

# YUANLONG HUANG

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## EMPLOYMENT

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<b>California Institute of Technology</b> Research Scientist Division of Geological and Planetary Science	2020.07 - present
<b>California Institute of Technology</b> Postdoctoral Fellow (Advisor: John H. Seinfeld) Department of Environmental Science and Engineering	2019.07 - 2020.07

## EDUCATION

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<b>California Institute of Technology</b> Doctor of Philosophy (Advisor: John H. Seinfeld) Department of Environmental Science and Engineering Thesis: Development of Methods to Study Secondary Organic Aerosol	2014.09 - 2019.06
<b>Fudan University</b> Master of Science (Advisor: Xin Yang) Department of Environmental Science and Engineering Thesis: Field Studies of Aerosol Optical and Chemical Properties in Shanghai	2011.09 - 2014.06
<b>Fudan University</b> Bachelor of Science Department of Environmental Science and Engineering Thesis: Single Particle Analysis of Amines in Ambient Aerosol in Shanghai	2007.09 - 2011.06

## RESEARCH EXPERIENCE

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### Laboratory Experience (2014 - present)

- Development and characterization of atmospheric chemical reactors: the Caltech photooxidation flow tube reactor, vapor-film interaction in Teflon-walled chamber reactors
- Instrumentation development: dual-polar differential mobility analyzer for particle size distribution measurement, filter-based thermal desorption system for aerosol-phase components detection, low-cost vaporizer for reagents injection into a chamber, cloud condensation nuclei growth tube

### Modeling Experience (2014 - present)

- Computational simulation of secondary organic formation in laboratory chambers and flow reactors
- Simulation of multi-phase mass transport and chemical reactions in a droplet
- Development of programs to run the Master Chemical Mechanism (MCM)
- Application of machine learning algorithm to atmospheric chemical transport model (CTM)

### Field Experience (2010 - 2014, 2020)

- Employed aerosol time-of-flight mass spectrometer (ATOFMS) and cavity ring-down spectroscopy (CRDS) to monitor the evolution of aerosol properties during haze period in Shanghai
- Monitoring the air quality in Pasadena, CA during the COVID-19 lockdown period

## PUBLICATIONS

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27. **Huang, Y.** and Seinfeld, J. H.: A Neural Network Assisted Euler Integrator for Stiff Kinetics in Atmospheric Chemistry, *Environ. Sci. Technol.*, 56, 4676-4685, **2022**.
26. Zhai, J., Yang, X., Li, L., Bai, B., Liu, P., **Huang, Y.**, Fu, T., Zhu, L., Zeng, Z., Tao, S., Lu, X., Ye, X., Wang, X., Wang, L., and Chen, J.: Absorption Enhancement of Black Carbon Aerosols Constrained by Mixing-State Heterogeneity, *Environ. Sci. Technol.*, 56, 1586-1593, **2022**.
25. Charan, S. M., **Huang, Y.**, Buenconsejo, R. S., Li, Q., Cocker III, D. R., and Seinfeld, J. H.: Secondary Organic Aerosol Formation from the Oxidation of Decamethylcyclopentasiloxane at Atmospherically Relevant OH Concentrations, *Atmos. Chem. Phys.*, 22, 9177-928, **2022**.
24. Pushpawela, B., Amanatidis, S., **Huang, Y.**, and Flagan, R. C.: Variability of the Penetration of Particles through Facemasks, *Aerosol Sci. Technol.*, 56, 186-203, **2022**.
23. Wang, L., Chen, X., Zhang, Y., Li, M., Li, P., Jiang, L., Xia, Y., Li, Z., Li, J., Wang, L., Hou, T., Liu, W., Rosenfeld, D., Zhu, T., Zhang, Y., Chen, J., Wang, S., **Huang, Y.**, Seinfeld, J. H., and Yu, S.: Switching to Electric Vehicles Can Lead to Significant Reductions of PM<sub>2.5</sub> and NO<sub>2</sub> across China, *One Earth*, 4, 1037-1048, **2021**.
22. Kong, W., Amanatidis, S., Mai, H., Kim, C., Schulze, B. C., **Huang, Y.**, Lewis, G. S., Hering, S. V., Seinfeld, J. H., and Flagan, R. C.: The Nano-Scanning Electrical Mobility Spectrometer (nSEMS) and Its Application to Size Distribution Measurements of 1.5-25 nm Particles, *Atmos. Meas. Tech.*, 14, 5429-5445, **2021**.
21. Amanatidis, S., **Huang, Y.**, Pushpawela, B., Schulze, B. C., Kenseth, C. M., Ward, R. X., Seinfeld, J. H., Hering, S. V., and Flagan, R. C.: Efficacy of A Portable, Moderate-Resolution, Fast-Scanning DMA for Ambient Aerosol Size Distribution Measurements, *Atmos. Meas. Tech.*, 14, 4507-4516, **2021**.
20. McGuffin, D. L., **Huang, Y.**, Flagan, R. C., Petäjä, T., Ydstie, B. E., and Adam, P. J.: Novel Estimation of Aerosol Processes with Particle Size Distribution Measurements: A Case Study with TOMAS Algorithm v1.0.0, *Geosci. Model Dev.*, 14, 1821-1839, **2021**.
19. **Huang, Y.**, Kenseth, C. M., Dalleska, N. F., and Seinfeld, J. H.: Coupling Filter-Based Thermal Desorption Chemical Ionization Mass Spectrometry with Liquid Chromatography/Electrospray Ionization Mass Spectrometry for Molecular Analysis of Secondary Organic Aerosol, *Environ. Sci. Technol.*, 54, 13238-13248, **2020**.
18. Kenseth, C. M., Hafeman, N. J., **Huang, Y.**, Dalleska, N. F., Stoltz, B. M., and Seinfeld, J. H.: Synthesis of Carboxylic Acid and Dimer Ester Surrogates to Constrain the Abundance and Distribution of Molecular Products in  $\alpha$ -Pinene and  $\beta$ -Pinene Secondary Organic Aerosol, *Environ. Sci. Technol.*, 54, 12829-12839, **2020**.
17. Amorim, J. V., Wu, S., Klimchuk, K., Lau, C., Williams, F. J., **Huang, Y.**, and Zhao, R.: pH-Dependence of the OH-Reactivity of Organic Acids in the Aqueous-Phase, *Environ. Sci. Technol.*, 54, 12484-12492, **2020**.
16. **Huang, Y.**, Seinfeld, J. H., and Flagan, R. C.: Diffusional Transfer Function for the Scanning Electrical Mobility Spectrometer (SEMS), *Aerosol Sci. Technol.*, 54, 1157-1168, **2020**.
15. Charan, S. M., **Huang, Y.**, Seinfeld, J. H.: Computational Simulation of Secondary Organic Aerosol Formation in Laboratory Chambers, *Chem. Rev.*, 119, 11912-11944, **2019**.
14. Schwantes, R. H., Charan, S. M., Bates, K. H., **Huang, Y.**, Nguyen, T. B., Mai, H., Kong, W., Flagan, R. C., and Seinfeld, J. H.: Low-Volatility Compounds Contribute Significantly to Isoprene SOA under High-NO Conditions, *Atmos. Chem. Phys.*, 19, 7255-7278, **2019**.
13. **Huang, Y.** and Seinfeld, J. H.: A Note on Flow Behavior in Axially-Dispersed Plug Flow Reactors with Step Input of Tracer, *Atmos. Environ.: X*, 1, 100006, **2019**.

12. **Huang, Y.\***, Barraza, K. M.\*, Kenseth, C. M., Zhao, R., Wang, C., Beauchamp, J. L., and Seinfeld, J. H.: Probing the OH Oxidation of Pinonic Acid at the Air-Water Interface Using Field-Induced Droplet Ionization Mass Spectrometry (FIDI-MS), *J. Phys. Chem. A*, 122, 6445-6456, **2018**.
11. Kenseth, C. M., **Huang, Y.**, Zhao, R., Dalleska, N. F., Hethcox, J. C., Stoltz, B. M., and Seinfeld, J. H.: Synergistic O<sub>3</sub> + OH Oxidation Pathway to Extremely Low-Volatility Dimers Revealed in  $\beta$ -Pinene Secondary Organic Aerosol, *Proc. Natl. Acad. Sci. USA*, 115, 8301-8306, **2018**.
10. Zhang, X., Ortega, J., **Huang, Y.**, Shertz, S., Tyndall, G. S., and Orlando, J. J.: A Steady-State Continuous Flow Chamber for the Study of Daytime and Nighttime Chemistry under Atmospherically Relevant NO Levels, *Atmos. Meas. Tech.*, 11, 2537-2551, **2018**.
9. Zhao, R., Kenseth, C. M., **Huang, Y.**, Dalleska, N. F., Kuang, X. M., Chen, J., Paulson, S. E., and Seinfeld, J. H.: Rapid Aqueous-Phase Hydrolysis of Ester Hydroperoxides Arising from Criegee Intermediate and Organic Acids, *J. Phys. Chem. A*, 122, 5190-5201, **2018**.
8. **Huang, Y.**, Zhao, R., Charan, S. M., Kenseth, C. M., Zhang, X., and Seinfeld, J. H.: Unified Theory of Vapor-Wall Mass Transport in Teflon-Walled Environmental Chambers, *Environ. Sci. Technol.*, 52, 2134-2142, **2018**.
7. Zhao, R., Kenseth, C. M., **Huang, Y.**, Dalleska, N. F., and Seinfeld, J. H.: Iodometry-Assisted Liquid Chromatography Electrospray Ionization Mass Spectrometry for Analysis of Organic Peroxides: An Application to Atmospheric Secondary Organic Aerosol, *Environ. Sci. Technol.*, 52, 2108-2117, **2018**.
6. **Huang, Y.\***, Coggon, M. M.\*, Zhao, R., Lignell, H., Bauer, M., Flagan, R. C., and Seinfeld, J. H.: The Caltech Photooxidation Flow Tube Reactor: Design, Fluid Dynamics and Characterization, *Atmos. Meas. Tech.*, 10, 839-867, **2017**.
5. Tang, Y., **Huang, Y.**, Li, L., Chen, H., Chen, J., Yang, X., Gao, S., and Gross, D. S.: Characterization of Aerosol Optical Properties, Chemical Composition and Mixing States in the Winter Season in Shanghai, China, *J. Environ. Sci.*, 26, 2412-2422, **2014**.
4. **Huang, Y.**, Yang X.: Influence of Fine Particulate Matter on Atmospheric Visibility (in Chinese), *Chin. Sci. Bull (Chin Ver)*, 58, 1165-1170, **2013**.
3. Wang, X., Williams, B. J., Wang, X., Tang, Y., **Huang, Y.**, Kong, L., Yang, X., and Biswas, P.: Characterization of Organic Aerosol Produced during Pulverized Coal Combustion in A Drop Tube Furnace, *Atmos. Chem. Phys.*, 13, 10919-10932, **2013**.
2. **Huang, Y.**, Li, L., Li, J., Wang, X., Chen, H., Chen, J., Yang, X., Gross, D. S., Wang, H., Qiao, L., and Chen, C.: A Case Study of the Highly Time-Resolved Evolution of Aerosol Chemical and Optical Properties in Urban Shanghai, China, *Atmos. Chem. Phys.*, 13, 3931-3944, **2013**.
1. **Huang, Y.**, Chen, H., Wang, L., Yang, X., and Chen, J.: Single Particle Analysis of Amines in Ambient Aerosol in Shanghai, *Environ. Chem.*, 9, 202-210, **2012**.

## PRESENTATIONS

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- Solving Stiff Atmospheric Chemical Kinetics with Neural Networks, Southern University of Science and Technology, 04/21/2022 (**Virtual Platform**).
- From the General Dynamic Equation to Aerosol Science and Technology, University of Miami, 11/16/2021 (**Platform**).
- Application of Machine Learning to Development of Atmospheric Chemical Mechanisms, AGU Fall Meeting, 12/09/2020 (**Virtual Platform**).
- Application of Machine Learning to Simulate Atmospheric Chemical Reactions, 38th American Association of Aerosol Research, 10/08/2020 (**Virtual Platform**).

- Identification of Aerosol-Phase Accretion Products with Filter-Based Thermal Desorption, 37th American Association of Aerosol Research, Portland, OR, 10/17/2019 (**Platform**).
- Diffusional Transfer Function for the Scanning Electrical Mobility Spectrometer (SEMS), 37th American Association of Aerosol Research, Portland, OR, 10/16/2019 (**Platform**).
- Characterization and Application of Teflon Chamber Reactors to Study Secondary Organic Aerosol Formation, 6th Chinese Environmental Scholars Forum, Huston, CA, 06/01/2019 (**Poster**).
- Characterizing Photochemical Environment in the Caltech PhotoOxidation Flow Tube Reactor (CPOT), 10th International Aerosol Conference, Saint Louis, MO, 09/03/2018 (**Platform**).
- OH Oxidation of Surface-Active Species at the Air-Water interface, the Los Angeles Environmental Forum, San Gabriel, CA, 08/10/2018 (**Platform**).
- Unified Theory of Vapor-Wall Mass Transport in Teflon-Walled Environmental Chambers, 36th American Association of Aerosol Research, Raleigh, NC, 10/17/2017 (**Poster**).

## TEACHING EXPERIENCE

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### California Institute of Technology

#### *Teaching Assistant*

Aerosol Physics and Chemistry

Winter Term, 2017, 2019

#### *Mentor*

Supervised three Summer Undergraduate Research Fellow students

2017, 2018, 2019

### Fudan University

#### *Teaching Assistant*

Energy and the Environment

Fall Semester, 2011, 2012, 2013

Frontiers of Environmental Science

Spring Semester, 2012

## HONORS AND AWARDS

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Caltech GSC Teaching and Mentoring Award	2020.11
Chinese government award for outstanding self-financed students abroad	2020.05
CESF 2019 Student Travel Grant	2019.05
Best Student Research Paper Award at Los Angeles Environmental Forum	2018.08
IAC 2018 Student Travel Grant	2018.07
CESASC Annual Scholarship Awards	2018.05
Excellent Graduate Research Achievement in Shanghai	2015.08
Stanback Fellowship	2014.09
National Scholarship	2008.10, 2012.10, 2013.10
Outstanding Graduates Awards of Shanghai	2011.06
Tung OOCL Scholarship	2010.10
Suntory International Group Scholarship	2009.10

## PROFESSIONAL SERVICES

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Peer-review referee: Atmospheric Chemistry and Physics, Atmospheric Measurement Techniques, Geoscientific Model Development, Environmental Science & Technology, PNAS, Journal of Aerosol Science, ACS Earth and Space Chemistry, Atmospheric Environment, Atmospheric Research, Scientific Reports, Environmental Research Letters, Atmosphere

## REFERENCE

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Prof. John H. Seinfeld	seinfeld@caltech.edu
Prof. Richard C. Flagan	flagan@caltech.edu
Prof. Paul O. Wennberg	wennberg@caltech.edu
Prof. Michael R. Hoffmann	mrh@caltech.edu