DEBORAH SUSAN GROSS

Department of Chemistry
Carleton College
1 North College Street
Northfield, MN 55057
Phone: (507)222-5629
E-Mail: dgross@carleton.edu
http://www.people.carleton.edu/~dgross/index.htm

EMPLOYMENT:

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

2005 – present: 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:

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 Intitute, 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.

Atmospheric Chemistry Conference for Emerging Senior Scientists IV, Selected participant and recipient of travel grant, June, 1997.

William R. Grace Corporation Graduate Fellowship, Recipient, Academic Year 1993-1994.

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
- ***Analytical Chemistry:*** Equilibrium and Analysis (Chem 230 + labs), Fall 1998, Spring & Fall 2000, Spring 2001, Spring 2002, Spring 2003, Fall 2003, lab only Spring 2004, Fall 2004, Fall 2006, Fall 2007, Spring 2008, Spring 2009. 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.
- ***Environmental Chemistry:*** Environmental Analysis (Chem/ENTS 328 + Chem/ENTS 329, Environmental Analysis Laboratory), Spring & Fall 1999, Winter 2001, Spring 2004, Winter 2008.
- ***FOCUS Colloquium***: Fall 2007, Winter 2008, Spring 2008, Fall 2008, Winter 2009, Spring 2009.
- ***Advanced Laboratory:*** Chemical Kinetics (Chem 305 lab + lecture), Winter 2003, Winter 2004, Winter 2005, Fall 2008.
- ***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). Advised long papers, Winter 2001, Winter 2008.
- ***Independent Study:*** Mentored 23 students over a total of 56 terms of Independent Research, 1999 - 2008.
- ***ENTS Junior Colloquium (ENTS 298):*** Participated Spring 2000, Winter 2002.
- ***Informal Affiliation:*** Participated in Advanced Lab I (Chem 304), Fall 1999.
- ***Guest Presentation:*** Environmental Policy and Politics (ENTS/PS 262, N. Vig), Winter 1999.

PUBLICATIONS IN PEER REVIEWED JOURNALS:

(undergraduate students are underlined)

Work Carried out at Carleton College:

- 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.

Work Carried Out at the University of California, Riverside:

- 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.; Fergenson, 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.; Fergenson, 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.

Work Carried Out at the University of California, Berkeley:

- 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 $(M + H + X)^{2+}$ (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:

- **Gross, D. S**. "A Model for Collaborative Undergraduate Research: Integrating Disciplines and Institutions to Better Understand the Earth's Atmosphere" In C. Rutz and M. Savina (Eds.), *Building intellectual community through collaboration* (pp. 105 – 120). Northfield, MN: College City Publications.

INVITED TALKS:

- ***NASA Ames Research Seminar, Mountain View, CA (July 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."
- ***Eidgenossische Technische Hochshule (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 (11/292005***), "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)*

- 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, 2007.
- 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, 2007.
- 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, 55th 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.; 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." 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, 54th Annual ASMS Conference on Mass Spectrometry and Allied Topics, Seattle, WA.
- **Gross, D. S.*** "EnChilADA: The development of an integrated atmospheric data mining application." Oral Presentation, November 2005, European On-line Particle Mass Spectrometry Workshop, Ispra, Italy.
- Ault, A.P.*, Yuen, M., Frontiera, R., Schmitt, A. M., Olson, M., Hall, B. D., Schauer, J. J., **Gross, D. S.** "Trends in 0.2-3μm 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 ofDiesel 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.; Fergenson, 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:

- 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:

- ***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.

INTERNAL SUPPORT:

- ***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 ATTENDED FROM CARLETON COLLEGE:

- ***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.
- ***55th 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.

- ***54th 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.
- ***51st 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.
- ***34th 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.
- ***49th Annual American Society for Mass Spectrometry Conference on Mass Spectrometry and Allied Topics***, May 2001, Chicago, IL.
- ***Minnesota Academy of Science, 69th 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^2,*** April 1998, St. Paul, MN.

PROFESSIONAL ACTIVITIES:

- Site Coordinator for Carleton College in the North Star STEM Alliance, funded by the NSF Louis Stokes Alliance for Minority Participation, 2008 – present.
- Member, Project Kaleidoscope, Faculty for the 21st 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.
- 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 present (except 2003).
- Mentor, through MentorNet online, of graduate students and postdoctoral fellows in science, 2005 – present.
- Panelist, *Balanced Academic Life Symposium*, for graduate students considering faculty positions at Primarily Undergraduate Institutions (PUIs), University of Minnesota, September 6, 2003.
- Session Chair, American Association for Aerosol Research Annual Meeting, Charlotte, NC, October 2002.
- Manuscript review for Journals: *Environmental Science and Technology*, *Analytical Chemistry*, *Aerosol Science and Technology*, *International Journal of Mass Spectrometry and Ion Processes*, *Journal of the Air and Waste Management Association*, *Atmospheric Environment*, *Analytica Chimica Acta*, *Bulletin of the Chemical Society of Japan*.
- Proposal review for National Science Foundation, Atmospheric Chemistry Division; American Chemical Society Petroleum Research Fund.
- Proposal panel review for National Science Foundation, Spring 2002, Spring 2006, Spring 2007.
- Tenure review for chemists at nationally ranked liberal arts colleges.
- Consultant at TSI, Inc., Shoreview, MN (December 1998, Summer 1999).

COLLEGE AND CHEMISTRY DEPARTMENT ACTIVITIES AT CARLETON COLLEGE:

- Department Chair, 2009 – present.
- Coordinator, Focusing on Cultivating Scientists (FOCUS) cohort, 2007 – present.
- Member, Transitions Group for Student Success in the Sciences, 2004 – present.
- Member, Environmental and Technology Studies Program, 1998 – present.
- Elected to Faculty Affairs Committee, Fall 2003 – 2005.
- Chemistry Department Seminar Co-Chair, 2003 – 2005.
- 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 of the Campus Academic Integrity Assessment Committee, Fall 2002 – Fall 2003.
- Member of the Carleton College Academic Standing Committee, May 2002 – Summer 2003.
- Member of the Carleton College Junior Faculty Affairs Committee, 1999 – 2002.
- Guest Lecturer in Environmental Science at Carleton Summer Program, Summers 2001, 2002, and 2003.
- Participant in Winter Break Workshop on Interdisciplinarity, December 2003.
- Participant in European Novel Reading Group, Spring 2004 – 2005.

FIELD STUDIES:

- ***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'sATOFMS 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:

- **Alexander R. Barron ('00), Summer 1999,** Ph. D., Princeton University. Currently employed in Energy and Commerce Committee, U.S. House of Representatives.
- **Benjamin S. Warren ('00), Summer 1999**, Dentist. Currently employed in Kathmandu, Nepal.
- **Julia C. Jarvis ('01), Summer 2000,** Ph.D., University of Washington, Seattle.
- **Ellen M. Sukovich ('01), Summer 2000**, M.S., University of Washington, Seattle.Staff Scientist, NOAA.
- **William J. Galush (’02), Summer 2001**, Ph. D. University of California, Berkeley. Currently employed at Genentech.
- **Amy M. Silverberg (’02), Summers 2001 and 2002**, Medical Student.
- **Alexandra M. Schmitt (’05), Summers 2002, 2003, and 2004**, Currently applying to Nursing School.
- **Renee Frontiera (’04), Summer 2003**, Graduate student, Department of Chemistry, University of California, Berkeley.
- **Margrith Mattmann (’05), Summer 2003**, Graduate student, Department of Chemistry, University of Wisconsin - Madison.
- **Andrew Ault (’05), Summer 2004,** Graduate student, Department of Chemistry, University of California, San Diego.
- **Melanie Yuen (’06), Summers 2004 and 2005,** Research Technician, Rockefeller University, New York.
- **Katie Barton (’07), Summer 2005,** Surgical Technician, Bozeman, MT.
- **John Choiniere (’07), Summer 2005,** Graduate student, Department of Chemistry, University of Washington.
- **Beth Friedman (’08), Summer 2007**, Graduate student, Department of Atmospheric Science, University of Washington.
- **Claire Liepmann (’09), Summer 2007, academic year 2008-09**, Undergraduate student, Carleton College.
- **Juan Medrano (’09), Summer 2007 and 2008**, Undergraduate student, Carleton College.
- **Keven Tell (’09), Summer 2008,** Undergraduate student, Carleton College.
- **Lisa Wang (’10), Summer 2008,** Undergraduate student, Carleton College.
- **Sicelo Masango (’10), Summer 2009,** Undergraduate student, Carleton College.
- **Samantha Thompson (’11)**, **Summer 2009,** Undergraduate student, Carleton College.

SIGNIFICANT COLLABORATORS:

- ***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 (A.A.A.R.)***
- ***American Chemical Society (A.C.S.)*** Membership in Analytical, Environmental and Physical Divisions.
- ***American Geophysical Union (A.G.U.)***
- ***American Society for Mass Spectrometry (A.S.M.S.)***
- ***Association for Women in Science (A.W.I.S.***)
- ***Minnesota Mass Spectrometry Group (MinnMass)***
- ***Sigma Xi, The Scientific Research Society***
- ***Association for Environmental Studies and Sciences (A.E.S.S.)***