

VITA

Paul B. Farnsworth

- Education: B.S. Brigham Young University 1977
Ph.D. University of Wisconsin, Madison 1981
- Experience: Indiana University
Department of Chemistry
Research Associate 1981-1982
- Brigham Young University
Department of Chemistry
Assistant Professor 1983-1988
Associate Professor 1988-1993
Professor 1993-
Associate Chair 2001-2004
Chair 2004-2010
- Joint Research Center of the European Community
Ispra Establishment
Visiting Scientist 1989-1990, 1998-1999
- University of Utah
Department of Chemistry
Visiting Professor 2003
- Research Emphases: Atomic Spectroscopy
Spectroscopic Instrumentation
Laser Spectroscopy
Elemental Mass Spectrometry
- Awards *Spectrochimica Acta* Atomic Spectroscopy Award 1998, 2006, 2015
Lester W. Strock Award, SAS 2006
Utah Award, American Chemical Society 2006
Distinguished Service Award, SAS 2009
Karl G. Maeser Research and Creative Works, BYU 2009
College Distinguished Faculty Citizenship, BYU 2010
Fellow, Society for Applied Spectroscopy 2012
Alumni Professorship, BYU 2012
- Professional Affiliations: Sigma Xi, Phi Kappa Phi, Society for Applied Spectroscopy
American Chemical Society, American Society for Mass Spectrometry
- Professional Service: Assistant Editor, *Spectrochimica Acta, part B*, 1992 - 1993
Editor, *Spectrochimica Acta Electronica*, 1994 - 2001
Chair, Intermountain Section of the Society for Applied Spectroscopy, 1995-
1997
Editor, *Applied Spectroscopy*, 1997 - 2009
Editorial Board, *Spectrochimica Acta*, 2001-
Editorial Board, *Applied Spectroscopy*, 2009 - 2012

Publications:

1. P.B. Farnsworth and J.P. Walters, "On Electrical Sparks and Their Use for Excitation of Spectra," a translation of the paper by H. Kaiser and A. Wallraff, *Spectrochimica Acta*, **35B**, 315 (1980).
2. S.G. Barnhart, P.B. Farnsworth and J.P. Walters, "Integrated, Microcomputer-Controlled, Adjustable-Waveform Spark Source for Atomic Emission Spectrometry," *Analytical Chemistry*, **53**, 1432 (1981).
3. P.B. Farnsworth and J.P. Walters, "Instrumental System for Multidimensional Spectroscopic Characterization of a Radio Frequency Boosted, Pulsed Hollow Cathode Lamp," *Analytical Chemistry*, **54**, 885 (1982).
4. P.B. Farnsworth and J.P. Walters, "Excitation Processes in an R.F.-Boosted, Pulsed Hollow Cathode Lamp," *Spectrochimica Acta*, **37B**, 773 (1982).
5. J.F. Cannon and P.B. Farnsworth, "High Pressure Syntheses of ThB₁₂ and HfB₁₂," *J. Less-Common Metals*, **92**, 359 (1983).
6. P.B. Farnsworth and G.M. Hieftje, "Sample Introduction into the Inductively Coupled Plasma by a Radio-Frequency Arc," *Analytical Chemistry*, **55**, 1414 (1983).
7. P.B. Farnsworth and J.P. Walters, "The Radiofrequency-Boosted, Pulsed Hollow-Cathode Lamp," in *Improved Hollow Cathode Lamps for Atomic Spectroscopy*, S. Caroli, ed., Ellis Horwood, LTD, Chichester (1985).
8. P.B. Farnsworth, "The Use of Pulse-Interrupted Radiofrequency Excitation to Study Energy Transport and Analyte Excitation in the Inductively Coupled Plasma," *Applied Spectroscopy*, **39**, 1078-1081 (1985).
9. P.B. Farnsworth, "Optical Emission Spectroscopy," in *Metals Handbook*, R.E. Whan, Coordinator, Vol. 10, Materials Characterization, Metals Park, Ohio, American Society for Metals, June 1986.
10. P.B. Farnsworth, D. A. Rodham and D. W. Ririe, "The Use of Time- and Space-Resolved Emission Data for Fundamental Studies of a Pulsed ICP," *Spectrochimica Acta.*, **42B**, 393-406 (1987)
11. K.E. Markides, R.J. Skelton, Jr., P.B. Farnsworth, M.L. Lee, and F.J. Yang, "Multi-Element Selective Radio Frequency Plasma Detector for Capillary Gas Chromatography," *Journal of High Resolution Chromatography*, **11**, 75-81 (1988).
12. L. R. Padgett and P. B. Farnsworth, "The Use of Refractive Optics for High Fidelity Image Transfer in Spatially Resolved Spectroscopic Measurements," *Applied Spectroscopy*, **42**, 608-614 (1988).
13. P.B. Farnsworth and P. A. Cox, "A Laser Illuminator Designed for Pollination Studies with a Night Vision Device," *Biotropica*, 20(4): 334-335, 1988.

14. P.B. Farnsworth "An Evaluation of a GaAlAs Diode Laser as a Source For Absorption Measurements in the ICP," *Spectrochimica Acta*, **44B** 729-235 (1989).
15. M.T. Cicerone and P.B. Farnsworth, "A Simple, Non-Invasive Method for the Measurement of Gas Flow Velocities in the Inductively Coupled Plasma," *Spectrochimica Acta*, **44B**, 897-907 (1989).
16. D.A. Rodham, J.K. Shurtleff and P.B. Farnsworth, "Energy Transport in the Inductively Coupled Plasma," *Mikrochimica Acta*, **III**, 187-195 (1989).
17. R.J. Skelton, Jr., P.B. Farnsworth, K.E. Markides and M.L. Lee, "Element Selective Detection After Supercritical Fluid Chromatography Using a Radio Frequency Plasma Detector," *Analytical Chemistry*, **61**, 1815-1821 (1989).
18. R.J. Skelton, Jr., H.-C. K. Chang, P.B. Farnsworth, K.E. Markides and M.L. Lee, "Radio Frequency Plasma Detector for Sulphur Selective Capillary Gas Chromatographic Analysis of Fossil Fuels," *Analytical Chemistry*, **61**, 2292-2298 (1989).
19. R.J. Skelton, Jr., K.E. Markides, M.L. Lee and P.B. Farnsworth, "Characterization of Near-infrared Atomic Emission From a Radio-Frequency Plasma for Selective Detection in Capillary Gas Chromatography," *Applied Spectroscopy*, **44**, 853-857 (1990).
20. P.B. Farnsworth, "Element-selective Plasma Detectors" in "Analytical Supercritical Fluid Chromatography and Extraction," M.L. Lee and K.E. Markides eds., Brigham Young University Press, 1990, pp 226-231.
21. B.W. Smith, P.B. Farnsworth, J.D. Winefordner and N. Omenetto, "Experimental Demonstration of a Raman Scattering Detector Based on Laser Enhanced Ionization," *Optics Letters*, **15**, 823-825 (1990).
22. B.W. Smith, P.B. Farnsworth and N. Omenetto, "Study of Weak Forbidden Transitions by Means of Laser Enhanced Ionization Spectroscopy in the Air-Acetylene Flame," *Spectrochimica Acta*, **45B**, 1085-1089 (1990).
23. P.B. Farnsworth, B.W. Smith and N. Omenetto, "Computer Modeling of Collection Efficiency of Laser Excited Fluorescence from a Graphite Furnace," *Spectrochimica Acta*, **45B**, 1151-1166 (1990).
24. B.W. Smith, P.B. Farnsworth, P. Cavalli and N. Omenetto, "Optimization of Laser Excited Atomic Fluorescence in a Graphite Furnace for the Determination of Thallium," *Spectrochimica Acta*, **45B**, 1369 - 1373 (1990).
25. P.B. Farnsworth, B.W. Smith and N. Omenetto, "An Investigation of the Balance of Charge Exchange Between Mg and Ar Ions in the ICP," *Spectrochimica Acta*, **45B**, 843-850 (1990).
26. N. Omenetto, B.W. Smith, and P.B. Farnsworth, "Characterization of the Laser Enhanced Ionization and Photoionization Techniques as Photon Detectors," *Inst. Phys. Conf. Ser. No 114: Section 9*, 369-372 (1991).
27. Z. Liu, P.B. Farnsworth, and M.L. Lee, "Sample Introduction in Capillary Supercritical Fluid Chromatography Using Sequential Density Gradient Focusing and Solvent Venting," *Journal of Microcolumn Separations*, **3**, 435-442 (1991).

28. P.B. Farnsworth, "Spectroscopy of Power Modulated Inductively Coupled Plasmas," invited review, *Spectrochimica Acta Reviews*, **14**, 447-462 (1991).
29. M. Wu, M.L. Lee, and P.B. Farnsworth, "Nitrogen-Selective Detection for Gas Chromatography With a Helium Radiofrequency Plasma Detector," *Journal of Analytical Atomic Spectrometry*, **7**, 197-200 (1992).
30. Z. Liu, P.B. Farnsworth, and M. L. Lee, "High-Speed, Thermally Modulated SFE/GC for the Analysis of Volatile Organic Compounds in Solid Matrices," *Journal of Microcolumn Separations*, **4**, 199-208 (1992).
31. N. Omenetto, B. W. Smith, P. B. Farnsworth, and J. D. Winefordner, "Photon Detection Based on Pulsed, Laser-enhanced Ionization and Photoionization of Magnesium Vapour: Quantum Efficiency Versus Ion Yield," *Journal of Analytical Atomic Spectrometry*, **7**, 89-98 (1992).
32. C. M. Ogilvie and P. B. Farnsworth, "Correlation Spectroscopy as a Probe of Excitation and Ionization Mechanisms in the Inductively Coupled Plasma," *Spectrochimica Acta* **47B**, 1389-1401 (1992).
33. P. B. Farnsworth and N. Omenetto, "The Kinetics of Charge Exchange Between Argon and Magnesium in the Inductively Coupled Plasma," *Spectrochimica Acta* **48B**, 809-816 (1993).
34. P. B. Farnsworth, "The Inductively Coupled Plasma as a Source for the Measurement of Fundamental Spectroscopic Constants," *Physica Scripta* **T47**, 36-41 (1993).
35. Z. Liu, I. Ostrovsky, P. B. Farnsworth and M. L. Lee, "Instrumentation for Comprehensive Two-Dimensional Capillary Supercritical Fluid-Gas Chromatography," *Chromatographia* **35**, 567-573 (1993).
36. P. B. Farnsworth, "News on Fundamental Reference Data," *Spectrochimica Acta* **48B**, 1301-1302 (1993).
37. M. Wu, Z. Liu, P. B. Farnsworth and M. L. Lee, "Comprehensive Supercritical Fluid Extraction/Gas Chromatographic Analysis of Organic Compounds in Soil Matrices with and Element-Selective Radiofrequency Plasma Detector," *Analytical Chemistry* **65**, 2185-2188 (1993).
38. P. B. Farnsworth, "News on Fundamental Reference Data," *Spectrochimica Acta* **48B**, 1651-1652 (1993).
39. P. B. Farnsworth, M. Wu, M. Tacquard and M. L. Lee, "Background Correction Device for Enhanced Element Selective Gas Chromatographic Detection by Atomic Emission Spectroscopy," *Applied Spectroscopy* **48**, 742-746 (1994).
40. P. B. Farnsworth, "News on Fundamental Reference Data," *Spectrochimica Acta* **49B**, 811-814 (1994).
41. E. S. Francis, M. Wu, P. B. Farnsworth and M. L. Lee, "Supercritical Fluid Extraction/Gas Chromatography with a Thermal Desorption Modulator Interface and Nitro-specific Detection for the Analysis of Explosives," *J. Microcol. Sep.* **7**, 23-28 (1995).

42. P. B. Farnsworth, "Efficiency Calculations for Spectroscopic Collection Optics," *Spectrochimica Acta* **50B**, 1159-1161 (1995).
43. N. Omenetto and P. B. Farnsworth, "Ions and Photons: Interplay of Laser Induced Ionization and Fluorescence Techniques in Different Atomic and Molecular Reservoirs" in Laser-Enhanced Ionization Spectroscopy, J. Travis and G. C. Turk, eds., Wiley, 1996.
44. Y. Chen and P. B. Farnsworth, "Ion Deposition Experiments as a Tool for the Study of Spatial Distribution of Analyte Ions in the Second Vacuum Stage of an Inductively Coupled Plasma Mass Spectrometer," *Spectrochimica Acta* **52B**, 231-239 (1997).
45. A. C. Lazar and P. B. Farnsworth, "Investigation of the Analytical Performance of an MDMI-ICP-AES System," *Applied Spectroscopy* **51**, 617-624 (1997).
46. A. C. Lazar and P. B. Farnsworth, "Characterization of an Inductively Coupled Plasma with Xylene Solutions Introduced as Monodisperse Aerosols," *Anal. Chem.* **69**, 3921-3929 (1997).
47. R. B. Shirts, H. P. Parry and P. B. Farnsworth, "Anomalous Line Shapes Caused by Charge Transfer in Low-Pressure Discharges," *Spectrochimica Acta* **53B**, 487-498 (1998).
48. B. S. Duersch, Y. Chen., A. Ciocan and P. B. Farnsworth, "Optical Measurements of Ion Density in the Second Vacuum Stage of an Inductively Coupled Plasma Mass Spectrometer," *Spectrochimica Acta* **53B**, 569-579 (1998).
49. J. B. Knight and P. B. Farnsworth, "An Electronic Spectroscope for Classroom Displays of Visible Spectra," *Spectrochimica Acta* **53B**, 1889-1893 (1998).
50. A. C. Lazar and P. B. Farnsworth, "Matrix Effect Studies in the Inductively Coupled Plasma with Monodisperse Droplets, I: The Influence of Matrix on the Vertical Analyte Emission Profile," *Applied Spectroscopy* **53**, 457-464 (1999)
51. A. C. Lazar and P. B. Farnsworth, "Matrix Effect Studies in the Inductively Coupled Plasma with Monodisperse Droplets, II: The Influence of Matrix on Spatially Integrated Ion Density," *Applied Spectroscopy* **53**, 465-470 (1999).
52. B. S. Duersch and P. B. Farnsworth, "Characterization of the Ion Beam Inside the Skimmer Cone of an Inductively Coupled Plasma Mass Spectrometer by Laser Excited Atomic and Ionic Fluorescence," *Spectrochimica Acta* **54B**, 545-555 (1999).
53. J. E. Patterson, B. S. Duersch, and P. B. Farnsworth, "Optically Determined Velocity Distributions of Metastable Argon in the Second Stage of an Inductively Coupled Plasma Mass Spectrometer," *Spectrochimica Acta* **54B**, 537-544 (1999)
54. B. S. Duersch, J. E. Patterson and P. B. Farnsworth, "The Effects of a Torch Shield on Performance of the Vacuum Interface of an Inductively Coupled Plasma Mass Spectrometer," *J. Anal. Atom. Spectrosc.* **14**, 615-619 (1999).
55. P. B. Farnsworth, A. Woolley, N. Omenetto and O. Matveev, "Experimental Studies of Charge Transfer Reactions Between Argon and the Third Row Metals Ca Through Cu in the Inductively Coupled Plasma," *Spectrochimica Acta* **54B**, 2143-2155 (1999).

56. G. A. Petrucci, P. B. Farnsworth, Paolo Cavalli and Nicol Omenetto, "A Differentially Pumped Particle Inlet for Sampling of Atmospheric Aerosols into a Time-of-Flight Mass Spectrometer: Characterization and Initial Results," *Aerosol Science and Technology*, **33**, 105-121(2000).
57. J. H. Macedone, Dennis J. Gammon and Paul B. Farnsworth, "Factors Affecting Analyte Transport Through the Sampling Orifice of an Inductively Coupled Plasma Mass Spectrometer," *Spectrochimica Acta* **56B**, 1687-1695 (2001).
58. Jeffrey H. Macedone, Andrew A. Mills and Paul B. Farnsworth, "Optical Measurements of Ion Trajectories through the Vacuum Interface of an Inductively Coupled Plasma Mass Spectrometer," *Applied Spectroscopy*, **58**, 463-467 (2004).
59. R. Todd Bronson, David J. Michaelis, Randy D. Lamb, Ghaleb A. Hussein, Paul B. Farnsworth, Matthew R. Linford, Reed M. Izatt, Jerald S. Bradshaw, and Paul B. Savage, "Efficient Immobilization of a Cadmium Chemosensor in a Thin Film: Generation of a Cadmium Sensor Prototype," *Organic Letters*, **7**, 1105-1108 (2005).
60. Uchenna P. Paul, Li Li, Milton L. Lee and Paul B. Farnsworth, "Compact Detector for Proteins Based on Two-Photon Excitation of Native Fluorescence," *Anal. Chem.* **77**(11), 3690-3693 (2005).
61. W. Neil Radicic, Jordan B. Olsen, Rebecca V. Nielson, Jeffrey H. Macedone, and Paul B. Farnsworth, "Characterization of the Supersonic Expansion in the Vacuum Interface of an Inductively Coupled Plasma Mass Spectrometer by High-Resolution Diode Laser Spectroscopy," *Spectrochimica Acta*, **61B**, 686-695 (2006).
62. Jikun Liu, Xuefei Sun, Paul B. Farnsworth, and Milton L. Lee, "Fabrication of Conductive Membrane in a Polymeric Electric Field Gradient Focusing Microdevice," *Analytical Chemistry*, **78**, 4654-4662 (2006).
63. Jordan B. Olsen, Jeffrey H. Macedone and Paul B. Farnsworth, "Source Gas Kinetic Temperatures in an ICP-MS Determined By Measurements of the Gas Velocities in the First Vacuum Stage," *Journal of Analytical Atomic Spectrometry*, **21**, 856-860 (2006).
64. Jeffrey Macedone and Paul B. Farnsworth, "Changes in Plasma Composition During the Expansion into the First Vacuum Stage of an inductively Coupled Plasma Mass Spectrometer," *Spectrochimica Acta*, **61B**, 1031-1038 (2006).
65. Andrew A. Mills, Jeffrey H. Macedone, and Paul B. Farnsworth, "High Resolution Imaging of Barium Ions and Atoms near the Sampling Cone of an Inductively Coupled Plasma Mass Spectrometer," *Spectrochimica Acta*, **61B**, 1039-1049 (2006).
66. Paul H. Humble, John N. Harb, H. Dennis Tolley, Adam T. Woolley, Paul B. Farnsworth, and Milton L. Lee, "Influence of Transport Properties in Electric Field Gradient Focusing," *Journal of Chromatography A*, **1160**, 311-319 (2007).
67. Xufei Sun, Paul B. Farnsworth, Adam T. Woolley, H. Dennis Tolley, Karl F. Warnick, and Milton L. Lee, "Poly(ethylene glycol)-Functionalized Devices for Electric Field Gradient Focusing," *Analytical Chemistry*, **80**, 451-460 (2008).

68. Xufei Sun, Paul B. Farnsworth, H. Dennis Tolley, Karl F. Warnick, Adam T. Woolley, and Milton L. Lee, "Performance Optimization in Electric Field Gradient Focusing," *Journal of Chromatography A*, **1216**, 159-164 (2009).
69. Haibin Ma, Nicolas Taylor, and Paul B. Farnsworth, "The Effect of the Sampling Interface on Spatial Distributions of Barium Ions and Atoms in an Inductively Coupled Plasma Ion Source," *Spectrochimica Acta*, **64B**, 384-391 (2009).
70. Michael C. Wood, Devin K. Busby, and Paul B. Farnsworth, "Microscopic Imaging of Glass Surfaces under the Effects of Desorption Electrospray Ionization," *Analytical Chemistry*, **81**, 6407-6415 (2009).
71. Paul B. Farnsworth, Ross L. Spencer, W. Neil Radicic, Nicholas Taylor, Jeffrey Macedone, Haibin Ma, "A comparison of ion and atom behavior in the first stage of an inductively coupled plasma mass spectrometer vacuum interface: Evidence of the effect of an ambipolar electric field," *Spectrochimica Acta*, **64B**, 905-910 (2009).
72. Ross L. Spencer, Nicholas Taylor, and Paul B. Farnsworth, "Comparison of calculated and experimental flow velocities upstream from the sampling cone of an inductively coupled plasma mass spectrometer," *Spectrochimica Acta*, **64B**, 921-924 (2009).
73. James A. Holcombe and Paul B. Farnsworth, "Atomic Emission and Fluorescence Theory," in: John Linden, George Tranter and David Koppenaal, editors. *Encyclopedia of Spectroscopy and Spectrometry*, 2nd edition, Vol 1. Oxford: Elsevier; 2010. pp 63-69.
74. Matthew S. Heywood and Paul B. Farnsworth, "Optimization of Native Fluorescence Detection of Proteins Using a Pulsed Nanolaser Excitation Source," *Applied Spectroscopy*, **64**, 1283-1288 (2010).
75. Matthew S. Heywood, Nicholas Taylor, and Paul B. Farnsworth "Measurement of Helium Metastable Atom Densities in a Plasma-Based Ambient Ionization Source," *Analytical Chemistry*, **83**, 6493-6499 (2011).
76. Nicholas Taylor, Ross L. Spencer, and Paul B. Farnsworth, "The effect of matrix composition on radially resolved argon metastable atom populations in an emission ICP," *Journal of Analytical Atomic Spectrometry*, **27**, 857-867 (2012).
77. Nicholas Taylor and Paul B. Farnsworth, "Experimental characterization of the effect of skimmer cone design on shock formation and ion transmission efficiency in the vacuum interface of an inductively coupled plasma mass spectrometer," *Spectrochimica Acta, part B*, **69**, 2-8 (2012).
78. Alisa J. Edmund, Scott D. Bergeson, Mary Lyon, Nicholas Taylor, Iouri Kalinitchenko, and Paul B. Farnsworth, "Evaluation of space charge effects in the second vacuum stage of a commercial inductively coupled plasma mass spectrometer by planar laser-induced fluorescence imaging," *Spectrochimica Acta, part B*, **76**, 109-118 (2012).
79. Jonathan P. Wright, Matthew S. Heywood, Glen K. Thurston, and Paul B. Farnsworth, "The effects of added hydrogen on a helium atmospheric-pressure plasma jet ambient desorption/ionization source," *Journal of the American Society for Mass Spectrometry*, **24**, 335-340 (2013).
80. Sonika Sharma, Alex Plistil, Robert S. Simpson, Kun Liu, Paul B. Farnsworth, Stanley D.

- Stearns, and Milton L. Lee, "Instrumentation for hand-portable liquid chromatography," *Journal of Chromatography A*, **1327**, 80-89 (2014).
81. Nicholas Taylor, Kyli N. McKay-Bishop, Ross L. Spencer and Paul B. Farnsworth, "A novel approach to understanding the effect of matrix composition on analyte emission in an inductively coupled plasma." *Journal of Analytical Atomic Spectrometry*, **29**, 644-656 (2014).
 82. Charlotte Reininger, Kellie Woodfield, Joel D. Keelor, Adam Kaylor, Facundo M. Fernandez, and Paul B. Farnsworth, "Absolute number densities of helium metastable atoms determined by atomic absorption spectrometry in helium plasma-based discharges used as ambient desorption/ionization sources for mass spectrometry," *Spectrochimica Acta part B*, **100**, 98-104 (2014).
 83. Lance M. Moses, Wade C. Ellis, Derick D. Jones and Paul B. Farnsworth, "Fluorescence imaging of ion distributions in an inductively coupled plasma with laser ablation sample introduction," *Spectrochimica Acta, part B*, **105**, 47 - 59 (2015).
 84. Sonika Sharma, H. Dennis Tolley, Paul B. Farnsworth, and Milton L. Lee, "LED-Based UV Absorption Detector with Low Detection Limits for Capillary Liquid Chromatography," *Analytical Chemistry*, **87**, 1381 – 1386 (2015).
 85. Supriya S. Kanyal, Tim T. Häbe, Cody V. Cushman, Manan Dhunna, Tuhin Roychowdhury, Paul B. Farnsworth, Gertrude E. Morlock, and Matthew R. Linford, "Microfabrication, separations, and detection by mass spectrometry on ultrathin-layer chromatography plates prepared via the low-pressure chemical vapor deposition of silicon nitride onto carbon nanotube templates," *Journal of Chromatography A*, **1404**, 115-123 (2015).
 86. Lance M. Moses and Paul B. Farnsworth, "Evaluation of particle size distributions produced during ultra-violet nanosecond laser ablation and their relative contributions to ion densities in the inductively coupled plasma," *Spectrochimica Acta, part B*, **113**, 54-62 (2015).
 87. Sonika Sharma, Alex Plistil, Hal E. Barnett, H. Dennis Tolley, Paul B. Farnsworth, Stanley D. Stearns, and Milton Lee, "Hand-Portable Gradient Capillary Liquid Chromatography Pumping System," *Analytical Chemistry*, **87**, 10457-10461 (2015).
 88. Lance M. Moses and Paul B. Farnsworth, "The effects of He on ablation and inductively coupled plasma environment in ultra-violet, nanosecond laser ablation inductively coupled plasma mass spectrometry," *Spectrochimica Acta, part B*, **113**, 138-146 (2015).
 89. Buphinder Singh, Stacey J. Smith, David S. Jensen, Hodge F. Jones, Andrew E. Dadson, Paul B. Farnsworth, Richard Vanfleet, Jeffrey K. Farrer, and Matthew R. Linford, "Multi-instrument characterization of five nanodiamond samples: a thorough example of nanomaterial characterization," *Analytical and Bioanalytical Chemistry*, **408**, 1107-1124 (2016).
 90. Joel D. Keelor, Paul B. Farnsworth, Arthur L. Weber, Heather Abbott Lyon, and Facundo M. Fernandez, "Multimodal Vacuum-Assisted Plasma Ion (VaPI) Source with Transmission Mode and Laser Ablation Sampling Capabilities," *Journal of the American Society for Mass Spectrometry*, **27**, 897-907 (2016).
 91. Wade C. Ellis, Charlotte R. Lewis, Anna P. Openshaw, and Paul B. Farnsworth, "The Effects of Added Hydrogen on Noble Gas Discharges used as Ambient Desorption/Ionization Sources for Mass Spectrometry," *Journal of the American Society for Mass Spectrometry*, **27**, 1539-1549 (2016).

92. Jessica J. Larsen, Alisa J. Edmund, and Paul B. Farnsworth, "The effects of analyte mass and collision gases on ion beam formation in an inductively coupled plasma mass spectrometer," *Spectrochimica Acta part B*, **125**, 61-65 (2016).
93. Xiaofeng Zhao, Xiaofeng Xie, Sonika Sharma, Luke T. Tolley, Alex Plistil, Hal E. Barnett, Martin P. Brisbin, Adam C. Swensen, John C. Price, Paul B. Farnsworth, H. Dennis Tolley, Stanley D. Stearns, and Milton L. Lee, "Compact Ultrahigh-Pressure Nanoflow Capillary Liquid Chromatography," *Analytical Chemistry*, **89**, 807-812 (2017).
94. Paul B. Farnsworth and Ross L. Spencer, "Ion Sampling and Transport in ICP-MS," *Spectrochimica Acta part B*, **134**, 105-122 (2017).
95. Richard H. Carson, Charlotte R. Lewis, Mercede N. Ericson, Anna P. Zagieboylo, Bradley C. Naylor, Kelvin W. Li, Paul B. Farnsworth and John C. Price, "Imaging Regiospecific Lipid Turnover in Mouse Brain with Desorption Electrospray Ionization Mass Spectrometry," *Journal of Lipid Research*, **58**, 1884-1892 (2017).
96. Xiaofeng Xie, Luke T. Tolley Thy X. Truong, H. Dennis Tolley, Paul B. Farnsworth, and Milton L. Lee, "Dual-wavelength LED-based UV Absorption Detector for Nano-flow Capillary Liquid Chromatography," *Journal of Chromatography A*, **1523**, 242-247 (2017).
97. Wade C. Ellis, Ross L. Spencer, Charlotte Reininger and Paul B. Farnsworth, "Computational Model of a Direct Current Glow Discharge used as an Ionization Source for Mass Spectrometry," *Journal of Analytical Atomic Spectrometry*, **32**, 2407-2415 (2017).
98. Felix D. Klute, Sebastian Brandt, Pascal Vogel, Beatrix Biskup, Charlotte Reininger, Vlasta Horvatic, Cedomil Vadla, Paul B. Farnsworth, and Joachim Franzke, "Systematic Comparison between Half and Full Dielectric Barrier Discharges Based on the Low Temperature Plasma Probe (LTP) and Dielectric Barrier Discharge for Soft Ionization (DBDI) Configurations," *Analytical Chemistry*, **89**, 9368-9374 (2017).

Patents

1. F.J. Yang, P.B. Farnsworth, K.E. Markides, M.L. Lee and R.J. Skelton, Jr., "Element Specific Radio Frequency Discharge Helium Plasma Detector for Chromatography," U.S. Patent 4,851,683, July 25, 1989.
2. M. L. Lee, P. B. Farnsworth and Z. Liu, "Apparatus and Method for Simultaneous Supercritical Fluid Extraction and Gas Chromatography," U.S. Patent 5,205,154, April 27, 1993.

PAUL B. FARNSWORTH

PRESENTATIONS

1. P.B. Farnsworth and G.M. Hieftje, "A Novel Solid Sampling Device for the Inductively Coupled Plasma," FACSS, Philadelphia, PA, September 1982.
2. P.B. Farnsworth, "A Digital Boxcar Integrator Controlled by a Small Microcomputer," invited talk in a symposium on microcomputers in chemistry and chemical education, Northwest Regional Meeting of the ACS, June 14, 1984.
3. P.B. Farnsworth, "Emission Studies of a Pulsed Inductively Coupled Plasma," FACSS, Philadelphia, September 1984.
4. P.B. Farnsworth, "Studies of Energy Transport and Analyte Excitation in the Inductively Coupled Plasma Using a Pulsed Power Waveform," invited talk, Atomic Spectroscopy Symposium, Rocky Mountain Conference, July 17, 1985.
5. P.B. Farnsworth, "Studies of Energy Transport and Analyte Excitation in the Inductively Coupled Plasma Using Pulsed Excitation," Colloquium Spectroscopicum Internationale, Garmisch, West Germany, September 1985.
6. P.B. Farnsworth, D.W. Ririe, and D.A. Rodham, "The Use of Time- and Space-Resolved Emission Data to Identify Excitation Mechanisms in a Pulsed Inductively Coupled Plasma," 1986 Winter Conference on Plasma Spectrochemistry, Hawaii, January, 1986.
- * 7. D. Clark Turner, Max W. Hill, Paul B. Farnsworth, Lee D. Hansen, Nolan F. Mangelson, "UV-Visible Emission from Solid Materials Bombarded by 2.0 MeV Protons." Presented in Utah Academy of Sciences, Arts and Letters Spring Meeting, Southern Utah State College, May 2, 1986.
8. P.B. Farnsworth and D.A. Rodham, "Energy Transport in the ICP, a Detailed Look Using Pulsed Excitation," FACSS, St. Louis, September, 1986.
9. P.B. Farnsworth, "Single-Droplet Emission Signals from the Inductively Coupled Plasma," 20th SWAP meeting, Logan, Utah, January, 1987.
10. P.B. Farnsworth and M.L. Lee, "Spectroscopic Characteristics of a Radiofrequency Plasma Detector for Gas Chromatograph," Pittsburgh Conference, Atlantic City, March, 1987.
- * 11. L.R. Padgett and P.B. Farnsworth, "The Use of Refractive Optics for High Fidelity Image Transfer in Spatially Resolved Spectroscopic Measurements," Pittsburgh Conference, Atlantic City, March, 1987.
- * 12. M.L. Lee, R.I. Skelton, K.E. Markides, P.B. Farnsworth, and J.F. Yang, "Gas Chromatographic Applications of Multi-element Selective Radiofrequency Plasma Detector," Pittsburgh Conference, Atlantic City, March 1987.
13. P.B. Farnsworth and D.A. Rodham, "Time- and Space-Resolved Electron Densities in a Pulsed Inductively Coupled Plasma," CSI, Toronto, July, 1987.

14. P.B. Farnsworth, "Single-Droplet Emission Signals From an Inductively Coupled Plasma," FACSS, Detroit, October 1987.
15. P.B. Farnsworth, "A Simple, Noninvasive Technique for Measuring Gas Velocities in the Inductively Coupled Plasma," FACSS, Detroit, October 1987.
16. P.B. Farnsworth, D.A. Rodham and J.K. Shurtleff, "Time-Resolved Electron Density Measurements in a Pulsed Inductively Coupled Plasma," FACSS, Detroit, October 1987.
17. P.B. Farnsworth and J.K. Shurtleff, "The Use of a Low-Cost Diode Laser for Diagnostic Measurements in the Inductively Coupled Plasma," Pittsburgh Conference, New Orleans, March, 1988.
18. M.T. Cicerone, D.A. Rodham, and P.B. Farnsworth, "Time Resolved Gas Velocity Measurements in a Pulsed ICP. FACSS Boston, October, 1988.
19. P.B. Farnsworth and D.C. Williams, A Resonance Ionization Probe for the Detection of Penning Ionization in the ICP. FACSS Boston, October 1988.
20. P.B. Farnsworth and M.T. Cicerone, "The use of single Droplet Emission to Character Aerosols Introduced into the ICP. FACSS Boston, October 1988.
21. P.B. Farnsworth "Plasma Diagnostics in an Inhomogeneous Discharge: Some Lessons From the Pulsed ICP," invited lecture at the 1989 European Winter Conference on Plasma Spectrochemistry, Reutte, Austria, January 1989.
22. P.B. Farnsworth, B.W. Smith and N. Omenetto, "Optical Collection Efficiency of Longitudinally Excited Fluorescence in a Graphite Furnace as Calculated by a Ray Tracing Approach," CANAS, Moscow, July, 1990.
23. P.B. Farnsworth, B.W. Smith and N. Omenetto, "Optical Collection Efficiency of Longitudinally Excited Fluorescence in a Graphite Furnace as Calculated by a Ray Tracing Approach," FACSS, Cleveland, October, 1990.
24. P.B. Farnsworth, B.W. Smith and N. Omenetto, "Pump and Probe Laser Spectroscopy for the Characterization of Excitation Mechanisms in the ICP," FACSS, Cleveland, October 1990.
25. P.B. Farnsworth, Z. Zhao, M. Wu, and M.L. Lee, "Recent Developments in Atomic Emission Plasma Detectors for Microcolumn Chromatography," invited lecture at CSI, Bergen, June 1991.
26. P. B. Farnsworth, "Computer Modelling of Collection Optics for Spectroscopic Instruments," FACSS, Anaheim, October 1991.
27. P. B. Farnsworth and C. Ogilvie, "Correlation Spectroscopy as a Probe of Excitation Mechanisms in the ICP," FACSS, Anaheim, October 1991.
28. P. B. Farnsworth, "The Use of a Diode Laser for Time-Resolved Absorption Measurements in the ICP on a Nanosecond Time Scale," FACSS, Anaheim, October 1991.
- * 29. M. Wu, P. B. Farnsworth and M. L. Lee, "Gas Chromatography/Radio Frequency Plasma System for Selective Detection of Nitrogen, Oxygen, and Sulfur in the Near Infrared Spectral Region," FACSS, Anaheim, October 1991.

30. P. B. Farnsworth and N. Omenetto, "Kinetics of Charge Transfer Between Magnesium and Argon in the Inductively Coupled Plasma," Winter Conference on Plasma Spectrochemistry, San Diego, January 1992.
31. P. B. Farnsworth, C. M. Ogilvie and M. C. Asplund, "The Search for Selective Excitation Mechanisms in the Inductively Coupled Plasma," invited lecture at the Rocky Mountain Conference, August 1992.
32. P. B. Farnsworth, "The Inductively Coupled Plasma as a Source for the Measurement of Fundamental Spectroscopic Constants: Opportunities and Potential Pitfalls," invited lecture at the 4th International Colloquium on Atomic Spectra and Oscillator Strengths, Gaithersburg, September 1992.
33. P. B. Farnsworth, M. Wu, M. Lee, E. Lee and J. Prince, "Time-of-Flight Mass Spectrometry with Atmospheric-Pressure Plasma Ion Sources," FACSS, Philadelphia, September 1992.
34. C. M. Ogilvie, C. Hemming and P. B. Farnsworth, "Charge Transfer in the ICP: A Survey of the Transition Metals," FACSS, Philadelphia, September 1992.
35. P. B. Farnsworth, M. Wu and M. L. Lee, "A Simple Background Correction Device for Atomic Spectroscopy Using an Interference Filter," Pittsburg Conference, Atlanta, March 1993.
- * 36. P. B. Farnsworth, M. Wu, M. L. Lee, E. D. Lee and J. Prince, "A Time-of-flight Mass Spectrometer for use in ICP/MS," Pittsburg Conference, Atlanta, March 1993.
37. M. Wu, Xiaoli Ren, C. H. Sin, M. L. Lee, P. B. Farnsworth and E. D. Lee, "Radiofrequency Plasma Ionization Time-of-flight Mass Spectrometry," 41st ASMS Conference on Mass Spectrometry, San Francisco, June 1993.
38. M. Wu, C. H. Sin, E. D. Lee, P. B. Farnsworth and M. L. Lee, "ICP TOFMS System for Use in Elemental Analysis," 41st ASMS Conference on Mass Spectrometry, San Francisco, June 1993.
39. P. B. Farnsworth and A. Woolley, "The Effect of Charge Transfer and Analyte on Analyte Excitation in the Argon Inductively Coupled Plasma," invited lecture at the XXVIII Colloquium Spectroscopicum Internationale, York, England, July, 1993.
40. P. B. Farnsworth and A. Woolley, "Charge Exchange in the Inductively Coupled Plasma: a Curiosity or Significant Excitation and Ionization Pathway?," FACSS, Detroit, October 1993.
41. P. B. Farnsworth, "The overselling of Plasma-Source Mass Spectrometry," invited lecture at FACSS, Detroit, October, 1993.
42. P. B. Farnsworth, "Mechanisms and Plasma Phenomena: Status," invited lecture at the 1994 Winter Conference on Plasma Spectrochemistry, San Diego, January, 1994.
43. P. B. Farnsworth, Y. Chen, M. L. Lee, M. Wu and J. Sin, "Time of Flight Mass Analyzers for Elemental Mass Spectrometry," invited lecture at the 1994 Pittsburgh Conference, Chicago, March, 1994.

44. Y. Chen, M. Wu and P. B. Farnsworth, "Experimental Studies of the Effect of Space Charge on Ion Focusing in an Inductively Coupled Plasma Mass Spectrometer" presented at FACSS, St. Louis, October 1994.
45. P. B. Farnsworth and A. Lazar, "Laser Excited Atomic and Ionic Fluorescence from Single Particles Injected on Demand Into an ICP" presented at the XXIX CSI in Leipzig, Germany, August, 1995.
46. P. B. Farnsworth and A. Lazar, "ICP-LEAFS-MDMI: Alphabet Soup or a Viable Analytical Technique" presented at FACSS, Cincinnati, October, 1995.
- * 47. Y. Chen, P. B. Farnsworth, M. Lee, J. Fabbi and H. Lee, "Characterization of an ICP-TOFMS with a Novel High-Speed Data Acquisition System" presented at FACSS, Cincinnati, October, 1995.
48. P. B. Farnsworth and B. S. Duersch, "Optical Diagnostics Inside an ICP/MS," invited lecture presented at the 1996 Winter Conference on Plasma Spectrochemistry, Fort Lauderdale, January, 1996.
49. B. S. Duersch, Yibai Chen and P. B. Farnsworth, "Analyte Ion Density Measurements Behind the Skimmer Cone of an Inductively Coupled Plasma Mass Spectrometer Measured by Laser Excited Ionic Fluorescence," presented at the Asilomar Conference on Mass Spectrometry, September, 1996.
50. P. B. Farnsworth, B. S. Duersch, A. Ciocan and Y. Chen, "Characterization of the Ion Beam in an ICP-MS by Laser Excited Ionic Fluorescence," presented at FACSS, Kansas City, September, 1996.
51. P. B. Farnsworth and A. C. Lazar, "Investigation of the Influence of Organic Solvents Introduced into the ICP as Monodisperse Droplets," presented at the 1997 Pittsburgh Conference, Atlanta, March, 1997.
- * 52. B. S. Duersch and P. B. Farnsworth, "The Effect of Matrix on Ion Beam Profiles in the Second Vacuum Stage of an Inductively Coupled Plasma Mass Spectrometer as Measured by Laser Excited Ionic Fluorescence," presented at the 1997 Pittsburgh Conference, Atlanta, March, 1997.
53. P. B. Farnsworth, "Can We Build a Better ICP-Mass Spec.?" Analytical Area Seminar at the University of Utah, April, 1997.
54. P. B. Farnsworth, B. S. Duersch and J. E. Patterson, "A Study of Ion Extraction and Transport in the First and Second Vacuum Stages of an Inductively Coupled Plasma Mass Spectrometer by Laser Excited Atomic and Ionic Fluorescence," presented at XXX CSI, Melbourne, Australia, September, 1997.
55. P. B. Farnsworth and B. S. Duersch, "Ion Extraction in an Inductively Coupled Plasma Mass Spectrometer Studied by Laser Excited Ionic Fluorescence," invited lecture presented at FACSS, Providence, October, 1997.
- * 56. J. E. Patterson, P. B. Farnsworth and R. L. Spencer, "Computational Model of Ion Transport Into the Second Vacuum Stage of an Inductively Coupled Plasma Mass Spectrometer," invited lecture presented at FACSS, Providence, October, 1997.

57. P. B. Farnsworth and A. C. Lazar, "Study of the Influence of the Matrix in an Inductively Coupled Plasma with Monodisperse Droplets," presented at FACSS, Providence, October, 1997.
- * 58. A. C. Lazar and P. B. Farnsworth, "Time-Resolved Evaluation of Quenching in ICP-LEAFS," presented at the Winter Conference on Plasma Spectrochemistry, Scottsdale, January, 1998.
59. P. B. Farnsworth and B. S. Duersch, "Characterization of the Ion Beam Extracted from an Inductively Coupled Plasma Mass Spectrometer by Laser-Excited Ionic Fluorescence," presented at the Winter Conference on Plasma Spectrochemistry, Scottsdale, January, 1998.
- * 60. J. E. Patterson, P. B. Farnsworth and R. L. Spencer, "Investigation of Ion Beam Formation in ICP-MS by Computational Simulation," presented at the Winter Conference on Plasma Spectrochemistry, Scottsdale, January, 1998.
- * 61. B. S. Duersch and P. B. Farnsworth, "Optical Evaluation of the Effects of Torch Shield on Ion Extraction Processes in an Inductively Coupled Plasma Mass Spectrometer," presented at the Winter Conference on Plasma Spectrochemistry, Scottsdale, January, 1998.
62. Paul B. Farnsworth and Dennis Gammon, "Characterization of the First Vacuum Stage Expansion in an Inductively Coupled Plasma Mass Spectrometer by Laser Induced Atomic Fluorescence," presented at FACSS, Vancouver, BC, October 1999.
63. Paul B. Farnsworth and Dennis Gammon, "Analyte Ion Velocity and Density Distributions in the First Vacuum Stage of an ICP-MS Measured by Laser Excited Ionic Fluorescence," presented at the Winter Conference on Plasma Spectrochemistry, Ft. Lauderdale, January 2000.
64. Paul B. Farnsworth "Gaining a Fundamental Understanding of the Inductively Coupled Plasma Mass Spectrometer Interface: Will It Change the Way We Do Things?" invited lecture presented at the Canadian Society for Chemistry National Meeting, Calgary, June 2000.
65. Paul B. Farnsworth, Dennis Gammon, and Jeff Macedone, "The Relationship Between Plasma Potential and Matrix Effects Measured in the First Vacuum Stage of an Inductively Coupled Plasma Mass Spectrometer," presented at FACSS, Nashville, TN, September 2000.
66. Paul B. Farnsworth, "Laser Diagnostics of Inductively Coupled Plasmas: Making Better Photon and Ion Sources for Elemental Analysis," seminar at Oregon State University, Corvallis, OR, Nov. 2000.
67. Rebekah Stanley and Paul B. Farnsworth, "Interference Suppression in ICP/MS by Extraction Lens Modulation and Phase Sensitive Detection," Presented at the Pittsburgh Conference, New Orleans, LA, March 2001.
68. Paul B. Farnsworth, "Tracking Down Matrix Effects in Inductively Coupled Plasma Mass Spectrometers Using Laser Spectroscopy," invited lecture presented to the New York Section of the Society for Applied Spectroscopy, March 2001.
69. Paul B. Farnsworth, Jeffrey Macedone, and Rebecca VanWagoner, "The Influence of Matrix on Analyte Temperature and Velocity Distributions in the First Vacuum Stage of an Inductively Coupled Plasma Mass Spectrometer," presented at FACSS, Detroit, MI, October 2001.
- * 70. J. H. Macedone and Paul B. Farnsworth, "Comparison of Ion Transport Efficiencies Through the Vacuum Interface of an ICP-MS Using Center-Tapped and Reversed Load Coil Geometries,"

presented at the 2002 Winter Conference on Plasma Spectrochemistry, Scottsdale, Az, January 2002.

- * 71. Gordon T. Mitchell and Paul B. Farnsworth, "Laser-Induced Plasma Spectroscopy of Monodisperse Particles," presented at the 2002 Winter Conference on Plasma Spectrochemistry, Scottsdale, Az, January 2002.
- * 72. Rebecca VanWagoner, Jeffrey H. Macedone, and Paul B. Farnsworth, "Velocity and Temperature Distributions in the First Vacuum Stage of an ICP-MS," presented at the 2002 Winter Conference on Plasma Spectrochemistry, Scottsdale, Az, January 2002.
- 73. Paul B. Farnsworth, Jeffrey H. Macedone, and Rebecca V. Nielson, "The Effect of Load Coil Geometry on Ion Transmission Efficiency through the Sampling Orifice of and ICP-MS," presented at FACSS, Providence, RI, October 2002.
- * 74. Uchenna Paul, Todd Bronson, Paul B. Farnsworth, Matthew Linford, Amarchand Sathyapalan, and Paul Savage, "Spectroscopic Characterization of Immobilized Chemosensors for the Detection of Cadmium," presented at Pittcon, Orlando, FL, March 2003.
- 75. Paul B. Farnsworth, J. H. Macedone, Andrew Mills, "Optical Studies of the First-Stage Expansion in the Vacuum Interface of an Inductively Coupled Plasma Mass Spectrometer," presented at CSI XXXIII, Granada, Spain, September 2003.
- * 76. Jeffrey H. Macedone, Andrew Mills, and Paul B. Farnsworth, "A Comparison of Optical and Mass Spectrometric Measurements of Ion Density Profiles in an Inductively Coupled Plasma," presented at FACSS, Ft. Lauderdale, FL, October 2003.
- 77. Paul B. Farnsworth, Jeffrey H. Macedone, and Andrew Mills, "A Study of Ion Loss Mechanisms in the First Vacuum Stage of and Inductively Coupled Plasma Mass Spectrometer," presented at FACSS, Ft. Lauderdale, FL, October 2003.
- 78. Paul B. Farnsworth, "Lasers as Probes of Analytically Useful Plasmas," Department Seminar, BYU Idaho, November 2003.
- 79. Paul B. Farnsworth, Jeffrey H. Macedone and Andrew A. Mills, "High-resolution Images of the Sampling Cone of an Inductively Coupled Plasma Mass Spectrometer," presented at the 2004 Winter Conference on Plasma Spectrochemistry, Ft. Lauderdale, FL, January 2004.
- 80. Paul B. Farnsworth, "An Ion's Journey through the ICP-MS Interface: The Long Version of a Short Trip," invited lecture, presented at Pittcon, Chicago, IL, March 2004.
- * 81. Jeffrey H. Macedone and Paul B. Farnsworth, "Comparing Atom and Ion Transport Through the Sampling Orifice of an Inductively Coupled Plasma Mass Spectrometer," presented at Pittcon, Chicago, IL, March 2004.
- * 82. Andrew A. Mills and Paul B. Farnsworth, "High-Resolution Imaging of the Plasma Flow through the Sampling Cone of an Inductively Coupled Plasma Mass Spectrometer," presented at Pittcon, Chicago, IL, March 2004.
- * 83. W. Neil Radicic and Paul B. Farnsworth, "A Velocity and Temperature Study of Analyte Ion Transport Efficiency in the First Vacuum Stage of an ICP-MS," presented at Pittcon, Chicago, IL, March 2004.

84. Paul B. Farnsworth, "Where have all the ions gone?," Analytical Chemistry Seminar presented at the University of Florida, Gainesville, FL, April 2004.
85. Paul B. Farnsworth, Jeffrey Macedone, and Andrew Mills, "Imaging of Ion Densities in the Sampling Cone of an ICP-MS by Planar Laser Induced Fluorescence," presented at FACSS, Portland, OR, October 2004.
- * 86. Li Li, Uchenna Paul, Milton Lee, and Paul B. Farnsworth, "The Use of a Microchip Laser for Two-Photon Excitation of Native Fluorescence in Proteins," presented at FACSS, Portland, OR, October 2004.
87. Paul B. Farnsworth, Jeffrey Macedone, and Andrew Mills, "Fundamental Characterization of the ICP/MS Interface for Improved Instrument Performance," invited lecture presented at Pittcon, Orlando, FL, March 2005
88. Paul B. Farnsworth, Ross L. Spencer, Andrew Mills, Jeffrey Macedone, Jaron Krogel, and Jamie Palmer, "A Comparison Between Experimentally Measured and Calculated Flows through the Sampling Cone of an Inductively Coupled Plasma Mass Spectrometer," invited lecture presented at Pacificchem, Honolulu, HI, December 2005.
89. Paul Farnsworth, Andrew Mills, Jeff Macedone, and Jordan Olsen, "An Experimental Overview of Atom and Ion Behavior in the First Vacuum Stage of an ICP-MS," presented at the 2006 Winter Conference on Plasma Spectrochemistry, Tucson, AZ, January 2006.
90. Paul B. Farnsworth and Ross Spencer, "Ion Sampling and Transport in Plasma Source Mass Spectrometers," DOE Contractors meeting, Warrentown, VA, April 2006
91. Paul B. Farnsworth, "Probing Plasmas with Photons," plenary award lecture at FACSS 2006, Orlando, FL, September, 2006.
- * 92. Jeff Macedone, Haibin Ma, and Paul B. Farnsworth, "Atom and ion densities immediately upstream from the sampling cone of an ICP-MS" presented at FACSS, Orlando FL, September, 2006.
- * 93. W. Neil Radicic, Jordan Olsen, and Paul B. Farnsworth, "A Comparison of Neutral Atom and Ion Behavior in the First Vacuum Stage of an ICP-MS," presented at FACSS, Orlando FL, September, 2006.
94. Paul B. Farnsworth and Jeffrey Macedone, "Probing the ICP-MS Interface with Lasers: Where are the Ions Going?" invited lecture presented at the second Asia-Pacific Winter Conference on Plasma Spectrochemistry, Bangkok, Thailand, November 2006.
95. Paul B. Farnsworth and Haibin Ma, "The Use of Planar Laser-induced Fluorescence to Study Ion Flow into the Sampling Cone of an Inductively Coupled Plasma Mass Spectrometer," invited lecture presented at Euroanalysis XIV, Antwerp Belgium, September 2007.
96. Paul B. Farnsworth, "Putting the Heat to Atoms," Utah Award Lecture, Thanksgiving Point, Utah, June 2007.
97. Paul B. Farnsworth and Haibin Ma, "The Effect of the Sampling Cone on Ion and Atom Distributions in an ICP-MS," invited lecture presented at FACSS, Memphis, TN, October 2007.

- * 98. Haibin Ma and Paul B. Farnsworth, "Spectroscopic Imaging of Argon Metastable Atoms Between the Load Coil and the Sampling Cone of an ICP-MS," FACSS, Memphis, TN, October 2007.
- 99. Paul B. Farnsworth and Ross L. Spencer, "Combining Experiments and Modeling to Understand Sample Transport in Inductively Coupled Plasma Mass Spectrometry," invited lecture presented at the 2008 Winter Conference on Plasma Spectrochemistry, Temecula, CA, January 2008.
- 100. Paul B. Farnsworth, "ICP-MS – Linking Atomic Spectroscopy's Future to its Past," invited lecture presented at Pittcon, New Orleans, LA, March 2008.
- 101. Paul B. Farnsworth, "Atomic Fluorescence Spectroscopy: A Powerful Tool for Fundamental Studies of Plasmas," invited lecture presented at Pittcon, New Orleans, LA March 2008.
- 102. Paul B. Farnsworth, "Where Have All the Ions Gone," Society for Applied Spectroscopy speakers tour, St. Louis, MO, May 2008.
- 103. Paul B. Farnsworth, "Where Have All the Ions Gone," presented at Covidian, St. Louis, MO, May 2008.
- 104. Paul B. Farnsworth, "Where Have All the Ions Gone," department seminar, Truman State University, Kirksville, MO, September 2008.
- 105. Paul B. Farnsworth, Nicholas Taylor, and Haibin Ma, "Mapping Argon Metastable Atoms in an ICP-MS Using Absorption Depletion Imaging," invited lecture presented at FACSS, Reno NV, September 2008.
- * 106. Haibin Ma, Jeff Macedone, Paul B. Farnsworth, "Fluorescence-Based Studies of Ion Transmission through the Skimmer Cone of an ICP-MS," presented at FACSS, Reno NV, September 2008.
- * 107. Nicholas Taylor, Paul B. Farnsworth, "Evaluation of Penning Ionization in Inductively Coupled Plasmas," presented at FACSS, Reno NV, September 2008.
- * 108. Ross Spencer, Paul B. Farnsworth, Daniel Wilcox, "Monte Carlo Simulation of Ambipolar Electric Field Effects and Trace Elements in the ICP-MS Vacuum Interface," presented at FACSS, Reno NV, September 2008.
- * 109. Mike Wood, Paul B. Farnsworth, Devin Busby, "Fluorescence Microscopy of Surfaces in Desorption Electrospray Ionization (DESI)," presented at FACSS, Reno NV, September 2008.
- * 110. Matthew Heywood, Paul Farnsworth, "In-Capillary Protein Detection using Laser-Induced Native Fluorescence of the Aromatic Amino Acids," presented at FACSS, Reno NV, September 2008.
- 111. Paul B. Farnsworth, "Making the Most of Plasma Source Mass Spectrometry: Converting an Art into a Science," seminar presented to the Indiana University Department of Chemistry, April, 2009

112. Paul B. Farnsworth, Nicholas Taylor, Ross L. Spencer, "Experimental and computational characterization of the flow through the skimmer cone of an ICP-MS," presented at CSI XXXVI, Budapest, Hungary, September 2009.
113. Paul B. Farnsworth, "Building from the Basics: Using Fundamental Studies as a Springboard for Future Developments in Atomic Spectroscopy," invited lecture presented at FACSS, Louisville, KY, October 2009.
114. Paul B. Farnsworth, Nick Taylor, and Ross Spencer, "Experimental and Computational Characterization of the Flow through the Skimmer Cone of an ICP-MS," invited lecture presented at FACSS, Louisville, KY, October 2009.
- * 115. Nick Taylor and Paul B. Farnsworth, "The Effect of Matrix Composition on Argon Metastable Atom Populations in an Emission ICP," presented at FACSS, Louisville, KY, October 2009.
116. Paul B. Farnsworth, Nick Taylor, and Ross Spencer, "A Comparison between Ideal and Experimentally-Measured Skimming in the Vacuum Interface of an ICP-MS," invited lecture presented at the 2010 Winter Conference on Plasma Spectrochemistry, Fort Myers, FL, January 2010.
117. Paul B. Farnsworth, Nick Taylor, and Matthew Heywood, "Imaging Helium Metastable Atoms in a Dielectric Barrier Discharge Used as an Ambient Ionization Source for Mass Spectrometry," presented at the 26th Asilomar Conference on Mass Spectrometry, Pacific Grove, CA, October 2010.
- * 118. Kyli McKay, Nicholas Taylor, and Paul B. Farnsworth, "The Formation of Doubly Charged Ions in an Inductively Coupled Plasma," presented at FACSS, Raleigh, NC, October 2010.
- * 119. Nicholas Taylor and Paul B. Farnsworth, "The Effect of Matrix Composition on Several Fundamental Parameters in an Emission ICP," presented at FACSS, Raleigh, NC, October 2010.
- * 120. Alisa Edmund, Nicholas Taylor, and Paul B. Farnsworth, "Evaluation of Ion Transmission and Shock Structure of Various Skimmer Cone Designs in an ICP-MS," presented at FACSS, Raleigh, NC, October 2010.
121. Paul B. Farnsworth, Nicholas Taylor, and Ross L. Spencer, "ICP-MS Performance after 30 Years: Filling in the Blanks," invited lecture presented at FACSS, Raleigh, NC, October 2010.
122. Paul B. Farnsworth, Nicholas Taylor, and Alisa Edmund, "Imaging the Ion Beam in the Second Vacuum Stage of an Inductively Coupled Plasma Mass Spectrometer," invited lecture presented at FACSS, Raleigh, NC, October 2010.
- * 123. Matthew Heywood, Jonathan Wright, and Paul B. Farnsworth, "Optical and Mass Spectrometric Studies of a Helium Dielectric Barrier Discharge used as an Ambient Ionization Source, presented at FACSS, Raleigh, NC, October 2010.
- * 124. Ross Spencer, Steven Schmidt, and Paul B. Farnsworth, "Shock Behavior and Analyte Transport in the ICP-MS via the Direct Simulation Monte Carlo Algorithm," presented at FACSS, Raleigh, NC, October 2010.

- 125 Paul B. Farnsworth, Nicholas Taylor, and Alisa Edmund, "The Effect of Sample Matrix on Ion Transmission through the Vacuum Interface of an Inductively Coupled Plasma Mass Spectrometer," invited lecture presented at Pacificchem, Honolulu, HI, December 2010
- 126 Paul B. Farnsworth, Nicholas Taylor, and Alisa Edmund, "Direct Measurement of Space Charge Effects in the Second Vacuum Stage of an Inductively Coupled Plasma Mass Spectrometer," presented at the European Winter Conference on Plasma Spectrochemistry, Zaragoza, Spain, February, 2011.
- * 127 Alisa Edmund, Nicholas Taylor, Mary Lyon, Scott D. Bergeson, and Paul B. Farnsworth, "Imaging the Ion Beam in the Second Vacuum Stage of an ICP-MS using Planar Laser-Induced Fluorescence," presented at FACSS, Reno, NV, October 2011.
- * 128 Kyli Bishop, Nicholas Taylor, and Paul B. Farnsworth, "A Novel Approach to Understanding the Effect of Matrix Composition on Analyte Emission in an Inductively Coupled Plasma," presented at FACSS, Reno, NV, October 2011.
- 129 Paul B. Farnsworth, Matthew Heywood, Nicholas Taylor, Jonathan Wright and Kellie Woodfield, "Dissecting Helium Plasmas as Ambient Ionization Sources," invited lecture, presented at FACSS, Reno, NV, October 2011.
- 130 Paul Farnsworth, Nicholas Taylor, Kyli Bishop, Alisa Edmund, "Matrix Effects in Inductively Coupled Plasma Spectroscopies Revisited," invited lecture, presented at the Winter Conference on Plasma Spectrochemistry, Tucson, AZ, January 2012.
- 131 Paul Farnsworth, "Tracking Ions through an ICP-MS with Photons," invited lecture, presented at Pittcon, Orlando, FL, March 2012.
- 132 Paul B. Farnsworth, Matthew Heywood, Nicholas Taylor, Jonathan Wright, and Kellie Woodfield, "Seeing the Light in Ambient Mass Spectrometry," invited lecture, presented at Pittcon, Orlando, FL, March 2012.
- 133 Paul B. Farnsworth, "Imaging Ion and Atom Distributions in an Inductively Coupled Plasma Mass Spectrometer with Laser Ablation Sample Introduction," invited lecture, presented at the Nordic Plasma Conference, Loen, Norway, June 2012.
- 134 Paul B. Farnsworth, "Signal Production and Matrix Effects in ICP-OES and ICP-MS," short course taught at the Nordic Plasma Conference, Loen, Norway, June 2012.
- 135 Paul B. Farnsworth and Alisa Edmund, "Matrix Effects in the Second Vacuum Stage of an ICP-MS," invited lecture, presented at SciX, Kansas City, MO, October 2012.
- 136 Paul B. Farnsworth, Nicholas Taylor, Kyli Bishop, and Ross Spencer, "The use of Laser Radiation to Modulate Electron Temperature in the Inductively Coupled Plasma," invited lecture, presented at SciX, Kansas City, MO, October 2012.
- * 137 Lance Moses, Wade Ellis, and Paul Farnsworth, "Fluorescence Imaging of Analyte Profiles in an Inductively Coupled Plasma with Laser Ablation as a Sample Introduction Source," presented at SciX, Kansas City, MO, October 2012.

- * 138 Jonathan Wright, Matthew Heywood, Glen Thurston, and Paul Farnsworth, "The Effects of Hydrogen on a Helium Based Dielectric-Barrier Discharge Ambient Desorption/Ionization Source," presented at SciX, Kansas City, MO, October 2012.
- 139 Paul B. Farnsworth, "Putting the Heat to Atoms: Fun in the Lab with Lasers and Plasmas," Departmental Seminar at Weber State University, November, 2012.
- 140 Paul B. Farnsworth, H. Dennis Tolley, and Alisa Edmund, "Signal Processing Considerations for Single Particle Analysis by ICP-MS," invited lecture presented at Pittcon, Philadelphia, PA, March 2013.
- 141 Paul B. Farnsworth and Lance Moses, "Spatial Distributions of Analyte Ions in an Inductively Coupled Plasma with Laser Ablation Sample Introduction," invited lecture presented at SciX, Milwaukee, WI, October 2013.
- * 142 Charlotte Reininger, Kellie Woodfield, and Paul B. Farnsworth, "Absolute Number Densities of Helium Metastable Atoms in Helium-Based Discharges used as Ambient Desorption/Ionization Sources," presented at SciX, Milwaukee, WI, October 2013.
- * 143 Alisa J. Edmund, Scott Bergeson, and Paul Farnsworth, "Imaging the Ion Beam in the Second Vacuum Stage of an ICP-MS using Planar Laser-Induced Fluorescence," presented at SciX, Milwaukee, WI, October 2013.
- 144 Paul B. Farnsworth, "Ambient Ionization Sources for Mass Spectrometry," Departmental Seminar at Northern Arizona University, November 2013.
- 145 Paul B. Farnsworth, Matthew Heywood, and Charlotte Reininger, "Spectroscopic Diagnostics of Plasmas used as Ambient Desorption/Ionization Sources for Mass Spectrometry," invited lecture presented at the Winter Conference on Plasma Spectrochemistry, Amelia Island, FL, January 2014.
- 146 Paul B. Farnsworth, "Ambient Ionization Sources for Mass Spectrometry," Departmental Seminar at BYU Idaho, January, 2014.
- * 147 S. Sharma, P.B. Farnsworth, M.L. Lee, S.D. Stearns, A. Plistil, R.S. Simpson, "Hand-Portable Liquid Chromatography," presented at Pittcon, Chicago, IL, March 2014.
- * 148 M.L. Lee, X. Xie, S. Sharma, P.B. Farnsworth, H.D. Tolley, "Hand-portable Instrumentation for Gas and Liquid Chromatography," presented at the 38th International Symposium on Capillary Chromatography, Riva del Garda, Italy, May 2014.
- 149 Paul B. Farnsworth, Wade Ellis, Charlotte Reininger, Adam Kaylor, and Joel Keelor, "Optical Spectroscopic Comparisons of Helium Plasma Ambient Desorption/Ionization Sources for Mass Spectrometry" presented ASMS, Baltimore, MD, June 2014.
- * 150 Wade C. Ellis, Anna P. Openshaw, and Paul B. Farnsworth, "An Effective Ambient Desorption/Ionization Source Using Hydrogen-Doped Argon as the Support Gas," presented at ASMS, Baltimore, MD, June 2014.
- * 151 M.L. Lee, S. Sharma, P.B. Farnsworth, H.D. Tolley, "Emerging Liquid Chromatographic Technologies for Environmental Monitoring," presented at the National Environmental Monitoring Conference, Washington, DC, August 2014.

- * 152 Anna Openshaw, Paul B. Farnsworth, and John Price “Developing DESI as a Tool in Kinetic Tissue Imaging,” presented at SciX, Reno, NV, October 2014.
- 153 Paul B. Farnsworth, Alisa Edmund, and Jessica Ramsey, “The Effects of Interface Design and Operating Parameters on Ion Beam Formation in an ICP-MS,” invited lecture presented at SciX, Reno, NV, October 2014.
- * 154 Jessica J. Ramsey, Alisa J. Edmund, and Paul B. Farnsworth, “Evaluation of the Effect of Skimmer Cone Design on Ion Beam Formation in the Second Vacuum Stage of an ICP-MS,” presented at SciX, Reno, NV, October 2014.
- * 155 Lance Moses and Paul B. Farnsworth, “Characterization of Size Distributions of Laser Ablation Produced Aerosol Particles and their Relative Contributions to Ion Densities in an ICP,” presented at SciX, Reno, NV, October 2014.
- * 156 Wade C. Ellis and Paul B. Farnsworth, “A Comparison of Rise Times Obtained Using Four Support-Gas Compositions in Plasma-Based Ambient Desorption/Ionization Mass Spectrometry,” presented at SciX, Reno, NV, October 2014.
- * 157 Charlotte Reininger, Kellie Woodfield, Joel Keelor, Adam Kaylor, and Paul B. Farnsworth, “Spectroscopic Comparisons of Helium Plasmas used as Ambient Desorption/Ionization Sources for Mass Spectrometry,” presented at SciX, Reno, NV, October 2014.
- 158 Paul B. Farnsworth, “Making the Most of Plasma Source Mass Spectrometry,” Departmental Seminar at Utah Valley University, November 2014.
- 159. Paul B. Farnsworth, “Seeing the Light in Ambient Mass Spectrometry,” seminar, University of Florida, Gainesville, February 2015.
- * 160 “Hand-portable Gradient Liquid Chromatographic System,” S. Sharma, A. Plistil, H.E. Barnett, P.B. Farnsworth, H.D. Tolley, A.J. Alpert, S.D. Stearns, M.L. Lee, “Hand-portable Gradient Liquid Chromatographic System,” Pittcon, New Orleans, March 8-12, 2015
- 161. Paul B. Farnsworth, Wade C. Ellis, and Charlotte Reininger, “Plasmas for Ambient Ionization: Connecting Plasma Fundamentals to Mass Spectrometric Performance,” invited lecture presented at Pittcon, New Orleans, March 2015.
- 162. Paul B. Farnsworth, “Seeing the light in Ambient Mass Spectrometry,” seminar, ISAS, Dortmund, Germany, May 2015.
- * 163 M.L. Lee, S. Sharma, P. Aggarwal, X. Zhou, A. Plistil, S.D. Stearns, H.E. Barnett, P.B. Farnsworth, H.D. Tolley, “Monolithic Capillary LC Systems for On-Site Analysis,” Internat. Symp. on Capillary Chromatography, Fort Worth, TX, May 16-21, 2015
- * 164 M.L. Lee, S. Sharma, P.B. Farnsworth, H.D. Tolley, A. Plistil, H.E. Barnett, S.D. Stearns, SciX 2015, “Miniaturization of Liquid Chromatography,” Providence, RI, September 27-October 2, 2015.
- 165. Paul B. Farnsworth, Lance Moses, and Jessica Ramsey, “Photons as reporters of fundamental activity in the ICP-MS: Using lasers to answer the five W’s,” invited lecture presented at SciX, Providence, RI, October 2015.

166. Paul B. Farnsworth and Wade C. Ellis, "Mixed gas ADI plasmas, useful tool or curiosity?," invited lecture presented at SciX, Providence, RI, October 2015.
- * 167. M.L. Lee, S. Sharma, A. Plistil, H.E. Barnett, S.D. Stearns, P.B. Farnsworth, A.J. Alpert, H.D. Tolley, "Liquid Chromatographic Instrumentation for On-site and Point-of-care Analysis," Pacifichem, Honolulu, HI, December 15-20, 2015.
- * 168. M.L. Lee, S. Sharma, A. Plistil, H.E. Barnett, S.D. Stearns, P.B. Farnsworth, H.D. Tolley, "Small-scale Ultrahigh Performance Capillary Liquid Chromatograph," Pacifichem, Honolulu, HI, December 15-20, 2015.
169. Paul B. Farnsworth, Wade C. Ellis, Matthew Heywood, Charlotte Lewis, and Joachim Franzke, "Time-resolved spectroscopic studies of dielectric barrier discharges used as ambient desorption/ionization sources for mass spectrometry," invited lecture presented at Pacifichem, Honolulu, HI, December 2015.
170. Paul B. Farnsworth, Ross L. Spencer, and Matthew Zachreson, "Recombination and Diffusion in the Vacuum Interface of an ICP-MS: A New Look at Some Old Data," invited lecture presented at the Winter Conference on Plasma Spectrochemistry, Tucson, AZ, January 2016.
171. Paul B. Farnsworth, Wade C. Ellis, Charlotte Lewis, Jessica Larsen, Daniel Thurston, and Ross Spencer, "Ambient Sampling and Ionization with Low-Power Plasmas: Limits and Possibilities," invited lecture at the 2016 Gordon Conference on Plasma Processing Science, Andover, NH, July, 2016.
172. Paul B. Farnsworth and Wade C. Ellis, "Elemental Analysis by Ambient Ionization Mass Spectrometry," presented at SciX, Minneapolis, MN, September 2016.
- * 173. Wade C. Ellis, Ross L. Spencer, and Paul B. Farnsworth, "Simulation of a Helium DC Glow Discharge Used as an Ambient Desorption/Ionization Source for Mass Spectrometry," presented at SciX, Minneapolis, MN, September 2016.
- * 174. Daniel F. Thurston, David Klute, Joachim Franzke, and Paul B. Farnsworth, "Spectral Comparison of Dielectric Barrier Discharge Ionization Sources," presented at SciX, Minneapolis, MN, September 2016.
175. Paul Farnsworth, Charlotte Lewis, Richard Carson, and John C. Price, "Imaging regio-specific lipid synthesis in mouse brain with DESI-mass spectrometry," presented at the meeting of the Society of Western Analytical Professors," Salt Lake City, UT, February 2017.
- * 176. Pascal Vogel, Felix David Klute, Sebastian Brandt, Antje Michels, Charlotte Reininger, Daniel Thurston, Beatrix Biskup, Paul Farnsworth, and Joachim Franzke, "Comparison of "Half" and "Full" Dielectric Barrier Discharges – LTP vs. DBDI", presented at SciX, Reno, NV, October 2017.
- * 177. Felix David Klute, Sebastian Burhenn, Pascal Vogel, Antje Michels, Charlotte Lewis, Daniel Thurston, Beatrix Biskup, Paul Farnsworth, Joachim Franzke, "On the Roles of Metastable and Quasi -Metastable Species in Atmospheric Noble Gas Dielectric Barrier Discharges," presented at SciX, Reno, NV, October 2017.

- 178 Paul Farnsworth, Richard Carson, Charlotte Lewis, Mercede Erickson, Anna Zagieboylo, Bradley Naylor, Kelvin Lee, John Price, “Imaging Lipid Turnover Rates in Mouse Brains with Desorption Electrospray Ionization Mass Spectrometry,” presented at SciX, Reno, NV, October 2017.
- * 179 Mercede Erickson, Isabella James, Richard Carson, John C Price, and Paul B Farnsworth, “The Use of a Capillary Dielectric Barrier Discharge Ionization (DBDI) Source for Spatially-Resolved Measurements of Cholesterol in Mouse Brains,” presented at SciX, Reno, NV, October 2017.

* Presented by students, Post-docs, or colleagues.

Student Theses and Dissertations

1. Lynda Jean Jones, "The Development and Temperature Mapping of an ICP Torch for Use in the Study of Coal Pyrolysis," Masters thesis, 1989.
2. David A. Rodham, "Energy Transport and Analyte Excitation in a Pulse-Modulated Inductively Coupled Plasma," Masters thesis, 1989.
3. David C. Williams, "Energy Distribution Among Argon Levels and Penning Ionization in the Inductively Coupled Plasma," Doctoral dissertation, 1990.
4. Hilary Porter Parry, "The Effect of Charge Transfer on Spectral Profiles of Atomic Lines," Masters thesis, 1995.
5. Yibai Chen, "Construction and Characterization of an Inductively Coupled Plasma Time-of-Flight Mass Spectrometer," Doctoral Dissertation, 1996.
6. Alexandru C. Lazar, "Analytical Performance Evaluation and Matrix Effects Studies in an Inductively Coupled Plasma with a Monodisperse Aerosol Sample Introduction System," Doctoral Dissertation, 1998.
7. Brett S. Duersch, "Optical Mapping of the Ion Beam Inside an Inductively Coupled Plasma Mass Spectrometer," Masters thesis, 1998.
8. James E. Patterson, "Optical and Computational Investigation of Plasma Flow in an Inductively Coupled Plasma - Mass Spectrometer," Masters thesis, 1998.
9. Uchenna Prince Paul, "Fluorescence Detectors for Proteins and Toxic Metals," Masters thesis, 2004.
10. W. Neil Radicic, "Velocity and Temperature Characterization of the First Vacuum Stage Expansion in an Inductively Coupled Plasma Mass Spectrometer," Masters thesis, 2004.
11. Jeffrey H. Macedone, "Ion Transmission Studies in the First Vacuum Stage of an Inductively Coupled Plasma Mass Spectrometer," Doctoral Dissertation, 2005.
12. Li Li, "Detection of Proteins by Two-Photon Excitation of Native Fluorescence," Masters thesis, 2006.
13. Haibin Ma, "Ion Transport Behaviors Upstream and Downstream from the Sampling Cone of an Inductively Coupled Plasma Mass Spectrometer," Doctoral Dissertation, 2009.
14. Michael Wood, "The Characterization of the Desorption Electrospray Ionization Mechanism Using Microscopic Imaging of the Sample Surface," Doctoral Dissertation, 2011.
15. Matthew S. Heywood, "Optical and Mass Spectrometric Studies of a Helium Dielectric-Barrier Atmospheric-Pressure Plasma Jet Used as an Ambient Ionization Source," Doctoral Dissertation, 2012.
16. Manan Dhunna, "Desorption Electrospray Ionization Mass Spectrometry Imaging: Instrumentation, Optimization and Capabilities," Master's thesis, 2014.

17. Alisa J. Edmund, "Laser-Induced Fluorescence Imaging of Calcium and Barium Ion Beams in the Second Vacuum Stage of a Commercial Inductively Coupled Plasma Mass Spectrometer," Master's thesis, 2014.
18. Lance Moses, "Fluorescence Imaging of Analyte Profiles in an Inductively Coupled Plasma with Laser Ablation as a Sample Introduction Source," Doctoral Dissertation, 2015.
19. Charlotte Reininger, "Desorption Electrospray Ionization (DESI) Mass Spectrometric Imaging of Spatially Regulated In Vivo Metabolic Rates," Master's thesis, 2017.
20. Jessica Larsen, "Ion Transport in a Commercial ICP-MS," Master's thesis, 2017.
21. Wade C. Ellis, "Fundamental Studies and Applications of Ambient Plasma Ionization Sources for Mass Spectrometry," Doctoral Dissertation, 2017.