Siyuan Shen

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EDUCATION

Washington University in St. Louis 2020 - Present
Ph.D., Energy, Environmental & Chemical Engineering

Peking University 2016 – 2020
B.S., Physics
B.S., Economics

RESEARCH INTERESTS

My research is dedicated to applying deep learning methods to uncover new perspectives on air quality, satellite image-based retrievals, and climate-aerosol interactions. I am also willing to explore the interactions between air quality, anthropogenic activities, climate change and public health.

PROFESSIONAL EXPERIENCE

Graduate Research Assistant, Washington University in St. Louis 2020 – Present
Advisor: Randall V. Martin
Visiting Undergraduate Student, University of Colorado, Boulder 2019
Advisor: Daven K. Henze
Undergraduate Research Assistant, Peking University 2018 – 2020
Advisor: Lin Zhang

SELECTED HONORS

Award for Academic Excellence, Peking University. 2018 – 2019

PUBLICATIONS (*SUBMITTED)

1. **Shen, S.**, Li, C., van Donkelaar, A., Jacobs, N., Wang, C., and Martin, R. V.: *Enhancing Global Estimation of Fine Particulate Matter Concentrations by Including Geophysical a Priori Information in Deep Learning.* ACS ES&T Air. DOI: 10.1021/acsestair.3c00054

2. **Shen, S.**, van Donkelaar, A., Jacobs, N., Li, C., and Martin, R. V.: *Enhancing Estimation of Fine Particulate Matter Chemical Composition Across North America by Including Geophysical A Priori Information in Deep Learning with Uncertainty Quantification.** (Under review)

3. Aaron van Donkelaar, Bonnie Ford, Chi Li, Amanda J. Pappin**, Siyuan Shen**, Dandan Zhang, and Randall V. Martin: *North American Fine Particulate Matter Chemical Composition for 2000–2022 from Satellites, Models, and Monitors: The Changing Contribution of Wildfires.* ACS ES&T Air. DOI: 10.1021/acsestair.4c00151

SELECTED CONFERENCE PRESENTATIONS

2024 AGU Fall Meeting, Washington D.C., U.S.A. (Poster)
2024 11th International GEOS-Chem Meeting, St. Louis, MO, U.S.A. (Poster)
2023 AGU Fall Meeting, San Francisco, CA, U.S.A. (Talk)
2023 AERSS Annual Meeting, Wuhan, Hubei, P.R.C. (PICO)
2023 NASA HAQAST Missouri Meeting, St. Louis, MO, U.S.A. (Poster)
2022 AGU Fall Meeting, Chicago, IL, U.S.A. (Poster)
2022 10th International GEOS-Chem Meeting, St. Louis, MO, U.S.A. (Poster)

TEACHING EXPERIENCE

Washington University in St. Louis Department of Energy, Environmental, and Chemical Engineering
EECE 301: Transport Phenomena I: Basics and Fluid Mechanics **Spring 2023**
EECE 314 Air Quality Engineering with Lab **Fall 2022**

RESEARCH ADVISING

Undergraduate Students:

- Evan Sharafuddin, (Spring 2023 – Summer 2023, Washington University in St. Louis): *"Replicate the chemical solver of the GEOS-Chem High Performance (GCHP) with Deep Learning Methods"*

Graduate Students:

- Xiaoyi (Jason) Liu, (Autumn 2024 – Spring 2025, Washington University in St. Louis): "*Chemical and Transport Solver of the GEOS-Chem High Performance (GCHP) based on neural operators*"
- Yu Yan, (Autumn 2024 – Present, Washington University in St. Louis): *"Developing Global NO2 by combining satellite retravels and chemical transport modeling with deep learning methods."*

SYNERGISTIC ACTIVITIES

Co-leader of Statistical Learning in Atmospheric Chemistry (SLAC) group, seminar series (2023–Present)
OSPA Judge at AGU Fall Meeting (2023, 2024)
Peer reviewer for *The Lancet Planetary Health, Artificial Intelligence for the Earth Systems, Atmospheric Environment, ACS ES&T Letter, and ACS ES&T Air.*

SKILLS

• Familiar with machine learning and deep learning structure.
• Experiences in modeling global air quality with a chemical transport model, GEOS-Chem
• Programming: Python, C++
• Software: Matlab, Stata
• Language: Chinese (native); English (professional)