

JULIANE L. FRY

Associate Professor of Chemistry & Environmental Studies 3203 SE Woodstock Boulevard
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EDUCATION

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, Chemistry Department and Environmental Studies Program, Reed College, Portland, OR	2014-
Assistant Professor, Chemistry Department and Environmental Studies Program, Reed College, Portland, OR	2009-2014
Visiting Assistant Professor, Chemistry Department, Reed College, Portland, OR	2008-2009
Undergraduate Research Assistant, University of Rochester, Rochester, NY	1999-2000
Teaching Assistant, General Chemistry and Molecular Spectroscopy, University of Rochester, Rochester NY	1996-2000
Teaching Assistant, Physics Laboratory, University of Rochester, Rochester NY	1998

RESEARCH & PROFESSIONAL EXPERIENCE

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 (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 Reed: Molecular Structure and Properties; Chemical Reactivity; Environmental Chemistry;
Physical Chemistry Lab; Environmental Studies Junior Seminar; Senior Symposium; and as
Teaching Assistant in graduate school: 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.

My research group works to:

- Measure chemical composition of ambient atmospheric aerosol using filter samplers and offline FTIR, GC-MS, and ESI-MS; interpret to derive formation mechanisms using chemical kinetics modeling and employing ancillary gas-phase composition measurements

- Simulate atmospheric aerosol formation chemistry in kinetics flow tube and environmental chamber experiments
- Model regional atmospheric chemistry, including secondary organic aerosol (SOA) formation, to investigate NO_x effects on aerosol formation
- Analyze satellite datasets of NO_x and aerosol optical properties to investigate correlations and test modeling results
- Conduct field measurements focusing on anthropogenically-influenced biogenic aerosol formation (e.g., BEACHON-RoMBAS 2011: Rocky Mountain Biogenic Aerosol Study, SOAS 2013: Southeast Oxidant and Aerosol Study)

MENTORING SUMMARY: 23 unique students and 1 postdoc mentored (several for multiple years)

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)

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, Cassandra 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: Kang Kang, Natalie Keehan, Catherine Neshyba

Postdoctoral Fellow: Ben Ayres (2013-2015)

Postbaccalaureate Fellows: Danielle Draper (2014), Kang Kang (2015), Natalie Keehan (2015)

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

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

PhD thesis committee member at Portland State University: Meenakshi Rao (current), Jacinda Mainord (current).

PUBLICATIONS

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

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 NO₃ + BVOC in the Southeastern US," *ACP*, 15, 13377-13392, 2015.

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*, doi: 10.1016/j.apr.2015.04.004, 2015.

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, DOI: 10.1021/acs.est.5b03738, 2015.
- D.C. Draper, D.K. Farmer, Y. Desyaterik, and J.L. Fry, “Composition and yield comparison of secondary organic aerosol (SOA) formation from NO₃ vs O₃ oxidation of monoterpenes,” *Atmospheric Chemistry and Physics*, 15, 12267-12281, 2015.
- 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 NO₃⁻ aerosol during the 2013 Southern Oxidant and Aerosol Study,” *Atmospheric Chemistry and Physics*, 15, 10669–10685, 2015.
- 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.
- 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.
- 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.
- J.L. Fry, D.C. Draper, K.C. Barsanti, J.N. Smith, J. Ortega, S. S. Brown, P. Winkler, *et al.*, “Secondary organic aerosol formation and Organic Nitrate Yield from NO₃ oxidation of biogenic hydrocarbons,” *Environmental Science and Technology*, 48, 11944-11953, 2014.
- 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.
- 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.
- 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 N₂O₅ mixing ratios during NO₃Comp 2007 in SAPHIR,” *Atmos. Meas. Tech.*, 5, 2763-2777, 2012.
- J. L. Fry and K. Sackinger, “Model evaluation of NO₃ secondary organic aerosol (SOA) source and heterogeneous organic aerosol (OA) sink in the western United States,” *Atmos. Chem. Phys.*, 12, 8797-8811, 2012.
- 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 NO₃ in its generation and degradation,” *Atmos. Chem. Phys.*, 11, 3879-3894, 2011.

- 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.
- 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.
- 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.
- 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 NO₂ concentrations in the atmosphere simulation chamber SAPHIR during the NO₃Comp campaign," *Atmos. Meas. Tech.*, **3**, 21-37, 2010.
- 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 (Σ PNs) in the atmosphere: the thermal dissociation-laser induced fluorescence (TD-LIF) technique and comparisons to speciated PAN measurements, *Atmos. Meas. Tech. Discuss.* **2**, 3055-3097, 2009.
- 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.
- 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 NO₃ oxidation of β -pinene evaluated using a gas-phase kinetics/aerosol partitioning model," *Atmos. Chem. Phys.*, **9**, 1431-1449, February 23, 2009.
- J.L. Fry et al., "Global environmental solutions require global funding," *Eos Trans. AGU*, **89** (43), 420, October 21, 2008.
- J. Matthews, J.L. Fry, C.M. Roehl, P.O. Wennberg, and A. Sinha, "Vibrational overtone initiated unimolecular dissociation of HOCH₂OOH and HOCD₂OOH: Evidence for mode selective behavior," *Journal of Chemical Physics*, **128**, 184306, May 15, 2008.
- C.M. Roehl, Z. Marka, J.L. Fry, and P.O. Wennberg, "Near-UV photolysis cross sections of CH₃OOH and HOCH₂OOH determined via action spectroscopy," *Atmospheric Chemistry and Physics*, **7**, 713-720, February 14, 2007.
- 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.
- 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.

- 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.
- 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.
- 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.
- 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.
- 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)

- 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 O₃ vs. NO₃ oxidation of monoterpenes," Pacifichem (The International Chemical Congress of Pacific Basin Societies) 2015 Meeting, Honolulu, HI, Dec. 19, 2015.
- *J.L. Fry, "Chamber studies of secondary organic aerosol (SOA) yield and composition from NO₃ reactions with monoterpenes," Workshop on NO₃ radicals and BVOCs, Georgia Institute of Technology, GA, June 23, 2015.
- 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, "NO₃-initiated biogenic SOA production: Insights from field and chamber studies," Wennberg/Okumura/Seinfeld group meeting, California Institute of Technology, May 14, 2015.
- 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, "NO₃-initiated biogenic SOA production: Insights from field and chamber studies," American Chemical Society National Meeting, Denver, CO, Mar. 24, 2015.
- *J.L. Fry, "When NO₃ met terpene," Telluride Science Research Center, July 28, 2014.
- J.L. Fry, B. Ayres, H. Allen, D.C. Draper, "NO_y fate in the southeastern U.S.: NO₃-initiated organonitrate production vs. dust uptake of HNO₃," SOAS/SENEX Data Meeting, Boulder, CO, April 1, 2014.
- *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.
- *J.L. Fry, "New insights into atmospheric particle formation in forests," seminar presentations at Reed College, Pacific University, and Willamette University, October 2012.
- *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, "NO₃ oxidation of biogenic VOCs: an alternate take on NO_x suppression of SOA formation from monoterpenes," American Chemical Society National Meeting, Denver, CO, Aug. 21, 2012.

- *J.L. Fry, “NO₃ vs O₃ oxidation of BVOC: an alternate take on NO_x suppression of SOA formation and a renewed plea for speciated treatment of NO₃ + BVOC in SOA models,” Telluride Science Research Center, July 29 – Aug. 3, 2012.
- *J.L. Fry, “NO₃-initiated secondary organic aerosol (SOA) production and NO_y chemistry in a pine forest,” Colorado State University Atmospheric Chemistry Group Meeting, Mar. 26, 2012.
- *J.L. Fry, “NO₃-initiated secondary organic aerosol (SOA) production and NO_y 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.
- *J.L. Fry, “Climate Change and the role of Atmospheric Aerosols,” Environmental Program, Colorado College, Jan. 31, 2012.
- 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_y) in a pine forest (BEACHON-RoMBAS 2011),” American Geophysical Union Fall Meeting, San Francisco, CA, December 5-9, 2011.
- *J.L. Fry, “Role of organic nitrates in secondary organic aerosol (SOA) production in forests,” University of Colorado Analytical Chemistry Seminar, Nov. 14, 2011.
- *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.
- *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, 242nd American Chemical Society National Meeting, Denver, CO, Aug. 30, 2011.
- 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,” 242nd American Chemical Society National Meeting, Denver, CO, Aug. 28, 2011. (*student presented*)
- L. Zha and J.L. Fry, “Temporal correlations of NO₂ and aerosol optical depth observed by satellites over the western United States,” American Chemical Society Northwest Regional Meeting, Jun 26, 2011. (*student presented*)
- 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*)
- *J.L. Fry, “Chemistry of Earth’s Atmosphere: From Global Climate Change to Local Air Quality,” American Chemical Society Portland Section, May 19, 2011.
- *J.L. Fry, J. Katz, K. Sackinger, L. Zha, R.C. Cohen, A.W. Rollins, A. Kiendler-Scharr, S.S. Brown, “NO_x effects on organic aerosol: Aerosol production from NO₃ + biogenic hydrocarbons vs. NO₃ heterogeneous loss,” 240th American Chemical Society National Meeting, Boston, MA, August 24, 2010.
- *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.

- *J.L. Fry, “NO_x effects on atmospheric aerosol formation: Suppression? Enhancement? Innocent bystander?” Environmental Science and Management Seminar Series, Portland State University, May 21, 2010.
- *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.
- *J.L. Fry, “Atmospheric chemistry of nitrogen oxides,” Department of Chemistry, Haverford College, December 8, 2008.
- *J.L. Fry, “Atmospheric chemistry of nitrogen oxides,” Department of Chemistry, Drexel University, December 10, 2008.
- *J.L. Fry, “Atmospheric chemistry of nitrogen oxides,” Department of Chemistry, Lewis & Clark College, November 25, 2008.
- *J.L. Fry, “Atmospheric chemistry of nitrogen oxides,” Department of Chemistry, Vassar College, November 3, 2008.
- *J.L. Fry, “Atmospheric chemistry of nitrogen oxides,” Department of Chemistry, Portland State University, October 24, 2008.
- *J.L. Fry, “Atmospheric chemistry of nitrogen oxides,” Division of Atmospheric Sciences & Global Change, Pacific Northwest National Lab, August 22, 2008.
- *J.L. Fry and A. Stine, “Intro to Atmospheres for Architects,” Department of Architecture, University of California – Berkeley, July 7, 2008.
- *J.L. Fry, “Atmospheric chemistry of nitrogen oxides,” Berkeley Atmospheric Science Center Seminar Series, University of California – Berkeley, April 29, 2008.
- *J.L. Fry, “Atmospheric chemistry: From air pollution to climate change,” Reed College, March 13, 2008.
- J.L. Fry, “NO₃ + monoterpenes at the SAPHIR (Simulation of Atmospheric PHotochemistry In a large Reaction) Chamber,” NO₃ Intercomparison Campaign Data Discussion Meeting, Forschungszentrum Jülich, Jülich, Germany, November 29, 2007.
- *J.L. Fry, “Spectroscopy and kinetics of atmospheric reservoir species,” Department of Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA, April 17, 2006.
- *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.
- *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.
- *J.L. Fry, M. Okumura, and P.O. Wennberg, “Spectroscopy and kinetics of atmospheric reservoir species: HOONO and HOCH₂OOH,” National Oceanic and Atmospheric Administration Aeronomy Lab, Boulder, CO, December 12, 2005.
- *J.L. Fry, “Spectroscopy and kinetics of HOONO and hydroxymethyl hydroperoxide (HMHP),” Berkeley Atmospheric Sciences Center, University of California – Berkeley, November 18, 2005.
- *J.L. Fry, “Chemistry in Earth’s Atmosphere,” Oceanside Branch of the American Association of University Women, Vista Chico, CA, October 15, 2005.

- 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.
- 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," 228th American Chemical Society National Meeting, Philadelphia, PA, August 22, 2004.
- 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.
- 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.
- 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.
- 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.
- 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

- J.L. Fry, et al., "Secondary Organic Aerosol (SOA) from NO₃ + 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.
- D. Draper, D.K. Farmer, Y. Desyaterik, J.N. Smith, J.L. Fry, "Comparison of NO₂ 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.
- 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 NO₃ Oxidation of α -pinene and Δ -carene under Varying HO₂/RO₂/NO₃ Regimes," American Geophysical Union National Meeting, San Francisco, CA, December 16, 2014.
- B. Ayres, D. 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_y fate at SOAS 2013: Organonitrate Formation via NO₃ + BVOC and Inorganic Nitrate Formation via Heterogeneous Uptake of HNO₃," American Geophysical Union National Meeting, San Francisco, CA, December 17, 2014.
- 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.

- 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.
- D.C. Draper, D. K. Farmer, Y. Desyaterik, J.L. Fry, "SOA yield from ozonolysis of BVOC at varying NO₂ concentrations," American Association for Aerosol Research National Meeting, Portland, OR, Sept 30-Oct 4, 2013.
- 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.
- D. Draper and J.L. Fry, "NO_x 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.*
- 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.
- D. Draper and J.L. Fry, "NO_x effects on nighttime secondary organic aerosol (SOA) formation," Urban Ecology and Conservation Symposium, Portland State University, Portland, OR, February 11, 2013.
- J.L. Fry and C. Koski, "NO₃-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.
- 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, "NO₃-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.
- C.M. Arata, R.D. Meade, and J.L. Fry, "Chamber studies of secondary organic aerosol formation (SOA) from O₃ and NO₃ + α -pinene," 242nd American Chemical Society National Meeting, Denver, CO, Aug. 29, 2011.
- 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.
- J.L. Fry, J.D. Katz, and R.D. Meade, "Daytime vs. nighttime NO_x effects on aerosol formation: Constraints from ambient measurements and chamber studies," American Association of Aerosol Research National Meeting, Portland, OR, October 28, 2010.
- C. Arata, L. George, and J.L. Fry, "Nitrogen dioxide (NO₂) air pollutant concentrations in Portland's atmospheric outflow," Urban Ecology and Conservation Symposium, Portland State University, Portland, OR, January 25, 2010.
- 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 NO₃ + monoterpenes; NO_x effects on aerosol formation and composition,"

Atmospheric Chemistry Gordon Research Conference, Waterville Valley, NH, August 26-31, 2009.

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 NO₃ Oxidation of β -pinene and Limonene," American Geophysical Union Fall Meeting, San Francisco, CA, December 14-18, 2008.

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 NO₃ oxidation of isoprene," American Geophysical Union Fall Meeting, San Francisco, CA, December 14-18, 2008.

H.-P. Dorn et al, "Intercomparison Campaign of NO₃ and N₂O₅ Detection Techniques at the Atmosphere Simulation Chamber SAPHIR," American Geophysical Union Fall Meeting, San Francisco, CA, December 10-14, 2007.

A.W. Rollins, J.L. Fry, P.J. Wooldridge, and R.C. Cohen, "Detection of NO₃ and N₂O₅ by thermal dissociation with LIF detection of NO₂ and NO₃," American Geophysical Union Fall Meeting, San Francisco, CA, December 10-14, 2007.

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.

J.L. Fry, S. Nizkorodov, C.M. Roehl, J.D. Crouse, M. Okumura, and P.O. Wennberg, "Action Spectroscopy of HOONO." 20th Informal Symposium on Kinetics and Photochemical Processes in the Atmosphere, Riverside, CA, February 18, 2003.

J.L. Fry, "Weakly bound complexes of importance in the atmosphere," Caltech Women's Science Symposium, Pasadena, CA, November 12-13, 2002.

J.L. Fry, C.M. Liberatore, L.J. Rothberg, "Vibrational spectroscopy of interfaces using sum frequency generation." 219th American Chemical Society National Meeting, San Francisco, CA, March 26, 2000.

J.L. Fry, N. Simhai, E. Bones, "University of Rochester Undergraduate Chemistry Council: "Bonding" students with faculty and the real world outside campus." 219th American Chemical Society National Meeting, San Francisco, CA, March 26, 2000.

L. Balogh, D.R. Swanson, J. Fry, D.A. Tomalia, "Component transfer without interface resistance: Interactions of copper(II) ions with poly(amidoamine) dendrimers." 216th American Chemical Society National Meeting, Boston, MA, August 23, 1998.

OTHER PROFESSIONAL ACTIVITIES

Panel presenter and co-convenor, "Pollution Analysis in Urban and Rural Settings" at Association for Environmental Studies and Sciences 2013 conference, Pittsburgh, PA, June 19-22, 2013

Member, Urban Ecology Research Consortium Steering Committee of Portland/Vancouver, 2012-2015.

Member, American Meteorological Society Scientific and Technological Activities Commission, Committee on Atmospheric Chemistry, 2011-2014.

Program co-chair and convener, 5th 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)

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

Memberships: American Chemical Society, American Geophysical Union, American Meteorological Society, Environmental Science Women’s Network, Environmental Chemistry at Liberal Arts Colleges

SELECTED SERVICE AND VOLUNTEER ACTIVITIES

Presented at OMSI Climate Science Communication Workshop, Sept. 2013

Co-PI, American Chemical Society Portland Local Section Climate Science Challenge Grant, 2013-2014.

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

Member, Reed College Environmental Studies Committee (2008-present), Fellowships and Awards Committee (2009-present), Sustainability Committee (2009-2010), and Canyon Committee (2010-2011)

Reed College Chemistry Department Seminar Chair, 2009-2011

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, Pioneer Courthouse Square, 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

SELECTED HONORS

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 and Biogenic Hydrocarbons GRC, 2012

Selected to participate in US/Nordic Workshops 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)