

## Curriculum Vitae – Keith E. Miller

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### EDUCATION

2000 **Doctor of Philosophy** University of Washington (Analytical Chemistry)  
1988 **Bachelor of Science** United States Naval Academy (Chemistry)

### PROFESSIONAL EXPERIENCE

2009 - present Associate Professor, Department of Chemistry and Biochemistry, University of Denver, Denver, CO.  
2012 - present Faculty Associate, Center for Community Engagement and Service Learning, University of Denver, Denver, CO.  
2005 - 2011 Science Advisor, Food and Drug Administration, Denver District Laboratory, Lakewood, CO.  
2008 - 2010 Associate Director, Center for Nanoscale Science and Engineering, University of Denver, Denver, CO.  
2003 - 2009 Assistant Professor, Department of Chemistry and Biochemistry, University of Denver, Denver, CO.  
2003 - 2004 Guest Researcher, National Institute of Standards and Technology, Boulder, CO.  
2002 - 2003 Postdoctoral Research Associate, Professional Research Experience Program (PREP), National Institute of Standards and Technology, Boulder, CO.  
2000 - 2002 National Research Council (NRC) Postdoctoral Fellow, National Institute of Standards and Technology, Boulder, CO.  
2000 Chemistry Instructor/Huckabay Fellow, Seattle University, Seattle, WA  
1996 - 2000 Graduate Research and Teaching Assistant, University of Washington  
1994 - 1996 Associate Chemist, Foster Wheeler Environmental Corporation, Bellevue, WA  
1993 - 1994 Field Chemist, Laidlaw Environmental Services (GS), Port Orchard, WA  
1988 - 1993 Nuclear Power Engineering Officer, United States Navy, USS Nimitz (CVN-68)  
1988 Research Associate, Los Alamos National Laboratory, Los Alamos, NM

### PROFESSIONAL ORGANIZATIONS

American Chemical Society (1988 to present)  
Analytical Chemistry Division (2008 – present)  
Chromatography and Separation Chemistry (2008 – 2012)  
Chemical Education Division (2012 – present)  
National Science Teachers Association (2013 – present)  
Clay Minerals Society (2007)

**PUBLICATIONS (Corresponding author denoted by \*; student co-authors underlined)****Refereed Journals**

1. Sorauf, K.J., Conners, D.E., Wells, T.A., \*Miller, K.E. A hydrodynamic method for the measurement of Laponite-RD caffeine binding, *Applied Clay Science*, 2014, 87, 197-204.
2. Schmidt, M. Sorauf, K., Miller, K.E., Sonnenfroh, D., Wainner, R., \*Bauer, A. Spark-induced breakdown spectroscopy and multivariate analysis applied to the measurement of total carbon in soil, *Applied Optics*, 2012, 51(7), B176-82.
3. \*Turnipseed, S. B.; Story, J.; Clark, S. B.; Miller, K. E., Analysis of veterinary drugs and metabolites in milk using quadrupole- time of flight liquid chromatography mass spectrometry, *Journal of Food and Agricultural Chemistry* 2011, 59(14), 7569-7581.
4. \*Karbiwnyk, C.M., Rodney Williams, R., Andersen, W., Turnipseed, S., Madson, M.R. Miller, K.E., Reimschuessel, R. Bioaccumulation of cyanuric acid in edible tissues of shrimp following experimental feeding, *Food Additives & Contaminants: Part A* 2010, 27(12), 1658-1664.
5. Caulfield, J.A.; Bruno, T.J.; \*Miller, K.E., Enthalpy of solution and Kováts retention indices for nitroaromatic compounds on stationary phases using gas chromatography, *Journal of Chemical and Engineering Data* 2009, 54, 1814-1822.
6. \*Turnipseed, S. B.; Clark, S. B.; Karbiwnyk, C. M.; Andersen, W. C.; Miller, K. E.; Madson, M.R., Analysis of aminoglycoside residues in bovine milk by liquid chromatography electrospray ion trap mass spectrometry after derivitization with phenyl isocyanate. *Journal of Chromatography, B: Analytical Technologies in the Biomedical and Life Sciences* 2009, 877, (14-15), 1487-1493.
7. \*Andersen, W.C.; Turnipseed, S.B.; Karbiwnyk, C.M.; Lee, R.H.; Clark, S.B.; Rowe, W.D.; Madson, M.R.; Miller, K.E., Multiresidue Method for the Triphenylmethane Dyes in Fish: Malachite Green, Crystal (Gentian)Violet, and Brilliant Green, *Analytica Chimica Acta* 2009, 637, 279-289.
8. \*Karbiwnyk, C.M.; Andersen, W.C.; Turnipseed, S.B.; Storey, J.M.; Madson, M.R.; Giesecker, C.M.; Miller, R.M.; Rummel, N.G.; Reimschuessel, R.; Miller, K.E., Determination of cyanuric acid residues in catfish, trout, tilapia, salmon and shrimp by LC-MS/MS, *Analytica Chimica Acta* 2009, 637, 101-111.
9. \*Karbiwnyk, C.M.; Faul, K.C.; Turnipseed, S.B.; Andersen, W.C.; Miller, K.E., Determination of oxytocin in a dilute IV solution by LC-MS<sup>n</sup>, *Journal of Pharmaceutical and Biomedical Analysis* 2008, 48, 672-677.
10. \*Turnipseed, S. B.; Andersen, W. C.; Karbiwnyk, C. M.; Madson, M.R.; Miller, K. E., Multi-class, multi-residue LC-MS-MS screening and confirmation method for drug residues in milk, *Rapid Communications in Mass Spectrometry* 2008, 22, 1467-1480.
11. \*Karbiwnyk, C. M.; Carr, L. E.; Turnipseed, S. B.; Andersen, W. C.; Miller, K. E., Determination of quinolone residues in shrimp using liquid chromatography with fluorescence detection and residue confirmation by mass spectrometry. *Analytica Chimica Acta* 2007, 596, (2), 257-263.
12. Caulfield, J. A.; Wells, T. A.; \*Miller, K. E., Novel method for transmission infrared analysis of Clay minerals using silicon wafer substrates. *Clays and Clay Minerals* 2007, 55, (2), 213-219.
13. \*Turnipseed, S. B.; Clark, S. B.; Andersen, W. C.; Karbiwnyk, C. M.; Miller, K. E.; Hurlbut, J. A., Confirmation of diminazene diacetate in bovine plasma using electrospray liquid chromatography-mass spectrometry. *Journal of Chromatography, B: Analytical Technologies in the Biomedical and Life Sciences* 2006, 844, (1), 127-133.
14. \*Turnipseed, S. B.; Andersen, W. C.; Karbiwnyk, C. M.; Roybal, J. E.; Miller, K. E., No-discharge atmospheric pressure chemical ionization: evaluation and application to the analysis of

- animal drug residues in complex matrices. *Rapid Communications in Mass Spectrometry* 2006, 20, (8), 1231-1239.
15. \*Bramanti, E.; Toncelli, D.; Morelli, E.; Lampugnani, L.; Zamboni, R.; Miller, K. E.; Zemetra, J.; D'Ulivo, A., Determination and characterization of phytochelatins by liquid chromatography coupled with on line chemical vapour generation and atomic fluorescence spectrometric detection. *Journal of Chromatography, A* 2006, 1133, (1-2), 195-203.
  16. Quigley, W. W. C.; Bramanti, E.; Staggemeier, B. A.; Miller, K. E.; Nabi, A.; Skogerboe, K. J.; \*Synovec, R. E., Determination, by dynamic surface-tension analysis, of the molar mass of proteins denatured in guanidine thiocyanate. *Analytical and Bioanalytical Chemistry* 2004, 378, (1), 134-143.
  17. Miller, K. E.; \*Bruno, T. J., Thermally-treated clay as a stationary phase in liquid chromatography. *Journal of Chromatography, A* 2004, 1042, (1-2), 49-54.
  18. Miller, K.E.; \*Bruno, T.J., Kovát's retention indices of sulfur compounds on stationary phases used in gas chromatography. *Journal of Chromatography, A*, 2003, 1007, 117-125.
  19. Miller, K.E.; \*Bruno, T.J., Enthalpy of fuel gas odorants on surrogate soil surfaces by gas chromatography. *Journal of Chromatography, A*, 2002, 975, 311-318.
  20. \*Bruno, T.J.; Lewandowska, A.; Tsvetkov, F.; Miller, K.E.; Hanley, H.J.M.; Wall Coated Open Tubular Column Chromatography on an Organo-clay Stationary Phase. *Journal of Chromatography, A*, 2002, 973, 143-149.
  21. Bramanti, E.; Ferri, F.; Raspi, G.; Lampugnani, L.; Spinetti, M.C.; Miller, K.E.; \*Synovec, R.E.; New Method for Separation of Determination of Caseins by Hydrophobic Interaction Chromatography. *Talanta*, 2001, 54, 343-349.
  22. Miller, K.E.; Bramanti, E.; Prazen, B.J.; Prezhdo, M.; \*Synovec, R.E.; Multi-dimensional Analysis of Poly(ethylene glycols) by Size Exclusion Chromatography and Dynamic Surface Tension Detection. *Analytical Chemistry*, 2000, 72, 4372-4380.
  23. Miller, K.E.; \*Synovec, R.E.; Review of Analytical Measurements Facilitated by Drop Formation Technology. *Talanta*, 2000, 51, 921-933. (Invited Review)
  24. Miller, K.E.; \*Synovec, R.E.; Rapid Polymeric Surfactant Characterization using a Novel Flow-Injection System and Dynamic Surface Tension Detection. *Analytica Chimica Acta*, 2000, 412, 149-160.
  25. Miller, K.E.; Skogerboe, K.J.; \*Synovec, R.E.; Novel Calibration of a Dynamic Surface Tension Detection: Flow Injection Analysis of Kinetically-Hindered Surface Active Analytes. *Talanta*, 1999, 50, 1045-1056.
  26. Young, T.E.; Miller, K.E.; \*Synovec, R.E.; Comparison of the Binding Constant of Decanesulfonate with Beta-Cyclodextrin as Determined by Liquid Chromatography with a Water Mobile Phase, and Flow Injection Analysis Coupled with Dynamic Surface Tension Detection. *Microchemical Journal*, 1999, 62, 70-82.

### Refereed Journals (in preparation)

Connors, D.E.; \*Miller, K.E., Subcritical water chromatography of polar compounds with picogram detection limits, submission to *Talanta*.

Caulfield, J.A.; Titelman, L.H.; \*Miller, K.E., Adsorption of caffeine on homoionic montmorillonites, results pending; publication in *Science of the Total Environment*.

## Book Chapters

27. Karbiwnyk, C.M & Miller, K.E. (2011) A Review of Current Analytical Applications Employing Graphitized Carbon Black. In I.J. Sanders & T.L. Peeten (Eds.) *Carbon Black: Production, Properties and Uses* (pp. 69-91) Hauppauge, N.Y: Nova Science Publishers.

## Conference Proceedings, Reports and Others

28. \*Rosenthal, L.; Miller, K.E. Fostering Authentic Research Opportunities for Undergraduates: Integrating a Portable X-ray Fluorescence Instrument Across Science Disciplines, AERA Conference paper, 2010.
29. Clark, S.B.; Karbiwnyk, C.M.; Madson, M.R.; Sofos, J.N.; Miller, K.E., Detection of penicillin residues on environmental gauze swabs by liquid chromatography with liquid chromatography/mass spectrometry confirmation, *FDA Laboratory Information Bulletin* 4441, October, 2009.
30. Clark, S.B.; Miller, K.V.; Storey, J.M.; Murphy, L.L.; Turnipseed, S.B.; Sofos, J.N.; Miller, K.E., Determination of chlorotetracyclin residues in animal feed by LC/MS/MS, *FDA Laboratory Information Bulletin* 4437, July, 2009.
31. Clark, S.B.; Murphy, L.L.; Miller, K.E.; Sofos, J.N., ELISA screening for residues in milk-based products, *FDA Laboratory Information Bulletin* 4429, March, 2009.
32. Turnipseed, S.B.; Clark, S.B.; Karbiwnyk, C.M.; Andersen, W.C.; Miller, K.E.; Madson, M.R., Analysis of aminoglycoside residues in milk by electrospray LC-MS<sup>n</sup> after derivatization with phenyl isocyanate, *FDA Laboratory Information Bulletin* 4425, January, 2009.
33. Storey, J.M.; Clark, S.B.; Turnipseed, S.B.; Sofos, J.N.; Miller, K.E., Determination of monensin residues in animal feed by LC/MS/MS, *FDA Laboratory Information Bulletin* 4424, September, 2008.
34. McGrew, J.; Miller, K.E., A simple and economical chemical reactor system oxidizes aqueous wastes to produce reusable water, heat and other byproducts, *Proceedings of the 2008 (101<sup>st</sup>) Air and Waste Management Association Annual Conference*, paper #627, available September 2008.
35. \*Turnipseed, S. B.; Andersen, W. C.; Karbiwnyk, C. M.; Madson, M.R.; Miller, K. E., Multi-class, multi-residue LC-MS-MS screening and confirmation method for drug residues in milk, *FDA Laboratory Information Bulletin* 4410, November, 2007.
36. \*Clark, S.B.; Rowe, W.D.; Miller, K.V.; Sofos, J.N.; Miller, K.E., Determination of four fluoroquinolones by liquid chromatography with fluorescence detection in catfish, shrimp and tilapia, *FDA Laboratory Information Bulletin* 4408, November, 2007.
37. \*Andersen, W.C.; Turnipseed, S.B.; Karbiwnyk, C.M.; Lee, R.H.; Clark, S.B.; Rowe, W.D.; Madson, M.R.; Miller, K.E., Quantitative and confirmatory analyses of crystal violet (gentian violet) and brilliant green in fish, *FDA Laboratory Information Bulletin* 4395, May, 2007.
38. \*Karbiwnyk, C.M.; Faul, K.C.; Turnipseed, S.B.; Andersen, W.C.; Miller, K.E., Determination of oxytocin in a dilute IV solution by LC-MS<sup>n</sup>, *FDA Laboratory Information Bulletin* 4385, November, 2006.
39. \*Karbiwnyk, C.M.; Hibbard, L.; Turnipseed, S.B.; Andersen, W.C.; Miller, K.E., Confirmation of oxcolinic acid, flumequine, and nalidixic acid in shrimp using liquid chromatography electrospray mass spectrometry, *FDA Laboratory Information Bulletin* 4383, October, 2006.
40. \*Turnipseed, S.B.; Clark, S.B.; Andersen, W.C.; Karbiwnyk, C.M.; Miller, K.E.; Hurlbut, J.A., Confirmation of diminazene diaceturate (Berenil) in bovine plasma using electrospray liquid chromatography-mass spectrometry, *FDA Laboratory Information Bulletin* 4364, March, 2006.

41. \*Bruno, T.J.; Miller, K.E., Application of Kováts retention indices as an odorant quality control tool, *Proc. Int. Conf. Nat. Gas and LPG Odorization*, Gas Technology Institute, July 25, 2005, Chicago, Ill. (published conference proceedings paper)
42. Miller, K.E.; Dynamic surface tension detector in flow injection analysis and liquid chromatography. 2000, 144 pp.

## INVENTION DISCLOSURE

\*Miller, K.E.; Connors, D.E; Sorauf, K.J., Nanoparticles as selective separation media, University Disclosure Log No. 198, University of Denver, October 31, 2008.

## ORAL PRESENTATIONS (Speaker)

1. "Why Teach Science?", Miller, K. E., Women's Library Association Meeting, Craig Hall. (October 11, 2012).
2. "Blended-Learning in General Chemistry," Miller, K. E., Board of Trustee's Meeting, DU. (September 21, 2012).
3. "Treatment of emerging contaminants in wastewater by wet air oxidation," Miller, K. E., McGrew, J., AWRA 2012 Summer Specialty Conference. Contaminants of Emerging Concern in Water Resources II: Research, Engineering, and Community Action, AWRA, Denver, CO. (June 26, 2012).
4. "Community-based projects in analytical chemistry and environmental science courses," Miller, K. E., Community-Based Research Seminar Series, CSU-Pueblo, CSU-Pueblo. (March 7, 2012).
5. "Making Public Good Work in Chemistry and Environmental Sciences," Miller, K. E., Colorado Campus Compact's Engaged Faculty Institute, Colorado Campus Compact, CU Denver/Metro Campus. (January 27, 2012).
6. "Wastewater treatment technology using wet-oxidation: an overview of laboratory studies using a vertical tube reactor (VTR) design," Miller, K. E., McGrew, J., Materials Challenges for Next-Generation Water Treatment, NIST, October 27, 2011 - October 28, 2011, Boulder, CO. (invited presentation)
7. "Building sustainability communities through service learning at University of Denver", member of faculty panel from DU, Association for the Advancement of Sustainability in Higher Education, National Meeting, October 11, 2010, Denver, CO (presentation and panel discussion)
8. "Wastewater treatment technology using wet-oxidation: addressing emerging water issues", Miller, K.E.; and McGrew, J., Rocky Mountain Water Quality Analyst Association 2010 Water Quality Symposium, April 30, 2010. (invited presentation)
9. "Integrating a portable X-ray fluorescence instrument into social, biological, and physical sciences", Keith E. Miller, Bonnie J. Clark, Robert L. Sanford Jr., August 20, 2009, 238<sup>th</sup> ACS National Meeting, Washington, DC. (invited presentation and published abstract)
10. "Where did the drug go? An undergraduate laboratory in analytical chemistry based on food safety", Keith E. Miller, Holly Appleberry, Michelle Collier, Elizabeth Dressen, Arsalan Rizvi and Samuel Schroeder, July 21, 2009, 51<sup>st</sup> Rocky Mountain Conference on Analytical Chemistry, Snowmass, CO. (presentation and published abstract)
11. "Measurements and modeling of absorption enthalpies of explosives and taggants on polymer surfaces", Keith Miller, Jeffrey Caulfield and Thomas J. Bruno, June 22, 2009, 17<sup>th</sup> Symposium on Thermophysical Properties, Boulder, CO. (presentation and published abstract)

12. "Apparatus for determining distribution coefficients of nitrogen heterocycles on nanoparticles and colloids", Keith Miller, Kellen Sorauf and Daniel Connors, June 24, 2009, 17<sup>th</sup> Symposium on Thermophysical Properties, Boulder, CO. (presentation and published abstract)
13. "Integrating portable X-ray fluorescence into service-based projects in analytical chemistry and environmental science courses", Keith E. Miller, March 8, 2009, Pittcon 2009, Chicago, IL. (invited workshop speaker and published abstract).
14. "Making Public Good Work: DU Faculty Perspectives on the Promises and Challenges of Public Good Work", Keith E. Miller, October 3, 2008, University of Denver. (invited presentation)
15. "Integrating pharmaceutical and food safety analyses into the analytical chemistry curriculum", K.E. Miller, July 28, 2008, 50<sup>th</sup> Rocky Mountain Conference on Analytical Chemistry, Breckenridge, CO. (presentation and published abstract)
16. "Antibiotics in surface and waste waters: an overview of adsorbent interactions and removal technology research", Keith E. Miller, April 10, 2008, Consortium for Research and Education on Emerging Contaminants (CREEC) meeting, Denver, CO. (invited presentation)
17. "Is environmental chemistry important?", Keith E. Miller, September 14, 2007, Department of Chemistry, University of Northern Colorado. (invited presentation)
18. "Pioneer Analytics: Integrating pharmaceutical analyses into analytical chemistry courses", Keith E. Miller, August, 30, 2007, 20<sup>th</sup> ACS Rocky Mountain Regional Meeting, Denver, CO. (presentation and published abstract)
19. "Caffeine adsorption on clay minerals and natural sediments", Keith E. Miller and Jeffrey A. Caulfield, June 4, 2007, 44<sup>th</sup> Annual Meeting of The Clay Minerals Society, Santa Fe, NM. (presentation and published abstract)
20. "Absorption enthalpy of explosives and taggants on polymeric surfaces", Thomas J. Bruno, Keith E. Miller and Esther Nakagawara, August 2, 2006, 16<sup>th</sup> Symposium on Thermophysical Properties, Boulder, CO. (presentation and published abstract)
21. "Adsorption of pharmaceuticals on minerals and sediments", Jeffery A. Caulfield, Laura H. Titelman and Keith E. Miller, Aug 1, 2005, 47<sup>th</sup> Rocky Mountain Conference on Analytical Chemistry, Denver, CO. (presentation and published abstract)
22. "Spectroscopy and modeling throughout the curriculum", Keith E. Miller, April 2, 2004, Rocky Mountain Chemistry Chairs Conference, Denver, CO. (presentation)
23. "Clay adsorbent evaluation by liquid chromatography", K.E. Miller and T.J. Bruno, July 29, 2003, 45<sup>th</sup> Rocky Mountain Conference on Analytical Chemistry, Denver, CO. (presentation and published abstract)
24. "Evaluation of clay adsorbents by liquid chromatography", K.E. Miller and T.J. Bruno, June 25, 2003, 15<sup>th</sup> Symposium on Thermophysical Properties, Boulder, CO. (presentation and published abstract)
25. "Sorption of fuel gas odorants on clay surfaces by gas chromatography", K.E. Miller and T.J. Bruno, June 24, 2003, 15<sup>th</sup> Symposium on Thermophysical Properties, Boulder, CO. (presentation and published abstract)
26. "Sorption of fuel gas odorants on soils", K.E. Miller and T.J. Bruno, February 21, 2003, University of Northern Colorado, Greeley, CO. (presentation)
27. "Sorption of fuel gas odorants on soils", K.E. Miller, January 13, 2003, United States Naval Academy, Annapolis, MD. (presentation)
28. "Measurements at the Boundary: Investigation of interfacial properties of industrial and environmental systems", K.E. Miller, December 12, 2002, University of Denver, Denver, CO. (presentation)
29. "Sorption of fuel gas odorants on soils", K.E. Miller, November 21, 2002, Creighton University, Omaha, NE. (presentation)

30. "Measurements at the Boundary: Investigations of interfacial properties of industrial systems", K.E. Miller, October 7, 2002, Baxter Healthcare Cooperation, Round Lake, IL. (presentation)
31. "Heat of Adsorption and Interaction Determinations of Fuel Gas Odorants on Surrogate Soil Surfaces by Gas Chromatography", K.E. Miller and T. J. Bruno, June 12, 2002, 39<sup>th</sup> Annual Meeting of The Clay Minerals Society, Boulder, CO. (presentation and published abstract)
32. "Measurements at the Boundary : Investigation of Interfacial Properties of Industrial Systems", K.E. Miller, April 5, 2002, Chemical, Science and Technology (CSTL) Colloquium, National Institute of Standards and Technology, Boulder, CO. (presentation)
33. "Adsorption of Fuel Gas Odorants on Surrogate Soil Surfaces", K.E. Miller, March 8, 2002, Chemistry Department, The Metropolitan State College of Denver, Denver, CO. (presentation)
34. "Preparing for the Professoriate: a graduate student's perspective", K.E. Miller and K.J. Skogerboe, March 28, 2000, 219<sup>th</sup> American Chemical Society National Meeting, San Francisco, CA. (presentation and published abstract)
35. "On-Line Measurements of Interfacial Properties", K.E. Miller, B.J. Prazen, M. Prezhdo, E. Bramanti, and R.E. Synovec, November 3, 1999, Center for Process Analytical Chemistry (CPAC) Meeting, Seattle, WA. (presentation)
36. "Dynamic Surface Tension Sensor for Process Monitoring of Liquids", K.E. Miller, M. Prezhdo, and R.E. Synovec, October 27, 1999, 26<sup>th</sup> Annual Conference of the Federation of Analytical Chemistry and Spectroscopy Societies, Vancouver, BC. (presentation and published abstract)
37. "Dynamic Surface Tension Sensor for Process Monitoring Applications", K.E. Miller and R.E. Synovec, June 21, 1999, 54<sup>th</sup> Northwest Regional Meeting of the American Chemical Society, Portland, OR. (presentation and published abstract)
38. "On-Line Measurements of Interfacial Properties", K.E. Miller and R.E. Synovec, May 5, 1999, CPAC Meeting, Bellevue, WA. (presentation)
39. "Dynamic Surface Tension Sensor for Process Monitoring and Microbore Liquid Chromatography Applications", K.E. Miller and R.E. Synovec, April 20, 1999, 9<sup>th</sup> Annual Kenan Award Symposium, Union Carbide, South Charleston, WV. (presentation)
40. "Dynamic Surface Tension Sensor for Process Monitoring and Microbore Liquid Chromatography Applications", K.E. Miller and R.E. Synovec, March 10, 1999, Pittsburgh Conference, Orlando, FL. (presentation and published abstract)
41. "On-Line Measurements of Interfacial Properties", K.E. Miller and R.E. Synovec, November 3, 1998, CPAC Meeting, Seattle, WA. (presentation)
42. "On-Line Measurements of Interfacial Properties", K.E. Miller and R.E. Synovec, May 5, 1998, CPAC Meeting, Seattle, WA. (presentation)

#### **ORAL PRESENTATIONS (co-author)**

43. "Improving Scientific Literacy in Elementary Students: Lessons from DPS/DU Math/Science Partnership," Benson, L. A., Sasaki, N. T., Morris, L., Miller, K. E., NSTA 2013 Annual Conference, National Science Teachers Association, April 11, 2013, San Antonio, Texas. (presentation)
44. "Spark-Induced Breakdown Spectroscopy for Elemental Analysis of Soils and the Development of a Fieldable Soil Carbon Monitor", M.S. Schmidt, K.J. Sorauf, K.E. Miller, A.J.R. Bauer, D.M. Sonnenfroh and R.T. Wainner, 242nd American Chemical Society National meeting, Denver, CO, September 1, 2011. (presentation)
45. "Characterization of nanoparticles and nitrogen heterocycles by hydrodynamic chromatography", Sorauf, K. J.; Connors, D. E.; Wells. T.A.; and Miller, K. E., Rocky Mountain SETAC Annual Meeting, Denver, CO, April 16, 2010. (presentation)

46. "Characterization of nanoparticles and colloids by hydrodynamic chromatography", K.J. Sorauf, D.E. Connors, T.A. Wells and K.E. Miller, July 21, 2009, 51<sup>st</sup> Rocky Mountain Conference on Analytical Chemistry, Snowmass, CO. (presentation and published abstract)
47. "Subcritical water chromatography: Green liquid chromatography with a thermal separation mechanism", D.E. Connors and K.E. Miller, July 28, 2008, 50<sup>th</sup> Rocky Mountain Conference on Analytical Chemistry, Breckenridge, CO. (presentation and published abstract)
48. "A simple and economical chemical reactor system oxidizes aqueous wastes to produce reusable water, heat and other byproducts", J. McGrew and K.E. Miller, K.E., June 27, 2008, 101<sup>st</sup> Air and Waste Management Association Annual Conference, Portland, OR. (presentation and published paper)
49. "Thermal retention mechanisms in subcritical water chromatography", D.E. Connors and K.E. Miller, May 13, 2008, HPLC 2008, Baltimore, MD. (presentation and published abstract)
50. "Development of a multi-class, multi-residue LC-MS-MS screening method for drug residues in milk", S.B. Turnipseed, C.M. Karbiwnyk, W.C. Andersen, S.B. Clark, M.R. Madson and K.E. Miller, July 24, 2007, 49<sup>th</sup> Rocky Mountain Conference on Analytical Chemistry, Breckenridge, CO. (presentation and published abstract)
51. "Quantifying Vapor-Soil Interactions Using Surrogate Soil Stationary Phases in Gas Chromatography", T.J. Bruno and K.E. Miller, July 29, 2003, 45<sup>th</sup> Rocky Mountain Conference on Analytical Chemistry, Denver, CO. (presentation and published abstract)

## POSTER PRESENTATIONS

1. "Integrating environmental and sustainable chemistry challenges into capstone chemistry courses." K.E. Miller, April 18, 2014, Rocky Mountain Society of Environmental Toxicology and Chemistry, Denver, CO.
2. "From I wonder to I understand: observations on student learning from a chemistry capstone course." B. Murugaverl, K.E. Miller, April 4, 2014, OTL Teaching and Learning Conference, University of Denver, Denver CO.
3. "Distribution coefficient of nitrogen heterocycles on clay mineral colloids using multivariate curve resolution." K.J. Sorauf, D.E. Connors, T.A. Wells and K.E. Miller, Aug. 28-Sep. 1, 2011, 242nd American Chemical Society Meeting, Denver, CO. (poster and published abstract)
4. "Spark-Induced Breakdown Spectroscopy for Elemental Analysis of Soil and the Development of a Fieldable Soil Carbon Monitor", M.S. Schmidt, K.J. Sorauf, K.E. Miller, A.J.R. Bauer, D.M. Sonnenfroh and R.T. Wainner, July 19, 2011, North American Symposium on Laser-Induced Breakdown Spectroscopy, Clearwater Beach, FL (poster)
5. "Distribution coefficient of pharmaceuticals on clay mineral nanoparticles using multivariate curve resolution." K.J. Sorauf, D.E. Connors, T.A. Wells and K.E. Miller, May 15-20 2011, 6th Annual Eigenvector University, Seattle, WA. (poster)
6. "Spark-Induced Breakdown Spectroscopy for Elemental Analysis of Soil", M.S. Schmidt, K.E. Miller, A.J.R. Bauer, D.M. Sonnenfroh and R.T. Wainner, September 15, 2010, 6th International Conference on Laser-Induced Breakdown Spectroscopy, Memphis, TN. (poster)
7. "Wastewater treatment by wet air oxidation; an overview of laboratory studies", Connors, D. E.; Rizvi, A.; Stetser, T.; Miller, K. E., and McGrew, J, Rocky Mountain SETAC Annual Meeting, Denver, CO, April 16, 2010. (poster)
8. "Removal of antibiotics from wastewater by wet air oxidation", Keith E. Miller, Daniel E. Connors, Arsalan Rizvi, Jennifer Riggs and Jay McGrew, August 4-7, 2009, 2<sup>nd</sup> International Conference on Occurrence, Fate, Effects, and Analysis of Emerging Contaminants in the Environment (EmCon2009), Fort Collins, CO. (poster and published abstract)



9. "Integrating X-ray fluorescence (XRF) into undergraduate chemistry and environmental science courses", F. Habte, S. Newman, A. Amo-Quarm, K. Atkinson, C. Fukami, C. Parks and K.E. Miller, July 20-22, 2009, 51<sup>st</sup> Rocky Mountain Conference on Analytical Chemistry, Snowmass, CO. (poster and published abstract)
10. "Absorption enthalpies of nitrogen heterocycles on polymer surfaces by gas chromatography", Keith Miller, Jeffrey Caulfield and Thomas J. Bruno, June 24, 2009, 17<sup>th</sup> Symposium on Thermophysical Properties, Boulder, CO. (poster and published abstract)
11. "Distribution coefficient and enthalpy of adsorption determinations of explosives on clays and clay mineral colloids", Keith Miller, Kellen Sorauf and Daniel Connors, June 24, 2009, 17<sup>th</sup> Symposium on Thermophysical Properties, Boulder, CO. (poster and published abstract)
12. "Analysis of aminoglycoside residues in milk by electrospray LC-MS<sup>n</sup> after derivatization with phenyl isocyanate", S.B Turnipseed, S.B. Clark, C.M. Karbiwink, W.C. Andersen, K.E. Miller and M.R. Madson, June 1-5, 2008, 56<sup>th</sup> ASMS Conference on Mass Spectrometry, Denver, CO. (poster and published abstract).
13. "Development of a multi-class, multi-residue LC-MS-MS screening method for drug residues in whole milk", S.B Turnipseed, W.C. Andersen, C.M. Karbiwink, S.B. Clark, M.R. Madson, and K.E. Miller, May 19-21, 2008, EuroResidue XI, Egmond aan Zee, The Netherlands. (poster)
14. "Adsorption of emerging contaminants on clay minerals", K.E. Miller, B.L. Smith, and J.A. Caulfield, November 14, 2007, 28<sup>th</sup> Annual Society of Environmental Toxicology and Chemistry – North America, Milwaukee, WI. (poster and published abstract)
15. "Development of a multi-class, multi-residue LC-MS-MS screening method for drug residues in whole milk", S.B Turnipseed, W.C. Andersen, C.M. Karbiwink, S.B. Clark, M.R. Madson, and K.E. Miller, September 2007, 121<sup>th</sup> AOAC Annual Meeting, Anaheim, CA. (poster)
16. "Adsorption of caffeine on clay minerals and natural sediments", J.A. Caulfield and K.E. Miller, July 23-24, 2007, 49<sup>th</sup> Rocky Mountain Conference on Analytical Chemistry, Breckenridge, CO. (poster and published abstract)
17. "Modified clay minerals as renewable adsorbents", J. Zemetra, B. Swanson, and K.E. Miller, July 23-24, 2007, 49<sup>th</sup> Rocky Mountain Conference on Analytical Chemistry, Breckenridge, CO. (poster and published abstract)
18. "Novel method for infrared analysis of clay minerals.", J.A. Caulfield, T.A. Wells and K.E. Miller, July 23-24, 2007, 49<sup>th</sup> Rocky Mountain Conference on Analytical Chemistry, Breckenridge, CO. (poster and published abstract)
19. "Community-based research using a portable X-ray fluorescence (PXRF) instrument", P. Ayres, E. Hanawa, W. Carspecken, A. Ruehle, M. Seager and K.E. Miller, July 23-24, 2007, 49<sup>th</sup> Rocky Mountain Conference on Analytical Chemistry, Breckenridge, CO. (poster and published abstract)
20. "Infrared analysis of silicon wafer-supported clay minerals", K.E. Miller, J.A. Caulfield and T.A. Wells, June 4-6, 2007, 44<sup>th</sup> Annual Meeting of The Clay Minerals Society, Santa Fe, NM. (poster and published abstract)
21. "Adsorption of caffeine on clay minerals and natural sediments", K.E. Miller and J.A. Caulfield, April 13, 2007, 20<sup>th</sup> Annual Meeting of the Rocky Mountain Chapter of the Society for Environmental Toxicology and Chemistry, Golden, CO. (poster)
22. "Comparison of chloramphenicol analysis methods in crab and shrimp using LC-MS-MS and surface plasmon resonance biosensor technology", W.C. Andersen, S.B. Turnipseed, C.M. Karbiwink, L.E. Carr, R.H. Lee, M.R. Madson, K.S. Kreuzer and K.E. Miller, September 17-21, 2006, 120<sup>th</sup> AOAC Annual Meeting, Minneapolis, MN. (poster)
23. "Sensitive LC-MS<sup>n</sup> Method for the Quantitation and Confirmation of Oxytocin in a Dilute IV Solution by LC-MS<sup>n</sup>", C.M. Karbiwink, K.C. Faul, S.B. Turnipseed, W.C. Andersen, and K.E.

- Miller, May 28 – June 1 , 2006, 54<sup>th</sup> ASMS Conference on Mass Spectrometry, Seattle, WA.  
(poster and published abstract)
24. “Development of a Mult-class, Mult-Residue LC-MS<sup>n</sup> Screening Method for Drug Residues in Whole Milk”, S.B. Turnipseed, C.M. Karbiwnyk, W.C. Andersen, S.B. Clark, and K.E. Miller, 2006 FDA Science Forum, April 18-20, 2006, Washington, DC. (poster)
  25. “Determination of Oxytocin in Dilute IV Solution by LC-MS<sup>MS</sup>”, C.M. Karbiwnyk, K.C. Faul, S.B. Turnipseed, W.C. Andersen, and K.E. Miller, 2006 FDA Science Forum, April 18-20, 2006, Washington, DC. (poster)
  26. “Surface Plasmon Resonance Biosensor Analysis for Chloramphenicol Residue Determination in Crab and Shrimp”, W.C. Andersen, S.B. Turnipseed, C.M. Karbiwnyk, L.E. Carr, R.H. Lee, M.R. Madson, K.S. Kreuzer, and K.E. Miller, 2006 FDA Science Forum, April 18-20, 2006, Washington, DC. (poster)
  27. “Modified-clay minerals as solid-phase extraction media for tetracycline antibiotics”, L. Brent and K. E. Miller, Aug 1, 2005, 45<sup>th</sup> Rocky Mountain Conference on Analytical Chemistry, Denver, CO. (poster and published abstract)
  28. “Thermodynamics and Kinetics of Fluid-Clay Interactions”, K. E. Miller and T.J. Bruno, May 4-5, 2001, Symposium in Honor of Professor Daniel E. Martire, Georgetown University, Washington, DC.
  29. “Liquid Chromatography of Proteins Using a Multidimensional Dynamic Surface Tension Detector”, E. Bramanti, K.E. Miller, B.J. Prazen, M. Prezhdo, K.J. Skogerboe and R.E. Synovec, October 5, 2000, 23<sup>rd</sup> International Symposium on Chromatography, Olympia, London.
  30. “Liquid Chromatography of Proteins and Polymers Using a Multidimensional Dynamic Surface Tension Detector”, E. Bramanti, K.E. Miller, B.J. Prazen, M. Prezhdo, R.E. Synovec and K.J. Skogerboe, June 29, 2000, 24<sup>th</sup> International Symposium on High Performance Liquid Phase Separations (HPLC 2000), Seattle, WA.
  31. “Dynamic Surface Tension and Adhesion Measurements on Flowing Aqueous Liquids”, R.E. Synovec, K.E. Miller, N.A. Olson, and K.J. Skogerboe, February 9-10, 1998, Gordon Conference on Colloidal, Macromolecular and Polyelectrolyte Solutions, Ventura, CA.

## REVIEWER FOR JOURNALS

*Analytica Chimica Acta, Talanta, Journal of Agricultural and Food Chemistry, Food Chemistry, Separation Science and Technology, Fuel, Energy and Fuels, Applied Spectroscopy*

## GRANTS AND CONTRACTS (FUNDED)

1. “Designing interactive activities to stimulate informal science learning in public libraries”, Keith Miller (PI), Public Good Fund, University of Denver, 7/2014 – 6/2015, \$14,906.
2. “Assessing learning through student notebooks”, Nancy Sasaki, Kathy Green, Keith Miller, DU Interdisciplinary PROF, 7/2012 – 6/2014, \$30,000.
3. “Development of a Fieldable Soil Carbon Monitor”, Keith Miller (DU-PI, subcontract to PSI), Department of Energy, 9/2010 – 8/2012, \$230,000.
4. “Community-based learning mini-grant”, Keith Miller (PI), University of Denver, 6/2010 – 5/2011, \$1,000.
5. “Professional Research Experience Program (PREP)”, Keith Miller (PI), National Institute of Science and Technology (NIST), 8/2009 – 8/2014, \$11,405,997.
6. “NIST Summer Undergraduate Research Fellowship Program”, Keith Miller (PI), National Institute of Standards and Technology, 2009, \$7,500.

7. "Chemical activity characterization of nano-particles", Keith Miller (PI), DU PROF, 2009 – 2011, \$14,934.
8. "The Science Teachers Learning from Lesson Analysis (STeLLA) Professional Development Program: Scaling for Effectiveness", Instructor on grant; PI is Dr. Nancy Landes (BSCS), National Science Foundation, 2010-2012, \$123,000 direct costs (DU's portion)
9. "DPS/DU Urban Partnership to Improve Science Education", DU Co-PI and instructor on grant; PI is Linda Morris (DPS), Colorado Department of Education, 2010-2013
10. "Integration of a Portable X-ray fluorescence instrument into courses in Social, Natural and Physical Sciences", Keith Miller (PI), NSF-DUE-CCLI, 2008-2011, \$148,948.
11. "Optimizing the effluent from the Vertical Tube Reactor for agriculture application", Keith Miller (PI), USDA-NCRS, 2007-2009, \$74,980
12. "Community Research and Outreach: Water Quality Monitoring of Sand Creek", Keith Miller, Center for Community Engagement and Service Learning, University of Denver, 2006 – 2007, \$10,000.
13. "NIST Summer Undergraduate Research Fellowship Program", Keith Miller, National Institute of Standards and Technology, 2006, \$6,000.
14. WLA Grant recipient (with Mike Kerwin and Buck Sanford) for purchase of *Soils in the Environment* for the Penrose Library collection, \$1,200.
15. "Measurement of surface energetics on natural and synthetic polymers", Keith Miller, National Institute of Standards and Technology, 2005 – 2006, \$24,431.
16. "Fate of human pharmaceuticals in natural waters", Keith Miller, Professional Research Opportunities for Faculty, University of Denver, 2005 – 2008, \$14,548.
17. "NIST Summer Undergraduate Research Fellowship Program", Keith Miller, National Institute of Standards and Technology, 2005, \$5,850.
18. "Certificate Program in Homeland Security. A proposed course of study at the University of Denver", Keith Miller and Todd Wells (Co-PI), Colorado Institute of Technology, 2004 – 2005, \$197,858.
19. "Laptop Computers and Spectroscopy: Let's spread the word – Seeing is believing", Keith Miller, Center for Teaching and Learning, University of Denver, 2004 – 2005, \$8,051
20. "Molecular spectroscopy – theory, modeling, and experimentation: A unifying theme throughout the chemistry and biochemistry curriculum", Keith Miller and Todd Wells (Co-PI), Marsico Grant, University of Denver, 2003 – 2004, \$46,964.
21. "Adsorption of pharmaceuticals, antibiotics and antiseptics on sediments", K.E. Miller, Faculty Research Fund, University of Denver, 2003, \$2,500.
22. "Diffusion of Organic Contaminants on Clay Soil Surfaces", K.E. Miller, National Research Council Research Associate Program, 2000 – 2002, \$115,000.
23. "Using the world of the working chemist to reform the quantitative analysis laboratory", K.J. Skogerboe and K.E. Miller, Special Grant Program in the Chemical Sciences, The Camille and Henry Dreyfus Foundation, 2000, \$20,000.
24. "Curricular Development in Analytical Chemistry", K.E. Miller, Huckabay Fellowship, University of Washington and Seattle University, 1999 – 2000, \$10,000.

## AWARDS AND FELLOWSHIPS

- Outstanding Service Award, Division of Natural Sciences and Mathematics, University of Denver (December 2013)
- University of Denver Pioneer Professor, University of Denver. (May 2012)

- Distinguished Teacher Award, University of Denver (2011-2012)
- Civic Engagement Fellow, University of Denver (2006-2007)
- National Research Council (NRC) Postdoctoral Fellow, National Institute of Standards and Technology (2000–2002)
- Huckabay Fellow, University of Washington (1999-2000)
- Kenan Symposium Award, Union Carbide (1999)
- Tomas Hirschfeld Memorial Scholarship Award, University of Washington (1999)
- Klaus A. and Mary Ann Saegebarth Fellow, University of Washington (1996)
- Distinguished Graduate, United States Naval Academy (1988)
- ACS (Local Chapter) Award for Analytical Chemistry, United States Naval Academy (1988)
- Detroit Women's Council of the Navy League Award for Proficiency in Chemistry, United States Naval Academy (1988)

## SERVICE

### External Service

- 2009 Presided (co-chair) of Treatment and Water Reuse/Policy and Prevention session, August 4-7, 2009, 2<sup>nd</sup> International Conference on Occurrence, Fate, Effects, and Analysis of Emerging Contaminants in the Environment (EmCon2009), Fort Collins, CO.
- 2009 Coordinated and presided over one analytical session, July 19-23, 2009, 51<sup>st</sup> Rocky Mountain Conference on Analytical Chemistry, Snowmass, CO.
- 2009 Presided (co-chair) of Novel Instrumentation Session, June 21-26, 2009, 17<sup>th</sup> Symposium on Thermophysical Properties, Boulder, CO.
- 2008 Coordinated and presided over one analytical session, July 28-30, 2008, 50<sup>th</sup> Rocky Mountain Conference on Analytical Chemistry, Breckenridge, CO.
- 2007 Coordinated and presided over two (2) sessions, July 23-24, 2007, 49<sup>th</sup> Rocky Mountain Conference on Analytical Chemistry, Breckenridge, CO.
- 2006 Presided over two (2) Novel Instrumentation Sessions, July 30-Aug 4, 2006, 16<sup>th</sup> Symposium on Thermophysical Properties, Boulder, CO.
- 2003 Presided over one (1) Novel Instrumentation Session, June 22-27, 15<sup>th</sup> Symposium on Thermophysical Properties, Boulder, CO.
- 1999 Presided over Analytical Chemistry Sessions I and II, June 23, 1999, 54<sup>th</sup> Northwest Regional Meeting of the American Chemical Society, Portland, OR.

### Internal Service

- 2014 – present Associate Provost for the Advancement of Teaching and Learning search committee
- 2014 Chemistry Lecturer (3 positions) search committee
- 2013 – present Chair, Faculty Athletic Committee
- 2013 – 2014 Chair, Organic Chemistry faculty search committee
- 2012 – 2013 Chair, Organic Chemistry faculty search committee
- 2012 – 2013 Chair, Department Promotion and Tenure committee
- 2012 – 2013 ReNew DU -- Teaching Incubator member
- 2012 Chemistry Lecturer search committee
- 2012 Chemistry Budget and Office Manager search committee
- 2012 Chair, Department Pre-Tenure committee (2 faculty members reviewed)

2012 – present	Graduate Commencement Marshall
2012 – present	Departmental Assessment representative
2011 – present	Division of Natural Sciences and Mathematics Promotion and Tenure committee, Departmental representative
2010 – present	Chair, Departmental Undergraduate Committee
2010 – 2011	Chair, Environmental Chemistry faculty search committee
2008 – 2013	Faculty Senator (Chemistry and Biochemistry Department)
2008 – 2013	Student Relations Sub-committee (Faculty Senate)
2008 – present	Departmental Executive Committee
2008 – 2010	Departmental representative, Center for Nanoscale Science and Engineering
2008 – 2011	Chair, Phillipson Endowed faculty search committee
2008 – 2009	Global Change Ecologist faculty search committee
2008 – 2009	Sustainability Council - Research and Curriculum Committee
2008	Making of a Scientist, Academy Instructor (summer)
2007 – 2009	Biophysical/biochemistry and bio-organic/organic faculty search committee
2007 – 2009	Departmental Representative, Environmental Science Committee
2006 – 2007	Divisional Space Committee
2006 – 2010	Faculty Advisor for Colleges Against Cancer (DU chapter)
2006 – 2008	Departmental Seminar Coordinator
2006	Graduate student recruiting, Seattle University
2006	Honors NATS Adhoc Committee
2005 – present	Faculty Athletic Committee
2004 – 2006	Ammi Hyde Interviews (both Fall and Winter rounds)
2004 – 2007	Marsico Undergraduate Internship Committee
2004 – present	Departmental Undergraduate Committee
2004 – 2008	Departmental Assessment Committee
2004 – present	Departmental Undergraduate Advisor
2003 – 2007	Departmental Alternate, Environmental Science Committee
2003 – present	CUME preparation for analytical graduate students

### **Outreach**

2013	National Chemistry Week, Englewood Public Library, November, 2013.
2010	National Chemistry Week, Denver Museum of Nature and Science, October, 2010.
2008	Bluff Lake sediment and site assessment, Sand Creek water quality monitoring (Fall quarter)
2008	Science Demonstrations, Paddington Station Pre-school and Steele Elementary, Denver, CO.
2008	Science Fair Judge, Steele Elementary, Denver, CO.
2007	Bluff Lake sediment analysis (Winter and Spring quarters)
2007	Science Demonstrations, Steele Elementary, Denver, CO.
2006	Sand Creek water quality monitoring and analysis (Winter quarter)
2006	Science Demonstrations, Paddington Station Pre-school, Denver, CO.
2004	Water quality sampling with The Waldorf School, Denver, CO. Completed multiple sampling events over a period of 4 weeks.
2004	Coordinated and helped perform chemistry demonstrations for Pioneer Charter School
2001	Kids and Chemistry, March 23, 2001, Denver, CO.
2001	CIRES (Cooperative Institute for Research in Environmental Sciences), December 7, 2001, Lafayette, CO.

2001 Special Awards Judge for Department of Commerce, Colorado Science and Engineering Fair, April 12, 2001, Fort Collins, CO.

## RESEARCH EXPERIENCE

- 2009 – Pres. *Associate Professor*: University of Denver, Denver, CO
- 2003 – 2009 *Assistant Professor*: University of Denver, Denver, CO
- Currently direct the research of two (2) PhD candidates, one (1) MS candidate, and one (1) undergraduate students in areas related to applied separation science, waste water treatment and soil analysis.
  - Research areas include:
    1. Measure adsorption thermodynamics and kinetics of pharmaceutical uptake on clay minerals and natural sediment surfaces using batch adsorption techniques.
    2. Development of engineered clay, nano-composite material for use as selective, solid-phase extraction (SPE) media and stationary phase material. Techniques include cation-exchange substitutions and sol-gel synthesis.
    3. Treatment of municipal and agricultural wastewaters using wet-oxidation laboratory reactor. Current research involves treating waste for beneficial water reuse applications and investigation of pharmaceutical removal from waste streams with the reactor.
- 2000 – 2003 *Postdoctoral Research*: National Institute of Standards and Technology, Boulder, CO, (research advisor: Dr. Thomas J. Bruno)
- Measured adsorption thermodynamics and kinetics of solute uptake on inorganic-organic composite substrates (clay and organo-clay) using gas chromatographic techniques.
  - Developed predictive models for enthalpy values based on known physical properties (e.g., molecular mass, critical volume) as well as linear solvation energy relationships (LSERs).
  - Extended adsorption thermodynamic metrology to aqueous environments. Research included formation of inorganic-organic composite particles for use as stationary phase in liquid chromatography.
  - Conducted infrared attenuation studies on refrigerant mixtures.
- 1996 – 2000 *Doctoral Research*: University of Washington, Seattle, WA  
(research advisor: Professor Robert E. Synovec)  
Dissertation Title: “Dynamic Surface Tension Detection: Detector Development for Applications in Aqueous Chromatography and Process Control Analysis.”
- Developed a novel surface tension detector for the selective monitoring of surfactants with applications in liquid chromatography and continuous flow analyzers.
  - Directed liquid chromatographic method development activities of undergraduate students and staff scientists.
- 1988 *Research Associate*: Los Alamos National Laboratory, Los Alamos, NM  
(research advisor: Dr. Carlyle B. Storm)
- Studied alternate synthetic pathways for explosives used in military weapon applications.

- 1988      ***Undergraduate Research:*** United States Naval Academy, Annapolis, MD  
(research advisor: Professor Thomas E. Bitterwolf)
- Studied alternate synthetic pathways, including photochemical substitution mechanisms, for ruthenium (I) carbonyl compounds.

## RESEARCH INTERESTS

- Fate and transport of pharmaceutical compounds (antibiotics) in surface waters and sediments.
- Impacts and fate of nanomaterials in the environment
- Analytical method development for trace analysis of pharmaceuticals in food and animal feed.
- Wastewater treatment using sub-critical water; water re-use and energy production.
- Measurement of organic pollutant (explosives and chemical agents) interactions with natural clay and organo-clay composites using chromatographic (gas and liquid) techniques.
- Application of multivariate analysis in chemical analysis of environmental pollutants.

## UNDERGRADUATE RESEARCH STUDENTS (Advisor)

- Laura Titelman** (2004-05) Thesis title: *Adsorption mechanisms of pharmaceuticals onto clay minerals*, Departmental Honors, B.S. in Chemistry (ACS), 2005.
- Dinah Cho** (2004) Research topic: Adsorption properties of brompheniramine on clay minerals B.S. in Biochemistry, 2005.
- Duc Ha** (2005) Research topic: Octanol-water partition coefficient of ETBE, B.S. in Chemistry (ACS), 2005
- Marta Martins** (2004) Research topic: Metal-porphyrin complexes mediated with clay minerals B.A. in Chemistry, 2006.
- Allison Peddle** (2004-06) Thesis title: *Passive sampling and analyte derivative techniques for monitoring aquatic pesticide concentrations*, Partners in Scholarship Award, Departmental Honors, B.S. in Environmental Chemistry, 2006.
- Jolene Diedrich** (2005-06), Thesis title: *Surfactant analysis of Roundup®: Development of a method for identifying a toxic surfactant in the environment*, Partners in Scholarship Award, Departmental Honors, B.S. in Chemistry (ACS), 2006.
- Elizabeth Stephens** (2006) Research topic: Heavy metal analysis of copper-treated lumber B.S. in Chemistry, 2006.
- Beverly Smith** (2005) Research topic: Adsorption properties of lincomycin on clay minerals Departmental Honors, B.S. in Chemistry (ACS), 2007.
- Emme Hanawa** (2007) Research topic: Regeneration of clay mineral-based adsorbents for removing antibiotics from wastewater, B.S. in Chemistry, 2007.
- Stephanie Gillund** (2007) Research topic: Evaluation of solid-phase extraction media for use as field sampling device for cations and anions in natural waters, B.S. in Chemistry, 2007.
- Hai Pham** (2007) Research topic: Regeneration of clay mineral-based adsorbents for removing antibiotics from wastewater, Partners in Scholarship Award, B.S. in Biochemistry, 2009.
- Whitney Hoover** (2008) Research topic: Tetracycline and microbe degradation under sub-critical water conditions, B.S. in Biological Sciences, 2009.

- Anna So** (2009) Research Topic: Degradation of gemfibrozil by wet-oxidation, B.S. in Biochemistry, 2009.
- Arsalan Rizvi** (2008 – 2009) Research Topic: Degradation of antibiotics and estrogenic compounds using wet-oxidation, Partners in Scholarship Award, B.S. in Biochemistry, 2010.
- Jennifer Riggs** (2009) Research Topic: Degradation of lincomycin using wet-oxidation, B.S. in Biochemistry, 2010.
- Moira Pryhoda** (2010 – 2012) Thesis title: *Metal analysis of late Pleistocene sediments using X-ray fluorescence*, Distinction in Major, B.S. in Chemistry, 2012.
- Kelly Goheen** (2011 – 2012) Thesis title: *Removal of Heavy Metals from Acid Mine Drainage by Wet-Air Oxidation*, Undergraduate Honors Thesis. B.S in Environmental Chemistry, 2012.
- Kelsey Jensen** (2011 – 2012) Thesis title: *Elemental Analysis of Bioaerosols and Minerals with Direct Ablation Spectroscopy*, Undergraduate Honors Thesis. B.S in Chemistry, June 2012.
- Oscar Baez** (2012 – 2013) Research topic: Isolation and analysis of anthocyanins from radishes grown in soil and soilless conditions, B.S in Chemistry, 2013
- Daniel Powell**, (2013 – 2014) Thesis title: *Quantitative Low-Cost Water Quality Monitoring*, Partners in Scholarship Award, B.S. in Chemistry (ACS), 2014.

#### **GRADUATE RESEARCH STUDENTS (Advisor)**

- Lacey Brent** (2005-2006) Thesis title: *Investigating the sorption of tetracycline antibiotics to modified clay minerals*, M.S. in Chemistry, 2006.
- Brooke Swanson** (2005-2007) Thesis title: *Investigating the adsorption of nitro-aromatic compounds on modified clay minerals*, M.S. in Chemistry, 2007.
- Joseph Zemetra** (2005-2007) Thesis title: *Synthesis and evaluation of sol-gel clay minerals*, M.S. in Chemistry, 2007.
- Jeff Caulfield** (2004-2008) Dissertation title: *Analytical study of sorption phenomena for nitrogen heterocycles*, Ph.D. in Chemistry, 2008.
- Daniel Connors** (2006-2009) Dissertation title: *Analysis and treatment of emerging polar contaminants*, Ph.D. in Chemistry, 2009.
- Kellen Sorauf** (2008 – 2012) Dissertation title: *A Hydrodynamic method for measuring aqueous nanoparticle surface interactions*, Ph.D. in Chemistry, 2012.
- Morgan Schmidt** (2008 – 2012) Dissertation title: *Plasma spectroscopic techniques applied to biological and environmental matrices*, Ph.D. in Chemistry, 2012. (joint advisor with A. Bauer)
- Miao Sun** (2011-2013) Thesis title: *The Removal of Pharmaceuticals From Wastewater by Wet-Air Oxidation*, M.S. in Chemistry, 2013.
- John Haynes** (2013 – present). Research topics: nanoparticle-metal ion interactions using hydrodynamic chromatography and ICP-MS, Ph.D. candidate in Chemistry
- Thomas Stetser** (2009 – present) Research topics: Water treatment of industrial and agricultural wastewater by wet-air oxidation using the vertical-tube reactor (MS candidate)

#### **GRADUATE RESEARCH STUDENTS (Committee Member)**

- Angela M. Monateri**, Thesis title: *Infrared thermal imaging of automobiles: identification of cold start vehicles*, M.S. in Chemistry, 2004 (Advisor: D. Stedman).
- Ryan Stadtmuller**, Thesis title: *Advances in remote sensing instrumentation*, M.S. in Chemistry, 2006 (Advisor: D. Stedman).
- Behrang Mahjoub**, Thesis title: *Study of selected sorbents*, M.S. in Chemistry, 2007



- (Advisor: D. Stedman).  
**Allison Peddle**, Thesis title: *Performance and calibration of on-road sensors*, M.S. in Chemistry, 2008  
(Advisor: D. Stedman).  
**Nick Holubowitch**, Thesis title: *Applications of high-speed infrared spectroscopy*, M.S. in Chemistry, 2008  
(Advisor: D. Stedman).  
**Ignacio J. Garcia**, Dissertation title: *Polymer supported optical biosensors*, Ph.D. in Chemistry, 2008  
(Advisor: T. Wells).  
**Kelly Owens** (2007 – 2009) M.S. in Biological Sciences, 2009 (Advisor: R. Sanford).  
**Tiffany Gustafson** (2006 – 2009) Ph.D. in Chemistry, 2010 (Advisor: A. Kutateladze).  
**Maria Steblyanko** (2007-2009) Ph.D. candidate in Chemistry [left DU: 2009] (Advisor: S. Mansey).  
**Brent Schuchmann**, Dissertation title: *Trends in HDDV emissions and analyses of Colorado's Inspection Maintenance Programs for LDVs*, Ph.D. in Chemistry, 2011 (Advisor: D. Stedman)  
**Ayisha Siddiqua** (2008-2012) Ph.D. in Chemistry, 2012 (Advisor: M. Margittai)  
**Paul Dinkel**. Dissertation title: *Seeded Propagation of Tau Fibrils*, Ph.D. in Chemistry, 2013. (Advisor: M. Margittai)  
**Erika Ross** (2010 – 2012) M.S. in Biological Sciences (Advisor: D. Linseman)  
**Jennifer Chapin Lake**, Dissertation title: *Molecular encapsulation in kinetically trapped, hydrogen-bonded pyrogallolarene hexamers*, Ph.D. in Chemistry, 2014 (Advisor: B. Purse)  
**Joshua Biller**, Dissertation title: *Nitroxyl Radicals for Low Frequency EPR*, Ph.D. in Chemistry, 2014  
(Advisor: G. Eaton)  
**Virginia Meyer**, Dissertation title: *Applications of EPR to Unique Samples with an Emphasis on Tau Fibril Structure*, Ph.D. in Chemistry, 2014 (Advisor: M. Margittai)  
**Carolyn Schumacher**, M.A. in Chemistry, 2014. (Advisor: A. Huffman)  
**Nitika Dewan** (2011 – present) Ph.D. candidate in Chemistry (Advisor: B. Majestic)  
**Nathan Duval** (2008 – present) Ph.D. candidate in Biological Sciences (Advisor: D. Patterson)  
**Phillip Cheney** (2010 – present) Ph.D. candidate in Chemistry (Advisor: M. Knowles)  
**Aimee Winter** (2012 – present) Ph.D. candidate in Biological Sciences (Advisor: D. Linseman)  
**Faten Tarem** (2012 – present) Ph.D. candidate in Biological Sciences (Advisor: D. Linseman)

## GRADUATE STUDENTS (Oral Defense Chair)

- Heather Wilkins**, "Mitochondrial Glutathione transport: implications for BCI-2 and neuronal survival," Completed. (June 20, 2013).  
**Alexa Hart**, Ph.D. in Astronomy, Oral Defense Dissertation Chair. Completed. (May 8, 2013).  
**Michael Spencer**, Master of Music Performance Oral Defense. Completed. (May 2012).

## TEACHING EXPERIENCE

- 2009 – Pres. *Associate Professor*: University of Denver, Denver, CO  
2003 – 2009 *Assistant Professor*: University of Denver, Denver, CO

### Courses Developed/Taught

- General Chemistry, CHEM 1010 (2009 – 67 students, 2010 – 73 students, 2012 – 78 students, 2013 – 75 students), 4 contact hrs/wk
- Analysis of Equilibrium Systems, CHEM 2011 (2004 – 86 students, 2005 – 85 students, 2008 – 109 students (2 sections), 2011 – 66 students), 4 contact hrs/wk

- Analysis of Equilibrium Systems Laboratory, CHEM 2041 (2012 – 143 students in 8 sections), 6-8 contact hrs/wk
- Instrumental Analysis, CHEM 3210 (2004 – 11 students, 2005 – 24 students, 2006 – 16 students, 2007 – 15 students, 2008 – 23 students, 2009 – 19 students, 2012 – 24 students), 12-14 contact hrs/wk
- Environmental Chemistry II – Aquatic Chemistry, CHEM 3411 (2006 – 8 students, 2009 – 6 students, 2011 – 7 students, 2013 – 10 students, 2014 – 20 students), 3 contact hrs/wk
- Environmental Chemistry III – Environmental Toxicology, CHEM 3412 (2005 – 7 students, 2007 – 3 students), 3 contact hrs/wk
- Directed Study – Environmental Chemistry and Toxicology, CHEM 3992 (2012 – 2 students), 3 contact hrs/wk
- Chemistry Frontiers, CHEM 3500 (2009 – 20 students, 2013 – 14 students, 2014 – 19 students), 15 – 25 contact hrs/wk
- Water Quality of Western Rivers and Streams, ENVI 2800 (2008 – 12 students), field intensive course – 2 weeks full time
- First-Year Seminar (2004 – 6 students, 2005 – 15 students, 2006 – 15 students, 2011 – 16 students), 4 contact hrs/wk
- Research Issues/Culturally and Linguistically Diverse Learners, CUI 4533-2 (2011 - 9 students)

### **Significant Activities and Course Developments**

- Led the development and implementation of hybrid courses for General Chemistry
- Responsible for development/implementation of Environmental Chemistry Major
- Revised the Instrumental Analysis laboratory to include experiments requiring increased problem solving skills and advanced laboratory experiments with industrial applications. Modeled course on small analytical laboratory. Course called “Pioneer Analytics”.
- Integrated laboratory experiences into First-Year Seminar including forensic analysis such as fingerprinting, drug analysis, and DNA analysis (Fall 2005, 2006); seminar called “Hollywood Science: Fact or Fiction?”
- Integrated service learning into First-Year Seminar, Environmental Chemistry Courses, Environmental Science and Chemistry Frontiers courses. Topics include water quality monitoring, risk assessment, and science outreach through activities to public libraries.

- 1999 - 2000 ***Chemistry Instructor and Huckabay Fellow:*** Seattle University, Seattle, WA
- Instructor for quantitative analysis course (lecture and laboratory) and general chemistry laboratory.
  - Revised the quantitative analysis laboratory to include experiments requiring increased problem solving skills, and a capstone project where student teams selected an analytical problem of their interest.
- 1999 ***Guest Lecturer:*** University of Washington, Seattle, WA
- Prepared and delivered lecture on nuclear radiation fundamentals and nuclear reactor accidents for a non-major, general chemistry course.
- 1996 – 1998 ***Graduate Teaching Assistant:*** University of Washington, Seattle, WA

- Led discussions and supervised undergraduate students in six laboratory sections of general chemistry, quantitative analysis, and instrumental analysis courses.
- 1994 –1996 **Regional Hazardous Material Trainer:** Foster Wheeler Environmental Corporation, Bellevue, WA
- Responsible for initial and continuing training of all regional employees involved in the handling and management of hazardous material.
- 1991 – 1992 **Reactor Training Division Officer:** United States Navy, USS Nimitz
- Developed a training curriculum for 400-man department.
  - Implementation of curriculum by lecturing and by coordinating lectures given by other instructors on numerous topics, including reactor safeguards and radiochemistry.

## CHEMICAL EDUCATION AND TEACHING INTERESTS

- Development and integration of service learning programs in the chemistry and environmental science curriculums.
- Integration of active learning techniques into chemistry lectures and laboratories.
- Teaching interests: environmental chemistry, analytical chemistry, general chemistry, chemistry for non-majors, professional development for K-8 teachers.

## WORKSHOP PARTICIPANT

- 2011 “New Faculty Workshop Symposium”, online workshop faculty expert, Center for Teaching and Learning, University of Denver (August/September)
- 2009 “New Faculty Workshop Symposium”, workshop leader, Center for Teaching and Learning, University of Denver (September)
- 2008 “New Faculty Workshop Symposium”, workshop leader, Center for Teaching and Learning, University of Denver (September 26)
- 2007 “Workshop of use of clicker in Science and Engineering classes for effective teaching”, DU’s Center for Teaching and Learning (August 24)
- 2006 “The Cooperative Learning Workshop – II”, DU’s Center for Teaching and Learning (August)
- 2005 NSF, Center for Workshops in the Chemical Sciences, Forensic science workshop (June 20-24) held at Williams College
- 2004 Science Education workshop, University of Colorado at Denver (November 19)
- 2004 “Putting Cooperative Learning into Practice”, DU’s Center for Teaching and Learning (August)
- 2004 “The Power of Cooperative Learning: What is it and why does it work?”, hosted by DU’s Center for Teaching and Learning (March 5)
- 2003 Service Learning Workshop, Center for Service Learning & Civic Engagement (December)
- 2003 “Preparing experts to combat bio-terrorism: Bridging the science-policy divide”. Stony Brooke University (November 7)
- 2003 Multi-initiative Dissemination (MID) Project workshop, University of Denver (October 17,18)
- 2003 “New Faculty Workshop Symposium”, Center for Teaching and Learning, University of Denver (Fall)