

## **Paul J. Ziemann**

Department of Chemistry & Biochemistry  
Cooperative Institute for Research in Environmental Sciences (CIRES)  
University of Colorado at Boulder  
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### **Education and Training**

University of Connecticut, Biology, B.S., 1980

University of Alaska-Fairbanks, Chemical Oceanography, M.S., 1986

Pennsylvania State University, Chemistry, Ph.D., 1991

University of Minnesota, Aerosol Science and Technology, Postdoc, 1991-1996

### **Research and Professional Experience and Employment**

2013-present Professor, Department of Chemistry & Biochemistry, CU-Boulder

2013-present Fellow, CIRES, CU-Boulder

2008-2013 Director, Air Pollution Research Center, UC-Riverside

2006-2013 Professor, Department of Environmental Sciences, UC-Riverside  
Research Chemist, Air Pollution Research Center, UC-Riverside

2002-2006 Associate Professor, Department of Environmental Sciences, UC-Riverside  
Associate Research Chemist, Air Pollution Research Center, UC-Riverside

1996-2002 Assistant Professor, Department of Environmental Sciences, UC-Riverside  
Assistant Research Chemist, Air Pollution Research Center, UC-Riverside

### **Honors and Awards**

2001 Kenneth T. Whitby Award, American Association for Aerosol Research

2002 Outstanding Professor Award, Environmental Toxicology Graduate Program

2017 Fellow, American Association for Aerosol Research

2018 Outstanding Publication Award, Aerosol Science & Technology

### **Professional Service**

#### *Association Memberships*

American Association for Aerosol Research, American Association for the Advancement of Science, American Chemical Society, American Geophysical Union

#### *Association Governance & Editing*

2002-2005 Board of Directors, American Association for Aerosol Research

2007-2008 Vice-President Elect, American Association for Aerosol Research

2008-2009 Vice-President, American Association for Aerosol Research

2009-2010 President, American Association for Aerosol Research

- 2004-2007 Editorial Advisory Board, *Aerosol Science & Technology*, American Association for Aerosol Research
- 2008-present Editor (one of 12), *Aerosol Science & Technology*, American Association for Aerosol Research

### **Teaching at CU-Boulder**

- Spring 2014: CHEM 4141/5141, Environmental Water and Soil Chemistry
- Fall 2014: CHEM 5181, Mass Spectrometry and Chromatography (Co-taught with J. Jimenez)
- Spring 2015: CHEM 4141/5141, Environmental Water and Soil Chemistry
- Spring 2015: CHEM 5152/ATOC 5152, Advanced Atmospheric Chemistry (Co-taught with J. Jimenez)
- Fall 2015: CHEM 5181, Mass Spectrometry and Chromatography (Co-taught with J. de Gouw)
- Spring 2016: CHEM 4141/5141, Environmental Water and Soil Chemistry
- Spring 2016: CHEM 5152/ATOC 5152, Advanced Atmospheric Chemistry (Co-taught with J. de Gouw)
- Spring 2017: CHEM 4141/5141, Environmental Water and Soil Chemistry
- Spring 2018: CHEM 5152/ATOC 5152, Advanced Atmospheric Chemistry (Co-taught with J. de Gouw)
- Spring 2018: CHEM 4141/5141, Environmental Water and Soil Chemistry
- Fall 2018: CHEM 5181, Mass Spectrometry and Chromatography (Co-taught with J. Jimenez)

### **Refereed Journal Articles**

1. Farley, R.W., Ziemann, P., Castleman, Jr, A.W. 1989. Investigation of the stabilities of neutral and ionic lead and lead-antimony clusters under single and multiphoton ionization conditions. *Zeitschrift Fur Physik D Atoms, Molecules & Clusters*, 14, 353-360.
2. Ziemann, P.J., Castleman, Jr, A.W. 1991. Stabilities and structures of gas phase MgO clusters. *Journal of Chemical Physics*, 94, 718-728.
3. Ziemann, P.J., Castleman, Jr, A.W. 1991. Mass-spectrometric study of the formation, evaporation, and structural properties of doubly-charged MgO clusters. *Physical Review B*, 44, 6488-6499.
4. Ziemann, P.J., Castleman, Jr., A.W. 1992. Structures and bonding properties of Ca-O clusters inferred from mass spectral abundance patterns. *Journal of Physical Chemistry*, 96, 4271-4276.
5. Ziemann, P.J., Castleman, Jr, A.W. 1992. Mass-spectrometric investigation of the stabilities and structures of Mn-O and Mn-Mg-O clusters. *Physical Review B*, 46, 13480-13486.
6. Farley, R.W., Ziemann, P.J., Keese, R.G., Castleman, Jr, A.W. 1993. Kinetic study of neutral lead cluster reactions. *Zeitschrift fur Physik D Atoms, Molecules & Clusters*, 25, 267-

273.

7. Liu, P., Ziemann, P.J., Kittelson, D.B., McMurry, P.H. 1995. Generating particle beams of controlled dimensions and divergence: I. Theory of particle motion in aerodynamic lenses and nozzle expansions. *Aerosol Science and Technology*, 22, 293-313.
8. Liu, P., Ziemann, P.J., Kittelson, D.B., McMurry, P.H. 1995. Generating particle beams of controlled dimensions and divergence: II. Experimental evaluation of particle motion in aerodynamic lenses and nozzle expansions. *Aerosol Science and Technology*, 22, 314-324.
9. Ziemann, P.J., Liu, P., Kittelson, D.B., McMurry, P.H. 1995. Particle beams mass spectrometry of submicron particles charged to saturation in an electron beam. *Journal of Aerosol Science*, 26, 745-756.
10. Ziemann, P.J., Liu, P., Kittelson, D.B., McMurry, P.H. 1995. Electron impact charging properties of size-selected, submicrometer organic particles. *Journal of Physical Chemistry*, 99, 5126-5138.
11. McMurry, P.H., Nijhawan, S., Rao, N., Ziemann, P., Kittelson, D.B., Campbell, S. 1996. Particle beam mass spectrometer measurements of particle formation during low pressure chemical vapor deposition of polysilicon and SiO<sub>2</sub> films. *Journal of Vacuum Science and Technology A*, 14, 582-587.
12. Ziemann, P.J., Kittelson, D.B., McMurry, P.H. 1996. Effects of particle shape and chemical composition on the electron impact charging properties of submicron inorganic particles. *Journal of Aerosol Science*, 27, 587-606.
13. Ziemann, P.J., McMurry, P.H. 1997. Spatial distribution of chemical components in aerosol particles as determined from secondary electron yield measurements: implications for mechanisms of multicomponent aerosol crystallization. *Journal of Colloid and Interface Science*, 193, 250-258.
14. Jefferson, A., Eisele, F.L., Ziemann, P.J., Marti, J.J., Weber, R.J., McMurry, P.H. 1997. Measurements of H<sub>2</sub>SO<sub>4</sub> mass accommodation coefficient onto polydisperse aerosol. *Journal of Geophysical Research*, 102, 19021-19028.
15. Ziemann, P.J., McMurry, P.H. 1998. Secondary electron yield measurements as a means for probing organic films on aerosol particles. *Aerosol Science and Technology*, 28, 77-90.
16. Schreiner, J., Voigt, C., Mauersberger, K., McMurry, P.H., Ziemann, P. 1998. Aerodynamic lens system for producing particle beams at stratospheric pressures. *Aerosol Science and Technology*, 29, 50-56.
17. Dick, W.D., Ziemann, P.J., Huang, P.F., McMurry, P.H. 1998. Optical shape fraction measurements of submicrometre laboratory and atmospheric aerosols. *Measurement Science and Technology*, 9, 183-196.
18. Ziemann, P.J. 1998. Particle mass and size measurement using mass spectrometry. *Trends in Analytical Chemistry*, 17, 322-328.
19. Tobias, H.J., Ziemann, P.J. 1999. Compound identification in organic aerosols using

- temperature-programmed thermal desorption particle beam mass spectrometry. *Analytical Chemistry*, 71, 3428-3435.
20. Tobias, H.J., Kooiman, P.M., Docherty, K.S., Ziemann, P.J. 2000. Real-time chemical analysis of organic aerosols using a thermal desorption particle beam mass spectrometer. *Aerosol Science and Technology*, 33, 170-190.
  21. Tobias, H.J., Ziemann, P.J. 2000. Thermal desorption mass spectrometric analysis of organic aerosol formed from reactions of 1-tetradecene and O<sub>3</sub> in the presence of alcohols and carboxylic acids. *Environmental Science and Technology*, 34, 2105-2115.
  22. Tobias, H.J., Docherty, K.S., Beving, D.E., Ziemann, P.J. 2000. Effect of relative humidity on the chemical composition of secondary organic aerosol formed from reactions of 1-tetradecene and O<sub>3</sub>. *Environmental Science and Technology*, 34, 2116-2125.
  23. Docherty, K.S., Ziemann, P.J. 2001. On-line, inlet-based trimethylsilane derivatization for gas chromatography of mono- and dicarboxylic acids. *Journal of Chromatography A*, 921, 265-275.
  24. Tobias, H.J., Beving, D.E., Ziemann, P.J., Sakurai, H., Zuk, M., McMurry, P.H., Zarling, D., Waytulonis, R., Kittelson, D.B. 2001. Chemical analysis of diesel engine nanoparticles using a nano-DMA/thermal desorption particle beam mass spectrometer. *Environmental Science and Technology*, 35, 2233-2243.
  25. Tobias, H.J., Ziemann, P.J. 2001. Kinetics of the gas-phase reactions of alcohols, aldehydes, carboxylic acids, and water with the C13 Criegee intermediates formed from ozonolysis of 1-tetradecene. *Journal of Physical Chemistry A*, 105, 6129-6135.
  26. Chattopadhyay, S., Tobias, H.J., Ziemann, P.J. 2001. A method for measuring vapor pressures of low-volatility organic aerosol compounds using a thermal desorption particle beam mass spectrometer. *Analytical Chemistry*, 73, 3797-3803.
  27. Ziemann, P.J. 2002. Evidence for low-volatility diacyl peroxides as a nucleating agent and major component of aerosol formed from reactions of O<sub>3</sub> with cyclohexene and homologous compounds. *Journal of Physical Chemistry A*, 106, 4390-4402.
  28. Sakurai, H., Tobias, H.J., Park, K., Zarling, D., Docherty, K.S., Kittelson, D.B., McMurry, P.H., Ziemann, P.J. 2003. On-line measurements of diesel nanoparticle composition and volatility. *Atmospheric Environment*, 37, 1199-1210.
  29. Ziemann, P.J. 2003. Formation of alkoxyhydroperoxy aldehydes and cyclic peroxyhemiacetals from reactions of cyclic alkenes with O<sub>3</sub> in the presence of alcohols. *Journal of Physical Chemistry A*, 107, 2048-2060.
  30. Docherty, K.S., Ziemann, P.J. 2003. Effects of stabilized Criegee intermediate and OH radical scavengers on aerosol formation from reactions of  $\beta$ -pinene with O<sub>3</sub>. *Aerosol Science and Technology*, 37, 877-891.
  31. Sakurai, H., Park, K., McMurry, P.H., Zarling, D., Kittelson, D.B., Ziemann, P.J. 2003. Size-dependent mixing characteristics of volatile and non-volatile components in diesel exhaust

- aerosols. *Environmental Science and Technology*, 37, 5487-5495.
32. Hering, S.V., Jimenez, J.L., Prather, K.A., Wexler, A.S., Ziemann, P.J. 2004. Experimental methods and instrumentation: chemical characterization. In: Friedlander, S.K., D.Y.H. Pui. *Emerging issues in nanoparticle aerosol science and technology*. *Journal of Nanoparticle Research*, 6, 313-320.
33. Docherty, K.S., Kumboonlert, K., Lee, I.J., Ziemann, P.J. 2004. Gas chromatography of trimethylsilyl derivatives of  $\alpha$ -methoxyalkyl hydroperoxides formed in alkene-O<sub>3</sub> reactions. *Journal of Chromatography A*, 1029, 205-215.
34. Gong, H., Matsunaga, A., Ziemann, P.J. 2005. Products and mechanism of secondary organic aerosol formation from reactions of linear alkenes with NO<sub>3</sub> radicals. *Journal of Physical Chemistry A*, 109, 4312-4324.
35. Lim, Y.B., Ziemann, P.J. 2005. Products and mechanism of secondary organic aerosol formation from reactions of linear alkanes with OH radicals in the presence of NO<sub>x</sub>. *Environmental Science and Technology*. Vol. 39: p.9229-9236.
36. Chattopadhyay, S., Ziemann, P.J. 2005. Vapor pressures of unsubstituted and substituted monocarboxylic and dicarboxylic acids measured using an improved thermal desorption particle beam mass spectrometry method. *Aerosol Science and Technology*, 39, 1085-1100.
37. Ziemann, P.J. 2005. Aerosol products, mechanisms, and kinetics of heterogeneous reactions of ozone with oleic acid in pure and mixed particles. *Faraday Discussions*, 130, 469-490.
38. Docherty, K.S., Wu, W., Lim, Y.B., Ziemann, P.J. 2005. Contributions of organic peroxides to secondary aerosol formed from reactions of monoterpenes with O<sub>3</sub>. *Environmental Science and Technology*, 39, 4049-4059.
39. Petters, M.D., Prenni, A.J., Kreidenweis, S.M., DeMott, P.J., Matsunaga, A., Lim, Y.B., Ziemann, P.J. 2006. Chemical aging and the hydrophobic-to-hydrophilic conversion of carbonaceous aerosol. *Geophysical Research Letters*, 33, L24806.
40. Docherty, K.S., Ziemann, P.J. 2006. Reaction of oleic acid particles with NO<sub>3</sub> radicals: products, mechanism, and implications for radical-initiated organic aerosol oxidation. *Journal of Physical Chemistry A*, 110, 3567-3577.
41. Prenni, A.J., Petters, M.D., Kreidenweis, S.M., DeMott, P.J., Ziemann, P.J. 2007. Cloud droplet activation of secondary organic aerosol. *Journal of Geophysical Research*, 112, D10223.
42. Dick, W.D., Ziemann, P.J., McMurry, P.H. 2007. Multiangle light-scattering measurements of refractive index of submicron atmospheric particles. *Aerosol Science and Technology*, 41, 549-569.
43. Jordan, C.E., Ziemann, P.J., Griffin, R.J., Lim, Y.B., Atkinson, R., Arey, J. 2008. Modeling SOA formation from OH reactions with C8-C17 n-alkanes. *Atmospheric Environment*, 42, 8015-8026.
44. Huffman, J.A., Ziemann, P.J., Jayne, J.T., Worsnop, D.R., Jimenez, J.L. 2008. Development and characterization of a fast-stepping/scanning thermodenuder for chemically-resolved aerosol

volatility measurements. *Aerosol Science and Technology*, 42, 395-407.

45. Aiken, A.C., DeCarlo, P.F., Kroll, J.H., Worsnop, D.R., Huffman, J.A., Docherty, K.S., Ulbrich, I.M., Mohr, C., Kimmel, J.R., Sueper, D., Zhang, Q., Sun, Y., Trimborn, A., Northway, M., Ziemann, P.J., Canagaratna, M.R., Alfarra, R., Prevot, A., Dommen, J., Duplissy, J., Metzger, A., Baltensperger, U., Jimenez, J.L. 2008. O/C and OM/OC ratios of primary, secondary, and ambient organic aerosols with a high resolution time-of-flight aerosol mass spectrometer. *Environmental Science and Technology*, 42, 4428-4485.

46. Prenni, A.J., Petters, M.D., Faulhaber, A., Carrico, C.M., Ziemann, P.J., Kreidenweis, S.M., DeMott, P.J. 2009. Heterogeneous ice nucleation measurements of secondary organic aerosol generated from ozonolysis of alkenes. *Geophysical Research Letters*, 36, L06808.

47. Lim, Y.B., Ziemann, P.J. 2009. Chemistry of secondary organic aerosol formation from OH radical-initiated reactions of linear, branched, and cyclic alkanes in the presence of NO<sub>x</sub>. *Aerosol Science and Technology*, 43, 604-619.

48. Faulhaber, A., Thomas, B.M., Jimenez, J.L., Jayne, J.T., Worsnop, D.R., Ziemann, P.J. 2009. Characterization of a thermodenuder-particle beam mass spectrometer system for the study of organic aerosol volatility and composition. *Atmospheric Measurement Techniques*, 2, 15-31.

49. Matsunaga, A., Docherty, K.S., Lim, Y.B., Ziemann, P.J. 2009. Composition and yields of secondary organic aerosol formed from OH radical-initiated reactions of linear alkenes in the presence of NO<sub>x</sub>: Modeling and measurements. *Atmospheric Environment*, 43, 1349-1357.

50. Matsunaga, A., Ziemann, P.J. 2009. Yields of β-hydroxynitrates and dihydroxynitrates in aerosol formed from OH radical-initiated reactions of linear alkenes in the presence of NO<sub>x</sub>. *Journal of Physical Chemistry A*, 113, 599-606.

51. Volkamer, R., Ziemann, P.J., Molina, M.J. 2009. Secondary organic aerosol formation from acetylene (C<sub>2</sub>H<sub>2</sub>): seed effect on SOA yields due to organic photochemistry in the aerosol aqueous phase. *Atmospheric Chemistry and Physics*, 9, 1907-1928.

52. Lim, Y.B., Ziemann, P.J. 2009. Effects of molecular structure on aerosol yields from OH radical-initiated reactions of linear, branched, and cyclic alkanes in the presence of NO<sub>x</sub>. *Environmental Science and Technology*, 43, 2328-2334.

53. Petters, M.D., Kreidenweis, S.M., Prenni, A.J., Sullivan, R.C., Carrico, C.M., Koehler, K.A., Ziemann, P.J. 2009. Role of molecular size in cloud droplet activation. *Geophysical Research Letters*, 36, L22801.

54. Lim, Y.B., Ziemann, P.J. 2009. Kinetics of the heterogeneous conversion of 1,4-hydroxycarbonyls to cyclic hemiacetals and dihydrofurans on organic aerosol particles. *Physical Chemistry Chemical Physics*, 11, 8029-8039.

55. Huffman, J.A., Docherty, K.S., Aiken, A.C., Cubison, M.J., Ulbrich, I.M., DeCarlo, P.F., Sueper, D., Jayne, J.T., Worsnop, D.R., Ziemann, P.J., Jimenez, J.L. 2009. Chemically-resolved aerosol volatility measurements from two megacity field studies. *Atmospheric Chemistry and*

Physics, 9, 7161-7182.

56. Dzepina, K., Volkamer, R., Madronich, S., Tulet, P., Ulbrich, I.M., Zhang, Q., Cappa, C.D., Ziemann, P.J., Jimenez, J.L. 2009. Evaluation of recently-proposed secondary organic aerosol models for a case study in Mexico City. *Atmospheric Chemistry and Physics*, 9, 5681-5709.

57. Huffman, J.A., Docherty, K.S., Mohr, C., Cubison, M.J., Ulbrich, I.M., Ziemann, P.J., Onasch, T.B., Jimenez, J.L. 2009. Chemically-resolved volatility measurements of organic aerosol from different sources. *Environmental Science and Technology*, 43, 5351-5357.

58. Matsunaga, A., Ziemann, P.J. 2010. Yields of  $\beta$ -hydroxynitrates, dihydroxynitrates, and trihydroxynitrates formed from OH radical-initiated reactions of 2-methyl-1-alkenes. *Proceedings of the National Academy of Sciences*, 107, 6664-6669.

59. Vicars, W.C., Sickman, J.O., Ziemann, P.J. 2010. Atmospheric phosphorus deposition at a montane site: Size distribution, effects of wildfire, and ecological implications. *Atmospheric Environment*, 44, 2813-2821.

60. Matsunaga, A., Ziemann, P.J. 2010. Gas-wall partitioning of organic compounds in a Teflon film chamber and potential effects on reaction product and aerosol yield measurements. *Aerosol Science and Technology*, 44, 881-892.

61. Day, D.A., Liu, S., Russell, L.M., Ziemann, P.J. 2010. Organonitrate group concentrations in submicron particles with high nitrate and organic fractions in coastal southern California. *Atmospheric Environment*, 44, 1970-1979.

62. Farmer, D.K., Matsunaga, A., Docherty, K.S., Surratt, J.D., Seinfeld, J.H., Ziemann, P.J., Jimenez, J.L. 2010. Response of an aerosol mass spectrometer to organonitrates and organosulfates and implications for atmospheric chemistry. *Proceedings of the National Academy of Sciences*, 107, 6670-6675,

63. Russell, L.M., Bahadur, R., Ziemann, P.J. 2011. Identifying organic aerosol sources by comparing functional group composition in chamber and atmospheric particles. *Proceedings of the National Academy of Sciences*, 108, 3516-3521.

64. Ziemann, P.J. 2011. Effects of molecular structure on the chemistry of aerosol formation from the OH-radical-initiated oxidation of alkanes and alkenes. *International Reviews in Physical Chemistry*, 30, 161-195.

65. Docherty, K.S., Aiken, A.C., Huffman, J.A., Ulbrich, I.M., DeCarlo, P.F., Sueper, D., Worsnop, D.R., Snyder, D.C., Peltier, R.E., Weber, R.J., Grover, B.D., Eatough, D.J., Williams, B.J., Goldstein, A.H., Ziemann, P.J., Jimenez, J.L. 2011. The 2005 Study of Organic Aerosols at Riverside (SOAR-1): instrumental intercomparisons and fine particle composition. *Atmospheric Chemistry and Physics*, 11, 12387-12420.

66. Suda, S.R., Petters, M.D., Matsunaga, A., Sullivan, R.C., Ziemann, P.J., Kreidenweis, S.M. 2011. Hygroscopicity frequency distributions of secondary organic aerosols. *Geophysical Research Letters*, 117, D04207, doi:10.1029/2011JD016823.

67. Yee, L.D., Craven, J.S., Loza, C.L., Schilling, K.A., Ng, N.L., Canagaratna, M.R., Ziemann,

- P.J., Flagan, R.C., Seinfeld, J.H. 2012. Secondary organic aerosol formation from low-NO<sub>x</sub> photooxidation of dodecane: evolution of multigeneration gas-phase chemistry and aerosol composition. *Journal of Physical Chemistry A*, 116, 6211–6230.
68. Craven, J.S., Yee, L.D., Ng, N.L., Canagaratna, M.R., Loza, C.L., Schilling, K.A., Yatavelli, R.L.N., Thornton, J.A., Ziemann, P.J., Flagan, R.C., Seinfeld, J.H. 2012. Analysis of secondary organic aerosol formation and aging using positive matrix factorization of high-resolution aerosol mass spectra: application to the dodecane low-NO<sub>x</sub> system. *Atmospheric Chemistry and Physics*, 12, 11795–11817.
69. Ziemann, P.J. Atkinson, R. 2012. Kinetics, products, and mechanisms of secondary organic aerosol formation. *Chemical Society Reviews*, 41, 6582-6605.
70. Aimanant, S., Ziemann, P.J., 2013. Development of spectrophotometric methods for the analysis of functional groups in oxidized organic aerosol. *Aerosol Science and Technology*, 47, 581–591.
71. Aimanant, S., Ziemann, P.J., 2013. Chemical mechanisms of aging of aerosol formed from the reaction of *n*-pentadecane with OH radicals in the presence of NO<sub>x</sub>. *Aerosol Science and Technology*, 47, 979-990.
72. Strollo, C.M., Ziemann, P.J., 2013. Products and mechanism of secondary organic aerosol formation from the reaction of 3-methylfuran with OH radicals in the presence of NO<sub>x</sub>. *Atmospheric Environment*, 77, 534-543.
73. Shiraiwa, M., Yee, L.D., Schilling, K.A., Loza, C.L., Craven, J.S., Zuend, A., Ziemann, P.J., Seinfeld, J.H. 2013. Size distribution dynamics reveal particle-phase chemistry in organic aerosol formation. *Proceedings of the National Academy of Sciences*, 110, 11746-11750.
74. Loza, C.L., Craven, J.S., Yee, L.D., Coggin, M. M., Schwantes, R. H., Shiraiwa, M., Zhang, X., Schilling, K.A., Ng, N.L., Canagaratna, M.R., Ziemann, P.J., Flagan, R.C., Seinfeld, J.H. 2014. Secondary organic aerosol yields of 12-carbon alkanes. *Atmospheric Chemistry and Physics*, 14, 1423–1439.
75. Yeh, G.K., Ziemann, P.J., 2014. Alkyl nitrate formation from the reactions of C<sub>8</sub>–C<sub>14</sub> *n*-alkanes with OH radicals in the presence of NO<sub>x</sub>: Measured yields with essential corrections for gas–wall partitioning. *Journal of Physical Chemistry A*, 118, 8147-8157.
76. Suda, S.R., Petters, M.D., Yeh, G.K., Strollo, C.S., Matsunaga, A., Faulhaber, A., Ziemann, P.J., Prenni, A.J., Carrico, C.M., Sullivan, R.C., Kreidenweis, S.M. 2014. Influence of functional groups on organic aerosol cloud condensation nucleus activity. *Environmental Science and Technology*, 48, 10182–10190.
77. Yeh, G.K., Ziemann, P.J., 2014. Identification and yields of 1,4-hydroxynitrates formed from the reactions of C<sub>8</sub>–C<sub>16</sub> *n*-alkanes with OH radicals in the presence of NO<sub>x</sub>. *Journal of Physical Chemistry A*, 118, 8797-8806.
78. Bilde, M., Barsanti, K., Booth, M., Cappa, C.D., Donahue, N.M., Emanuelsson, E.U., McFiggans, G., Krieger, U.K., Marcolli, C., Topping, D., Ziemann, P., Barley, M., Clegg, S.,



Dennis-Smith, B., Hallquist, M., Hallquist, Å.M., Khlystov, A., Kulmala, M., Mogensen, D., Percival, C.J., Pope, F., Reid, J.P., Ribeiro da Silva, M.A.V., Rosenoern, T., Salo, K., Soonsin, V.P., Yli-Juuti, T., Prisle, N.L., Pagels, J., Rarey, J., Zardini, A.A., Riipinen, I., 2015. Saturation vapor pressures and transition enthalpies of low-volatility organic molecules of atmospheric relevance: From dicarboxylic acids to complex mixtures. *Chemical Reviews*, 115, 4115-4156.

79. Yeh, G. K., Ziemann, P.J., 2015. Gas-wall partitioning of oxygenated organic compounds: Measurements, structure–activity relationships, and correlation with gas chromatographic retention factor. *Aerosol Science and Technology*, 49, 726-737.

80. Waxman, E.M., Elm, J., Kurtén, T., Mikkelsen, K.V., Ziemann, P.J., Volkamer, R., 2015. Glyoxal and methylglyoxal setschenow salting constants in sulfate, nitrate, and chloride solutions: Measurements and Gibbs energies. *Environmental Science and Technology*, 49, 11500-11508.

81. Yeh, G.K., Claflin, M.S., Ziemann, P.J., 2015. Products and mechanism of the reaction of 1-pentadecene with NO<sub>3</sub> radicals and the effect of a –ONO<sub>2</sub> group on alkoxy radical decomposition. *Journal of Physical Chemistry A*, 119, 10684-10696.

82. La, Y.S., Camredon, M., Ziemann, P. J., Valorso, R., Matsunaga, A., Lannuque, V., Lee-Taylor, J., Hodzic, A., Madronich, S., Aumont, B., 2016. Impact of chamber wall loss of gaseous organic compounds on secondary organic aerosol formation: explicit modeling of SOA formation from alkane and alkene oxidation. *Atmospheric Chemistry and Physics*, 16, 1417–1431.

83. Strollo, C.M., Ziemann, P.J., 2016. Investigation of the formation of benzoyl peroxide, benzoic anhydride, and other potential aerosol products from gas-phase reactions of benzoylperoxy radicals. *Atmospheric Environment*, 130, 202–210.

84. Petters, M.D., Kreidenweis, S.M., Ziemann, P.J., 2016. Prediction of cloud condensation nuclei activity for organic compounds using functional group contribution methods. *Geoscientific Model Development*, 9, 111–124.

85. Ranney, A.P., Ziemann, P.J., 2016. Microscale spectrophotometric methods for quantification of functional groups in oxidized organic aerosol. *Aerosol Science and Technology*, 50, 881–892.

86. Ranney, A.P., Ziemann, P.J., 2016. Kinetics of acid-catalyzed dehydration of cyclic hemiacetals in aerosol particles in equilibrium with nitric acid vapor. *Journal of Physical Chemistry A*, 120, 2561–2568.

87. Krechmer, J.E., Pagonis, D., Ziemann, P.J., Jimenez, J.L., 2016. Quantification of gas-wall partitioning in teflon environmental chambers using rapid bursts of low-volatility oxidized species generated in situ. *Environmental Science and Technology*, 50, 5757–5765.

88. Algrim, L.B., Ziemann, P.J., 2016. Effect of the keto group on yields and composition of organic aerosol formed from OH radical-initiated reactions of ketones in the presence of NO<sub>x</sub>.

Journal of Physical Chemistry A, 120, 6978–6989.

89. Liu, S., Li, R., Wild, R.J., Warneke, C., de Gouw, J.A., Brown, S.S., Miller, S.L., Luongo, J.C., Jimenez, J.L., Ziemann, P.J., 2016. Contribution of human-related sources to indoor volatile organic compounds in a university classroom. *Indoor Air*, 925–938.

90. Ranney, A.P., Ziemann, P.J., 2017. Identification and quantification of oxidized organic aerosol compounds using derivatization, liquid chromatography, and chemical ionization mass spectrometry. *Aerosol Science and Technology*, 51, 342–33.

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98. Clafin, M.S., Ziemann, P.J. Identification and quantitation of aerosol products of the reaction of  $\beta$ -pinene with NO<sub>3</sub> radicals and implications for gas- and particle-phase reaction mechanisms. *Journal of Physical Chemistry A*, 122, 3640–3652.

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Murphy, B.N., Xu, L., Ng, N.L., McKinney, K.A., Budisulistiorini, S.H., Bertram, T.H., Nenes, A., Surratt, J.D., 2017. Regional similarities and NO<sub>x</sub>-related increases in biogenic secondary organic aerosol in summertime Southeastern U.S. *Journal of Geophysical Research: Atmospheres*, 123, 10620–10636.

100. Pagonis, D., Ziemann, P.J., 2018. Chemistry of hydroperoxycarbonyls in secondary organic aerosol, *Aerosol Science and Technology*, 52, 1178–1193.

101. Claflin, M.S., Krechmer, J.E., Hu, W., Jimenez, J.-L., Ziemann, P.J. Functional group composition of secondary organic aerosol formed from ozonolysis of  $\alpha$ -pinene under high VOC and autoxidation conditions, *ACS Earth and Space Chemistry*, 2, 1196–1210.

102. Petters, S.S., Kreidenweis, S.M., Grieshop, A. P., Ziemann, P.J., Petters, M.D., 2018. Temperature- and humidity-dependent phase states of secondary organic aerosols. *Geophysical Research Letters*, in press.

### **Semi-Technical Journal Articles**

1. Ziemann, P.J. 2009. Thwarting the seeds of clouds. *Nature*, 461, 353–354.
2. Ziemann, P.J. 2010. Phase matters for aerosols. *Nature*, 467, 797–798.
3. Ziemann, P.J. 2016. Nature's plasticized aerosols. *Nature Geoscience*, 9, 7–8.

### **Patents**

1. Apparatus and method for shaping and detecting a particle beam. United States Patent 5270542. Inventors: McMurry, P.H., Kittelson, D.B., Ziemann, P.J., Liu, P., Rao, N. Assignees: University of Minnesota Regents.

### **Invited and Presented Talks**

Gas- and Particle-Phase Products and their Mechanisms of Formation from the Reactions of Monoterpenes with NO<sub>3</sub> Radicals: Comprehensive Measurements and Modeling, Davis, CA, Invited Plenary. 12/2018.

Aerosol Chemistry 101, 2018 Chemistry of Indoor Environments Science Meeting, Boulder, CO, Invited Tutorial. 10/2018.

Effects of Acid-Catalyzed Heterogeneous/Multiphase Reactions on the Fate of Organic Compounds. Army Research Office Program Review, Durham, NC, Invited. 8/2018.

Effects of Molecular Structure on the Atmospheric Oxidation of Organic Compounds and Aerosol Formation, Department of Chemistry Seminar, Hong Kong Institute of Science & Technology, Invited. 5/2018.

Secondary Aerosol Formation. 36th Annual American Association for Aerosol Research Conference. Raleigh, NC. Invited Tutorial. 10/2017.

Why Molecular Structure Matters in the Chemistry of Atmospheric Organic Aerosol Formation. National Center for Atmospheric Research, Boulder, CO. Invited. 5/2017.

Effects of Molecular Structure on Atmospheric Oxidation of Organic Compounds and Aerosol Formation. Castleman Symposium on Cluster Science. Washington, DC. Invited. 04/2017.

Formation of Organic Nitrates from Reactions of Alkanes and Alkenes with OH Radicals in the Presence of NO<sub>x</sub>. 253rd American Chemical Society National Meeting. San Francisco, CA. Invited. 04/2017.

Secondary Aerosol Formation. 35th Annual American Association for Aerosol Research Conference. Portland, OR. Invited Tutorial. 10/2016.

Why Molecular Structure Matters in the Chemistry of Atmospheric Organic Aerosol Formation. Department of Atmospheric Sciences Seminar. University of Alabama, Huntsville. Huntsville, AL. Invited. 09/2016.

Detailed Mechanisms of SOA Formation and Aging from Laboratory Studies of Gas and Particle Chemistry (Isomerization/Decomposition Reactions in SOA Chemistry). Telluride Workshop on Organic Particles in the Atmosphere: Formation, Properties, Processing, and Impact. Telluride, CO. Invited. 07/2016.

Probing Indoor Air Chemistry Through Gas Phase and Surface Measurements. 14th International Conference on Indoor Air Quality and Climate. Ghent, Belgium. Invited. 7/2016.

Multi-Instrumental Characterization of Indoor Environments from Air to Surfaces. Interaction Between Indoor and Atmospheric Chemistry Workshop. Lille, France. Invited. 5/2015.

Developing Comprehensive Mechanisms of Secondary Organic Aerosol Formation from Environmental (Smog) Chamber Studies. Chemical Sciences Division Seminar. Earth Systems Research Laboratory, National Oceanic and Atmospheric Administration, Boulder, CO. Invited. 1/2015.

Laboratory Studies of the Chemistry of Secondary Organic Aerosol Formation. Department of Chemistry Seminar. University of Colorado, Denver. Denver, CO. Invited. 10/2014.

Experimental Study of the Effects of Functional Groups on the Decomposition of Alkoxy Radicals Formed from the Reactions of Alkenes with OH and NO<sub>3</sub> Radicals. 248th American Chemical Society National Meeting. San Francisco, CA. Invited. 08/2014.

Mechanistic Studies of SOA Formation. Telluride Workshop on Organic Particles in the Atmosphere: Formation, Properties, Processing, and Impact. Telluride, CO. Invited. 07/2014.

Atmospheric Chemistry Moves Indoors: Implications for the Built Environment. 2014 Microbiology of the Built Environment Conference. Boulder, CO. Invited. 6/2014

Using Chemistry to Understand Secondary Organic Aerosol Formation. Department of Environmental Engineering Seminar. University of Colorado, Boulder. Boulder, CO. Invited. 3/2014.

Development of a Comprehensive Mechanism for SOA Formation from Chamber Studies of Alkanes + OH/NO<sub>x</sub>. National Center for Atmospheric Research, Boulder, CO. Invited. 12/2013.

Comprehensive Laboratory Studies of Organic Aerosol Formation from the Atmospheric Oxidation of Hydrocarbons. Berkeley Atmospheric Sciences Center Seminar. University of California, Berkeley. Berkeley, CA. Invited. 11/2013.

Comprehensive Laboratory Studies of the Chemistry of Secondary Organic Aerosol Formation.

Analytical Chemistry Seminar. Colorado State University. Fort Collins, CO. Invited. 10/2013.

Secondary Aerosol Formation. 32nd Annual American Association for Aerosol Research Conference. Portland, OR. Invited Tutorial. 10/2013.

Effects of Molecular Structure on Secondary Organic Aerosol Formation. Wadsworth Center Seminar. New York State Department of Health. Albany, NY. Invited. 05/2013.

Secondary Aerosol Formation. 31st Annual American Association for Aerosol Research Conference. Minneapolis, MN. Invited Tutorial. 10/2012.

Formation of Organic Nitrates from Reactions of Alkanes and Alkenes with OH Radicals in the Presence of NO<sub>x</sub>. 244th American Chemical Society National Meeting. Philadelphia, PA. Invited. 08/2012.

Comprehensive SOA Chamber Studies. Telluride Workshop on Organic Particles in the Atmosphere: Formation, Properties, Processing, and Impact. Telluride, CO. Invited. 07/2012.

Unraveling the Complexity of Organic Aerosol Chemistry Through the Study of Simple Heterogeneous Reaction Systems. 22nd International Symposium on Gas Kinetics. Boulder, CO. Invited. 06/12.

Secondary Aerosol Formation. 30th Annual American Association for Aerosol Research Conference. Orlando, FL. Invited Tutorial. 10/2011.

Developing a Comprehensive Approach to Chamber Studies of Secondary Organic Aerosol Formation. Goldschmidt Conference. Prague, Czech Republic. Invited. 08/2011.

Effects of Molecular Structure on Atmospheric Organic Aerosol Chemistry. Department of Chemistry Seminar. Portland State University. Portland, OR. Invited. 04/2011.

The Devil is in the Details: On the Role of Molecular Structure in Atmospheric Organic Aerosol Chemistry. Department of Chemistry LaMattina Family Lecture. University of New Hampshire. Durham, NH. Invited. 03/2011.

Effect of Molecular Structure on Secondary Organic Aerosol Formation. Pacificchem. The International Chemical Congress of Pacific Basin Societies. Honolulu, HI. Invited. 12/2010.

Gas-Phase and Condensed-Phase Mechanisms Involved in Secondary Organic Aerosol Formation. Atmospheric Chemical Mechanisms. Air Quality Research Center, University of California, Davis. Davis, CA. Invited Plenary. 12/2010.

Probing the Relationship between Organic Aerosol Volatility and Composition via Thermal Desorption Measurements. BACCI Workshop on Vapor Pressures and Vaporization Enthalpies of Organic Compounds of Atmospheric Interest. Copenhagen, Denmark. Invited. 11/2010.

Secondary Aerosol Formation. 29th Annual American Association for Aerosol Research Conference. Portland, OR. Invited Tutorial. 10/2010.

On the Impact of Molecular Structure on Aerosol Formation from the Oxidation of Hydrocarbons. Chemical and Environmental Engineering Seminar. University of California, Riverside. Riverside, CA. Invited. 10/2010.

Chemistry of Secondary Organic Aerosol Formation from the Oxidation of Aromatic Hydrocarbons. US Environmental Protection Agency Atmospheric Science Progress Review

Meeting. US Environmental Protection Agency. Research Triangle Park, NC. Invited. 09/2010.

Effect of Molecular Structure on Secondary Organic Aerosol Formation. 240th American Chemical Society National Meeting. Boston, MA. Invited. 08/2010.

“Have You Thought About the Walls?”: Semi-Volatile Organics and Teflon Films. Telluride Workshop on Organic Particles in the Atmosphere: Formation, Properties, Processing, and Impact. Telluride, CO. Invited. 08/2010.

The Importance of Molecular Structure in Aerosol Formation from the Oxidation of Hydrocarbons. Department of Atmospheric Sciences Seminar. Colorado State University. Fort Collins, CO. Invited. 03/2010.

Chemistry of Aerosol Formation from Reactions of Alkenes with OH Radicals. Air Quality Committee Meeting. American Lung Association in California, San Bernardino. San Bernardino, CA. Invited. 01/2010.

Products and Mechanism of Aerosol Formation from reactions of OH radicals with Linear and Branched Alkenes in the Presence of NO<sub>x</sub>. American Geophysical Union Fall Meeting. San Francisco, CA. Invited. 12/2009.

Secondary Aerosol Formation. 28th Annual American Association for Aerosol Research Conference. Minneapolis, MN. Invited Tutorial. 10/2009.

Chemistry of Aerosol Formation from Reactions of Alkenes with OH Radicals. Department of Chemistry Seminar. University of Toronto. Toronto, Canada. Invited. 07/2009.

In Search of a Molecular Level Understanding of Atmospheric Organic Aerosol Formation. Civil and Environmental Engineering Seminar Series. University of California, Davis. Davis, CA. Invited. 04/2009.

Chemical Mechanisms of SOA Formation from Alkanes and Alkenes. Atmospheric Chemical Mechanisms. Air Quality Research Center, University of California, Davis. Davis, CA. Invited. 12/2008.

The Importance of Molecular Structure in Aerosol Formation from the Oxidation of Hydrocarbons. Department of Chemistry Seminar. Arizona State University. Tempe, AZ. Invited. 10/2008.

Secondary Aerosol Formation. 27th Annual American Association for Aerosol Research Conference. Orlando, FL. Invited Tutorial. 10/2008.

Chemistry of Secondary Organic Aerosol Formation from Reactions of Simple Hydrocarbons. Telluride Workshop on Organic Aerosols. Telluride, CO. Presented. 08/2008.

Chemistry of Secondary Organic Aerosol Formation from The Oxidation of Aromatic Hydrocarbons. US Environmental Protection Agency Sources and Atmospheric Formation of Organic PM Grants Kick-Off Meeting. US Environmental Protection Agency. Research Triangle Park, NC. Invited. 05/2008.

Chemistry of Secondary Organic Aerosol Formation from Reactions of Linear, Branched, and Cyclic Alkanes with OH Radicals. 235th American Chemical Society National Meeting. New Orleans, LA. Invited. 04/2008.

Elucidating Chemical Mechanisms of Aerosol Formation through Studies of the Oxidation of

Simple Hydrocarbons. Environmental Science and Engineering Seminar. California Institute of Technology. Pasadena, CA. Invited. 01/2008.

Composition and Chemistry of Tropospheric Secondary Organic Aerosols: State of the Art. NATO Advanced Research Workshop: Simulation and Assessment of Chemical Processes in a Multiphase Environment. North Atlantic Treaty Organization. Alushta, Ukraine. Invited. 10/2007.

Secondary Aerosol Formation. 26th Annual American Association for Aerosol Research Conference. Reno, NV. Invited Tutorial. 09/2007.

The Devil is in the Details: On the Role of Molecular Structure in Secondary Organic Aerosol Chemistry. 26th American Association for Aerosol Research Annual Conference. Reno, NV. Invited Plenary. 09/2007.

Development and Application of a Mass Spectra-Volatility Database of Combustion and Secondary Organic Aerosol Sources for the Aerodyne Aerosol Mass Spectrometer. US Environmental Protection Agency Atmospheric Science Progress Review Meeting. US Environmental Protection Agency. Research Triangle Park, NC. Invited. 06/2007.

Atmospheric Aerosol Formation and Processing from Hydrocarbon Oxidation. Atmospheric Sciences Seminar. University of California, Los Angeles. Los Angeles, CA. Invited. 05/2007.

Organic Aerosol Formation from the Oxidation of Simple Hydrocarbons. Atmospheric Chemistry Seminar. Aerodyne Research, Inc. Billerica, MA. Invited. 03/2007.

Elucidating Complex Mechanisms of Secondary Organic Aerosol Formation through Studies of Simple Hydrocarbons. 24th Annual Symposium on Kinetics and Photochemical Processes in the Atmosphere. California State University, Los Angeles. Los Angeles, CA. Invited Plenary. 02/2007.

Organic Aerosol Formation from the Oxidation of Hydrocarbons. Chemistry Department Colloquium. University of Georgia. Athens, GA. Invited. 02/2007.

Chemistry of Atmospheric Organic Aerosol Formation from the Oxidation of Hydrocarbons. Chemistry Department Colloquium. Carnegie Mellon University. Pittsburgh, PA. Invited. 02/2007.

Secondary Aerosol Formation. International Aerosol Conference. St. Paul, MN. Invited Tutorial. 09/2006.

On the Role of Multiple-Generation Reaction Products in Secondary Organic Aerosol Formation. Telluride Workshop on Organic Particles in the Atmosphere: Formation, Properties, Processing, and Impact. Telluride, CO. Invited. 08/2006.

Aerosol Formation and Processing from Reactions of Unsaturated Organic Compounds with Nitrate Radicals. 87th Annual Meeting of the Pacific Division of the American Association for the Advancement of Science. Pacific Division of the American Association for the Advancement of Science. San Diego, CA. Invited. 06/2006.

Applications of Thermal Desorption Particle Beam Mass Spectrometry to Studies of Atmospheric Organic Aerosol Chemistry. 54th American Society of Mass Spectrometry Conference. Seattle, WA. Invited. 05/2006.

Organic Aerosol Formation from the Oxidation of Hydrocarbons. Analytical Chemistry Seminar. University of Maryland. College Park, MD. Invited. 03/2006.

Organic Aerosol Formation from the Oxidation of Hydrocarbons. Analytical and Physical Chemistry Seminar. University of Delaware. Newark, DE. Invited. 03/2006.

Secondary Organic Aerosol Formation from Reactions of Alkanes with OH/NO<sub>x</sub>. 40th Western Regional Meeting of the American Chemical Society. Anaheim, CA. Invited. 01/2006.

Laboratory Studies of Secondary Organic Aerosol Formation from Reactions of Linear Alkanes with OH/NO<sub>x</sub>. 24th Annual American Association for Aerosol Research Conference. Austin, TX. Presented. 10/2005.

Secondary Aerosol Formation. 24th Annual American Association for Aerosol Research Conference. Austin, TX. Invited Tutorial. 10/2005.

Aerosol Products, Mechanisms, and Kinetics of Heterogeneous Reactions of Ozone with Oleic Acid in Pure and Mixed Particles. Faraday Discussions on Atmospheric Chemistry. Leeds, United Kingdom. Invited. 04/2005.

Photochemical Formation and Processing of Atmospheric Organic Aerosols. Department of Chemistry and Biochemistry Seminar. California State University, Fullerton. Fullerton, CA. Invited. 04/2005.

Applications of a Thermal Desorption Particle Beam Mass Spectrometer to Studies of Atmospheric Organic Aerosol Chemistry. 229th American Chemical Society National Meeting. San Diego, CA. Invited. 03/2005.

Chemistry of Secondary Organic Aerosol Formation from the Atmospheric Oxidation of Hydrocarbons. 229th American Chemical Society Meeting. San Diego, CA. Invited. 03/2005.

Secondary Organic Aerosol Formation. Gordon Research Conference on Gaseous Ions: Structures, Energetics, and Reactions. Ventura, CA. Invited. 02/2005.

Development and Application of a Mass Spectra-Volatility Database of Combustion and Secondary Organic Aerosol Sources for the Aerodyne Aerosol Mass Spectrometer. Conference on Particulate Matter Supersites Program and Related Studies. Atlanta, GA. Invited. 02/2005.

Laboratory Studies of Processing of Carbonaceous Aerosols by Atmospheric Oxidants. Department of Energy Atmospheric Science Program 2005 Science Team Meeting. US Department of Energy. Charleston, NC. Invited. 01/2005.

Products and Mechanism of the Heterogeneous Reaction of NO<sub>3</sub> Radicals with Oleic Acid Particles. 23rd Annual American Association for Aerosol Research Conference. Atlanta, GA. Presented. 10/2004.

Products and Mechanisms of Organic Oxidation Reactions Involved in Aerosol Aging. Telluride Workshop on Atmospheric Aerosol Aging. Telluride, CO. Invited. 08/2004.

“What's Happening in Southern California's Air?” UC Riverside Summer Enrichment Program for Advanced High School Students. University of California, Riverside. Riverside, CA. Invited. 08/2004.

Short-Lived Products of Indoor Oxidative Processes. National Institute for Occupational Safety



and Health Workshop on Indoor Chemistry and Health. National Institute for Occupational Safety and Health. Santa Cruz, CA. Invited. 07/2004.

Organic Aerosol Analysis Using Thermal Desorption Aerosol Mass Spectrometry. International State of the Science Workshop on Organic Speciation in Atmospheric Aerosol Research. US Environmental Protection Agency/National Science Foundation. Las Vegas, NV. Invited. 04/2004.

Organic Aerosol Formation from the Atmospheric Oxidation of Hydrocarbons. Physical Chemistry Seminar. Temple University. Philadelphia, PA. Invited. 03/2004.

Air Pollution: From Southern California Smog to Global Warning. Environmental Sciences Seminar. Whittier College. Whittier, CA. Invited. 03/2004.

Ambient Measurements of Aerosol Composition in Southern California Using a Particle Concentrator-Thermal Desorption Particle Beam Mass Spectrometer. US EPA Supersites and PM Centers Meeting. US Environmental Protection Agency. Las Vegas, NV. Invited. 02/2004.

Alkene-Ozone Chemistry in the Formation and Processing of Organic Aerosol Particles. Atmospheric Sciences Seminar. Harvard University. Cambridge, MA. Invited. 01/2004.

Secondary Aerosol Formation. 22nd Annual American Association for Aerosol Research Conference. Anaheim, CA. Invited Tutorial. 10/2003.

Aerosol Products and Mechanism of the Heterogeneous Reaction of Ozone with Oleic Acid in Pure and Mixed Particles. 22nd Annual American Association for Aerosol Research Conference. Anaheim, CA. Presented. 10/2003.

Chemistry of Aerosol Formation from Hydrocarbon Oxidation. Analytical and Environmental Chemistry Seminar. University of Colorado, Boulder. Boulder, CO. Invited. 03/2003.

Chemistry of Aerosol Formation from Alkene-Ozone Reactions. Department of Earth and Atmospheric Sciences Seminar. Georgia Institute of Technology. Atlanta, GA. Invited. 03/2003.

Chemistry of Aerosol Formation from Hydrocarbon Oxidation. Chemistry Department Seminar. Regis University. Denver, CO. Invited. 03/2003.

Nucleation, Heterogeneous Chemistry, and Film Formation in Organic Aerosols. 1st University of California Symposium on Surface Science and Its Applications. University of California, Riverside. Riverside, CA. Invited. 02/2003.

On-Line Analysis of Diesel Exhaust Nanoparticles Using Mass Spectrometry and Tandem Differential Mobility Analysis. International Workshop on Vehicle Exhaust Nanoparticles. National Institute for Environmental Studies. Tsukuba, Ibaraki, Japan. Invited. 01/2003.

Real-Time and Temperature-Programmed Thermal Desorption Mass Spectrometry of Diesel Exhaust Particles. Health Effects Institute Workshop to Improve Estimates of Diesel and Other Emissions for Epidemiologic Studies. Health Effects Institute. Baltimore, MD. Invited. 12/2002.

Laboratory Studies of the Chemistry of Secondary Organic Aerosol Formation from Reactions of Alkanes with OH Radicals. 21st Annual American Association for Aerosol Research Conference. Charlotte, NC. Presented. 10/2002.

Chemical and Physical Properties of Nanoparticles. Workshop on Vehicle Exhaust Particulate Emission Measurement Methodology/Society of Automotive Engineers 2002 Powertrain & Fluid

Systems Conference. San Diego, CA. Invited. 10/2002.

The Air We Breath: Smog, the Bane of the South Coast Air Basin of California. Public Seminar Series. Rancho Santa Anna Botanic Garden. Claremont, CA. Invited. 09/2002.

Chemistry of Secondary Organic Aerosol Formation in Selected VOC/Oxidant Systems. 224th American Chemical Society National Meeting. Boston, MA. Invited. 08/2002.

Chemistry of Secondary Organic Aerosol Formation from Ozone-Alkene Reactions. 223rd American Chemical Society Meeting. Orlando, FL. Invited. 04/2002.

Studies of Secondary Organic Aerosol Chemistry Using a Thermal Desorption Particle Beam Mass Spectrometer. Environmental Engineering Seminar. University of Southern California. Los Angeles, CA. Invited. 03/2002.

Chemistry of Secondary Organic Aerosol Formation from Alkene Ozonolysis and Nanoparticles from Engine Exhaust. Scientific Meeting on Issues in the Assessment of Health Impacts of Gasoline Emissions in California. UCLA, Los Angeles, CA. Invited. 06/2001.

Chemistry of Aerosol Formation from Reactions of Cyclic Alkenes and Ozone. 221st American Chemical Society Meeting. San Diego, CA. Presented. 04/2001.

Aerosol Formation from Biogenic Volatile Organic Compounds. SCOS97-NARSTO Data Analysis Conference. Diamond Bar, CA. Invited. 02/2001.

Chemistry of Secondary Organic Aerosol Formation from Reactions of Cyclic Alkenes and Ozone. American Geophysical Union Fall Meeting. San Francisco, CA. Presented. 12/2000.

Biogenic Aerosols. California Air Resources Board Biogenic Research Planning Workshop. Sacramento, CA. Invited. 12/2000.

Chemistry of Secondary Organic Aerosol Formation from Ozonolysis of Cyclic Alkenes. 19th Annual American Association for Aerosol Research Conference. St. Louis, MO. Presented. 11/2000.

Analysis of Secondary Organics and Combustion Aerosols by Thermal Desorption Particle Beam Mass Spectrometry. 39th Annual Eastern Analytical Symposium and Exposition. Atlantic City, NJ. Invited. 10/2000.

Investigations of the Chemistry of Secondary Aerosol Formation Using Thermal Desorption Particle Beam Mass Spectrometry. Air & Waste Management Association and U.S. EPA Symposium on Measurement of Toxic and Related Air Pollutants. Research Triangle Park, NC. Presented. 09/2000.

Chemistry of Secondary Organic Aerosol Formation from Alkene/Ozone Reactions Investigated Using a Thermal Desorption Particle Beam Mass Spectrometer. NARSTO 2000 Technical Symposium on Aerosol Science, Tropospheric Aerosols: Science and Decisions in an International Community. Queretaro, Mexico. Invited. 08/2000.

Investigations of the Chemistry of Secondary Aerosol Formation Using Thermal Desorption Particle Beam Mass Spectrometry. 220th American Chemical Society National Meeting. Washington, DC. Presented. 08/2000.

Studies of Secondary Organic Aerosol Chemistry Using a Thermal Desorption Particle Beam Mass Spectrometer. Physical/Analytical Chemistry Seminar Series. University of California, Irvine, CA. Invited. 03/2000.

Studies of Secondary Organic Aerosol Chemistry Using a Thermal Desorption Particle Beam Mass Spectrometer. Research in Atmospheric Chemistry and the Environment in the Triangle (RACHET) Lecture Series. U. S. Environmental Protection Agency, National Exposure Research Laboratory. Research Triangle Park, NC. Invited. 01/2000.

Studies of Secondary Organic Aerosol Chemistry Using a Thermal Desorption Particle Beam Mass Spectrometer. Environmental Engineering Science and Global Environmental Science Seminar Series. California Institute of Technology, Pasadena, CA. Invited. 01/2000.

Studies of Secondary Organic Aerosol Chemistry Using a Thermal Desorption Particle Beam Mass Spectrometer. Analytical and Environmental Chemistry Seminar Series. University of Colorado, Boulder, CO. Invited. 11/1999.

Studies of the Chemistry of Secondary Organic Aerosol Formation Using a Thermal Desorption Particle Beam Mass Spectrometer. 18th Annual American Association for Aerosol Research Conference. Tacoma, WA. Presented. 08/1999.

Use of a Thermal Desorption Particle Beam Mass Spectrometer for Studies of Secondary Organic Aerosol Formation. Combined US/German Ozone/Fine Particle Science and Environmental Chamber Workshop. Riverside, CA. Invited. 08/1999.

A Thermal Desorption Particle Beam Mass Spectrometer for Aerosol Chemistry Studies. 217th American Chemical Society Meeting. Anaheim, CA. Invited. 03/1999.