

**JULIANE L. FRY**  
**Associate Professor of Air Quality**  
**& Atmospheric Chemistry**  
**Research Fellow, AMS Institute**  
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Meteorology and Air Quality Group  
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## EDUCATION

Master of Studies in Environmental, Natural Resources, and Energy Law, 2016  
Lewis and Clark Law School, Emphasis: Clean Air Act and Climate Change Law

Ph.D., Atmospheric Chemistry, California Institute of Technology, 2005  
Thesis: "Spectroscopy and Kinetics of Atmospheric Reservoir Species"  
Advisors: Prof. Mitchio Okumura and Prof. Paul Wennberg

B.S., Chemistry, University of Rochester, 2000  
cum laude; Minors: Physics, German, Women's Studies

## TEACHING EXPERIENCE

Associate Professor of Air Quality and Atmospheric Chemistry, 2021-  
Environmental Sciences Group, Wageningen University, Netherlands

Fulbright U.S. Teaching & Research Scholar Netherlands, 2016-2017  
Climate Physics Master's Degree Program, Universiteit Utrecht, Netherlands

Assistant Professor, (2009-2014), Associate Professor (2014-2020), Professor (2020-), 2009-2021  
Chemistry Department and Environmental Studies Program,  
Reed College, Portland, OR

## RESEARCH & PROFESSIONAL EXPERIENCE

Fulbright U.S. Teaching & Research Scholar Netherlands, 2016-2017  
Institute for Marine and Atmospheric Research, Universiteit Utrecht, Netherlands

Visiting Scientist at Institute of Energy and Climate Research, 2016-2017  
Forschungszentrum Jülich, Germany

Courtesy Appointment, Environmental Science and Management Department, 2012-2021  
Portland State University (enables serving on graduate student degree committees)

National Center for Atmospheric Research Advanced Studies Program (NCAR ASP) 2011-2012  
Faculty Fellow and Cooperative Institute for Research in the Environmental Sciences (CIRES)  
Visiting Fellow, Boulder, CO (junior sabbatical year)

Postdoctoral Fellow, University of California, Berkeley, CA with R. Cohen 2006-2008

Climate Policy Fellow, Environmental and Energy Study Institute, Washington, DC 2006

Fulbright Fellow, Phys. Chemistry, Freie Universität Berlin, Germany with M. Wolf 2000-2001

## COURSES TAUGHT

**At Wageningen University:** Air Quality (BSc); Governance for Sustainable Cities (MSc);  
**At Universiteit Utrecht:** Atmospheric Composition and Chemical Processes; **At Reed:**  
Environmental Studies Research Methods; Analytical Chemistry; Molecular Structure and  
Properties; Chemical Reactivity; Environmental Chemistry; Physical Chemistry Lab; Environmental  
Studies Junior Seminar; Senior Symposium; and **as Teaching Assistant at California Institute of  
Technology:** Molecular Spectroscopy; Atmospheric Chemistry.

## RESEARCH INTERESTS

Atmospheric chemistry; aerosol formation, especially from biogenic VOC precursors; chemistry-climate interactions; air pollution; aerosol chemical composition; field measurements; molecular spectroscopy; atmospheric modeling; chemical kinetics; satellite observations of atmospheric composition; environmental and climate policy.

**MENTORING SUMMARY:** 48 undergraduates, 8 graduate students and 1 postdoc mentored PhD theses at Wageningen University: Farhan Nursanto (2021-2025)

MSc theses at Wageningen University: Ralph van Gageldonk (2022); Bart Smulders (2022)

BSc theses at Wageningen University: Mischa Gort (2022)

Senior theses at Reed: Jessica Tobin ('09), Anna Stonestrom ('09), Tara Cass ('10), Caleb Arata ('11), Claire Remington ('11), Lisa Schomaker ('11 Biology, joint with David Dalton), James Bianconi ('13), Danielle Draper ('13), Laura Krause ('13), Kathryn Sackinger ('13), Hannah Allen ('14), Chris Cogell ('14), Alan Tuan ('14), Kang Kang ('15), Natalie Keehan ('15), Eve Mozur ('15), Makoto Kelp ('16), Annelise Hill ('17), Anna Miller ('18), Hunter Wise ('18, joint with Miriam Bowring), Bellamy Brownwood ('19), Marcus Bamberger ('19), Tiffany Thio ('19, joint with Danielle Cass), Cordero Ortiz ('19), Ted Hume ('20), Kendal Dragotto ('21), Calin Grimm ('21), Lena Low ('21), Andrey Marsavin ('21).

Summer research projects at Reed: Summer 2009: Caleb Arata, Stephanie Dillon, and Li Zha; Summer 2010: Claire Remington, Rhiana Meade, Caleb Arata, Josh Katz, Li Zha, Kathryn Sackinger, Kassandra Reuss-Schmidt (co-advised with David Dalton, Biology); Summer 2012: Danielle Draper and Laura Krause; Summer 2013: Hannah Allen and Danielle Draper; Summer 2014: Kang Kang, Makoto Kelp, Natalie Keehan; Summer 2015: Hyungu Kang, Natalie Keehan, Catherine Neshyba, Summer 2016: Katie Stellmach (co-advised with Alan Shusterman); Summer 2018: Bella Brownwood, Megan Hilton, Hannah McFadden, Andrey Marsavin; Summer 2019: Liam Farley, Ted Hume, Lena Low, Andrey Marsavin, Emily McLaughlin Sta. Maria, Cordero Ortiz, Summer 2020: Calin Grimm, Lena Low, Spencer Mann, Andrey Marsavin, Arielle Sherbak, Teddie Stewart.

Postdoctoral Fellow: Ben Ayres (2013-2015)

Postbaccalaureate Fellows: Danielle Draper (2014), Hyungu Kang (2015), Natalie Keehan (2015), Anna Miller (2018)

Independent Study projects at Reed: Li Zha (2009), Josh Katz (2010), Rhiana Meade (2011), Makoto Kelp (2014), Andrey Marsavin (2019), James Vesto (2019).

Master's thesis committee member at Portland State University: Holly Neill ('12).

PhD thesis committee member at Portland State University: Meenakshi Rao (Ph.D. '16), Jacinda Mainord (Ph.D. '17).

Master's thesis co-mentor at Univ. Utrecht: Alessia Mafoddo ('16), Juhi Varendra Nagori ('17)

## PUBLICATIONS

underline designates students or postdocs supervised by J.L. Fry

1. M. Dam, D.C. Draper, A. Marsavin, J.L. Fry, J.N. Smith, "Observations of gas-phase products from the nitrate radical-initiated oxidation of four monoterpenes," in press, *Atmos. Chem. Phys.*, 2022.
2. E. Tsiligiannis, R. Wu, B.H. Lee, C.M. Garcia Salvador, M. Priestley, P.T.M. Carlsson, S. Kang, A. Novelli, L. Vereecken, H. Fuchs, A.W. Mayhew, J.F. Hamilton, P.M. Edwards, J.L. Fry, B. Brownwood, S.S. Brown, R.J. Wild, T.J. Bannan, H. Coe, J. Allan, J.D. Surrat, A. Bacak, P. Artaxo, C. Percival, S. Guo, M. Hu, T. Wang, T.F. Mentel, J.A. Thornton, "A four carbon organonitrate as a significant production of secondary isoprene chemistry," in press, *Geophysical Research Letters*, 2022.
3. L. Garofalo, Y. He, S. Jathar, J. Pierce, C. Fredrickson, J. Thornton, B. Palm, F. Mahrt, G. Crescenzo, A. Bertram, D. Draper, J. Fry, J. Orlando, X. Zhang, D. Farmer, "Heterogeneous

- nucleation drives particle size segregation in sequential ozone and nitrate oxidation of catechol,” in press, *Environmental Science and Tech*, 2021.
4. B. Brownwood, A. Turdziladze, T. Hohaus, S. Andres, P. Carlsson, H. Fuchs, A. Novelli, E. Tsiligiannis, M. Hallquist, R. Wu, T. Mentel, L. Hantschke, J. Liebmann, S. S. Brown, F. Rohrer, R. Tillmann, D. Reimer, B. Winter, A. Kiendler-Scharr, and J. L. Fry, “Gas-particle partitioning and SOA yields of organonitrate products from NO<sub>3</sub>-initiated oxidation of isoprene under varied chemical regimes,” *ACS Earth & Space Chem.*, 5, 785-800, 2021.
  5. R. Wu, L. Vereecken, E. Tsiligiannis, S. Kang, S. R. Albrecht, L. Hantschke, D. Zhao, A. Novelli, H. Fuchs, R. Tillmann, T. Hohaus, P. T. M. Carlsson, J. Shenolikar, F. Bernard, J. N. Crowley, J. L. Fry, B. Brownwood, J. A. Thornton, S. S. Brown, A. Kiendler-Scharr, A. Wahner, M. Hallquist, and T. F. Mentel, “Molecular composition and volatility of multi-generation products formed from isoprene oxidation by nitrate radical,” *Atmos. Chem. Phys.*, 21, 10799-10824, 2021.
  6. M. Powers and J.L. Fry, “Climate Litigation Disrupted: From Massachusetts v. EPA to Juliana v. United States,” in *Environmental Law, Disrupted* (Jessica Owley & Keith Hirokawa, Eds.) Environmental Law Institute, 2021.
  7. N.I. Keehan, B. Brownwood, A. Marsavin, D.A. Day, and J.L. Fry, “Thermal dissociation cavity ring-down spectrometer (TD-CRDS) for detection of organic nitrates in gas and particle phase,” *Atmos. Meas. Tech.* 13, 6255-6269, 2020.
  8. J.H. Kroll, C.L. Heald, C.D. Cappa, D.K. Farmer, J.L. Fry, J.G. Murphy and A.L. Steiner “The complex chemical effects of the COVID-19 pandemic on air quality,” *Nature Chemistry*, 12, 777–779 (2020).
  9. D.C. Draper, N. Myllys, N. Hyttinen, K. Möller, H.G. Kjaergaard, J.L. Fry, J.N. Smith, T. Kurtén, “Formation of Highly Oxidized Molecules from NO<sub>3</sub> Radical Oxidation of Δ-3-Carene: A Mechanistic Study,” *ACS Earth Space Chem.* 2019, 3, 8, 1460-1470, <https://doi.org/10.1021/acsearthspacechem.9b00143>.
  10. J. Nagori, R. Janssen, J.L. Fry, M. Krol, J.L. Jimenez, W. Hu, and J. Vilà-Guerau de Arellano, “Biogenic emissions and land-atmosphere interactions as drivers of the diurnal evolution of secondary organic aerosol in the southeastern US,” *Atmos. Chem. Phys.* 19, 701-729, 2019.
  11. A.N. Miller, D.M. Raduma, L.A. George, and J.L. Fry, “Source apportionment of trace elements and black carbon in an urban industrial area (Portland, Oregon),” *Atmospheric Pollution Research*, 2018, <https://doi.org/10.1016/j.apr.2018.12.006>.
  12. J.L. Fry, S.S. Brown, A.M. Middlebrook, P.M. Edwards, P. Campuzano-Jost, D.A. Day, J.L. Jimenez, H.M. Allen, T. B. Ryerson, I. Pollack, M. Graus, C. Warneke, J. A. deGouw, C. A. Brock, J. Gilman, B.M. Lerner, W.P. Dubé, J. Liao, A. Welti, “Secondary Organic Aerosol (SOA) yields from NO<sub>3</sub> radical + isoprene based on nighttime aircraft power plant plume transects,” *Atmos. Chem. Phys.*, 18, 11663-11682, 2018.
  13. H. O. T. Pye, A. Zuend, J. L. Fry, G. Isaacman-VanWertz, S. L. Capps, K. W. Appel, H. Foroutan, L. Xu, N. L. Ng, and A. H. Goldstein, “Coupling of organic and inorganic aerosol systems and the effect on gas-particle partitioning in the southeastern United States,” *Atmos. Chem. Phys.*, 18, 357-370, <https://doi.org/10.5194/acp-18-357-2018>, 2018.
  14. P. M. Edwards, K. Aikin, W.P. Dube, J. L. Fry, J.B. Gilman, J.A. de Gouw, M.G. Graus, T.F. Hanisco, J. Holloway, G. Hübler, J. Kaiser, F.N. Keutsch, B.M. Lerne, J.A. Neuman, D.D. Parrish, J. Peischl, I. Pollack, A.R. Ravishankara, J.M. Roberts, T.B. Ryerson, M. Trainer, G.M. Wolfe, Warneke C., S.S. Brown, “The high to low NO<sub>x</sub> transition in nocturnal biogenic VOC oxidation aloft: Indications of a regime transition in the Southeast U.S.,” *Nature Geosciences*, 10, 490–495 (2017).
  15. T. Kurtén, K. H. Möller, T. B. Nguyen, R. H. Schwantes, P. K. Misztal, L. Su, P. O. Wennberg, J. L. Fry, H. G. Kjaergaard, “Alkoxy radical bond scissions explain the anomalously low

- secondary organic aerosol and organonitrate yields from  $\alpha$ -pinene +  $\text{NO}_3$ ,” *J. Phys. Chem. Letters*, 8, 2826-2834, 2017.
16. B.B. Palm, P. Campuzano-Jost, D.A. Day, A.M. Ortega, J.L. Fry, S.S. Brown, K.J. Zarzana, W. Dube, N.L. Wagner, D.C. Draper, L. Kaser, W. Jud, T. Karl, A. Hansel, C. Gutiérrez-Montes, and J.L. Jimenez, “Secondary organic aerosol formation from in situ OH, O<sub>3</sub>, and NO<sub>3</sub> oxidation of ambient air in an oxidation flow reactor,” *Atmos. Chem. Phys.* 17, 5331-5354, 2017.
  17. M.C. Blumm, J.L. Fry, and O. Jamin, “Still Crying Out for a ‘Major Overhaul’ after All These Years — Salmon and the Fourth Failed Biological Opinion on Columbia Basin Hydroelectric Operations,” 47 *Environmental Law*, 2, 287-333 (2017).
  18. N. L. Ng, S. S. Brown, A. T. Archibald, E. Atlas, R. C. Cohen, J. N. Crowley, D. A. Day, N. M. Donahue, J. L. Fry, H. Fuchs, R. J. Griffin, M. I. Guzman, H. Herrmann, A. Hodzic, Y. Iinuma, J. L. Jimenez, A. Kiendler-Scharr, B. H. Lee, D. J. Luecken, J. Mao, R. McLaren, A. Mutzel, H. D. Osthoff, B. Ouyang, B. Picquet-Varrault, U. Platt, H. O. T. Pye, Y. Rudich, R. H. Schwantes, M. Shiraiwa, J. Stutz, J. A. Thornton, A. Tilgner, B. J. Williams, R. A. Zaveri, “Nitrate radicals and biogenic volatile organic compounds: Oxidation, mechanisms and organic aerosol,” *Atmos. Chem. Phys.*, 17, 2103-2162, 2017.
  19. P.A. Feiner, W.H. Brune, D.O. Miller, L. Zhang, R.C. Cohen, P. Romer, A. Goldstein, F. Keutsch, K.M. Skog, P.O. Wennberg, T. Nguyen, A. Teng, J. de Gouw, A. Koss, R.J. Wild, S.S. Brown, A. Guenther, E. Edgerton, K. Baumann, J.L. Fry, “Testing Atmospheric Oxidation in an Alabama Forest,” *J. Atmos. Sci.*, 73, 4699–4710, 2016.
  20. P. S. Romer, K. C. Duffey, P. J. Wooldridge, H. M. Allen, B. R. Ayres, S. S. Brown, W. H. Brune, J. D. Crouse, J. de Gouw, D. C. Draper, P. A. Feiner, J. L. Fry, A. H. Goldstein, A. Koss, P. K. Misztal, T. B. Nguyen, K. Olson, A. P. Teng, P. O. Wennberg, R. J. Wild, L. Zhang, and R. C. Cohen, “The Lifetime of Nitrogen Oxides in an Isoprene Dominated Forest,” *Atmos. Chem. Phys.*, 16, 7623-7637, 2016.
  21. B.R. Ayres, H.M. Allen, D.C. Draper, S.S. Brown, R.J. Wild, J.L. Jimenez, D.A. Day, P. Campuzano-Jost, W. Hu, J. de Gouw, A. Koss, R.C. Cohen, K.C. Duffey, P. Romer, K. Baumann, E. Edgerton, S. Takahama, J.A. Thornton, B.H. Lee, F.D. Lopez-Hilfiker, C. Mohr, P.O. Wennberg, T.B. Nguyen, A. Teng, A.H. Goldstein, K. Olson, and J.L. Fry, “Organic Nitrate Aerosol Formation via  $\text{NO}_3$  + BVOC in the Southeastern US,” *Atmos. Chem. Phys.*, 15, 13377-13392, 2015.
  22. D. Jaffe, J. Putz, G. Hof, G. Hof, J. Hee, D.A. Lommers-Johnson, F. Gabela, J.L. Fry, B. Ayres, M. Kelp and M. Minsk, “Diesel Particulate Matter and Coal Dust from Trains in the Columbia River Gorge, Washington State, USA,” *Atmospheric Pollution Research*, 2015.
  23. H.O.T. Pye, D. J. Luecken, L. Xu, C.M. Boyd, N.L. Ng, K.R. Baker, B.R. Ayres, J. Bash, K. Baumann, W.P.L. Carter, E.S. Edgerton, J.L. Fry, W.T. Hutzell, D. Schwede, and P.B. Shepson, “Modeling the current and future roles of particulate organic nitrates in the southeastern United States,” *Environmental Science & Technology*, 49 (24), 14195-14203, 2015.
  24. D.C. Draper, D.K. Farmer, Y. Desyaterik, and J.L. Fry, “A qualitative comparison of secondary organic aerosol yields and composition from ozonolysis of monoterpenes at varying concentrations of  $\text{NO}_2$ ,” *Atmos. Chem. Phys.*, 15, 12267-12281, 2015.
  25. H.M. Allen, D.C. Draper, B.R. Ayres, A. Ault, A. Bondy, S. Takahama, R.L. Modini, K. Baumann, E. Edgerton, C. Knote, A. Laskin, B. Wang, and J.L. Fry, “Influence of mineral dust and seaspray supermicron particle concentrations and acidity on inorganic  $\text{NO}_3^-$  aerosol during the 2013 Southern Oxidant and Aerosol Study,” *Atmos. Chem. Phys.*, 15, 10669–10685, 2015.

26. J.L. Fry, C.Koski, K. Bott, R. Hsu-Flanders, M. Hazell, “Downwind Particulate Matters: Regulatory Implications of Secondary Aerosol Formation from the Interaction of Nitrogen Oxides and Tree Emissions,” *Environmental Science and Policy*, 50, 180-190, 2015.
27. R. A. Washenfelder, A. R. Attwood, C. A. Brock, H. Guo, L. Xu, R. J. Weber, N. L. Ng, H. M. Allen, B. R. Ayres, K. Baumann, R. C. Cohen, D. C. Draper, K. C. Duffey, E. Edgerton, J. L. Fry, W. W. Hu, J. L. Jimenez, B. B. Palm, P. Romer, E. A. Stone, P. J. Wooldridge, and S. S. Brown, “Biomass burning dominates brown carbon absorption in the rural southeastern United States,” *Geophysical Research Letters*, 2014, DOI: 10.1002/2014GL062444.
28. J.D. Proctor, K. Eshleman, T. Chartier, L. Taub-Pervizpour, K. Bott, J.L. Fry, C. Koski, T. Moreno, “Digital field scholarship and the liberal arts: results from a 2012-13 sandbox,” *Int. J. Digit. Libr.*, DOI: 10.1007/s00799-014-0126-y, 2014.
29. J.L. Fry, D.C. Draper, K.C. Barsanti, J.N. Smith, J. Ortega, P. Winkler, M.J. Lawler, S.S. Brown, P.M. Edwards, R.C. Cohen, L. Lee, “Secondary organic aerosol formation and Organic Nitrate Yield from NO<sub>3</sub> oxidation of biogenic hydrocarbons,” *Environmental Science and Technology*, 48, 11944-11953, 2014.
30. D.A Jaffe, G. Hof, S. Malashanka, J. Putz, J. Thayer, J.L. Fry, B. Ayres, and J.R. Pierce, “Diesel particulate matter emission factors and air quality implications from in-service rail in Washington State, USA ,” *Atmospheric Pollution Research*, 5, 344-351, 2014.
31. J.L. Fry, D.C. Draper, K.J. Zarzana, P. Campuzano-Jost, D.A. Day, J.L. Jimenez, S.S. Brown, R.C. Cohen, L. Kaser, A. Hansel, L. Cappelin, T. Karl, A. Hodzic Roux, A. Turnipseed, C. Cantrell, B.L. Lefer, and N. Grossberg, “Observations of gas- and aerosol-phase organic nitrates at BEACHON-RoMBAS 2011,” *Atmos. Chem. Phys.*, 13, 8585-8605, 2013.
32. H. Fuchs, W.R. Simpson, R.L. Apodaca, T. Brauers, R.C. Cohen, J.N. Crowley, H.-P. Dorn, W.P. Dube, J. L. Fry, R. Häsel, Y. Kajii, A. Kiendler-Scharr, I. Labazan, J. Matsumoto, T.R. Mentel, Y. Nakashima, F. Rohrer, A.W. Rollins, G. Schuster, R. Tillmann, A. Wahner, P.J. Wooldridge, and S.S. Brown, “Comparison of N<sub>2</sub>O<sub>5</sub> mixing ratios during NO<sub>3</sub>Comp 2007 in SAPHIR,” *Atmos. Meas. Tech.*, 5, 2763-2777, 2012.
33. J. L. Fry and K. Sackinger, “Model evaluation of NO<sub>3</sub> secondary organic aerosol (SOA) source and heterogeneous organic aerosol (OA) sink in the western United States,” *Atmos. Chem. Phys.*, 12, 8797-8811, 2012.
34. J.L. Fry, A. Kiendler-Scharr, A. W. Rollins, T. Brauers, S. S. Brown, H.-P. Dorn, W. P. Dube, H. Fuchs, A. Mensah, F. Rohrer, R. Tillman, A. Wahner, P. J. Wooldridge, and R. C. Cohen, “SOA from limonene: role of NO<sub>3</sub> in its generation and degradation,” *Atmos. Chem. Phys.*, 11, 3879-3894, 2011.
35. C.R. Hoyle, M. Boy, N.M. Donahue, J.L. Fry, M. Glasius, A. Guenther, A.G. Hallar, K. Huff Hartz, M.D. Petters, T. Petäjä, T. Rosenoern, and A.P. Sullivan, “A review of the anthropogenic influence on biogenic secondary organic aerosol,” *Atmos. Chem. Phys.*, 11, 321-343, 2011.
36. Fry, J.L., Graf, H.-F., Grotjahn, R., Raphael, M.N., Saunders, C., and Whitaker, R., *The Encyclopedia of Weather and Climate Change: A Complete Visual Guide*, University of California Press, released March 2010. Wrote chapter on Climate Change.
37. A.W. Rollins, J. L. Fry, J. F. Hunter, J. H. Kroll, D. R. Worsnop, S. W. Singaram, and R. C. Cohen, “Elemental analysis of aerosol organic nitrates with electron ionization high-resolution mass spectrometry,” *Atmos. Meas. Tech.*, 3, 301-310, 2010.
38. H. Fuchs, S. M. Ball, B. Bohn, T. Brauers, R. C. Cohen, H.-P. Dorn, W. P. Dubé, J. L. Fry, R. Häsel, U. Heitmann, R. L. Jones, J. Kleffmann, T. F. Mentel, P. Müsgen, F. Rohrer, A. W.

- Rollins, A. A. Ruth, A. Kiendler-Scharr, E. Schlosser, A. J. L. Shillings, R. Tillmann, R. M. Varma, D. S. Venables, G. Villena Tapia, A. Wahner, R. Wegener, P. J. Wooldridge, and S. S. Brown, "Intercomparison of measurements of NO<sub>2</sub> concentrations in the atmosphere simulation chamber SAPHIR during the NO<sub>3</sub>Comp campaign," *Atmos. Meas. Tech.*, **3**, 21-37, 2010.
39. Wooldridge, P. J., Perring, A. E., Bertram, T. H., Flocke, F. M., Roberts, J. M., Singh, H. B., Huey, L. G., Thornton, J. A., Murphy, J. G., Fry, J. L., Rollins, A. W., LaFranchi, B. W., and Cohen, R. C.: Total peroxy nitrates ( $\Sigma$ PNs) in the atmosphere: the thermal dissociation-laser induced fluorescence (TD-LIF) technique and comparisons to speciated PAN measurements, *Atmos. Meas. Tech.*, **3**, 593-607, 2010.
40. A.W. Rollins, A. Kiendler-Scharr, J.L. Fry, T. Brauers, S.S. Brown, H.-P. Dorn, W.P. Dubé, H. Fuchs, A. Mensah, T.F. Mentel, F. Rohrer, R. Tillmann, R. Wegener, P.J. Wooldridge, and R.C. Cohen, "Isoprene oxidation by nitrate radical: alkyl nitrate and secondary organic aerosol yields," *Atmos. Chem. Phys.*, **9**, 6685-6703, 2009.
41. J.L. Fry, A. Kiendler-Scharr, A.W. Rollins, P.J. Wooldridge, S.S. Brown, H. Fuchs, W. Dube, A. Mensah, M. dal Maso, R. Tillmann, H.-P. Dorn, T. Brauers, and R.C. Cohen, "Organic nitrate and secondary organic aerosol yield from NO<sub>3</sub> oxidation of  $\beta$ -pinene evaluated using a gas-phase kinetics/aerosol partitioning model," *Atmos. Chem. Phys.*, **9**, 1431-1449, February 23, 2009.
42. J.L. Fry et al., "Global environmental solutions require global funding," *Eos Trans. AGU*, **89** (43), 420, October 21, 2008.
43. J. Matthews, J.L. Fry, C.M. Roehl, P.O. Wennberg, and A. Sinha, "Vibrational overtone initiated unimolecular dissociation of HOCH<sub>2</sub>OOH and HOCD<sub>2</sub>OOH: Evidence for mode selective behavior," *Journal of Chemical Physics*, **128**, 184306, May 15, 2008.
44. C.M. Roehl, Z. Marka, J.L. Fry, and P.O. Wennberg, "Near-UV photolysis cross sections of CH<sub>3</sub>OOH and HOCH<sub>2</sub>OOH determined via action spectroscopy," *Atmospheric Chemistry and Physics*, **7**, 713-720, February 14, 2007.
45. J.L. Fry, J.N. Matthews, J.R. Lane, C.M. Roehl, A. Sinha, H.G. Kjaergaard, and P.O. Wennberg, "OH-Stretch Vibrational Spectroscopy of Hydroxymethyl Hydroperoxide," *Journal of Physical Chemistry A*, **110**, 7072-7079, June 8, 2006.
46. B.J. Drouin, C.E. Miller, J.L. Fry, D.T. Petkie, P. Helminger, and I.R. Medvedev, "Submillimeter measurements of isotopes of nitric acid," *Journal of Molecular Spectroscopy*, **236**, 29-34, March 2006.
47. J.L. Fry, B.J. Drouin, and C.E. Miller, "Rotational spectroscopy and dipole moment *cis-cis* HOONO and DOONO," *Journal of Chemical Physics*, **124**, 084304, February 28, 2006.
48. A.B. McCoy, J.L. Fry, J.S. Francisco, A.K. Mollner, and M. Okumura, "Role of OH-stretch/torsion coupling and quantum yield effects in the first OH overtone spectrum of *cis-cis* HOONO," *Journal of Chemical Physics*, **122**, 104311, March 8, 2005.
49. J.L. Fry, S.A. Nizkorodov, M. Okumura, C.M. Roehl, J.S. Francisco, and P.O. Wennberg, "*Cis-cis* and *trans-perp* HOONO: Action spectroscopy and isomerization kinetics," *Journal of Chemical Physics*, **121**, 1432-1448, July 15, 2004.
50. B.J. Drouin, J.L. Fry, and C.E. Miller, "Rotational spectroscopy of *cis-cis* HOONO," *Journal of Chemical Physics*, **120**, 5505-5508, March 22, 2004.
51. S.A. Nizkorodov, J.D. Crouse, J.L. Fry, C.M. Roehl, and P.O. Wennberg, "Near-IR photodissociation of peroxy acetyl nitrate," *Atmospheric Chemistry and Physics*, **4**, 1269-1289, March 1, 2004.

## TALKS (\*INVITED)

1. J.L. Fry, "What controls atmospheric reactive nitrogen? Exploring sources, lifetime, and deposition with ion chromatography and mass spectrometry," Integrated Sciences Seminar, Duke Kunshan University (virtual), Nov. 17, 2021.
2. J.L. Fry, "What controls reactive nitrogen in the Netherlands?" Meteorology and Air Quality Group Tea Talk, Wageningen University, Sept. 2, 2021.
3. J.L. Fry, "Atmospheric chemistry lab goes virtual: What can we learn about diesel particulate matter (DPM), wildfire plumes, and COVID-19 effects on air quality and climate using existing datasets?", to the Empirical Research Seminar Series, Reed College, Jun. 11, 2020.
4. J.L. Fry, "Diesel particulate matter (DPM) pollution and COVID-19 effects on air quality," virtual presentation to Civil Engineering students, University of Victoria, British Columbia, Jun. 2, 2020.
5. \*J.L. Fry, "Diesel particulate matter pollution in Portland," Reed College, Portland, OR, Oct. 10, 2019.
6. \*J.L. Fry, "Aerosol formation from  $\text{NO}_3$  + isoprene: Field and laboratory studies on mechanism and yields," American Chemical Society National Meeting, San Diego, CA, Aug. 28, 2019.
7. \*J.L. Fry, "Nitrate-initiated biogenic aerosol production: anthropogenically triggered atmospheric haze formation over forests," Women in Chemistry Annual Seminar Speaker, California Institute of Technology, May 16, 2019.
8. \*J.L. Fry, "Nitrate-initiated biogenic aerosol production: anthropogenically triggered atmospheric haze formation over forests," Washington State University at Vancouver, April 8, 2019.
9. \*J.L. Fry, "Nitrate radical initiated atmospheric particulate matter formation in forests: Anthropogenically-triggered biogenic aerosol production," School of Earth and Atmospheric Sciences, Harvard University, Mar. 2, 2018.
10. J.L. Fry, "Using PTR-MS measurements in an OFR at SOAS to identify key intermediates in biogenic VOC oxidation and SOA formation, with the help of PMF," Atmospheric Physics and Chemistry Group meeting, Institute for Marine and Atmospheric Research Utrecht (IMAU), Universiteit Utrecht, Utrecht, the Netherlands, Jul. 4, 2017.
11. \*J.L. Fry, "Nitrate radical initiated atmospheric particulate matter formation in forests: Isoprene vs. terpenes," Wolfson Atmospheric Chemistry Laboratory, York University, England, Mar. 23, 2017.
12. J.L. Fry, "Constraining Secondary Organic Aerosol (SOA) production from  $\text{NO}_3$  + isoprene based on nighttime aircraft power plant plume transects during SENEX 2013," Atmospheric Physics and Chemistry Group meeting, Institute for Marine and Atmospheric Research Utrecht (IMAU), Universiteit Utrecht, Utrecht, the Netherlands, Jan. 21, 2017.
13. \*J.L. Fry, "Nitrogen oxides ( $\text{NO}_x$ ) effects on atmospheric particulate matter formation in forests: Anthropogenically-triggered biogenic aerosol production," Atmospherica group, Aarhus University, Denmark, Nov. 3, 2016.
14. \*J.L. Fry, "Chamber observations of secondary organic aerosol (SOA) yield, molecular composition, and physical properties from  $\text{NO}_3$  vs.  $\text{O}_3$  reactions with monoterpenes: Seeking  $\text{RO}_2$  mechanistic explanations of SOA diversity," COPENHEL joint group meeting, Copenhagen University, Sept. 21, 2016.

15. \*J.L. Fry, “Nitrogen oxides (NO<sub>x</sub>) effects on atmospheric particulate matter formation in forests: Anthropogenically-triggered biogenic aerosol production,” Institute for Energy and Climate IEK-8 Seminar, Forschungszentrum Juelich, Juelich, Germany, May 19, 2016.
16. \*J.L. Fry, “Chamber studies of secondary organic aerosol (SOA) yield and composition from NO<sub>3</sub> reactions with monoterpenes,” Atmospheric Physics and Chemistry Group meeting, Institute for Marine and Atmospheric Research Utrecht (IMAU), Universiteit Utrecht, Utrecht, the Netherlands, Apr. 5, 2016.
17. \*J.L. Fry, “Nitrogen oxides (NO<sub>x</sub>) effects on atmospheric particulate matter formation in forests: Anthropogenically-triggered biogenic aerosol production,” EPA STAR grant review meeting, Environmental Protection Agency, Research Triangle Park, NC, Mar. 14, 2016.
18. \*J.L. Fry, “Nitrogen oxides (NO<sub>x</sub>) effects on atmospheric particulate matter formation in forests: Anthropogenically-triggered biogenic aerosol production,” Institute for Marine and Atmospheric Research Utrecht (IMAU) Colloquium, Universiteit Utrecht, Utrecht, the Netherlands, Mar. 8, 2016.
19. J.L. Fry, D. Draper, H. Kang, A. Laskin, J. Laskin, B. Wang, P. Lin, “Size-dependent molecular-level characterization of secondary organic aerosol from O<sub>3</sub> vs. NO<sub>3</sub> oxidation of monoterpenes,” Pacificchem (The International Chemical Congress of Pacific Basin Societies) 2015 Meeting, Honolulu, HI, Dec. 19, 2015.
20. \*J.L. Fry, “Chamber studies of secondary organic aerosol (SOA) yield and composition from NO<sub>3</sub> reactions with monoterpenes,” Workshop on NO<sub>3</sub> radicals and BVOCs, Georgia Institute of Technology, GA, June 23, 2015.
21. J.L. Fry, B. Ayres, D. Draper, H. Allen, H. Kang, S. Brown, J. Jimenez, D. Day, S. Thompson, W. Hu, P. Campuzano-Jost, D. Farmer, Y. Desyaterik, “NO<sub>3</sub>-initiated biogenic SOA production: Insights from field and chamber studies,” Wennberg/Okumura/Seinfeld group meeting, California Institute of Technology, May 14, 2015.
22. J.L. Fry, B. Ayres, D. Draper, H. Allen, H. Kang, S. Brown, J. Jimenez, D. Day, S. Thompson, W. Hu, P. Campuzano-Jost, D. Farmer, Y. Desyaterik, “NO<sub>3</sub>-initiated biogenic SOA production: Insights from field and chamber studies,” American Chemical Society National Meeting, Denver, CO, Mar. 24, 2015.
23. \*J.L. Fry, “When NO<sub>3</sub> met terpene,” Telluride Science Research Center, July 28, 2014.
24. J.L. Fry, B. Ayres, H. Allen, D.C. Draper, “NO<sub>y</sub> fate in the southeastern U.S.: NO<sub>3</sub>-initiated organonitrate production vs. dust uptake of HNO<sub>3</sub>,” SOAS/SENEX Data Meeting, Boulder, CO, April 1, 2014.
25. \*J.L. Fry, “Student-driven field projects in an Environmental Chemistry course,” Association of Environmental Studies and Sciences Annual Meeting, Pittsburg, PA, Jun 21, 2013.
26. \*J.L. Fry, “New insights into atmospheric particle formation in forests,” seminar presentations at Reed College, Pacific University, and Willamette University, October 2012.
27. \*J.L. Fry, D. Draper, J.N. Smith, S.S. Brown, J.D. Ortega, P. Winkler, R.C. Cohen, K.J. Zarzana, P. Edwards, W.P. Dube, D.K. Farmer, K. Barsanti, L. Krause, “NO<sub>3</sub> oxidation of biogenic VOCs: an alternate take on NO<sub>x</sub> suppression of SOA formation from monoterpenes,” American Chemical Society National Meeting, Denver, CO, Aug. 21, 2012.
28. \*J.L. Fry, “NO<sub>3</sub> vs O<sub>3</sub> oxidation of BVOC: an alternate take on NO<sub>x</sub> suppression of SOA formation and a renewed plea for speciated treatment of NO<sub>3</sub> + BVOC in SOA models,” Telluride Science Research Center, July 29 – Aug. 3, 2012.



29. \*J.L. Fry, "NO<sub>3</sub>-initiated secondary organic aerosol (SOA) production and NO<sub>y</sub> chemistry in a pine forest," Colorado State University Atmospheric Chemistry Group Meeting, Mar. 26, 2012.
30. \*J.L. Fry, "NO<sub>3</sub>-initiated secondary organic aerosol (SOA) production and NO<sub>y</sub> chemistry in a pine forest (BEACHON-RoMBAS 2011)," National Oceanic and Atmospheric Administration Earth Systems Research Lab (NOAA ESRL) Chemical Sciences Division Seminar, Mar. 14, 2012.
31. \*J.L. Fry, "Climate Change and the role of Atmospheric Aerosols," Environmental Program, Colorado College, Jan. 31, 2012.
32. J.L. Fry, D. Draper, K.J. Zarzana, S.S. Brown, B. Dube, N. Wagner, R.C. Cohen, B.B. Palm, A.M. Ortega, P. Campuzano Jost, D.A. Day, J.L. Jimenez, W.H. Brune, T.Karl, L.Kaser, W.Jud, A. Hansel, "Gas- and aerosol-phase chemistry of nitrogen oxides (NO<sub>y</sub>) in a pine forest (BEACHON-RoMBAS 2011)," American Geophysical Union Fall Meeting, San Francisco, CA, December 5-9, 2011.
33. \*J.L. Fry, "Role of organic nitrates in secondary organic aerosol (SOA) production in forests," University of Colorado Analytical Chemistry Seminar, Nov. 14, 2011.
34. \*J.L. Fry and D. Draper, "Field and laboratory studies of secondary organic aerosol formation from biogenic VOCs," Biosphere-Atmosphere Interactions Group, Atmospheric Chemistry Division, National Center for Atmospheric Research, Oct. 10, 2011.
35. \*J.L. Fry, "Nighttime formation and processing of atmospheric organic aerosol by nitrate radical," Special symposium in honor of 100 year anniversary of Marie Curie's Nobel Prize in Chemistry, 242<sup>nd</sup> American Chemical Society National Meeting, Denver, CO, Aug. 30, 2011.
36. R.D. Meade, C.M. Arata, and J.L. Fry, "Secondary organic aerosol (SOA) formation from a-pinene: Chamber studies of kinetics, yield, and aerosol chemical composition," 242<sup>nd</sup> American Chemical Society National Meeting, Denver, CO, Aug. 28, 2011. (*student presented*)
37. L. Zha and J.L. Fry, "Temporal correlations of NO<sub>2</sub> and aerosol optical depth observed by satellites over the western United States," American Chemical Society Northwest Regional Meeting, Jun 26, 2011. (*student presented*)
38. K. Sackinger and J.L. Fry, "Kinetic modeling of nitrate radical impact on formation and revolatilization of atmospheric organic aerosol," American Chemical Society Northwest Regional Meeting, Jun 26, 2011. (*student presented*)
39. \*J.L. Fry, "Chemistry of Earth's Atmosphere: From Global Climate Change to Local Air Quality," American Chemical Society Portland Section, May 19, 2011.
40. \*J.L. Fry, J. Katz, K. Sackinger, L. Zha, R.C. Cohen, A.W. Rollins, A. Kiendler-Scharr, S.S. Brown, "NO<sub>x</sub> effects on organic aerosol: Aerosol production from NO<sub>3</sub> + biogenic hydrocarbons vs. NO<sub>3</sub> heterogeneous loss," 240<sup>th</sup> American Chemical Society National Meeting, Boston, MA, August 24, 2010.
41. \*Lectures on Atmospheric Chemistry and Long-range transport and meteorology of the Arctic and sub-Arctic for Juneau Icefield Research Program, Juneau, Alaska, August 2-9, 2010.
42. \*J.L. Fry, "NO<sub>x</sub> effects on atmospheric aerosol formation: Suppression? Enhancement? Innocent bystander?" Environmental Science and Management Seminar Series, Portland State University, May 21, 2010.
43. \*Lectures on Climate Change and Geoengineering for Pan-American Advanced Studies Institute Climate Change summer school, La Selva Biological Station, Costa Rica, May 7-10, 2010.

44. \*J.L. Fry, "Atmospheric chemistry of nitrogen oxides," Department of Chemistry, Haverford College, December 8, 2008.
45. \*J.L. Fry, "Atmospheric chemistry of nitrogen oxides," Department of Chemistry, Drexel University, December 10, 2008.
46. \*J.L. Fry, "Atmospheric chemistry of nitrogen oxides," Department of Chemistry, Lewis & Clark College, November 25, 2008.
47. \*J.L. Fry, "Atmospheric chemistry of nitrogen oxides," Department of Chemistry, Vassar College, November 3, 2008.
48. \*J.L. Fry, "Atmospheric chemistry of nitrogen oxides," Department of Chemistry, Portland State University, October 24, 2008.
49. \*J.L. Fry, "Atmospheric chemistry of nitrogen oxides," Division of Atmospheric Sciences & Global Change, Pacific Northwest National Lab, August 22, 2008.
50. \*J.L. Fry and A. Stine, "Intro to Atmospheres for Architects," Department of Architecture, University of California – Berkeley, July 7, 2008.
51. \*J.L. Fry, "Atmospheric chemistry of nitrogen oxides," Berkeley Atmospheric Science Center Seminar Series, University of California – Berkeley, April 29, 2008.
52. \*J.L. Fry, "Atmospheric chemistry: From air pollution to climate change," Reed College, March 13, 2008.
53. J.L. Fry, "NO<sub>3</sub> + monoterpenes at the SAPHIR (Simulation of Atmospheric PHotochemistry In a large Reaction) Chamber," NO<sub>3</sub> Intercomparison Campaign Data Discussion Meeting, Forschungszentrum Jülich, Jülich, Germany, November 29, 2007.
54. \*J.L. Fry, "Spectroscopy and kinetics of atmospheric reservoir species," Department of Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA, April 17, 2006.
55. \*J.L. Fry, "Spectroscopy and kinetics of atmospheric reservoir species...and some thoughts on scientists in DC," Department of Atmospheric and Oceanic Science, University of Maryland, College Park, MD, April 7, 2006.
56. \*J.L. Fry, M. Okumura, and P.O. Wennberg, "Spectroscopy and kinetics of atmospheric reservoir species: HOONO," Laboratory of Atmospheric Chemistry, Paul Scherer Institute, Villigen, Switzerland, December 19, 2005.
57. \*J.L. Fry, M. Okumura, and P.O. Wennberg, "Spectroscopy and kinetics of atmospheric reservoir species: HOONO and HOCH<sub>2</sub>OOH," National Oceanic and Atmospheric Administration Aeronomy Lab, Boulder, CO, December 12, 2005.
58. \*J.L. Fry, "Spectroscopy and kinetics of HOONO and hydroxymethyl hydroperoxide (HMHP)," Berkeley Atmospheric Sciences Center, University of California – Berkeley, November 18, 2005.
59. \*J.L. Fry, "Chemistry in Earth's Atmosphere," Oceanside Branch of the American Association of University Women, Vista Chico, CA, October 15, 2005.
60. J.L. Fry, S. Nizkorodov, C.M. Roehl, A.B. McCoy, J.S. Francisco, A.K. Mollner, B.J. Drouin, M. Okumura and P.O. Wennberg, "Kinetics and Spectroscopy of HOONO," ACCESS VIII Colloquium of the Gordon Research Conference on Atmospheric Chemistry, Yellowstone National Park, September 3, 2005.
61. J.L. Fry, S.A. Nizkorodov, C.M. Roehl, M. Okumura, P.O. Wennberg, A.B. McCoy, and J.S. Francisco, "*Cis-cis* and *trans-perp* HOONO: I. Action spectroscopy and isomerization kinetics, II.

Simulating the spectrum: Torsion – OH coupling,” 228<sup>th</sup> American Chemical Society National Meeting, Philadelphia, PA, August 22, 2004.

62. J.L. Fry, S.A. Nizkorodov, C.M. Roehl, M. Okumura, P.O. Wennberg, C.E. Miller, and B.J. Drouin, “Action spectroscopy, isomerization kinetics, and rotational spectroscopy of HOONO,” Dow Chemical Company, Midland, MI, May 20, 2004.
63. J.L. Fry, S.A. Nizkorodov, C.M. Roehl, M. Okumura, P.O. Wennberg, C.E. Miller, and B.J. Drouin, “Action spectroscopy, isomerization kinetics, and rotational spectroscopy of HOONO,” National Oceanic and Atmospheric Administration Aeronomy Lab, Boulder, CO, April 16, 2004.
64. J.L. Fry, C.E. Miller, and B.J. Drouin, “Rotational spectroscopy of *cis-cis* HOONO,” Earth Sciences Division, Jet Propulsion Laboratory, Pasadena, CA, March 15, 2004.
65. J.L. Fry, M. Okumura, and P.O. Wennberg, “Peroxynitrous Acid (HOONO) in the Atmosphere: Photochemistry and Kinetics,” Southern California Inorganic Photochemistry Conference, Catalina Island, CA, October 18-19, 2003.
66. J.L. Fry, S. Nizkorodov, C.M. Roehl, M. Okumura, P.O. Wennberg, “Action Spectroscopy of HOONO: Two conformers.” The Ohio State University Molecular Spectroscopy Conference, Columbus, OH, June 16-20, 2003.

#### **POSTER PRESENTATIONS**

1. Andrey Marsavin, Noah Bernays, Nathaniel W. May, Daniel A. Jaffe, Juliane L. Fry, “Observations of Ozone, Noy, and Particulate Matter in Smoke for Wild and Prescribed Fires in the Western US,” American Geophysical Union national meeting, December 14, 2021.
2. Andrey Marsavin, Emily McLaughlin Sta. Maria, Danielle C. Draper, Michelia Dam, James N. Smith, Juliane L. Fry, “Comparative laboratory studies of NO<sub>3</sub> radical-initiated oxidation of monoterpenes,” American Chemical Society National Meeting, virtual fall meeting, August 18, 2020.
3. James Vesto, Danielle Cass, and Juliane L. Fry, “Developing R coding resources for upper-division undergraduate coursework,” American Chemical Society National Meeting, virtual edition, Mar 22, 2020.
4. Bellamy Brownwood, Juliane L. Fry, Epameinondas Tsiligiannis, Mattias Hallquist, Avtandil Turdziladze, Thorsten Hohaus, Hendrik Fuchs, Anna Novelli, “NO<sub>3</sub>-initiated oxidation of isoprene: Gas-particle partitioning and SOA yields of organonitrate products in varied chemical regimes,” American Association of Aerosol Research National Meeting, Portland, OR, Oct. 14-18, 2019.
5. Emily McLaughlin Sta. Maria, Andrey Marsavin, Danielle Draper, Michelia Damm, James N. Smith, and Juliane L. Fry, “Chemical mechanisms of atmospheric particulate matter production from tree emissions,” Student Research Showcase, Reed College, 4. October 2019.
6. Juliane L. Fry, Bellamy Brownwood, Epameinondas Tsiligiannis, Mattias Hallquist, Avtandil Turdziladze, Thorsten Hohaus, Hendrik Fuchs, Anna Novelli, and the rest of the chamber measurement team of NO<sub>3</sub>ISOP 2018 @ SAPHIR, “Yields and gas/aerosol partitioning of organonitrate products from NO<sub>3</sub>-initiated oxidation of isoprene in varied chemical regimes,” Atmospheric Chemistry Gordon Research Conference, Sunday River, ME, Jul. 29 - Aug. 1, 2019.
7. Juliane L. Fry, Bellamy Brownwood, Epameinondas Tsiligiannis, Matthias Hallquist, Nils Friedrich, John Crowley, Yun Li, Fred Stroh, Avtandil Turdziladze, Thorsten Hohaus, Steven S. Brown, Hendrik Fuchs, Anna Novelli, and team NOSISOP 2018 @ SAPHIR, “Oxidation

products and aerosol production from NO<sub>3</sub> + isoprene: Preliminary results from the NO<sub>3</sub>ISOP 2018 campaign,” Atmospheric Chemistry Mechanisms Conference, Dec. 5-7, 2018.

8. Juliane L. Fry, Steven S. Brown, Ann M. Middlebrook, Peter M. Edwards, Pedro Campuzano-Jost, Doug A. Day, Jose L. Jimenez, and measurement team of SENEX 2013, “Anthropogenically-triggered biogenic aerosol formation: NO<sub>3</sub> + isoprene SOA yields measured in aircraft power plant plume transects,” Dreyfus Teacher-Scholar Symposium: Research Frontiers in the Chemical Sciences, New York, NY, Oct. 26, 2018 and International Commission on Atmospheric Chemistry and Global Pollution and International Global Atmospheric Chemistry joint conference, Takamatsu, Japan, Sept. 25-29, 2018.
9. James N. Smith, Juliane L. Fry, Theo Kurtén, Danielle C. Draper, “Atmospheric Nanoparticle Growth from NO<sub>3</sub> Radical Initiated Oxidation of Monoterpenes,” NCAR / NSF Atmospheric Chemistry Principal Investigators Workshop, May 30-31, 2018.
10. H. Kang, D.A. Day, J. Krechmer, B.R. Ayres, N.I. Keehan, S. Thompson, W. Hu, P. Campuzano-Jost, J.C. Schroder, H. Stark, A. Ranney, P.J. Ziemann, K.J. Zarzana, R.J. Wild, W. Dubé, S.S. Brown, J.L. Fry, J.L. Jimenez, Secondary organic aerosol mass yields from the dark NO<sub>3</sub> oxidation of  $\alpha$ -pinene and  $\Delta$ -carene: effect of RO<sub>2</sub> radical fate. *AGU Fall Meeting*, 2016, <https://agu.confex.com/agu/fm16/meetingapp.cgi/Paper/135842>.
11. J.L. Fry, et al., “Secondary Organic Aerosol (SOA) from NO<sub>3</sub> + BVOC: Field and lab evidence of its variable importance and implications for power plant downwind particulate matter,” Atmospheric Chemistry Gordon Research Conference, Waterville Valley, NH, Aug. 2-6, 2015.
12. N.I. Keehan, B. Ayres, J.L. Fry, “Detecting Organic Nitrates using Thermal Dissociation Cavity Ringdown Spectrometry,” American Chemical Society National Meeting, Denver, CO, Mar. 23, 2015.
13. D.C. Draper, D.K. Farmer, Y. Desyaterik, J.N. Smith, J.L. Fry, “Comparison of NO<sub>2</sub> Effects on Secondary Organic Aerosol (SOA) Formation From Ozonolysis of Four Monoterpenes,” American Association for Aerosol Research National Meeting, Minneapolis, MN, Oct. 12-16, 2015.
14. K. Kang, B. Ayres, S.S. Brown, D. Day, S. Thompson, W. Hu, P. Campuzano-Jost, H. Stark, J. Jimenez, A. Ranney, P. Ziemann, and J.L. Fry, “Chamber Study Exploring Aerosol Formation from NO<sub>3</sub> Oxidation of  $\alpha$ -pinene and  $\Delta$ -carene under Varying HO<sub>2</sub>/RO<sub>2</sub>/NO<sub>3</sub> Regimes,” American Geophysical Union National Meeting, San Francisco, CA, December 16, 2014.
15. B. Ayres, D.C. Draper, H. Allen, R. Wild, S.S. Brown, D. Day, P. Campuzano-Jost, B. Palm, W. Hu, J. Jimenez, B. Lee, C. Mohr, J. Thornton, K. Duffey, P. Romer, R. Cohen, A. Koss, J. de Gouw, K. Olson, A. Goldstein, J.L. Fry, “NO<sub>y</sub> fate at SOAS 2013: Organonitrate Formation via NO<sub>3</sub> + BVOC and Inorganic Nitrate Formation via Heterogeneous Uptake of HNO<sub>3</sub>,” American Geophysical Union National Meeting, San Francisco, CA, December 17, 2014.
16. A. Tuan, B. Ayres, and J.L. Fry, “The effect of Brooklyn Rail Yard on air quality in Portland: A study of black carbon, particulate matter, and other air pollutants,” Urban Ecology and Conservation Symposium, Portland State University, Portland, OR, February 10, 2014.
17. B.R. Ayres, D.C. Draper, H. Allen, R. Wild, S.S. Brown, A. Koss, J.A. de Gouw, K.F. Olson, A.H. Goldstein, K. Baumann, E. Edgerton, and J.L. Fry, “Reactive nitrogen fate in the southeastern U.S.: Preliminary results from the SOAS campaign,” American Geophysical Union National Meeting, San Francisco, CA, December 9, 2013.
18. D.C. Draper, D. K. Farmer, Y. Desyaterik, J.L. Fry, “SOA yield from ozonolysis of BVOC at varying NO<sub>2</sub> concentrations,” American Association for Aerosol Research National Meeting, Portland, OR, Sept 30-Oct 4, 2013.

19. J.L. Fry, B. Ayres, D.C. Draper, H. Allen, R. Wild, and S. Brown, "Fate of reactive nitrogen in the southeastern United States: Preliminary results from the Southern Oxidant and Aerosol Study, June-July, 2013," Atmospheric Chemistry Gordon Research Conference, Mt. Snow Resort, West Dover, VT, July 28 - August 2, 2013.
20. D.C. Draper and J.L. Fry, "NO<sub>x</sub> effects on nighttime secondary organic aerosol formation," American Chemical Society National Meeting, New Orleans, LA, April 7-11, 2013. *Won Certificate of Merit from the Division of Environmental Chemistry.*
21. L. Krause, J. Mainord, J.D. Katz, and J.L. Fry, "Quantification of Organic Functional Groups of Ambient Aerosol using FTIR," Urban Ecology and Conservation Symposium, Portland State University, Portland, OR, February 11, 2013.
22. D.C. Draper and J.L. Fry, "NO<sub>x</sub> effects on nighttime secondary organic aerosol (SOA) formation," Urban Ecology and Conservation Symposium, Portland State University, Portland, OR, February 11, 2013.
23. J.L. Fry and C. Koski, "NO<sub>3</sub>-initiated oxidation of plant emissions as a source of secondary organic aerosol: Speciated BVOC yield parameterization and policy implications," American Meteorological Society National Meeting, Austin, TX, January 7, 2013.
24. J.L. Fry, D. Draper, S.S. Brown, J.N. Smith, R.C. Cohen, K.J. Zarzana, B.B. Palm, J.L. Jimenez, L. Kaser, A. Hansel, T. Karl, J. Ortega, P. Winkler, K.C. Barsanti, "NO<sub>3</sub>-initiated oxidation of biogenic hydrocarbons: Nighttime sink of volatile organic compounds and source of secondary organic aerosol," CIRES Rendezvous, Boulder, CO, April 24, 2012, and Biogenic Hydrocarbons Gordon Research Conference, Lewiston, ME, June 24-29, 2012.
25. C.M. Arata, R.D. Meade, and J.L. Fry, "Chamber studies of secondary organic aerosol formation (SOA) from O<sub>3</sub> and NO<sub>3</sub> +  $\alpha$ -pinene," 242<sup>nd</sup> American Chemical Society National Meeting, Denver, CO, Aug. 29, 2011.
26. J.L. Fry, J.D. Katz, T. Dittrich, and K. Redell, "Summertime ozone and airborne particle concentrations measured on the Juneau Icefield (58°N)," American Geophysical Union Fall Meeting, San Francisco, CA, December 15, 2010.
27. J.L. Fry, J.D. Katz, and R.D. Meade, "Daytime vs. nighttime NO<sub>x</sub> effects on aerosol formation: Constraints from ambient measurements and chamber studies," American Association of Aerosol Research National Meeting, Portland, OR, October 28, 2010.
28. C. Arata, L. George, and J.L. Fry, "Nitrogen dioxide (NO<sub>2</sub>) air pollutant concentrations in Portland's atmospheric outflow," Urban Ecology and Conservation Symposium, Portland State University, Portland, OR, January 25, 2010.
29. J.L. Fry, A. Kiendler-Scharr, A.W. Rollins, P.J. Wooldridge, S.S. Brown, H. Fuchs, W. Dube, A. Mensah, M. Dal Maso, R. Tillmann, H.-P. Dorn, T. Brauers, R.C. Cohen; C. Arata, S. Dillon, A. Stonestrom, J.D. Tobin, L. Zha, "Secondary organic aerosol and organic nitrate yields from NO<sub>3</sub> + monoterpenes; NO<sub>x</sub> effects on aerosol formation and composition," Atmospheric Chemistry Gordon Research Conference, Waterville Valley, NH, August 26-31, 2009.
30. J.L. Fry, A. Kiendler-Scharr, A.W. Rollins, P.J. Wooldridge, S.S. Brown, H. Fuchs, W. Dube, A. Mensah, M. Dal Maso, R. Tillmann, H.-P. Dorn, T. Brauers, R.C. Cohen, "Observed Secondary Organic Aerosol (SOA) and Organic Nitrate Yields From NO<sub>3</sub> Oxidation of  $\beta$ -pinene and Limonene," American Geophysical Union Fall Meeting, San Francisco, CA, December 14-18, 2008.
31. A.W. Rollins, J.L. Fry, A. Kiendler-Scharr, P.J. Wooldridge, S.S. Brown, H. Fuchs, W. Dube, A. Mensah, M. Dal Maso, R. Tillmann, H.-P. Dorn, T. Brauers, R.C. Cohen, "Observed secondary

- organic aerosol (SOA) and organic nitrate yields from NO<sub>3</sub> oxidation of isoprene,” American Geophysical Union Fall Meeting, San Francisco, CA, December 14-18, 2008.
32. H.-P. Dorn et al, “Intercomparison Campaign of NO<sub>3</sub> and N<sub>2</sub>O<sub>5</sub> Detection Techniques at the Atmosphere Simulation Chamber SAPHIR,” Americal Geophysical Union Fall Meeting, San Francisco, CA, December 10-14, 2007.
  33. A.W. Rollins, J.L. Fry, P.J. Wooldridge, and R.C. Cohen, “Detection of NO<sub>3</sub> and N<sub>2</sub>O<sub>5</sub> by thermal dissociation with LIF detection of NO<sub>2</sub> and NO<sub>3</sub>,” Americal Geophysical Union Fall Meeting, San Francisco, CA, December 10-14, 2007.
  34. J.L. Fry, S.A. Nizkorodov, A.B. McCoy, J.S. Francisco, A.K. Mollner, B.J. Drouin, M. Okumura, and P.O. Wennberg, “Kinetics and Spectroscopy of HOONO,” Atmospheric Chemistry Gordon Research Conference, Big Sky, MT, September 4-9, 2005.
  35. J.L. Fry, S. Nizkorodov, C.M. Roehl, J.D. Crounse, M. Okumura, and P.O. Wennberg, “Action Spectroscopy of HOONO.” 20<sup>th</sup> Informal Symposium on Kinetics and Photochemical Processes in the Atmosphere, Riverside, CA, February 18, 2003.
  36. J.L. Fry, “Weakly bound complexes of importance in the atmosphere,” Caltech Women’s Science Symposium, Pasadena, CA, November 12-13, 2002.
  37. J.L. Fry, C.M. Liberatore, L.J. Rothberg, “Vibrational spectroscopy of interfaces using sum frequency generation.” 219<sup>th</sup> American Chemical Society National Meeting, San Francisco, CA, March 26, 2000.
  38. J.L. Fry, N. Simhai, E. Bones, “University of Rochester Undergraduate Chemistry Council: “Bonding” students with faculty and the real world outside campus.” 219<sup>th</sup> American Chemical Society National Meeting, San Francisco, CA, March 26, 2000.
  39. L. Balogh, D.R. Swanson, J. Fry, D.A. Tomalia, “Component transfer without interface resistance: Interactions of copper(II) ions with poly(amidoamine) dendrimers.” 216<sup>th</sup> American Chemical Society National Meeting, Boston, MA, August 23, 1998.

#### **OTHER PROFESSIONAL ACTIVITIES**

- Co-organizer and convener of Frontiers in Atmospheric Chemistry Seminar Series, a virtual seminar series featuring emerging and senior scientists, coordinated by a team of faculty from Colorado State University, University of California Davis, University of Michigan, University of Toronto, Reed College, and the Massachusetts Institute of Technology, 2020- . <https://facss.mit.edu/>
- Organizer and convener of Environmental and Geochemistry Symposium at Northwest Regional Meeting of the American Chemical Society Meeting, Portland OR, June 16-19, 2019.
- Co-organizer and panel presenter, “Women in Science Student Summit,” American Chemical Society Portland Section, Jan. 28. 2018.
- Panel presenter and co-convener, “Pollution Analysis in Urban and Rural Settings” at Association for Environmental Studies and Sciences 2013 conference, Pittsburgh PA, June 19-22, 2013
- Program co-chair and convener, 5<sup>th</sup> annual Symposium on Aerosol-Cloud-Climate Interactions and Chair, Chemistry at the Climate Science / Policy Interface session, American Meteorological Society National Meeting, Austin, TX, January 6-10, 2013.
- Chair and convener of three joint sessions, Conference on Climate Variability and Change and Symposium on Policy and Socio-Economic Research, American Meteorological Society National Meeting, January 12-15, 2009.
- Chair, Conference on Climate Variability and Change session on “Impacts of Climate Change” and Conference on Climate Variability and Change and Symposium on Policy and Socio-Economic

Research joint session on “Climate Policy, Vulnerability, and Adaptation,” American Meteorological Society National Meeting, January 20-24, 2008.

Proposal reviewer and panelist: National Oceanic and Atmospheric Administration (NOAA), National Science Foundation (NSF), Pacific Northwest National Lab User Facility

Manuscript reviewer: Journal of Chemical Physics, Atmospheric Chemistry and Physics, Journal of Geophysical Research, Science of the Total Environment, Environmental Science and Technology, Atmospheric Environment, Journal of Atmospheric Chemistry, Environmental Science: Processes and Impacts, ACS Earth and Space Chemistry

Memberships: American Chemical Society, American Geophysical Union, American Meteorological Society, Environmental Science Women’s Network, Environmental Chemistry at Liberal Arts Colleges, Urban Ecology Research Consortium Steering Committee of Portland/Vancouver, (2012-2015), American Meteorological Society Scientific and Technological Activities Commission, Committee on Atmospheric Chemistry (2011-2014)

### **SELECTED SERVICE AND VOLUNTEER ACTIVITIES**

Member of Advisory Board, Neighbors for Clean Air, Portland, OR, 2020 - 2021.

Air Quality Fellow to Embassy Post Kuwait and Embassy Post Bahrein, U.S. Department of State, 2020 - 2021.

Member, Multnomah County Advisory Committee on Sustainability and Innovation (ACSI) Subcommittee on Air Toxics, 2017 - 2021.

Program Chair, Reed College Environmental Studies Program, 2014-2015 and 2019-2021

Department Chair, Reed College Chemistry Department, 2017-2019

Organized Celebrating Diversity social hour for American Association of Aerosol Research National Meeting in Portland, OR, 2019.

Reed College Chemistry Department Seminar Chair, 2009-2011

Liaison to Reed facilities and architects for Chemistry Building renovations, 2014-2015

Chair, Environmental/Analytical Chemistry visiting faculty search in (2013)

Presented at OMSI Climate Science Communication Workshop (2013)

Secretary, Math and Natural Sciences Division, Reed College, 2012-2013, 2019-2020.

Member, Reed College Committee on Advancement and Tenure (2018-2020), ad hoc committee on Introductory Sciences, 2014-2015, teaching and research strategic planning committee, 2013-2014, Environmental Studies Committee (2008-2015; Chair 2014-2015 and 2019-2020), Fellowships and Awards Committee (2009-2015), Sustainability Committee (2009-2010), and Canyon Committee (2010-2011)

Developed air quality *Science on a Sphere* exhibit with staff at Oregon Museum of Science and Industry, February 2010

Speaker at International Day of Climate Action, Portland, OR, Oct. 24, 2009

Mentored high school student science fair project on ozone absorption by water, 2008

Organized Berkeley Great Decisions Foreign Policy Discussion Group, 2008

Guest Commentary on *RealClimate.org*, 2007

Opinion Editorials for *Midland Daily News*, the Environmental and Energy Study Institute, and the *Oregonian* newspaper

Presented keynote lecture to the Carlsbad-Oceanside-Vista Chico branch of the American Association of University Women on “Chemistry in Earth’s Atmosphere,” Oct. 15, 2005

Organized Pasadena Great Decisions Foreign Policy Discussion Group, 2002-2005

Served on Caltech Graduate Student Council Academics Committee, 2002-2005, including serving as Secretary, 2003-2004

Editor of Caltech graduate student publication, the *Technique* (a 300-page guide to Caltech and Pasadena distributed to incoming graduate students), 2004-2005

Served as board member of the Aero Association of the California Institute of Technology (flying club with 7 airplanes and 100 members), 2004-2005

Served on the University of Rochester Undergraduate Chemistry Council, 1997-2000, including serving as Chair, 1999-2000

### **ADDITIONAL CERTIFICATION**

Private pilot (VFR), March 2005

### **HONORS**

Caltech Women in Chemistry Annual Seminar Speaker, 2019

Henry Dreyfus Teacher-Scholar Award, 2017

Fulbright U.S. Scholar Award to the Netherlands, 2016

Arthur F. Scott Endowed Chair in Chemistry, 2016

EPA Early Career Award, 2013

Gordon Research Conferences Travel Award for PUI Faculty, 2012

National Center for Atmospheric Research (NCAR) Advanced Study Program Faculty Fellowship, 2011

Cooperative Institute for Research in the Environmental Sciences Visiting Fellow, 2011-2012

*Encyclopedia of Weather and Climate Change* selected as ASLI (Atmospheric Science Librarians International) Book of the Year for 2010 in the Popular category

Selected to participate in Atmospheric Chemistry Gordon Research Conference, 2007, 2009, 2013, 2015; Biogenic Hydrocarbons GRC, 2012, 2016

Selected to participate in US/Nordic Workshop on Biogenic Secondary Organic Aerosol, 2007-2008

Travel Grant Award from UC Berkeley Science, Technology & Engineering Policy White Paper Competition, 2007

American Association of University Women Dissertation Fellowship, 2005

Selected to participate in Atmospheric Chemistry Gordon Research Conference and ACCESS VIII Colloquium for emerging scientists, 2005

Dow Chemical Company Travel Fellowship, 2003

National Science Foundation Graduate Research Fellowship, 2001-2004

Fulbright Fellowship, 2000-2001

Flagg Award (2000) and Merck Award (1999) for achievement in chemistry (U. Rochester)

### **EXTERNAL GRANTS FUNDED**

National Science Foundation, Atmospheric Chemistry Program, "Collaborative Research: Atmospheric Nanoparticle Growth from NO<sub>3</sub> Radical Initiated Oxidation of Monoterpenes,"

PIs: Jim Smith (UCI), Juliane L. Fry

\$167,727

1/1/2018- 12/30/2020



Environmental Protection Agency, Community-Scale Air Toxics Ambient Monitoring, “Improving Diesel Particulate Matter Exposure Assessment for Vulnerable Populations in the Portland Metropolitan Area,” Subaward of Oregon DEQ grant

Academic PIs: Linda George, Vivek Shandas (PSU), Juliane L. Fry

\$59,926

3/15/2018 – 3/15/2020

Henry Dreyfus Teacher-Scholar Award

Juliane L. Fry

\$60,000

9/2017-9/2022

Fulbright U.S. Scholars Program in the Netherlands, “Nitrogen Oxides to Particulate Matter: Investigating the Chemical Mechanisms of Human Influences on Air Quality in Northern Europe,”

PI: Juliane L. Fry

€20,000

09/01/16 - 12/31/16

Pacific Northwest National Lab Environmental Molecular Science Laboratory Science Theme Proposal # 48347 “Size-dependent molecular-level characterization of secondary organic aerosol from various oxidants using nanospray desorption electrospray (nano-DESI) high-resolution mass spectrometry”

PI: Juliane L. Fry

In-kind instrumentation support, estimated value \$25,677

10/01/14-10/01/16

Collaborative Research: “Influence of NO<sub>3</sub> on secondary aerosol formation: analysis, and interpretation of real-time field observations”

PIs: Jose L. Jimenez, Juliane L. Fry, Douglas Day, Steven S. Brown

National Oceanic and Atmospheric Administration Climate Program Office

\$103,324

08/01/13 - 07/31/16

EPA-STAR (Early Career): “Anthropogenic influence on biogenic VOC oxidation: the role of NO<sub>x</sub> pollution in secondary organic aerosol production in the Southeast U.S.”

PI: Juliane L. Fry

Environmental Protection Agency

\$299,995

04/01/13 - 03/31/16

American Chemical Society Climate Science Challenge Grant to Portland Local ACS Section

PIs: Tracey Scherban, Juliane L. Fry, Angela Hoffman, Carl Wamser

\$3,000

05/01/13-05/01/14

Cooperative Institute for Research in the Environmental Sciences (CIRES) Visiting Fellowship, “Investigation of NO<sub>x</sub>-influenced nighttime aerosol chemistry in the real atmosphere: The role of NO<sub>3</sub> + biogenic hydrocarbons and NO<sub>3</sub> heterogeneous losses,”

6 months salary

September 2011 - May 2012

National Center for Atmospheric Research (NCAR) Advanced Studies Program (ASP) Faculty Fellowship program,  
research stipend for self + student assistant  
September 2011 - May 2012

PNNL Environmental Molecular Science Lab Supercomputer use grant, “Investigating NO<sub>x</sub> effects on Secondary Organic Aerosol formation in the western United State using WRF-Chem regional modeling,” granted September 2008, renewed September 2009, 2010 with additional 20,000 CPU hours (sole PI)

## **REFERENCES**

Available upon request.