

Han N. Huynh

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EDUCATION

Columbia University – New York City, NY

Doctor of Philosophy, Master of Science, Chemical Engineering (CHE) 2021

GPA: 4.0/4.0, Omega Chi Epsilon (OCE) scholar

Worcester Polytechnic Institute – Worcester, MA 2014

Bachelor of Science, CHE with a Mathematics minor

GPA: 3.96/4.00, Presidential Scholar, Dean's List, High Honor Graduate, ACS and OCE scholar

PROFESSIONAL RESEARCH EXPERIENCE

Cooperative Institute for Research in Environmental Sciences (CIRES), CU Boulder June 2023 – present

National Oceanic and Atmospheric Administration (NOAA) – Boulder, CO

Research Scientist, Aerosol Properties & Processes Group, Chemical Sciences Laboratory (CSL)

- Joined as an instrument scientist for the aerosol optical properties (AOP) suite that consists of a cavity ringdown spectrometer (CRDS) and a photoacoustic absorption spectrometer (PAS).
- Responsible for maintaining the instrument suite, collecting, and analyzing AOP relevant data from field campaigns (e.g., extinction, adsorption, scattering) to better understand the effects of aerosol optical and microphysics (i.e., SSA, f(RH)) on the atmosphere.
- Collaborate with modeling and satellite groups to validate their aerosol products against field data.

POSTDOCTORAL RESEARCH EXPERIENCE

University of Toronto – Toronto, Ontario, Canada

Dec 2021 – May 2023

Postdoctoral Fellow, Abbatt Group, Environmental Chemistry, Department of Chemistry

- Participated in CASA indoor chemistry field campaign conducted from Feb-April 2022 at NIST (Maryland, US) in a team of three to investigate the sorption processes of VOCs in a test house using a GC-Vocus PTR-ToF-MS, i.e. via continuous measurements, analyses of the behavior of test compounds injected into the house, surface flux chamber measurements.
- Analyzing the chemical composition and evolution of VOCs and SVOCs from different sanitizing surface wipes with both the GC-Vocus PTR-MS and a DART-MS.

DOCTOR OF PHILOSOPHY DISSERTATION

Heterogeneous Chemistry of HNO₃ and HCl with CaCO₃ Aerosols & Its Potential Impact on Stratospheric Ozone

Advisor: V. Faye McNeill, Professor of Chemical Engineering and Earth and Environmental Sciences

- Determined the kinetics and reaction mechanism between solid calcite (CaCO₃) particles and stratospherically relevant trace gases – HNO₃ and HCl – using a Fourier transform infrared spectroscopy (FTIR) at 296 K under dry conditions.
- Experimentally measured and confirmed the kinetics between CaCO₃ aerosols and HCl using an aerosol flow tube (AFT) coupled with a custom-built quadrupole chemical ionization mass spectrometer (CIMS) both at 296 K and at stratospheric temperature, 204 K.

- Reviewed stratospheric solar radiation management (SSRM) studies on the different impacts of seeding aerosols in the stratosphere and on any existing policy framework that have been put into place to regulate this potential new field.

PEER-REVIEWED PUBLICATIONS

- 1) **Huynh, H. N.**, McNeill, V. F. (2024). The Potential Environmental and Climate Impacts of Stratospheric Aerosol Injection: A Review, DOI: [10.1039/D3EA00134B](https://doi.org/10.1039/D3EA00134B) (Critical Review) *Environ. Sci.: Atmos.*, 2024, *Accepted Manuscript*
- 2) **Huynh, H. N.**, Ditto, J. C., Yu, J., Link, M. F., Poppendieck, D., Farmer, D. K., Vance, M. E., Abbatt, J. P. D. (2024). Assessing VOC Emission Rates from an Indoor Surface Using a Flux Chamber and PTR-MS, *in prep.*
- 3) **Huynh, H. N.**, Liu, R., Liu, Q., Abbatt, J. P. D. (2024). Potential Long-Term Exposure to VOCs and SVOCs from Disinfecting Wipes, *in prep.*
- 4) Ditto, J.; Webb, M.; **Huynh, H. N.**; Yu, J.; Morrison, G.; Turpin, B.; Alves, M.; Mayer, K., Link, M. F.; Goldstein, A.; Poppendieck, D.; Vance, M. E.; Farmer, D. K.; Chan, A. W. H.; Abbatt, J. P. D. The role of indoor surface pH in controlling the fate of acids and bases in an unoccupied residence, *in prep.*
- 5) Link, M. F.; Li, J.; Ditto, J. C.; **Huynh, H.**; Yu, J.; Zimmerman, S. M.; Rediger, K. L.; Shore, A.; Abbatt, J. P. D.; Garofalo, L. A.; Farmer, D. K.; Poppendieck, D. Ventilation in a Residential Building Brings Outdoor NO_x Indoors with Limited Implications for VOC Oxidation from NO₃ Radicals. *Environ. Sci. Technol.* **2023**, 57 (43), 16446–16455. <https://doi.org/10.1021/ACS.EST.3C04816>.
- 6) Jorga, S. D.; Liu, T.; Wang, Y.; Hassan, S.; **Huynh, H.**; Abbatt, J. P. D. Kinetics of Hypochlorous Acid Reactions with Organic and Chloride-Containing Tropospheric Aerosol. *Environ. Sci. Process. Impacts* **2023**, 25 (10), 1645–1656. <https://doi.org/10.1039/D3EM00292F>.
- 7) **Huynh, H. N.**; McNeill, V. F. Heterogeneous Reactivity of HCl on CaCO₃ Aerosols at Stratospheric Temperature. *ACS Earth Sp. Chem.* **2021**, 5 (8), 1896–1901. <https://doi.org/10.1021/ACSEARTHSPACECHEM.1C00151>.
- 8) **Huynh, H. N.**; McNeill, V. F. Heterogeneous Chemistry of CaCO₃ Aerosols with HNO₃ and HCl. *J. Phys. Chem. A* **2020**, 124 (19), 3886–3895. <https://doi.org/10.1021/acs.jpca.9b11691>.

CONFERENCES

- *Presentation*, Assessing VOC Emission Rates from an Indoor Surface Using a Flux Chamber and PTR-MS, Indoor Air session, AAAR, Portland, OR (10/2023)
- *Presentation*, The Potential Environmental and Climate Impacts of Stratospheric Aerosol Injection: A Review, Atmospheric Chemistry (AC) session, American Association for Aerosol Research (AAAR), Raleigh, NC (10/2022)
- *Poster*, Potential long-term exposure to VOCs and SVOCs from disinfecting wipes, Infectious Disease session, AAAR, Raleigh, NC (10/2022)
- *Presentation*, Heterogeneous Reactivity of HCl on CaCO₃ Aerosols at Stratospheric Temperature, AC session, AAAR, Albuquerque, NM (10/2021)

- *Presentation, Heterogeneous Chemistry of CaCO₃ Aerosols with HNO₃ and HCl and Its Potential Impact on Stratospheric Ozone, Laboratory Studies in Atmospheric Sciences session, American Geophysical Union (AGU), San Francisco, CA (12/2020)*
- *Presentation, Innovation Now session, MITAB Applied Energy Symposium, Boston, MA (08/2020)*
- *Presentation, Regional Kinetics and Dynamics Meeting, MIT, Boston, MA (01/2020)*
- *Poster, AC session, AAAR, Portland, OR (10/2019)*

ENGINEERING TOOLS & SOFTWARE

- *Tools: GC-Vocus PTR-ToF-MS, DART-MS, octupole quad-CIMS, Scanning Mobility Particle Sizer (SMPS), FTIR, Fluorescence Microscope, Micro-Orifice Uniform Deposit Impactor (MOUDI), Differential Scanning Calorimeter (DSC), Viscometer*
- *Software: Tofware, Igor, OpenFOAM, ParaView, COMSOL, Mathcad, Solidworks, AutoCAD, XChemEdit, Maestro*

TECHNICAL SKILLS

- *Programming language: Python, Java, MATLAB, FORTRAN, Microsoft/Oracle PL/SQL*
- *Data-related system: Oracle Data Integrator (ODI), Oracle Business Intelligence Tool (OBIEE)*

PROFESSIONAL EXPERIENCE

Archetype Consulting Group – Boston, MA 2016 – 2017
Consultant, Team Lead, Healthcare Practice

- Led a team of five on an enrollment interface development project between Vermont Health Connect (VHC), the Healthcare Exchange system in Vermont, and the federal Center for Medicaid and Medicare Services (CMS) to design an automated system that analyzed and aggregated Vermont’s monthly policy-level enrollment data to transmit to CMS.
- Designed and developed the monthly XML file, downstream reporting, and script testing cases using Oracle technologies, including Oracle SQL, ODI and OBIEE in all environments.

Infinata, Mergermarket Group – Boston, MA 2015 – 2016
Product Analyst, Custom Data Services

- Developed new reporting platform with OBIEE for a banking client, and aggregated data with SQL & PL/SQL to support data driven decisions for client’s sales and marketing campaign.
- Analyzed business requirements, and iteratively developed algorithms with client inputs using SQL on existing database to track the marketable population for refinanced education loans.
- Incorporated new data sources into client’s existing OBIEE reports and Infinata proprietary reporting platforms to measure marketing campaign sales metrics more completely and accurately.

Exeter Group Inc. – Boston, MA 2014 – 2015
Consultant, Health Insurance Exchange Data Layer Product Development

- Developed a data reader using Java that supported different file formats (Excel and CSV) to feed health insurance entities information to the middleware platform API.

- Organized and mapped health insurance entities between the rule base (Oracle Policy Automation), the API platform, and customer UI (Siebel Systems).
- Provided support and training for the Asia offshore team on the new API platform (data consumption & transformation, coding, unit testing) required to implement the new technology.

EXTRACURRICULAR ACTIVITIES

- Mentor, Undergraduate Mentoring Program, Women in Science at Columbia (WISC), 2020 – 2021
- Teaching Assistant, Chemical Engineering department, 2017 – 2020
- Academic Tutor, WPI tutoring center, 2013 – 2014
- Teaching Assistant, Mathematics department, 2011 – 2014