Zhao, **X. Liang** and J. Tian, 2016: Temporal variability of diapycnal mixing in the northern South China Sea. *J. Geophys. Res*, doi: 10.1002/2016JC012044
19. Yang, Q., W. Zhao, **X. Liang**, and J. Tian, 2016: Three-dimensional distribution of turbulent mixing in the South China Sea\*. *J. Phys. Oceanogr*, 46, doi:10.1175/JPO-D-14-0220.1.
20. **Liang, X.**, and C. Wunsch, 2015: Note on the redistribution and dissipation of tidal energy over mid-ocean ridges. *Tellus A*, 67, doi:10.3402/tellusa.v67.27385.
21. Zhang, Y., Z. Liu, Y. Zhao, J. Li, and **X. Liang**, 2015: Effect of surface mesoscale eddies on deep-sea currents and mixing in the northeastern South China Sea. *Deep Sea Res*, 122, 6–14.
22. **Liang, X.**, C. Wunsch, P. Heimbach, and G. Forget, 2015: Vertical redistribution of oceanic heat content. *J. Clim*, 28, 3821–3833, doi:10.1175/JCLI-D-14-00550.1.
23. Forget, G., D. Ferreira, and **X. Liang**, 2015: On the observability of turbulent transport rates by Argo: supporting evidence from an inversion experiment. *Ocean Sci*, 11, 839–853, doi:10.5194/os-11-839-2015.
24. **Liang, X.**, 2014: Semidiurnal tidal currents in the deep ocean near the East Pacific Rise between 9° and 10° N. *J. Geophys. Res*, doi:10.1002/2013jc009522.
25. Yang, Q., J. Tian, W. Zhao, **X. Liang**, and L. Zhou, 2014: Observations of turbulence on the shelf and slope of northern South China Sea. *Deep Sea Res. I*, 87, 43–52, doi:10.1016/j.dsr.2014.02.006.

26. Zhang, Z., W. Zhao, J. Tian, and **X. Liang**, 2013: A mesoscale eddy pair southwest of Taiwan and its influence on deep circulation. *J. Geophys. Res*, 118, 6479–6494, doi:10.1002/2013JC008994.
27. **Liang, X.**, and A. M. Thurnherr, 2012: Eddy-modulated internal waves and mixing on a midocean ridge. *J. Phys. Oceanogr*, 42, 1242–1248, doi:10.1175/JPO-D-11-0126.1.
28. **Liang, X.**, and A. M. Thurnherr, 2011: Subinertial variability in the deep ocean near the East Pacific Rise between 9 and 10N. *Geophys. Res. Lett*, 38, doi:10.1029/2011GL046675.
29. Adams, D. K., D. J. J. McGillicuddy, L. Zamudio, A. M. Thurnherr, **X. Liang**, O. Rouxel, C. R. German, and L. S. Mullineaux, 2011: Surface-generated mesoscale eddies transport deep-sea products from hydrothermal vents. *Science*, 332, 580–583, doi:10.1126/science.1201066.
30. Tian, J., Q. X. Yang, **X. Liang**, L. L. Xie, D. X. Hu, F. Wang, and T. D. Qu, 2006: Observation of Luzon Strait transport. *Geophys. Res. Lett*, 33, doi: 10.1029/2006GL026272.
31. **Liang, X.**, X. Q. Zhang, and J. Tian, 2005: Observation of internal tides and near-inertial motions in the upper 450 m layer of the northern South China Sea. *Chin. Sci. Bull*, 50, 2890–2895, doi:10.1360/982005-210.
32. Tian, J., L. Zhou, X. Q. Zhang, **X. Liang**, Q. Zheng, and W. Zhao, 2003: Estimates of M2 internal tide energy fluxes along the margin of Northwestern Pacific using TOPEX/POSEIDON altimeter data. *Geophys. Res. Lett*, 30, doi: 10.1029/2003GL018008.

### **TECHNICAL REPORTS**

1. Rodriguez E., D. Chelton, D. Dukhovskoy, T. Farrar, M. M. Flexas, T. Kilpatrick, P. Klein, **X. Liang**, D. Long, N. Maximenko, D. Menemenlis, S. Morey, R. Samelson, A. Thompson, S-P. Xie, *White paper to NASA: Air-Sea Exchange Drivers of Climate Variability, Ocean Circulation, and Weather: A Case for Coincident Observations of Ocean Surface Winds and Currents*, 2017
2. **Liang X.**, Lowered Acoustic Doppler Current Profiler (LADCP). *In Cruise report: RRS James Clark Ross, JR281*, 2013.
3. **Liang X.**, A. Brearley. Vessel-mounted ADCP. *In Cruise report: RRS James Cook, JC054*, 2011.
4. **Liang X.**, A. Thurnherr, Evaluating a Prototype of the Tele-dyne/RDI Workhorse ADCP, 2009.

### **SELECTED INVITED TALKS**

- 2022 University of Delaware (Delaware Environmental Institute)
- 2022 University of Delaware (School of Marine Science and Policy)
- 2021 University of Washington (School of Oceanography)
- 2021 Princeton University (Department of Geosciences)
- 2021 University of California, Riverside (Department of Earth and Planetary Sciences)
- 2019 University of Delaware (School of Marine Science and Policy)
- 2018 Louisiana State University (College of the Coast & Environment)
- 2018 Peking University (Department of Atmospheric and Oceanic Sciences)

- 2017 WHOI (Physical Oceanography Department Seminar)
- 2017 Columbia University (Lamont-Doherty Earth Observatory)
- 2016 Florida State University (Department of Earth, Ocean & Atmospheric Science)
- 2015 MIT (Sack Lunch Seminar Series)
- 2015 University of South Florida (College of Marine Science)
- 2015 North Carolina State University (Dep. of Marine, Earth, and Atmospheric Sciences)
- 2013 MIT (Sack Lunch Seminar Series)
- 2013 WHOI (Physical Oceanography Department Seminar)

**SELECTED PRESENTATIONS AT SCIENTIFIC MEETINGS**

- 2022 **Liang, X.**, Hidden Upwelling Systems Associated with Major Western Boundary Currents, *Middle Atlantic Bight Physical Oceanography and Meteorology (MABPOM) Meeting*, Newark, DE
- 2020 **Liang, X.**, Vertical Redistributions of the Oceanic Heat and Salt Contents, *Ocean Sciences Meeting*, San Diego, CA
- 2019 **Liang, X.**, Vertical Redistributions of the Global Oceanic Heat and Salt Contents, *EGU General Assembly*, Vienna, Austria
- 2018 **Liang, X.**, How Good is the Net Air-Sea Heat Flux from ECCO v4?, *ECCO Group Annual Meeting*, Austin, TX
- 2017 **Liang, X.**, Influence of Mesoscale Eddies on the Deep Ocean Dynamics over the East Pacific Rise, *Ocean Surface Topography Science Team Meeting*, Miami, FL
- 2016 **Liang, X.**, C. Wunsch, P. Heimbach, G. Forget, R. Ponte and C. Piecuch, Global ocean vertical heat flux and its bidecadal change, *CLIVAR Open Science Conference*, Qingdao
- 2014 **Liang X.**, C. Wunsch, Estimation of the global ocean vertical velocity, *Ocean Sciences Meeting*, Honolulu, HI
- 2013 **Liang X.**, C. Wunsch, Redistribution and dissipation of tidal energy over an idealized ridge, *Ocean Turbulence Conference*, Santa Fe, NM
- 2012 **Liang X.**, A. Thurnherr, Eddy-modulated internal waves and mixing on a mid-ocean ridge, *Ocean Sciences Meeting*, Salt Lake City, UT
- 2010 **Liang X.**, A. Thurnherr et al, Subinertial variability in the deep ocean near the East Pacific Rise, *Ocean Sciences Meeting*, Portland, OR

**TEACHING EXPERIENCE**

†Course co-taught with other faculty members

\*Numbers of people who did not register but audited courses

| <i>Semester</i> | <i>Title (Credits)</i>                         | <i>Enrollment</i> |
|-----------------|------------------------------------------------|-------------------|
| Fall 2022       | MAST 602 - Physical Oceanography (3)           | 14                |
| Spring 2022     | †MAST 409 - The Oceans & Climate Change (3)    | 19                |
| Spring 2022     | †MAST 382 - Introduction to Ocean Sciences (3) | 34                |
| Fall 2021       | MAST 602 - Physical Oceanography (3)           | 16                |

|             |                                                               |        |
|-------------|---------------------------------------------------------------|--------|
| Fall 2021   | †MAST 402 – Physical Oceanography (3)                         | 22     |
| Spring 2021 | †MAST 382 - Introduction to Ocean Sciences (3)                | 37     |
| Spring 2021 | MAST 882 - Physical Ocean Science and Engineering Seminar (1) | 10     |
| Fall 2020   | MAST 602 - Physical Oceanography (3)                          | 9      |
| Spring 2020 | †MAST 382 - Introduction to Ocean Sciences (3)                | 37     |
| Spring 2020 | MAST 882 - Physical Ocean Science and Engineering Seminar (1) | 8      |
| Spring 2019 | The Warming Papers (3)                                        | 4 (2*) |
| Fall 2018   | Geophysical Fluid Dynamics (3)                                | 1 (7*) |
| Spring 2018 | Introduction to Climate Change and Climate Variability (3)    | 4 (4*) |
| Fall 2017   | Geophysical Fluid Dynamics (3)                                | 4 (1*) |
| Spring 2017 | Introduction to Climate Change and Climate Variability (3)    | 3 (3*) |

### **POSTDOC SUPERVISION**

2019-2021 Dr. Yingli Zhu  
 2019-2020 Dr. Fanglou Liao

### **GRADUATE STUDENT SUPERVISION (MAJOR ADVISOR)**

2019-present Chao Liu, PhD student  
 2018-present Yang Zhang, PhD student  
 2018-present Li Pan, PhD student  
 2018-present Minghai Huang, PhD student  
 2016-2019 Chao Liu, MS (USF)

### **GRADUATE STUDENT SUPERVISION (COMMITTEE MEMBER)**

2018-present Jordan Meyer PhD student (USF)  
 2022-present Lei Huang PhD student (UD)  
 2022-present Bo Dong PhD student (UD)  
 2022-present Xinyu Liu PhD student (UD)  
 2022-present Bastian Münch Master student (UD)  
 2020-2021 Lina Wang PhD (UD)

### **UNDERGRADUATE STUDENT SUPERVISION**

2020-2021 Rucha Wani (UD)  
 2019 Angel Cedeño (University of the Virgin Islands)

### **SERVICES**

#### **- PROFESSIONAL SERVICE**

- Co-Chair of the Organizing Committee for a USCLIVAR International Workshop (2022-)
- Co-Chair of the 2022 MABPOM Meeting (2022)
- Member of the DOSI Climate Change Working Group (2021-now)

- Panel member of the USCLIVAR POS Panel (2020 - now)
- AGU Fall Meeting Travel Grant Reviewer (2020)
- Panelist of the NSF Physical Oceanography Program (2018)
- Reviewer (~10 papers/year) for various scientific journals: *Nature*, *Science Advances*, *PNAS*, *GRL*, *J. Climate*, *JGR-Oceans*, *JPO*, *Deep-Sea Research*, *Climate Dynamics*, etc.
- Reviewer (~1/year) for the NSF Physical Oceanography Program

**- UNIVERSITY SERVICE**

- Graduate Director UD SMSP (2022- )
- Member of the UD SMSP Searching Committee for CT Faculty (2022)
- Graduate Committee Member UD SMSP (2021-2022)
- Chair of the USF CMS Honors and Awards Committee (2019)
- Member of the USF CMS Annual Evaluation Committee (2018)
- Member of the USF CMS Searching Committee for Chemical Oceanography (2018)

**- PUBLIC SERVICE**

- Invited Speaking for the SPOONBILL Ocean Sciences Bowl, St Petersburg, FL (2018)
- Judge of SPOONBILL Ocean Sciences Bowl, St Petersburg, FL (2016)