Yaowei Li

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EDUCATION

Harvard University, John A. Paulson School of Engineering and Applied Sciences (SEAS) Cambridge, US

Ph.D. student in Environmental Sciences & Engineering (Advisor: Prof. Frank N. Keutsch) 09/2018-present

- Thesis topic: *Microphysical and chemical characterizations of Aerosols in the Stratosphere and Upper Troposphere*

Peking University, College of Environmental Sciences and Engineering (CESE) Beijing, China

B.S. in Environmental Science (with honor, class rank: 1/28), and B.A. in Economics 09/2014-06/2018

- Thesis title: *Development and Application of Drone-based VOC Monitoring Platform* (Advisor: Prof. Qi Chen)

RESEARCH EXPERIENCE

Research Fellow, Harvard University, Advisor: Prof. Frank N. Keutsch 09/2018-present

- Aircraft studies of aerosol microphysics and composition in the stratosphere and upper troposphere over North America and the perturbations from deep convections, wildfires, and volcanic activities. **Developed and deployed** the DCOTSS Portable Optical Particle Spectrometer (DPOPS) instrument and mini-MOUDI particle collection system. (**Instrument Co-PI**, NASA DCOTSS EVS-3 mission & NOAA SABRE mission)
- Laboratory studies of optical properties of organic aerosols using ellipsometry and FTIR techniques.
- Modeling studies of radiative impacts of organic aerosols in the stratosphere using RRTMG radiative transfer model.
- Laboratory studies of organic gas-particle partitioning inside an aerosol flow tube using the NH_4^+ CIMS instrument.
- Field studies of urban air quality in Munich, Germany. (**Instrument lead** for the Thermal Desorption NH_4^+ CIMS)

Undergraduate Research Assistant, Harvard University, Advisor: Prof. Scot T. Martin 06/2017-09/2017

- **Developed** a drone-based volatile organic compounds (VOCs) sampling apparatus.

Undergraduate Research Fellow, Peking University, Advisor: Prof. Qi Chen 01/2015-06/2018

- Field and laboratory studies of VOCs emissions and distributions over a subtropical forest in China. Deployed a self-built drone-based VOC monitoring platform.
- Field studies of chemical composition and sources of PM_1 and $PM_{2.5}$ in Beijing. Deployed an Aerodyne time-of-flight aerosol chemical speciation monitor (ToF-ACSM). (2016 PKU Summer/Fall Campaign & 2017 AIRLESS Campaign)

PUBLICATIONS (Google Scholar)

Under review, submitted, & in preparation

1. Zhang, J., Zhu, T., Catena, A., **Li, Y.**, Schwab, M., Liu, P., Asa-Awuku, A., Schwab, J., "A simple optical scatter monitor system quantifying organic aerosol subsaturated hygroscopicity." (*submitted*)
2. **Li, Y.**, Dykema, J., Allen, N., Litchfield, M., Greenberg, M., Rivero, M., Yang, D., Dhaniyala, S., Keutsch, F. N., et al., "Modification and performance of the Portable Optical Particle Spectrometer for particle concentration and size distribution measurements in the stratosphere and upper troposphere." (*in preparation*)

Peer reviewed

10. **Li, Y.**, Pedersen, C., Dykema, J., Vernier, J. P., Vattioni, S., Pandit, A. K., Stenke, A., Asher, E., Thornberry, T., Todt, M. A., Bui, T. P., Dean-Day, J., Keutsch, F. N. **(2023)**. "In situ measurements of perturbations to stratospheric aerosol

and modeled ozone and radiative impacts following the 2021 La Soufrière eruption." *Atmospheric Chemistry and Physics,* 23, 15351–15364, DOI: 10.5194/acp-23-15351-2023.

9. Barber, V. P., Goss, M. B., Franco Deloya, L. J., LeMar, L. N., **Li, Y.**, Helstrom, E., Canagaratna, M., Keutsch, N. F., Kroll, J. H. **(2023)**. "Indoor air quality implications of germicidal 222 nm light." *Environmental Science & Technology,* 57(42), 15990-15998. DOI: 10.1021/acs.est.3c05680

8. **Li, Y.**, Bai, B., Dykema, J., Shin, N., Lambe, A. T., Chen, Q., Kuwata, M., Ng, N. L., Keutsch, F. N., Liu, P. **(2023)**. "Predicting real refractive index of organic aerosols from elemental composition." *Geophysical Research Letters,* 50(12), e2023GL103446. DOI: 10.1029/2023GL103446

7. Zheng, Y., Miao, R., Zhang, Q., **Li, Y.**, Cheng, X., Liao, K., Koenig, T. K., Ge, Y., Tang, L., Shang, D., Hu, M., Chen, S., Chen, Q. **(2023)**. "Secondary formation of submicron and supermicron organic and inorganic aerosols in a highly polluted urban area." *Journal of Geophysical Research: Atmospheres,* 128(4), e2022JD037865. DOI: 10.1029/2022JD037865

6. Ye, Q., Goss, M. B., Krechmer, J. E., Majluf, F., Zaytsev, A., **Li, Y.,** Roscioli, J. R., Canagaratna, M., Keutsch, F. N., Heald, C. L., Kroll, J. H. **(2022)**. "Product distribution, kinetics, and aerosol formation from the OH oxidation of dimethyl sulfide under different RO2 regimes." *Atmospheric Chemistry and Physics,* 22(24), 16003-16015. DOI: 10.5194/acp-22-16003-2022

5. **Li, Y.**, Dykema, J., Deshler, T. and Keutsch, F., **(2021)**. "Composition dependence of stratospheric aerosol shortwave radiative forcing in northern midlatitudes." *Geophysical Research Letters,* 48(24), e2021GL094427. DOI: 10.1029/2021GL094427

4. **Li, Y.**, Liu, B., Ye, J., Jia, T., Khuzestani, R. B., Sun, J. Y., Cheng, X., Zheng, Y., Li, X., Wu, C., Xin, J., Wu, Z., Tomoto, M. A., McKinney, K. A., Martin, S. T., Li, Y. J., Chen, Q. **(2021)**. "Unmanned aerial vehicle measurements of volatile organic compounds over a subtropical forest in China and implications for emission heterogeneity." *ACS Earth and Space Chemistry,* 5(2), 247-256. DOI: 10.1021/acsearthspacechem.0c002713

3. Ye, Q., Krechmer, J.E., Shutter, J.D., Barber, V.P., **Li, Y.**, Helstrom, E., Franco, L. J., Cox, J. L., Hrdina, A. I. H., Goss, M. B., Tahsini, N., Canagaratna, M., Keutsch, F. N., Kroll, J. H. **(2021)**. "Real-time laboratory measurements of VOC emissions, removal rates, and byproduct formation from consumer-grade oxidation-based air cleaners." *Environmental Science & Technology Letters*, 8(12), 1020-1025. DOI: 10.1021/acs.estlett.1c0077

2. Zheng, Y., Cheng, X., Liao, K., **Li, Y.**, Li, Y. J., Huang, R. J., Hu, W., Liu, Y., Zhu, T., Chen, S., Zeng, L., Worsnop, D. R., Chen, Q. **(2020)**. "Characterization of anthropogenic organic aerosols by TOF-ACSM with the new capture vaporizer." *Atmospheric Measurement Techniques,* 13(5), 2457-2472. DOI: 10.5194/amt-13-2457-2020

1. Liu, B., Wu, C., Ma, N., Chen, Q., **Li, Y.**, Ye, J., Martin, S. T., Li, Y. J. **(2020)**. "Vertical profiling of fine particulate matter and black carbon by using unmanned aerial vehicle in Macau, China." *Science of the Total Environment,* 709, 136109. DOI: 10.1016/j.scitotenv.2019.136109

INVITED TALKS

- 2024 AMS Annual Meeting, Baltimore, MD, January 2024
- Engineering Special Seminar, School of Engineering at Westlake University, Hangzhou, January 2024
- College of Environmental Sciences and Engineering at Peking University, Beijing, January 2024
- The Department of Atmospheric Sciences at Zhejiang University, Virtual, December 2023
- VolImpact Seminar, DFG (German Research Foundation) Research Unit, Virtual, November 2023
- Earth, Atmospheric, and Planetary Sciences (EAPS) Seminar at Purdue University, West Lafayette, IN, April 2023
- The Department of Atmospheric Sciences at Texas A&M University, College Station, TX, January 2023

CONFERENCE PRESENTATIONS

- **Li, Y.**, et al., Jan. 2024, *In situ* measurements of perturbations to stratospheric aerosol and modeled ozone and radiative impacts following the 2021 La Soufrière eruption. **AMS Annual Meeting 2024**, Baltimore, MD (Talk)
- **Li, Y.**, et al., Dec. 2023, Radiative impacts of pyrocumulonimbus smoke in the upper troposphere: insights from *in-situ* aircraft observations and microphysical modelling. **AGU Fall Meeting 2023**, San Francisco, CA (eLightning talk)
- **Li, Y.**, et al., Nov. 2023, Morphological and chemical properties of stratospheric aerosols from *in situ* and offline measurements. **NASA DCOTSS 2023 Science Team Meeting**, Norman, OK (Talk)
- **Li, Y.**, et al., Oct. 2023, Predicting Real Refractive Index of Organic Aerosols from Elemental Composition. **AAAR 41st Annual Conference**, Portland, OR (Talk)
- **Li, Y.**, et al., Oct. 2023, Aerosol Perturbations in the Upper Troposphere and Lower Stratosphere due to Volcanic and Wildfire Injections: Insights from the DCOTSS Airborne Mission. **AAAR 41st Annual Conference**, Portland, OR (Talk)
- **Li, Y.**, et al., Aug. 2023, Organic-containing Aerosols in the Upper Troposphere and Lower Stratosphere (UT/LS): Climate and Chemical Impacts. **Atmospheric Chemistry Gordon Research Conference 2023**, Newry, ME (Poster)
- **Li, Y.**, et al., Jan. 2023, Aircraft measurements of aerosol microphysics in 2021 La Soufrière volcanic plumes and their stratospheric impacts. **NASA DCOTSS 2022 Science Team Meeting**, College Station, TX (Talk)
- **Li, Y.**, et al., Dec. 2022, Microphysical and Chemical Characterization of Aerosols in the Stratosphere and Upper Troposphere: Influence of Biomass Burning. **AGU Fall Meeting 2022**, Chicago, IL (Poster)
- **Li, Y.** et al., Oct. 2022, Volcanic and Wildfire Perturbations of Aerosols in the Stratosphere and Upper Troposphere during the NASA DCOTSS Airborne Mission. **the 7th SPARC General Assembly**, Boulder, CO (Poster)
- **Li, Y.**, et al., Dec. 2021, Estimation of the Elemental Composition of Organic Aerosols in the Mid-latitude Lower Stratosphere over the Continental US. **AGU Fall Meeting 2021**, Virtual (Poster)
- **Li, Y.**, et al., Apr. 2021, DPOPS: 2021 science operations, data products, updates for 2022. **NASA DCOTSS 2021 Science Team Meeting**, Virtual (Talk)
- **Li, Y.**, et al., Apr. 2021, Composition Dependence of Stratospheric Aerosol Radiative Forcing. **EGU General Assembly 2021**, Virtual (Talk)
- **Li, Y.**, et al., Dec. 2020, Unmanned Aerial Vehicle Measurements of Volatile Organic Compounds over a Subtropical Forest in China and Implications for Emission Heterogeneity. **AGU Fall Meeting 2020**, Virtual (Talk)
- **Li, Y.**, et al., Dec. 2019, Measurements of α-Pinene Ozonolysis Products Uptake to Submicron Aerosols at A Broad Range of Tropospheric Temperatures. **AGU Fall Meeting 2019**, San Francisco, CA (Talk)
- **Li, Y.**, et al., Nov. 2017, Detection of Non-refractory $PM_{2.5}$ chemical composition by Time-of-Flight Aerosol Chemical Speciation Monitor equipped with a Capture Vaporizer. **the 5th International Conference on Environmental Simulation and Pollution Control**, Beijing, China (Poster)
- Goss, M., Ye, Q., **Li, Y.**, et al., Dec. 2022, Chamber studies of the oxidation of DMS, DMDS, and DMSO: Mechanism and aerosol formation. **The 2022 Atmospheric Chemical Mechanisms Conference**, Davis, CA (Talk)
- Franco Deloya, L., **Li, Y.**, et al., Sep. 2022, Simulated long-term atmospheric aging of organic carbon in a laboratory chamber. **the 11th International Aerosol Conference**, Athens, Greece

GRANTS & FUNDS

- FY 2024 EMSL Large-Scale Research Funding (as an Investigator), US Department of Energy 2023
- AAAR 41st Annual Conference Student Travel Grant, American Association for Aerosol Association 2023
- GSAS Professional Development Fund, Harvard University 2022
- Clare Marie Doris Innovation Fund in Engineering and Applied Sciences, Harvard University 2018-2019

- Chen Shouren Overseas Research Summer Fund, Peking University 2017

AWARDS & HONORS

- AMS 2024 Best Student Presentation Award, American Meteorological Society 2024
- AGU 2022 Outstanding Student Presentation Award (OSPA), American Geophysical Union 2023
- Certificate of Distinction in Teaching, Harvard University 2020
- Beijing Outstanding Graduate Award (Highest honor for graduate set by the government of Beijing) 2018
- Tang Xiaoyan Environmental Science and Innovation Scholarship 2018
- Best Poster Award, 5th International Conference on Environment Simulation and Pollution Control 2017
- National Scholarship, Chinese Ministry of Education 2016 & 2017
- Chongto Environmental Science Scholarship, Peking University 2016
- Robin Li Scholarship, Peking University 2015
- First Prize Spark Scholarship, Peking University 2015-2017

TEACHING & ADVISING EXPERIENCE

Teaching Fellow / Teaching Assistant:

- GENED 1137 - The Challenge of Human Induced Climate Change: Transitioning to a Post Fossil Fuel Future (Spring 2023, Harvard University)
- EPS/ESE 162 - Hydrology (Fall 2020, Harvard University)
- 12730070 - China's Energy and Environmental Challenges (Spring 2016, Peking University)

Guest Lecturer:

- PUM 6306 - Energy, Climate Change and Sustainable Development in China (Spring 2023, Shanghai Jiao Tong University)

Teaching Certificate from Harvard Derek Bok Center for Teaching & Learning (2024)

Student Mentor:

- Research mentor for 4 undergraduate students: Emmanuel Rassou, Matthew P. Hallman, Bella Nesti, Ploy Assawaphadungsit
- Research mentor for 2 graduate students: Sophie Abou-Rizk, Michael Gee
- Graduate Qualifying Exam mentor for 2 graduate students: Mona Dai, Lucas Estrada
- Graduate School Application Assistant for 2 students: Yi Xia, Daniel Adjei

PROFESSIONAL ACTIVITIES & SERVICE

- **Committee member**: AGU Atmospheric Science Section Early Career Committee-DEI Subcommittee 2024-present
- **Organizer** of the 22nd Conference on Middle Atmosphere (AMS meeting) 2023-2024
- **Committee member**: AMS Middle Atmosphere committee 2023-present
- **Instrument Co-PI** (mini-MOUDI instrument) for NOAA SABRE airborne mission 2022-present
- **Instrument Co-PI** (DPOPS & mini-MOUDI instruments) for NASA DCOTSS airborne mission 2019-present

- **Session chair** for AAAR 2023 Annual Conference 2023
- **Session chair** for NASA DCOTSS Science Team Meetings 2021, 2023
- **Organizer** of the Harvard Stratospheric Supergroup Meeting series 2021-2022
- **Host** for the Harvard Atmospheric & Environmental Chemistry (AEC) Seminar series 2019-present
- **Conference student presentation judge/reviewer**: AGU (2023), AAAR (2023)
- **Proposal reviewer** for *NASA Earth Science ROSES Program (2024)*
- **Peer reviewer** for *JGR-Atmosphere, Atmospheric Chemistry and Physics, Environmental Health Perspectives, Atmospheric Environment, Urban Climate, Meteorological Applications*
- **Professional Memberships**: AGU, AMS, AAAR, EGU
- **Research collaborations**: Daniel Cziczo Group (Purdue), Qi Chen Group (Peking University), Swarup China Group (PNNL), Terry Deshler (CU Boulder), Suresh Dhaniyala Group (Clarkson), Jesse Kroll Group (MIT), Alexander Laskin Group (Purdue), Pengfei Liu Group (Georgia Tech), Scot Martin Group (Harvard), David Peterson and Michael Fromm (NRL), Jeffrey Pierce Group (Colorado State University), Jean-Paul Vernier Group (NASA Langley), Jianhuai Ye (SUSTech), Yue Zhang Group (Texas A&M), DCOTSS Science Team, SABRE Science Team, and others

FIELD EXPERIENCE

- **Instrument Lead** in Munich Urban Air Quality Campaigns (ground station) 2023-present
- **Instrument Co-PI** in NOAA SABRE WB-57 aircraft mission 2022-present
- **Instrument Co-PI** in NASA DCOTSS ER-2 aircraft mission 2019-present
- AIRLESS campaign in Beijing on air pollution and human health (ground station) 2017

OUTREACH

- **Mentor** in Harvard SEAS Research Mentorship Program (RMP) for undergraduate students 2024
- **Mentor** in Harvard Graduate Admissions Assistance Program (GAAP) 2023
- **Presenter** at Harvard Undergraduate Research Opportunities (HUROS) Fair 2023
- **Scientific instrument showcase** at the 4th Annual Harvard Nexus Event 2023
- **Science outreach interview participant** at Superheroes of Science 2022
- **Vice President** of the Harvard Chinese Students and Scholars Association (HCSSA) 2021-2022
- **Student Group Leader** at Harvard Graduate School of Arts and Sciences (GSAS) 2021-2022
- **Judge** of the National Collegiate Research Conference 2021
- **Member of the Standing Committee**, 35th Student Union, Peking University 2017-2018
- **President** of the Youth Volunteer Association in College of Environmental Sciences and Engineering (CESE), Peking University 2015-2016
- **STEM Class Tutor** in a K-12 school, Hebei, China 2014-2017