

## DEBORAH SUSAN GROSS

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### EMPLOYMENT:

#### **Carleton College, Northfield, MN**

2012 – Present Professor of Chemistry  
2009 – 2012: Chair, Chemistry Department  
2005 – 2012: Associate Professor of Chemistry  
1998 – 2005: Assistant Professor of Chemistry

### EDUCATION:

#### **1991 - 1996**

**University of California, Berkeley, CA, Ph. D., Chemistry, Fall 1996**

**Thesis Title:** “*Protein Structural Elucidation with Electrospray Ionization Fourier-Transform Mass Spectrometry.*”

#### **1987 - 1991**

**Haverford College, Haverford, PA, B.A. Chemistry, 1991.**

#### **1989 - 1990**

**St. Andrews University, St. Andrews, Scotland, UK**

Junior Year Abroad program, Honors Chemistry and English.

### RESEARCH EXPERIENCE:

#### **2012**

**Atmospheric Chemistry: Visiting Scientist (Sabbatical): Department of Environmental Science and Engineering, Fudan University (in the group of Dr. Xin Yang):** Characterized emissions in the local ambient atmosphere and taught a portion of the Aerosol Science and Technology graduate course.

#### **2006**

**Atmospheric Chemistry: Visiting Scientist (Sabbatical), Particle Technology Laboratory, Department of Mechanical Engineering, University of Minnesota (in the group of Dr. Peter McMurry):** Characterized emissions from biomass combustion (hardwood, softwood, corn, meat, biodiesel and ethanol fuel mixes) using the single-particle mass spectrometer.

#### **2005 - 2006**

**Atmospheric Chemistry: Visiting Scientist (Sabbatical), Laboratory for Atmospheric Chemistry, Paul Scherrer Institut, Villigen, Switzerland (in the group of Dr. Urs Baltensperger):** Performed single-particle mass spectrometry measurements on secondary organic aerosol formed in the PSI smog chamber and measured ambient atmospheric particles in southern Switzerland.

#### **1996 - 1998**

**Analytical/Atmospheric Chemistry: Postdoctoral Fellow, University of California at Riverside (Prof. K. A. Prather, Advisor):** Real-time measurement of size and composition of individual ambient atmospheric particles using aerosol time-of-flight mass spectrometry. Study of heterogeneous gas-particle chemistry of tropospheric relevance.

#### **1991 - 1996**

**Physical/Analytical Chemistry: Ph. D. Candidate, University of California at Berkeley (Prof. E. R. Williams, Advisor):** Construction and use of Fourier-transform mass spectrometer with external electrospray ionization source to investigate electrostatic effects, conformation, and reactivity of multiply charged gas-phase biomolecules.

### AWARDS:

**American Society for Mass Spectrometry Research Award, Sponsored by Micromass, Award and Research Grant recipient (\$25,000), 2001.**

**COURSES TAUGHT AT CARLETON COLLEGE:**

- **General Chemistry:** General Chemistry II (Chem 121 + labs), Winter 1999, Winter 2000. Principles of Chemistry (Chem 123 + labs) Spring 2005, Spring 2007. Principles of Chemistry II (Chem 224 + labs) Spring 2019, Fall 2019.
- **Analytical Chemistry:** Equilibrium and Analysis (Chem 230 + labs), Fall 1998, Spring 2000, Fall 2000, Spring 2001, Spring 2002, Spring 2003, Fall 2003, lab only Spring 2004, Fall 2004, Fall 2006, Fall 2007, Spring 2008, Spring 2009, Fall 2009, lab only Spring 2010, Spring 2011, Fall 2011, Spring 2012, Spring 2014, Fall 2014, Spring 2015, lab only Spring 2016. Mass Spectrometry in the Chemical Sciences (Chem 395), Winter 2005. Bioanalytical Chemistry (Chem 334 + Chem 335, Bioanalytical Chemistry Laboratory), Winter 2007. Spectroscopic Characterization of Chemical Compounds (Chem 306 Laboratory), Winter 2009, Winter 2010, Spring 2012. Instrumental Chemical Analysis, (Chem 330 + Chem 331 Labs) Winter 2016, Winter 2018.
- **Environmental Science:** Environmental Analysis (Chem/ENTS 328 + Chem/ENTS 329, Environmental Analysis Laboratory), Spring & Fall 1999, Winter 2001, Spring 2004, Winter 2008, Spring 2011. Climate Science (ENTS 287), Winter 2012, Winter 2014, Fall 2015. Climate Change and Human Health, Spring 2018, Fall 2020.
- **FOCUS Colloquium:** First year: Fall 2007, Winter 2008, Spring 2008, Fall 2008, Winter 2009, Spring 2009, Fall 2013, Winter 2014, Spring 2014, Fall 2016, Winter 2017, Spring 2017, Fall 2018. Sophomore year: Fall 2014, Winter 2015, Spring 2015, Spring 2016, Fall 2017, Winter 2018, Spring 2018, Fall 2020.
- **Argument and Inquiry Seminar:** Air Pollution and Human Health (Chem 100), Fall 2010.
- **Advanced Laboratory:** Chemical Kinetics (Chem 305 or 301 lab + lecture), Winter 2003, Winter 2004, Winter 2005, Fall 2008, Fall 2010, Fall 2013, Fall 2016, Fall 2017, Fall 2018.
- **Comprehensive Exercise:** Invited speakers and worked with comps groups Winter 1999 (Dr. Ronald A. Hites, Indiana University), Winter 2000 (Dr. Susan Solomon, NOAA), Winter 2002 (Dr. Jack Calvert, NCAR), Winter 2004 (Dr. F. Fleming Crim, University of Wisconsin-Madison), Winter 2005 (Dr. F. M. M. Morel, Princeton University), Winter 2007 (Dr. R. Graham Cooks, Purdue University), Winter 2009 (Chemistry of Cooking, Dr. Chris Loss), Winter 2010 (Dr. Ben Cravatt), Winter 2014 (Dr. Scott Mabury), Winter 2015 (Dr. Martin Zanni), Winter 2017 (Dr. Jonathan Sweedler), Winter 2018 (Dr. Paul Wennberg). Advised long papers, Winter 2001, Winter 2008, Winter 2012, Winter 2014, Fall 2017, Winter 2019.
- **Independent Study:** Mentored 40 students in Independent Research, 1999 – 2020; Mentored 15 students in curriculum development for youngchefsprogram.org, 2013 – 2015.
- **ENTS Junior Colloquium (ENTS 298):** Participated Spring 2000, Winter 2002.

**PUBLICATIONS IN PEER REVIEWED JOURNALS:** (*undergraduate students are underlined*)

- Drew, S. R.; Gross, D. S.; Hollingsworth, W. E.; Baraniak, T.; Zall, C. M.; Mann, K. R. “Overdriven Pulsed Light Emitting Diodes: An Inexpensive Excitation Source for Time-Resolved Luminescence Lifetime Measurements” *J. Chem. Educ.* **2019**, *96*, 1046-1050 DOI: 10.1021/acs.jchemed.8b01024
- DiBartolo, P. M.; Gregg-Jolly, L.; Gross, D.; Manduca, C. A.; Iverson, E.; Cooke III, D. B.; Davis, G. K.; Davidson, C.; Hertz, P. E.; Hibbard, L.; Ireland, S. K.; Mader, C.; Pai, A.; Raps, S.; Siwicki, K.; Swartz, J. E. “Principles and Practices Fostering Inclusive Excellence: Lessons from the Howard Hughes Medical Institute’s Capstone Institutions” *CBE – Life Sci. Educ.*, **2016**, *15:ar44*, 1 - 11. Doi:10.1187/cbe.16-01-0028
- Huo, J.; Lu, X.; Wang, X.; Chen, H.; Ye, X.; Gao, S.; Gross, D. S.; Chen, J.; Yang, X. “Online single particle analysis of chemical composition and mixing state of crop straw burning particles: from laboratory study to field measurement” *Front. Environ. Sci. Eng.* **2016**, *10*, 244–252. Doi: 10.1007/s11783-015-0768-z.
- Gross, D. S.; Manduca, C. A.; Iverson, E. A. R.; Willett, G. A. “Broadening Access to Science with Support for the Whole Student in a Residential Liberal Arts College Environment” *J. Coll. Science Teaching*, **2015**, *44*, 99-107.
- Tang, Y.; Huang, Y.; Li, L.; Chen, H.; Chen, J.; Yang, X.; Gao, S.; Gross, D. S. “Characterization of aerosol optical properties, chemical composition and mixing states in the winter season in Shanghai, China” *J. Env. Sci.*, **2014**, *26*, 2412 - 2422. doi: /10.1016/j.jes.2014.03.002.
- Gross, D. S.; Van Ryswyk, H. “Examination and Manipulation of Protein Surface Charge in Solution with Electrospray Ionization Mass Spectrometry” *J. Chem. Educ.*, **2014**, *91*, 1240 – 1243. doi: 10.1021/ed4005886.
- Wang, X.; Ye, X.; Chen, H.; Chen, J.; Yang, X.; Gross, D. S. “Online Hygroscopicity and Chemical Measurement of Urban Aerosol in Shanghai, China.” *Atmospheric Environment*, **2014**, *95*, 318-326. doi: 10.1016/j.atmosenv.2014.06.051.
- Dall'Osto, M.; Querol, X.; Alastuey, A.; Minguillon, M. C.; Alier, M.; Amato, F.; Brines, M.; Cusack, M.; Grimalt, J. O.; Karanasiou, A.; Moreno, T.; Pandolfi, M.; Pey, J.; Reche, C.; Ripoll, A.; Tauler, R.; Van Drooge, B. L.; Viana, M.;

- Harrison, R. M.; Gietl, J.; Beddows, D.; Bloss, W.; O'Dowd, C.; Ceburnis, D.; Martucci, G.; Ng, N. L.; Worsnop, D.; Wenger, J.; Mc Gillicuddy, E.; Sodeau, J.; Healy, R.; Lucarelli, F.; Nava, S.; Jimenez, J. L.; Gomez Moreno, F.; Artinano, B.; Prévôt, A. S. H.; Pfaffenberger, L.; Frey, S.; Wilsenack, F.; Casabona, D.; Jiménez-Guerrero, P.; Gross, D.; Cots, N., "Presenting SAPUSS: Solving Aerosol Problem by Using Synergistic Strategies in Barcelona, Spain." *Atmos. Chem. Phys.* **2013**, *13*, 8991-9019. doi:10.5194/acp-13-8991-2013
- Smyth, A. M.; Thompson, S. L.; de Foy, B.; Olson, M. R.; Sager, N.; McGinnis, J.; Schauer, J. J.; Gross, D. S. "Sources of metals and bromine-containing particles in Milwaukee" *Atmospheric Environment*, **2013**, *73*, 124 – 130. doi: 10.1016/j.atmosenv.2013.03.014
  - Huang, Y., Li, L., Li, J., Wang, X., Chen, H., Chen, J., Yang, X., Gross, D. S., Wang, H., Qiao, L., Chen, C. "A case study of the highly time-resolved evolution of aerosol chemical and optical properties in urban Shanghai, China" *Atmos. Chem. Phys.* **2013**, *13*, 3931–3944. doi:10.5194/acp-13-3931-2013
  - Pagels, J.; Dutcher, D. D.; Stolzenburg, M. R.; McMurry, P. H.; Gälli, M. E.; Gross, D. S. "Fine Particle Emissions from Solid Biofuel Combustion Studied with Single Particle Mass Spectrometry – Identification of Markers for Organics, Soot and Ash Components" *J. Geophys. Res.*, **2012**, *118*, 1-12. doi:10.1029/2012JD018389.
  - de Foy, B.; Smyth, A. M.; Thompson, S. L.; Gross, D. S.; Olson, M. R.; Sager, N.; Schauer, J. J. "Sources of Nickel, Vanadium and Black Carbon in Aerosols in Milwaukee" *Atmospheric Environ.*, **2012**, *59*, 294-301. doi:10.1016/j.atmosenv.2012.06.002
  - Dutcher, D. D.; Stolzenburg, M. R.; Thompson, S. L.; Medrano, J. M.; Gross, D. S.; Kittelson, D.; McMurry, P. H. "Emissions from Ethanol-Gasoline Blends: A Single Particle Perspective" *Atmosphere*, **2011**, *2*, 182 – 200. doi:10.3390/atmos2020182
  - Dutcher, D. D.; Pagels, J.; Bika, J.; Franklin, L.; Stolzenburg, M.; Thompson, S.; Medrano, J.; Brown, N.; Gross, D. S.; Kittelson, D.; McMurry, P. H. "Emissions from soy biodiesel blends: A single particle perspective" *Atmospheric Environment*, **2011**, *45*, 3406 - 3413. doi:10.1016/j.atmosenv.2011.03.047
  - Baltensperger, U.; Chirico, R.; DeCarlo, P. F.; Dommen, J.; Gaeggeler, K.; Heringa, M.; Li, M.-L.; Prevot, A.; Alfarra, M. R.; Gross, D. S.; Kalberer, M. "Recent developments in the mass spectrometry of atmospheric aerosols" *Eur. J. Mass Spectrom.*, **2010**, *16*, 389 - 395.
  - Gross, D.S.; Atlas, R.; Rzeszotarski, J.; Turetsky, E.; Christensen, J.; Benzaid, S.; Olson, J.; Smith, T.; Steinberg, L.; Sulman, J.; Ritz, A.; Anderson, B.; Nelson, C.; Musicant, D. R.; Chen, L.; Snyder, D. C.; Schauer, J. J. "Environmental chemistry through intelligent atmospheric data analysis," *Environ. Model. Softw.* **2010**, *25*, 760-769. doi: 10.1016/j.envsoft.2009.12.001
  - Snyder, D. C.; Schauer, J. J.; Gross, D. S.; Turner, J. R. "Estimating the contribution of point sources to atmospheric metals using single-particle mass spectrometry," *Atmospheric Environment*, **2009**, *43*, 4033-4042. doi:10.1016/j.atmosenv.2009.05.011.
  - Friedman, B.; Herich, H.; Kammermann, L.; Gross, D. S.; Arneth, A.; Holst, T.; Cziczo, D. J. "Subarctic atmospheric aerosol composition: 1. Ambient aerosol characterization," *J. Geophys. Res.*, **2009**, *114*, D13203. doi:10.1029/2009JD011772.
  - Herich, H.; Kammermann, L.; Friedman, B.; Gross, D. S.; Weingartner, E.; Lohmann, U.; Spichtinger, P.; Gysel, M.; Baltensperger, U.; Cziczo, D. J. "Subarctic atmospheric aerosol composition: 2. Hygroscopic growth properties," *J. Geophys. Res.*, **2009**, *114*, D13204. doi:10.1029/2008JD011574.
  - Anderson, B. J.; Gross, D. S.; Musicant, D. R.; Ritz, A. R.; Smith, T. G.; Steinberg, L. E. "Adapting K-Medians to Generate Normalized Cluster Centers." *Proceedings of the Sixth SIAM International Conference on Data Mining*, Joydeep Ghosh, Diane Lambert, David Skillcorn, Jaideep Srivastava, editors, Society for Industrial and Applied Mathematics, Bethesda, MD, **2006**, 165-175.
  - Hall, B. D.; Olson, M. L.; Rutter, A. P.; Frontiera, R. R.; Krabbenhoft, D. P.; Gross, D.S.; Yuen, M.; Rudolph, T.M.; Schauer, J. J. "Atmospheric mercury speciation in Yellowstone National Park," *Sci. Total Environ.*, **2006**, *367*, 354-366, doi:10.1016/j.scitotenv.2005.12.007
  - Gross, D. S.; Gälli, M. E.; Kalberer, M.; Prevot, A. S. H.; Dommen, J.; Alfarra, M. R.; Duplissy, J.; Gaeggeler, K., Gascho, A.; Metzger, A.; Baltensperger, U. "Real-Time Measurement of Oligomeric Species in Secondary Organic

- Aerosol with the Aerosol Time-of-Flight Mass Spectrometer” *Anal. Chem.* **2006**, *78*, 2130 – 2137 doi: 10.1021/ac060138l
- Gross, D. S., Barron, A. R., Warren, B. S., Sukovich, E. M., Jarvis, J. C., Suess, D. T., Prather, K. A. “Stability of Single Particle Tracers for Differentiating Between Heavy- and Light-Duty Vehicle Emissions”, *Atmospheric Environment*, **2005**, *39*, 2889.
  - Huang, Z., Chen, L., Cai, J.-Y., Gross, D. S., Musicant D. R., Ramakrishnan, R., Schauer, J. J., Wright, S. J. “Mass Spectrum Labeling: Theory and Practice”, *Proceedings of the Fourth IEEE International Conference on Data Mining*, IEEE Press, **2004**, 122-129.
  - Ramakrishnan, R., Schauer, J. J., Chen, L., Huang, Z., Shafer, M. M., Gross, D. S., Musicant, D. R. “The EDAM Project: Mining Atmospheric Datasets”, *International Journal of Intelligent Systems*, **2005**, *20*, 759 - 787.
  - Okada, S., Kweon, C.-B., Stetter, J. C., Foster, D. E., Shafer, M. M., Christensen, C. G., Schauer, J. J., Schmitt, A. M., Silverberg, A. M., Gross, D. S., “Measurement of Trace Metal Composition in Diesel Engine Particulate and its Potential for Determining Oil Consumption: ICPMS and ATOFMS Measurements”, *Society of Automotive Engineers Technical Papers Series* **2003**, Number 2003-01-0076.
  - Gross, D. S.; Gälli, M. E., Silva, P. J., Wood, S. H., Liu, D. Y., Prather, K. A. “Single Particle Characterization of Automobile and Diesel Truck Emissions in the Caldecott Tunnel” *Aerosol Science and Technology*, **2000**, *32*, 152-163.
  - Gross, D. S.; Gälli, M. E., Silva, P. J., Prather, K. A. “Relative Sensitivity Factor for Main Group and Ammonium Cations in Single-Particle Aerosol Time-of-Flight Mass Spectra” *Anal. Chem.*, **2000**, *72*, 416-422.
  - Allen, J. O.; Hughes, L. S.; Kleeman, M. J.; Cass, G. R.; Gard, E. E.; Gross, D. S.; Galli, M. E.; Morrical, B. D.; Prather, K. A. “Determination Of The Particle Counting Efficiency; Chemical Sensitivities Of An Aerosol Time Of Flight Mass Spectrometer Under Ambient Sampling Conditions” *Environ. Sci. Technol.* **2000**, *34*, 211-217.
  - Hughes, L. S., Gross, D. S.; Allen, J. O.; Gard, E. E.; Kleeman, M. J.; Gälli, M. E.; Johnson, R. J.; Morrical, B. D.; Ferguson, D. P.; Dienes, T.; Noble, C. A.; Liu, D. -Y.; Silva, P. S.; Cass, G. R.; Prather, K. A. “The Size and Composition Distribution of Atmospheric Particles in Southern California”, *Environ. Sci. Technol.* **1999**, *33*, 3506-3515.
  - Gard, E. E.; Kleeman, M. J.; Gross, D. S.; Hughes, L. S.; Allen, J. O.; Morrical, B. D.; Ferguson, D. P.; Dienes, T.; Gälli, M. E.; Johnson, R. J.; Cass, G. R.; Prather, K. A. “Direct Observation of Gas-Particle Interchange in the Atmosphere” *Science*, **1998**, *279*, 1184-1187.
  - Gross, D. S.; Zhao, Y.; Williams, E. R. “Dissociation of Heme-Globin Complexes by Blackbody Infrared Radiative Dissociation: Molecular Specificity in the Gas-Phase?” *J. Am. Soc. Mass Spectrom.* **1997**, *8*, 519-524.
  - Gross, D. S.; Williams, E. R. “On the Dissociation and Conformation of Gas-Phase Methonium Ions” *Int’l J. Mass Spectrom. Ion Processes*, **1996**, *158*, 305-318.
  - Gross, D. S.; Schnier, P. D.; Rodriguez-Cruz, S. E.; Fagerquist, C. K.; Williams, E. R. “Protein Ion Conformations and Folding in Vacuo” *Proc. Nat’l Acad. Sci. U.S.A.*, **1996**, *93*, 3143-3148.
  - Gross, D. S.; Williams, E. R. “Structure and Reactivity of Gramicidin S (M + H + X)<sup>2+</sup> (X = Li, Na, K) Ions”, *J. Am. Chem. Soc.* **1996**, *118*, 202-204.
  - Gross, D. S.; Rodriguez-Cruz, S. E.; Bock, S.; Williams, E. R. “Measurement of Coulomb Energy and Dielectric Polarizability of Gas-Phase Diprotonated Diaminoalkanes”, *J. Phys. Chem.* **1995**, *99*, 4034-4038.
  - Gross, D. S.; Williams, E. R. “Experimental Measurement of Coulomb Energy and Intrinsic Dielectric Polarizability of a Multiply Protonated Peptide Ion Using Electrospray Ionization Fourier-Transform Mass Spectrometry”, *J. Am. Chem. Soc.* **1995**, *117*, 883-890.
  - Schnier, P. D.; Gross, D. S.; Williams, E. R. “Electrostatic Forces And Dielectric Polarizability Of Multiply Protonated Gas-Phase Cytochrome *c* Ions Probed By Ion/Molecule Chemistry”, *J. Am. Chem. Soc.* **1995**, *117*, 6747-6757.
  - Schnier, P. D.; Gross, D. S.; Williams, E. R. “On the Maximum Charge State of Multiply Protonated Ions Generated By Electrospray Ionization”, *J. Am. Soc. Mass Spectrom.* **1995**, *6*, 1086-1097.

#### BOOK CHAPTERS AND CURRICULAR MODULES:

- Gilbert, L.; Gross, D. S.; Kreutz, K. “Systems Thinking” **2016**, *InTeGrate*. Retrieved Sept. 5, 2018, [https://serc.carleton.edu/integrate/teaching\\_materials/syst\\_thinking/index.html](https://serc.carleton.edu/integrate/teaching_materials/syst_thinking/index.html).
- **Gross, D. S.** “A Model for Collaborative Undergraduate Research: Integrating Disciplines and Institutions to Better Understand the Earth’s Atmosphere” **2007**, In C. Rutz and M. Savina (Eds.), *Building intellectual community through collaboration* (pp. 105 – 120). Northfield, MN: College City Publications.

## INVITED TALKS:

- **Presentation, U.S. Embassy, Addis Ababa, Ethiopia (8/7/2018)** “A Student-Centered Educational Collaboration Focusing on Sustainable Environments: Carleton College and Addis Ababa University Linkage.”
- **Chemistry Seminar, Grinnell College, Grinnell, IA (4/26/2018)** “Particulate Air Pollution: Impacts and Remedies in Household and Urban Settings.”
- **Chemistry Seminar, Smith College, Northampton, MA (3/21/2017)** “Particulate Air Pollution: Impacts and Remedies in Household and Urban Settings.”
- **Climate Sustainability Lecture Series, Nova Southeastern University, Ft. Lauderdale, FL (3/21/2016)** “Particulate Air Pollution: Impacts and Remedies in Household and Urban Settings.”
- **Department of Environmental Science, Peking University, Beijing, China (12/16/2013)** “Real-Time Chemical Analysis of Atmospheric Aerosol Particles.” Department seminar.
- **Department of Chemistry, St. Thomas University, St. Paul, MN (11/8/2013)** “Real-Time Chemical Analysis of Atmospheric Aerosol Particles.” Department seminar.
- **Consortium for Aerosol Science and Technology, Lund University, Sweden (3/25/2013)**, “Real-time analysis of atmospheric aerosol particles: from single-particles to emissions sources,” Consortium for Aerosol Science and Technology Seminar.
- **Department of Chemistry, University of Iowa (12/6/2010)**, “Real-time analysis of atmospheric aerosol particles: from single-particles to emissions sources.” Physical Chemistry Seminar.
- **NASA Ames Research Seminar, Mountain View, CA (7/2008)**, “Chemical Composition of Individual Aerosol Particles: SOA, Biofuels, and Beyond.”
- **Department of Chemistry, University of Wisconsin – Madison (3/26/2008)**, Physical Chemistry Seminar, “Chemical Composition of Individual Aerosol Particles: SOA, Biofuels, and Beyond.”
- **School of Earth and Atmospheric Sciences, University of Leeds, UK (4/5/2008)**, “Chemical Composition of Individual Aerosol Particles: SOA, Biofuels, and Beyond.”
- **Second European On-line Mass Spectrometry Workshop, Leeds, UK, (4/10/2008)** “Data analysis methods for atmospheric data sets from multiple instruments: applications and software description,” Keynote speech.
- **Department of Mechanical Engineering, University of Minnesota (2006)**, Particle Technology Laboratory Seminar, “Measuring Oligomers in Secondary Organic Aerosol with the Aerosol Time-of-Flight Mass Spectrometer.”
- **Eidgenössische Technische Hochschule (ETH), Zürich Switzerland (1/23/2006)**, Atmospheric Chemistry Seminar, “Adventures with the ATOFMS: Initial Results from MS-ChAOS and AEROWOOD.”
- **European On-line Particle Mass Spectrometry Workshop, JRC Italy (11/29/2005)**, “EnChilADA: The development of an integrated atmospheric data mining application,” Ispra, Italy.
- **Grinnell College, Grinnell, IA (2/24/2004)**, Department Seminar, “Single Particle Mass Spectrometry: Composition of Atmospheric Aerosols in Urban and Rural Locations”
- **Bowdoin College, Brunswick, ME (12/3/2003)**, Department Seminar, “Single Particle Mass Spectrometry: Composition of Atmospheric Aerosols in Urban and Rural Locations”
- **Indiana University, School of Public and Environmental Affairs (3/27/03)**, Department Seminar, “Single Particle Mass Spectrometry for the Analysis of Vehicle Emissions: A Tale of Three Studies”
- **Delaware Valley Mass Spectrometry Discussion Group, Philadelphia, PA (11/11/2002)**, “Single Particle Mass Spectrometry for the Analysis of Vehicle Emissions: A Tale of Three Studies”
- **Haverford College, Haverford, PA (11/8/2002)**, Chemistry Department Seminar, “Single Particle Mass Spectrometry for the Analysis of Vehicle Emissions: A Tale of Three Studies”
- **Minnesota Mass Spectrometry Discussion Group, St. Paul, MN (11/1/2002)**, “Mass Spectrometry of Individual Aerosol Particles in the Atmosphere: Atmospheric Reactions and Emissions Characterization”
- **34th American Chemical Society Great Lakes Regional Meeting, Minneapolis, MN (6/2002)**, Galush, W. J.; Jarvis, J. C.; Silverberg, A. M.; Sukovich, E. M.; **Gross, D. S.** "Analysis of Individual Vehicle Emissions Particles with Real-Time Mass Spectrometry," Oral presentation.
- **Macalester College, St. Paul, MN (9/26/2001)**, Chemistry Department Seminar: “A Breath of Fresh Air? Characterization of Tropospheric Aerosol Particles in Real Time”
- **Federation of Analytical Chemistry and Spectroscopy Societies Annual Meeting, Nashville, TN (9/2000)**, **Gross, D. S.**, Barron, A. R.; Warren, B. S.; Sukovich, E. M., Jarvis, J. C.; Prather, K. A. "Vehicle Emissions Markers in Individual Atmospheric Aerosol Particles" Invited Oral Presentation.
- **University of Iowa, Iowa City, IA (4/13/2000)**, Chemistry Department Physical Chemistry Seminar: "Single-Particle Analysis: Recent Results with the Aerosol Time-of-Flight Mass Spectrometer"
- **University of Wisconsin, Madison, WI (10/29/1999)**, Water Chemistry Program: "Real-Time Single Particle Information Using the Aerosol Time-of-Flight Mass Spectrometer (ATOFMS)"

**PRESENTATIONS WITH PUBLISHED ABSTRACTS:**

(*undergraduate students are underlined, \* indicates presenting author*)

- **Gross, D. S.\***, Nega, T. “The Earth's Climate and Human Health Taught Through the Lens of Clean Cookstoves” Oral Presentation at the International Aerosol Conference, St. Louis, MO, September 2018.
- **Gross, D. S.\***, Maini Rekdal, V. “Young Chefs Program Lesson Plan Development: A Student-Led Independent Study Project in Cooking and Science” Oral Presentation at the American Chemical Society National Meeting, Boston, MA, August 2018.
- Smith, C.\*; Nega, T.; **Gross, D. S.** “Aerosol Particle Emissions and Efficiency of Cookstove Prototypes for Use in Ethiopia” Poster presentation at the American Association for Aerosol Research, Raleigh, NC, October 2017. **Poster selected as one of ~10 recipients of a “Best Poster Award.”**
- Smith, C.; Nega, T.; **Gross, D. S.\*** “Chemical Composition of Particle Emissions from Clean Cookstoves” Oral presentation at the American Association for Aerosol Research, Raleigh, NC, October 2017.
- He, S.\*; Li, L., Duan, H., Naqwi, A., Flowers, J., Grubb, E., Au, L., **Gross, D. S.**, Jiang, L., Hogan, C. J. “The Development of Electrostatic Precipitation-Electrospray Ionization Mass Spectrometry (EP-ESI-MS) for Atmospheric Aerosol Analysis” Oral presentation at the American Geophysical Union Fall Meeting, San Francisco, December, 2015.
- Flowers, J.\*, Grubb, E.\*, Au, L., He, S.; Li, L., Duan, H., Naqwi, A., Hogan, C., **Gross, D.S.** “Identification of Organic Components in Aerosols Sampled with Electrostatic Precipitation-Electrospray Ionization Mass Spectrometry (EP-ESI-MS)” Poster presented at the American Association for Aerosol Research national conference, Minneapolis, Minnesota, October, 2015.
- Au, L.\*, Janes, A., Polania-Gonzalez, E. Flowers, J., Grubb, E., **Gross, D. S.** “Particle Mass Concentration Determined from Single-Particle Mass Spectrometry Number Concentrations: Stability of Number Scaling Factors Over Multiple Seasons” Poster presented at the American Association for Aerosol Research national conference, Minneapolis, Minnesota, October, 2015.
- Janes, A.\*; **Gross, D. S.** “Quantitative analysis of single-particle mass spectra acquired in Northfield, MN” Poster presentation at the American Chemical Society National Meeting, Denver, CO, March 2015.
- **Gross, D.S.\***; Iverson, E. R.; Manduca, C. A. “Building Community in STEM at Carleton College: Cohort Program Components and Evaluation.” Poster presentation at the Washington University Circle Conference on Integrating Cognitive Science with Innovative Teaching in STEM Disciplines, September 2014.
- Polania-Gonzalez, E.\*; Janes, A.N.; **Gross, D. S.** “Aerosol Chemistry in Northfield : Single Particle Measurements” Poster presentation at the North Star STEM Alliance Fall 2014 Kick-Off, September 2014, Minneapolis, MN.
- Healy, R. M.\*; Jeong, C. H., Wenger, J. C., **Gross, D. S.**, Arndt, J.; O’Connor, I. P.; McGillicuddy, E.; Sodeau, J. R.; Yang, X.; Chen, H.; Huang, Y.; Sierau, B.; Dall’Osto, M.; Riemer, N.; West, M.; Murphy, M.; Evans, G. J. “A Global Library of Single Particle Mass Spectrometry Data” Poster presentation at the International Aerosol Conference, Busan, Korea, August/September 2014.
- Gross, D. S.\* “Air Quality in the Northfield Community: A Class Project for First-Year Students” Oral presentation at the Association for Environmental Studies and Sciences Annual Meeting, Pittsburgh, PA, June 2013.
- McClellan, M. J.\*, **Gross, D. S.** “After The Spray: Investigating The Fate Of Particles From Cyclodextrin-Containing Air Fresheners” Oral presentation at the Minnesota Academy of Sciences Meeting, Minneapolis, MN, April 2013.
- McDuffie, E. E.\*, **Gross, D. S.** “A New Instrument For Analysis Of Single Aerosol Particles: The Coupling Of ATOFMS And LIBS” Poster presentation at the Minnesota Academy of Sciences Meeting, Minneapolis, MN, April 2013.
- McClellan, M. J.\*, Smyth, A. M., **Gross, D. S.** “Cyclodextrin-Containing Air Fresheners: A New Pathway for Inhaling Pollutants?” Poster and oral presentation at the Minnesota Academy of Sciences Meeting, Northfield, MN, April 2012.
- McClellan, M. J.\*, Smyth, A. M., **Gross, D. S.** “Cyclodextrin-Containing Air Fresheners: A New Pathway for Inhaling Pollutants?” Poster and oral presentation at the Minnesota Academy of Sciences Meeting, Northfield, MN, April 2012.
- Smyth, A. M.\*; Thompson, S.; **Gross, D. S.**; Snyder, D. C.; Schauer, J. J.; de Foy, B. “Particle Sources in Milwaukee, WI Studied with Single-Particle Mass Spectrometry” Poster presented at the American Chemical Society National Meeting, San Diego, CA, March 2012.
- Smyth, A.; Thompson, S.; **Gross, D. S.\***; de Foy, B.; Snyder, D.; Schauer, J. “Characterization of Particle Emissions from Great Lakes Shipping.” Oral presentation at the American Society for Aerosol Research, Orlando, FL, October 2011.
- **Gross, D. S.\***; Walser-Kuntz, D. “Particulate Matter and Asthma Triggers in Homes: A Combined Civic Engagement and Research Project for Undergraduate Students” Oral presentation at the American Society for Aerosol Research, Orlando, FL, October 2011.

- Thompson, S. L.\*, Smyth, A. M., **Gross, D. S.**, Snyder, D. C., Schauer, J. J. “Temporal Dynamics and Sources of Particle Types in Milwaukee, WI Studied with Single-Particle Mass Spectrometry” Poster presented at the American Association for Aerosol Research national conference, Portland, Oregon, October, 2010.
- Gianini, M. F. D.\*; Hueglin, C.; Herich, H.; Lanz, V. A.; Prévôt, A. S. H., **Gross, D. S.** “Source apportionment of ambient aerosols based on a combined analysis of ToF-AMS and ATOFMS mass spectra” Oral presentation at the International Aerosol Conference, Helsinki, Finland, August 30 – September 3, 2010.
- **Gross, D. S.\***; Thompson, S. L.; Smyth, A. M.; Gälli, M. E. “Temporal Effects of Clustering Single-Particle Mass Spectra from Ambient Measurements” Poster presented at the International Aerosol Conference, Helsinki, Finland, August 30 – September 3, 2010.
- Wang, L.\*; **Gross, D. S.**; Dutcher, D. D.; Olson, B.; Kuehn, T. M. “Chemical Composition of Cooking Aerosols” Poster presented at the American Chemical Society National Meeting, San Francisco, CA, March 21 – 25, 2010. **Poster selected as one of 21 presentations out of ~12,500 for a press release by ACS.**
- Thompson, S. L.\*; Hamilton, R. M.; Masango, S.; Zach, M.; **Gross, D. S.** “Particle Emissions from the Construction-Related Grinding of Metal and Carpet Glue” Poster presented at the American Association for Aerosol Research National Meeting, Minneapolis, MN, October. 26 – 30, 2009.
- Hamilton, R. M.\*; Tell, K. A.; **Gross, D. S.**; Van Wyngarden A. L.; Iraci, L. T. “Mass Spectrometry for the Analysis of SOA Model Compounds” Poster presented at the American Association for Aerosol Research National Meeting, Minneapolis, MN, October. 26 – 30, 2009.
- Masango, S.\*; **Gross, D. S.**; Snyder, D. C.; Shafer, M. M.; Schauer, J. J. “Single-Particle Measurements in Dearborn, Michigan” Poster presented at the American Association for Aerosol Research National Meeting, Minneapolis, MN, October. 26 – 30, 2009.
- Dutcher, D.\* Pagels, J.; Bika, A.; Franklin, L.; Stolzenburg, M.; Thompson, S.; Medrano, J.; Brown, N.; Gross, D.; Kittelson, D.; McMurry, P. “Testing Emissions from Biodiesels” Poster presented at the American Association for Aerosol Research National Meeting, Minneapolis, MN, October. 26 – 30, 2009.
- Tell, K. A.\*; **Gross, D. S.**; Van Wyngarden, A. L.; Iraci, L. T. “Identification of Components in Organic Films by Coupled Liquid Chromatography-Mass Spectrometry” Poster presented at the American Geophysical Union National Meeting, San Francisco, CA, December 15 – 19, 2008.
- Hamilton, R. M.\*; **Gross, D. S.**; “Detection of Sulfate Esters as a Function of Particle Composition using Single Particle Mass Spectrometry” Poster presented at the American Geophysical Union National Meeting, San Francisco, CA, December 15 – 19, 2008.
- Friedman, B.\*; **Gross, D. S.**; Herich, H.; Lohmann, U.; Cziczo, D.; Holst, T.; Arneth, A. “Composition of Individual Aerosol Particles Measured in the Arctic” Poster presented at the American Geophysical Union National Meeting, San Francisco, CA, December 10 – 14, 2007.
- Liepmann, C.\*; **Gross, D. S.**; Sandradewi, J.; Prevot, A.; Baltensperger, U.; Benzaid, S.; Christensen, J.; Turetsky, E.; Musicant, D.. “Single-Particle Composition Measured in an Alpine Valley: Wood Smoke, EC and BC” Poster presented at the American Geophysical Union National Meeting, San Francisco, CA, December 10 – 14, 2007.
- Medrano, J.\*; **Gross, D. S.**; Dutcher, D.; Drayton, M.; Stolzenburg, M.; Kittelson, D.; McMurry, P. “Chemical Composition of Aerosol Particles Emitted by a Passenger Car Engine Fueled by Ethanol/Gasoline Mixtures” Poster presented at the American Geophysical Union National Meeting, San Francisco, CA, December 10 – 14, 2007.
- **Gross, D. S.\***; Dutcher, D. D.; Pagels, H. J.; Stolzenburg, M. R.; Franklin, L.; Bika, A., Kittelson, Drayton, M.; D. R.; McMurry, P. H. “Biomass Combustion Aerosols Studied With Single-Particle Mass Spectrometry.” Poster Presentation, June 2007, 55<sup>th</sup> Annual ASMS Conference on Mass Spectrometry and Allied Topics, Indianapolis, IN.
- Herich, H.\*; Cziczo, D. J.; **Gross, D. S.**; Gälli, M. E.; Lohmann, U. “Single Particle Mass Spectrometry of Oligomerization in Secondary Organic Aerosols in the PSI Smog Chamber ” Poster Presentation, Workshop on Humic-like substances and their role in the atmosphere, November 2006, Budapest, Hungary.
- **Gross, D. S.\***; Schauer, J. J.; Chen, L.; Ramakrishnan, R.; Ritz, A.; Smith, T.; Musicant, D. R. “Enchilada: A Data-Mining Application for the Analysis of Atmospheric Mass Spectrometry Data.” Poster Presentation, September 2006, International Aerosol Conference, St. Paul, MN USA.
- **Gross, D. S.\***; Gälli, M. E.; Kalberer, M; Prevot, A. S. H.; Dommen, J.; Alfara, M. R.; Duplissy, J.; Gaeggeler, K., Gascho, A.; Metzger, A.; Baltensperger, U. “Real-Time Measurement of Oligomeric Species in Secondary Organic Aerosol with the Aerosol Time-of-Flight Mass Spectrometer.” Oral Presentation, September 2006, International Aerosol Conference, St. Paul, MN USA.
- **Gross, D. S.\***; Gälli, M. E.\*; Kalberer, M; Prevot, A. S. H.; Dommen, J.; Baltensperger, U. “Online Real-Time Detection of Oligomers in Secondary Organic Aerosol with the ATOFMS.” Poster Presentation, June 2006, 54<sup>th</sup> Annual ASMS Conference on Mass Spectrometry and Allied Topics, Seattle, WA.

- Ault, A.P.\*, Yuen, M., Frontiera, R., Schmitt, A. M., Olson, M., Hall, B. D., Schauer, J. J., **Gross, D. S.** "Trends in 0.2-3 $\mu$ m ambient particles and their relationship to atmospheric mercury" Poster Presentation, March 2005, American Chemical Society National Meeting, San Diego, CA.
- Yuen, M.\*, Ault, A.P., **Gross, D. S.**, Anderson, B., Ritz, A., Musicant, D. R., Schauer, J. J., Chen, L., Chen, B.-C., Ramakrishnan, R. "Analysis of complex real-time atmospheric data sets: A data mining approach" Poster Presentation, March 2005, American Chemical Society National Meeting, San Diego, CA.
- Dutcher, D. D.\*, Park, K., McMurry, P. H., Zachariah, M. R., Gälli, M., **Gross, D. S.**, Schmitt, A. M., Silverberg, A. M. "Atmospheric Aerosol Composition As A Function Of Hygroscopicity, Volatility And Density," Poster presentation, October 2003, American Association for Aerosol Research Conference, Anaheim, CA.
- Schmitt, A. M.\*; **Gross, D. S.**, Shafer, M. M., Rudolph, T. M., Schauer, J. J., Olson, M., Krabbenhoft, D. "The Effects Of Particle Matrix On Single-Particle Mass Spectra Of Mercury And Metal Containing Particles," Poster presentation, October 2003, American Association for Aerosol Research Conference, Anaheim, CA.
- Frontiera, R.\*, Mattmann, M., Schmitt, A. M., **Gross, D. S.**, Edgerton, E. "Long Term Trends And Short Term Spikes In 0.2 – 3 Micrometer Particles During ANARChE 2002," Poster presentation, October 2003, American Association for Aerosol Research Conference, Anaheim, CA.
- **Gross, D. S.\***, Schmitt, A. M., Silverberg, A. M., Schauer, J. J., Shafer, M. M., Foster, D. E., Kweon, C.-B., Okada, S. "Diesel Engine Emissions as a Function of Engine Operating Conditions, A Single-Particle Mass Spectrometry Study," Poster presentation, June 2003, 51st Annual ASMS Conference on Mass Spectrometry and Allied Topics, Montreal, Canada.
- **Gross, D. S.**; Schmitt, A. M.\*; Silverberg, A. M.; Okada, S.; Kweon, C. B.; Stetter, J. C.; Shafer, M. M.; Christensen, C. G.; Foster, D. E.; Schauer, J. J.; "Single particle analysis of diesel particulate matter: A comparison of real-time and integrated measurements" Poster Presentation, March 2003, American Chemical Society National Meeting, New Orleans, LA.
- Kweon, C.-B.; Okada, S.; Foster, D.; Christenson, C. G.; Shafter, M.; Schauer, J. J.; Schmitt, A. M.; Silverberg, A. M.; **Gross, D. S.\*** "Single Particle Mass Spectrometry for the Analysis of Diesel Particulate Matter: Effect of Engine Operating Conditions," Oral presentation, October, 2002, American Association for Aerosol Research Conference, Charlotte, NC.
- Gälli, M. E.; Holm, R.; Dutcher, D. D.; Zachariah, M. R.; McMurry, P. H.; Schmitt, A.M.; Silverberg, A. M.; **Gross, D. S.\*** "Integration Of An Aerodynamic Lens System With TSI's Aerosol Time-Of-Flight Mass Spectrometer (Model 3800 ATOFMS)," Poster presentation, October 2002, American Association for Aerosol Research Conference, Charlotte, NC.
- Jarvis, J. C.\*; Sukovich, E. M.; Suess, D. T.; Prather, K. A.; **Gross, D. S.** "Relationship Between Size Distribution and Individual Particle Composition from Individual Particles Sampled in a Road Tunnel," Poster presentation, May 2001, 49th Annual ASMS Conference on Mass Spectrometry and Allied Topics, Chicago, IL.
- Sukovich, E. M.\*; Jarvis, J. C.; Suess, D.T.; Prather, K.A.; **Gross, D.S.** "Identification of Marker Ions from Emissions of Gasoline and Diesel Fueled Vehicles by Single Particle Aerosol Time-of-Flight Mass Spectrometry," Poster presentation, May 2001, 49th Annual ASMS Conference on Mass Spectrometry and Allied Topics, Chicago, IL.
- Barron, A. R.\*; Warren, B. S.; **Gross, D. S.**; Liu, D.-Y., Wenzel, R.; Prather, K. A. "Real-Time Single Particle Information Using the Aerosol Time-of-Flight Mass Spectrometer at the Southern Center for the Integrated Study of Secondary Air Pollutants (SCISSAP) Atlanta SuperSite (1999)". Poster presentation, December 1999, American Geophysical Union National Meeting, San Francisco, CA.
- Warren, B. S.\*; Barron, A. R.; **Gross, D. S.**; Liu, D.-Y., Wenzel, R.; Prather, K. A. "Real-Time Single Particle Information Using the Aerosol Time-of-Flight Mass Spectrometer at the Southern Center for the Integrated Study of Secondary Air Pollutants (SCISSAP) Atlanta SuperSite (1999)". Poster presentation, March 2000, American Chemical Society National Meeting, San Francisco, CA.
- **Gross, D. S.\***, Kleeman, M. J., Cass, G. R., Prather, K. A. "Real-Time Measurement of Heterogeneous Chemistry in Atmospheric Marine Aerosols" Oral presentation, October 1997 American Association for Aerosol Research Conference, Denver, CO.
- **Gross, D. S.\***, Gälli, M. E., Prather, K. A. "Relative Response of Ion Signals For Quantitation of Species In Atmospheric Aerosol Particles" Poster presentation, October 1997 American Association for Aerosol Research Conference, Denver, CO.
- **Gross, D. S.\***; Prather, K. A.. "Real-Time Analysis of Ambient Atmospheric Particles" Invited poster presentation, American Chemical Society National Meeting, Analytical Division, Las Vegas, NV, 1997.
- **Gross, D. S.\***; Gälli, M. E.; Gard, E. E.; Morrical, B. D.; Dienes, T.; Ferguson, D. F.; Wood, S. H.; Prather, K. A.. "Atmospheric Aerosol Analysis: A Comparison of Single Particle ATOFMS and Traditional Techniques" Poster



- presentation, Proceedings of the 45th ASMS Conference on Mass Spectrometry and Allied Topics, Palm Springs, CA, 1997.
- **Gross, D. S.\***; Schnier, P. D.; Williams, E. R. “Solvation Effects on the Stability and Reactivity of Multiply Charged Gas-Phase Ions” Poster presentation, Proceedings of the 44th ASMS Conference on Mass Spectrometry and Allied Topics, Portland, OR, 1996.
  - Schnier, P. D.\*; **Gross, D. S.**; Price, W. D.; Williams, E. R. “Blackbody Infrared Radiative Dissociation: Binding Energies of Non-Covalent Biomolecule Complexes in the Gas Phase” Poster presentation, Proceedings of the 44th ASMS Conference on Mass Spectrometry and Allied Topics, Portland, OR, 1996.
  - **Gross, D. S.\***; Rodriguez-Cruz, S. E.; Williams, E. R. “The Influence of Ion Structure on Coulomb Energy in Multiply Charged Ions” Poster presentation, Proceedings of the 43rd ASMS Conference on Mass Spectrometry and Allied Topics, Atlanta GA, 1995.
  - Williams, E. R.; **Gross, D. S.\***; Schnier, P. D.; Rodriguez-Cruz, S. E.; Fagerquist, C. K. “Electrostatic Interactions in Multiply Protonated Gas-Phase Ions” Poster presentation, Proceedings of the 43rd ASMS Conference on Mass Spectrometry and Allied Topics, Atlanta GA, 1995.
  - Schnier, P. D.\*; **Gross, D. S.**; Williams, E. R. “Modeling the Maximum Charge State and Proton Transfer Reactivity of Electrospray Ions” Poster presentation, Proceedings of the 43rd ASMS Conference on Mass Spectrometry and Allied Topics, Atlanta GA, 1995.
  - Fagerquist, C. K.\*; Schnier, P. D.; **Gross, D. S.**; Rodriguez-Cruz, S. E.; Williams, E. R. “Tertiary Structure of Protein Ions in the Gas-Phase” Poster presentation, Proceedings of the 43rd ASMS Conference on Mass Spectrometry and Allied Topics, Atlanta GA, 1995.
  - **Gross, D. S.\***; Schnier, P. D.; Williams, E. R. “The Role of Charge in Protein Ion Stability and Conformation” Poster presentation, Proceedings of the 42nd ASMS Conference on Mass Spectrometry and Allied Topics, Chicago IL, 1994.
  - Johnson, P. J.\*; **Gross, D. S.**; Schnier, P. D.; Williams, E. R. “CE/MS Using a Novel External Ion Source Fourier-Transform Mass Spectrometer” Poster presentation, Proceedings of the 42nd ASMS Conference on Mass Spectrometry and Allied Topics, Chicago IL, 1994.
  - **Gross, D. S.\***; Mills, P. D.; Tien, L. T.; Johnson, P. J.; Williams, E. R. “Protein Structural Elucidation by Electrospray Ionization Tandem Fourier-Transform Mass Spectrometry”, Poster presentation, Proceedings of the 41st ASMS Conference on Mass Spectrometry and Allied Topics, San Francisco, CA, 1993.

#### **ADDITIONAL CONFERENCE PRESENTATIONS:**

- Gross, D. S.\*; Iverson, E.\*; North, W.\* “Engaging A Network of Groups to Enhance Cohort Program Effectiveness” Workshop presented at the AAC&U STEM Conference, This Changes Everything, November 2020, Virtual.
- Gross, D. S.\*; Walser-Kuntz, D., Hofmeister, G., Iverson, E. “Success Of Low-Income, Academically-Talented Students In Carleton’s ‘Broader Focus’ Project” Poster Presentation, September 2019, American Association for the Advancement of Science 2019 S-STEM Symposium, Washington, DC.
- Swartz, J.\*; Robinson, G.\*; Gross, D.\*; Iverson, E.\* “Using Qualitative Data to Inform Support of Academic Success for Students from Groups Traditionally Underrepresented in STEM” Seminar presented, January 2018, American Association of Colleges and Universities National Meeting, Washington, DC.
- Eblen-Zayas, M.\*; Gross, D. S.\*; Walser-Kuntz, D.\* “Civic Engagement Models to Foster Integrative Science Education” Workshop presented, November 2015, American Association of Colleges and Universities Crossing Boundaries: Transforming STEM Education Conference, Seattle, WA.
- Gilbert, L.\*; Gross, D.\*; Kreutz, K.\* “Earth Systems Thinking: An InTeGrate Module That Can Be Used In Any Course” Poster presentation, July 2015 Earth Educator’s Rendezvous, Boulder, CO.
- Gross, D. S.\*; Iverson, E. R.; Willett, G.; Manduca, C.; “Broadening Participation through a Community-Building Approach in STEM: Carleton College’s Cohort Program Components and Evaluation” Oral presentation, July 2015 Earth Educator’s Rendezvous, Boulder, CO.
- Gross, D. S.\*; Chihade, J. C.; Iverson, E.; Manduca, C. “Building Community in STEM at Carleton College: Cohort Program Components and Evaluation.” Poster presentations, October 2013, American Association of Colleges and Universities Transforming STEM Education: Inquiry, Innovation, Inclusion, and Evidence Network for Academic Renewal Conference, San Diego, CA.
- Gross, D. S.\*; Walser-Kuntz, D. R.\*; Willett, G.\* “A Holistic Approach to Supporting Students in Math and Science Studies” Workshop presented, March 2012, American Association of Colleges and Universities Student Success: Pushing Boundaries, Raising Bars Conference, Seattle, WA.
- Smyth, A.\*; Thompson, S. L.; Gross, D. S.; Snyder, D. C.; Schauer, J. J.; de Foy, B.; “Size, Chemical Composition and Sources of Industrial Atmospheric Aerosol Particles” Poster presentation, April 2011 Council on Undergraduate Research Posters on the Hill Event, Washington, DC.

- Gross, D. S.\*; Walser-Kuntz, D.; Ciner, E.; Willett, G.; Iverson, E.; Manduca, C. "Two Cohort Programs Contributing to Broadening Access to the Sciences at Carleton College" Poster presentation, June 2010 Council on Undergraduate Research National Meeting, Ogden, UT.
- Galush, W. J.\*; Silverberg, A. M.\*; Gross, D. S. "Mass Spectrometry of Individual Aerosol Particles: Correcting Size Bias within ATOFMS Data" Poster presentation, June 2002 American Chemical Society Great Lakes Regional Meeting, Minneapolis, MN.
- Gross, D. S.\* and Prather, K. A. "Atmospheric Aerosol Analysis: A Comparison of Single Particle ATOFMS and Traditional Techniques" Invited oral presentation, June 1997 Atmospheric Chemistry Conference for Emerging Senior Scientists IV, Boston, MA.
- Gross, D. S.\* and Prather, K. A. "Atmospheric Aerosol Analysis: A Comparison of Single Particle ATOFMS and Traditional Techniques" Invited poster presentation, June 1997 Gordon Research Conference on Atmospheric Chemistry, Newport, RI.
- Gross, D. S.\*, Gard, E. E., Prather, K. A. "In-Situ Measurement of the Size and Composition of Airborne Particulate Matter Using a Portable ATOFMS" Oral presentation, January 1997 Lake Arrowhead Conference on Ion-Molecule Chemistry, Lake Arrowhead, CA.
- Gross, D. S.\*, Rodriguez-Cruz, S. E., Williams, E. R. "The Effect of Ion Structure on Coulomb Energy in Multiply Charged Ions" Poster presentation, January 1996 Lake Arrowhead Conference on Ion-Molecule Chemistry, Lake Arrowhead, CA.
- Gross, D. S.\*, Rodriguez-Cruz, S. E., Schnier, P. D., Williams, E. R. "Measuring Coulomb Repulsion in Multiply Protonated Ions" Oral presentation, January 1995 Lake Arrowhead Conference on Ion-Molecule Chemistry, Lake Arrowhead, CA.
- Gross, D. S.\*, Schnier, P. D., Williams, E. R. "The Role of Charge In Protein Ion Stability and Conformation" Oral presentation, January 1994 Lake Arrowhead Conference on Ion-Molecule Chemistry, Lake Arrowhead, CA.

**EXTERNAL RESEARCH SUPPORT:**

- *Co-Principal Investigator:* "A Student-Centered Educational Collaboration Focusing on Sustainable Environments: Carleton College and Addis Ababa University Linkage." **U.S.-Ethiopian University Linkages Seed Grant** from the American embassy in Addis Ababa, Ethiopia. September 2017 – August 2018; Award = \$18,000; co-PI Tsegaye Nega, ENTS, Carleton College.
- *Subaward Recipient:* "Chemical Composition Measurement of Atmospheric Aerosols in Real Time." **DOE-SBIR Grant to MSP Corp.**, 2/2015 – 12/2015; Subaward = \$22,235 to Carleton College.
- *Principal Investigator:* "MRI: Acquisition Of An LTQ-Velos-Pro For Research And Research Training In Chemistry And Biochemistry At Carleton College" **NSF MRI**, 8/1/2012 – 7/31/15; Award = \$351,622; with co-PIs in Chemistry Department.
- *Co-Principal Investigator:* "ROA Proposal for the Inclusion of the ATOFMS in Measurements and Models in Summer 2010," **NSF ROA**, 5/30/2010 – 9/1/2010; Award = \$35,986; with B. de Foy, St. Louis University.
- **European Science Foundation (ESF) Interdisciplinary Tropospheric Research (INTROP): from the Laboratory to Global Change Exchange Visit Grant:** €5300 to support travel and living expenses during 2005/2006 sabbatical.
- **Associated Colleges of the Midwest Faculty Career Enhancement Grant:** "Adding The ATOFMS To AEROWOOD: An Opportunity To Enhance Our Understanding Of Atmospheric Aerosol Particle Chemical Signatures" Through the Enhancing Scholarly Agendas initiative. \$3000 toward 2005/2006 sabbatical logistical support.
- *Co-Principal Investigator:* "ITR: Collaborative Focused Mining of Atmospheric Aerosol Datasets" *Integration of mass Spectrometry and Environmental Monitoring*," **NSF-IIS-ITR (medium)**, 11/2003 – 11-2007; Total Award = \$2,040,000 to the University of Wisconsin, Madison (PI: R. Ramakrishnan, Computer Science Department), subaward to Carleton College (D. Gross and D. Musicant)= \$287,587.
- *Co-Principal Investigator:* "Speciated Atmospheric Mercury: Gas/Particle Partitioning, Transformations, and Source Characterization," **EPA-STAR**, 10/2002 – 9/2005; Total Award = \$898,387 to the University of Wisconsin, Madison (PI: J. J. Schauer, Environmental Chemistry and Technology Program), subaward to Carleton College (D. Gross) = \$36,000 plus logistics, travel, etc. through main award.
- *Co-Principal Investigator:* "Composition of Individual Particles Segregated According to Electrical Mobility, Hygroscopicity, Volatility and Mass," **NSF-ATM**, 9/2001 – 1/2004; Total Award = \$605,618 to the University of Minnesota, Twin Cities (PI: P. H. McMurry, Department of Mechanical Engineering), subaward to Carleton College (D. Gross) = \$122,203.

- **Principal Investigator:** “Acquisition of an Aerosol Time-of-Flight Mass Spectrometer for Research and Undergraduate Research Training in Properties of Atmospheric Aerosol particles,” NSF-MRI, 8/2001 – 8/2004; Total Award = \$305,000 to Carleton College.
- **Co-Principal Investigator:** “Acquisition of an Electrospray Ionization/Atmospheric Pressure Chemical Ionization Ion Trap Mass Spectrometer to Support Student-Faculty Research at Carleton College,” NSF-CRIF 9/2000 – 8/2003; Total Award = \$106,050 to Carleton College.
- **Co-Principal Investigator:** “Integration of Capillary Column Gas Chromatography into Project-Oriented Laboratories,” NSF-CCLI 9/2000 – 8/2003; Total Award = \$35,050 to Carleton College.

**OTHER EXTERNAL GRANTS:**

- **Principal Investigator:** “Becoming a Scientist: Supporting Success of Low-Income, Academically Talented Students in the Carleton College “Broader FOCUS” Project” NSF S-STEM, 9/1/2016 – 9/31/2022; Award = \$1,000,000. Includes summer support for cohort program administration.
- **Principal Investigator:** “Cohort Development: Growing a Community of URM Scientists at Carleton” NSF S-STEM, 9/1/2009 – 8/31/2015; Award = \$600,000. Includes summer support for cohort program administration.
- **Co-Leader, AALAC/Mellon 23 Workshop:** “Learning And Teaching Physical Sciences In The Liberal Arts College And University 2: Identification Of Supports For Student Success”, with colleagues from Carleton, SERC, and Swarthmore, 2011; Award = \$25,000 for workshop.

**INTERNAL RESEARCH/TEACHING SUPPORT:**

- **Curriculum Innovation Grant:** From Dean of the College and the Global Engagement Initiative, to develop “Climate Change and Human Health” (with Tsegaye Nega). Summer 2017. Course taught Spring 2018 as linked course with Addis Ababa University.
- **Curriculum Innovation Grant:** From Dean of the College, to develop Principles of Chemistry II Laboratory (with Steven Drew, Joe Chihade, and Matt Whited). Summer 2016.
- **Targeted Opportunity Grant** From Dean of the College, to develop Instrumental Chemical Analysis course (with Steven Drew). Winter 2016.
- **InTeGrate Curriculum Development Project:** Member of a team developing an Earth Systems Thinking module through the NSF STEP funded InTeGrate project. 2014 – 2016.
- **HHMI Curriculum Development Fund Grant:** To support a student to enhance the measurement capabilities for air quality measurements in the Northfield Schools, Summer 2014.
- **Carleton College Puzak Fund for Experiential Learning and Community Engagement Grant:** To develop a more coherent experiment for the FOCUS Cohort measurements of air quality in the Northfield Schools, Summer 2014.
- **HHMI Curriculum Development Fund Grant:** To develop climate modeling resources for use in ENTS 287, “Climate Science” course and to attend NASA Climate modeling workshop, August 2011.
- **Curriculum Development Fund Grant:** From Dean of the College, to develop first-year Argument and Inquiry Seminar “Air Pollution and Human Health” for FOCUS 2014.
- **HHMI Curriculum Development Fund Grant:** To develop academic civic engagement component for first-year Argument and Inquiry Seminar “Air Pollution and Human Health” for FOCUS 2014, with D. Walser-Kuntz, Biology.
- **HHMI Course Release:** Shared with Professor Steven Drew, to develop Bioanalytical Chemistry course and laboratory, Winter 2007.
- **Bush Fellowship, Faculty Development Grant:** One term of full salary, to augment two terms of paid sabbatical. Academic Year 2005-6.
- **Course Releases:** Two course releases were awarded for work in conjunction with the acquisition of the Electrospray Ionization/Atmospheric Pressure Chemical Ionization Ion Trap Mass Spectrometer, funded by NSF. These were taken in Winter 2001 and Winter 2002.
- **Research Leave:** Two course releases were granted, through a Chemistry Department program, to support research, during Fall 2002.
- **Research Leave:** Two course releases were granted, through a Chemistry Department program of granting one term off during the fourth year, during Fall 2001.

**CONFERENCES AND WORKSHOPS ATTENDED FROM CARLETON COLLEGE:**

- **AAC&U STEM Conference, This Changes Everything,** November 2020, Virtual.
- **SACNAS Annual Meeting,** September 2020, Virtual.

- *American Association for Aerosol Research*, October 2020, Virtual.
- *American Association for the Advancement of Science 2019 S-STEM Symposium*, Washington, DC
- *American Association for Aerosol Research/International Aerosol Conference*, September 2018, St. Louis, MO.
- *American Chemical Society Annual Meeting*, August 2018, Boston, MA.
- *AAC&U 2018 Annual Meeting: "Can Higher Education Recapture the Elusive American Dream?"* January 2018, Washington, DC.
- *Sigma Xi National Meeting*, November 2017, Raleigh, NC.
- *American Association for Aerosol Research*, October 2017, Raleigh, NC.
- *AAC&U 2017 Annual Meeting: Building Public Trust in the Promise of Liberal Education and Inclusive Excellence*, January 2017, San Francisco, CA
- *Food Chemistry Workshop through NSF Chemistry Collaborations, Workshops, and Communities of Scholars*, June 2016, Clarke University, Dubuque, IA.
- *AAC&U Crossing Boundaries: Transforming STEM Education Conference*, November 2015, Seattle, WA.
- *American Association for Aerosol Research*, October 2015, Minneapolis, MN.
- *Earth Educators' Rendezvous*, July 2015, Boulder, CO.
- *HHMI Constellation Studio A*, June 2015, Chevy Chase, MD.
- *Sloan CUSTEMS Meeting*, June 2014, Baltimore, MD.
- *AAC&U Transforming STEM Education: Inquiry, Innovation, Inclusion, and Evidence Network for Academic Renewal Conference*, October 2013, San Diego, CA.
- *American Association for Aerosol Research Annual Meeting*, October 2013, Portland, OR.
- *Association for Environmental Studies and Sciences Annual Meeting*, June 2013, Pittsburgh, PA.
- *John Gardener Institute for Excellence in Undergraduate Education Annual Gateway Course Experience Conference*, March 2013, Indianapolis, IN.
- *American Association for Aerosol Research Annual Meeting*, October 2012, Minneapolis, MN.
- *AAC&U Student Success: Pushing Boundaries, Raising Bars Conference*, March 2012, Seattle, WA.
- *AALAC/Mellon 23 Workshop on Learning and Teaching Physical Sciences in the Liberal Arts College*, November 2011, Carleton College. Co-leader.
- *American Association for Aerosol Research Annual Meeting*, October 2011, Orlando, FL.
- *NASA Climate Modeling and Data Tools Workshop*, August 2011, Dickinson College.
- *Sloan CUSTEMS Meeting*, May 2011, Baltimore, MD.
- *Pittcon*, March 2011, Atlanta, Georgia.
- *Mellon 23 Workshop on Feminism and Science*, January 2011, Scripps College.
- *International Aerosol Conference*, September, 2010, Helsinki, Finland.
- *Council on Undergraduate Research (CUR) 2010 National Conference: Undergraduate Research As Transformative Practice: Developing Leaders and Solutions for a Better Society*, June 2010, Weber State University, Ogden, Utah.
- *Climate: What Every Faculty Member Should Know*, Chautauqua Workshop, May 2010, University of Dayton.
- *Mellon 23 Workshop on Defining a Research Agenda for Understanding Student Retention in the Physical Sciences*, May 2010, Swarthmore College. Co-leader.
- *Developing Student Understanding of Complex Systems in the Geosciences Workshop*, April 2010, Carleton College.
- *American Association for Aerosol Research Annual Meeting*, October 2009, Minneapolis, MN.
- *Mellon 23 Workshop on Strategies for Broadening Access to the Science*, June 2009, Carleton College.
- *AAC&U Meeting on Diversity, Learning, and Inclusive Excellence: Accelerating and Assessing Progress*, October 2008, Long Beach, CA
- *Second European On-line Particle Mass Spectrometry Workshop*, April 2008, Leeds, UK.
- *American Geophysical Union National Meeting*, December 2007, 2008, San Francisco, CA.
- *PKAL F21 National Assembly*, November 2 – 4, 2007, Chantilly, VA.
- *Sloan Foundation Workshop of Student Migration Patterns in STEM*, October, 2007; October, 2008; April 2009.
- *The Science of Diversifying Science Conference*, June 15 – 16, 2007, University of California, Berkeley.
- *55<sup>th</sup> Annual American Society for Mass Spectrometry Conference on Mass Spectrometry and Allied Topics*, June 2007, Indianapolis, Indiana.
- *Symposia on Diversity in the Sciences, Mentoring and Retaining Underrepresented Students*, October 2006, University of Washington.

- *International Aerosol Conference*, September 2006, St. Paul, Minnesota.
- *54<sup>th</sup> Annual American Society for Mass Spectrometry Conference on Mass Spectrometry and Allied Topics*, June 2006, Seattle, Washington.
- *European On-line Particle Mass Spectrometry Workshop*, November 2005, Ispra, Italy.
- *American Chemical Society National Meeting*, March 2005, San Diego, CA.
- *American Association for Aerosol Research Annual Meeting*, October 2003, Anaheim, CA.
- *Project Kaleidoscope (PKAL) Workshop on “Ensuring the Success of Under-represented Groups in STEM,”* October, 2003, Glassboro, NJ.
- *51<sup>st</sup> Annual American Society for Mass Spectrometry Conference on Mass Spectrometry and Allied Topics*, June 2003, Montreal, Canada.
- *American Association for Aerosol Research Annual Meeting*, October 2002, Charlotte, NC.
- *34<sup>th</sup> American Chemical Society Great Lakes Regional Meeting*, June 2002, Minneapolis, MN.
- *American Society for Mass Spectrometry Asilomar Conference*, October 2001, Monterey, CA.
- *American Association for Aerosol Research Annual Meeting*, October 2001, Portland, OR.
- *Midwest Environmental Chemistry Workshop*, October 2001, Minneapolis, MN.
- *49<sup>th</sup> Annual American Society for Mass Spectrometry Conference on Mass Spectrometry and Allied Topics*, May 2001, Chicago, IL.
- *Minnesota Academy of Science, 69<sup>th</sup> Annual Meeting*, April 2001, St. Paul, MN.
- *Federation of Analytical Chemistry and Spectroscopy Societies Annual Meeting*, September 2000, Nashville, TN.
- *Project Kaleidoscope (PKAL) Workshop on “Education in the Context of Local/Regional Environment,”* January, 2000, Tucson, AZ.
- *American Geophysical Union National Meeting*, December 1999, San Francisco, CA.
- *American Chemical Society National Meeting*, March 1999, Anaheim, CA.
- *MACTLAC Annual Meeting*, October, 1998, Waverly, IA..
- *Fourth Annual Pedagogy Meeting for ChemLinks/MC<sup>2</sup>*, April 1998, St. Paul, MN.

#### **PROFESSIONAL ACTIVITIES:**

- Tutorial Co-Chair, *American Association for Aerosol Science (AAAR)*, 2017.
- Elected Chair of History of Aerosol Science Working Group, *American Association for Aerosol Science (AAAR)*, 2017 - 2018
- Elected Member, Board of Directors, *American Association for Aerosol Science (AAAR)*, 2012 – 2015.
- Editorial Board Member: *Association for Environmental Studies and Science Journal*
- Editorial Board Member: *Atmosphere*.
- Site Coordinator for Carleton College in the North Star STEM Alliance, funded by the NSF Louis Stokes Alliance for Minority Participation, 2008 – present.
- Member of the faculty of the *Aerosol and Measurement Short Course for Practicing Professionals*, University of Minnesota Department of Mechanical Engineering and College of Continuing Education, August, 2002 through 2019 (excluding 2003).
- Member, Project Kaleidoscope, Faculty for the 21<sup>st</sup> Century.
- Co-organizer for the Second Annual ATOFMS Users’ Meeting, held in conjunction with the American Association for Aerosol Research National Meeting, Atlanta, GA, October 2004.
- Mentor, through MentorNet online, of graduate students and postdoctoral fellows in science, 2005 – 2009.
- Manuscript review for multiple professional Journals.
- Proposal review for National Science Foundation, Division of Undergraduate Research, Atmospheric Chemistry Division, Biological Sciences, and Chemistry Divisions; American Chemical Society Petroleum Research Fund.
- Proposal panel reviews for National Science Foundation.
- Tenure and promotion reviews for chemists at nationally ranked liberal arts colleges and universities.
- Consultant at TSI, Inc., Shoreview, MN (December 1998, Summer 1999).

#### **COLLEGE AND CHEMISTRY DEPARTMENT ACTIVITIES AT CARLETON COLLEGE:**

- Elected to the Faculty Personnel Committee, Fall 2016 – Summer 2019.
- Member, Science Board, 2010 – 2018, 2019 – present (representing Environmental and Technology Studies).
- Member, Science Planning Group, 2014 – 2018.
- Chemistry Department ICP-MS manager, 2012 – present.
- Chemistry Department Chair, 2009 – 2012.

- Coordinator, Focusing on Cultivating Scientists (FOCUS) cohort, 2007 – present.
- Member, Transitions Group for Student Success in the Sciences, 2004 – 2007.
- Member, Environmental and Technology Studies Program, 1998 – present. Member of steering committee, 2015 – present.
- Member of the core writing team for HHMI grant, Summer 2011.
- Chemistry Department Seminar Co-Chair, 2003 – 2005, 2017 – present.
- Chemistry Department Webmaster, 2000 – 2005.
- Chemistry Department Electrospray LC-MS manager, 2001 – present.
- Treasurer, Carleton College Chapter of Sigma Xi, The Scientific Research Society, 1999 – 2005.
- Member, CEDI Action Team on Campus Community Expectations, Fall 2010 – Spring 2011.
- Member, First-Year Student Experience Task Force, Fall 2008 – Spring 2009.
- Leader, Curriculum Design Team, Fall 2007 – Spring 2008.
- Member of SHARE Committee, Fall 2007 – Fall 2009.
- Member of the Campus Academic Integrity Assessment Committee, Fall 2002 – Fall 2003.
- Elected to Faculty Affairs Committee, Fall 2003 – 2005.
- Member of the Carleton College Academic Standing Committee, May 2002 – Summer 2003, Fall 2013 – Summer 2016, Fall 2019 – Summer 2023.
- Member of the Carleton College Junior Faculty Affairs Committee, 1999 – 2002.
- Member of the Premed Committee, 1999 – present.
- Guest Lecturer in Environmental Science at Carleton Summer Program, Summers 2001, 2002, and 2003.
- Participant in Winter Break Workshop on Interdisciplinarity, December 2003.

#### **FIELD STUDIES:**

- **Introduction of Clean Cookstoves to Merkato:** Addis Ababa, Ethiopia, Summer 2018, with Prof. Nega.
- **Focusing on Energy (FOE), PM2.5 Apportionment and Modeling:** Milwaukee, WI, Summer 2010, with Profs. J. J. Schauer (University of Wisconsin – Madison) and B. de Foy (St. Louis University).
- **Biofuels and Biomaterials Laboratory Studies:** University of Minnesota, Minneapolis, MN. Measurements of combustion/heating of a variety of biological fuels were carried out, including ethanol/gasoline mixtures, biodiesel/diesel mixtures, corn and wood combustion in residential stoves, and meat cooking on a variety of appliances.
- **AEROWOOD:** Roveredo, GR, Switzerland, November – December, 2005: This experiment, one of many AEROWOOD campaigns, sought to measure the contribution of wood smoke and vehicle emissions to wintertime pollution in a narrow alpine valley. The Carleton ATOFMS was brought to Switzerland for these measurements.
- **MS-ChAOS:** Paul Scherrer Institute, Villigen AR Switzerland, October – November, 2005: This experiment deployed 8 mass spectrometers to measure the chemical characteristics of the secondary organic aerosol formed in the smog chamber at the Paul Scherrer Institute. The Carleton ATOFMS was brought to Switzerland for these measurements.
- **Mercury Roadshow 3:** Mt. Horeb, WI, August 2004. This experiment, continued the Mercury Roadshow experiments described below. Data was obtained with the ATOFMS and the real-time mercury instrument, co-located on a farm in rural Mt. Horeb, WI. This data will also be provided to the data mining team.
- **Mercury Roadshow 2/Data Mining:** East St. Louis, MO, December 2003 – March 2004. This experiment followed on the Mercury Roadshow experiments in CO and Yellowstone National Park, and was carried out in collaboration with the University of Wisconsin-Madison Environmental Chemistry and Technology program (PI J. J. Schauer) and the United States Geological Survey, Middleton, WI office (PI D. Krabbenhoft) acquired real time speciated mercury data alongside real time particulate monitors, including Carleton College's ATOFMS, to evaluate the speciation and transformation of anthropogenic mercury emissions in a polluted urban area. The assistance of Professor Jay R. Turner, Washington University, was invaluable in running the instrument. The data set will also be used to provide input into the data mining program being created by collaborators Musicant and Ramakrishnan.
- **Mercury Roadshow:** Southwestern Colorado and Yellowstone National Park, August – September, 2003. This experiment, organized by members of the University of Wisconsin-Madison Environmental Chemistry and Technology program (PI J. J. Schauer) and the United States Geological Survey, Middleton, WI office (PI D. Krabbenhoft) acquired real time speciated mercury data alongside real time particulate monitors, including Carleton College's ATOFMS and EC/OC monitors, to evaluate the speciation and transformation of anthropogenic and biogenic mercury emissions.
- **Atlanta ANARChE 2002:** Atlanta, GA July – August, 2002: The Atlanta Aerosol Nucleation and Real-time Characterization Experiment (ANARChE) included the two ATOFMS instruments in which Carleton has a stake, and was funded with a grant from the National Science Foundation to a collaborative team from the University of

Minnesota Department of Mechanical Engineering and Carleton College. Studies of the ambient air were performed with the standard ATOFMS instrument (Carleton College) and a modified instrument which analyzed physically classified particles (Carleton College and University of Minnesota).

- **Diesel Engine Laboratory Study:** University of Wisconsin, Madison, WI. March – April, **2002:** The first field deployment of Carleton College’s ATOFMS instrument, funded with a grant from the National Science Foundation. The ATOFMS instrument was used to characterize the emissions from a laboratory based diesel engine as a function of engine conditions. (Carleton College in collaboration with J. Schauer in the Environmental Technology and Chemistry Program at the University of Wisconsin, Madison.)
- **Automobile/Heavy Vehicle Emissions Characterization Study:** Caldecott Tunnel, Berkeley, CA. July-August, **2000:** A return to the site of the 1997 study (mentioned below) to better characterize vehicle emissions on a single-particle basis, and to compare results with those obtained from multiple other instruments as well as vehicle fleet statistics. (Carleton College in collaboration with the University of California, Riverside.)
- **EPA/SOS SuperSite Study:** Atlanta, GA, August **1999:** The first of the EPA sponsored SuperSite locations, which brought together researchers from ~40 institutions to measure particulate matter in traditional and new ways, including the single-particle mass spectrometric methods. Goals are to establish rigorous method intercomparisons and to better understand particulate matter dynamics in a polluted urban area. (Carleton College in collaboration with the University of California, Riverside.)
- **Automobile/Heavy Vehicle Emissions Characterization Study:** California Air Resources Board Haagen-Smit Laboratory, El Monte, CA. July, **1998:** Sampling selected light and heavy duty vehicles running under identical conditions on a chassis dynamometer, to obtain characteristic single-particle information for each vehicle type. Comparisons with bulk particulate matter analyses are also possible.
- **Automobile/Heavy Vehicle Emissions Characterization Study:** Caldecott Tunnel, Berkeley, CA. November, **1997:** Extensive study employing a variety of instrumentation to characterize the emissions, on a single particle basis, of passenger cars versus heavy vehicles. Sampling in the air duct of a tunnel in which the vehicle types are significantly segregated and where traffic is operating under real-world conditions. Comparisons with bulk particulate matter analyses are also possible.
- **Southern California Ozone Study 97 (SCOS 97 - NARSTO):** South Coast Air Basin, CA. Summer/Fall, **1997:** Extensive two-part study (~100 research groups participating) of the effects of meteorology and emissions on urban pollution, with a focus on photochemical smog and ozone levels, and particulate levels and reactivity.
- **Marine Aerosol Study:** September/October **1996:** Transport of marine aerosol through Long Beach, Fullerton, and Riverside, CA. Comparison of single-particle aerosol time-of-flight mass spectrometer to conventional aerosol measurement techniques. Study of heterogeneous gas-particle chemistry in ambient aerosols.

**UNDERGRADUATE RESEARCH STUDENTS MENTORED** (*summer includes subsequent academic year also*):

- **Alexander R. Barron ('00), Summer 1999,** Ph. D. Ecology and Evolutionary Biology, Princeton University. Formerly senior Advisor to the Associate Administrator, Environmental Protection Agency, Washington, DC. Assistant Professor of Environmental Science and Policy, Smith College, Northampton, MA.
- **Benjamin S. Warren ('00), Summer 1999,** DMD University of Kentucky. Dentist.
- **Julia C. Jarvis ('01), Summer 2000,** Ph.D. Geosciences, University of Washington, Seattle.
- **Ellen M. Sukovich ('01), Summer 2000,** M.S. Atmospheric Sciences, University of Washington, Seattle. Staff Scientist, NOAA.
- **William J. Galush ('02), Summer 2001,** Ph. D. Chemistry, University of California, Berkeley. Scientist, Genentech.
- **Amy M. Silverberg ('02), Summers 2001 and 2002,** Medical School, Case Western Reserve University.
- **Alexandra M. Schmitt ('05), Summers 2002, 2003, and 2004.**
- **Renee Frontiera ('04), Summer 2003,** Ph.D. Chemistry, University of California, Berkeley. Postdoctoral Researcher, Northwestern University. Assistant Professor, Department of Chemistry, University of Minnesota, Twin Cities.
- **Margrith Mattmann ('05), Summer 2003,** Ph. D. Chemistry, University of Wisconsin – Madison. Postdoctoral Researcher, Vanderbilt University. Medicinal Synthetic Chemist, Biomatrix, CA.
- **Andrew Ault ('05), Summer 2004,** Ph.D. Chemistry, University of California, San Diego. Postdoctoral Researcher, University of Iowa. Assistant Professor, Departments of Chemistry and Environmental Health Sciences, University of Michigan, Ann Arbor.
- **Melanie Yuen ('06), Summers 2004 and 2005,** DMD Harvard University.
- **Katie Barton ('07), Summer 2005,** M.D. Oregon Health Sciences University. Physician, University of Vermont Medical Center.
- **John Choiniere ('07), Summer 2005,** Ph.D., Department of Chemistry, University of Washington. Analyst with Seattle Mariners.

- **Nicholas Brown ('08), Summer 2007**, M.D., University of Minnesota, Twin Cities. Pediatric Critical Care Fellow Children's Hospital of Wisconsin.
- **Beth Friedman ('08), Summer 2007**, Ph.D., Department of Atmospheric Science, University of Washington. State of Washington, Department of Ecology.
- **Claire Liepmann ('09), Summer 2007, academic year 2008-09**, M.D., Loyola University, Chicago.
- **Juan Medrano ('09), Summer 2007 and 2008**, Metallurgical Technician, Barrick Gold Corporation, Dominican Republic.
- **Keven Tell ('09), Summer 2008**. MAT, Hamline University. Science Teacher, Minneapolis, MN.
- **Lisa Wang ('10), Summer 2008**, Ph.D., Department of Chemistry, University of California, Los Angeles. Engineer, Lam Research.
- **Ross Hamilton ('10), Summer 2008 and 2009**, M.D., University of Rochester.
- **Sicelo Masango ('10), Summer 2009**, Ph.D., Department of Chemistry, Northwestern University. Process Engineer, Intel Corporation.
- **Samantha Thompson ('11), Summer 2009 and 2010**, M.S., Department of Chemistry, University of Colorado – Boulder. Research Engineer, 3M.
- **Alison Smyth ('12), Summer 2010 and 2011**. MS, Chemical Oceanography, Texas A&M.
- **Michael McClellan ('13), Summer 2011 and 2012**, Ph.D., Atmospheric Chemistry, MIT. Baseball Research and Development with Tampa Bay Devil Rays.
- **Erin McDuffie ('13), Summer 2012**, Ph.D., Department of Chemistry, University of Colorado – Boulder.
- **Aurora Janes ('15), Summer 2014**, Graduate student, Chemistry, University of Wisconsin - Madison.
- **Abraham Villarreal ('15), Summer 2014**, B.A. Biology, Carleton College.
- **Ernesto Polania-Gonzalez ('17), Summer 2014**, B.A. Chemistry, Carleton College. Americorps VISTA.
- **Jumaanah Flowers ('16), Summer 2015**, B.A. Chemistry, Carleton College.
- **Elizabeth Grubb ('17), Summer 2015 and 2016**, B.A. Chemistry, Carleton College.
- **Lisa Au ('18), Summer 2015**, B.A. Chemistry, Carleton College.
- **Panhia Yang ('17), Summer 2016**, B.A. Chemistry, Carleton College.
- **Clarissa Smith ('19), Summer 2016, 2017, and 2018**, B.A. Carleton College (Geology), Carleton College.
- **Austin Heuer ('19), Summer 2018**, B.A., Carleton College.
- **Nick Vetterli ('19), Summer 2018**, B.A. Carleton College. Ph.D. student, Department of Chemistry, University of Washington, Seattle.
- **Amelia Broman ('21), Winter-Spring 2019**, B.A. Physics, Carleton College.
- **Diana Rodriguez ('22)**, Undergraduate student, Carleton College.
- **Cassie Smith ('22)**, Undergraduate student, Carleton College.
- **Mohammed Mehdi Shahid ('22)**, Undergraduate student, Carleton College.
- **David Stem ('21)**, B.A. Chemistry, Carleton College.
- **Ella Hein ('23)**, Undergraduate student, Carleton College.
- **Alek Rabago ('23)**, Undergraduate student, Carleton College.

#### **SIGNIFICANT COLLABORATORS:**

- **Professor Tsegaye Nega**, Environmental Studies Program, Carleton College. Collaborator on a proposal funded by the U.S. Embassy in Ethiopia, and work related to clean cookstoves.
- **Professor Christopher Hogan Jr.**, Department of Mechanical Engineering, University of Minnesota: Collaborator on a proposal funded by DOE-SBIR.
- **Professor Mei Zheng**, Environmental Science Department, Peking University, Beijing, China.
- **Professor Xin Yang**, Department of Environmental Science and Engineering, Fudan University, Shanghai, China: Collaborator and host for research during 2012-2013 sabbatical.
- **Dr. Daniel Cziczo**, Pacific Northwest National Laboratories: Collaborator on work done with single-particle mass spectrometer in Switzerland and Sweden, including co-advising an undergraduate student (Beth Friedman) from Carleton).
- **Professor Peter H. McMurry**, Department of Mechanical Engineering, University of Minnesota: Collaborator on a proposal funded by NSF-Atmospheric Chemistry Division and host for sabbatical research in 2006.
- **Professor Michael R. Zachariah**, Departments of Chemistry and Mechanical Engineering, University of Maryland (formerly at University of Minnesota): Collaborator on a proposal funded by NSF-Atmospheric Chemistry Division.
- **Professor James J. Schauer**, Departments of Water Chemistry and Civil and Environmental Engineering, University of Wisconsin, Madison: Collaborator on proposals funded by NSF-Chemistry Division, the NSF-ITR, and the U. S. Environmental Protection Agency.



- **Professor Raghu Ramakrishnan**, Yahoo Research (Formerly Department of Computer Sciences, University of Wisconsin- Madison). Collaborator on a project funded by NSF-ITR.
- **Professor David R. Musicant**, Department of Mathematics and Computer Science, Carleton College. Collaborator on a project funded by NSF-ITR.
- **Dr. Urs Baltensperger**, Laboratory for Atmospheric Chemistry, Paul Scherrer Institute, Villigen AR, Switzerland. Host for sabbatical research in 2005 – 2006.
- **Dr. Markus Gälli**, Senior Development Engineer, TSI, Inc. St. Paul, MN: Research collaboration begun in 2001.
- **Professor Kimberly A. Prather**, Department of Chemistry, University of California, San Diego (previously University of California, Riverside): Research collaborator, Summer 1999 and Summer 2000.

**PROFESSIONAL AFFILIATIONS:**

- **American Association for Aerosol Research (AAAR)**
- **American Chemical Society (ACS)** Membership in Analytical, Environmental and Physical Divisions.
- **American Geophysical Union (AGU)** Membership in Atmospheric Division.
- **American Society for Mass Spectrometry (ASMS)**
- **Association for Environmental Studies and Sciences (AESS)**
- **Minnesota Mass Spectrometry Group (MinnMass)**
- **Sigma Xi, The Scientific Research Society**
- **Council on Undergraduate Research (CUR)**
- **American Association for the Advancement of Science (AAAS)**
- **National Association for Geoscience Teachers (NAGT)**
- **Society for Chicanos and Native Americans in Science (SACNAS)**