

PAUL BRADFORD SHEPSON

12 Braemer Rd., East Setauket, NY 11733

Telephone: 631-632-8781 (office)

631-601-3309 (cell)

e-mail: paul.shepson@stonybrook.edu

I. General Information:

A. Education:

B.S. 1978 S.U.N.Y. College at Cortland (Chemistry)

Ph.D. 1982 Pennsylvania State University (Analytical/Atmospheric Chemistry)

B. Professional Career:

2021- SUNY Distinguished Professor, Stony Brook University
2018- Dean, School of Marine and Atmospheric Sciences, Stony Brook University
2018- Jonathan Amy Distinguished Professor Emeritus, Purdue University
2014-2018 Division Director, Atmospheric and Geospace Sciences,
National Science Foundation, Alexandria, VA
2014-2018 Jonathan Amy Distinguished Professor, Depts. of Chemistry, and Earth,
Atmospheric, and Planetary Sciences, Purdue University
2008-2013 Head, Department of Chemistry, Purdue University
2006-2008 Director, Purdue Climate Change Research Center
2004-2006 Founding and Interim Director of the Purdue Climate Change Research Center
2003-2006 Head, Analytical Chemistry Division, Dept. of Chem., Purdue University
2001; 2008 Visiting Professor, University of Innsbruck, Institute for Ion Physics, Austria
2000 Visiting Scientist, Pacific Northwest National Labs, Environmental Molecular
Sciences Laboratory, Richland, WA
1994-2018 Professor, Departments of Chemistry, and Earth and Atmospheric Sciences,
Purdue University, West Lafayette, IN
1994-2006 Adjunct Professor, Department of Chemistry, York University
1991-1994 Associate Professor (with tenure), York University, Toronto, Ontario.
1988-1993 Acting Director, Centre for Atmospheric Chemistry (CAC), York University
1987-1991 Assistant Professor, Department of Chemistry, York University, Toronto, Ontario.
1982-1987 Research Chemist, Northrop Services, Inc. (on-site Contractor U.S. EPA,
Atmospheric Sciences Research Laboratory, Research Triangle Park, N.C.)
1982 Research Chemist, Mobil Research and Development Corp., Motor Gasoline
Group, Paulsboro, N.J.

C. Awards

Ontario Ministry of Environment and Energy 1994 Excellence in Research and Technology
Development Award
AGU 1999 Editor's Citation for Excellence in Refereeing
AGU 2006 Editors' Citation for Excellence in Refereeing for JGR-Atmospheres
Fellow of the American Association for the Advancement of Science, elected 2010
Fellow of the American Geophysical Union, elected 2011
2012 Purdue College of Science Graduate Student Mentoring Award

Walter Orr Roberts Lecturer in Interdisciplinary Sciences Award (American Meteorological Society (2015))

2015 American Chemical Society Award for Creative Advances in Environmental Science & Technology

D. Professional Associations:

American Chemical Society

American Geophysical Union

European Geophysical Union

Air and Waste Management Association

American Society for Mass Spectrometry

American Association for the Advancement of Science

American Meteorological Society

American Association for Aerosol Research

E. Areas of Expertise:

- Climate and Earth System Science
- Funding and organizing large scale international collaborative environmental science research projects
- Atmospheric Chemistry
- Atmospheric Chemistry and Analytical Chemistry Education
- Atmospheric Photochemistry and Free Radical Reaction Kinetics and Mechanisms
- Analytical Methods Development
- Aviation, and Aircraft Instrumentation Development
- Smog Chamber Studies
- Computer Modeling of Atmospheric Processes
- Atmospheric Pollutant Measurements
- Gas, Liquid, and Ion Chromatographic Techniques
- Quadrupole and Ion Trap mass spectrometry
- Atmospheric Mutagenesis
- Use of in-vitro and in-vivo Bioassay Techniques for Identification of Atmospheric Mutagens
- Snow chemistry/Arctic Chemistry
- Climate Change and Atmospheric Chemistry
- Greenhouse Gas Source and Sink Flux Measurements, and GHG Emissions Accounting
- Commercial, Multi-Engine and Instrument-Rated Pilot (2300+ hrs)

F. National and International Responsibilities/Activities:

1988 - Member and Secretary (1988-1990), Canadian Institute for Research in Atmospheric Chemistry (CIRAC) Scientific Steering Committee

1990 Organizing Committee Chair for CIRAC Air Toxics Research Planning Workshop, held November 26-28, 1990, Toronto.

1991 - Associate Editor, Atmosphere-Ocean

1997 – 2002 Associate Editor, Journal of Geophysical Research, Atmospheres

- 1997 – Associate Director, Program for Research on Oxidants: PHotochemistry, Emissions, and Transport
- 1999 – 2002 Member, Scientific Steering Committee, Arctic System Science Ocean-Atmosphere-Ice Interactions (ARCSS-OAII)
- 2000 Organized the 2000 Telluride Worksop on Atmospheric Chemistry
- 2001 Co-organized (with K. Prather) the 2001 ASMS Asilomar Conference on Mass Spectrometry
- 2003 Air-Ice Chemical Interactions Co-Chair (IGAC project)
- 2003-2007 NSF OPP External Advisory Panel
- 2003 NCAR ACD External Advisory Panel
- 2003 Created the Ocean-Atmosphere-Sea Ice-Snowpack (OASIS) project
- 2004 Co-Chair, IGAC project Air-Ice Chemical Interactions
- 2008-2010 NSF Geosciences Directorate External Advisory Panel
- 2008-2009 Organized OASIS2009 international field campaign
- 2013 - Inaugural Associate Editor (Atmospheric Sciences) for the online Journal *Elementa*
- 2013 Vice Chair, Atmospheric Chemistry Gordon Research Conference, Mt. Snow, Vt.
- 2014-2018 Division Director, Atmospheric and Geospace Sciences, National Science Foundation, Arlington, VA (Managed over \$1B in awards from AGS to the community)
- 2015 Chair, Atmospheric Chemistry Gordon Research Conference, Waterville Valley, N.H.
- 2020 Member of the New York State Climate Action Council (Responsible for developing the Scoping Plan for implementation of the Climate Leadership and Community Protection Act)
- 2020- New York Sea Grant Board of Governors
- 2021- Peconic Estuary Partnership Management Committee

Office of Science and Technology Policy (OSTP) service

2015 - Space Weather Operations, Research, and Mitigation Task Force

2016 - Greenhouse Gas Monitoring Working Group

2016 - Methane Monitoring and Characterization Working Group

II. Discovery

A. Peer-Reviewed Publications: (G= Shepson Grad. student, U= Undergrad., P= Postdoc)

245. Graham, K. A., C. D. Holmes, G. Friedrich, C. D. Rauschenberg, C. R. Williams, J. W. Bottenheim, F. P. Chavez, J. W. Halfacre, D. K. Perovich, P. B. Shepson, W. R. Simpson, P. P. Tans, and P. A. Matrai, Variability of Atmospheric CO₂ Over the Arctic Ocean: Insights From the O-Buoy Chemical Observing Network, *J. Geophys. Res.*, submitted, 2022.
244. Wei, D., H. Alwe, D. Millet, B. Bottorff, M. Lew, P. Stevens, F. Keutsch, Q. Shi, S. Kavassalis, J. Murphy, K. Vasquez, H. Allen, E. Praske, J. Crouse, P. Wennberg, P. B. Shepson, K. Pratt, F. Xiong, E. Wood, R. Griffin, and A. L. Steiner, FORest Canopy Atmosphere Transfer (FORCAsT) 2.0: model updates, *Geosci. Model Dev.*, *14*, 6309–6329, 2021.
243. Lopez-Coto, I., X. Ren, A. Karion, K. McKain, C. Sweeney, R. R. Dickerson, B. McDonald, P. B. Shepson, and J. R. Whetstone, Carbon Monoxide emissions anomaly and trend detection over the Washington, D.C. and Baltimore metropolitan area, under review, *ES&T*, 2021.
242. Pitt, J. R., I. Lopez-Coto, K. D. Hajny, J. Tomlin, R. Kaeser, T. Jayarathne, B. H. Stirm, C. R. Floerchinger, C. P. Loughner, R. Commane, C. K. Gately, L. R. Hutyla, K. R. Gurney, G. y S. Roest, J. Liang, A. Karion, J. R. Whetstone, and P. B. Shepson, New York City greenhouse gas emissions estimated with inverse modelling of aircraft measurements, in press, *Elementa*. 2022
241. Jones, T. S., Franklin, J. E., Chen, J., Dietrich, F., Hajny, K. D., Paetzold, J. C., Wenzel, A., Gately, C., Gottlieb, E., Parker, H., Dubey, M., Hase, F., Shepson, P. B., Mielke, L. H., and Wofsy, S. C.: Assessing urban methane emissions using column-observing portable Fourier transform infrared (FTIR) spectrometers and a novel Bayesian inversion framework, *Atmos. Chem. Phys.*, *21*, 13131–13147, <https://doi.org/10.5194/acp-21-13131-2021>, 2021.
240. Chen, Q., R. M. Kirpes, S. Thanekar, N. Loeb, L. Upchurch, A. J. Barget, A. R. W. Raso, S. M. McNamara, S. China, P. K. Quinn, A. Kennedy, P. B. Shepson, J. D. Fuentes, and K. A. Pratt, Atmospheric particle abundance and chemical composition observations

in the springtime Arctic: a focus on blowing snow and leads, *Atmos. Chem. Phys.*, submitted, 2020.

239. Tomlin^G, J. M., K. A. Jankowski, F. A. Rivera-Adorno, M. Fraund, S. China, B. H. Stirm, R. Kaeser, G. S. Eakins, R. C. Moffet, P. B. Shepson, and A. Laskin, Chemical Imaging of Fine Mode Atmospheric Particles Collected from a Research Aircraft over Agricultural Fields, *ACS Earth and Space Chemistry*, DOI: 10.1021/acsearthspacechem.0c00172, 2020.
238. Hajny^G, K. D., T. N. Lavoie^G, O. E. Salmon^G, J. M. Tomlin^G, T. Jayarathne^P, C. R. Floerchinger, R. Kaeser, A. A. Stuff, A. Armstrong, B. Wulle, B. H. Stirm, D. R. Lyon, J. Rudek, and P. B. Shepson, Assessing the Accuracy and Precision of the Airborne Mass Balance Technique for Point-Source Emissions Quantification, *Environ. Sci. Technol. Lett.*, submitted, 2020b.
237. Hajny^G, K. D., C. Floerchinger, R. Kaeser, J. Tomlin^G, J. Pitt^P, B. H. Stirm, T. Jayarathne^P, C. Gately, M. Sargent, K. Gurney, P. B. Shepson, and S. Wofsy, Estimating Anthropogenic CO₂ Emissions from New York City Using Aircraft Measurements and Dispersion Modelling, *Elementa.*, submitted, 2020a.
236. Morales^G, A. C., T. Jayarathne^P, J. H. Slade^P, A. Laskin, and P. B. Shepson, The Production and Hydrolysis of Organic Nitrates from OH Radical Oxidation of β -Ocimene, *Atmos. Chem. Phys.*, *Atmos. Chem. Phys.*, 21, 129–145, 2021
<https://doi.org/10.5194/acp-21-1-2021>.
235. Thomas, J. L., J. Stutz, M. M. Frey, T. Bartels-Rausch, K. Altieri, F. Baladima, J. Browse, M. Dall'Osto, L. Marelle, J. Mouginot, J. G. Murphy, D. Nomura, K. Pratt, M. Willis, P. Zieger, J. Abbatt, T. A. Douglas, M. C. Facchini, J. France, A. E. Jones, K. Kim, P. A. Matrai, V. F. McNeill, A. Saiz-Lopez, P. Shepson, N. Steiner, K. S. Law, S. R. Arnold, B. Delille, J. Schmale, J. Sonke, A. Dommergue, D. Voisin, M. L. Melamed, and J. Gier, Fostering multidisciplinary research on interactions between chemistry, biology, and physics within the coupled cryosphere-atmosphere system, *Elem. Sci. Anth.*, 7: 58.
DOI: <https://doi.org/10.1525/elementa.396>.
234. Swanson, W. F., Graham, K. A., Halfacre, J. W., Holmes, C. D., Shepson, P. B., and Simpson, W. R. (2020), Arctic reactive bromine events occur in two distinct sets of environmental conditions: A statistical analysis of 6 years of observations, *J. Geophys. Res.*, 125, e2019JD032139, <https://doi.org/10.1029/2019JD032139>.
233. McNamara, S. M., N. M. Garner, S. Wang, A. R. W. Raso^G, S. Thanekar, J. D. Fuentes, P. B. Shepson, K. A. Pratt, Bromine Chloride Observations in the Coastal Arctic: Diel Patterns and Production Mechanisms, *ACS Earth and Space Chemistry*, DOI 10.1021/acsearthspacechem.0c00021, 2020.
232. Ditto, J. C., T. Joo, J. H. Slade^P, P. B. Shepson, N. L. Ng, D. R. Gentner, Non-targeted tandem mass spectrometry analysis reveals diversity and variability of aerosol functional groups across multiple sites, seasons, and times of day, *Environ. Sci. Technol. Lett.*, <https://doi.org/10.1021/acs.estlett.9b00702>, 2020.

231. Floerchinger, C, Shepson, PB, Hajny^G, K, Daube, BC, Stirm, BH, Sweeney, C, Wofsy, SC., 2021, Relative flux measurements of biogenic and natural gas-derived methane for seven U.S. cities. *Elementa Science of the Anthropocene*, 9, DOI: <https://doi.org/10.1525/elementa.2021.000119>.
230. Ahn, D., J. R. Hansford, S. Howe, X. R. Ren, R. J. Salawitch, N. Zeng, M. D. Cohen, B. Stunder, O. E. Salmon^G, and P. B. Shepson, K. R. Gurney, T. Oda, A. Karion, I. Lopez-Coto, J. Whetstone, R. R. Dickerson, Fluxes of atmospheric greenhouse-gases in Maryland(FLAGG-MD): Emissions of carbon dioxide in the Baltimore, MD-Washington, D.C. area. *Journal of Geophysical Research: Atmospheres*, 125, e2019JD032004. <https://doi.org/10.1029/2019JD032004>, 2020.
229. Lopez-Coto, I., X. Ren, O. E. Salmon^G, A. Karion, P. B. Shepson, R. R. Dickerson, A. Stein, K. Prasad, and J. Whetstone, Wintertime CO₂, CH₄ and CO emissions estimation in the Washington DC / Baltimore metro area using an inverse modeling technique, *Environ. Sci. Technol.*, 54, 2606-2614, 2020.
228. Hajny, K. D.^G, O. E. Salmon^G, P. B. Shepson, J. Rudek, D. Lyon, A. A. Stuff, B. H. Stirm, R. Kaeser, C. R. Floerchinger, S. Conley, M. Smith, Observations of Methane Emissions from Natural Gas-Fired Power Plants, *Environ. Sci. Technol.*, DOI: 10.1021/acs.est.9b01875, 2019.
227. Raso^G, A. R. W., S. Wang, S. Thanekar, S. McNamara, J. D. Fuentes, P. B. Shepson, and K. A. Pratt, The vertical impact of a snowpack source of molecular chlorine, bromine, and iodine in the Arctic, *Atmos. Chem. Phys.*, in preparation, 2019.
226. Olson, N. E., N. W. May, R. M. Kirpes, J. H. Slade^P, A. E. Watson, K. D. Hajny^G, P. B. Shepson, K. A. Pratt, and A. P. Ault, Lake Spray Aerosol Incorporated in Great Lakes Clouds, *ACS Earth and Space Chemistry*, 3, 2765-2774, 2019.
225. Salmon, O. E.^G, L. R. Welp, M. Baldwin, K. Hajny^G, B. H. Stirm, and P. B. Shepson, Vertical profile observations of water vapor deuterium excess in the lower troposphere, *Atmos. Chem. Phys.*, 19, 11525-11543, 2019.
224. Ren, X., D. L. Hall, T. Vinciguerra, S. E. Benish, P. R. Stratton, D. Ahn, J. R. Hansford, M. D. Cohen, S. Sahu, H. He, C. Grimes, J. D. Fuentes, P. B. Shepson, R. J. Salawitch, S. H. Ehrman, and R. R. Dickerson, Methane emissions from the Marcellus Shale in southwestern Pennsylvania and northern West Virginia Based on Airborne Measurements, *J. Geophys. Res. – Atmos.*, 124, 1862–1878, 2019, <https://doi.org/10.1029/2018JD029690>.
223. McNamara, S. M., A. R. W. Raso^G, S. Wang, S. Thanekar, E. Boone, K. R. Kolesar, P. K. Peterson, W. R. Simpson, J. D. Fuentes, P. B. Shepson, and K. A. Pratt, Springtime Nitrogen Oxide-Influenced Chlorine Chemistry in the Coastal Arctic, *Environ. Sci. Technol.*, doi.org/10.1021/acs.est.9b01797, 2019.
222. Turnbull, J., A. Karion, K. J. Davis, T. Lauvaux, N. Miles, S. Richardson, C. Sweeney, K. McKain, S. Lehman, K. R. Gurney, R. Patarasuk, J. Liang, P. B. Shepson, A. Heimburger, R. Harvey, M. O. Cambaliza, J. Whetstone, Synthesis of urban CO₂ emission estimates

from multiple methods from the Indianapolis Flux Project (INFLUX), *Environ. Sci. Technol.*, DOI: 10.1021/acs.est.8b05552, 2018.

221. Wang, S., S. M. McNamara, C. W. Moore, D. Obrist, A. Steffen, A. R. W. Raso^G, P. B. Shepson, R. M. Staebler, and K. A. Pratt, Direct Detection of Tropospheric Atomic Bromine Leading to Mercury and Ozone Depletion, *Proc. Nat. Acad. Sci.*, *116*, 14479-14484, 2019.
220. Slade, J. H.^P, A. P. Ault, A. T. Bui, J. C. Ditto, Z. Lei, A. L. Bondy, N. E. Olson, R. D. Cook, S. J. Desrochers, R. M. Harvey^P, M. H. Erickson, H. W. Wallace, S. L. Alvarez, J. H. Flynn, B. E. Boor, G. A. Petrucci, D. R. Gentner, R. J. Griffin, P. B. Shepson, Bouncer Particles at Night: Biogenic Secondary Organic Aerosol Chemistry and Sulfate Drive Diel Variations in the Aerosol Phase in a Mixed Forest, *Environ. Sci. Technol.*, *53*, 4977-4987, 2019.
219. Peterson, P. K., D. Pöhler, J. Zielcke, S. General, U. Friess, U. Platt, W. R. Simpson, S. V. Nghiem, P. B. Shepson, B. H. Stirm, and K. A. Pratt, Springtime Bromine Activation Over Coastal and Inland Arctic Snowpacks, *ACS Earth and Space Chem.*, *2*, 1075-1086, 2018.
218. Ren, X., O. E. Salmon^G, J. R. Hansford, D. Ahn, D. Hall, S. E. Benish, P. R. Stratton, H. He, S. Sahu, C. Grimes, A. M. F. Heimbürger^P, W. T. Luke, P. Kelley, M. D. Cohen, B. Stunder, A. Karion, K. L. Mueller, J. R. Whetstone, R. J. Salawitch, S. H. Ehrman, P. B. Shepson, and R. R. Dickerson, Methane emissions from the Baltimore-Washington area based on airborne observations: Comparison to emissions inventories, *J. Geophys. Res. Atmospheres*, *123*, <https://doi.org/10.1029/2018JD028851>, 2018.
217. Alvarez, R. A., D. Zavala-Araiza, D. R. Lyon, D. T. Allen, Z. R. Barkley, A. R. Brandt, K. J. Davis, S. C. Herndon, D. J. Jacob, A. Karion, E. A. Kort, B. K. Lamb, T. Lauvaux, J. D. Maasackers, A. J. Marchese, M. Omara, S. W. Pacala, J. Peischl, A. L. Robinson, P. B. Shepson, C. Sweeney, A. Townsend-Small, S. C. Wofsy, and S. P. Hamburg, Assessment of Methane Emissions from the U.S. Oil and Gas Supply Chain, *Science*, *361*, 186-188, 2018.
216. Toma, S., S. Bertman, C. Groff, F. Xiong^G, P. B. Shepson, P. Romer, K. Duffey, P. Wooldridge, R. Cohen, K. Baumann, E. Edgerton, J. de Gouw, A. Goldstein, and J.-L. Jimenez, Importance of Biogenic Volatile Organic Compounds to Peroxyacyl Nitrates (PANs) Production in the Southeastern U.S. during SOAS 2013, *Atmos. Chem. Phys.*, *19*, 1867-1880, 2019.
215. Bonin, T. A., B. J. Carroll, R. M. Hardesty, W. A. Brewer, K. Hajny, O. E. Salmon^G, and P. B. Shepson, Doppler lidar observations of the mixing height in Indianapolis using an automated composite fuzzy logic approach, *J. Atmos. and Ocean. Technol.*, *35*, 473-490, 2018.
214. Salmon, O. E.^G P. B. Shepson, X. Ren, R. R. Dickerson, B. H. Stirm, S. S. Brown, D. L. Fibiger, E. E. McDuffie, K. R. Gurney, J. A. Thornton, Top-down Estimates of NO_x and CO Emissions from Washington, D.C.-Baltimore During WINTER, *J. Geophys. Res.*, <https://doi.org/10.1029/2018JD028539>, 2018.

213. Slade, J. H.^P, C. de Perre, L. Lee, and P. B. Shepson, Nitrate radical oxidation of γ -terpinene: hydroxy nitrate, total organic nitrate, and secondary organic aerosol yields, *Atmos. Chem. Phys.*, *17*, 8635–8650, 2017.
212. Custard, K. D.^G, A. R. W. Raso^G, P. B. Shepson, R. M. Staebler, and K. A. Pratt, Production and Release of Molecular Bromine and Chlorine from the Arctic Coastal Snowpack, *Earth and Space Chemistry*, *1*, 142-151, 2017.
211. Raso, A. R.^G W., K. D. Custard^G, N. W. May, D. J. Tanner, M. K. Newburn, L. Walker, R. Moore, L. G. Huey, M. L. Alexander, P. B. Shepson, and K. A. Pratt, Active Molecular Iodine Snowpack Photochemistry in the Arctic, *Proc. Nat. Acad. Sci.*, *114*, 10053-10058, 2017.
210. Artiglia, L., J. Edebeli, F. Orlando, S. Chen, P. C. Arroyo, A. Gilgen, T. Bartels-Rausch, A. Kleibert, M. Vazdar, M. A. Carignano, J. S. Francisco, P. B. Shepson, I. Gladich and M. Ammann, A surface-stabilized ozonide triggers bromide oxidation at the aqueous solution – vapor interface, *Nature Comms.*, DOI: 10.1038/s41467-017-00823, 2017.
209. Bondy, A. L. B. Wang, A. Laskin, R. L. Craig, V. M. Nhliziyo^U, S. B. Bertman, K. A. Pratt, P. B. Shepson, and A. P. Ault, Inland Sea Spray Aerosol Transport and Incomplete Chloride Displacement: Varying Heterogeneous Reactivity Observed during SOAS, *Environ. Sci. Technol.*, 10.1021/acs.est.7b02085, 2017.
208. Gurney, K.R., J. Liang, R. Patarasuk, D. O’Keeffe, J. Huang, M. Hutchins, T. Lauvaux, J. C. Turnbull, and P. B. Shepson, 2017, Reconciling the differences between a bottom-up and inverse-estimated FFCO₂ emissions estimate in a large US urban area, *Elem. Sci. Anth.*, *5*: 44, DOI: <https://doi.org/10.1525/elementa.137>, 2017.
207. N. L. Miles, S. J. Richardson, T. Lauvaux, K. J. Davis, N. V. Balashov, A. Deng, J. C. Turnbull, C. Sweeney, K. R. Gurney, R. Patarasuk, I. Razlivanov, M. O. L. Cambaliza^P and P. B. Shepson, Quantification of urban atmospheric boundary layer greenhouse gas dry mole fraction enhancements in the dormant season: Results from the Indianapolis Flux Experiment (INFLUX), *Elem Sci Anth*, *5*: 27, DOI: <https://doi.org/10.1525/elementa.127>.
206. Davis, K. J., A. Deng, T. Lauvaux, N. L. Miles, S. J. Richardson, D. Sarmiento, K. R. Gurney, R. M. Hardesty, A. Brewer, P. B. Shepson, R. M. Harvey, M. O. Cambaliza^P, C. Sweeney, J. Turnbull, J. Whetstone, and A. Karion, The Indianapolis Flux Experiment (INFLUX): A test-bed for developing anthropogenic greenhouse gas emission measurements, *Elem. Sci. Anth.*, *5*: 21, DOI: <https://doi.org/10.1525/elementa.188>, 2017.
205. Carlton A.M., J. de Gouw, J. L. Jimenez, J. L. Ambrose, S. Brown, K. R. Baker, C. A. Brock, R. C. Cohen, S. Edgerton, C. Farkas, D. Farmer, A. H. Goldstein, L. Gratz, A. Guenther, S. Hunt, L. Jaeglé, D. A. Jaffe, J. Mak, C. McClure, A. Nenes, T. Khoi, V. Nguyen, J. R. Pierce, N. Selin, V. Shah, S. Shaw, P. B. Shepson, S. Song, J. Stutz, J. Surratt, B. J. Turpin, C. Warneke, R. A. Washenfelder, P. O. Wennberg, X. Zhou, "Synthesis of the Southeast Atmosphere Studies: investigating fundamental atmospheric chemistry questions", *Bull. Am. Soc. Meteorol.*, *99*, 547-567, 2018.

204. Simpson, W. R., P. K. Peterson, U. Friess, H. Sihler, U. Platt, C. Moore, K. Pratt, P. B. Shepson, and S. V. Nghiem, Horizontal and vertical structure of reactive bromine events probed by bromine monoxide MAX-DOAS spectroscopy, *Atmos. Chem. Phys.*, *17*, 9291–9309, 2017.
203. Peterson, P. K., H. Sihler, D. Pöhler, J. Zielcke, S. General, U. Frieß, U. Platt, W. R. Simpson, S. V. Nghiem, P. B. Shepson, B. H. Stirm, D. R. Caulton^G, S. Dhaniyala, J. D. Fuentes, and K. A. Pratt, Observations of Bromine Monoxide Transport Aloft Sustained on Aerosol Particles, *Atmos. Chem. Phys.*, *17*, 7567–7579, 2017.
202. Rindelaub^G, J. D., C. H. Borca, M. A. Hostetler, M. A. Lipton, L. V. Slipchenko, and P. B. Shepson, The Acid-Catalyzed Hydrolysis of an α -Pinene-Derived Organic Nitrate: Kinetics, Products, Reaction Mechanisms, and Atmospheric Impact, *Atmos. Chem. Phys.*, *16*, 15425–15432, 2016.
201. Salmon^G, O. E., P. B. Shepson, X. Ren, A. G. Carlton, M. Miller, D. Sarmiento, B. H. Stirm, R. Grundman, R. R. Dickerson, J. D. Fuentes, J. Whetstone, Urban Emissions of Water Vapor and the Urban Heat Island, *J. Geophys. Res.*, *122*, doi:10.1002/2016JD026074, 2017.
200. J. W. Halfacre^G, P. B. Shepson, K. A. Pratt, Oxidative release of molecular chlorine, bromine, and iodine from frozen saline surfaces, *Atmos. Chem. Phys.*, *19*, 4917–4931, 2019.
199. Lavoie^G, T. N., P. B. Shepson, C. A. Susdorf^U, B. H. Stirm, R. Kaeser, B. Wulle, D. Lyon, R. Alvarez, J. Rudek, Measurements of the Contribution of Natural Gas-Fired Power Plants and Oil Refineries to National Methane Emissions, *Environ. Sci. Technol.*, doi:10.1021/acs.est.6b05531, 2017.
198. Su, L., E. G. Patton, J. Vilà-Guerau de Arellano, A. B. Guenther, L. Kaser, B. Yuan, F. Xiong^G, P. B. Shepson, L. Zhang, D. O. Miller, W. H. Brune, K. Baumann, E. Edgerton, A. Weinheimer, and J. E. Mak, Understanding isoprene photo-oxidation using observations and modelling over a subtropical forest in the Southeast US, *Atmos. Chem. Phys.*, *16*, 7725-7741, doi:10.5194/acp-16-7725-2016, 2016.
197. Fisher, J. A., D. J. Jacob, K. R. Travis, P. S. Kim, E. A. Marais, C. Chan Miller, K. Yu, L. Zhu, R. M. Yantosca, M. P. Sulprizio, J. Mao, P. O. Wennberg, J. D. Crouse, A. P. Teng, T. B. Nguyen, J. M. St. Clair, R. C. Cohen, P. Romer, B. A. Nault, P. J. Wooldridge, J. L. Jimenez, P. Campuzano-Jost, D. A. Day, P. B. Shepson, F. Xiong^G, D. R. Blake, A. H. Goldstein, P. K. Misztal, T. F. Hanisco, G. M. Wolfe, T. B. Ryerson, A. Wisthaler, and T. Mikoviny, Organic nitrate chemistry and its implications for nitrogen budgets in an isoprene- and monoterpene-rich atmosphere: constraints from aircraft (SEAC4RS) and ground-based (SOAS) observations in the Southeast US, *Atmos. Chem. Phys.*, *16*, 5969–5991, 2016.
196. Xiong F^G, C. H. Borca, L. V. Slipchenko, and P. B. Shepson, Photochemical Degradation of Isoprene-derived 4,1-nitrooxy enal, *Atmos. Chem. Phys.*, *16*, 5595–5610, 2016.
195. Peterson, P. K., K. A. Pratt, W. R. Simpson, P. B. Shepson, L. X. Perez Perez, E. J. Boone, D. Pöhler, J. Zielcke, S. General, U. Friess, U. Platt, S. V. Nghiem, and

- B. H. Stirm, The Role of Open Lead Interactions in Atmospheric Ozone Variability Between Coastal and Inland Sites in the Arctic, *Elementa.*, 4: 000109, doi: 10.12952, 2016.
194. Heimbürger^P, A. M. F., P. B. Shepson, B. H. Stirm, C. Susdorf^U, J. Turnbull, M. O. L. Cambaliza^P, O. E. Salmon^G, A.-E. M. Kerlo, T. N. Lavoie^G, A. Karion, M. Hardesty, J. Whetstone, Kevin Gurney, Improving and Assessing Aircraft-based Greenhouse Gas Emission Rate Measurements for the city of Indianapolis, as part of the INFLUX project, *Elem. Sci. Anth.*, 5: 26, DOI: <https://doi.org/10.1525/elementa.134>, 2017.
193. Rindelaub^G, J. D., R. L. Craig, L. Nandy, A. L. Bondy, C. S. Dutcher, P. B. Shepson, A. P. Ault, Direct Measurement of pH in Individual Particles via Raman Microspectroscopy and Variation in Acidity with Relative Humidity, *J. Phys. Chem. A.*, DOI: 10.1021/acs.jpca.5b12699, 2016.
192. Lavoie^G, T. N., P. B. Shepson, M. O. L. Cambaliza^P, B. H. Stirm, S. Conley, S. Mehrotra, I. C. Faloon, D. Lyon, R. Alvarez, The Nature of Temporally Varying Methane Emissions at Oil and Natural Gas Operations in the Eagle Ford Basin, *Environ. Sci. Technol.*, 10.1021/acs.est.7b00814, 2017.
191. Hornbrook, R. S., F. M. Flocke, S. Hall, A. J. Hills, D. J. Knapp, D. D. Montzka, J. J. Orlando, A. Turnipseed, K. Ullmann, A. J. Weinheimer, E. C. Apel, R. L. Mauldin III, D. D. Riemer, P. B. Shepson, B. Sive, and R. M. Staebler, Arctic springtime observations of volatile organic compounds during the OASIS-2009 campaign, *J. Geophys. Res. Atmos.*, 121, 9789–9813, doi:10.1002/2015JD024360, 2016.
190. Thompson^G, C. R., P. B. Shepson, J. Liao, L. G. Huey, C. Cantrell, F. Flocke, and J. Orlando, Bromine atom production and chain propagation during springtime Arctic ozone depletion events in Barrow, Alaska, *Atmos. Chem. Phys.*, 17, 3401–3421, 2017.
189. Custard^G, K. D., K. A. Pratt, and P. B. Shepson, Constraints on chlorine production in the Arctic through measurements and simulations of ClO and Cl₂, *Environ. Sci. Technol.*, 10.1021/acs.est.6b03909, 2016.
188. Cambaliza, M. O. L.^P, J. E. Bogner, R. B. Green, P. B. Shepson, T. A. Foster-Wittig, K. A. Spokas, Field measurements and modeling to resolve m² to km² CH₄ emissions for a complex urban source: An Indiana landfill study, *Elem Sci Anth*, 5: 36, DOI: <https://doi.org/10.1525/elementa.145>, 2017.
187. Pye, H. O. T., 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. 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, *Environ. Sci. Technol.*, DOI: 10.1021/acs.est.5b03738, 2015.
186. Rindelaub^G, J.D., Wiley, J.S., Cooper, B.R., Shepson, P.B., Chemical characterization of α -pinene secondary organic aerosol constituents using gas chromatography, liquid chromatography, and paper spray-based mass spectrometry techniques, *Rapid Comm. Mass Spectrom.*, 30, 1627-1638, 2016.

185. Thompson^G, C. R., P. B. Shepson, J. Liao, L. G. Huey, E. C. Apel, C. A. Cantrell, F. Flocke, J. Orlando, A. Fried, S. R. Hall, R. S. Hornbrook, D.J. Knapp, R. L. Mauldin III, D. D. Montzka, B. C. Sive, K. Ullmann, P. Weibring, and A. Weinheimer, Interactions of bromine, chlorine, and iodine photochemistry during ozone depletions in Barrow, Alaska, *Atmos. Chem. Phys.*, *15*, 9651-9679, 2015.
184. Weyant, C. L., P. B. Shepson, R. Subramanian, M. O. L. Cambaliza^P, A. Heimbürger^P, D. McCabe, E. Baum, B. H. Stirm, and T. C. Bond, Black Carbon Emissions from Associated Natural Gas Flaring, *Environ. Sci. Technol.*, DOI: 10.1021/acs.est.5b04712, 2016.
183. Zavala-Araiza, D., D. R. Lyon, R. A. Alvarez, K. J. Davis, R. Harriss, S. C. Herndon, R. B. Jackson, A. Karion, E. A. Kort, B. K. Lamb, X. Lan, A. J. Marchese, S. W. Pacala, A. L. Robinson, P. B. Shepson, C. Sweeney, A. Townsend-Small, R. Talbot, T. I. Yacovitch, D. Zimmerle, S. P. Hamburg, Reconciling divergent estimates of oil and gas methane emissions, *Proc. Nat. Acad. Sci.*, doi/10.1073/pnas.1522126112, 2015.
182. Xiong^G, F., K. M. McAvey^G, C. J. Groff^G, K. A. Pratt, P. B. Shepson, T. K. Starn, J. V. Seeley, S. B. Bertman, M. A. Hostetler, M. A. Lipton, P. O. Wennberg, P. K. Misztal, A. H. Goldstein, A. B. Guenther, A. R. Koss, J. A. de Gouw, K. F. Olson, K. Baumann, E. S. Edgerton, P. A. Feiner, L. Zhang, D. O. Miller, W. H. Brune, Observation of Isoprene Hydroxynitrates in the southeastern United States and Implications for the Fate of NO_x, *Atmos. Chem. Phys.*, *15*, 11257–11272, 2015.
181. Lauvaux, T., N. Miles, A. Deng, S. Richardson, M. O. Cambaliza^P, K. Davis, Brian Gaudet, K. Gurney, J. Huang, D. O'Keefe, Y. Song, A. Karion, T. Oda, R. Patarasuk, I. Razlivanov, Daniel Sarmiento, P. B. Shepson, C. Sweeney, J. Turnbull, K. Wu, High-resolution atmospheric inversion of urban CO₂ emissions during the dormant season of the Indianapolis Flux Experiment (INFLUX), *J. Geophys. Res. Atmos.*, *121*, doi:10.1002/2015JD024473, 2016.
180. Lee, B. H., C. Mohr, F. D. Lopez-Hilfiker, A. Lutz, M. Hallquist, L. Lee, P. Romer, R. C. Cohen, S. Iyer, T. Kurten, W. W. Hu, D. A. Day, P. Campuzano-Jost, J. L. Jimenez, L. Xu, N. L. Ng, H. Y. Guo, R. J. Weber, R. J. Wild, S. S. Brown, A. Koss, J. de Gouw, K. Olson, A. H. Goldstein, Allen H., R. Seco, S. Kim, K. McAvey^G, P. B. Shepson, T. Starn, K. Baumann, E. S. Edgerton, J. M. Liu, J. E. Shilling, D. O. Miller, W. Brune, S. Schobesberger, E. L. D'Ambro, J. A. Thornton, Highly Functionalized Organic Nitrates in the Southeastern U.S.: Contribution to Secondary Organic Aerosol and Reactive Nitrogen Budgets, *Proc. Nat. Acad. Sci.*, 10.1073/pnas.1508108113, 2016.
179. Kyle D. Custard^G, Chelsea R. Thompson^G, Kerri A. Pratt^P, Paul B. Shepson, Jin Liao, L. Gregory Huey, John J. Orlando, Andrew J. Weinheimer, Eric Apel, Samuel R. Hall, Frank Flocke, Lee Mauldin, Rebecca S. Hornbrook, Denis Pöhler, Stephan General, Johannes Zielcke, William R. Simpson, Ulrich Platt, Alan Fried, Peter Weibring, Barkley C. Sive, Kirk Ullmann, Christopher Cantrell, D.J. Knapp, D. D. Montzka, The NO_x dependence of halogen chemistry in the Arctic atmospheric boundary layer, *Atmos. Chem. Phys.*, *15*, 10799-10809, 2015.
178. Lyon, D., D. Zavala-Araiza, R. Alvarez, R. Harriss, V. Palacios, X. Lan, R. Talbot, T. Lavoie^G, P. Shepson, T. Yacovich, S. Herndon, and S. Hamburg, Constructing a Spatially

Resolved Methane Emission Inventory for the Barnett Shale Region, *Environ. Sci. Technol.*, 2015, 49 (13), pp 8147–8157.

177. Turnbull, J., C. Sweeney, A. Karion, T. Newberger, S. Lehman, P. Tans, K. J. Davis, T. Lauvaux, N. L. Miles, S. J. Richardson, M. O. Cambaliza^P, P. B. Shepson, K. Gurney, R. Patarasuk, I. Razlivanov, Towards quantification and source sector identification of fossil fuel CO₂ emissions from an urban area: Results from the INFLUX experiment, *J. Geophys. Res.*, 120, 292-312, 2015.
176. Lavoie^G, T. N., P. B. Shepson, M. O. Cambaliza^P, B. H. Stirm, A. Karion, C. Sweeney, E. Kort, B. Hirst, T. Yacovitch, X. Lan, D. Lyon, R. A. Alvarez, R. Harriss, Measurements of Point Source Methane Emissions in the Barnett Shale Basin, *Environ. Sci. Technol.*, 2015, 49 (13), pp 7904–7913.
175. Peterson, P. K., W. R. Simpson, K. A. Pratt, P. B. Shepson, U. Frieß, J. Zielcke, U. Platt, S. J. Walsh, and S. V. Nghiem, Meteorological controls on the vertical distribution of bromine monoxide in the lower troposphere, *Atmos. Chem. Phys.*, 15, 2119-2137, 2015.
174. B. K. Lamb, K. Prasad, M. Cambaliza^P, T. Ferrara, T. Lauvaux, S. Edburg, T. Howard, P. B. Shepson, B. H. Stirm, O. Salmon^G, T. Lavoie^G, and J. Whetstone, Direct and Indirect Measurements and Modeling of Methane Emissions in Indianapolis, IN, *Environ. Sci. Technol.*, DOI: 10.1021/acs.est.6b01198, 2016.
173. E. J. Boone^U, A. Laskin, J. Laskin, C. Wirth^G, P. B. Shepson, B. H. Stirm, and K. A. Pratt, Aqueous Processing of Atmospheric Organic Particles in Cloud Water in the Southeast United States, *Environ. Sci. Technol.*, DOI: 10.1021/acs.est.5b01639, 2015.
172. I. Gladich^P, J. S. Francisco, R. J. Buszek, M. Vazdar, M. A. Caignano, and P. B. Shepson, *Ab Initio* Study of the Reaction of Ozone with Bromide Ion, *J. Phys. Chem. A*, 119, 4482–4488, 2015.
171. Karion, A., C. Sweeney, E. Kort, P. B. Shepson, A. Brewer, M. Cambaliza^P, S. Conley, K. Davis, M. Hardesty, S. Herndon, T. Lauvaux, T. Lavoie^G, D. Lyon, T. Newburger, G. Petron, C. Rella, M. Smith, S. Wolter, T. Yacovitch, and P. Tans, Estimate of Methane Emissions from the Barnett Shale, *Environ. Sci. Technol.*, 2015, 49 (13), pp 8124–8131.
170. Cambaliza^P, M. O. L., P. B. Shepson, J. Bogner, D. R. Caulton^G, B. Stirm, C. Sweeney, S. A. Montzka, K. R. Gurney, K. Spokas, O. E. Salmon^G, T. N. Lavoie^G, A. Hendricks^U, K. Mays^G, J. Turnbull, B. R. Miller, T. Lauvaux, K. Davis, A. Karion, B. Moser^U, C. Miller, C. Obermeyer^U, J. Whetstone, K. Prasad, N. Miles, S. Richardson, Quantification and source apportionment of the methane emission flux from the city of Indianapolis, *Elementa*, 3: 000037, doi: 10.12952, 2015.
169. Caulton, Dana R.^G, Paul B. Shepson, Maria O. L. Cambaliza^P, David McCabe, Ellen Baum, Brian H. Stirm, Methane Destruction Efficiency of Natural Gas Flares Associated with Shale Formation Wells, *Environ. Sci. Technol.*, 48, 9548–9554, 2014.
168. S. General, D. Pöhler, J. Zielcke, U. Frieß, P. Shepson, B. Stirm, W. Simpson, H. Sihler, K. Weber, C. Fischer and U. Platt, The Heidelberg Airborne Imaging DOAS Instrument

- (HAIDI): A Novel Imaging DOAS Device for 2-D and 3-D Imaging of Trace Gases, *Atmos. Meas. Tech.*, 7, 3459-3485, 2014.
167. J. W. Halfacre^G, T. N. Knepp^G, C. R. Stephens^G, K. A. Pratt^P, P. B. Shepson, W. R. Simpson, P. Peterson, S. J. Walsh, P. A. Matrai, J. W. Bottenheim, S. Netcheva, D. K. Perovich, A. Richter, Temporal and spatial characteristics of ozone depletion events from measurements in the Arctic, *Atmos. Chem. Phys.*, 14, 4875–4894, 2014.
166. Joel D. Rindelaub^G, Kevin M. McAvey^G, and Paul B. Shepson, The photochemical production of organic nitrates from alpha-pinene and loss via acid-dependent particle phase hydrolysis, *Atmos. Environ.*, 100, 193-201, 2015.
165. Caulton, Dana R.^G, Paul B. Shepson, Renee L. Santoro, Jed P. Sparks, Robert W. Howarth, Anthony Ingraffea, Maria O. Cambaliza^P, Colm Sweeney, Anna Karion, Kenneth J. Davis, Brian H. Stirm, Stephen A. Montzka, and Ben Miller, Toward a better understanding and quantification of methane emissions from shale gas development, *Proc. Nat. Acad. Sci.*, doi:10.1073/pnas.1316546111, 2014.
164. Liao, J., L. G. Huey, Z. Liu, D. J. Tanner, C. A. Cantrell, J. J. Orlando, F. M. Flocke, P. B. Shepson, A. J. Weinheimer, S. R. Hall, H. J. Beine, Y. Wang, E. D. Ingall, C. R. Stephens^G, R. S. Hornbrook, E. Apel, A. Fried, L. Mauldin, J. N. Smith, R. M. Staebler, J.A. Neuman, J.B. Nowak, Observations of very high levels of molecular chlorine at Barrow, AK, *Nature Geoscience*, (2014) doi:10.1038/ngeo2046.
163. Son V. Nghiem, Pablo Clemente-Colón, Thomas Douglas, Christopher Moore, Daniel Obrist, Donald K. Perovich, Kerri A. Pratt^P, Ignatius G. Rigor, William Simpson, Paul B. Shepson, Alexandra Steffen, and John Woods, Studying Bromine, Ozone, and Mercury Chemistry in the Arctic, *EoS Trans.*, Feature Article, 94, 289-291, Aug. 13, 2013.
162. Cambaliza, M. O.^P, P. B. Shepson, D. Caulton^G, B. Stirm, D. Samarov, A. Possolo, J. Turnbull, T. Lauvaux, K. Davis, K. Mays^G, C. Sweeney, J. Whetstone, A. Karion, K. Gurney, J. Huang, I. Razlivanov, N. Miles, S. Richardson, B. Moser^U, A. Hendricks^U, Assessment of uncertainties of the aircraft-based mass-balance approach for quantifying urban greenhouse gas emissions, *Atmos. Chem. Phys.* 14, 9029–9050, 2014.
161. Kerri A. Pratt^P, Kyle Custard^G, Paul B. Shepson, Thomas A. Douglas, Denis Pöhler, Johannes Zielcke, Stephan General, Ulrich Platt, William Simpson, Mark Carlsen, David J. Tanner, L. Gregory Huey, Brian H. Stirm, Photochemical Production of Molecular Bromine in Arctic Surface Snowpacks, *Nature Geosciences*, DOI: 10.1038/NGEO1779, 2013.
160. Kerri A. Pratt^P, Marc N. Fiddler^G, Paul B. Shepson, Annmarie G. Carlton, and Jason D. Surratt, Cloud water chemistry above the Ozarks' isoprene source region, *Atmos. Environ.*, 77, 231-238, 2013.
159. Griffith, S., R. Hansen, S. Dusanter, P. S. Stevens, M. Alaghmand^P, S. Bertman, M. Carroll, M. Erickson, M. Galloway, N. Grossberg, J. Hottle, J. Hou, T. Jobson, A. Kammrath, F. Keutsch, B. Lefer, L. Mielke^G, A. O'Brien, P. B. Shepson, M. Thurlow, W. Wallace, N. Zhang, X. Zhou, OH and HO₂ Radical Chemistry during PROPHET 2008

- and CABINEX 2009 – Part 1: Measurements and Model Comparison, *Atmos. Chem. Phys.*, 13, 5403-5423, 2013.
158. Helmig, D., P. Boylan, B. Johnson, S. Oltmans, C. Fairall, R. Staebler, A. Weinheimer, J. Orlando, D. J. Knapp, D. D. Montzka, F. Flocke, U. Frieß, H. Sihler, and P. B. Shepson, Ozone Dynamics and Snow-Atmosphere Exchanges During Ozone Depletion Events at Barrow, AK, *J. Geophys. Res.*, 117, D20303, doi:10.1029/2012JD017531, 2012.
157. J. P. D. Abbatt, J. L. Thomas, K. Abrahamsson, C. Boxe, A. Granfors, A. E. Jones, M. King, A. Saiz-Lopez, P. B. Shepson, J. Sodeau, D. Toohey, C. Toubin, R. von Glasow, S. Wren, and X. Yang, Halogen Activation via Interactions with Environmental Ice and Snow, *Atmos. Chem. Phys.*, 12, 6237-6271, 2012.
156. Paul B. Shepson, Parisa A. Ariya, Clara Deal, D. James Donaldson, Thomas A. Douglas, Brice Loose, Ted Maksym, Patricia A. Matrai, Ocean-Atmosphere-Sea Ice-Snowpack Interactions, Changes, and Feedbacks in Polar Regions: A Scientific Challenge for the 21st Century, *EoS Transactions*, American Geophysical Union Feature Article, 93, No. 11, Page 117, 2012 doi:10.1029/2012EO110001, 2012.
155. A. M. Bryan, R. Forkel, S. B. Bertman, M. A. Carroll, S. Dusanter, G. D. Edwards^P, S. Griffith, A. B. Guenther, R. F. Hansen, D. Helmig, T. Jobson, F. N. Keutsch, B. L. Lefer, S. N. Pressley, P. B. Shepson, P. S. Stevens, and A. L. Steiner, In-canopy gas-phase chemistry during the 2009 CABINEX field campaign: Sensitivity to isoprene chemistry and vertical mixing, *Atmos. Chem. Phys.*, 12, 8829-8849, 2012.
154. N. Zhang, X. Zhou, S. Bertman, M. Alaghmand^P, P. B. Shepson, and M. A. Carroll, Measurements of Ambient HONO and Vertical HONO Flux Above a Northern Michigan Forest Canopy, *Atmos. Chem. Phys.*, 12, 8285–8296, 2012.
153. K. A. Pratt^P, L. H. Mielke^G, P. B. Shepson, A. M. Bryan, A. L. Steiner, J. Ortega, D. Helmig, C. S. Vogel, S. Griffith, S. Dusanter, P. S. Stevens, M. Alaghmand^P, Contributions of individual biogenic volatile organic compounds to organic nitrate formation above a mixed forest, *Atmos. Chem. Phys.*, 12, 10125–10143, 2012.
152. J. Liao, L. G. Huey, D. J. Tanner, F. M. Flocke, J. J. Orlando, J. A. Neuman, J. B. Nowak, A. J. Weinheimer, S. R. Hall, J. N. Smith, A. Fried, R. M. Staebler, Y. Wang, J.-H. Koo, C. A. Cantrell, P. Weibring, J. Walega, D. J. Knapp, P. B. Shepson, and C. R. Stephens^G, Observed and modeled inorganic bromine (HOBr, BrO, and Br₂) speciation at Barrow, AK in spring 2009, *J. Geophys. Res.*, 117, D00R16, doi:10.1029/2011JD016641.
151. G. D. Edwards^P, D. K. Martins^G, T. K. Starn, K. A. Pratt^P, and P. B. Shepson, A disjunct eddy accumulation system for the measurement of BVOC fluxes: Lab characterizations and Field deployment, *Atmos. Meas. Tech.* 5, 2115-2132, 2012.
150. T. Lauvaux, A. E. Schuh, M. Uliasz, S. Richardson, N. Miles, L. I. Diaz, D. Martins^G, P. B. Shepson, and K. J. Davis, Constraining the CO₂ budget of the Corn Belt: Exploring Uncertainties from the Assumptions in a Mesoscale Inverse System, *Atmos. Chem. Phys.*, 12, 337–354, 2012.

149. A. W. Costa^G, G. Michalski, B. Alexander, and P. B. Shepson, Analysis of Atmospheric Inputs of Nitrate to a Temperate Forest Ecosystem from $\Delta^{17}\text{O}$ Isotope Ratio Measurements, *Geophys. Res. Lett.*, 38, L15805, doi:10.1029/2011GL047539, 2011.
148. C. R. Stephens^G, P. B. Shepson, A. Steffen, J. W. Bottenheim, J. Liao, L. G. Huey, E. Apel, A. Weinheimer, S. V. Nghiem, and S. R. Hall, The relative importance of chlorine and bromine radicals in the oxidation of atmospheric mercury at Barrow, Alaska, *J. Geophys. Res.*, 117, D00R11, doi:10.1029/2011JD016649.
147. M. M. Galloway, J. P. DiGangi, J. R. Hottle, A. J. Huisman, L. H. Mielke^G, M. Alaghmand^P, P. B. Shepson, J. Weremijewicz, H. Klavon, F. M. McNeal, M. A. Carroll, S. Griffith, R. F. Hansen, P. S. Stevens, S. B. Bertman, and F. N. Keutsch, Observations and Modeling of Formaldehyde at the PROPHET Mixed Hardwood Forest Site in 2008, *Atmos. Environ.*, 49, 403-410, 2012.
146. Son V. Nghiem, Ignatius G. Rigor, Andreas Richter, John P. Burrows, Paul B. Shepson, Jan Bottenheim, David G. Barber, Alexandra Steffen, Jeff Latonas, Feiyue Wang, Garry Stern, Pablo Clemente-Colón, Seelye Martin, Dorothy K. Hall, Philip Tackett^G, Gregory Neumann, and Matthew Asplin, Field and satellite observations of the formation and distribution of Arctic atmospheric bromine above a rejuvenated sea ice cover, *J. Geophys. Res.* 117, D00S05, doi:10.1029/2011JD016268, 2012.
145. I. Gladich^P, P. B. Shepson, I. Szleifer, M. Carignano, Halide Affinity for the Water-Air Interface in Aqueous Solutions of Mixtures of Sodium Salts, *J. Phys. Chem.*, 115, 5895-5899, 2011.
144. J. Liao, H. Sihler, L. G. Huey, J. A. Neuman, D. J. Tanner, U. Friess, U. Platt, F. M. Flocke, J. J. Orlando, P. B. Shepson, H. J. Beine, A. J. Weinheimer, S. J. Sjostedt, J. B. Nowak, D. J. Knapp, R. M. Staebler, W. Zheng, and R. Sander, A comparison of Arctic BrO measurements by chemical ionization mass spectrometry and long path-differential optical absorption spectroscopy, *J. Geophys. Res.*, 116, D00R02, doi:10.1029/2010JD014788, 2011.
143. X. Zhou, N. Zhang, M. TerAvest, J. Hou, D. Tang, S. Bertman, M. Alaghmand^P, P. B. Shepson, M. A. Carroll, S. Griffith, P. Stevens, Nitric Acid Photolysis on the Forest Canopy Surface as a Tropospheric Nitrous Acid Source, DOI: 10.1038, *Nature Geosciences*, 4, 440-443, 2011.
142. Peter S. Kourtev, Kimberly A. Hill^G, Paul B. Shepson, and Allan Konopka, Atmospheric cloud water contains a diverse bacterial community, *Atmos. Environ.*, 45, (2011), 5399-5405.
141. L. H. Mielke^G, K. A. Pratt^P, P. B. Shepson, S. A. McLuckey, A. Wisthaler, A. Hansel, Quantitative Determination of Biogenic Volatile Organic Compounds in the Atmosphere Using Proton-Transfer Reaction Linear Ion Trap Mass Spectrometry, *Anal. Chem.*, 82, 7952-7957, 2010.

140. Slade, J. H.^G, T. M. VanReken, G. R. Mwaniki, S. Bertman, B. Stirm, and P. B. Shepson (2010), Aerosol production from the surface of the Great Lakes, *Geophys. Res. Lett.*, *37*, L18807, doi:10.1029/2010GL043852.
139. I. Gladich^P, P. Shepson, I. Szleifer, and M. Carignano, Halide and sodium ion parameters for modeling aqueous solutions in TIP5P-Ew water, *Chem. Phys. Lett.*, doi:10.1016/j.cplett.2010.02.032, 2010.
138. T. N. Knepp^G, J. Bottenheim, M. Carlsen, D. Carlson, D. Donohoue, G. Friederich, P. A. Matrai, S. Netcheva, D. K. Perovich, R. Santini, P. B. Shepson, W. Simpson, T. Valentic, C. Williams, and P. J. Wyss, Development of an autonomous sea ice tethered buoy for the study of ocean-atmosphere-sea ice-snow pack interactions: the O-buoy, *Atmos. Meas. Tech.*, *3*, 249-261, 2010.
137. A. L. Lockwood^G, P. B. Shepson, M. Alaghmand^P, M. N. Fiddler^G, Isoprene Nitrates: Separation, Identification, Yields, and Ozone Rate Constants, *Atmos. Chem. Phys.*, *10*, 6169–6178, 2010.
136. Kelly Mays^G, Paul Shepson, Brian Stirm, Anna Karion, Colm Sweeney, Kevin Gurney, Aircraft-Based Measurements of the Carbon Footprint of Indianapolis, *Environ. Sci. Technol.*, *43*, 7816–7823, 2009.
135. Zhang, N., X. Zhou, P. B. Shepson, H. Gao, M. Alaghmand^P, and B. Stirm (2009), Aircraft measurement of HONO vertical profiles over a forested region, *Geophys. Res. Lett.*, *36*, L15820, doi:10.1029/2009GL038999.
134. Martins, D. K.^G, Sweeney, C., Stirm B. H., and Shepson P. B., Regional surface flux of CO₂ inferred from changes in the advected CO₂ column density, *Agric. Forest Meteorol.* (2009), doi:10.1016/j.agrformet.2009.05.005.
133. Travis N. Knepp^G, Tennie L. Renkins^U, Paul B. Shepson, Gas phase acetic acid and its qualitative effects on snow crystal morphology and the quasi-liquid layer, *Atmospheric Chemistry and Physics.*, *9*, 7679-7690, 2009.
132. A.E. Perring, A. Wisthaler, M. Graus, P.J. Wooldridge, A. Lockwood^G, L. H. Mielke^G, P.B. Shepson, A. Hansel, and R.C. Cohen, A product study of the Isoprene+NO₃ Reaction, *Atmos. Chem. Phys.*, *9*, 4945-4956, 2009.
131. M. Müller, L. H. Mielke^G, M. Breitenlechner, S. A. McLuckey, P. B. Shepson, A. Wisthaler, and A. Hansel, MS/MS studies for the selective detection of isomeric biogenic VOCs using a Townsend Discharge Triple Quadrupole Tandem MS and a PTR-Linear Ion Trap MS, *Atmos. Meas. Tech.*, *2*, 703-712, 2009.
130. L. H. Mielke^G, D. E. Erickson, S. A. McLuckey, A. Wisthaler, A. Hansel, and P. B. Shepson, Development of a Proton Transfer Reaction Linear Ion Trap Mass Spectrometer (PTRLIT) for Quantification of Atmospheric Volatile Organic Compounds, *Anal. Chem.*, *80*, 8171–8177, 2008.

129. Lockwood, A. L.^G, T. R. Filley, D. Rhodes, and P. B. Shepson, Foliar uptake of atmospheric organic nitrates, *Geophys. Res. Lett.*, *35*, L15809, doi:10.1029/2008GL034714, 2008.
128. A. Cavender^G, T. Biesenthal^G, J. W. Bottenheim, and P. B. Shepson, Volatile Organic Compound Ratios as Probes of Halogen Atom Chemistry in the Arctic, *Atmos. Chem. Phys.*, *8*, 1737–1750, 2008.
127. K. E. Garman^G, P. Wyss, M. Carlsen, J. R. Zimmerman, B. H. Stirm, T. Q. Carney, R. Santini, and P. B. Shepson, The contribution of variability of lift-induced upwash to the uncertainty in vertical winds determined from an aircraft platform, *Boundary Layer Meteor.*, *126*, 461-476, 2008.
126. William R. Simpson, Roland von Glasow, Katja Riedel, Phil Anderson, Parisa Ariya, Jan Bottenheim, John Burrows, Lucy Carpenter, Udo Friß, Michael Goodsite, Dwayne Heard, Manuel Hutterli, Hans-Werner Jacobi, Lars Kaleschke, Bill Neff, John Plane, Ulrich Platt, Andreas Richter, Howard Roscoe, Rolf Sander, Paul Shepson, John Sodeau, Alexandra Steffen, Thomas Wagner, and Eric Wolff, Halogens and their role in polar boundary-layer ozone depletion, *Atmos. Chem. Phys.*, *7*, 4375–4418, 2007.
125. S. Morin, J. Savarino, S. Bekki, A. Cavender^G, P. B. Shepson, and J. W. Bottenheim, Major influence of BrO on the NO_x budget in the Arctic spring, inferred from $\Delta^{17}\text{O}(\text{NO}_3^-)$ measurements during Ozone Depletion Events, *Environ. Chem.*, *4*, 238-241, 2007.
124. A.M. Grannas^G, A.E. Jones, J. Dibb, M. Ammann, C. Anastasio, H.J. Beine, M. Bergin, J. Bottenheim, C.S. Boxe, G. Carver, G. Chen, J.H. Crawford, F. Dominé, M.M. Frey, M.I. Guzmán, D.E. Heard, D. Helmig, M.R. Hoffmann, R.E. Honrath, L.G. Huey, M. Hutterli, H.-W. Jacobi, P. Klán, J. McConnell, J. Plane, R. Sander, J. Savarino, P.B. Shepson, W.R. Simpson, J.R. Sodeau, R. von Glasow, R. Weller, E.W. Wolff, T. Zhu, An overview of snow photochemistry: Evidence, mechanisms and impacts, *Atmos. Chem. Phys.*, *7*, 4329–4373, 2007.
123. M. A. Carignano, P. B. Shepson, and I. Szleifer, Ions at the ice/water/vapor interface, *Chem. Phys. Lett.*, *436*, 99–103, 2007.
122. Hill, K. A.^G, P. B. Shepson, E. S. Galbavy, C. Anastasio, P. S. Kourtev, A. Konopka, and B. H. Stirm (2007), Processing of atmospheric nitrogen by clouds above a forest environment, *J. Geophys. Res.*, *112*, D11301, doi:10.1029/2006JD008002.
121. P. J. Tackett^G, A. Cavender^G, A. D. Keil^G, P. B. Shepson, J. W. Bottenheim, S. Morin, J. Deary, A. Steffen, and C. Doerge, A Study of the vertical scale of halogen chemistry in the Arctic troposphere during polar sunrise at Barrow, AK, *J. Geophys. Res.*, *112*, D07306, doi:10.1029/2006JD007785, 2007.
120. G. D. Edwards^P, P. B. Shepson, J. W. Grossenbacher^G, J. M. Wells, G. E. Patterson, D. J. Barket^G, Jr., S. Pressley, T. Karl, and E. Apel, Development of an Automated Cylindrical Ion Trap Mass Spectrometer for Determination of Atmospheric Volatile Organic Compounds, *Anal. Chem.*, *79*, 5040-5050, 2007.

119. M. A. Carignano, E. Baskaran^G, P. B. Shepson, and I. Szleifer, Molecular Dynamics Simulation of Ice Growth from Supercooled Pure Water and Salt Solution, *Annals Glaciol.*, *44*, 113-117, 2006.
118. A. Keil^G and P. B. Shepson, Chlorine and Bromine atom ratios in the Springtime Arctic troposphere as determined from measurement of halogenated VOCs, *J. Geophys. Res.*, *111*, D17303, doi:10.1029/2006JD007119, 2006.
117. K.E. Garman^G, K.A. Hill^G, P. Wyss, M. Carlsen, J.R. Zimmerman, B.H. Stirm, T.Q. Carney, R. Santini, and P.B. Shepson, An Airborne and Wind Tunnel Evaluation of a Wind Turbulence Measurement System for Aircraft-based Flux Measurements, *J. Ocean and Atmos. Technol.*, *23*, 1696-1708, 2006.
116. M. A. Carignano, P. B. Shepson, and I. Szleifer, Molecular Dynamics Simulations of Ice Growth from Supercooled Water, *Molec. Phys.*, *103*, 2957-2967, 2005.
115. E. A. Holland, S. B. Bertman, M. A. Carroll, A. B. Guenther, P. B. Shepson, J. P. Sparks, J. Lee-Taylor, US Nitrogen Science Plan Focuses Collaborative Efforts, *EOS Transactions*, *86*, 253-256, 2005.
114. K. A. Hill^G, P. B. Shepson, E. S. Galbavy, and C. Anastasio, Measurement of Wet Deposition of Inorganic and Organic Nitrogen in a Forest Environment, *J. Geophys. Res. - Biogeosciences*, *110*, doi:10.1029/2005JG000030, 2005.
113. P. Giacobelli^G, K. Ford^G, and P. B. Shepson, A Comparison of Measured and Simulated Isoprene Nitrates Above a Forest Canopy, *J. Geophys. Res.*, *110*, D01304, doi: 10.1029/2004JD005123, 2005.
112. C. Espada^G and P. B. Shepson, The Production of Organic Nitrates from Atmospheric Oxidation of Ethers and Glycol Ethers, *Int. J. Chem. Kinet*, *37*, 686-699, 2005.
111. C. Espada^G, J. Grossenbacher^G, K. Ford^G, T. Couch^G, and P. B. Shepson, The Production of Organic Nitrates from Various Anthropogenic Volatile Organic Compounds, *Int. J. Chem. Kinet*, *37*, 675-685, 2005.
110. A. Keil^G and P. B. Shepson, Development of a Chemical Ionization Ion Trap Mass Spectrometric Method for Trace Level Determination of Molecular Halogens, *Anal. Chem.*, 10.1021/ac04993m, 2004.
109. P. DiCarlo, W. H. Brune, M. Martinez, H. Harder, R. Lescher, X. Ren, T. Thornberry, M. A. Carroll, V. Young, P. B. Shepson, D. Riemer, and E. Apel, Missing OH Reactivity in a Forest: Evidence for Unknown Reactive Biogenic VOCs, *Science*, *304*, 722-725, 2004.
108. T. M. Dassau^G, P. B. Shepson, K. M. Ford, and J. W. Bottenheim, Peroxyacetyl Nitrate Photochemistry and Interactions with the Arctic Surface, *J. Geophys. Res.*, *109*, D18302, doi:10.1029/2004JD004562, 2004.
107. D. J. Barket^G, J. M. Hurst^G, J. W. Grossenbacher^G, P. B. Shepson, W. Brune, T. Thornberry, M. A. Carroll, T. Biesenthal^G, J. W. Bottenheim, and K. G. Olszyna, A Study

- of the NO_x Dependence of Isoprene Oxidation, *J. Geophys. Res.*, 109, D11310, doi:10.1029/2003JD003965, 2004.
106. A. M. Grannas^G, P. B. Shepson, and T. R. Filley, Photochemistry and nature of organic matter in Arctic and Antarctic snow, *Global Biogeochem. Cycles*, 18, 10.1029/2003GB002133, 2004.
 105. J. W. Grossenbacher^G, D. J. Barket^G, P. B. Shepson, M. A. Carroll, K. G. Olszyna, and E. Apel, A Comparison of Isoprene Nitrate Concentrations at two Forest-Impacted Sites, *J. Geophys. Res.*, 109, D11311, doi:10.1029/2003JD003966, 2004.
 104. P. Shepson, P. Matrai, L. Barrie, and J. Bottenheim, Ocean-Atmosphere-Sea Ice-Snowpack Interactions in the Arctic, and Global Change, *EOS Transactions*, 84, 349, 2003.
 103. J. M. Hurst^G, D. J. Barket^G, and P. B. Shepson, The atmospheric chemistry of nonanal, *Environ. Sci. Technol.*, 37, 2218-2225, 2003.
 102. F. Dominé and P. B. Shepson, Air-snow interactions and their impact on atmospheric chemistry, *Science*, 297, 1506-1510, 2002.
 101. J. W. Bottenheim, J. E. Dibb, R. E. Honrath, and P. B. Shepson, An Introduction to the ALERT2000 and Summit2000 Arctic Research Studies, *Atmos. Environ.*, 36, 2467-2469, 2002.
 100. T. M. Dassau^G, A. L. Sumner^G, S. L. Koeniger^U, P. B. Shepson, N. Cullen, K. Steffen, H.-W. Jacobi, and R. Bales, Investigation of the Role of the Snowpack on Formaldehyde Chemistry at Summit, Greenland, *J. Geophys. Res.*, Vol. 107, NO. D19, 4394, doi:10.1029/2002JD002182, 2002.
 99. S. Perrier, S. Houdier, F. Domine, A. Cabanes, L. Legagneux, A. L. Sumner^G, and P. B. Shepson, Formaldehyde in Arctic Snow. Incorporation into Ice Particles and Evolution in the Snowpack, *Atmos. Environ.*, 36, 2695-2705, 2002.
 98. Mary R. Albert, Amanda M. Grannas^G, Jan Bottenheim, and Paul B. Shepson, Processes and Properties of Snow-Air Transfer in the High Arctic with Application to Interstitial Ozone at Alert, Canada, *Atmos. Environ.*, 36, 2779-2787, 2002.
 97. Chester W. Spicer, Robert A. Plastridge, Krishna L. Foster, Barbara J. Finlayson-Pitts, Jan W. Bottenheim, Amanda M. Grannas^G, and Paul B. Shepson, Molecular Halogens Before and During Ozone Depletion Events in the Arctic at Polar Sunrise: Concentrations and Sources, *Atmos. Environ.*, 36, 2721-2731, 2002.
 96. Yang, J., R. E. Honrath, M. C. Peterson, J. E. Dibb, A. L. Sumner^G, P. B. Shepson, M. Frey, H.-W. Jacobi, A. Swanson, and N. Blake, Impacts of Snowpack Photochemistry on Levels of OH and Peroxy Radicals at Summit, Greenland, *Atmos. Environ.*, 36, 2523-2534, 2002.

95. J.W. Bottenheim, H. Boudries, C. Guimbaud^P, A. Grannas^G, P. B. Shepson, S. Houdier, S. Perrier, and F. Dominé, Distribution and Trends of Oxygenated Hydrocarbons in the High Arctic: Measurement in the Atmospheric Boundary Layer and Interstitial Snow Air During Polar Sunrise Experiment, Alert 2000, *Atmos. Environ.*, *36*, 2573-2583, 2002.
94. Houdier, S., S. Perrier, F. Domine, A. Grannas^G, C. Guimbaud^P, P. B. Shepson, H. Boudries, and J. W. Bottenheim, Acetaldehyde and Acetone in the Snowpack near Alert During Polar Sunrise Experiment 2000. Snowpack Composition, Incorporation Processes, and Atmospheric Impact, *Atmos. Environ.*, *36*, 2609-2618, 2002.
93. Sumner, A. L. ^G, P. B. Shepson, A. M. Grannas^G, J. W. Bottenheim, K. G. Anlauf, D. Worthy, F. Domine, and S. Houdier, Atmospheric Chemistry of Formaldehyde in the Arctic Troposphere at Polar Sunrise, and the Influence of the Snowpack, *Atmos. Environ.*, *36*, 2553-2562, 2002.
92. A. M. Grannas^G, P. B. Shepson, C. Guimbaud^P, F. Domine, M. Albert, W. Simpson, J. W. Bottenheim, and H. Boudries, A Study of photochemical and physical processes affecting carbonyl compounds in the Arctic Marine Boundary Layer, *Atmos. Environ.*, *36*, 2733-2742, 2002.
91. C. Guimbaud^P, A. M. Grannas^G, P. B. Shepson, H. Boudries, J. W. Bottenheim, S. Houdier, S. Perrier, F. Domine, and J. D. Fuentes, Importance of the snowpack in processing acetaldehyde and acetone in the Arctic atmospheric boundary layer, *Atmos. Environ.*, *36*, 2743-2752, 2002.
90. H. M. Cho, P. B. Shepson, L. A. Barrie, J. A. Cowin, and R. Zaveri, NMR investigation of the Quasi-Brine layer in ice/brine mixtures, *J. Phys. Chem., B*, *10.1021/jp020449*, November, 2002.
89. S. Sillman, M. A. Carroll, T. Thornberry, B. K. Lamb, H. Westberg, W. K. Brune, I. Faloon, D. Tan, J. M. Hurst^G, P. B. Shepson, A. L. Sumner^G, D. R. Hastie, C. M. Mihele, E. C. Apel, and D. D. Riemer, Loss of Isoprene and Sources of Nighttime OH Radicals at a Rural Site in the U.S.: Results from Photochemical Models, *J. Geophys. Res.*, *107*, (D5), 10.1029/2001JD000449, 2002.
88. K. Ford^G, B. Campbell^G, P. B. Shepson, S. B. Bertman, R. E. Honrath, M. Peterson, and J. E. Dibb, Studies of PAN and its interaction with the Snowpack at Summit, Greenland, *J. Geophys. Res.*, *107*, 10.1029/2001JD000547, 2002.
87. M. A. Carroll, P. B. Shepson, and S. B. Bertman, Overview of the Program for Research on Oxidants: PHotochemistry, Emissions, and Transport (PROPHET) Summer 1998 Measurements Intensive, *J. Geophys. Res.*, *106*, 24,275-24,288, 2001.
86. X. Zhou, H. J. Beine, R. E. Honrath, J. D. Fuentes, W. Simpson, P. B. Shepson, and J. Bottenheim, Snowpack Photochemical Production of HONO: a Major Source of OH in the Arctic Boundary Layer in Spring Time, *Geophys. Res. Lett.*, *28*, 4087-4090, 2001.
85. T. Thornberry, M. A. Carroll, G. J. Keeler, S. Sillman, S. B. Bertman, M. R. Pippin, K. Ostling, J. W. Grossenbacher, P. B. Shepson, O. R. Cooper, J. L. Moody, and W. R.

- Stockwell, Observations of reactive oxidized nitrogen and speciation of NO_y during the PROPHET summer 1998 intensive, *J. Geophys. Res.*, *106*, 24,359-24,368, 2001.
84. K. Foster, R. Plastridge, J. Bottenheim, P. Shepson, B. Finlayson-Pitts and C. W. Spicer, First Tropospheric Measurements of Br₂ and BrCl and Their Role in Surface Ozone Destruction at Polar Sunrise, *Science*, *291*, 471-474, 2001.
83. H. Westberg, B. Lamb, R. Hafer, A. Hills, P. B. Shepson, and C. Vogel, Measurement of Isoprene Fluxes at the PROPHET site, *J. Geophys. Res.*, *106*, 24,347-24,358, 2001.
82. A. L. Sumner^G, T. L. Couch^P, P. B. Shepson, T. Thornberry, M. A. Carroll, S. Sillman, S. B. Bertman, I. Faloona, D. Tan, W. Brune, O. Cooper, J. Moody, W. Stockwell, and V. Young, A Study of the Formaldehyde Budget above a Forest Canopy, *J. Geophys. Res.*, *106*, 24,387-24,405, 2001.
81. D. Tan, I. Faloona, W. Brune, P. B. Shepson, T. L. Couch^P, A. L. Sumner^G, T. Thornberry, M. A. Carroll, E. Apel, D. Riemer, W. Stockwell, HO_x Budgets in a Deciduous Forest: Results from the PROPHET Summer 1998 Campaign, *J. Geophys. Res.*, *106*, 24,407-24,427, 2001.
80. I. Faloona, D. Tan, W. Brune, J. Hurst^G, D. Barket^G, T. Couch^P, P. Shepson, E. Apel, D. Riemer, T. Thornberry, M. A. Carroll, S. Sillman, and S. Bertman, Nighttime Observations of Prodigious Hydroxyl Radical Abundances in a Boreal Deciduous Forest, *J. Geophys. Res.*, *106*, 24,315-24,333, 2001.
79. D. J. Barket^G, J. M. Hurst^G, T. L. Couch^P, P. B. Shepson, R. Haefler, B. Lamb, H. Westberg, D. Riemer, E. Apel, C. Farmer, E. Stabenau, and Rod Zika, Intercomparison of Automated Methodologies for Measurement of Ambient Isoprene During the PROPHET 1998 Summer Campaign, *J. Geophys. Res.*, *106*, 24,301-24,313, 2001.
78. J. W. Grossenbacher^G, P. B. Shepson, T. Thornberry, M. Witmer-Rich, M. A. Carroll, I. Faloona, D. Tan, W. Brune, E. Apel, D. Riemer, and H. A. Westberg, Measurements of Isoprene Nitrates Above a Forest Canopy, *J. Geophys. Res.*, *106*, 24,429-24,438, 2001.
77. J. M. Hurst^G, D. J. Barket^G, O. Herrera-Gomez, T. L. Couch^P, P. B. Shepson, I. Faloona, D. Tan, W. Brune, H. Westberg, B. Lamb, T. Biesenthal, V. Young, A. H. Goldstein, J. W. Munger, and M. A. Carroll, Investigation of the Nighttime Decay of Isoprene, *J. Geophys. Res.*, *106*, 24,335-24,346, 2001.
76. T. L. Couch^P, A. L. Sumner^G, T. M. Dassau^G, P. B. Shepson, and R. E. Honrath, An Investigation of the Interaction of Carbonyl Compounds with the Snowpack, *Geophys. Res. Lett.*, *27*, 2241-2244, 2000.
75. B. Michalowski^G, J. S. Francisco, Y. Li, S.-M. Li, and P. B. Shepson, A Study of Multiphase Chemistry in the Arctic Boundary Layer During Polar Sunrise, *J. Geophys. Res.*, *105*, 15,131-15,145, 2000.
74. Ridley, B., J. Walega, D. Montzka, F. Grahek, E. Atlas, F. Flocke, V. Stroud, J. Deary, A. Gallant, J. Bottenheim, K. Anlauf, D. Worthy, A. L. Sumner^G, B. Splawn^G, and P. B.

- Shepson, Is the Arctic surface layer a source and sink of NO_x in winter/spring?, *J. Atmos. Chem.*, 36, 1-22, 2000.
73. R. E. Honrath, M. C. Peterson, S. Guo, J. E. Dibb, P. B. Shepson, and B. Campbell^G, Evidence of NO_x Production and Release Within the Snowpack at Summit, Greenland, *Geophys. Res. Lett.*, 26, 695-698, 1999.
 72. A. L. Sumner^G and P. B. Shepson, Snowpack Production of Formaldehyde and its Effect on the Arctic Troposphere, *Nature*, 398, 230-233, 1999.
 71. G. A. Impey^G, C. M. Mihele, P. B. Shepson, D. R. Hastie, K. G. Anlauf, and L. A. Barrie, Measurements of Photolyzable Halogen Compounds and Bromine Radicals During the Polar Sunrise Experiment 1997, *J. Atmos. Chem.*, 34, 21-37, 1999.
 70. D. R. Hastie, J. Narayan, C. Schiller, H. Niki, P. B. Shepson, D. Sills, P. Taylor, W. J. Moroz, J. Drummond, N. Reid, R. Taylor, P. B. Roussel, and O. T. Melo, Observational evidence for the impact of the lake breeze circulation on ozone concentrations in Southern Ontario, *Atmos. Environ.*, 33, 323-335, 1999.
 69. J. M. O'Brien^G, E. Czuba, D. R. Hastie, J. S. Francisco, and P. B. Shepson, Determination of the Hydroxy Nitrate Yields from the Reaction of C₂-C₆ Alkenes with OH in the Presence of NO, *J. Phys. Chem.*, 102, 8903-8908, 1998.
 68. D. Riemer, W. Pos, P. Milne, C. Farmer, R. Zika, E. Apel, K. Olszyna, T. Kliendienst, S. Bertman, P. Shepson, and T. Starn^P, Observations of Nonmethane Hydrocarbons (NMHCs) and Oxygenated Volatile Organic Compounds (OVOCs) at a Rural Site in the Southeastern United States, *J. Geophys. Res.*, 103, 28,111-28,128, 1998.
 67. A. Colorado^P, D. J. Barket^G, J. M. Hurst^G, and P. B. Shepson, A Fast-Response Method for Determination of Atmospheric Isoprene Using Quadrupole Ion Trap Mass Spectrometry, *Anal. Chem.*, 70, 5129-5135, 1998.
 66. O. R. Cooper, J. L. Moody, J. C. Davenport, S. J. Oltmans, B. J. Johnson, P. B. Shepson, X. Chen^P, and J. T. Merrill, The Influence of Springtime Weather Systems on Vertical Ozone Distributions over Three North American Sites, *J. Geophys. Res.*, 103, 22,001-22,013, 1998.
 65. T.A. Biesenthal^G, J.W. Bottenheim, P.B. Shepson, S.-M. Li, and P. C. Brickell, The chemistry of biogenic hydrocarbons at a Rural Site in Eastern Canada, *J. Geophys. Res.*, 103, 25,487-25,498, 1998.
 64. Xiaohui Chen^P, David Hulbert^G, and Paul B. Shepson, Measurement of the Organic Nitrate Yield from OH Reaction with Isoprene, *J. Geophys. Res.*, 103, 25,563-25,568, 1998.
 63. G. Nouaime, S. B. Bertman, C. Seaver, D. Elyea, H. Huang, P. B. Shepson, T. K. Starn^P, D. D. Riemer, R. G. Zika, and K. Olszyna, Sequential Tropospheric Products from Isoprene Chemistry: MACR and MPAN at a NO_x-rich Forest Environment in the Southeast U.S., *J. Geophys. Res.*, 103, 22,463-22,471, 1998.

62. E. Apel, J. Calvert, D. Riemer, W. Pos, R. Zika, T. Kleindienst, W. Lonneman, K. Fung, E. Fujita, P. B. Shepson, and T. K. Starn^P, Measurements Comparison of Oxygenated Volatile Organic Compounds at a Rural Site During the 1995 SOS Nashville Intensive, *J. Geophys. Res.*, *103*, 22,295-22,316, 1998.
61. N. Srinivasan, R. G. Cooks, and P. B. Shepson, "Proton Affinity of Peroxyacetyl Nitrate Sampled by Membrane Introduction Mass Spectrometry", *Rapid Comm. Mass Spectrom.*, *12*, 328-334, 1998.
60. T. K. Starn^P, P. B. Shepson, S. B. Bertman, J. S. White, B. G. Splawn^G, D. Riemer, R. Zika, and K. Olszyna, Isoprene chemistry and its relationship to ozone production at an urban-impacted forest site, *J. Geophys. Res.*, *103*, 22,425-22,435, 1998.
59. T.K. Starn^P, P. B. Shepson, S. B. Bertman, D. D. Riemer, R. Zika, and K. Olszyna, Nighttime isoprene chemistry at an urban-impacted forest site, *J. Geophys. Res.*, *103*, 22,437-22,447, 1998.
58. T. A. Biesenthal^G and P. B. Shepson, Observations of Anthropogenic Inputs of the Isoprene Oxidation Products Methyl Vinyl Ketone and Methacrolein to the Atmosphere, *Geophys. Res. Lett.*, *24*, 1375-1378, 1997.
57. G. A. Impey^G, P. B. Shepson, D. R. Hastie, L. A. Barrie, and K. Anlauf, Measurements of Photolyzable Chlorine and Bromine During the Polar Sunrise Experiment 1995, *J. Geophys. Res.*, *102*, 16005-16010, 1997.
56. G. A. Impey^G, P. B. Shepson, D. R. Hastie, and L. A. Barrie, Measurement Technique for the Determination of Photolyzable Chlorine and Bromine in the Atmosphere, *J. Geophys. Res.*, *102*, 15,999-16004, (1997).
55. Li, S.-M., K. G. Anlauf, H. A. Wiebe, J. W. Bottenheim, P. B. Shepson, and T. Biesenthal^G, Emission Ratios and Photochemical Production Efficiencies of Nitrogen Oxides, Ketones, and Aldehydes in the Lower Fraser Valley During the Summer Pacific 1993 Oxidant Study, *Atmos. Environ.*, *31*, 2037-2048 (1997).
54. R. M. Banta, P. B. Shepson, J. W. Bottenheim, K. G. Anlauf, A. Wiebe, A. Gallant, T. Biesenthal^G, L. D. Olivier, C.-J. Zhu, I. G. McKendry, and D. G. Steyn, Nocturnal Cleansing Flows in a Tributary Valley, *Atmos. Environ.*, *31*, 2147-2162, 1997.
53. J. M. O'Brien^G, P. B. Shepson, T. Biesenthal^G, Q. Wu^P, J. W. Bottenheim, H. A. Wiebe, K. G. Anlauf and P. Brickell, "Production and Distribution of Organic Nitrates, and Their Relationship to Carbonyl Compounds in the Lower Fraser Valley, B.C.", *Atmos. Environ.*, *31*, 2059-2069 (1997).
52. T. Biesenthal^G, Q. Wu^P, P. B. Shepson, H. A. Wiebe, K. G. Anlauf, and G. I. Mackay, A Study of Relationships Between Isoprene, its Oxidation Products and Ozone, in the Lower Fraser Valley, B.C., *Atmos. Environ.*, *31*, 2049-2058, 1997.

51. P. B. Shepson, A.-P. Sirju^G, J. F. Hopper, L. A. Barrie, V. Young, H. Niki, and H. Dryfhout, Sources and Sinks of Carbonyl Compounds in the Arctic Ocean Boundary Layer: A Polar Icefloe Experiment, *J. Geophys. Res.*, *101*, 21,081-21,089, 1996.
50. P. B. Shepson, E. Mackay^U, and K. Muthuramu^P, Henry's Law Constants and Removal Processes for Several Atmospheric β -Hydroxy Alkyl Nitrates, *Environ. Sci. Technol.*, *30*, 3618-3623, 1996.
49. Plummer, D. A.^G, J. C. McConnell, P. B. Shepson, D. R. Hastie, and H. Niki, "Modeling of Ozone Formation at a Rural Site in Southern Ontario", *Atmos. Environ.*, *30*, 2195-2217 (1996).
48. D. R. Hastie, P. B. Shepson, N. Reid, P. B. Roussel, and O. T. Melo. "Summertime NO_x, NO_y, and Ozone at a Site in Rural Ontario", *Atmos. Environ.*, *30*, 2157-2165 (1996).
47. N. W. Reid, H. Niki, D. Hastie, P. Shepson, P. Roussel, O. Melo, G. Mackay, J. Drummond, H. Schiff, L. Poissant, and W. Moroz. "The Southern Ontario Oxidant Study (SONTOS): Overview and Case Studies for 1992", *Atmos. Environ.*, *30*, 2125-2132 (1996).
46. P. B. Roussel, X. Lin, F. Camacho, S. Laszlo, R. Taylor, O. T. Melo, P. B. Shepson, D. R. Hastie, and H. Niki. "Observation of Ozone and Precursor Levels at Two Sites Around Toronto, Ontario, During SONTOS 92", *Atmos. Environ.*, *30*, 2145-2155 (1996).
45. X. Lin, P. B. Roussel, S. Laszlo, R. Taylor, O. T. Melo, P. B. Shepson, D. R. Hastie, and H. Niki. "Impact of Toronto Urban Emissions on Ozone Levels Downwind - A Case Study", *Atmos. Environ.*, *30*, 2177-2193 (1996)
44. A.-P. Sirju^G and P. B. Shepson, "A Laboratory and Field Investigation of the DNPH Cartridge Technique for the Measurement of Atmospheric Carbonyl Compounds", *Environ. Sci. Technol.*, *29*, 384-392 (1995).
43. J. M. O'Brien^G, P. B. Shepson, K. Muthuramu^P, C. Hao^P, H. Niki, D. R. Hastie, R. Taylor, and P. B. Roussel, Measurements of Alkyl and Multifunctional Organic Nitrates at a Rural Site in Ontario, *J. Geophys. Res.*, *100*, 22,795-22,804, 1995.
42. W. R. Leitch, L. A. Barrie, J. W. Bottenheim, S. M. Li, P. B. Shepson, K. Muthuramu^P, and Y. Yokouchi, Airborne Observations Related to Ozone Depletion at Polar Sunrise, *J. Geophys. Res.*, *99*, 25,499-25,517, 1994.
41. C. Hao^P, P. B. Shepson, J. W. Drummond, and K. Muthuramu^P, Development of a Gas Chromatographic Detector for Selective and Sensitive Detection of Atmospheric Organic Nitrates, *Anal. Chem.*, *66*, 3737-3743, 1994.
40. J. F. Hopper, B. Peters, Y. Yokouchi, H. Niki, B. T. Jobson, P. B. Shepson, and K. Muthuramu^P. "Chemical and Meteorological Observations at Ice Camp Swan During Polar Sunrise Experiment 1992", *J. Geophys. Res.*, *99*, 25,489-25,498 (1994).

39. S. M. Li, Y. Yokouchi, L. A. Barrie, K. Muthuramu^P, P. B. Shepson, J. W. Bottenheim, W. T. Sturges, and S. Landsberger "Organic and Inorganic Bromine Compounds and Their Compositions in the Arctic Troposphere During Polar Sunrise", *J. Geophys. Res.*, 99, 25,415-25,428 (1994).
38. K. Muthuramu^P, P. B. Shepson, J. W. Bottenheim, T. Jobson, H. Niki, and K. G. Anlauf, Relationships Between Organic Nitrates and Surface Ozone Destruction During Polar Sunrise Experiment 1992, *J. Geophys. Res.*, 99, 25,369-25,378, 1994.
37. K.J. Hedley^G, P.B. Shepson, L.A. Barrie, J.W. Bottenheim, D. Mactavish, K. G. Anlauf, and G. I. Mackay, An Evaluation of Integrating Techniques for Measuring Atmospheric Nitrogen Dioxide, *Int. J. Environ. Anal. Chem.*, 54, 167-181, (1994).
36. Muthuramu K.^P, Shepson P. B., and O'Brien J. M.^G, Preparation, Analysis, and Atmospheric Production of Multifunctional Organic Nitrates, *Environ. Sci. Technol.*, 27, 1117- 1124, 1993.
35. P. B. Shepson, K. G. Anlauf, J. W. Bottenheim, A. Wiebe, N. Gao^G, K. Muthuramu^P, and G. I. Mackay, Alkyl Nitrates and Their Contribution to Reactive Nitrogen at a Rural Site in Ontario, *Atmos. Environ.*, 27A, 749-757, 1993.
34. P. Blanchard^G, P. B. Shepson, J. W. Drummond, and H. I. Schiff, Development of a Gas Chromatograph for Trace Level Measurements of Peroxyacetyl Nitrate Using Chemical Amplification, *Anal. Chem.*, 65, 2472-2477, 1993.
33. D. R. Hastie, P. B. Shepson, R. Berman and S. Sharma. "The Influence of the Nocturnal Boundary Layer on the Concentration of Secondary Trace Species at Dorset, Ontario". *Atmos. Environ.*, 27A, 533-541(1993).
32. J.A. Heddle, P.B. Shepson, J. Gingerich, A. Bouch, and K. So^U. "The Mutagenicity of Peroxyacetyl Nitrate (PAN) *In-Vivo*". *Environ. and Molec. Mutagen.*, 21, 58-66 (1993).
31. P. B. Shepson, J. W. Bottenheim, D. R. Hastie, and A. Venkatram "Determination of the Relative Ozone and PAN Deposition Velocities at Night" *Geophys. Res. Lett.*, 19, 1121-1124 (1992).
30. P.B. Shepson, D.R. Hastie, K.W. So^U, H.I. Schiff and P. Wong. "Relationships Between PAN, PPN, and O₃ at Urban and Rural Sites in Ontario". *Atmos. Environ.*, 26A, 1259-1270 (1992).
29. J.A. Heddle, G.D. Gingerich, C. Urlando, M. Pagura, P.B. Shepson and M.K. Khan, Detection of Somatic Mutations *In-Vivo* using the Concurrent Assay I. Spontaneous Frequencies in Chinese Hamsters and F344 Rats, *Mutation Res.*, 272, 195-203, 1991.
28. K.P. Gladstone^P, H. Niki, P.B. Shepson, J.W. Bottenheim, H.I. Schiff, and H.S. Sandhu. "Photochemical Oxidant Concentrations in two Canadian Prairie Cities: Model Evaluation". *Atmos. Environ.*, 25B, 243 (1991).

27. X. Lin, O.T. Melo, D.R. Hastie, P.B. Shepson, H. Niki, and J.W. Bottenheim. "A Case Study of Ozone Production in a Rural Area of Central Ontario", *Atmos. Environ.*, 26A, 311-324 (1991).
26. P.B. Shepson, D.R. Hastie, H.I. Schiff, M. Polizzi^U, J.W. Bottenheim, K. Anlauf, G.I. Mackay, and D. Karecki. "Atmospheric Concentrations and Temporal Variations of C₁-C₃ Carbonyl Compounds at Two Rural Sites in Central Ontario", *Atmos. Environ.*, 25A, 2001-2015 (1991).
25. T.E. Kleindienst, P.B. Shepson, D.F. Smith, E.E. Hudgens, C.M. Nero, L.T. Cupitt, J.J. Bufalini, and L.D. Claxton. "Comparison of Mutagenic Activities of Several Peroxyacyl Nitrates", *Environ. and Molec. Mutagen.*, 16, 170-180 (1990).
24. J.W. Bottenheim, L.A. Barrie, L. Heidt, H. Niki, R.A. Rasmussen, P.B. Shepson. "Depletion of Lower Tropospheric Ozone During Arctic Spring: The Polar Sunrise Experiment 1988", *J. Geophys. Res.*, 95, 18,555-18568 (1990).
23. P. Blanchard^G, P.B. Shepson, K.W. So^U, H.I. Schiff, J.W. Bottenheim, A.J. Gallant, J.W. Drummond, and P. Wong, A Comparison of Calibration and Measurement Techniques for Gas Chromatographic Determination of Atmospheric Peroxyacetyl Nitrate (PAN), *Atmos. Environ.*, 24A, 2839-2846, 1990.
22. T.E. Kleindienst, P.B. Shepson, C.M. Nero and J.J. Bufalini. "The Production of Chlorine Atoms from the Reaction of OH with Chlorinated Hydrocarbons", *Int. J. Chem. Kinet.* 21, 863 (1989).
21. T.E. Kleindienst, P.B. Shepson, D.N. Hodges, C.M. Nero, R.R. Arnts, P.K. Dasgupta, H. Hwaug, G.L. Kok, H.I. Schiff, G.I. MacKay and L. Mayne. "Comparison of Techniques for Measurement of Ambient Levels of Hydrogen Peroxide", *Environ. Sci. Technol.*, 22, 53, (1988).
20. B.E. Dumdei, D.V. Kenny, P.B. Shepson, T.E. Kleindienst, C.M. Nero, L.T. Cupitt, and L.D. Claxton. "MS/MS Analysis of the Products of Toluene Photooxidation and Measurement of their Mutagenic Activity", *Environ. Sci. Technol.*, 22, 1493, (1988).
19. T.E. Kleindienst, P.B. Shepson, C.M. Nero, R.R. Arnts, S.B. Tejada, G.I. MacKay, L.K. Mayne, H.I. Schiff, J.A. Lind, G.C. Kok, A.L. Lazrus, P.K. Dasgupta, and S. Doug. "An Intercomparison of Formaldehyde Measurement Techniques at Ambient Concentrations", *Atmos. Environ.*, 22, 1931, (1988).
18. D.L. Fox, L. Stockburger, W. Weathers, C.W. Spicer, G.I. MacKay, H.I. Schiff, D.J. Eatough, F. Mortensen, L.D. Hansen, P.B. Shepson, T.E. Kleindienst, and E.O. Edney. "Intercomparison of Nitric Acid Diffusion Denuder Methods with Tunable Diode Laser Absorption Spectroscopy", *Atmos. Environ.*, 22, 575, (1988).
17. T.E. Kleindienst, P.B. Shepson, E.O. Edney, C.M. Nero, L.T. Cupitt and L.D. Claxton. "The Atmospheric Transformation and Mutagenicity of Volatile Wood Smoke Emissions". *Environ. Sci. Res.*, 36, 311-323 (1987).

16. P.B. Shepson, T.E. Kleindienst, E.O. Edney, L.T. Cupitt, and L.D. Claxton. "The Production in the Atmosphere of Mutagenic Products from Simple Hydrocarbons". *Environ. Sci. Res.*, 36, 227-290 (1987).
15. P.B. Shepson, T.E. Kleindienst, C.M. Nero, D.N. Hodges, L.T. Cupitt and L.D. Claxton. "Allyl Chloride: The Mutagenic Activity of its Photooxidation Products", *Environ. Sci. Technol.*, 21, 568, (1987).
14. P.B. Shepson, T.E. Kleindienst, and H.B. McElhoe, A Cryogenic Trap/Porous Polymer Sampling Technique for the Quantitative Determination of Ambient Volatile Organic Compound Concentrations, *Atmos. Environ.*, 21, 57, 1987.
13. P.B. Shepson, T.E. Kleindienst, E.O. Edney, L.T. Cupitt, and L.D. Claxton. "Acetaldehyde: The Mutagenic Activity of its Photooxidation Products", *Environ. Sci. Technol.*, 20, 1008, (1986).
12. E.O. Edney, P.B. Shepson, T.E. Kleindienst and E.W. Corse. "The Photooxidation of Allyl Chloride", *Int. J. Chem. Kinet.*, 18, 597, (1986).
11. T.E. Kleindienst, P.B. Shepson, E.O. Edney, L.D. Claxton and L.T. Cupitt. "Wood Smoke: Measurement of the Relative Mutagenic Activity of its Gas and Particulate Phase Photooxidation Products", *Environ. Sci. Technol.*, 20, 193, (1986).
10. P.B. Shepson, T.E. Kleindienst, E.O. Edney, L.T. Cupitt, and L.D. Claxton. "The Mutagenic Activity of the Products of the Ozone Reaction with Propylene in the Presence and Absence of Nitrogen Dioxide", *Environ. Sci. Technol.*, 19, 1094, (1985).
9. P.B. Shepson, T.E. Kleindienst, E.O. Edney, G.R. Namie, J.H. Pittman, L.T. Cupitt, L.D. Claxton, and E. Perry. "The Mutagenic Activity of Irradiated C₂H₄/C₆H₅NH₂/NO_x Mixtures", *J. Environ. Sci. Health*, A20, No. 5,503, (1985).
8. P.B. Shepson, E.O. Edney, T.E. Kleindienst, J.H. Pittman, G.R. Namie, and L.J. Cupitt. "The Production of Organic Nitrates from OH and NO₃ Reaction with Propylene", *Environ. Sci. Technol.*, 19, 849, (1985).
7. T.E. Kleindienst, P.B. Shepson, E.O. Edney, and L.D. Claxton. "Peroxyacetyl Nitrate: Measurements of its Mutagenic Activity Using the Salmonella/Mammalian Microsome Reversion Assay", *Mutation Res.*, 157, 123, (1985).
6. T.E. Kleindienst, P.B. Shepson, E.O. Edney, L.T. Cupitt, and L.D. Claxton. "The Mutagenic Activity of the Products of Propylene Photooxidation", *Environ. Sci. Technol.*, 19, 620, (1985).
5. P.B. Shepson, T.E. Kleindienst, E.O. Edney, G.R. Namie, J.H. Pittman, L.T. Cupitt, and L.D. Claxton. "The Mutagenic Activity of Irradiated Toluene/NO_x/H₂O/Air Mixtures", *Env. Sci. Technol.*, 19, 249, (1985).
4. P.B. Shepson, E.O. Edney, and E.W. Corse. "Ring Fragmentation Reactions in the Photooxidations of Toluene and o-Xylene", *J. Phys. Chem.*, 88, 4122, (1984).

3. P.B. Shepson and J.P. Heicklen. "The Wavelength and Pressure Dependence of the Photolysis of Propionaldehyde Vapor", *J. Photochem.*, 19, 215, (1982).
2. P.B. Shepson and J.P. Heicklen. "The Photooxidation of Propionaldehyde Vapor at 313 nm", *J. Photochem.*, 18, 169, (1982).
1. P.B. Shepson and J.P. Heicklen. "The Photooxidation of Ethyl Iodide at 22°C", *J. Phys. Chem.*, 85, 2691, (1981).

B. Technical Reports:

1. T.E. Kleindienst, P.B. Shepson and E.O. Edney, "Mutagenic Activities of Wood Smoke Photooxidation Products", EPA/600/S3-86/049 (1986).
2. P.B. Shepson, T.E. Kleindienst and E.O. Edney, "The Production of Mutagenic Compounds as a Result of Urban Photochemistry", EPA/600/S3-87/020, (1987).
3. L.T. Cupitt, L.D. Claxton, P.B. Shepson, and T.E. Kleindienst, "IACP (Integrated Air Cancer Project) Emissions: Transformations and Fate", EPA Report (1987).

C. Book Chapters

P. B. Shepson, Organic Nitrates, in "Volatile Organic Compounds In The Atmosphere", Ralf Koppmann, Ed., Blackwell Publishing, Ltd., Oxford, UK, 2007.

P. B. Shepson and F. Domine, "Chemistry in the Cryosphere", 19 chapter volume on the subject, in press with World Scientific Publishing, 2021.

D. Book Editing

P. B. Shepson and F. Domine, "Chemistry in the Cryosphere", World Scientific, and wrote Chapter 1 - "Cryosphere-Atmosphere Interactions", <https://doi.org/10.1142/12095>, December 2021, 924 pages.

E. Invited Presentations:

1. "The Atmospheric Chemistry and Toxicology of Peroxyacetyl Nitrates (PAN)", York U. Chemistry Department Seminar, November 1989.
2. "Is the Chemistry and Composition of the Atmosphere Changing?" CHEMED '89. Queens University, Kingston, Ontario. August 16, 1989
3. "Measurements of Carbonyl Compounds During EMEFS", Atmospheric Environment Service, Downsview, Ontario, March 1989.
4. "Mechanisms for the Atmospheric Production of Peroxyacetyl Nitrate (PAN)", Atmospheric Environment Service, Downsview, Ontario, February 1988.

5. "Photochemical Smog and Air Pollution", Invited Lectures, Department of Chemistry, Queens University, Queen University, Kingston, Ontario, November 1987.
6. P.B. Shepson. "Are we Changing the Composition of the Atmosphere?" Science Teachers Association of Ontario Conference, Toronto, November 1-3, 1990.
7. "Atmospheric Chemistry at the Dorset Site", Ontario Ministry of the Environment - Technology Transfer Conference, Toronto, Ontario, November 25, 1991.
8. "PAN and Oxidant Chemistry", CIRAC/AWMA Joint International Conference on Atmospheric Chemistry - The Role of Models in Understanding Atmospheric Chemistry. Toronto, Ontario, Jan. 27, 1992.
9. "Mutagenicity of PAN *in vivo*", Workshop on the Genotoxicity and Dosimetry of Atmospheric Transformation Products, U.S. EPA, RTP, N.C., May 28, 29, 1992.
10. "Global Atmospheric Change" Science Teachers Association of Ontario Meeting, Toronto, November 5, 1992.
11. "Global Atmospheric Change and Odd-Nitrogen Chemistry", Purdue University, Dept. of Earth and Atmos. Sci., April 13, 1993.
12. "Uncovering a Hole in our Understanding of Arctic Ozone Chemistry", Clarkson University, Department of Chemistry, September 2, 1993
13. "Investigations of Arctic Tropospheric Ozone, and the Possible Role of Halogen Atom Chemistry", Purdue University, Dept. of Earth and Atmos. Sci., February 1994.
14. "The Impact of Natural Hydrocarbons on Ozone Production in an Urban Environment", Purdue University, Analytical Division Seminar, October 4, 1994.
15. "Surface Ozone Depletion in the Arctic, and the Possible Role of Halogen Atom Chemistry", University of Western Michigan, Department of Chemistry, November 24, 1994.
16. "Alkyl Nitrates, and Their Relationship to Halogen Atom Chemistry in the Arctic at Polar Sunrise", American Chemical Society National Meeting, Chicago, IL, August 20, 1995.
17. "Evidence for the Importance of Halogen Atom Chemistry in the Troposphere", Purdue University, Physical Chemistry Seminar, September 20, 1995.
18. "Trace Analysis in Atmospheric Chemistry", Purdue University, Industrial Associates Meeting, October 12, 1996.
19. "Evidence for Halogen Atom Chemistry in the Arctic Troposphere", U.C. - Irvine, Department of Chemistry, October 29, 1996.
20. "Evidence for Halogen Atom Chemistry in the Arctic Troposphere", U.C. - Riverside, Department of Chemistry, October 30, 1996.

21. "PROPHET: Program for Research on Oxidants: Photochemistry, Emissions, and Transport", U.S. Environmental Protection Agency, Research Triangle Park, N. C., Nov. 25, 1996.
22. "Studies of the Role of Biogenic Hydrocarbons in Production of Ozone in the Troposphere", Oak Ridge National Labs, Oak Ridge, TN, Dec. 5, 1996.
23. "The Role of Biogenic Hydrocarbons in Tropospheric Ozone Production", Indiana State University, Dept. of Chemistry, Feb. 11, 1997.
24. "Bromine Chemistry in the Arctic Troposphere", Great Lakes Chemical Co., West Lafayette, IN, Feb. 13, 1997.
25. "Surface Ozone Depletion in the Arctic, and the Possible Role of Halogen Atom Chemistry", Indiana University, Dept. of Geography, Bloomington, IN, Feb. 28, 1997.
26. "Field Intensive Preliminary Results as part of the Program for Research on Oxidants: Photochemistry, Emission, and Transport (PROPHET), 20th Annual Midwest Environmental Chemistry Workshop, Indiana University, November 9, 1997.
27. "Evidence for Halogen Atom Chemistry During Polar Sunrise", U. C. Davis, Dept. of Earth and Atmospheric Sciences, November 10, 1997.
28. "The Role of Isoprene in Tropospheric Ozone Production and the Sequestration of NO_x", U. C. Davis, Dept. of Chemistry, November 11, 1997.
29. "The Role of Biogenic Hydrocarbons in the Production of Ground Level Ozone", Northeastern Illinois University, Department of Chemistry, January 29, 1998.
30. "Development of a Fast Time Response Method for Isoprene Measurement Using Ion Trap MS/MS", National Center for Atmospheric Research, March 2, 1998.
31. "Studies of the Role of Halogen Atom Chemistry in the Destruction of Marine Boundary Layer Ozone at Polar Sunrise", Harvard University, Department of Earth, Atmospheric, and Space Science, March 30, 1998.
32. "Tropospheric Chemistry at the Air-Ice Interface", Telluride Summer Workshop, "Recent Advances in Tropospheric Chemistry", Telluride, CO, Aug. 6, 1998.
33. "Recent developments in the analytical chemistry of isoprene and its oxidation products", York University, Department of Chemistry, Toronto, Ontario, Oct. 2, 1998.
34. "Studies of Multi-Phase Chemistry in the Arctic", University of Michigan, Department of Chemistry, Ann arbor, MI, February 19, 1999.
35. "Sustainable Atmosphere", panel presentation, University of Michigan, Business School, Ann Arbor, MI, February 22, 1999.

36. “Studies of Multi-Phase Chemistry in the Arctic”, University of Illinois, Atmospheric Science Department, Champaign-Urbana, IL, February 24, 1999.
37. “Studies of Multi-Phase Chemistry in the Arctic”, New York State Department of Health, Wadsworth Center, Albany, N. Y., March 4, 1999.
38. “Studies of Multi-Phase Chemistry in the Arctic”, Purdue University, Department of Earth and Atmospheric Sciences, March 8, 1999.
39. “Development of Quadrupole Ion trap Methods for Determination of Atmospheric Volatile Organic Compounds”, American Chemical Society Meeting, Symposium on Quadrupole Ion Trap Mass Spectrometric Analysis in the Environment, March 22, 1999, Anaheim, CA.
40. “Studies of Multi-Phase Chemistry in the Arctic”, West Chester University, Department of Chemistry, April 5, 1999.
41. “Air/Snow Interactions of Atmospheric Carbonyl Compounds”, 9th Annual Goldschmidt Conference, Harvard University, Aug. 23, 1999.
42. “Interactions of Carbonyl Compounds with the Snowpack”, Pacific Northwest National Laboratories, Richland, WA, Oct. 5, 1999.
43. “Arctic Tropospheric Chemistry: Evidence for Photochemistry in the Snowpack”, University of California, Berkeley, Oct. 26, 1999.
44. “Polar Tropospheric Chemistry: The Importance of Snow Phase Photochemistry”, Environment Canada, 10/28/99, presented remotely from Purdue’s Distance Learning Lab.
45. “Atmospheric Chemistry at the Air-Snow Interface”, Ohio Wesleyan University, Interdisciplinary Science Series, 11/4/99.
46. “Atmospheric Chemistry at the Air-Snow Interface”, Bradley University, Department of Chemistry, 11/10/99.
47. “Dry and Wet Deposition of Atmospheric Organic Nitrates”, presented at the Society of Environmental Toxicology and Chemistry Annual Meeting, Philadelphia, PA, Nov. 17, 1999.
48. “Polar Tropospheric Chemistry: Evidence for Photochemistry in the Snowpack”, McGill University, Dept. of Chemistry, Dec. 2, 1999.
49. Paul B. Shepson, Ann Louise Sumner, Amanda M. Grannas, Christophe Guimbaud, Kevin Ford, Terra Dassau, Tara L. Couch, and Richard Honrath “Studies of the Interaction of Carbonyl Compounds Between the Atmosphere and the Snowpack”, Pacific Northwest National Laboratories, June 23, 2000.
50. “PROPHET: the Forest and the Trees”, University of Michigan Biological Station,

Pellston, MI, 7/12/00.

51. "Studies of Photochemistry in the Snowpack in the Arctic", Washington State University, Pullman, WA, September 25, 2000.
52. "Studies of the Role of the Snowpack in Determining the Concentration of Carbonyl Compounds in the Arctic Boundary Layer", at the "Reactivity on the surface of ice: Application to the Environment and Interstellar Space conference at Porquerrolles, France, Sept. 25 – 29, 2000.
53. "Air-Surface Interactions and New Challenges in Analytical Atmospheric Chemistry", Pacific Northwest National Laboratory, Richland, WA, October 17, 2000.
54. "Recent Developments in Measurements of Atmospheric Nitrogen Species, and the Search for the Missing NO_y ", Eastern Analytical Symposium, Atlantic City, N.J., Oct. 31, 2000.
55. "Ice and Snow Chemistry: Unearthing the Secrets", presented at the New Horizons in Science Briefing of the Council for the Advancement of Science Writing, Nov. 2, 2000, Houston, TX.
56. "The Role of Snowpack Processes in Determining Carbonyl Compound Concentrations in the Arctic", NOAA-Aeronomy Laboratory, November 14, 2000, Boulder, CO.
57. "Freezing Salty Water – NMR Studies", Pacific Northwest National Laboratory, Richland, WA, 12/13/00.
58. "Canadian Ice and NMR Spectroscopy", Antioch University, Yellow Springs, OH, March 30, 2001.
59. "Evidence for Photochemistry in the Snowpack, and its Impact on the Composition of the Atmosphere", University of Virginia, Dept. of Environmental Sciences, Charlottesville, VA, April 5, 2001.
60. "Evidence for Photochemistry in the Snowpack, and its Impact on the Composition of the Atmosphere", University of Innsbruck, Institut für Ionenphysik, May 14, 2001.
61. "Studies of the Role of Biogenic Volatile Organic Compounds (VOCs) and Their Role in Atmospheric Nitrogen Cycling at the PROPHET Site", Keynote presentation, Great Lakes Regional ACS meeting, Grand Rapids, MI, June 13, 2001.
62. "Studies of the Interaction of Carbonyl Compounds with Snow, and the Impact on Arctic Boundary Layer Photochemistry", Atmospheric Chemistry Gordon Conference, Salve Regina U., Newport, RI, June 21, 2001.
63. "Chemistry on the Quasi-Liquid Layer on the Surface of Ice", Analytical Chemistry Gordon Conference, Connecticut College, New London, CT, June 28, 2001.

64. “Studies Of Snowpack Processes And Their Role In Determining The Concentration Of Formaldehyde And Acetaldehyde In The Arctic Atmospheric Boundary Layer”, International Association of Meteorology and Atmospheric Sciences 11 July 2001 (session convenor).
Innsbruck, Austria .
65. “Chemistry on the Surface of Ice and Snow”, Industrial Associates Meeting, Purdue University, Department of Chemistry, October 5, 2001.
66. “Challenges for the Quantitative Determination of Atmospheric Trace Level Pollutants Using Ion Trap Mass Spectrometry”, Federation of Analytical Chemistry and Spectroscopy Societies meeting, Detroit, MI, October 8, 2001.
67. “Flux Measurements of Atmospheric Pollutants, on the Fly”, Asilomar meeting of the American Society for Mass Spectrometry - Real World Challenges and New Developments in Environmental Mass Spectrometric Measurements, Pacific Grove, CA, October 19-23, 2001 (Conference co-Chair, with Kim Prather).
68. “Planning for a Future Ocean-Ice-Atmosphere Research Program in the Arctic”, NSF OAI All Hands Meeting, Salt Lake City, UT, Nov. 14, 2001.
69. “Chemistry on the Surface of Ice and Snow”, Eastern Illinois University, Dept. of Chemistry, 11/5/01.
70. “Chemistry on the Surface of Ice and Snow, and its Impact on Atmospheric Chemistry”, Ohio State University, Dept. of Chemistry, 11/20/01
71. “Snowpack Photochemistry and its Impact on the Arctic Boundary Layer Atmosphere”, Georgia Institute of Technology, Dept. of Earth and Atmospheric Science, 11/30/01.
72. “Atmospheric Chemistry at the Air-Snow Interface”, Indiana University-NW, Merrillville, IN, February 27, 2002.
73. “Studies of the production of organic nitrates for OH oxidation of biogenic VOCs”, ACS Award symposium for Roger Atkinson, ACS National Meeting, Orlando, FL, April 9, 2002.
74. “The Biosphere, Inverse Micelles, Carbonyl Compounds, Organic Nitrates, Particulate Matter, and the Biosphere”, Telluride Atmospheric Chemistry Workshop, Telluride, CO, Aug. 5, 2002.
75. “Studies of Biogeochemical Cycling of Carbon and Nitrogen in a Forest Environment as Part of PROPHET”, ACS National Meeting, Boston, MA, August 19, 2002.
76. “Studies of the Interactions of the Carbon and Nitrogen Cycles in Forest Environments”, Department of Agronomy, Purdue University, Oct. 14, 2002.
77. Atmosphere-Forest Exchange: Important Questions Regarding the Atmosphere's Role in the Delivery of Nutrient Nitrogen and Impacts on Nitrogen and Carbon Cycling, M.

- Carroll, P. B. Shepson, S. B. Bertman, J. P. Sparks, and E. Holland, American Geophysical Union Fall Meeting, Dec. 6, 2002.
78. “Biosphere-Atmosphere Interactions and Global Climate Change”, Biology Dept., Purdue University, Eco-Lunch Seminar, Sept. 3, 2003.
 79. “What we Think We Might Possibly Know About VOC Structure and Organic Nitrate Yields, and Why we Should Care”, American Physical Society Meeting, March 22, 2004, Montreal, Canada.
 80. “Missing Carbon, Missing Nitrates, and Biosphere-Atmosphere Interactions”, U.C. Irvine, Dept. of Earth Systems Science, April 28, 2004, Irvine, CA.
 81. “New Developments in studies of photochemistry on the surface of ice and snow”, American Chemical Society National Meeting, Philadelphia, PA, August 25, 2004.
 82. “Development of an Aircraft-Based Platform for Study of Coupling Between the Carbon and Nitrogen Cycles”, School of Public and Environmental Affairs, Indiana University, October 21, 2004.
 83. “Climate Change and Air-Snow Interactions”, The Ukpeagvik Inupiat Corporation (UIC) Science Center, Barrow, AK, Feb. 5, 2005.
 84. “Atmospheric Chemistry and Climate Change in the Arctic”, Indiana University-Purdue University-Fort Wayne, Fort Wayne, IN, Sept. 30, 2005.
 85. “Cloud and canopy processes in the processing of atmospheric nitrogen”, Berkeley Atmospheric Sciences Center Symposium, U.C. Berkeley, October 14, 2005.
 86. “Studies of Halogen Atom Chemistry in the Arctic”, Georgia Institute of Technology, Departments of Earth and Atmospheric Sciences, and Chemistry, October 21, 2005.
 87. “Atmospheric Chemistry and Climate Change in the Arctic”, Reed College, Department of Chemistry, Portland, OR, Dec. 1, 2005.
 88. “The ALAR Program: Studies of Coupling Between the Carbon and Nitrogen Cycles”, NOAA GMD, Boulder, CO, Dec. 19, 2005.
 89. “Atmospheric Radiation and Photochemistry”, European Research Course on Atmospheres, University Joseph Fourier of Grenoble, Grenoble, France, January 9, 2006.
 90. “Chemical Kinetics and Atmospheric Lifetimes”, European Research Course on Atmospheres, University Joseph Fourier of Grenoble, Grenoble, France, January 10, 2006.
 91. “Photochemistry of Organic Compounds in Ice”, Conference on The routes for organics oxidation in the atmosphere and its implications to the atmosphere, Alpe d’Huez, France, January 8, 2006.

92. "Climate Change, Feedbacks, and the Future in the Arctic", The First Undergraduate Conference on Extreme Weather and Climate Change Impacts, Purdue University, April 21, 2006.
93. "State of the Fundamentals of Snowpack Photochemical Production of Important Stuff" Co-organizer (with Eric Wolff and Florent Domine) of the Air-Ice Chemical Interaction (AICI; an IGAC project) Workshop in Grenoble, Fr., May 29-Jun1, 2006.
94. "Coupling Between Forests, the Atmosphere, and Climate Change: the Big and Little Pictures", Purdue Climate Change Research Center, Purdue University, West Lafayette, IN, August 24, 2006.
95. "Coupling Between Climate Change, Atmospheric Chemistry, and Human Impacts in the Arctic", Michigan Technological University, Department of Civil and Environmental Engineering, October 9, 2006.
96. "Coupling Between Climate Change, Atmospheric Chemistry, and Human Impacts in the Arctic", Kalamazoo College, Department of Chemistry, November 6, 2006.
97. "Climate change and air-snow interactions in the Arctic", January 10, 2007, Grandes Conférences Des Sciences De L'univers Grenoble, Grenoble, France.
98. "Atmospheric Radiation and Photochemistry", January 11, 2007, European Research Course on Atmospheres, Université Joseph Fourier, Grenoble, France.
99. "Chemical kinetics, sources and sinks of atmospheric chemical species, and atmospheric lifetimes", January 11, 2007, European Research Course on Atmospheres, Université Joseph Fourier, Grenoble, France.
100. "Climate Change and Atmospheric Chemistry in the Arctic", January 12, 2007, European Research Course on Atmospheres, Université Joseph Fourier, Grenoble, France.
101. "A Case for NCAR involvement in OASIS", National Center for Atmospheric Research, Atmospheric Chemistry Division, Jan. 26, 2007.
102. "Quantitative Determination of Isobaric Volatile Organic Compounds using Proton Transfer Reaction – Linear Ion Trap (PTR-LIT) mass spectrometry", L. H. Mielke, P. B. Shepson, S. McLuckey, D. Erickson, A. Hansel, and A. Wisthaler, Biogenic Hydrocarbons and the Atmosphere Gordon Conference, Ventura, CA, Feb. 28, 2007.
103. "Arctic Halogen Chemistry, Climate Change, and the Future", NCAR ACD seminar, Boulder, CO, April 9, 2007.
104. "Atmospheric Chemistry and Climate Change in the Arctic", Department of Chemistry, Juniata College, Huntingdon, PA, Sept. 18, 2007.
105. "Atmospheric Chemistry and Climate Change in the Arctic", Department of Chemistry, Wabash College, Crawfordsville, IN, Sept. 27, 2007.

106. "Connections between biogenic volatile organic compound emissions and the fate of atmospheric NO_x", Texas A&M, Department of Atmospheric Sciences, College Station, TX, October 9, 2007.
107. "Connections between atmospheric nitrogen deposition and net ecosystem exchange of carbon", University of Iowa, Department of Chemical and Biological Engineering, Iowa City, Iowa, Nov. 1, 2007.
108. "Climate Change, and Atmosphere-Surface Interactions in the Arctic", the 17th Annual Harold I. Schiff Lecture, York University, Toronto, Ontario, Canada, Nov. 27, 2007.
109. "Snow and Ice Photochemistry in Polar Regions, and Interactions With a Changing Climate", American Geophysical Union Fall Meeting, Dec. 13, 2007, San Francisco, CA.
110. "Introduction to Atmospheric Chemistry", European Research Course on Atmospheres", U. Josef Fourier, Grenoble, Fr., January 7, 2008.
111. "Tropospheric Ozone and the Future", European Research Course on Atmospheres", U. Josef Fourier, Grenoble, Fr., January 8, 2008.
112. "Atmospheric Chemistry and Climate Change in the Arctic", European Research Course on Atmospheres", U. Josef Fourier, Grenoble, Fr., January 9, 2008.
113. "Climate Change, and Atmosphere-Cryosphere Chemical Interactions in the Arctic", University of Innsbruck, Institut fur Ionenphysik, Innsbruck, Austria, January 17, 2008.
114. "Atmospheric chemistry and climate change in the Arctic", Circumpolar Flaw Lead Study, on board the Canadian Coast Guard Icebreaker, The Amundsen, Feb. 5, 2008.
115. "Atmospheric chemistry and climate change in the Arctic", Department of Chemistry, Transylvania University, Lexington, KY, March 4, 2008.
116. "A connection between arctic haze and halogen chemistry?", American Physical Society Meeting, March 12, 2008, New Orleans, LA.
117. "Climate Change, and Atmosphere-Cryosphere Interactions in the Arctic", ACS National Meeting, April 10, 2008, New Orleans, LA.
118. "Climate Change: Realities, Impacts, and Opportunities", Fort Wayne Rotary Club World Affairs Conference, Indiana U. Purdue U.-Fort Wayne Campus, March 11, 2008.
119. "Climate Change: Fundamentals, Impacts, and Opportunities", Department of Physics Colloquium, Purdue University, West Lafayette, IN, March 27, 2008.
120. "Climate Change and Ecosystem Impacts", University of Michigan Biological Station, All-Camp Lecture, July 2, 2008.

121. "Photochemistry in and above ice and snow, and the impact on the atmosphere", International Global Atmospheric Chemistry Conference, Sept. 11, 2008, Annecy, France.
122. "Chemistry, Climate Change, Energy Management, and Politics: Why these things are exciting", Eastern Illinois University, Charleston, IL, Oct. 1, 2008.
123. "New Insights on Halogen Chemistry and Air-Surface Interactions in the Arctic", Harvard University, Dept. of Earth and Planetary Sciences, April 3, 2009.
124. "Determination of the Carbon Footprint of the City of Indianapolis Using an Aircraft-Based Mass-Balance Approach", Loyola University (Chicago), May 4, 2009.
125. "Climate Change: A Global Scale Challenge with Regional Scale Impacts and Opportunities", University of Notre Dame, Mendoza College of Business, June 25, 2009.
126. "Air-Snowpack-Sea Ice Chemical Interactions in the Arctic", University of Toronto, Department of Chemistry, November 10, 2009.
127. "Halogen Atom Chemistry in the Arctic in the Context of Climate Change", Howard University, Dept. of Chemistry, Feb. 26, 2010.
128. "Studies of Halogen Chemistry in the Arctic and Connections to Climate Change", Penn State University, Dept. of Meteorology, March 31, 2010.
129. "The INFLUX Project: Toward Improved Capabilities in Urban-Area Scale Greenhouse Gas Flux Measurements", NOAA, Boulder, CO, May 18, 2010.
130. "Climate Change and Atmospheric Chemistry in the Arctic", Plenary Lecture, 41st Central Regional Meeting of the American Chemical Society, June 18, 2010, Dayton, OH.
131. "Climate Change, Atmospheric Chemistry, and Arctic Sea Ice", Purdue University, Physical Chemistry Seminar, Oct. 20, 2010.
132. "Halogen Chemistry on the Surface of Ice", University of Alaska at Fairbanks, department of Chemistry, February 22, 2011.
133. "Atmospheric Chemistry and Climate Change in the Arctic", Villanova University, Dept. of Chemistry, April 12, 2011, Philadelphia, PA.
134. "Working Toward an Improved Ability to Quantitatively Determine Urban Area-Wide Fluxes of Greenhouse Gases, or, Going to the Dump", Atmospheric Chemistry Gordon Conference, Mt. Snow, Vt., July 26, 2011.
135. "Arctic Haze and Air Pollution", Arctic Climate Summer Course, U.of Stockholm research station at Abisko, Sweden, August 2, 2011.
136. "Tropospheric Ozone", Arctic Climate Summer Course, U.of Stockholm research station at Abisko, Sweden, August 2, 2011.

137. "Arctic Climate Change Impacts, and Going to the Dump", Purdue University, Earth and Atmospheric Sciences Departmental seminar, West Lafayette, IN, Sept. 8, 2011.
138. "Climate Change Impacts in the Arctic, and Going to the Dump", Atmospheric Sciences Research Center, SUNY-Albany, Albany, NY, September 12, 2011.
139. "Measuring Greenhouse Gas Fluxes in Indianapolis: Going to the Dump", Purdue University Dept. of Biology, Ecolunch Seminar Series, West Lafayette, IN, Sept. 21, 2011.
140. "Climate change and sea-ice-atmospheric chemistry-CCN-cloud cover feedbacks", Purdue Climate Change Research Center Water and Climate Seminar Series, West Lafayette, IN, Sept. 23, 2011.
141. "Climate change impacts and chemistry in the Arctic, and, Going to the dump", University of Illinois, Department of Chemistry, Urbana-Champaign, IL, October 21, 2011.
142. "Climate Change and Impacts on Atmospheric Chemical Composition in the Arctic", American Geophysical Union Fall Meeting, San Francisco, CA, Dec. 7, 2011.
143. "Climate Change and the Future of Ice at the Poles", Endurance Lecture Series, Indiana State Museum, Indianapolis, IN, January 19, 2012.
144. "INFLUX: Moving Toward the Ability to Conduct Regional and Global Scale Accounting of Greenhouse Gases", University of Madison, WI, Weston Roundtable Series, Nelson Institute Center for Sustainability and the Global Environment, Madison, WI, February 9, 2012.
145. "Assessment of uncertainties of aircraft based measurement of urban greenhouse gas emissions. Preliminary results from the Indianapolis Flux Experiment (INFLUX)", meeting of the Network of Airborne Environmental Research Scientists (NAERS), Garmisch-Partenkirchen, Germany, February 14, 2012.
146. "The latest on climate change and halogen chemistry in the Arctic troposphere", U. C. Irvine, Dept. of Chemistry, Irvine, CA, May 22, 2012.
147. "Interactions between atmospheric nitrogen chemistry, air quality, and the health of the biosphere", ACS National Meeting, Kinetics and Mechanism in the Atmosphere, August 21, 2012.
148. "Studies of the propagation of bromine chemistry in the Arctic: from the sea ice to open leads and across the tundra", IGAC, Beijing, China, September 18, 2012.
149. "Toward the Development of Integrated Approaches for the Measurement of Greenhouse Gas Emission Rates for Megacities", National Institute of Metrology, Beijing, China, September 20, 2012.

150. "Measurements of Urban Area-Wide CO₂ and CH₄ Fluxes as part of the Indianapolis Flux Experiment (INFLUX)", American Geophysical Union Fall Meeting, Dec. 7, 2012, San Francisco, CA.
151. "Airborne Measurements of Surface Fluxes of Greenhouse Gases", Cornell University, Dept. of Ecology and Evolutionary Biology, Ithaca, N.Y., January 25, 2013.
152. "Aircraft-Based Studies of Atmosphere-Surface Chemical Interactions: from Sea Ice to Shale Gas", University of Michigan, Dept. of Atmospheric, Oceanic and Space Sciences, Ann Arbor, MI, Feb. 21, 2013.
153. "Aircraft-based Studies of Methane Emission from Shale Gas Drilling Operations in the Bakken and Marcellus Formations", Purdue University Center for the Environment, March 1, 2013.
154. "37 Years of Research About Organic Nitrates and Their Impact on Atmospheric Nitrogen, Ozone and Aerosols", 30th Informal Symposium on Kinetics and Photochemical Processes in the Atmosphere, Caltech, Pasadena, CA, March 8, 2013.
155. "Visions and Musings", Dept. of Meteorology, Penn State University, University Park, PA, Sept. 9, 2013.
156. "Climate Change, and Quantification of Sources and Sinks of Greenhouse Gases Using an Aircraft Platform", Bradley University Dept. of Chemistry, Peoria IL, Oct. 3, 2013.
157. "Understanding climate change, and its impacts, while emitting a lot of CO₂ myself", University of Dubuque, Dubuque, IA, Oct. 4, 2013.
158. "Aircraft-based measurements of fluxes of greenhouse gases: from forest uptake to urban area-wide and shale gas basin scale emissions", University of Maryland, Dept. of Atmospheric and Oceanic Sciences, College Park, MD, November 7, 2013.
159. "Aircraft-based measurements of methane emissions from shale gas operations in the Bakken, the Barnett, and the Marcellus formations", Harvard University, Dept. of Earth and Planetary Sciences, Cambridge, MA, Feb. 28, 2014.
160. "Aircraft-based measurements of methane emissions from shale gas operations in the Bakken, the Barnett, and the Marcellus formations", Environment Canada, Toronto, ON, Canada, April 10, 2014.
161. "Aircraft-based measurements of methane emissions from shale gas operations in the Bakken, the Barnett, and the Marcellus formations", DePauw University, Dept. of Chemistry, Greencastle, IN, April 24, 2014.
162. "Climate Change and Halogen Chemistry in the Arctic", U. of Iowa, Dept. of Chemistry, Iowa City, IA, April 25, 2014.

163. "Dr. Tentativehope: or How I Learned to Stop Worrying About Climate Change and Embrace the Future", Dynamics of Climate Conference, PCCRC, Keynote Lecture, West Lafayette, IN, June 19, 2014.
164. "Dr. Tentativehope: or How I Learned to Stop Worrying About Climate Change and Embrace the Future", Telluride Town Talk, for the Telluride Science Research Center, Telluride, CO, July 29, 2014.
165. "Production and multi-phase processing of organic nitrates from BVOC oxidation", Telluride Atmospheric Chemistry Workshop, Telluride, CO, July 30, 2014.
166. "New insights into the impact of organic nitrate production on ozone, aerosols, and the biosphere", ACS National Meeting, Aug. 10, 2014, San Francisco, CA.
167. "Air-Ice Chemical Interactions, Their Impacts, and Connections to Climate Change", the 2015 Walter Orr Roberts Lecture of the American Meteorological Society, Phoenix, AZ, the American Meteorological Society National Meeting, January 5, 2015.
168. "Observing and Quantifying global sources and sinks of Greenhouse Gases", Council for Chemical Research national meeting, Alexandria, VA, May 5, 2015.
169. "Heterogeneous Photochemical Processes in a Changing Arctic", ACS Award Address for Creative Advances in Environmental Science and Technology, Aug. 17, 2015, Boston, MA.
170. "Studies of Halogen Chemistry and Climate Change in the Arctic", Kohn Distinguished Lecture in Chemistry, Penn State University, University Park, PA, Nov. 5, 2015.
171. "The Flow of Nitrogen into and Out of BVOCs", Keynote lecture, BVOC Gordon Research Conference, June 26, 2016, Girona, Spain.
172. "A National Science Foundation Programmatic Perspective", U. C. Davis, Atmospheric Chemical Mechanisms 2016 Conference, Keynote Presentation, Dec. 7, 2016, Davis, CA.
173. "Assessing the Needs and Progress for Urban Scale Greenhouse Gas Emissions Quantification", National Institute of Standards and Technology, March 1, 2017, Gaithersburg, MD.
174. "Studies of Halogen Chemistry in the Arctic", ACS meeting, San Francisco, April 5, 2017, Symposium in honor of Barbara Finlayson-Pitts.
175. "Climate Change Impacts on Atmospheric Composition and Chemistry: The Facts Matter", U. C. Irvine, Dept. of Chemistry, April 19, 2017.
176. "NSF Perspectives on Space Weather Research to Operations", Space Weather Prediction Center Annual Meeting, Broomfield, CO, May 2, 2017.
177. "NSF and Space Weather Research", Embassy of Italy, Washington, D.C., May 18, 2017.

178. "Anatomy of Climate Change Misinformation", July 27, 2017, Wolf Park, Battle Ground, Indiana.
179. "Measurements of Greenhouse Gases from U.S. Cities", West Chester University, West Chester, PA, November 1, 2017
180. "Everything you always wanted to know about securing funding from NSF*
*but were afraid to ask", West Chester University, West Chester, PA, November 1, 2017
181. "Iodine Chemistry in the Arctic, and Connections to Ozone and Aerosols", NETCARE Workshop, University of Toronto, Toronto, Ont., Canada, November 14, 2017.
182. "Halogen Chemistry in a Changing Arctic", Department of Environmental Science, Policy, and Management, U. C. Berkeley, Berkeley, CA, Feb. 14, 2018.
183. "Aircraft-based Measurements of CO₂ and CH₄ Emissions from Urban Environments, as Part of the Indianapolis Flux Experiment (INFLUX)", U. of Notre Dame, Dept. of Civil and Environmental Engineering, South Bend, IN, Feb. 20, 2018.
184. "Embrace the Change", Keynote presentation at Earthstock, Stony Brook University, April 20, 2018, Stony Brook, N.Y.
185. "High-Precision Measurements of the Emission Rates of Greenhouse Gases from East Coast Urban Environments", September 7, 2018, SoMAS Southampton Lecture Series, Southampton, N.Y.
186. "Studies of Snowpack Photochemistry in the Arctic: A Tribute to Richard Honrath", Richard Honrath Memorial Lecture, October 15, 2018, Michigan Tehnological University, Houghton, MI.
187. "Driving GHG Reductions and Verification Forward", CO₂-Urban Synthesis and Analysis Workshop, October 24, 2018, University of Utah, Salt Lake City, UT.
188. "Halogen Chemistry in the Arctic, and Connections to Climate Change", November 15, 2018, Dept. of Chemistry, Stony Brook University, Stony Brook, N. Y.
189. "Quantitative Observations of Greenhouse Gas Emission Rates for Megacities (like NYC) and Connections to Policy", February 7, 2019, Dept. of Geosciences, Stony Brook University, Stony Brook, N. Y.
190. "City Sensing Networks for Greenhouse Gas Emission", IEEE 5th World Forum on Internet of Things, 15-18 April 2019, Limerick, Ireland.
191. "Meeting the Challenge of Quantitative Measurement of Greenhouse Gas Emission Rates for Urban Environments", University of Minnesota, Duluth, Department of Chemistry and Biochemistry, April 26, 2019, Duluth, MN.

192. "An Opportunity to Rebuild the World", University of Minnesota, Duluth, Department of Chemistry and Biochemistry, Senior Awards Dinner Address, April 27, 2019, Duluth, MN.
193. "Atmospheric Organic Nitrates, Secondary Organic Aerosol, and Aqueous Phase Chemistry", American Chemical Society Meeting, Symposium on From Oceans to Clouds: The Environmental Chemistry of Water, August 27, 2019, San Diego, CA.
194. "Studies of Atmospheric Halogen Chemistry in a Rapidly Changing Arctic", SUNY College of Environmental Science and Forestry, October 24, 2019, Syracuse, NY.
195. "Quantitative Observations of Greenhouse Gas Emission Rates for Megacities (like NYC) and Connections to Policy", College of Engineering and Applied Sciences, Stony Brook University, November 15, 2019, Stony Brook, NY.
196. "The Impact of SUNY Cortland on a Long Academic Career and a Gifted Life", Sixth Annual Michael J. Bond '75, M.D. Alumni/ Undergraduate Science Symposium, SUNY College at Cortland, Cortland, NY, October 23, 2021

F. Grants:

- November 1987 – October 1990 NSERC Strategic Grant "Atmospheric Chemistry and Toxicology of Peroxyacyl Nitrates" with H. Schiff, H. Niki, D.R. Hastie and J.A. Heddle \$101,120/yr.
- April 1988 AES Science Subvention "Development and Application of Techniques for Measurement of Atmospheric Carbonyl Compound Concentrations \$7,000.
- March 1989 AES Contract "Development of a Technique for Measurement of Atmospheric Nitrogen Dioxide" \$7,000.
- April 1989 AES Science Subvention "Development of Measurement Techniques for Peroxyacyl Nitrates and Organic Nitrates \$10,000.
- April 1988 - March 1990 NSERC Operating Grant "Atmospheric Mutagenesis Involving Volatile Organo-Chlorine Compounds" \$25,300/yr.
- March 1990 AES Contract "Development of a Technique for Measurement of Atmospheric Nitrogen Dioxide" \$10,000.
- April 1990 NSERC Equipment Grant - High Performance Liquid Chromatograph (with D.R. Hastie) \$34,772.
- April 1990- AES/NSERC Science Subvention "Atmospheric Measurements of Organic Nitrates and PANs" \$20,000.

March 1990

April 1990-
March 1992 NSERC Operating Grant "Atmospheric Photochemistry and Mutagenesis involving Volatile Organo-Chlorine Compounds" \$26,000/yr.

Sep. 1990-Aug. 1991 OME Contract "PAN Measurement and Data Analysis for two Sites in Ontario" \$23,100

October 1990 AES Contract "Measurements of PAN during the Intercomparison of NO₂ Measurement Methods" \$4,212

November 1990 AES Contract to Plan, Conduct and Report on a Workshop entitled, "Atmospheric Processes of Organic Toxic Pollutants and their Role in Current Environmental Problems" \$25,000

April 1991 OME Grant, Environment Technologies Program "Development of a Nitrogen-Specific GC/Detector for Measurement of Atmospheric Nitrates" (with D.R. Hastie) \$248,980 (3 years).

April 1991 OME Grant "Studies of Oxidant Formations in Rural Areas of Ontario" \$346,825 (3 years).

April 1991 NSERC Major Equipment Grant, GC/MS, (with Leznoff, Aspinall, Lee-Ruff, Lever, Potvin, Niki) \$252,619

May 1991 AES/NSERC Science Subvention "Atmospheric Measurements of Organic Nitrates" \$19,760

February 1992 AES Contract - Construction of a Flow Mode Reaction Chamber. \$36,668.90

April 1992 NSERC Operating Grant. "Studies of Oxidant Chemistry in Sensitive Canadian Environments" \$92,000 (4 years).

May 1992 AES/NSERC Science Subvention "Development and Application of a Gas Chromatographic Technique for Measurement of Atmospheric Carbonyl Compounds" \$21,000

May 1992 York University, President's NSERC Fund. "Computer Control and Data System for the CIRAC Air Toxics Research Project". \$2,500

November 1992 AES Strategic Grant. "Development of an Automated Cryo-Concentration/GC/MSD method for Routine Measurements of Atmospheric Oxidation Products" \$50,000

January 1993 OME Contract. "Measurement of Peroxyacetyl Nitrate at Urban and Rural Sites in Ontario" \$36,500

April 1993 NSERC Equipment Grant. "Automated Sample Acquisition/Gas Chromatograph/Mass Selective Detector for Atmospheric Pollutant Measurements" \$62,292

April 1993 York University, President's NSERC Fund. "Development of a Method for Measurement of Atmospheric Cl₂" \$1,000.

June 1993 AES/NSERC Science Subvention. "Measurements of Hydrocarbon Oxidation Products in Canadian Atmospheric Environments" \$63,000 (three years).

June 1994 Ontario Ministry of Environment and Energy. "Studies of Oxidant Formation in Southern Ontario" \$87,000


June 1994 AES/NSERC Strategic Grant. "Photochemical Reaction Chamber Hydrocarbon Oxidation Product Measurement System" \$35,607


May 1995 EPA subcontract (GIT). "Carbonyl Compound Measurements During the Nashville 1995 Summer Intensive of the Southern Oxidants Study", \$31,700

July 1995 Showalter Foundation, Purdue University. Proposal for Purchase of Instrumentation for Measurement of Vertical Profiles of Atmospheric Ozone, \$49,462.


January 1996 National Science Foundation, "Arctic Outflow Campaign: A Measurement Study to Characterize the Composition and Photochemistry of Arctic Air Transported Southward During Spring", \$7,802 (in collaboration with Michigan Technical University).

January 1996 National Science Foundation, "A Study of the Importance of Organic Nitrates as Sinks for Atmospheric Nitrogen Oxides", \$350,000 (3 years).

May 1996 NOAA contract,  AEROCE Ozone Vertical Profile Measurements at Purdue, \$5,525

October 1996 US EPA,  Development, Evaluation, and Application of a Fast Time-Response Mass Spectrometric Method for Quantitative Monitoring Oxidant Precursors, \$485,262 (3 years)

September 1996 BASF - Industrial Associates Program, \$20,000

Feb. 1997 NSF, "  Investigations of the Importance of Halogen Atom Chemistry in the Arctic Troposphere", \$649,817 (three years; with co-PIs Sun, Francisco, and Margerum).

May 1997 PRF Research Grant. "Studies of the Contribution of Isoprene and its Oxidation Products to Ozone Formation in the Troposphere", \$11,666.

May 1997 Supplement to “A Study of the Importance of Organic Nitrates as Sinks for Atmospheric Nitrogen Oxides”, \$21,336.

September 1997 BASF - Industrial Associates Program, \$20,000
 January 1998 – NSF – Air-Snow Exchange of Reactive Nitrogen Oxides at Summit, Greenland, co-PI with J. Dibb, U.-N.H., \$255,692
 Dec. 2000

January 1998 PRF Research Grant. “Studies of Formaldehyde Photochemistry in the Arctic at Polar Sunrise”, \$11,666.

May 1998 Chemical Manufacturers Assoc., “Studies of Organic Nitrate Formation from Atmospheric Oxidation of Glycol Ethers”, \$35,325.

February 1999 Albemarle Corp., “Studies of the Organic Nitrate Yield from OH Reaction with 1-Bromopropane”, \$39,348.

March 1999 NSF, (Office of Polar Programs), “Studies of the Role of Sea Ice in Arctic Tropospheric Ozone Chemistry”, 3 years, 397,394.

March 1999 NSF (Atmospheric Chemistry), “A Study of the Role of Organic Nitrate Formation in the Removal of Tropospheric NO_x”, 3 years, \$360,000.

March 1999 NOAA, “Measurements of Biogenic VOCs During the Southern Oxidants Study 1999”, \$56,000, 3/99-2/00.

Sept. 1999 NSF, OPP “Investigation of Photochemical Transformations within Snow and Their Effect on Snow and the Atmospheric Composition”.
 Years 1&2 - \$190,179

Sept. 2001 NSF, Biocomplexity Program, “Development of Instrumentation for Measurement of Biosphere-Atmosphere Fluxes of Carbon and Nitrogen”, 4 years, \$588,474
 (Collaborative grant with B. Lamb, H. Westberg (WSU), A. Guenther (NCAR), and P. Curtis (OSU); total award was \$1.7M)

May 2002 NSF, (Office of Polar Programs), “Studies of the Role of Sea Ice in Arctic Tropospheric Ozone Chemistry”, Supplement, \$22,865

July 2002 The Showalter Foundation, “Studies of the Impact of Atmospheric Nitrogen Deposition on the Sequestration of Carbon Dioxide by North American Forests, \$100,000

April 2002 NSF (Atmospheric Chemistry), “A Study of the Role of Organic Nitrate Formation in the Removal of Tropospheric NO_x”, supplement, \$30,191.

August 2002 NSF (Office of Polar Programs), “Changing Environmental Controls on Coupled Chemical Exchange Between the Ocean, Ice, and Atmosphere in the Arctic – A Workshop Request”, \$81,191

January 2003	NSF (Atmospheric Chemistry), “Studies of the Fluxes of Atmospheric Organic Nitrogen Compounds to a Forest Environment”, \$360,000
June 2003	NSF (Polar Programs), “Studies of the Impact of Emission of Reactive Gases from Arctic Snowpacks and Sea Ice”, \$399,959.
June 2003	NSF (Analytical Chemistry), “Development of a Proton Transfer Reaction Linear Ion Trap for Fast Atmospheric Pollutant Detection”, \$535,000
April 2003	NSF-IGERT, via U. Mich., (BART), “The Development of a Light-Aircraft Flux Measurement System for Determinations of Fluxes of CO ₂ and Odd-Nitrogen Compounds”, \$55,000.
July 2003	Purdue Research Foundation, “Studies Of The Impact Of Frost Flowers On Tropospheric Ozone”, 2 years, \$13,263/yr.
December 2003	NSF, SBIR Phase I grant, with Aerodyne Corp. (Boston), “Innovative Aerosol Collector for On-line Analysis of Organics”, \$15,000.
August 2004	21 st Century Fund, \$120,566.
September 2004	Budget for the 2004/2005 Academic Yr. for the Purdue Climate Change Research Center, \$122,000
December 2004	Purdue Research Foundation, International Travel Grant, “OASIS Implementation Plan Workshop”, \$1,000.
August 2005	Budget for the 2005/2006 Academic Yr. for the Purdue Climate Change Research Center, \$212,275
July 2005	Supplement to "Studies of the Impact of Emission of Reactive Gases from Arctic Snowpacks and Sea Ice.", NSF, Office of Polar Programs, \$43,320.
August 2005	Supplement to “Studies of the Fluxes of Atmospheric Organic Nitrogen Compounds to a Forest Environment”, \$37,151
September 2005	Supplement to “Development of Instrumentation for Measurement of Biosphere-Atmosphere Fluxes of Carbon and Nitrogen”, \$53,443
January 2006	A Multiphase Study of the Nature, Sources, and Fate of Atmospheric Organic Nitrogen, NSF-ATM, \$689,869 (4 yrs).
February 2006	Purdue Research Foundation, “Halogen Atom Measurements as part of the International Polar Year”, \$14,040, 1 Year Graduate Fellowship.
January 2006	Purdue Research Foundation International Travel Grant – AICI Workshop, \$1,000

March 2007 The Collaborative O-Buoy Project: Deployment of a Network of Arctic Ocean Chemical Sensors for the IPY and Beyond, 3 years, \$462,843

June 2007 Aircraft-Based Measurements of CO₂ as Part of the Mid-Continent Intensive, NOAA, \$19,825

July 2007 Showalter Trust (co-PI with lead PI Kevin Gurney), “The Hestia Project: Supporting Climate Science, Policy and Planning at Purdue”, \$74,591

July 2007 Health Research, Inc., Aircraft-based HONO measurements, with PI Xianliang Zhou, \$11,742

May 2007 U. Mich. IGERT, "Secondary organic aerosol formation from biogenic VOC's and feedbacks to the climate system" (BART), \$31,500

Sept. 2007 IPY: Halogen Chemistry and Ocean-Atmosphere-Sea Ice-Snowpack (OASIS) Chemical Exchange During IPY, NSF-OPP, \$469,513

Nov. 2007 Production of Secondary Organic Aerosol from Multiphase Terpene Photooxidation, U.S. EPA STAR Grant, \$333,397

June 2008 Purdue Research Foundation Fellowship, \$12,000

July 2009 “Collaborative Research: Program for Research on Oxidants – Photochemistry Emissions & Transport (PROPHET) 2009 – Community Atmosphere-Biosphere INteractions Experiment (CABINEX)”, 2 years, \$116,836

January 2009 “Computational & Laboratory Studies of Arctic Sea Ice Halogen Chemistry”, The Camille and Henry Dreyfus Foundation Inc., two years, \$120,000

July 2009 “The Canadian Obuoy Project”, Environment Canada/Bigelow Labs, 1 year, \$42,128

August 2009 Supplement to: IPY: Halogen Chemistry and Ocean-Atmosphere-Sea Ice-Snowpack (OASIS) Chemical Exchange During IPY, NSF-OPP, \$74,148

August 2009 Supplement to: The Collaborative O-Buoy Project: Deployment of a Network of Arctic Ocean Chemical Sensors for the IPY and Beyond, \$44,676

August 2009 Supplement to: A Multiphase Study of the Nature, Sources, and Fate of Atmospheric Organic Nitrogen, NSF-ATM, \$61,148.

January 2010 “Development, Improvement, & Assessment of the Accuracy of Aircraft-Based Mass Balance Measurements of Integrated Urban Emission Fluxes of Greenhouse Gases”, NIST, 3 years, \$1,500,000

April 2010 "Implications of Arctic Sea Ice Reduction of Tropospheric Bromine, Ozone, and Mercury Chemical Processes, Transport, and Distribution" NASA, IDS, 3 years, \$269,451

September 2010 "Collaborative Research: The O-Buoy Network of Chemical Sensors in the Arctic Ocean", NSF, OPP, 5 years, \$1,041,211 (Purdue component)

December 2010 "Airborne Microwave Observatory of Subcanopy and Subsurface (AirMOSS)", 5 years, \$586,958 (Purdue component of NASA Earth Venture-1 Project).

July 2011 "Studies of the Production of Molecular Halogens in Arctic Snowpacks and on Sea Ice Surfaces", NSF, OPP, 3 years, \$526,971.

August 2011 "Collaborative Research: Biogenic Volatile Organic Compounds and their Impacts in a Changing Temperate Forest", NSF, ATM, 2 years, \$162,743.

May 2012 Gift in support of the Shepson Atmospheric Chemistry Research Group, Clean Air Task Force, \$23,100.

August 2012 "Studies of the Impact of Organic Nitrates on Nitrogen Cycling and Aerosol Production", NSF-GEO, 3 years, \$526,971

October 2012 "Aircraft-Based Assessment of the Individual Source Contributions to the Total Greenhouse Gas Emissions from an Urban Environment, National Institute of Standards and Technology, 1 year, \$268,000.

May 2013 "The Role of Oxidation of BVOCs in SOA Production in the Southeastern U.S.", EPA, 1 year, \$105,000.

September 2013 "Improvement and Application of Aircraft and Ground-Based Measurements of the Emission of Greenhouse Gases from the City of Indianapolis", 1 year, \$258,169.

October 2013 "Quantitative Aircraft Mass Balance Measurements of the Flux of Methane from Specific Sources Related to Shale Gas Operations in the Barnett Shale Formation Region", Environmental Defense Fund, \$78,300.

September 2013 "Coordinated Research Campaign to Estimate and Attribute Methane Emissions in the Barnett Shale Region", Environmental Defense Fund, \$78,315, Sept. 1. 2013-Sept.30, 2015.

February 2014 "Gift in support of the Shepson Atmospheric Chemistry Research Group, Clean Air Task Force, \$38,000.

May 2014 "Gift in support of the Shepson Atmospheric Chemistry Research Group, Clean Air Task Force, \$25,000.

June 2014 "ALAR Measurements of Methane in the Eagle Ford Region", Environmental Defense Fund, \$71,558.

September 1, 2014 Collaborative Research: Studies of Chlorine, Bromine and Iodine Chemistry in the Arctic, and its Impacts, NSF, \$316,777, Sept. 1, 2014-Aug. 31, 2017.

September 2014 "Intergovernmental Personnel Act Assignment for Paul B. Shepson" NSF; \$268,495; Sept. 15, 2014-Sept. 14, 2015.

September 2014 "Refinement and Application of Aircraft-Based Methods for the Determination of Greenhouse Gas Emission Rates from Urban Environments", National Institute of Standards and Technology, January 1, 2015 - Dec. 31, 2016, \$629,707.

April 2015 "Gift in support of the Shepson Atmospheric Chemistry Research Group", Clean Air Task Force, \$25,000.

September 2015 "Intergovernmental Personnel Act Assignment for Paul B. Shepson" NSF; \$277,417 ; Sept. 15, 2015-Sept. 14, 2016.

January 2016 "Multiphase Chemistry of Organic Nitrates from Monoterpene Oxidation and Their Role in Aerosol Growth", April 1, 2016 - March 31, 2020, \$480,858, Jonathan Slade, NSF substitute PI for the Shepson Group.

September 2016 "Measurements of Methane Emissions from Natural Gas Power Plants", Environmental Defense Fund, \$96,906.

September 2016 "Intergovernmental Personnel Act Assignment for Paul B. Shepson". NSF; \$283,465; Sept. 15, 2016-Sept. 14, 2017.

October 2016 "Application of the Aircraft Mass Balance Method for Measurement of Greenhouse Gas Emission Rates for Eastern U.S. Cities", NIST, October 2016 - September 2018, \$754,565.

June 2017 "Measurements of Methane Emissions from Natural Gas Power Plants", Environmental Defense Fund, \$20,000.

September 2017 "Intergovernmental Personnel Act Assignment for Paul B. Shepson". NSF; \$283,465; Sept. 15, 2017-Sept. 14, 2018.

June 2019 "Development of SUNY Expertise in Understanding and Minimizing Urban Air Quality Human Health Risks," SUNY Empire Innovation Program, \$750,000, July 1, 2019 – June 30, 2025.

September 2019 "Observations, Analysis, and Modeling Applied to Determination of CO₂ and CH₄ Emission Rates Along the U.S. East Coast", NIST, \$1,185,941, Oct. 1, 2019 – Sept. 30, 2022.

July 2020	"Collaborative Research: CHEMISTRY in the Arctic: Clouds, Halogens, and Aerosols (CHACHA)", NSF (recommended to Grants and Agreements), \$2.3M, July 1, 2020 - June 30, 2024 (SBU funding for Shepson (Lead PI for 6 Universities), \$398,226; Purdue funding for the ALAR aircraft operations, \$278,937).
August 2020	"Collaborative Research: Greater NY Oxidant, Trace gas, Halogen, and Aerosol Airborne Mission (GOTHAAM)", \$3,497,538, for four years (\$665,000 total to SBU researchers Mak (lead PI; there are 6 other collaborating Universities), Knopf (co-PI), Shepson (co-PI) and Lindenfeld Sher
Submitted	"Securing a Strong Future for the Peconic Estuary Partnership" (Award to Host the PEP), U. S. Environmental Protection Agency, \$950,825, July 1, 2021 – Sept. 30, 2022. FY21 PEP budget is \$1.91M.
March 2021	"Greenhouse Gas Emission Rates for Urban Environments Along the U.S. Northeast Coast", NIST, \$752,304, 3/1/21 - 2/29/24.

III. Mentoring

A. Graduate Supervision:

Current students	Ana Morales (July '17 - ; Ph.D.) Jay Tomlin (Oct. '17 -; Ph.D.)
Former students	Ning Gao (September 1989 -1990; Ph.D.(transferred)) Kathleen Hedley (September 1989 - 1991; M.Sc.) Pierrette Blanchard (September 1988 - 1993; Ph.D.) Anna-Pearl Sirju (January 1992 - 1993 ; M.Sc.) David Plummer (September 1992-1995 ; M.Sc.) Meghan Jones (Oct. 95 - May '96) T. Walker (Nov. 96 - May 97; transferred) Tom Biesenthal (York U., September 1992-May 1997 ;Ph.D.) Gary Impey (York U., September 1993- Dec. 1998;Ph.D.) Orlando Herrera-Gomez (Nov. 96 – Dec. 98; M.S.) Bradley Campbell (Nov. '97 – Dec. 1999; M.S.) Brian Michalowski (Sept. '97 – June 1999; M.S.) Bryan Splawn (June 1995 – August 1999; M.S.) David Hulbert (Oct. 96 – Dec. '98; M.S.) Jason O'Brien (York U., September 1992-1998 ;Ph.D.) John Grossenbacher (Oct. 95 -; 2001, Ph.D.) Ann Louise Sumner (Nov. 96 -; 2001, Ph.D.) Dennis Barket (Nov. 96 - 2001; Ph.D.) Julia Hurst (Nov. 96 - 2001; Ph.D.) Kevin Ford (Nov. '98 - 2001 M.S.) Amanda Grannas (Nov. '98- Dec. 2002; Ph.D.) Cynthia Espada (Nov. '97 - Dec. 2003; Ph.D.) Pete Giacomelli (Nov. '00 - Dec. 2003; M.S.)

Rose Ravelo (Nov. 2001 -2004; withdrew)
Terra Dassau (Nov. '98- 2005; Ph.D.)
Adam Keil (Nov. 2000 – Nov. 2005; Ph.D.)
Cory Moffatt (Nov. '02 -; Aug. '06; M.S.)
Kimberly Hill (Sept. '02 – April 06; Ph.D.)
Amanda Lockwood (Nov. 2001 – Dec. 2008; Ph.D.)
Aubrey Cavender (Nov. 2001- June 2008; Ph.D.)
Phil Tackett (Nov. '03 – Dec. 2008; Ph.D.)
Marc Fiddler (Jan. '07 – Jan. '09; Ph.D.)
Karl Garman (Jan. 2002 - ; Dec. 2009; Ph. D.)
Doug Martins (Sept. '02 -; May '09; Ph.D.)
Kelly Mays (Sept. '07 – May '09; M.S.)
Jonathan Slade (Nov. '07 – Dec. '09; M.S.)
Levi Mielke (Nov. '04 – Dec. '09; Ph.D.)
Travis Knepp (Nov. '04 - Apr. '10; Ph.D.)
Jade Jones (Nov. '08 - May 2011; M. S.)
Allyson Costa (Nov. '04 - Aug. '11; Ph.D.)
Nick Veselka (Nov. '09 - Dec. '11; M.S.)
Chelsea Stephens (Nov. '07 - Dec. '12); Ph.D.)
Dana Caulton (Nov. '10 - Dec. '14; Ph.D.)
Kevin McAvey (Nov. '09 - April '15; Ph.D.)
Joel Rindelaub (Jun. '09 - April '15; Ph.D.)
Kyle Custard (Nov. '10 - April '15; Ph.D.)
Chris Groff (Nov '12 - April '15;- M.S.)
Fulizi Xiong (Nov. '10 - November '15; Ph.D.)
Wes Halfacre (Nov. '10 - July 2016; Ph.D.)
Tegan Lavoie (Nov. '13- July 2016; Ph.D.)
Olivia Salmon (June '13 - July 2018; Ph.D.)
Angela Raso (Nov '12-August '18; Ph.D.)
Kris Hajny (Nov. '15 – Dec. '20; Ph.D.)

B. Post-Doctoral Fellows:

York U.:

Kirk Gladstone (January - July 1989)
Kayambu Muthuramu (February 1991 - May 1994)
J. Zhang (May 1991 - December 1991)
Cunshing Hao (May 1992 - April 1994)
Quanji Wu (February 1993 - March 1994)

Purdue U.

Tim Starn (January 1995 - May 1996)
Xiaohui Chen (March 1996 - April 1997)
Orlando Colorado (January 1997 – Aug. 1998)
Tara Couch (August 1997 – July 1999)
Christophe Guimbaud (August 1999 - 2001)
Gavin Edwards (June 2003 – Oct. 2005)
Marjan Alaghmand (May 2007 – Oct. 2009)

Ivan Gladich (Jan. 2009 - Dec. 2010)
Shexia Ma (Sept. 2009 - August 2011)
Kerri Pratt (April 2010 - June 2013)
Maria Cambaliza (May 2010 - June 2014)
Alexie Heimburger (May 2014 - May 2016)
Ana Kerlo (September 2015 - September 2016)
Jonathan Slade (January 2015 - 2018)
Rebecca Harvey (June 2016 - 2017)
Karunarathna Jayarathne (June 2017 – June 2019)

Stony Brook U.

Joseph Pitt (September 2019 -)
Kris Hajny (January 2021 -)
Austin Hope (February 2021 -)

IV. Summary of Courses Developed/Taught

Undergraduate (York U.)

SC/CHEM 3110.08 Analytical Chemistry
SC/CHEM 4100.06 Research Project (Les Toth, Leslie Topham, Talbir Singh, Anna Sirju, Liz Frankford, Mary Boseovski, Kok Zhi Khoo, Craig Stroud)
SC/CHEM 3120.04 Instrumental Methods of Chemical Analyses
SC/CHEM 3160.03/
EATS 3130.03 Introductory Atmospheric Chemistry
SC/NATS 1770.06 Science and the Environment (non-majors General)
SC/NATS 1820.06 Chemistry in Modern Living (non-majors General)
SC/NATS 1770.06B Science and the Environment (non-majors general)
SC/CHEM 3130.04 Atmospheric Chemistry Measurements

Undergraduate (Purdue)

CHM490A Atmospheric Chemistry
CHM 499 Undergraduate Research (Kim Pollins, Charlie Snyder, Shonn Stanley, Kim Pollins, Jeff Hardy, Megan McMahon, Steve Yontz, Chris Bowman, Jamie Ursta, Stormy Ratajczak, Ralph Holler, Ben Nault, Megan Williams, Tennie Renkens; Arisa Iwasaki, Greg Hopkinson Cyrus Baker, Rachel Svetanov, Ye Xuan Gan, Hao Zong, Leigh Anderson)
CHM481 Environmental Chemistry
CHM115 General Chemistry
CHM599 Carbon Neutrality at Purdue (open to all students, all levels)

Graduate (York U.)

SC/CHEM 6010.03 Review Essay
SC/CHEM 5610.03 Special Topics in Atmospheric Chemistry
SC/ESS 5300.03 Introductory Atmospheric Chemistry
SC/CHEM 5710.03 Recent Advances in Atmospheric Chemistry

Graduate (Purdue)

ATMS 591/CHM581 Atmospheric Chemistry
CHM 695A Seminar in Analytical Chemistry
CHM599C/EAS591C Atmosphere-Surface Chemical Interactions

External

Summer 1989/ Summer 1990 CIRAC Summer Course - Lectures on Chemical Kinetics and Smog Chamber Studies
Summer 1991, 1992
1993, 1994 CIRAC Summer Course - Course Organizer

V. Service and Outreach

A. Significant University Service:

1988 - 1993 Acting Director, Centre for Atmospheric Chemistry, York U.
1989 Participated in the Development of a new Undergraduate Stream in Atmospheric Chemistry (York University)
1996 Created Undergraduate streams in atmospheric chemistry in the Departments of Chemistry and EAS, Purdue.
2003-2008 Created and Directed the Purdue Climate Change Research Center
2003-2007 Head, Analytical Chemistry Division, Dept. of Chem., Purdue U.
2008-2013 Head, Department of Chemistry, Purdue University
2013 - Executive Committee, Purdue Climate Change Research Center
2013 - Executive Committee, Purdue Center for the Environment
2018 - Dean, School of Marine and Atmospheric Sciences, Stony Brook University

B. Presentations at Schools and/or outreach presentations

1990 Unionville High School
1990 Milliken Mills High School
1991 Glen Forest Secondary School
1991 Bowmanville High School
1991 Markham Secondary School
1991 City School
1992 St. Andrews Collegiate
(All the above in the Toronto area)
2003 Cumberland Elementary School, "Climate Change"
2005 Barrow High School, Barrow, AK
2005 West Lafayette High School
2006 Happy Hollow Elementary School, West Lafayette, IN
2011 West Lafayette, IN High School Convocation, February 17, 2011, "Donuts, Fire, Ice, and Saving the World".
2011 Elderhostel Group, Purdue University, June 13, 2011, "Climate Change - Exciting???"
2016 Trumansburg, NY Middle School, April 22, "Climate change in the Arctic" (Career Day)

- 2018 Jefferson Ferry (retirement community), Dec. 6, 2018, “Exciting Things About Climate Change”, Port Jefferson Station, NY.
- 2019 Mt. Sinai Congregational Church, “Exciting Things About Climate Change”, April 3., 2019, Mt. Sinai, NY.
- 2019 Northport Public Library, “Exciting Things About Climate Change”, May 6, 2019, Northport, NY.
- 2019 Montauk Lighthouse, “Exciting Things About Climate Change”, July 25, 2019
- 2021 Montauk Lighthouse, “Exciting Developments in Climate Change Mitigation”, July 29, 2021.