CURRICULUM VITAE

Kun Gao, Ph.D.

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PROFESSIONAL EXPERIENCE

2019 May – present	Associate Research Scholar, Princeton University and NOAA/Geophysical Fluid Dynamics Laboratory.
2023 Jun – present	Affiliate Graduate Faculty, University of Rhode Island.
2016 May – 2019 Apr	Postdoctoral Research Associate in the Program of Atmospheric and Oceanic Sciences, Princeton University.
2015 Sep – 2016 Apr	Postdoctoral Fellow at Graduate School of Oceanography, University of Rhode Island.
2010 Sep – 2015 Aug	Research Assistant at Graduate School of Oceanography, University of Rhode Island.
EDUCATION	
2015	Ph.D. in Oceanography University of Rhode Island, Narragansett, RI.

2009	B.S. in Marine Sciences
	Ocean University of China, Qingdao, China.

AWARDS

- 2023 NOAA OAR Award Personal and Professional Excellence
- 2013 URI Robert & Marjorie Fillmore Scholarship

2014, 2012 URI Graduate School of Oceanography Alumni Awards

MENTORING EXPERIENCE

- Current committee member for Ph.D Student Sofia Menemenlis at Princeton University
- Co-advisor for Postdoc researcher Dr. Jie Chen at Princeton University
- Committee member for Ph.D Student Mansur Ali Jisan at Univ. of Rhode Island
- Mentor for a summer intern Stella Heflin from Arizona State University funded under NOAA EPP/MSI program (2021).

PUBLICATIONS UNDER REVIEW

- 1. Mouallem, J., <u>K. Gao</u>, B. Reichl, et al., 2025: Development of a High-Resolution Coupled SHiELD-MOM6 Model. Part I Model Overview, Coupling Technique, and Validation in a Regional Setup. GMD, *under review*.
- 2. Chen. J, <u>K. Gao</u>, L. Harris, T. Marchok, 2025: Do Tropical Cyclone Outer Size Forecasts Improve Simultaneously with Intensity Forecasts? *GRL, under review*.
- P. Zhu, K. Fung, X. Zhang, J. Zhang, J.-W. Bao, C.-K Wang, B. Liu, Z. Zhang, L. Harris, <u>K. Gao</u>, F. Yang, J. Han, 2025: Toward a Unified Parameterization of Three-Dimensional Turbulent Transport in High-Resolution Numerical Weather Prediction Models. *npj Climate and Atmospheric Science, under review*.
- B. L. Zavadoff, K.-Y. Cheng, H. Lopez, S.-K. Lee, D. Kim, <u>K. Gao</u>, J.-H. Chen, and L. M. Harris, 2025: Western US Subseasonal Atmospheric River Prediction in the Global-Nested GFDL SHiELD Model, *JGR-Atmosphere*, *under review*.

REFERRED PUBLICATIONS

- 1. J.-H. Chen, T. Marchok, M. Bender, <u>K. Gao</u>, et al., 2025: Closing the gap Advances in US Models' Hurricane Predictions. *BAMS*, *in press*.
- M. Tong, L. Zhou, <u>K. Gao</u>, L. Harris, A. Kaltenbaugh, X. Chen, B. Xiang, 2025: Improved Weather Predictions Through Data Assimilation for GFDL SHiELD. *QJRMS*, doi:10.1002/qj.4930.

- Zhou L., L. Harris, J.-H. Chen, <u>K. Gao</u> and co-authors, 2024: Bridging the Gap Between Global Weather Prediction and Global Storm-Resolving Simulation: Introducing the GFDL 6.5-km SHiELD, *J. Adv. Model. Earth Syst.*, doi: 10.1029/2024MS004430.
- 4. <u>Gao K.</u>, J. Mouallem, L. Harris, 2024: What are the finger-like clouds in the hurricane's eyes? *Geophysical Research Letters*, doi: 10.1029/2024GL110810.
- 5. <u>Gao K.</u>, et al. 2024: A flexible tropical cyclone vortex initialization technique for GFDL SHIELD. *Frontiers in Earth Science*, doi: 10.3389/feart.2024.1396390.
- Menemenlis S., G. Vecchi, <u>K. Gao</u>, J. Smith, K.-Y. Cheng, 2024: Extreme Rainfall Risk in Hurricane Ida's Aftermath: An Analysis with Convection-Permitting Ensemble Hindcasts, *J. Atmos. Sci.* doi: 10.1175/JAS-D-23-0160.1
- Chen. J, <u>K. Gao</u>, L. Harris, T. Marchok, L. Zhou, M. Morin, 2023: Assessing the postlandfall tropical cyclone wind field in GFDL T-SHiELD using automatic surface observations, *Geophysical Research Letters*, doi: 10.1029/2023GL104587.
- <u>Gao K.</u>, L. M. Harris, M. Bender, J.-H. Chen, L. Zhou, T. Knutson, 2023: Regulating finescale resolved convection in high-resolution models for better hurricane track prediction, *Geophysical Research Letters*, doi: 10.1029/2023GL103329. (*Highlighted by NOAA/GFDL:* https://www.gfdl.noaa.gov/research_highlight/regulating-finescale-resolved-convection-in-high-resolutionmodels-for-better-hurricane-track-prediction/)
- Zavadoff B., <u>K. Gao</u>, and co-authors, 2022: Improved MJO forecasts using the experimental global-nested GFDL SHiELD model, *Geophysical Research Letters*, doi: 10.1029/2022GL101622.
- Zhou. L., L. M. Harris, J.-H. Chen, <u>K. Gao</u>, and co-authors, 2022: Improving global weather prediction in GFDL SHiELD through an upgraded GFDL cloud microphysics scheme, *J. Adv. Model. Earth Syst.* doi: 10.1029/2021MS002971.
- 11. Hazelton. A., <u>K. Gao</u>, and co-authors, 2022: Performance of 2020 real-time Atlantic hurricane forecasts from high-resolution global-nested hurricane models: HAFS-globalnest and GFDL T-SHiELD, *Weather and Forecasting*, 37(1). 143-161.
- Xiang, B., Harris, L., Delworth, T. L., Wang, B., Chen, G., Chen, J., Clark, S. K., Cooke, W. F., <u>Gao, K.</u>, Huff, J. J., Jia, L., Johnson, N. C., Kapnick, S. B., Lu, F., McHugh, C., Sun, Y., Tong, M., Yang, X., Zeng, F., Zhao, M., Zhou, L., & Zhou, X., 2021: S2S Prediction in GFDL SPEAR: MJO Diversity and Teleconnections, *Bulletin of the American Meteorological Society*. doi: 10.1175/BAMS-D-21-0124.1
- <u>Gao K.</u>, L. M. Harris, L. Zhou, M. Bender, M. Morin, 2021: On the sensitivity of hurricane intensity and structure to horizontal tracer advection schemes in FV3, *J. Atmos. Sci.*, 78(9), 3007-3021. doi: 10.1175/JAS-D-20-0331.1

- Schiavone J., <u>K. Gao</u>, D. Robinson, P.Johnsen, M. Gerbush, 2021: Large roll vortices exhibited by Post-tropical Cyclone Sandy during landfall, *Atmosphere*, 12(2), 259. doi: 10.3390/atmos12020259.
- 15. Harris L., L. Zhou, J.-H. Chen, X. Chen, <u>K. Gao</u> and coauthors, 2020: GFDL SHiELD: A Unified System for Weather-to-Seasonal Prediction, J. Adv. Model. Earth Syst. doi: 10.1029/2020MS002223. (Highlighted by NOAA/GFDL: https://www.gfdl.noaa.gov/research_highlight/gfdl-shield-a-unified-system-for-weather-to-seasonalprediction/)
- 16. <u>Gao, K.</u>, J.-H. Chen, L. Harris, Y. Sun and S.-J. Lin, 2019: Skillful Prediction of Monthly Major Hurricane Activity in the North Atlantic with Two-way Nesting, *Geophysical Research Letters*, doi: 10.1029/2019GL083526. (*Highlighted by NOAA/GFDL: https://www.gfdl.noaa.gov/research_highlight/skillful-prediction-of-monthly-north-atlantic-majorhurricane-activity-with-two-way-nesting/*)
- <u>Gao, K.</u>, L. Harris, J.-H. Chen, S.-J. Lin and A. Hazelton, 2019: Improving AGCM hurricane structure with two-way nesting, *J. Adv. Model. Earth Syst.* doi: 10.1029/2018MS001359.
- <u>Gao, K.</u> and I. Ginis, 2018: On the characteristics of linear-phase roll vortices under a moving hurricane boundary layer. J. Atmos. Sci., 75, 2589-2598. doi: 10.1175/JAS-D-17-0363.1.
- <u>Gao, K.</u>, J.-H. Chen, L.M. Harris[,] S.-J. Lin, B. Xiang and M. Zhao, 2017: Impact of intraseasonal oscillations on the tropical cyclone activity over the Gulf of Mexico and western Caribbean Sea in GFDL HiRAM. J. Geophys. Res. - Atmos., 122, 13125-13137. doi: 10.1002/2017JD027756. (Highlighted by Eos.org: https://eos.org/research-spotlights/improvingtropical-cyclone-predictions-in-the-gulf-of-mexico)
- <u>Gao, K.</u>, I. Ginis, J. Doyle and Y. Jin, 2017: Effect of boundary layer roll vortices on the development of an axisymmetric tropical cyclone. *J. Atmos. Sci.*, 74, 2737-2759. doi: 10.1175/JAS-D-16-0222.1.
- Zhang, S., Y. Luo, L. Rothstein., and <u>K. Gao</u>, 2016: A numerical investigation of the interannual-to-interpentadal variability of the along-shelf transport in the Middle Atlantic Bight. *Continental Shelf Research*, 122, 14-28. doi: 10.1016/j.csr.2016.03.022.
- 22. <u>Gao, K.</u> and I. Ginis, 2016: On the equilibrium-state roll vortices and their effect in the hurricane boundary layer. *J. Atmos. Sci.*, 73, 1205-1222. doi: 10.1175/JAS-D-15-0089.1.
- <u>Gao, K.</u> and I. Ginis, 2014: On the generation of roll vortices due to the inflection point instability of the hurricane boundary layer flow. *J. Atmos. Sci.*, 71, 4292-4307. doi: 10.1175/JAS-D-13-0362.1.
- 24. <u>Gao, K.</u>, X. Chen, H. Yu and S. Zhang, 2010: The influence of internal tides on the diagnostic calculation of geostrophic currents in Luzon Strait. *Journal of Ocean University of China*, 40, 9-16 (in Chinese).

SELECTED SEMINARS AND CONFERENCE PRESENTATIONS

- 2024 *Towards turbulence-permitting hurricane simulations with FV3*. 3rd Unifying Innovations in Forecasting Capabilities Workshop, Jackson, MS and Online.
- 2024 *What are the finger clouds in the hurricane inner region?* AMS 36th Conference on Hurricanes and Tropical Meteorology, Long Beach, CA.
- 2023 *Recent GFDL efforts on high-resolution hurricane prediction*. Shanghai Typhoon Institute, Shanghai, China (invited).
- 2023 *Improving hurricane track prediction in a large-domain high-resolution model*. 2nd Unifying Innovations in Forecasting Capabilities Workshop, Boulder, CO and Online.
- 2022 *Hurricane forecasting with GFDL T-SHiELD*. AMS 35th Conference on Hurricanes and Tropical Meteorology, New Orleans, LA and Online.
- 2022 *GFDL SHiELD: a unified system for weather-to-seasonal predictions.* Panel Review for the Cooperative Institute for Modeling the Earth System, online.
- 2019 *Variable-resolution Strategy for Subseasonal prediction*. NOAA/Geophysical Fluid Dynamics Laboratory External Review, Princeton, NJ.
- 2019 *Predicting Monthly Hurricane Activity in the North Atlantic*. NOAA/Geophysical Fluid Dynamics Laboratory Poster Expo, Princeton, NJ.
- 2018 *Hurricanes in regional-refined GFDL HiRAM: Inner-core Structure and Subseasonal prediction.* AMS 33th Conference on Hurricanes and Tropical Meteorology, Ponte Vedra Beach, FL.
- 2017 Toward skillful sub-seasonal prediction of North Atlantic hurricanes with regionallyrefined GFDL HiRAM. AGU Fall Meeting, New Orleans, LA.
- 2017 Experimental sub-seasonal prediction of North Atlantic hurricanes using the GFDL HiRAM. AMS 30th Conference on Climate Variability and Change, 24th Conference on Probability and Statistics in the Atmospheric Sciences, and the 16th Conference on Artificial Intelligence and its Applications to the Environmental Sciences, Baltimore, MD.
- 2017 *Toward skillful sub-seasonal prediction of North Atlantic hurricanes.* Seminar at NOAA/Geophysical Fluid Dynamics Laboratory, Princeton, NJ.
- 2017 Modulation effect of MJO on Tropical Cyclones in Gulf of Mexico: GFDL HiRAM Simulation.
 AMS 97th Annual Meeting, Seattle, WA.
 NOAA/Geophysical Fluid Dynamics Laboratory Poster Expo, Princeton, NJ.

- 2016 *Effect of boundary layer roll vortices on the structure and intensity of the hurricane.* Department of Environmental Science, Rutgers University, New Brunswick, NJ. AMS 32nd Conference on Hurricanes and Tropical Meteorology, San Juan, PR. NOAA/Geophysical Fluid Dynamics Laboratory, Princeton, NJ.
- 2015 *How do the boundary layer roll vortices affect the hurricane?* 7th Northeast Tropical Workshop, MIT Endicott House, MA.
- 2014 *Interactions between roll vortices and large-scale flow in the hurricane boundary layer.* AMS 31st Conference on Hurricanes and Tropical Meteorology, San Diego, CA.
- 2013 On the generation of roll vortices due to the inflection point instability in the hurricane boundary layer. AMS 19th Conference on Atmospheric and Oceanic Fluid Dynamics, Newport, RI.
- 2012 *On the generation of roll vortices in idealized hurricane boundary layer.* AMS 20th Symposium on Boundary Layers and Turbulence, Boston, MA.
- 2012 *A numerical study of roll vortices in the hurricane boundary layer.* AMS 30th Conference on Hurricanes and Tropical Meteorology, Ponte Vedra Beach, FL.

SERVICES

- Reviewer for the following journals: 1) Nature Communications, 2) Geophysical Research Letters, 3) Journal of Atmospheric Sciences, 4) Quarterly Journal of the Royal Meteorological Society, 5) Atmospheric Chemistry and Physics, 6) Journal of Advances in Modeling Earth Systems, 7) Journal of Climate, 8) Climate Dynamics, 9) Dynamics of Atmospheres and Oceans, 10) Weather and Forecasting 11) MDPI-Atmosphere, 12) Journal of Meteorological Research, 13) Tropical Cyclone Research and Review, , 14) Frontiers.
- Volunteer for the networking session of the NOAA-CESSRST Student Symposium at GFDL (2024).
- NOAA Severe Weather Weeks 2-4 Tiger Team (2023 present)
- NOAA GFDL onboarding committee (2024 present)
- NOAA GFDL Employee Association Board member (2020 2021)
- NOAA GFDL FMS Coupler Task Force (2025 present)
- Review panel for Department of Energy Earth System Model Development and Analysis project (2018).
- Writing team member for the proposal for the Cooperative Institute for Modeling the Earth System submitted to NOAA and awarded to Princeton University (2018).
- Poster judge committee member for AMS 33rd Conference on Hurricanes and Tropical Meteorology (2018).
- Organizer for Physical Oceanography Seminar at URI Graduate School of Oceanography (2012-2013).
- Student volunteer for AMS 31st Conference on Hurricanes and Tropical Meteorology (2014).
- Volunteer on the Woods Hole Oceanographic Institute Line W cruise for measuring the Deep Western Boundary Current in the North Atlantic Ocean (Woods Hole, MA to Bermuda, 2014)