Laura H. Yang

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EDUCATION

Harvard University — Cambridge, MA
Ph.D., Environmental Science and Engineering — 2021-

Georgia Institute of Technology — Atlanta, GA
B.S., Environmental Engineering — 2021

RESEARCH EXPERIENCE

NSF Intern Program Research Intern, *NASA Jet Propulsion Laboratory* 2025
Advisor: Kevin W. Bowman, Kazuyuki Miyazaki

- Studied the interaction between air pollution, greenhouse gas emissions, and urban economic growth to inform environmental policy in global megacities

NSF Graduate Research Fellow, *Harvard University* 2021 - Present
Advisor: Daniel J. Jacob

- Assessed the climate and air quality impacts of a hydrogen economy using the GEOS-Chem global chemical transport model
- Studied air quality over East Asia using aircraft observations and GEOS-Chem
- Investigated drivers of diurnal variation in NO_2 observed by the GEMS geostationary satellite
- Improved NO_2 retrieval of the geostationary satellite

Undergraduate Research Assistant, *Georgia Institute of Technology* 2019 - 2021
Advisor: Nga L. (Sally) Ng

- Conducted air pollution source apportionment using the non-negative matrix factorization (NMF) on low-cost sensor data
- Characterized thermal decomposition pathways and extent of organic compounds in the FIGAERO-CIMS instrument

Global Internship Program Intern, *Yonsei University* 2019 - 2020
Advisor: Jhoon Kim

- Developed a public-facing Handbook of "Air Pollution: An Introduction to Its Causes, Effects, and Solutions" in collaboration with the Korean Ministry of Foreign Affairs and UN ESCAP division

Undergraduate Research Assistant, *Georgia Institute of Technology* 2017 - 2018
Advisor: Kostas T. Konstantinidis

- Analyzed the impact of geographic remoteness on gut microbiota in northern Ecuador using bioinformatics tools
- Developed a protocol to extract genomic data from uncultivated bioaerosol microbes

High School Research Assistant, *Cary Institute of Ecosystem Studies* 2015 - 2016
Advisor: Barbara A. Han

- Predicted tick species with potential to transmit human diseases using Boosted Regression Tree (BRT) machine learning techniques

RESEARCH INTERESTS

I use chemical transport models, satellite data, and aircraft observations to study atmospheric composition and inform air quality policy. I also investigate the atmospheric and climate impacts of the transition to cleaner energy.

PEER-REVIEWED PUBLICATIONS

H-index: 9, citations: 270 (as of June 2025, Google Scholar)

First-Author Papers

[19] **Yang, L.H.**, Jacob, D.J., Bates, K.H., Lin, H., H.M. Allen, J.F. Müller, Brown, S.S., Dang, R., Colombi N.K., Zhai, S., Yantosca, R.M., Brewer, J.F., Ng, N.L., Crounse, J.D., Wennberg, P.O., Li, K., Liao, H. Modeling of Methyl Hydroperoxide Observations in Urban and Remote Air over South Korea: Methyl Radical Chemistry and Inference of Atmospheric Methanediol. submitted to *Geophysical Research Letters*.

[13] **Yang, L.H.**, Jacob, D.J., Lin, H., Dang, R., Bates, K.H., East, J.D., Travis, K.R., Pendergrass, D.C., Murray, L.T. Assessment of Hydrogen's Climate Impact Is Affected by Model OH Biases. *Geophysical Research Letters*, 52(5), e2024GL112445, 2025.
https://doi.org/10.1029/2024GL112445

[9] **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., Liao, H. Interpreting Geostationary Environment Monitoring Spectrometer (GEMS) Observations of the Diurnal Variation in NO_2 over East Asia. *Atmospheric Chemistry and Physics*, 24(12), 7027–7039, 2024.
https://doi.org/10.5194/acp-24-7027-2024

[4] **Yang, L.H.**, Jacob, D.J., Colombi, N.K., Bates, K., Shah, V., Beaudry, E., Yantosca, R.M., Lin, H., Brewer, J., Chong, H., Travis, K., Crawford, J., Lamsal, L., Koo, J.-H., Kim, J. Tropospheric NO_2 Vertical Profiles over South Korea and Their Relation to Oxidant Chemistry. *Atmospheric Chemistry and Physics*, 23(4), 2465–2481, 2023.
https://doi.org/10.5194/acp-23-2465-2023

[3] **Yang, L.H.**, Hagan, D.H., Rivera-Rios, J.C., Kelp, M.M., Cross, E.S., Peng, Y., Kaiser, J., Williams, L.R., Croteau, P.L., Jayne, J.T., Ng, N.L. Investigating the Sources of Urban Air Pollution Using Low-Cost Air Quality Sensors at an Urban Atlanta Site. *Environmental Science & Technology*, 56(11), 7063–7073, 2022.
https://doi.org/10.1021/acs.est.1c07005

[2] **Yang, L.H.**, Takeuchi, M., Chen, Y., Ng, N.L. Characterization of Thermal Decomposition of Oxygenated Organic Compounds in FIGAERO-CIMS. *Aerosol Science and Technology*, 55(12), 1321–1342, 2021.
https://doi.org/10.1080/02786826.2021.1945529

[1] **Yang, L.H.**, Han, B.A. Data-driven Predictions and Novel Hypotheses about Zoonotic Tick Vectors from the Genus Ixodes. *BMC Ecology*, 18(7), 1–6, 2018.
https://doi.org/10.1186/s12898-018-0163-2

Co-Authored Papers

[18] Dang R., Jacob D.J., Wang H., Nowlan C.R., Abad G.G., Chong H., Liu X., Shah V., Yang L.H., Oak Y.J,, Marais E.A., Horner R.P., Rollins A.W., Crawford J.H., Li K., and Liao H. High-resolution Geostationary Satellite Observations of Free Tropospheric NO2 over North America: Implications for Lightning Emissions, Submitted to *Proceedings of the National Academy of Sciences*, 2025.

[17] Colombi N.K., Jacob D.J., Ye X., Yantosca B., Bates K., Pendergrass D.C., Yang L.H., Li K., and Liao H. Large and Increasing Stratospheric Contribution to Tropospheric Ozone over East Asia, Submitted to *Atmospheric Chemistry and Physics*, 2025.

[16] Pendergrass, D.C., Jacob, D.J., Oak, Y., Dang, R., **Yang, L.H.**, Beaudry, E., Colombi, N.K., Zhai, S., Kim, H., Choi, J.S., Park, J.S., Kim, S., Li, K., Liao, H. Wintertime Trends of $PM_{2.5}$ in South Korea: Response of Nitrate and Organic Components to Decreasing NO_x Emissions. Submitted to *Geophysical Research Letters*, 2025.

[15] Westgate, S., Shivji, Z., **Yang, L.H.**, Rivera-Rios, J.C., Ng, N.L. Field evaluation of low-cost particulate matter (PM) sensor instruments in indoor and outdoor environments: A university lecture hall and urban southeastern United States *Aerosol Science and Technology*, 1–22, 2025. https://doi.org/10.1080/02786826.2025.2484244

[14] Beaudry, E., Jacob, D.J., Bates, K., Zhai, S., **Yang, L.H.**, Pendergrass, D.C., Colombi, N., Simpson, I., Wisthaler, A., Hopkins, J., Ke, L., Liao, H. Ethanol and Methanol in South Korea and China: Evidence for Large Anthropogenic Emissions Missing from Current Inventories. *ACS ES&T Air*, 2(4), 456-465, 2025. https://doi.org/10.1021/acsestair.4c00210

[12] Dang, R., Jacob, D.J., Zhai, S., **Yang, L.H.**, Pendergrass, D.C., Coheur, P., Clarisse, L., Van Damme, M., Choi, J., Park, J., Liu, Z., Xie, P., Liao, H. A Satellite-Based Indicator for Diagnosing Particulate Nitrate Sensitivity to Precursor Emissions: Application to East Asia. *Environmental Science & Technology*, 58(45), 20101–20113, 2024. https://pubs.acs.org/doi/10.1021/acs.est.4c08082

[11] 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., Jacob, D.J. Intercomparison of GEOS-Chem and CAM-chem Tropospheric Oxidant Chemistry within CESM2. *Atmospheric Chemistry and Physics*, **24**(15), 8607–8624, 2024. https://doi.org/10.5194/egusphere-2024-470

[10] Oak, Y.J., Jacob, D.J., Balasus, N., **Yang, L.H.**, Chong, H., Park, J., Lee, H., Lee, G.-T., Ha, E.-J., Park, R.J., Kwon, H.-A., Kim, J. A Bias-Corrected GEMS Satellite Product for NO_2 Using Machine Learning with TROPOMI. *Atmospheric Measurement Techniques*, 17(17), 5147–5159, 2024. https://doi.org/10.5194/amt-17-5147-2024

[8] Varon, D., Jervis, D., Pandey, S., Gallardo, S., Balasus, N., **Yang, L.H.**, Jacob, D. Quantifying NO_x Point Sources with Landsat and Sentinel-2 Observations of NO_2 Plumes. *Proceedings of the National Academy of Science*, 121(27), e2317077121, 2024. https://doi.org/10.1073/pnas.2317077121

[7] Westervelt, D., Isavulambire, P., Yombo Phaka, R., **Yang, L.H.**, Raheja, G., Milly, G., Selenge, J.-L., Mulumba, J.P., Bousiotis, D., Djibi, B., McNeill, V.F., Ng, N.L., Pope, F., Mbela, G., Konde, J. A Low-Cost Investigation into Sources of $PM_{2.5}$ in Kinshasa, DRC. *ACS ES&T Air*, 1(1), 43–51, 2023. https://doi.org/10.1021/acsestair.3c00024

[6] Zhai, S., Jacob, D.J., Pendergrass, D., Colombi, N., Shah, V., **Yang, L.H.**, Zhang, Q., Sun, Y., Wang, S., Luo, G., Yu, F., Woo, J.-H., Kim, Y., Kim, H., Dibb, J.E., Lee, T., Han, J.-S., Li, K., Liao, H. Coarse Particulate Matter Air Quality in East Asia: Implications for Fine Particulate Nitrate. *Atmospheric Chemistry and Physics*, 23(7), 4271–4281, 2023. https://doi.org/10.5194/acp-23-4271-2023

[5] Colombi, N.K., Jacob, D.J., **Yang, L.H.**, Zhai, S., Shah, V., Grange, S.K., Yantosca, R.M., Kim, S., Liao, H. Why Is Ozone in South Korea and the Seoul Metropolitan Area So High and Increasing? *Atmospheric Chemistry and Physics*, 23(7), 4031–4044, 2023. https://doi.org/10.5194/acp-23-4031-2023

HONORS, AWARDS, AND FELLOWSHIPS

WashU in St. Louis Air Quality and Health Initiative Postdoctoral Fellowship	2025
NSF Intern Supplemental Funding	2025
NSF Graduate Research Fellowship	2021
Harvard Stonington Endowment Graduate Fellowship	2021
Georgia Tech Sigma Xi Best Undergraduate Research Award	2021
Civil and Environmental Engineering Best Undergraduate Research Award	2021
Buck Stith Outstanding Senior Award in Civil and Environmental Engineering	2021
Georgia Tech President's Undergraduate Research Awards	2017, 2019

Buck Stith Outstanding Junior Award in Civil and Environmental Engineering	2019
Georgia Tech Callaway Scholarship	2017
Georgia Tech Provost Scholarship	2016
Cary Institute Outstanding Young Environmental Scientist Award	2016

PRESENTATIONS

[14] Modeling of methyl hydroperoxide observations in urban and remote air over South Korea: methylperoxy radical chemistry and inference of atmospheric methanediol. Caltech Laboratory for the Study of Atmospheric Composition Group Meeting, Pasadena, CA, USA, June 2025. (Invited Talk)

[13] Assessment of Hydrogen's Climate Impact Is Affected by Model OH Biases. EGU Annual Meeting, Vienna, Austria, April 2025. (Talk)

[12] Modeling of methyl hydroperoxide observations in urban and remote air over South Korea: Demonstration of high-NO and low-NO regimes for hydrocarbon oxidation, and inference of atmospheric methanediol. AMS Annual Meeting, New Orleans, LA, USA, January 2025. (Talk)

[11] Assessment of Hydrogen's Climate Impact Is Affected by Model OH Biases. AGU Annual Meeting, Washington, DC, USA, December 2024. (Talk)

[10] Interpreting GEMS Geostationary Satellite Observations of the Diurnal Variation of Nitrogen Dioxide (NO_2) over East Asia. The 104th AMS Annual Meeting, Baltimore, MD, USA, January 2024. (Poster)

[9] Interpreting GEMS Geostationary Satellite Observations of the Diurnal Variation of Nitrogen Dioxide (NO_2) over East Asia. The 14th GEMS Science Team Meeting, Jeju, South Korea, September 2023. (Talk)

[8] Interpreting GEMS Geostationary Satellite Observations of the Diurnal Variation of Nitrogen Dioxide (NO_2) over East Asia. NASA and EPA Joint Atmospheric Chemistry Group Meeting, Remote, December 2023. (Invited Talk)

[7] Tropospheric NO_2 Vertical Profiles over South Korea and Their Relation to Oxidant Chemistry: Implications for Geostationary Satellite Retrievals and the Observation of NO_2 Diurnal Variation from Space. Joint Science Meeting for TEMPO, GeoXO, & TOLNet, Huntsville, AL, USA, May 2023. (Poster)

[6] Tropospheric NO_2 Vertical Profiles over South Korea and Their Relation to Oxidant Chemistry: Implications for Geostationary Satellite Retrievals and the Observation of NO_2 Diurnal Variation from Space. Atmospheric Measurement Group Meeting, Center for Astrophysics – Harvard & Smithsonian, Cambridge, MA, USA, December 2023. (Invited Talk)

[5] Tropospheric NO_2 Vertical Profiles over South Korea and Their Relation to Oxidant Chemistry: Implications for Geostationary Satellite Retrievals and the Observation of NO_2 Diurnal Variation from Space. AGU Fall Meeting, Chicago, IL, USA, December 2022. (Poster)

[4] Tropospheric NO_2 Vertical Profiles over South Korea and Their Relation to Oxidant Chemistry: Implications for Geostationary Satellite Retrievals and the Observation of NO_2 Diurnal Variation from Space. The 13th GEMS Science Team Meeting, Seoul, South Korea, November 2022. (Talk)

[3] Tropospheric NO_2 Vertical Profiles over South Korea and Their Relation to Oxidant Chemistry: Implications for Geostationary Satellite Retrievals and the Observation of NO_2 Diurnal Variation from Space. The 10th International GEOS-Chem Meeting, St. Louis, MO, June 2022. (Talk)

[2] Understanding the Sources of Urban Air Quality Using Low-Cost Air Quality Sensors. The 39th AAAR Conference, Remote, October 2021. (Talk)

[1] Thermal Decomposition Characterization of Filter Inlet for Gases and AEROsols (FIGAERO) coupled with Chemical Ionization Time-of-Flight Mass Spectrometer (ToF-CIMS). The 37th AAAR Conference, Portland, OR, October 2019. (Poster)

MENTORSHIP

Jaden Southern (Stanford University, class of 2026) Summer 2024

Project: Evaluating TEMPO Satellite HCHO and NO_2 Products Against Ground-Based Pandora Instruments. Co-mentor with Ruijun Dang, Yujin Oak, and Loretta Mickley.

Lucy Gagnon (Williams College, Class of 2024; now Ph.D. student at Duke University) Summer 2023
Project: Spatial and Temporal Differences in NO_2 Column Densities and Implications for Geostationary Satellite Product Applications Across Asia. Co-mentor with Yujin Oak and Loretta Mickley.

TEACHING EXPERIENCE

Harvard University, Teaching Fellow — Cambridge, MA
EPS 200: Atmospheric Chemistry and Physics — Spring 2023, Spring 2024

Georgia Institute of Technology, Teaching Assistant — Atlanta, GA
CEE 2300: Environmental Engineering Principles — Spring 2018, Spring 2019

PROFESSIONAL ACTIVITIES

Reviewer
Atmospheric Measurement Techniques; npj Clean Air

Service on NASA review panels 2025