Xu Feng

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EDUCATION

- **Peking University** 09/2016 – 06/2021
  Ph.D., Atmospheric Physics and Atmospheric Environment
- **Sun Yat-Sen University** 09/2012 – 06/2016
  B.S., Atmospheric Science

PROFESSIONAL EXPERIENCE

- **Research Associate, Harvard University** 09/2024 – Present
  Advisors: Loretta J. Mickley and Daniel J. Jacob
- **Postdoctoral fellow, Harvard University** 09/2021 – 08/2024
  Advisors: Loretta J. Mickley and Daniel J. Jacob
- **Graduate Research Assistant, Peking University** 09/2016 – 06/2021
  Advisor: Tzung-May Fu

RESEARCH INTERESTS

- My research interests focus on wildfire-climate interactions, air quality modeling and model development, and the machine learning application to atmospheric environment.

PUBLICATIONS (*SUBMITTED, **IN PREPARATION)

h-index: 9 (Google Scholar)

First author

- ***Feng, X.**, Mickley, L. J., Kaplan, J. O., Kelp, M., Li, Y., and Liu, T. Large role of anthropogenic climate change in driving smoke exposure across the western United States from 1992 to 2020, submitted to *PNAS*.
- **Feng, X.**, Mickley, L. J., Bell, M. L., Liu, T., Fisher, J. A., and Val Martin, M. Improved estimates of smoke exposure during Australia fire seasons: importance of quantifying injection heights, *Atmospheric Chemistry and Physics*, 24, 2985–3007, https://doi.org/10.5194/acp-24-2985-2024, 2024.
- **Feng, X.**, Ma, Y., Lin, H., Fu, T.-M., Zhang, Y., Wang, X., Zhang, A., Yuan, Y., Han, Z., Mao, J., Wang, D., Zhu, L., Wu, Y., and Yang, X. Impacts of ship emissions on the air quality in Southern China: opportunistic insights from the abrupt emission changes in early 2020, *Environmental Science & Technology*, 57, 16999-17010. https://doi.org/10.1021/acs.est.3c04155, 2023. (**Journal Cover Article**)
- **Feng, X.**, Lin, H., Fu, T.-M., Sulprizio, M. P., Zhuang, J., Jacob, D. J., Tian, H., Ma, Y., Zhang, L., Wang, X., Chen, Q., and Han, Z. WRF-GC (v2.0): online two-way coupling of WRF (v3.9.1.1) and GEOS-Chem (v12.7.2) for modeling regional atmospheric chemistry–meteorology interactions, *Geoscientific Model Development*, 14, 3741–3768, https://doi.org/10.5194/gmd-14-3741-2021, 2021.
- **Feng, X.**, Fu, T.-M., Cao, H., Tian, H., Fan, Q., and Chen, X. Neural network predictions of pollutant emissions from open burning of crop residues: Application to air quality forecasts in southern China, *Atmospheric*

Environment, 204, 22-31, https://doi.org/10.1016/j.atmosenv.2019.02.002, 2019.

- ****Feng, X.**, Mickley, L. J., and Kaplan, J. O. Regionwide modeling study shows that the historical "fire deficit" has a strong influence on recent wildfire in the western United States, *in prep*.

Co-author

- *Li, Y., Dykema, J. A., Peterson, D. A., **Feng, X.**, Shen, X., June, N. A., Fromm, M. D., McHardy, T. M., Jacquot, J. L., Pittman, J. V., Daube, B. C., Wofsy, S. C., Dean-Day, J., Rapp, A. D., Bowman, K. P., Cziczo, D. J., Mickley, L. J., Pierce, J. R., and Keutsch, F. N. Enhanced Radiative Cooling by Large Aerosol Particles from Pyrocumulonimbus, submitted to *Nature Geoscience*.
- Kim, H., Park, R. J., Hong, S. Y., Park, D. H., Kim, S. W., Oak, Y. J., **Feng, X.**, Lin, H., and Fu, T.-M. A mixed layer height parameterization in a 3-D chemical transport model: Implications for gas and aerosol simulations, *Science of The Total Environment*, 176838, https://doi.org/10.1016/j.scitotenv.2024.176838, 2024.
- Xia, H., Wang, D., Abad, G., Yang, X., Zhu, L., Pu, D., **Feng, X.**, Zhang, A., Song, Z., Mo, Y., and Wang, J. Multi-Scale Correlation Reveals the Evolution of Socio-Natural Contributions to Tropospheric HCHO Over China from 2005 to 2022, *Science of The Total Environment*, 954, 176197, https://doi.org/10.1016/j.scitotenv.2024.176197, 2024.
- Nyadanu, S. D., Foo, D., Pereira, G., Mickley, L. J., **Feng, X.**, Bell, M. L. Short-term effects of wildfire-specific fine particulate matter and its carbonaceous components on perinatal outcomes: A multicentre cohort study in New South Wales, Australia, *Environment International*, 191, 109007, https//doi.org/10.1016/j.envint.2024.109007, 2024.
- Lin, H., Emmons, L. K., Lundgren, E. W., Yang, L. H., **Feng, X.**, Dang, R., Zhai, S., Tang, Y., Kelp, M. M., Colombi, N. K., Eastham, S. D., Fritz, T. M., and Jacob, D. J. Intercomparison of GEOS-Chem and CAM-chem tropospheric oxidant chemistry within the Community Earth System Model version 2 (CESM2), *Atmospheric Chemistry and Physics*, 24, 8607–8624, https://doi.org/10.5194/acp-24-8607-2024, 2024.
- Wang, D., Pu, D., De Smedt, I., Zhu, L., Yang, X., Sun, W., Xia, H., Song, Z., Li, X., Li, J., Zhang, A., **Feng, X.**, Chen, Y., Yang, X., Fu, T.-M., and Wang, J. Evolution of global O_3-NOx-VOCs sensitivity before and after the COVID-19 from the ratio of formaldehyde to NO2 from satellites observations, *Journal of Environmental Sciences*, https://doi.org/10.1016/j.jes.2024.07.029, 2024.
- Yang, L. H., Jacob, D. J., Dang, R., Oak, Y. J., Lin, H., Kim, J., Zhai, S., Colombi, N. K., Pendergrass, D. C., Beaudry, E., Shah, V., **Feng, X.**, Yantosca, R. M., Chong, H., Park, J., Lee, H., Lee, W.-J., Kim, S., Kim, E., Travis, K. R., Crawford, J. H., and Liao, H. Interpreting Geostationary Environment Monitoring Spectrometer (GEMS) geostationary satellite observations of the diurnal variation in nitrogen dioxide (NO2) over East Asia, *Atmospheric Chemistry and Physics*, 24, 7027–7039, https://doi.org/10.5194/acp-24-7027-2024, 2024.
- Wu, W., Fu, T.-M., Arnold, S., Spracklen, D., Zhang, A., Tao, W., Wang, X., Hou, Y., Mo, J., Chen, J., Li, Y., **Feng, X.**, Lin, H., Huang, Z., Zheng, J., Shen, H., Zhu, L., Wang, C., Ye, J., and Yang, X. Temperature-dependent evaporative anthropogenic VOC emissions significantly exacerbate regional ozone pollution, *Environmental Science & Technology*, 58, 5430-5441, https://doi.org/10.1021/acs.est.3c09122, 2024.
- Zhang, A., Fu, T.-M., **Feng, X.**, Guo, J., Liu, C., Chen, J., Mo, J., Zhang, X., Wang, X., Wu, W., Hou, Y., Yang, H., and Lu, C. Deep learning-based ensemble forecasts and predictability assessments for surface ozone pollution, *Geophysical Research Letters*, 50, e2022GL102611, https://doi.org/10.1029/2022GL102611, 2023.
- Wang, X., Fu, T.-M., Zhang, L., Lu, X., Liu, X., Amnuaylojaroen, T., Latif, M. T., Ma, Y., Zhang, L., **Feng, X.**, Zhu, L., Shen, H., and Yang, X. Rapidly changing emissions drove substantial surface and tropospheric ozone increases over Southeast Asia, *Geophysical Research Letters*, 49, e2022GL100223, https://doi.org/10.1029/2022GL100223, 2022.

- Xu, X., **Feng, X.**, Lin, H., Zhang, P., Huang, S., Song, Z., Peng, Y., Fu, T.-M., and Zhang, Y. Modeling the high-mercury wet deposition in the southeastern US with WRF-GC-Hg v1.0, *Geoscientific Model Development*, 15, 3845–3859, https://doi.org/10.5194/gmd-15-3845-2022, 2022.
- Hu, S., Wang, D., Wu, J., Zhou, L., **Feng, X.**, Fu, T.-M., Yang, X., Ziegler, Alan D., and Zeng, Z. Aerosol presence reduces the diurnal temperature range: an interval when the COVID-19 pandemic reduced aerosols revealing the effect on climate, *Environmental Science: Atmospheres*, 1, 5, 208-213, https://doi.org/10.1039/D1EA00021G, 2021.
- Li, Y., Fu, T.-M., Yu, J., **Feng, X.**, Zhang, L., Chen, J., Boreddy, S. K. R., Kawamura, K., Fu, P., Yang, X., Zhu, L., and Zeng, Z. Impacts of Chemical Degradation on the Global Budget of Atmospheric Levoglucosan and Its Use As a Biomass Burning Tracer, *Environmental Science & Technology*, 55, 8, 5525-5536, https://doi.org/10.1021/acs.est.0c07313, 2021.
- Wang, X., Fu, T.-M., Zhang, L., Cao, H., Zhang, Q., Ma, H., Shen, L., Evans, M. J., Ivatt, P. D., Lu, X., Chen, Y., Zhang, L., **Feng, X.**, Yang, X., Zhu, L., and Henze, D. K. Sensitivities of ozone air pollution in the Beijing–Tianjin–Hebei area to local and upwind precursor emissions using adjoint modeling, *Environmental Science & Technology*, 55, 9, 5752-5762, https://doi.org/10.1021/acs.est.1c00131, 2021.
- Lin, H., **Feng, X.**, Fu*, T.-M., Tian, H., Ma, Y., Zhang, L., Jacob, D. J., Yantosca, R. M., Sulprizio, M. P., Lundgren, E. W., Zhuang, J., Zhang, Q., Lu, X., Zhang, L., Shen, L., Guo, J., Eastham, S. D., and Keller, C. A. WRF-GC (v1.0): online coupling of WRF (v3.9.1.1) and GEOS-Chem (v12.2.1) for regional atmospheric chemistry modeling – Part 1: Description of the one-way model, *Geoscientific Model Development*, 13, 3241–3265, https://doi.org/10.5194/gmd-13-3241-2020, 2020.
- Zhang, R., Zhang, Y., Lin, H., **Feng, X**., Fu, T.-M., and Wang, Y.: NOx Emission Reduction and Recovery during COVID-19 in East China, *Atmosphere,* 11, 433, https://doi.org/10.3390/atmos11040433, 2020.

SELECTED CONFERENCE & PRESENTATIONS

- 2024/06 **The 11th International GEOS-Chem Meeting (IGC11)**, St. Louis, MO (talk)
  Drivers of smoke air quality in the western United States from 1992 to 2020: natural variability and anthropogenic climate change
- 2023/12 **American Geosciences Union (AGU) Fall Meeting 2023**, San Francisco, CA (talk)
  Drivers of smoke air quality in western United States from 1992 to 2020: Natural variability and anthropogenic climate change
- 2022/12 **AGU Fall Meeting 2022**, Chicago, IL (poster)
  Investigation of smoke exposure during the fire seasons in Australia: Importance of quantifying plume injection heights
- 2022/06 **The 10th International GEOS-Chem Meeting (IGC10)**, St. Louis, MO (talk)
  WRF-GC (v2.0): online two-way coupling of WRF and GEOS-Chem for modeling regional atmospheric chemistry-meteorology interactions
- 2020/12 **American Geosciences Union (AGU) Fall meeting 2020**, remote (poster)
  WRF-GC v2.0: online two-way coupling of WRF and GEOS-Chem for regional modeling of air quality-meteorology interactions
- 2020/09 **The 1st GEOS-Chem Europe User's Meeting (GCE1)**, remote (talk)
  Online two-way coupling of WRF and GEOS-Chem for regional modeling
- 2019/11 **The 6th International Conference on Environmental Simulation and Pollution Control**, Beijing (talk)
  WRF-GC online coupling of WRF and GEOS-Chem for atmospheric chemistry modeling

- 2019/05 **The 9th International GEOS-Chem Meeting (IGC9)**, Cambridge, MA
  Model Clinic (host): WRF-GC: GEOS-Chem in WRF
- 2018/12 **American Geosciences Union (AGU)**, Washington D.C., US (poster)
  Neural network prediction of pollutant emissions from open burning of crop residues and application to air quality forecasts in southern China
- 2017/06 **The 14th Annual Meeting Asia Oceanic Geosciences Society (AOGS)**, Singapore (talk)
  Predicting pollutant emissions from agricultural waste burning in Guangdong Province using neural network

HONORS AND AWARDS

- 2021 Excellent Graduate of Beijing Municipal Higher Education Institutions (1% of the Department)
- 2019 Presidential Fellowship of Peking University (5% of the Department)
- 2019 Merit Student of Peking University
- 2017 Award for Zhong Shengbiao Physics Education Foundation Postgraduate Academic Forum
- 2016/2017 Award for Contribution in Student Organization of Peking University
- 2016 Graduate School Fellowship of Peking University
- 2016 Excellent Graduate of Sun Yat-sen University
- 2013 National Scholarship (2% of the Department)

TEACHING EXPERIENCE

- Mentor
  Hui Xia (graduate student at Guangzhou University) Summer 2023
- Teaching Assistant Spring 2017
  Introduction to Atmospheric Sciences (Undergraduate course), Peking University

PROFESSIONAL SERVICE

- **Host** of Model Clinic (Running GEOS-Chem with WRF: WRF-GC) at the 9th, 10th, and 11th International GEOS-Chem Meeting May 2019, June 2022, June 2024
- **Co-Leader** of Air Quality and Chemistry (AQC) subgroup, Harvard Atmospheric Chemistry Modeling Group 2022 – Present
- **Coordinator** of Atmospheric & Environmental Chemistry (AEC) seminars, Harvard John A. Paulson School of Engineering and Applied Sciences 2023 Spring
- **Peer reviewer** for *Nature*, *Environmental Science & Technology, ES&T Air, Remote Sensing of Environment, Atmospheric Chemistry and Physics, Geoscientific Model Development, Sustainability, Cleaner Materials*