DANDAN ZHANG

Department of Energy, Environmental and Chemical Engineering, Washington University in St. Louis, St. Louis, USA
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EDUCATION

Washington University in St. Louis, Dept. of Energy, Environmental & Chemical Engineering St. Louis, USA
PhD, Major in Environmental Engineering Aug. 2019 – Present

Peking University, College of Environmental Sciences and Engineering Beijing, China
Bachelor of Science, Major in Environmental Science Sep. 2015 – Jul. 2019

Peking University, National School of Development Beijing, China
Bachelor of Economics, Double Major in Economics Sep. 2016 – Jul. 2019

RESEARCH EXPERIENCE

Randall Martin's Group, Dept. of Energy, Environmental & Chemical Engineering, Washington University in St. Louis St. Louis, USA
PhD student Dec. 2020 – Present

- Improve dust representation in GEOS-Chem with emission schemes, below-cloud scavenging, and submicron size bins.
- Study the global spatial heterogeneity of air quality by a chemical transport model (GEOS-Chem) in its high-performance implementation (GCHP) at a high spatial resolution globally (~25 km)
- Investigate source sector contributions to surface air pollution and implications to pollution management

Young-Shin Jun's Group, Dept. of Energy, Environmental & Chemical Engineering, Washington University in St. Louis St. Louis, USA
PhD student Sep. 2019 – Dec. 2020

- Study the formation processes of manganese oxides minerals with oxidants generated during redox reactions of manganese minerals under simulated sunlight

Wen Liu's Group, College of Environmental Sciences and Engineering, Peking University Beijing, China
Research Assistant Oct. 2017 – Jun. 2019

- Investigate the degradation processes of trace antibiotics in polluted aquatic systems by oxidants generated by engineered catalysts under simulated sunlight

Juan Liu's Group, College of Environmental Sciences and Engineering, Peking University Beijing, China
Research Assistant Apr. 2017 – Feb. 2018

- Investigate the aggregation and deposition kinetics of iron oxides minerals under saline conditions

RESEARCH INTERESTS

- Air quality modeling
- Source sector contributions to air quality and pollution management
- Effects of air pollution on human health

My research focuses on understanding the effects of grid resolution of models on population exposure to air pollutants using a chemical transport model, investigating different emission source contributions to surface air pollution, and improving model aerosol, specifically mineral dust simulation against ground-based and satellite observations.

SCHOLARSHIPS AND AWARDS

- Outstanding Student Presentation Award, American Geophysical Union Conference, Dec. 2022
- Award for Academic Excellence, College of Environmental Sciences and Engineering, Peking University, 2016-2017
- Top Talent Project Scholarship, College of Environmental Sciences and Engineering, Peking University, 2016-2017
- May 4th Scholarship, College of Environmental Sciences and Engineering, Peking University, 2015-2016
- Award for Academic Diligence, College of Environmental Sciences and Engineering, Peking University, 2015-2016
- Top Talent Project Scholarship, College of Environmental Sciences and Engineering, Peking University, 2015-2016

SKILLS

- Experiences in modeling global air quality with a chemical transport model, GEOS-Chem
- Programming: C/C++, Python, Matlab, Fortran
- Software: Originlab, SPSS, Stata
- Language: English

PRESENTATIONS

- Impact of GCHP Spatial Resolution on Global Geophysical Satellite-Derived Fine Particulate Matter, 11th International GEOS-Chem Meeting, St. Louis, June 2024 (Talk)
- Advances in Simulating the Global Spatial Heterogeneity of Air Quality Using GCHP and Its Implications for the Relation of AOD with $PM_{2.5}$, 2nd Regional GEOS-Chem Europe User's Meeting, London, August 2023 (Talk)
- Advances in Simulating the Global Spatial Heterogeneity of Air Quality and Source Sector Contributions: Insights into the Global South, American Geophysical Union Conference, Chicago, Dec 2022. (Poster)
- Advances in Simulating the Spatial Heterogeneity of Air Quality and Source Contributions Using GCHP, 10th International GEOS-Chem Meeting, St. Louis, June 2022 (Talk)

PUBLICATIONS

Under review & submitted:

[5] van Donkelaar, A., Ford, B., Li, C., Pappin, A. J., Shen, S., **Zhang, D.**, Martin, R. V. North American Chemical Composition for 2000-2022 from Satellites, Models, and Monitors: The Changing Contribution of Wildfires to North American Fine Particulate Component Concentrations. (under review)

[4] Chatterjee, D., Martin, R. V., Li, C., **Zhang, D.**, Zhu, H., Henze, D. K., Crawford, J. H., Cohen, R. C., Lamsal, L. N., Cede, A. M. Interpreting Summertime Hourly Variation of NO_2 Columns with Implications for Geostationary Satellite Applications. (under review)

[3] Zhu, H., Martin, R. V., van Donkelaar, A., Hammer, M. S., Li, C., Meng, J., Oxford, C. R., Liu, X., Li, Y., **Zhang, D.**, Singh, I., Lyapustin, A. Importance of Aerosol Composition and Aerosol Vertical Profile in Global Spatial Variation in the $PM_{2.5}$ to AOD Relationship. (under review)

[2] Lu, G., Marais, E. A., Vohra, K., Horner, R. P., **Zhang, D.**, Martin, R. V., Guttikunda, S. Near-Automated Estimate of City Nitrogen Oxides Emissions Applied to South and Southeast Asia. (under review)

[1] Croft, B., Martin, R. V., Chang, R. Y-W., Bindle, L., Eastham, S. D., Estrada, L., Ford B., Li, C., Long, M. S., Lundgren, E. W., Sinha, S., Sulprizio, M. P., Tang Y., van Donkelaar, A., Yantosca, R. M., **Zhang, D.**, Zhu, H., Pierce, J. R. Towards fine horizontal resolution global simulations of aerosol sectional microphysics: Advances enabled by GCHP-TOMAS. (under review)

Peer-reviewed:

[8] **Zhang, D.**, Martin, R. V., van Donkelaar, A., Li, C., Zhu, H., & Lyapustin, A. (2024). Impact of Model Spatial Resolution on Global Geophysical Satellite-Derived Fine Particulate Matter. *ACS ES&T Air*, DOI: 10.1021/acsestair.4c00084

[7] **Zhang, D.**, Martin, R. V., Bindle, L., Li, C., Eastham, S. D., van Donkelaar, A., & Gallardo, L. (2023). Advances in Simulating the Global Spatial Heterogeneity of Air Quality and Source Sector Contributions: Insights into the Global South. *Environmental Science & Technology*, 57(17), 6955-6964. DOI: 10.1021/acs.est.2c07253

[6] Li, C., Martin, R. V., Cohen, R. C., Bindle, L., **Zhang, D.**, Chatterjee, D., Weng H., & Lin, J. (2023). Variable Effects of Spatial Resolution on Modeling of Nitrogen Oxides. *Atmospheric Chemistry and Physics*, 23(5), 3031-3049. DOI: 10.5194/acp-23-3031-2023

[5] Martin, R. V., Eastham, S. D., Bindle, L., Lundgren, E. W., Clune, T. L., Keller, C. A., Downs, W., **Zhang, D.**, Lucchesi, R. A., Sulprizio, M. P., Yantosca, R. M., Li, Y., Estrada, L., Putman, W. M., Auer, B. M., Trayanov, A. L., Pawson, S., & Jacob, D. J. (2022). Improved Advection, Resolution, Performance, and Community Access in the New Generation (Version 13) of the High Performance GEOS-Chem Global Atmospheric Chemistry Model (GCHP). *Geoscientific Model Development*, 15(23), 8731-8748. DOI: 10.5194/gmd-15-8731-2022

[4] Gao, Z., **Zhang, D.**, & Jun, Y. S. (2021). Does Tert-Butyl Alcohol Really Terminate the Oxidative Activity of ·OH in Inorganic Redox Chemistry? *Environmental Science & Technology*, 55(15), 10442-10450. DOI: 10.1021/acs.est.1c01578

[3] **Zhang, D.**, Qi, J., Ji, H., Li, S., Chen, L., Huang, T., Xu, C., Chen, X., & Liu, W. (2020). Photocatalytic degradation of ofloxacin by perovskite-type $NaNbO_3$ nanorods modified g-C_3N_4 heterojunction under simulated solar light: Theoretical calculation, ofloxacin degradation pathways and toxicity evolution. *Chemical Engineering Journal*, 400, 125918. DOI: 10.1016/j.cej.2020.125918

[2] Liu, W., Li, Y., Liu, F., Jiang, W., **Zhang, D.**, & Liang, J. (2019). Visible-light-driven photocatalytic degradation of diclofenac by carbon quantum dots modified porous g-C_3N_4: Mechanisms, degradation pathway and DFT calculation. *Water Research*, *151*, 8-19. DOI: 10.1016/j.watres.2018.11.084

[1] Cheng, K., Cai, Z., Fu, J., Sun, X., Sun, W., Chen, L., **Zhang, D**., & Liu, W. (2019). Synergistic adsorption of Cu (II) and photocatalytic degradation of phenanthrene by a jaboticaba-like TiO_2/titanate nanotube composite: An experimental and theoretical study. *Chemical Engineering Journal*, 358, 1155-1165. DOI: 10.1016/j.cej.2018.10.114