

WENDELL WALTERS, PhD

Assistant Professor
Department of Chemistry and Biochemistry
University of South Carolina
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EDUCATION

- 2016 **Purdue University**, Ph.D. Earth, Atmospheric, and Planetary Sciences. *Thesis Title*: “The nitrogen and oxygen stable isotopes of NO_x and its oxidation products: implications for NO_x source partitioning and assessing atmospheric oxidation chemistry”
- 2012 **University of Maryland College Park**, B.S. Chemistry (Scholars)

RESEARCH POSITIONS

- 2023- University of South Carolina, Department of Chemistry and Biochemistry, Assistant Professor
- 2022-2023 US EPA, Office of Research and Development, Visiting Assistant Professor
- 2018-2023 Brown University, Institute at Brown for Environment and Society Assistant Professor of Research
- 2016-2018 Brown University, Institute at Brown for Environment and Society and Department of Earth, Environmental, and Planetary Sciences NSF Postdoctoral Fellow with Meredith Hastings
- 2012-2016 Purdue University, Earth, Atmospheric, and Planetary Sciences Graduate Research Assistant with Greg Michalski
- 2010-2012 University of Maryland College Park, Department of Chemistry and Biochemistry Undergraduate Research Assistant with Amy Mullin

SELECTED AWARDS & FELLOWSHIPS

- 2017 Atmospheric Chemistry Colloquium for Emerging Senior Scientists (ACCESS XIV), Selected Participant, Brookhaven National Lab
- 2016 NSF Atmospheric and Geospace Sciences (AGS) Postdoctoral Fellowship
- 2016 Bisland Dissertation Fellowship

- 2016 Purdue Earth, Atmospheric, and Planetary Sciences Outstanding Graduate Student of the Year
- 2015 P.F. Low Travel Grant
- 2015 Henry Silver Environmental Science Graduate Student of the Year
- 2014 Purdue University Earth, Atmospheric, and Planetary Sciences Expo Outstanding Student Presentation Award
- 2013 NSF Graduate Research Fellowship
- 2012 Purdue Climate Change Research Center Graduate Fellowship
- 2012 American Institute of Chemist Award

RESEARCH GRANTS

- 2022 Institute at Brown for Environment and Society Seed Grant. “Towards a Global Interpretation of Nitrogen Stable Isotopes of Atmospheric Ammonia and Products”. PI: Wendell Walters. Amount: \$15,237.
- 2021 NSF EPSCOR RII Track-4, “Assessment of CMAQ Representation of Spatiotemporal Atmospheric Nitrate Chemical Production in New England. PI: Wendell Walters. Amount: \$168,980
- 2021 The Centre for Energy, Environmental and Technological Research, “Effects of nitrogen deposition in the Mediterranean” Amount: \$5,088.
- 2020 Institute at Brown for Environment and Society Seed Grant. “Spatiotemporal Dynamics of Particulate Nitrate in the Northeastern US in Response to Emission Regulations”. PIs: Meredith Hastings and Wendell Walters. Amount: \$23,000.
- 2020 NSF Atmospheric and Geospace Sciences. “Evaluating the atmospheric dynamics of nitrate and sulfate in southern New England in response to emission regulations”. PI: Wendell Walters (Brown), Meredith Hastings (Brown), Mark Thiemens (UC San Diego). Amount: \$485,613.
- 2018 NOAA Atmospheric Chemistry, Carbon, and Climate (AC4). “Constraining NO_x-BVOC Oxidation Chemistry and Feedbacks Using Oxygen Stable Isotopes”. PIs: Wendell Walters (Lead), Meredith Hastings (Brown), and Nga Lee Ng (GA Tech). Amount: \$587,082; \$386,343 to Brown University. Grant ID: NA18OAR4310118.

- 2018 Institute at Brown for Environment and Society Seed Grant. “Novel Characterization of Particulate Matter (PM) at an Urban Background Site”. PIs: Wendell Walters (Lead) and Meredith Hastings (co-PI). Amount: \$10,000.
- 2016 NSF Atmospheric and Geospace Sciences Postdoctoral Fellowship. “Constraining Ammonia Emission Sources in Urban Areas Utilizing Nitrogen Stable Isotopes”. PI: Wendell Walters. Amount: \$172,000. Grant ID: 1624618.
- 2014 Geological Society of America Graduate Research Grant. The Nitrogen and Oxygen Stable Isotopes of the Ross Ice Drainage Ice Core. PI: Wendell Walters. Amount: \$900. Grant ID: 9174354.
- 2013 NSF Graduate Research Fellowship Program. “Anthropogenic and Natural Impacts on Oxygen Isotopes of Ice-Core Nitrate”. PI: Wendell Walters. Amount: \$96,000. Grant ID: DGE-1333468.

PUBLICATIONS

† designates mentored graduate student; ‡ designates mentored undergraduate student; ★ designates these authors contributed equally to the manuscript.

- 2023 MacFarland, A. B., Joyce, E. E., Wang, X., **Walters, W. W.**, Altieri, K. E., Schiebel, H. N., Hastings, M. G. Investigation of Coastal Ammonium Aerosol Sources in the Northwestern Pacific Ocean. *Atmos. Environ.* (in press)
- 2023 Joyce, E., Balint, S., **Walters, W. W.**, Lichiheb, N., Heuer, M., Myles, L., Heikes, B., Hastings, M. G. Discerning the concentration and bi-directional flux of ammonia in an urban estuary using the relaxed eddy accumulation method. *JGR-Biogeosciences*, e2023JG007414
- 2023 Barth, P., Stueken, E. E., Helling, C., Rossmanith, L., Peng, Y., **Walters, W. W.**, Claire, M. Isotopic constraints on lightning as a source of fixed nitrogen in Earth’s early biosphere. *Nature Geoscience*, 1-7.
- 2023 Kim, H.†; **Walters, W.W.**; Bekker, C.‡; Murray, L.T.; Hastings, M.G. Nitrate chemistry in the Northeast US Part II: Oxygen Isotopes Reveal Differences in Particulate and Gas Phase Formation. *Atmos. Chem. Phys.*, 23(7), 4203-4219.
- 2023 Bekker, C.‡★; **Walters, W.W.★**; Murray, L.T.; Hastings, M.G. Nitrate chemistry in the Northeast US Part 1: Nitrogen isotope seasonality tracks nitrate formation chemistry. *Atmos. Chem. Phys.*, 23(7), 4185-4201.
- 2023 Blum, B.E.†; **Walters, W.W.**; Gamze, E.; Takeuchi, M.; Huey, G.; Tanner, D.; Ng, N.L.; Hastings, M.G. Collection of nitrogen dioxide for nitrogen and oxygen isotope

- determination – laboratory and environmental chamber experiment evaluation. *Anal. Chem.*, 95(6), 3371-3378.
- 2022 **Walters, W.W.**, Wilcock, E.‡; Baek, B.H.; Karod, M.‡; Blum, D.E.†; Hastings, M.G. Quantifying the importance of vehicle ammonia emissions in an urban area of the northeastern US utilizing nitrogen isotopes. *Atmos. Chem. Phys.*, 22(20), 13431-13448.
- 2022 Chang, Y.; Cheng, K.; Kuang, Y.; Hu, Q.; Gao, Y.; Huang, R.; Huang, Ch.; **Walters, W.W.**; Lehmann, M.F. Isotopic variability of ammonia ($\delta^{15}\text{N-NH}_3$) slipped from heavy-duty vehicles under real-world conditions. *Environ. Sci. Technol. Lett.*, 9(9), 726-732.
- 2022 Gu, M., Pan, Y., Sun, Q., **Walters, W.W.**, Song, L.†, Fang, Y. Is fertilization the dominant source of ammonia in the urban atmosphere? *Sci. Total Environ.*, 838, 155890.
- 2022 Gu, M., Pan, Y., **Walters, W.W.**, Sun, Q., Song, L., Wang, Y., Xue, Y., Fang, Y. Vehicular emissions enhanced ammonia concentration in winter mornings: Insights from diurnal nitrogen isotopic signatures. *Environ. Sci. Technol.*, 56(3), 1578-1585.
- 2022 Li, Z.‡; **Walters, W.W.**; Hastings, M.G.; Song, L.; Huang, S.; Zhu, F.; Liu, D.; Shi, G.; Fang, Y. Atmospheric nitrate formation pathways in urban and rural atmosphere of Northeast China: Implications for complicated anthropogenic effects. *Environ. Pollut.*, 296, 118752.
- 2021 Song, L.‡; **Walters, W.W.**; Pan, Y.; Li, Z.‡; Gu, M.; Duan, Y.; Lu, Z.; Fang, Y. ^{15}N natural abundance of vehicular exhaust ammonia, quantified by active sampling techniques. *Atmos. Environ.*, 255, 118430.
- 2021 Chai, J. Dibb, J.E., Anderson, B.E., Bekker, C., Blum, D.E., Heim, E., Jordan, C.E., Joyce, E.E., Kaspari, J.H., Munro, H., **Walters, W.W.**, Hastings, M.G. Isotopic evidence for dominant secondary production of HONO in near-ground wildfire plumes, *Atmos Chem Phys.*, 21, 13077-13098
- 2021 Michalski, G.; Fang, H.; **Walters, W.W.**; Mase, D. iNRACM: Incorporating ^{15}N into the Regional Atmospheric Chemistry Mechanism (RACM) for assessing the role photochemistry plays in controlling the isotopic composition of NO_x , NO_y , and atmospheric nitrate, *Geosci. Model Dev.*, 14, 5001-5022.
- 2021 Le Roy, E.‡; **Walters, W.W.**; Joyce, E.E.†; Hastings, M.G. Sources of Ammonium in Seasonal Wet Deposition at a Coastal New England City, *Atmos. Environ.*, 118557.
- 2021 Zhang, Q.; Pan, Y.; He, Y., **Walters, W.W.**, Ni, Q., Liu, X., Xu, G., Shao, J., Jiang, C. Substantial nitrogen oxides emission reduction from China due to COVID-19 and its impact on surface ozone and aerosol pollution, *Science of the Total Environ.*, 753, 142238.

- 2021 Song, W.; Liu, X.Y.; Hu, C.C.; Chen, G.Y.; Liu, X.J.; **Walters, W.W.**; Michalski, G.; Liu, C.Q. Important contributions of non-fossil fuel nitrogen oxides emissions, *Nat. Commun.*, 12, 243
- 2021 Matiatos, I.; Wassenaar, L.; Monteiro, L.R.; Venkiteswaran, J.J.; Gooddy, D.C.; Boeckx, P.; Sacchi, E.; Yue, F.; Michalski, G.; Alonso-Hernandez, C.; Biasi, C.; Bouchaou, L.; Edirisinghe, N.N.; Fadhullah, W.; Fianko, J.R.; Garcia-Moya, A.; Kazakis, N.; Luu, M.T.; Priyadarshanee, S.; Re, V.; Rivera, D.S.; Romanelli, A.; Sanyal, P.; Tamoooh, F.; Trinh, D.A.; **Walters, W.W.**; Welti, N. Global patterns of nitrate isotope composition in rivers and adjacent aquifers reveal reactive nitrogen cascading. *Communications Earth & Environment*, 2(1), 1-10.
- 2020 Blum, D. E.†; **Walters, W.W.**; Hastings, M.G. Collection Methods of Simultaneously Speciated Nitric Acid and Fine Particulate Matter for Determination of Nitrogen and Oxygen Stable Isotopic Composition, *Anal Chem*, 92, 16079-16088.
- 2020 **Walters, W.W.**; Song, L.†; Fang, Y.; Colombi, N.‡; Chai, J.; Hastings, M.G. Characterizing the spatiotemporal nitrogen stable isotopic composition of ammonia in vehicle plumes *Atmos. Chem. Phys.*, 20, 11551-11567.
- 2020 Joyce, E.†; **Walters, W.W.**; Le Roy, E.‡; Clark, S.; Schiebel, H.; Hastings, M.G. Highly concentrated atmospheric nitrogen deposition in an urban coastal region in the United States. *Environ. Sci. Technol.*, 2(8), 081001.
- 2020 Pan, Y.; Gu, M.; He, Y.; Wu, D.; Liu, C.; Song, L.; Tian, S.; Lu, X.; Sun, Y.; Song, T.; **Walters, W.W.**; Liu, X.; Martin, N.A.; Zhang, Q.; Fang, Y.; Ferracci, V.; Wang, Y. Revisiting the concentration observations and source apportionment of atmospheric ammonia. *Adv. Atmos. Sci.*, 37, 933-938.
- 2020 Pan, Y.; Gu, M.; Song, L.; Tian, S.; Wu, D.; **Walters, W.W.**; Yu, X.; Lu, X.; Ni, X.; Wang, Y.; Cao, J.; Liu, X.; Fang, Y.; Wang, L. Systematic low bias of passive samplers in characterizing nitrogen isotopic composition of atmospheric ammonia, *Atmos. Res.*, 243, 105018.
- 2020 Li, Z.†; Hastings, M. G.; **Walters, W.W.**; Tian, L.; Clemens, S. C.; Song, L.; Shao, L.; Fang, Y. Isotopic evidence that recent agriculture overprints climate variability in nitrogen deposition to the Tibetan Plateau. *Environ. Int.*, 138, 105614.
- 2019 Li, Z. †; **Walters, W.W.**; Hastings, M.G.; Zhang, Y.; Song, L.; Liu, D.; Zhang, W.; Pan, Y.; Fu, P.; Fang, Y. Nitrate isotopic composition in precipitation at a Chinese megacity: Seasonal variations, atmospheric processes and implications for sources. *Earth Space Sci.*, 6, 2200-2213
- 2019 **Walters, W.W.**; Michalski, G.; Böhlke, J. K.; Alexander, B.; Savarino, J.; Thieme, M. H. Assessing the seasonal dynamics of nitrate and sulfate aerosols at the South Pole utilizing stable isotopes. *J Geophys Res-Atmos.* 124(14), 8161-8177.

- 2019 **Walters, W.W.** Stable Isotopes, Chemistry of the atmosphere. (Reference Module in Earth Systems and Environmental Sciences; <https://doi.org/10.1016/B978-0-12-409548-9.11911-6>)
- 2019 **Walters, W.W.;** Blum, D. E.; Hastings, M.G. Selective collection of particulate ammonium for nitrogen isotopic characterization using a denuder-filter pack sampling device. *Anal. Chem.*, *91*(12), 7586-7594.
- 2018 **Walters, W.W.;** Chai, J.; Hastings, M.G. Theoretical phase resolved ammonia-ammonium nitrogen equilibrium isotope exchange fractionations: Applications for tracking atmospheric ammonia gas-to-particle conversion. *ACS Earth Space Chem.*, *3*(1), 79-89.
- 2018 **Walters, W.W.;** Hastings, M.G. Collection of ammonia for high time-resolved nitrogen isotopic characterization utilizing an acid-coated honeycomb denuder. *Anal. Chem.*, *90*(13), 8051-8057.
- 2018 **Walters, W.W.;** Fang, H.; Michalski, G. Summertime diurnal variations in the isotopic composition of atmospheric nitrogen dioxide at a small midwestern United States city. *Atmospheric Environ.* *179*, 1-11.
- 2016 **Walters, W. W.;** Michalski, G. Ab initio study of nitrogen and position-specific oxygen kinetic isotope effects in the $\text{NO} + \text{O}_3$ reaction. *J. Chem. Phys.* *145*(22), 224311.
- 2016 **Walters, W. W.;** Michalski, G. Theoretical calculation of oxygen equilibrium isotope fractionation factors involving various NO_y molecules, OH, and H_2O and its implications for isotope variations in atmospheric nitrate. *Geochim. Cosmochim. Acta* *191*, 89-101.
- 2016 Lyons, W. B.; Deuerling, K.; Welch, K. A.; Welch, S. A.; Michalski, G.; **Walters, W.W.;** Nielsen, U.; Wall, D. H.; Hogg, I.; Adams, B J. The soil geochemistry in the Beardmore Glacier Region, Antarctica: implications for terrestrial ecosystem history. *Sci. Rep.* *6*, 26189.
- 2016 **Walters, W.W.;** Simonini‡, D. S.; Michalski, G. Nitrogen isotope exchange between NO and NO_2 and its implications for $\delta^{15}\text{N}$ variations in tropospheric NO_x and atmospheric nitrate. *Geophys. Res. Lett.* *43*(1), 440-448.
- 2015 **Walters, W.W.;** Tharp, B. D.‡; Fang, H.; Kozak, B. J.; Michalski, G. Nitrogen isotope composition of thermally produced NO_x from various fossil-fuel combustion sources. *Environ. Sci. Technol.*, *49*(19), 11363-11371.
- 2015 **Walters, W. W.;** Michalski, G. Theoretical calculation of nitrogen equilibrium isotope exchange fractionation factors for various NO_y molecules. *Geochim. Cosmochim. Acta*, *164*, 284-297.

- 2015 **Walters, W. W.**; Goodwin, S. R.‡; Michalski, G. Nitrogen stable isotope composition ($\delta^{15}\text{N}$) of vehicle-emitted NO_x . *Environ. Sci. Technol.* 49(4), 2278-2285.
- 2014 Echebiri, G. O.; Smarte, M. D.; **Walters, W. W.**; Mullin, A. S. Performance of a high-resolution mid-IR optical-parametric-oscillator transient absorption spectrometer. *Optics Express*, 22(12), 14885-14895.

PUBLICATIONS—IN REVIEW

- 2023 **Walters, W. W.**, Hastings, M. G. Triple Oxygen Stable Isotope Analysis of Nitrite. (*MethodsX*, in revision)
- 2023 Kim, H., **Walters, W. W.**, Kysela, L., Hastings, M. G. Long-term trends in inorganic aerosol chemical composition and chemistry at an urban and rural site in the northeastern US (*Science of the Total Environment*, in review)
- 2023 Li, Z.†; **Walters, W.W.**; Hastings, M.G.; Tian, L.; Song, L.; Shao, L.; Geng, L.; Ruan, X.; Pan, Y.; Huang, K.; Wu, L.; Fang, Y. Isotope evidence for the acidification of aerosol in the last 200 years from an Asia ice core (*Science*, in review)

PUBLICATIONS—IN DRAFT

- 2023 **Walters, W.W.**; Takeuchi, M.; Eris, G.; Blum, D.E.; Huey, G.; Tanner, D.; Xu, W.; Rivera-Rios, J.; Liu, F.; Weber, R.; Ng, N.L.; Hastings, M.G. Evaluating Nitrogen Oxide and Alpha-Pinene Oxidation Chemistry and Impact on Reactive Nitrogen: Insights from Oxygen and Nitrogen Stable Isotopes.
- 2023 **Walters, W.W.**; Takeuchi, M.; Ng, N. L.; Hastings, M. G. Incorporating Oxygen Isotopes of Oxidized Reactive Nitrogen in the Regional Atmospheric Chemistry Mechanism, Version 2 (ICOIN-RACM2).
- 2023 **Walters, W.W.**; Pye, H. O. T.; Kim, H.; Hastings, M. G. Incorporating Oxidation Tracers of Reactive Nitrogen in the Community Multiscale Air Quality (CMAQ) Model Utilizing Oxygen Isotope Mass-Independent Fractionation.

CONFERENCE PRESENTATIONS

- 2023 **Walters, W. W.** Incorporating NO_x Oxidation Tracers ($\Delta(^{17}\text{O})$) in the Community Multiscale Air Quality (CMAQ) Model. Gordon Research Conference on Atmospheric Chemistry, Newry, ME (Poster).
- 2023 **Walters, W. W.** Investigating Reactive Chemistry Using Stable Isotopes. ASCENT Workshop, Atlanta, GA (Oral).

- 2022 **Walters, W.W.**; Blum, D.E.; Takeuchi, M.; Xu, W.; Rivera-Rios, J.C.; Eris, G.; Min, J.; Weber, R.; Turner D.; Huey, G.; Ng, N.L.; Hastings, M.G. Improving model representation of NO_x and α -pinene oxidation chemistry utilizing oxygen and nitrogen stable isotope constraints, American Geophysical Union, Chicago, IL (Poster)
- 2022 **Walters, W.W.**; Nitrate chemistry in the northeast US part I: nitrogen isotope seasonality tracks nitrate formation chemistry, National Atmospheric Deposition Program, Knoxville, TN (Oral).
- 2021 **Walters, W.W.**; Blum, D.E.; Takeuchi, M.; Xu, W.; Rivera-Rios, J.C.; Eris, G.; Min, J.; Weber, R.; Turner D.; Huey, G.; Ng, N.L.; Hastings, M.G. Tracking NO_x and α -pinene Oxidation Chemistry Utilizing Novel Oxygen Isotopic Constraints, American Geophysical Union, San Francisco, CA (Oral)
- 2020 **Walters, W.W.**; Song, L.; Fang, Y.; Colombi, N.; Chai, J.; Hastings, M. G. Tracking ammonia emission and chemistry in fresh traffic-derived plumes utilizing nitrogen stable isotopes” American Meteorology Society, Boston, MA (Oral).
- 2019 **Walters, W.W.**; Blum, D.; Takeuchi, M.; Xu, W.; Rivera-Rios, J.; Eris, G.; Liu, F.; Min, J.; Ng, N.L.; Weber, R.J.; Hastings, M.G. “Tracking NO_x and α -pinene Oxidation Chemistry Utilizing Novel Oxygen Isotopic Constraints.” Gordon Research Conference Atmospheric Chemistry, Newry, MA (Poster).
- 2018 **Walters, W.W.**; Karod, M.; Clark, S.; Le Roy, E.; Blum, D.; Joyce, E.; Hastings, M.G. “Investigation of Atmospheric Ammonia and Ammonium Dynamics in Providence, RI.” Fall Meeting of the American Geophysical Union, Washington D.C. (Poster).
- 2018 **Walters, W.W.**; Colombi, N.; Hastings, M.G. “Investigating Phase-Speciatiated Ammonia/Ammonium Dynamics of Traffic-Derived Plumes Utilizing Nitrogen Stable Isotopes,” International Symposium of Isotopomers, Baton Rouge, LA (Oral).
- 2017 **Walters, W.W.**; Hastings, M.G. “Collection of NH₃ for N Isotopic Characterization: Implications for Evaluating Traffic-Derived NH₃,” Fall Meeting of the American Geophysical Union, New Orleans, LA (Oral).
- 2017 **Walters, W.W.**; Colombi, N.; Hastings, M.G. “Fingerprinting Vehicle Derived Ammonia Utilizing Nitrogen Stable Isotopes”, Fall Meeting of the American Geophysical Union, New Orleans, LA (Poster).
- 2017 **Walters, W.W.**; Hastings, M.G. “Fingerprinting Vehicle Derived Ammonia Utilizing Nitrogen Stable Isotopes”, National Atmospheric Deposition Program, San Diego, CA (Oral).
- 2017 **Walters, W.W.**; Hastings, MG. “Constraining Ammonia Emission Sources in Urban Areas Utilizing Nitrogen Stable Isotopes”, Gordon Research Conference Atmospheric Chemistry, Newry, MA (Poster).

- 2016 **Walters, W.W.**; Michalski, G. “Do Oxygen and Nitrogen Isotopic Compositions ($\delta^{18}\text{O}$ - $\delta^{15}\text{N}$) of Atmospheric Nitrate Track NO_x Oxidation Pathways?”, Fall Meeting of the American Geophysical Union, San Francisco, CA (Poster).
- 2016 Michalski, G.; **Walters, W.W.**, Riha, K.M.; Crawley, L.; Katzman, T.L. “What causes $\delta^{15}\text{N}$ variations in atmospheric nitrate, NO_x , and NO_y : N sources or N chemistry?”, Fall Meeting of the American Geophysical Union, San Francisco, CA (Poster).
- 2015 **Walters, W.W.**; Michalski, G. “Nitrogen Stable Isotope Composition of Various Fossil-fuel Combustion Nitrogen Oxide Sources”. Fall Meeting of the American Geophysical Union, San Francisco, CA (Poster).
- 2014 **Walters, W.W.**; Michalski, G. “Natural and Anthropogenic Impacts on the Stable Isotopes of Nitrogen and Oxygen of Ice-Core Nitrate”. Fall Meeting of the American Geophysical Union, San Francisco, CA (Oral).

INVITED TALKS

- 2022 **American Geophysical Union**. “Quantifying the Importance of Vehicle Ammonia Emissions in an Urban Area of the Northeastern US Utilizing Nitrogen Isotopes”
- 2022 **Joint European Stable Isotope Users Group Meeting (JESIUM 2022)**, “Evaluating the Atmospheric Dynamics of Nitrate and Sulfate in New England in Response to Emission Regulations Utilizing Novel Isotope Observations”
- 2022 **US EPA New Insights into Atmospheric Science Seminar**, “Evaluating the Atmospheric Dynamics of Nitrate and Sulfate in New England in Response to Emission Regulations Utilizing Novel Isotope Observations”
- 2021 **China National Symposium on Stable Isotope Ecology**, “Vehicle Emissions are Significant Sources of Ammonia in the Northeastern US”
- 2021 **University of Connecticut, Department of Chemistry**, “Investigating Atmospheric Reactive Nitrogen Utilizing Advanced Chemical Fingerprinting Tools”
- 2020 **MIT, Department of Earth, Atmospheric, and Planetary Sciences**. “Investigating Atmospheric Reactive Nitrogen Utilizing Novel Isotopic Constraints.”
- 2020 **Texas A&M, Department of Atmospheric Sciences**. “Investigating Atmospheric Reactive Nitrogen Utilizing Novel Isotopic Constraints.”
- 2019 **Georgia Tech, Department of Earth and Atmospheric Sciences**. “Investigating Atmospheric Reactive Nitrogen Utilizing Novel Isotopic Constraints.”

- 2018 **Tianjin University, Institute of Surface-Earth System Science**, “Constraining Vehicle-Derived Ammonia Emissions and its Role in Particulate Matter Formation Utilizing Novel Isotopic Measurements.”
- 2018 **Institute of Applied Ecology, Chinese Academy of Sciences** (Shenyang, China) Constraining Vehicle-Derived Ammonia Emissions and its Role in Particulate Matter Formation Utilizing Novel Isotopic Measurements.”
- 2017 **University of California, San Diego, The Center for Aerosol Impacts on Climate and the Environment**. “Fingerprinting Vehicle Derived Ammonia Utilizing Nitrogen Stable Isotopes”.
- 2017 **Brown University, Department of Earth, Environmental, and Planetary Sciences**. “Collection of NH₃ for N Isotopic Characterization: Implications for Evaluating Traffic-Derived NH₃”.
- 2017 **Brookhaven National Lab, Atmospheric Chemistry Colloquium for Emerging Senior Scientist (Access XIV)**. “Constraining Ammonia Emission Sources in Urban Areas Utilizing Nitrogen Stable Isotopes”.
- 2016 **Southern Illinois University, Department of Geology**. “The Nitrogen and Oxygen Stable Isotopes of Nitrogen Oxides: Implications for Source Partitioning and Evaluation of Atmospheric Oxidation Pathways”.

TEACHING

Guest Lecturer:

- 2018 GEOL1950B, Atmospheric Chemistry, “Atmospheric Models”
- 2018 GEOL1950B, Atmospheric Chemistry, “Atmospheric Transport”
- 2020 GEOL1950B, Atmospheric Chemistry, “Air Quality”
- 2021 GEOL1950B, Atmospheric Chemistry, “Urban Air Quality- Challenges and Solutions.”
- 2016 EAPS591, Biogeochemistry, “Nitrogen in the Atmosphere”

Teaching Assistantships:

- 2015 EAPS521/CHM581, Atmospheric Chemistry
- 2014 EAPS591, Stable Isotope Instrumentation
- 2009 – 2011 CHM132, General Chemistry 1 Lab (Lab Instructor)

ADVISEES

- 2022- Livia Grimnes, Undergraduate Student, Brown University
- 2022- Meg Fey, Undergraduate Student, Brown University
- 2021 Lizzy Kysela, Summer REU (Leadership Alliance), University of Wisconsin
- 2021-2022 Isabella Pulzone, Undergraduate Student, Brown University
- 2020- Heejeong Kim, Graduate Student, Brown University
- 2020-2021 Clair Bekker, Undergraduate Student (Senior Thesis), Brown University
- 2019-2020 Emma, Wilcocks, Undergraduate Student (Senior Thesis), Brown University
- 2017-2022 Danielle Blum, Graduate Student, Brown University
- 2019 Emmie Le Roy, Undergraduate Student (Senior Thesis), Brown University
- 2018 Madeline Karod, Undergraduate Student (Leadership Alliance), Simmons College
- 2017 Nadia Colombi, Undergraduate Student (Leadership Alliance), UCLA
- 2014-2016 Damian Simoni, Undergraduate Student, Purdue University
- 2014-2015 Bruce Tharp, Undergraduate Student, Purdue University
- 2013-2014 Stanford Goodwin, Undergraduate Student, Purdue University

OUTREACH AND SERVICE

- 2023 Co-convener American Geophysical Union Fall 2023 Meeting, “Isotopes of the atmospheric components: laboratory investigation, field observation, modeling, and remote sensing”
- 2022 Review Editor for “Atmosphere and Climate”
- 2018 Co-convener American Geophysical Union Fall 2018 Meeting, “Stable Isotope Investigations of Atmospheric Processes”
- 2017 Group Mentor, Leadership Alliance, Brown University
- 2016 Science Teacher Volunteer, Vartan Gregorian Elementary School, Providence, RI

2015 Student Mentor, Summer Undergraduate Research Fellows, Purdue, IN

2012-2016 Graduate Student Mentor, Purdue University