

Curriculum vitae
Stephen L. Morgan

Professor

Department of Chemistry & Biochemistry

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EDUCATION

Emory University, Atlanta, GA, Ph.D., Analytical Chemistry, July 1975.

Dissertation title: "Simplex optimization and experimental design in the development of analytical chemical methods," mentor: Professor Stanley N. Deming.

Emory University, Atlanta, GA, M.S., Analytical Chemistry, August 1974.

Duke University, Durham, NC, B.S. Chemistry (ACS Certified), June 1971.

PROFESSIONAL EXPERIENCE

8/89-present: Professor, Department of Chemistry, University of South Carolina, Columbia, SC.

8/81-7/89: Associate Professor, Department of Chemistry, University of South Carolina, Columbia, SC.

8/76-8/81: Assistant Professor, Department of Chemistry, University of South Carolina, Columbia, SC.

8/75-8/76: Postdoctoral Fellow, Department of Chemistry, University of Houston, Houston, TX.

PROFESSIONAL SOCIETY MEMBERSHIPS

American Association for the Advancement of Science American Academy of Forensic Sciences, Associate Member, 2015 American Chemical Society (ACS) Analytical Division ACS South Carolina Section of the American Chemical Society Sigma Xi Society for Applied Spectroscopy Coblenz Society South Carolina Academy of Science

NATIONAL LEVEL ADVISORY COMMITTEES

Special Working Group on Materials (SWGEMAT)/Fiber subgroup (National Institute of Justice/Federal Bureau of Investigation), 2011-2014.

Member, Scientific Area Committee for Chemistry/Instrumental Analysis, National Institute of Standards (NIST)/Department of Justice (DOJ) Organization of Scientific Area Committees (OSAC), 2014-2019 (5-yr. term). Non-voting member of OSAC Forensic Toxicology subcommittee.

Committee E11 on Quality and Statistics, American Society for Testing and Materials, voting member, 2016-present.

Member, Editorial Board, *Journal of Forensic Chemistry*, Elsevier, 2016-present.

Reviewer of research proposals for National Science Foundation, and Department of Justice (National Institute of Justice).

HONORS AND AWARDS

Fellow, American Association for the Advancement of Science, November 2016

American Chemical Society, South Carolina Section, *2011 Outstanding Chemist*, May 2011.

Sigma Xi Distinguished Lecturer, 1 July 2008-30 June 2009 (see Jan.-Feb. 2008 issue of *American Scientist*).

Distinguished Undergraduate Research Mentor, University of South Carolina, May 2007.

The Society of the Sigma Xi, Student Research, *Award Winner for Ph.D. Dissertation*, "Simplex Optimization and Experimental Design in the Development of Analytical Methods," Emory University, Atlanta, GA, May 1976.

GRANT PROPOSALS (submitted and funded)

1. "Experimental Optimization in Programmed Temperature Gas Chromatography," Petroleum Research Fund, American Chemical Society, July 1976, \$5,000 requested, not funded.
2. "Automated Response Surface Investigations in Gas Chromatography," National Science Foundation, February 1977, \$93,405 requested; revised budget and comments submitted as requested by NSF, October 1977, \$107,168 requested, not funded.
3. "Processing of Gas Chromatographic Data for Pattern Recognition," Research & Productive Scholarship Committee, University of South Carolina, February 1977, funded \$1,000, 1 July 1977-31 June 1978.
4. "Separation and Quantitation of Nucleosides by HPLC," University of South Carolina Fund for Cancer Related Research, American Cancer Society, October 1977, \$2,650 requested, not funded.
5. "Pyrolysis Gas Chromatography of Biological Materials: Carbohydrate Analysis," S. L. Morgan, PI, NIH Biomedical Research Support Institutional Grant Program, October 1977, funded \$4,914, 1 January 1978-31 March 1979.
6. "Glass Capillary Pyrolysis Gas Chromatography of Carbohydrates," S. L. Morgan, PI, NIH Biomedical Research Support Institutional Grant Program, January 1979, \$4,874 requested, not funded.
7. "Pyrolysis GC-MS of Biomedically Important Compounds," S. L. Morgan, PI, National Institutes of Health, March 1979, 1 August 1980-31 July 1982, NIH Grant No. GM-27135-01; funded \$162,340 for total 3 year direct costs.
8. "Fundamental Studies of Pyrolysis Gas Chromatography Using Pattern Recognition and Mass Spectrometry," National Science Foundation, January 1980, \$187,748 requested, not funded.
9. "Multidimensional GC Methods for Metabolic Profiling," National Institutes of Health, February 1980, \$79,553 requested, not funded.
10. "Analytical Chemical Studies in GC-MS," contribution in Departmental Instrumentation Proposal to the National Science Foundation for the purchase of a GC-MS system, \$225,000 requested, not funded.
11. "Pyrolysis Gas-Chromatography-Mass Spectrometry," contribution in Departmental Instrumentation Proposal to the National Science Foundation Experimental Program to Stimulate Competitive Research (EPSCR) for the purchase of a Finnigan 4021C GC-MS system, funded \$100,000 from NSF, July 1981 - June 1984.
12. "Rapid Detection of Bacterial Infections Using Analytical Pyrolysis and GC-MS," co-investigator with Alvin Fox (School of Medicine, USC), contribution in instrumentation proposal, "Acquisition of a High Resolution GC-MS System for Investigations in Environmental Stresses on Biological Systems," with E. O. Oswald, PI (School of Environmental Health, USC), Biological Instrumentation Program, National Science Foundation, \$540,000 requested, not funded.
13. "Rapid Detection of Bacterial Endophthalmitis by GC-MS," coinvestigator with Alvin Fox (School of Medicine, USC), National Institutes of Health, February 1981, \$138,000 requested, not funded.
14. "Inflammatory Uveitis: Role of Bacterial Debris," coinvestigator with Alvin Fox (School of Medicine, USC), Small Grant Program for Pilot Studies, National Eye Institute, National Institutes of Health, August 1981, \$15,000 requested, not funded.
15. "Analysis of Oils and Dispersants in Mangrove Plant Extracts by Capillary GC-MS," Research Planning Institute-EXXON, August 1981, funded \$20,000 with \$6,000 matching funds from USC, 1 August 1981-31 July 1982.
16. "Chemotaxonomic Characterization of Legionella by GC-MS," PI with coinvestigator Alvin Fox, NIH Biomedical Research Support Institutional Grant Program, November 1981, funded \$4,000, 1 January 1982-31 December 1982.
17. "Chemical Methods for Detection of Infectious Disease," coinvestigator with A. Fox and A. Brown (School of Medicine, USC), U. S. Army Research Office, June 1982, \$42,623 requested, not funded.
18. "Inflammatory Uveitis: Role of Bacterial Debris," Coinvestigator with Alvin Fox, (School of Medicine, USC), National Eye Institute, National Institutes of Health, July 1982, \$104,835 requested, funded \$104,835, 3/1/83-2/28/86.
19. "Comparative Efficacy of Cefazolin and Cefamandol," coinvestigator with C. S. Bryan, PI (Chief, Infectious Diseases, Richland Memorial Hospital, School of Medicine, USC), Smith, Kline & French, funded \$21,000, 7/1/82-6/30/83.

20. "Application of GC-MS to the Taxonomic Study of the *Legionellaceae*," coinvestigator with Arnold Brown, PI, (Chief of Research, Veterans' Hospital and School of Medicine, USC) and A. Fox (School of Medicine, USC), Veterans' Administration, funded \$8,500, 11/1/82-10/30/83.
21. "Biochemical, Morphologic Immunologic Predictors of Lung Disease Utilizing Organ Explants," coinvestigator with M. Sigel, PI, and others (School of Medicine, USC), Health Effects Institute, September 1982, \$370,978 requested, not funded.
22. "An Instrument Proposal for the Acquisition of a Gas Chromatograph-Mass Spectrometer System to Support Fundamental Studies in GC-MS," Department of Defense Instrumentation Program, December 1982, \$190,000 requested to supplement \$100,000 matching funds from USC, not funded.
23. "Optimization of Microsomal Metabolism in Inbred Mice," Coinvestigator with R. K. Abramson (Department of Neuropsychiatry and Behavior, USC School of Medicine), National Institutes of Health, 1 March 1983, \$88,628 requested, not funded.
24. "Pyrolysis GC/FT-IR Studies of Coal and Peat," Coinvestigator with J. R. Durig, PI (Department of Chemistry, USC) and J. R. Carpenter (Department of Geology, USC), Department of Energy/Fossil Energy Program, February 1983, \$200,000 requested to match \$180,752 from USC, not funded.
25. "Experimental Optimization and Characterization of the Metabolism of Amitriptyline and Chlorpromazine in Inbred Mice," Coinvestigator with R. K. Abramson (Department of Neuropsychiatry and Behavior, School of Medicine, USC), Drug Science Foundation, \$4,000 requested, May 1983, not funded.
26. "Legionellae: Structural and Pathogenic Studies," Coinvestigator with A. Fox and A. Brown (PI) (School of Medicine, USC), National Institutes of Health, June 1983, \$198,050 requested, not funded.
27. "Analysis of Oils in Mangrove Plant Extracts and Sediments by Capillary GC and GC-MS," S. L. Morgan, PI, Research Planning Institute-Exxon, May 1984-April 1985, funded \$2,750.
28. "Equipment purchase of a gas chromatograph-mass spectrometer", (Coinvestigator with A. Fox, PI, and other faculty in the School of Medicine), National Science Foundation, funded \$42,000, 7/84-7/85.
29. "Development of Computer-assisted Strategies in Liquid Chromatography," Waters Associates, Milford, MA, funded \$10,000 for two years plus donation of equipment totaling \$65,000, initiated 10/15/84.
30. "Pyrolysis GC/FT-IR Studies of Coal and Peat," Coinvestigator with J. R. Durig, PI, (Department of Chemistry, USC) and J. R. Carpenter (Department of Geology, USC), Department of Energy/Fossil Energy Program, February 1984, \$220,000, not funded.
31. "Products of virulent Legionella which promote survival in macrophages," co-investigator with A. Fox and A. Brown, USC School of Medicine, Veterans' Administration Research Service, funded \$25,000, 7/84- 7/85.
32. "The Establishment of a Chemical Systems Technology Center at the University of South Carolina," with J. R. Durig, PI, Department of the Army, Chemical Research & Development Center, \$1,200,000 requested, 6/84, not funded.
33. "Legionella: structural and pathogenic studies," (with A. Fox, PI, A. Brown, M. M. Sigel, and J. A. Hightower, USC School of Medicine), National Institutes of Health, \$148,077 requested, June 1984, not funded.
34. "Chemotaxonomic Characterization of Microorganisms by Capillary GC-MS," S. L. Morgan (PI) and A. Fox (Microbiology & Immunology), Army Research Office, funded \$246,371, 3/1/85-2/28/88.
35. "High Performance Liquid Chromatography of Vancomycin Antibiotics," (with C. S. Bryan, PI), Eli Lilly Drug Company, funded \$3,800, 3/1/85-7/1/86.
36. "Combined SFFF and GC-MS Studies on the Degradation of Bacteria by Mammalian Tissues," (with A. Fox), National Science Foundation Program on Chemistry of Life Processes, \$378,276 requested, 1/15/85, not funded.
37. Contribution to Departmental NSF/NIH Instrument Proposal for High Resolution Gas Chromatograph-Mass Spectrometer System, funded total approx. \$450,000 (includes matching funds from USC), 6/86.
38. "Products of virulent Legionella which promote survival in macrophages," (with A. Fox, PI, and A. Brown, USC School of Medicine), Veterans' Administration Research Service, funded \$25,000, 7/84-7/85.
39. "Analysis of Oils in Mangrove Plant Extracts and Sediments by Capillary GC and GC-MS," S. L. Morgan, PI, Research Planning Institute-EXXON, funded \$2,750, 5/1/1984-4/30/1985.
40. "Legionella: structural and pathogenic studies," (with A. Fox, PI, A. Brown, M. M. Sigel, and J. A. Hightower, USC School of Medicine), National Institutes of Health, funded \$148,077, 6/86-5/88.

41. "Combined SFFF and GC-MS Studies on the Degradation of Bacteria by Mammalian Tissues," (with A. Fox), National Science Foundation Program on Chemistry of Life Processes, \$378,276 requested, 1/15/86, not funded.
42. "Inflammatory Uveitis: Role of Bacterial Debris," renewal proposal, with Alvin Fox (PI, School of Medicine, USC), National Eye Institute, National Institutes of Health, July 1985, funded \$160,000, 9/86-9/89.
43. "Biodetection by Mass Spectrometry," S. L. Morgan, PI, \$68,000 per year requested as part of a multi-University (USC, Michigan State University, and Colorado School of Mines) and multi-company (Honeywell, Perkin-Elmer) proposal to the US Army for a \$12 million project to develop a new mass spectrometer system for biodetection, February and June 1986, not funded.
44. "Trace Detection and Characterization of Microorganisms by Capillary Gas Chromatography-Mass Spectrometry," S. L. Morgan, PI, (with A. Fox), research instrumentation proposal to the Department of Defense, funded \$102,505, with \$100,000 matching funds from the University of South Carolina, July 1986-June 1987.
45. "Identification of chemical markers for microorganisms by analytical pyrolysis gas chromatography mass spectrometry," U. S. Army Office of Research, Stephen L. Morgan (PI) and Alvin Fox (Department of Microbiology & Immunology, School of Medicine), submitted 8/87, 3 year total direct and indirect costs requested \$656,247, funded \$360,000 for 3 years, 5/1/88-4/31/91.
46. Contribution to "Computer-interfacing in the physical chemistry laboratory and replacement of obsolete undergraduate laboratory equipment," W. R. Gilkerson, PI (with S. R. Goode, S. L. Morgan, and P. Chou), National Science Foundation Instrumentation and Laboratory Improvement Program, \$63,264 requested, November 1987, not funded.
47. "Effects of texture and pore-throat mineralogy on the flow of organic fluids through porous rock," M. Gipson (PI, Geological Sciences) with R. Ehrlich, and S. L. Morgan, National Science Foundation, November 1987, \$269,192 requested, not funded.
48. "Detection of chemical markers for cancer by pyrolysis gas chromatography-mass spectrometry," S. L. Morgan, American Cancer Society Institutional Grant Program for Cancer Related Research, April 1988, \$7,500 requested, not funded.
49. "Instrumentation for identification of chemical markers for bacteria by gas chromatography-mass spectrometry," Department of Defense instrumentation program, \$65,000 requested (to match \$65,000 from USC), May 1988, not funded.
50. "Chemical fingerprinting of microbes by mass spectrometry", S. L. Morgan (co-investigator with A. Fox), June 1989, Cutting Edge Research Program, University of South Carolina, \$72,500 requested, not funded.
51. "Detection of chemical markers for cancer by pyrolysis gas chromatography-mass spectrometry," S. L. Morgan, American Cancer Society Institutional Grant Program for Cancer Related Research, 1/90-4/91, funded \$2,000.
52. Equipment donation from Chemical Data Systems/Autoclave Engineers, Oxford, PA, total donation \$15,000 of equipment including \$2,000 matching funds from USC.
53. Contribution to "Purchase of a Liquid Chromatograph-Mass Spectrometer System," NIH, \$256,090. 1990. J. Baynes (P.I.), (with A. Fox and six other principal user groups).
54. "Inflammatory Uveitis: Role of Bacterial Debris," NIH, requested \$478,078 direct costs + \$227,542 indirect costs, submitted June 1 1990 for 5 year award, with A. Fox (P.I.), not funded.
55. "Multicomponent spectrophotometric analysis using multivariate calibration and factor analysis," S. L. Morgan and S. R. Goode, 1990 University of South Carolina Cutting Edge Grant Program, requested \$70,970, not funded.
56. "Identification of chemical markers for microorganisms by analytical pyrolysis gas chromatography mass spectrometry," Contract extension, U. S. Army Office of Research-CRDEC (Aberdeen, MD), Stephen L. Morgan (PI) and Alvin Fox (Department of Microbiology & Immunology, School of Medicine), funded \$100,000 direct and indirect costs, 5/1/91-12/31/91.
57. "Identification of chemical markers for microorganisms by analytical pyrolysis gas chromatography/mass spectrometry," Army Research Office and CRDEC (Aberdeen, MD), S. L. Morgan (PI, with A. Fox, co-investigator) funded total direct and indirect costs \$100,000; 1 May 1991 to 30 July 1992; Extension to ARO Contract DAAL03-88-K-0075.

58. "Fiber-optic Raman Measurements of Bonding Agents and Interfaces during the Curing Process," Office of Naval Research, Co-investigator with M. L. Myrick (P.I.); funded \$255,000, 6/1/92-5/31/95.
59. "Chemistry for the Multimedia PC," S. L. Morgan and S. R. Goode (Co-PI's), Provost's Instructional Innovation Program, University of South Carolina; funded \$3,000 from Provost's office with \$4,500 matching funds from the Department of Chemistry & Biochemistry; 7-1-94 to 6-31-95.
60. "Artificial Neural Networks and Multivariate Calibration for determination of monomer components in microbial biopolymers using Pyrolysis GC-MS," Department of Defense EPSCOR program, \$339,093 requested with \$61,679 matching funds from USC; January 1994; not funded.
61. "Simultaneous Multi-point Process Monitoring Using Fiber-optic Raman Sensors and Chemometric Techniques", part of group proposal "Process Analytical Spectroscopy for Clean Manufacturing", submitted October 1994 to NSF-EPSCOR as part of SC EPSCOR proposal (R. Williams, Clemson, S. L. Morgan, USC, P.I.'s), USC portion of requested funding involved \$390,981 for first year (NSF \$160,818, USC match \$230,163), three year budget requested for USC was \$497,512 (NSF) and \$697,391 (USC); October 1994, not funded.
62. "Automated Real-time Identification of Environmental Contaminants in Mixtures Using Field-Generated Raman Sensor Signatures," S. M. Angel and S. L. Morgan, Co-PI's, proposal to Program Notice 94-09, Measurement Science Program, Office of Health and Environmental Research, U. S. Department of Energy; June 1994; \$499,000 requested for 3 years; not funded.
63. "Non-invasive monitoring of lipid peroxidation products in breath of cancer patients using thermal desorption GC/MS," J. Skibba and S. L. Morgan, Co-PI's, submitted to Richland Cancer Center Research Program, \$25,000 requested, December 1994, not funded.
64. "Multivariate Data Analysis of Two Dimensional Images from Fiber-Optic Spectroscopy", contribution to proposal co-authored by S. M. Angel, S. L. Morgan, and C. Murphy, Co-PI's, contribution from the Department of Chemistry & Biochemistry to DOE EPSCOR proposal, R. White (Chemical Engineering) PI; funded \$79,000/2 yr (SLM portion); 10/01/95-09/31/97
65. "Cancer Therapy-induced Oxidative Stress", J. Skibba, S. L. Morgan, and G. Gonzalez, Co-PIs, Richland Memorial Hospital/USC Cancer Treatment & Research Center, funded \$15,000, 15 May 1996-14 May 1997.
66. "Discrimination of Copy Toners using Combined Data from Infrared Microscopy, Pyrolysis Gas Chromatography/Mass Spectrometry, and Scanning Electron Microscopy", S. L. Morgan (PI), FBI Forensic Laboratory, Quantico, VA, funded \$9,605, 1 August 1996- 14 May 1997.
67. "Discrimination of Copy Toners and Paint Samples using Combined Data from Infrared (IR) Microscopy, Pyrolysis Gas Chromatography/Mass Spectrometry (Py-GC/MS), and Scanning Electron Microscopy (SEM)," S. L. Morgan, Proposal to the FBI Laboratories, Quantico, VA, February 1997, requested \$67,840.50, not funded.
68. "Development and Validation of Pyrolysis Gas Chromatography/Mass Spectrometry/Pattern Recognition Methods for Forensic Analysis", S. L. Morgan (PI), National Institute of Justice, 5/16/97 to 5/15/01, funded \$200,025.
69. "Fiber-optic Raman Sensing for Rapid Identification of Illicit Drugs," S. M. Angel, S. L. Morgan and W. E. Brewer, DOD Combat Readiness Proposal DOD/ONR, February 1997, requested \$440,000, not funded.
70. "Rapid Biodetection of Bacterial Cells by Laser Pyrolysis/Mass Spectrometry and Laser Spectroscopy," S. L. Morgan, S. R. Goode, and S. M. Angel, DOD Combat Readiness Proposal DOD/ONR, February 1997, \$440,000 requested, funded \$434,000, 7/1/97 to 6/31/01.
71. "Multivariate Data Analysis of Two Dimensional Images from Fiber-Optic Spectroscopy", contribution to proposal co-authored by S. M. Angel, S. L. Morgan, and C. Murphy, Co-PI's, DOE EPSCoR, R. White (Chemical Engineering) PI; funded ca. \$80,000/2 yr (SLM portion); 10/01/97-09/31/99.
72. "Acquisition of Multi-User Mass Spectrometry Facilities to Upgrade the Mass Spectrometry Laboratory at the University of South Carolina," J. W. Baynes (PI) (coordinated and written in major parts by S. L. Morgan), NSF Instrumentation Program, February 1997, requested \$665,000, not funded.
73. "Fundamental Investigations of Laser Ablation/Pyrolysis/Ionization for Analysis of Biological Materials by Time-of-Flight Mass Spectrometry," S. L. Morgan, S. R. Goode, and T. J. Shaw, (Major section in NSF Instrumentation proposal), February 1997, requested \$165,000, not funded.

74. "Rapid Drug Analysis for Forensic Toxicology and Drug Identification Laboratories," W. E. Brewer and S. L. Morgan (PIs), Advanced Forensic Development Program DEA/FBI, December 1997, requested \$672,568, not funded.
75. Equipment donation, July 1998, Flash CG instrument, Thermedics Corporation, Chelmsford, MA; est. value: \$85,000.
76. Equipment donation, July 1998, DraChrom, Inc., Large Volume Programmable Injection system for capillary gas chromatography; est. value \$10,000.
77. "South Carolina Forensic Science Research and Training Center," W. E. Brewer, S. L. Morgan, M. G. Fitts, proposal submitted to Dr. Marsha Tour, Vice Provost for Research, The University of South Carolina, June 1998, not funded.
78. "An Opportunity for pollution prevention during biosolids production: The development of new techniques for monitoring the partitioning of persistent organic pollutants and metals during municipal wastewater treatment," J. L. Ferry and S. L. Morgan, 1 December 1999, \$86,700 requested; not funded.
79. "Electrochemical Power Sources", Principal Investigator R. White, Sub area: Chemical Sensors, Sub area PIs: S. Michael Angel, Catherine J. Murphy, and Stephen L. Morgan, "Fiber-optic Chemical Sensors for In-Situ Battery Diagnostics", DOE/EPSCoR, January 1999, funded total >\$1M, SLM portion approx. \$60,000 funded from 10/99 to 9/01.
80. "Analysis of Pharmaceutical Compounds in Municipal Wastewater", J. Ferry and S. L. Morgan, May 1999-May 2000, Carolina Venture Fund, funded \$25,000 plus \$5,000 matching contributions from the SC Hazardous Waste Fund and \$5,000 from the Department of Chemistry & Biochemistry, USC.
81. "Instructional Computing in the Chemistry Laboratory," S. L. Morgan, June 2000-May 2001, University of South Carolina, College of Science & Mathematics Computer Committee, funded \$28,763.51.
82. Equipment donation, December 2000, Eastman Kodak Company (Rochester, NY), Hewlett-Packard Model 5970 gas chromatography/mass spectrometry system and Rushka Laboratories (Houston, TX) pyrolysis system; funded, est. value \$60,000.
83. "Establishment of the South Carolina Forensic Science Research and Training Center," S. L. Morgan, Research Opportunities, Vice Provost for Research, University of South Carolina, funded \$100,000, January 2001 to 31 December 2001.
84. "Laser-Pyrolysis/Gas Chromatography/Time-of-flight Mass Spectrometry for Bacterial Characterization and Detection of Small-Scale Heterogeneity in Microbial Biofilms," S. L. Morgan (PI), S. R. Goode, and A. W. Decho (Public Health), Research Opportunities, Vice Provost for Research, University of South Carolina, funded \$30,000, January 2001 to 31 December 2001.
85. Memorandum of understanding, R. B. Dunlap, T. Shaw, J. Ferry, S. L. Morgan, requesting \$100,000, submitted to Cardinal Chemical Co., Columbia, SC (Dr. Tim Ross), 16 March 2001, not funded.
86. "Characterization and Optimization of an Industrial Process for Removal of Organotin Compounds from Brine Water," S. L. Morgan, Proposal to Sustainable Universities Initiative, University of South Carolina, \$7,395.50 requested, not funded.
87. "Chiral Separations with Bipolar Membranes Modified with Molecularly Imprinted Stationary Phases," Thomas A. Davis (Chemical Engineering), Stephen L. Morgan, and Walter A. Scrivens (Chemistry & Biochemistry), Research Opportunities, Vice Provost for Research, University of South Carolina, funded \$50,000, January 2002 to 31 December 2002.
88. 'Proposal to Create the "Floyd Spence Forensic Science Research and Training Center" at the University of South Carolina,' S. L. Morgan, S. R. Goode, S. M. Angel, December 2001, \$9,173,845 requested, not funded.
89. "COSM Center of Excellence Proposal: USC Forensic Science Research and Training Center" S. L. Morgan, S. R. Goode, S. M. Angel, proposal submitted to the College of Science & Mathematics, University of South Carolina, 30 June 2002, \$4,000,080 requested, not funded.
90. "Laser-Pyrolysis/Gas Chromatography/Time-of-flight Mass Spectrometry for Characterization and Detection of Small-Scale Heterogeneity in Microbial Biofilms," S. L. Morgan, S. R. Goode, A. W. Decho, 2003 South Carolina DEPSCOR, \$846,440 requested, not funded.
91. "Rapid and portable analysis of Botulinum toxins," W. E. Brewer, S. L. Morgan, and S. M. Angel, NIH STTR proposal, 1 August 2002, \$100,000 requested, not funded.

92. "Laser Induced Breakdown Spectroscopy for the Field Detection of Gunshot Residue," S. R. Goode, S. L. Morgan, Federal Bureau of Investigation, requested \$474,647 (2002-2003), Not funded.
93. "Relative Discriminating Power of Visible, UV/Visible, and UV/Fluorescence Spectrophotometry of Dyed Textile Fibers," S. L. Morgan (PI), Federal Bureau of Investigations, funded \$272,316, 28 September 2002 to 31 August 2004.
94. "Analysis of Fiber Dyes by Raman Spectroscopy," S. L. Morgan (PI) and S. M. Angel, Federal Bureau of Investigation, funded \$300,594, 28 September 2002 to 30 April 2004.
95. "High Performance Liquid Chromatography/Mass Spectrometry/Mass Spectrometry for the Forensic Identification of Ink Components from Inkjet Printers," C. R. Mubarak and S. L. Morgan, National Institute of Justice, 10 September 2002, \$20,000 requested, not funded.
96. "New method for large volume injection in gas chromatography," A. A. Nieuwland and S. L. Morgan, National Institute of Justice, 10 September 2002, \$20,000 requested, not funded.
97. Research donation for Laser Pyrolysis/Time of Flight Mass Spectrometry, Eastman Kodak, Rochester, NY, funded \$5,000, November 2002.
98. Research donation for Laser Pyrolysis/Time of Flight Mass Spectrometry, Eastman Kodak, Rochester, NY, funded \$6,000, December 2002.
99. "Rapid Analysis of Tetrahydrocannabinol Metabolites," W. E. Brewer, W. A. Scrivens, and S. L. Morgan, NIH STTR proposal, \$60,000 requested, not funded, March 2003.
100. "Searchable Polymeric Libraries," S. L. Morgan (PI), Federal Bureau of Investigation, \$492,250 requested, not funded, 1 October 2003 to 31 September 2004.
101. "Extension of Studies in Analysis of Fiber Dyes by Raman Spectroscopy," S. L. Morgan and S. M. Angel, Federal Bureau of Investigation, funded \$159,578.
102. "Capillary electrophoresis of Fiber Dyes," S. L. Morgan (PI), Federal Bureau of Investigation, funded \$791,667, 1 October 2003 to 31 September 2004.
103. Beckmann Undergraduate Scholars program, South Carolina Honor's College, total funding unknown. Although I had little to do with the final writing of this grant, I was one of the designated mentors for this proposal that provides up to \$15-17,000 for a two year period for undergraduates to participate in undergraduate research.
104. Donation of design effort, electronics, and machine shop work for Laser Pyrolysis/Time of Flight Mass Spectrometry, Eastman Kodak, Rochester, NY, funded ca. \$50,000 value, July 2004.
105. "Environmental Effects on Textile fibers," S. L. Morgan (PI), Federal Bureau of Investigation, funded \$670,201. (1 October 2004-29 September 2005).
106. Research funds donation for Laser Pyrolysis/Time of Flight Mass Spectrometry, Eastman Kodak, Rochester, NY, funded \$10,000, December 2004-December 2005.
107. Stephen L. Morgan and Scott R. Goode, Integration of Calculators into the USC Chemistry Curriculum, College of Arts and Sciences Computer Committee, 22 April 2005, funded \$6,530 plus \$3,000 matching funds from USC.
108. Stephen L. Morgan (PI), "DNA Student Employment Program," South Carolina State Law Enforcement Division Forensic Laboratory, funded \$32,000, 1 June 2005-30 May 2006.
109. Stephen L. Morgan and Scott R. Goode (co-PIs), "Laser Pyrolysis-Gas Chromatography/Mass Spectrometry: Fundamental Studies and Applications to Spatially-Resolved Chemical Analysis," DOD/EPSPCoR, 1 July 2005, \$695,537 requested, not funded.
110. Stephen L. Morgan (PI) and Scott R. Goode, "Development of Rapid Methods for Forensic Analysis of Inks from Questioned Documents", National Institute of Justice, 8 November 2005, \$472,599 requested, not funded.
111. Stephen L. Morgan (PI), "Development of rapid and sensitive methods for forensic analysis of pesticides using ultra-performance liquid chromatography/tandem mass spectrometry", National Institute of Justice, 22 November 2005, \$457,974, requested, not funded.
112. Stephen L. Morgan (PI), "Rapid Presumptive Identification of Blood and Semen at Crime Scenes using Multivariate Optical Spectroscopy", National Institute of Justice, 29 November 2005, \$492,133, requested, not funded.
113. Stephen L. Morgan, Donation from Voridian Corporation of used capillary electrophoresis instruments, July 2005. Approximate value, \$20,000.

114. Jennifer J. Yiu and Stephen L. Morgan (mentor), 2006 Magellan Undergraduate Research Award, "Systematic Investigation for the Forensic Analysis of Fiber Dyes by Raman Microspectroscopy" funded \$3,000, 12/05-12/06.
115. Natalya O. Hall and Stephen L. Morgan (mentor), 2006 Magellan Undergraduate Research Award, "Characterization of Ball-point Pen Ink for Improvements in Document Conservation," funded \$3,000, 03/06-12/06.
116. Heather M. Taylor and Stephen L. Morgan (mentor), 2006 Magellan Undergraduate Research Award "Validation of IR Spectroscopy for Forensic Detection of Blood and Semen at Crime Scenes", funded \$3,000, 05/06-05/07.
117. Development of Pattern Recognition Software for Trace Fiber Examinations, S. L. Morgan (PI), Federal Bureau of Investigation, funded \$150,000, 1 October 2006-28 February 2008.
118. DNA Student Employment Program, South Carolina State Law Enforcement Division Forensic Laboratory, funded \$32,000 for second year, 1 June 2006-30 June 2007.
119. Stephen L. Morgan and Michael L. Myrick (PIs), Rapid Visualization of Blood and Semen at Crime Scenes using Multivariate Optical Spectroscopy (PIs), National Institute of Justice, 6 March 2006, requested \$496,983 (not funded).
120. Stephen L. Morgan (PI), Development of rapid and sensitive methods for forensic analysis of pesticides using ultra-performance liquid chromatography tandem mass spectrometry, National Institute of Justice, 6 March 2006, requested \$463,138 (not funded).
121. Kim Painter (and Stephen L. Morgan, mentor), 2006 Magellan Undergraduate Research Award (\$3,000), " Differentiation of forensic trace fiber evidence by micro-extraction followed by capillary electrophoresis/UV-visible spectrophotometry and mass spectrometry", not funded.
122. Amanda C. Kesler (Stephen L. Morgan, mentor), Howard Hughes Undergraduate Research Program, funded \$2,500, summer 2007, "Forensic Analytical Chemistry for detection of inks."
123. Jessica Michaud (Stephen L. Morgan, mentor), 2007-2008 Magellan Undergraduate Research Award (funded \$3,000), "Validation of IR Spectroscopy for Forensic Detection of Blood and Semen at Crime Scenes."
124. Ashley L. Bagwell and Stephen L. Morgan (mentor), "Automation of a Novel Extraction Method for Rapid Analysis of Drugs of Abuse in Urine", 2007-2008 Magellan Undergraduate Research Award, submitted 27 September 2007 (requested \$3,000, not funded).
125. Dorekia Schultz and Stephen L. Morgan (mentor), "Forensic Measurement of Age of Bloodstains by IR Spectroscopy", 2007-2008 Magellan Undergraduate Research Award, submitted 27 September 2007 (requested \$3,000, not funded).
126. Stephen L. Morgan and Michael L. Myrick (co-PIs), Concept paper proposal: Rapid Visualization of Biological Fluids at Crime Scenes using Optical Spectroscopy (PIs), National Institute of Justice, submitted November 2007-March 2007 (two versions of proposal submitted), requested \$476,983 (approved for submission of revised proposal).
127. Stephen L. Morgan, Proposal to the College of Arts and Sciences, Request for Instructional Computing Funds. 2 April 2007. Funding is requested for the purchase of 10 new desktop computers for the Chemistry 321L and 621L analytical instrumental analysis laboratory. \$20,000 funded.
128. Stephen L. Morgan and Michael L. Myrick (PIs), Rapid Visualization of Biological Fluids at Crime Scenes using Optical Spectroscopy (PIs), National Institute of Justice, submitted 6 March 2007, funded \$382,394 (1 August 2007-31 May 2010).
129. Stephen L. Morgan, Disposable Pipette Extraction Techniques for Drugs and Metabolites of Forensic Interest, DPX Labs, submitted 11 September 2007, funded \$6,162.
130. Micheline Goulart and Stephen L. Morgan (mentor), "Capillary Electrophoresis for the Forensic Identification of Fluorescent Brighteners on Trace Evidence Fibers," 2009 Magellan Undergraduate Research Award, funded \$3,000 by USC Research Foundation, 1 January 2009-15 May 2010.
131. Nicholas M. Riley and Stephen L. Morgan (mentor), "Validation Studies for Forensic Detection of Patent and Latent Blood Stains by Diffuse Reflectance Infrared Spectroscopy using a Sensitized Camera," 2009 Magellan Undergraduate Research Award, funded \$3,000 by USC Research Foundation, 1 January 2009-15 May 2010.

132. Amanda M. Craig and Stephen L. Morgan (mentor), 2009 Magellan Undergraduate Research Award (funded \$3,000), "Rapid qualitative identification of polymer and dye types for forensic analysis of trace fibers," 1 April 2009-15 May 2010.
133. Stephen L. Morgan, "Validation of Forensic Characterization and Chemical Identification of Dyes Extracted from Millimeter-length Fibers," 2009 Research Opportunity Program, University of South Carolina, funded \$20,000, August 2009.
134. Stephen L. Morgan, "Validation of Forensic Characterization and Chemical Identification of Dyes Extracted from Millimeter-length Fibers," National Institute of Justice, Research and Development in the Forensic Analysis of Trace Evidence, submitted 6 April 2009, \$647,728 requested, not funded.
135. Stephen L. Morgan, "Development of Rapid Methods for Forensic Analysis of Inks from Questioned Documents," National Institute of Justice, Research and Development in the Forensic Analysis of Trace Evidence, submitted 6 April 2009, \$542,161 requested, not funded.
136. Guiren Wang (PI, Mechanical Engineering, USC), Patricia A. Wood, William Hrushesky, Sharon W. Webb, Stephen L. Morgan, Philip J. Buckhaults, Franklin G. Berger, Hexin Chen, "Nano- and microfluidic chip for diagnosis of early colorectal cancer," National Institutes of Health, NIH Challenge (RC1) proposal, \$674,513 requested for 2 years, 1 June 2009; not funded.
137. Stephen L. Morgan, "Evaluation of Statistical Measures for Fiber Comparisons: Interlaboratory Studies and Forensic Databases," National Institute of Justice/Department of Justice, funded \$489,049, 1 October 2010-30 June 2013.
138. Stephen L. Morgan, "Validation of Forensic Characterization and Chemical Identification of Dyes Extracted from Millimeter-length Fibers," National Institute of Justice/Department of Justice, funded \$451,336, 1 October 2010-30 September 2013.
139. Stephen L. Morgan and Michael L. Myrick (co-PIs), "Multimode Imaging in the Thermal Infrared: Validation for Blood, Extension to Latent Prints," Sensor, Surveillance and Biometric Technologies for Criminal Justice Applications: Evidence Identification at the Crime Scene, U. S. Department of Justice, National Institute of Justice, funded \$667,388, 1 October 2011-30 September 2013.
140. Lauren E. Stephens, Stephen L. Morgan (mentor) and Qian Wang (co-mentor), "Protein-based Mass Spectrometric Investigation of Breast Cancer Cell Lines," 2011 Magellan Undergraduate Research Award, funded \$2,500 by USC Research Foundation, 1 May 2011-15 August 2012.
141. Andrei Kovaltshuk and Stephen L. Morgan (mentor), "Forensic Characterization of Dye Extracts from Millimeter-Length Textile Fibers," 2011 Magellan Undergraduate Research Award, funded \$2,500 by USC Research Foundation, 1 May 2011- 15 August 2012.
142. Qian Wang (PI) and Stephen L. Morgan (Co-PI), "Rapid Multi-Pathogen Profiling of Human Sera by MALDI-TOF MS," pre-application proposal to Department of Defense Congressionally Directed Medical Research Programs (CDMRP), Military Infectious Diseases Applied Research Award, \$2,000,000 requested for four years, 13 September 2011, not funded.
143. L. Andrew Lee, Qian Wang, and Stephen L. Morgan, "Rapid Profiling of Human Antisera with Enteropathogen Antigens by MALDI-TOF MS," SBIR proposal from A&Q NanoDesigns, LLC Topic No. A11-125 Proposal No. A113-125-0053, 13 October 2011, not funded.
144. William J. Huntington and Stephen L. Morgan (mentor), "Forensic Detection of Latent Blood by Raman Spectroscopy," USC Magellan Undergraduate Research Award (requested \$3,000, 10/18/11, not funded).
145. Alexis N. Keller and Stephen L. Morgan (mentor), "Infrared Spectroscopy for Non-destructive Remote Detection of Latent Fingerprints," Magellan Undergraduate Research Award, funded \$3,000, 12/11-5/12.
146. James R. Hebert (PI, School of Public Health, USC), "The Paradox of Racial Disparities in Esophageal Squamous Cell Cancer Rates, (Co-PIs: James Chapman, Pharmacy; Michael Wyatt, Pharmacy; Kevin Carnevale, Pathology, Microbiology, and Immunology; Stephen L. Morgan, Chemistry & Biochemistry; Kim Creek, Pharmacy; Thomas Hurley, Public Health; Nitin Shivappa, Public Health; Stephen Lloyd, South Carolina Medical Endoscopy; Stephen Hecht, University of Minnesota), National Institute of Health, NIH Director's Transformative Research Awards (R01), 1 February 2012, amount requested: \$1,541,095, 9/01/2012-8/31/2015; not funded.

147. Stephen L. Morgan (PI) and Eric M. Breitung (Co-PI, Library of Congress), "Development and validation of infrared spectroscopy as a rapid, nondestructive tool for determining the degradation state of magnetic tape," Institute of Museum and Library Services, National Leadership Grant, 2 February 2012, funded: \$498,812, 10/01/2012-9/30/2015. Collaborators: Moving Images Research Collection, USC; Museum of Modern Art (New York); National Public Radio (Washington, DC).
148. Edward G. Bartick (P.I.), Stephen L. Morgan, John G. Goodpaster, "A Statistical Approach to the Evaluation of the Significance of Trace Class Evidence as Applied to Carpet Fibers," U. S. Department of Justice, National Institute of Justice, requested \$231,141 (Morgan portion), \$750,000 (total requested) 1 October 2012-30 September 2014; not funded.
149. Eric J. Bringley and Stephen L. Morgan (Mentor), "Identification of audio tape degradation using infrared spectroscopy with mass spectrometric validation," Magellan Undergraduate Research Award, funded \$3,000, 05/13-5/14.
150. Adam Glenn, Dr. Scott Gwara (Mentor, English), and Stephen L. Morgan (Mentor), "The Color of Prayer: Pigment Analysis of Three Medieval Illuminated Manuscripts," funded \$2,500, 1 January 2014-15 May 2015.
151. Alena Bensussan and Stephen Morgan (Mentor), "Attenuated Total Reflectance Fourier Transform Infrared Analysis of Blood Stains on Fabric," Magellan Undergraduate Research Award, requested \$3,000, 15 February 2014, not funded.
152. Edward G. Bartick (P.I.), Stephen L. Morgan, and Harold A. Deadman, "Carpet Fiber Database and Statistical Evaluation of Forensic Comparisons," U. S. Department of Justice, National Institute of Justice, requested ~\$550,000, 1 October 2013-30 September 2015; not funded.
153. Mackenzie Matney and Stephen L. Morgan (Mentor), "Environmentally Weathered Fabric Identification," Magellan Undergraduate Research Award, funded \$2,500, 16 May 2014-15 May 2015.
154. Stephen L. Morgan (PI), Dr. Michael L. Myrick, Dr. David B. Hitchcock, Dr. William E. Brewer, "Development and Statistical Validation of Forensic Analytical Methodology: Research and Training," request for Stage 1 funding for a Research Engagement Collaborative, USC Provost Office, 15 September 2014, requested \$23,000, not funded.
155. Katherine A. Witherspoon and Stephen L. Morgan (Mentor), "Quantitative Analysis of the Luminol Bloodstain Reaction," Magellan Undergraduate Research Award, funded \$1,500, 1 January 2015-15 May 2015.
156. Edward G. Bartick (PI) and Stephen L. Morgan, Drug Screening and Identification Confirmation
157. Using a Handheld Raman Spectrometer, U.S. Army, 7 March 2015, \$126,000 requested, not funded.
158. Edward G. Bartick (PI) and Stephen L. Morgan Automotive Carpet Fiber Database and Statistical Evaluation of Forensic Comparisons, National Institute of Justice, 1 October 2015-30 September 2017, requested \$585,043, submitted 7 April 2015, not funded.
159. Extension approved for Stephen L. Morgan (PI) and Eric M. Breitung (Co-PI, Library of Congress), "Development and validation of infrared spectroscopy as a rapid, nondestructive tool for determining the degradation state of magnetic tape," Institute of Museum and Library Services, National Leadership Grant, 2 February 2012, funded: \$498,812, 10/01/2012-9/30/2015. Collaborators: Moving Images Research Collection, USC; Museum of Modern Art (New York); National Public Radio (Washington, DC).
160. Jessica Rotheiser, Trett Burdette, and Stephen L. Morgan (Mentor), "Infrared Spectroscopy Detection of Magnetic Tape Degradation," Magellan Undergraduate Research Award, funded \$4,000, 6 April 2016-15 May 2017.
161. Michael L. Myrick, Stephen L. Morgan, and Edsel Pena, "Adaptive Optical Sensing for Big Data Chemical Calibrations," National Science Foundation, 31 October 2016, 677,302 requested, pending.

Research Funding Summary, 1977-2016

<u>Funding Source</u>	<u>Amount</u>	<u>Period</u>	
USC/Magellan/Undergraduate	\$4,000	2015-2016	
USC/Magellan/Undergraduate	\$1,500	2014-2015	
USC/Magellan/Undergraduate	\$2,500	2014-2015	
USC/Magellan/Undergraduate	\$2,500	2014-2015	Gwara
USC/Magellan/Undergraduate	\$3,000	2013-2014	
Institute of Museum and Library Services	\$498,812	2012-2016	
USC/Magellan/Undergraduate	\$2,500	2011-2012	
National Institute of Justice	\$667,388	2011-2015	Myrick
USC/Magellan/Undergraduate	\$2,500	2011-2012	
USC/Magellan/Undergraduate	\$2,500	2011-2012	Wang
National Institute of Justice	\$451,336	2010-2012	
National Institute of Justice	\$489,049	2010-2011	
USC/Magellan/Undergraduate	\$3,000	2010-2011	
USC/Magellan/Undergraduate	\$3,000	2010-2011	
USC/Research Opportunities	\$20,000	2010-2011	
USC/Magellan/Undergraduate	\$3,000	2009-2010	
USC/Magellan/Undergraduate	\$3,000	2009-2011	
USC/Magellan/Undergraduate	\$3,000	2009-2010	
DPX Labs (Columbia, SC)	\$6,162	2007-2008	Brewer
National Institute of Justice	\$382,394	2007-2010	Myrick
USC/Magellan/Undergraduate	\$3,000	2007-2008	
USC/Magellan/Undergraduate	\$2,500	2007-2008	
State law Enforcement Division	\$32,000	2005-2007	
FBI	\$150,000	2006-2008	
USC/Magellan/Undergraduate	\$3,000	2006-2007	
USC/Magellan/Undergraduate	\$3,000	2006-2007	
State law Enforcement Division	\$32,000	2005-2006	
Eastman Kodak	\$10,000	2004-2005	Goode
FBI	\$670,201	2004-2008	
FBI	\$159,578	2004-2006	Angel
FBI	\$791,667	2004-2007	
Eastman Kodak	\$6,000	2002-2003	Goode
Eastman Kodak	\$5,000	2002-2003	Goode
FBI	\$300,594	2002-2004	Angel
FBI	\$272,316	2002-2004	
USC/Research Opportunities	\$50,000	2002-2003	
USC/Research Opportunities	\$30,000	2001-2002	
USC/Research Opportunities	\$100,000	2001-2003	
Carolina Venture Fund/SC	\$30,000	1999-2000	Ferry
DOE/EPSCoR	\$60,000	1999-2001	
DOE/EPSCoR	\$80,000	1997-1999	

DoD/ONR	\$434,000	1997-2001	Goode
National Institute of Justice	\$200,025	1997-2001	
USC Cancer Center	\$15,000	1996-1997	
FBI	\$9,605	1996-1997	
DoD/EPSCoR	\$79,000	1995-1997	
USC Provost	\$7,500	1994-1995	
Army Research Office	\$100,000	1991-1992	Fox
American Cancer Society	\$2,000	1990-1991	
Army Research Office	\$360,000	1988-1991	Fox
DoD with USC matching	\$202,505	1986-1987	Fox
National Institute of Health	\$160,000	1986-1989	Fox
National Institute of Health	\$148,077	1986-1988	
RPI/Exxon	\$2,500	1984-1985	
Eli Lilly	\$3,800	1985-1986	Bryan
Army Research Office	\$246,371	1985-1988	Fox
Veterans' Admin. Res. Service	\$25,000	1984-1985	
Waters Associates	\$65,000	1984-1985	
National Science Foundation	\$42,000	1984-1985	Fox
RPI/Exxon	\$2,750	1984-1985	
Smith, Kline & French	\$21,000	1982-1983	Bryan
National Institute of Health	\$104,835	1983-1986	Fox
NIH Biomedical Research	\$4,000	1982-1983	
RPI/Exxon	\$26,000	1981-1982	
NSF EPSCoR	\$100,000	1981-1984	
National Institute of Health	\$162,340	1980-1982	
NIH Biomedical Research	\$4,914	1978-1979	
USC/RPS	\$1,000	1977-1978	
1977-2016, Total,	\$7,871,219		
Average per year	\$201,826		

PUBLICATIONS

1. S. N. Deming and S. L. Morgan, "Simplex optimization of variables in analytical chemistry," *Analytical Chemistry* **1973**, 45(3), 278A-283A.
2. S. L. Morgan and S. N. Deming, "Simplex optimization of analytical chemical methods," *Analytical Chemistry* **1974**, 46(9), 1170-1181.
3. P. G. King, S. L. Morgan, and S. N. Deming, "Difficulties in the application of simplex optimization to analytical chemistry," *Analytical Letters* **1975**, 8(5), 369-376.
4. S. L. Morgan and S. N. Deming, "Optimization strategies for the development of gas-liquid chromatographic methods," *Journal of Chromatography* **1975**, 112, 267-285; also published in "Proceedings of the 10th International Symposium (Advances in Chromatography)", A. Zlatkis, Ed., Munich, West Germany, 4 November 1975, Elsevier, Amsterdam, 1975.
5. L. R. Parker, Jr., S. L. Morgan, and S. N. Deming, "Simplex optimization of experimental factors in atomic absorption spectrometry," *Applied Spectroscopy* **1975**, 29(5), 429-433.
6. S. L. Morgan and S. N. Deming, "Experimental optimization of chromatographic systems," *Separation and Purification Methods* **1976**, 5(2), 333-360.
7. S. N. Deming, S. L. Morgan, M. R. Willcott, III, "Sequential simplex optimization," *American Laboratory* **1976**, 8(10, October), 13-19.
8. A. S. Olansky, L. R. Parker, Jr., S. L. Morgan, and S. N. Deming, "Automated development of analytical chemical methods," *Analytica Chimica Acta: Computer Techniques and Optimization* **1977**, 95, 107-133.
9. S. L. Morgan and C. A. Jacques, "Response surface evaluation and optimization in gas chromatography," *Journal of Chromatographic Science* **1978**, 16(10), 500-505.
10. S. N. Deming and S. L. Morgan, "The use of linear models and matrix least squares in clinical chemistry," *Clinical Chemistry* **1979**, 25(6), 840-855.
11. S. N. Deming and S. L. Morgan, "A response to comments on the necessity of a priori design considerations in experimental statistical determination of deviation from linearity," *Clinical Chemistry* **1979**, 25(12), 2053.
12. S. N. Deming and S. L. Morgan, "Comment on linear models article," *Clinical Chemistry* **1980**, 26(8), 1227.
13. C. A. Jacques and S. L. Morgan, "A precolumn cold trap and rapid reinjection system for pyrolysis gas chromatography with capillary columns," *Journal of Chromatographic Science* **1980**, 18(12), 679-683.
14. J. R. Hudson and S. L. Morgan, "Glass capillary T-connections for high resolution GC," *Journal of High Resolution Chromatography & Chromatographic Communications* **1981**, 4(4), 186-187.
15. R. J. Matthews, S. R. Goode, and S. L. Morgan, "Characterization of an enzymatic determination of arsenic using response surface methodology," *Analytica Chimica Acta: Computer Techniques and Optimization* **1981**, 133, 169-182.
16. S. L. Morgan, "HP-97 and HP-41C programs for the computation of acid-base species distribution," *PPC Calculator Journal* **1981**, 8(6), 41-44.
17. J. R. Hudson, S. L. Morgan, and A. Fox, "Quantitative pyrolysis gas chromatography mass spectrometry of bacterial cell walls," *Analytical Biochemistry* **1982**, 120, 59-65.
18. J. R. Hudson, S. L. Morgan, and A. Fox, "Preparation of high resolution glass capillary columns for the gas chromatographic analysis of alditol acetates of neutral and amino sugars," *Journal of High Resolution Chromatography & Chromatographic Communications* **1982**, 5(6), 285-290.
19. S. L. Morgan and C. A. Jacques, "Characterization of simple carbohydrate structure by glass capillary pyrolysis gas chromatography and cluster analysis," *Analytical Chemistry* **1982**, 54(4), 741-747.
20. S. L. Morgan, "Experimental design and computer modeling: Applications in chemistry," in: *Proceedings of the 1982 Scientific Conference*, Corn Refiners Association, Washington, D.C., 1982, pp. 251-280.
21. S. L. Morgan and A. Fox, "Chemotaxonomic characterization of microorganisms and chemical detection of infectious diseases by capillary GC, Pyrolysis GC-MS, and Solid Phase RIA," in *Proceedings of the Second Biodetection Workshop*, Army Research Office, Raleigh, NC, July, 1982.
22. S. N. Deming and S. L. Morgan, "Teaching the fundamentals of experimental design," *Analytica Chimica Acta* **1983**, 150, 183-198.
23. A. Fox, S. L. Morgan, J. R. Hudson, Z. T. Zhu, and P. Y. Lau, "Capillary gas chromatographic analysis of alditol acetates of neutral and amino sugars in bacterial cell walls," *Journal of Chromatography* **1983**, 256, 429-438.

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35. R. S. Whiton, S. L. Morgan, J. Gilbert, and A. Fox, "Modifications in the alditol acetate method for the analysis of muramic acid and other neutral and amino sugars by capillary gas chromatography-mass spectrometry," *Journal of Chromatography* **1985**, 347, 109-120.
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4. A. Fox, S. L. Morgan, L. Larsson, and G. Odham, (Editors), *Analytical Microbiology Methods: Chromatography and Mass Spectrometry*, Plenum Press, NY, 1990; ISBN 0-306-43536-5. [URL: <http://www.amazon.com/Analytical-Microbiology-Methods-Fox/dp/0306435365>]. I edited this multi-author volume, a product of the first International Symposium on Analytical Microbiology that I organized with Alvin Fox at the University of South Carolina in 1989. This conference helped to establish the growing field of analytical microbiology.
5. F. S. Walters, L. R. Parker, Jr., S. L. Morgan, and S. N. Deming, *Sequential Simplex Optimization for Quality & Productivity in Research, Development, and Manufacturing*, CRC Press, Boca Raton, FL, 1991. This book is cited by <http://mathworld.wolfram.com/Nelder-MeadMethod.html> and many other chemometrics sources, including in documentation for commercial products such as *Multisimplex* and the *Unscrambler*. Also cited by T. Öberg, "Introducing Chemometrics to Graduate Students," *J. Chem. Educ.*, **2006**, **83** (8), 1178. The *Amazon* page description reads: "The only book on the market devoted to sequential simplex optimization. This book presents an easy-to-learn, effective optimization technique that can be applied immediately to many problems in the real world. The sequential simplex is an evolutionary operation (EVOP) technique that uses experimental results-it does not require a mathematical model. The authors present their subject with a level of detail and clarity that is refreshingly welcome in a technical text. The basics are presented first, followed by a detailed discussion of the fine points needed to get the most out of this optimization technique. Worksheets are provided and their use is illustrated with step-by-step worked examples. This makes the logic and calculations of the simplex algorithms easy to understand and follow. The text also provides more than 200 figures and over 500 references to sequential simplex applications, which allows rapid access to specific examples of the use of the technique in a wide range of applications. *Sequential Simplex Optimization: A Technique for Improving Quality and Productivity in Research, Development, and Manufacturing* is essential for any student or professional who desires to learn this innovative technique quickly and easily."
6. S. N. Deming and S. L. Morgan, *Experimental Design: A Chemometric Approach*, 2nd revised and expanded edition, Elsevier Science Publishers, Amsterdam, 1993. 454 pages. ISBN 0-444-42734-1. Amazon URL: [http://www.amazon.com/Experimental-Design-Chemometric-Approach-Technology/dp/0444891110/ref=sr_1_1?ie=UTF8&s=books&qid=1290101724&sr=1-1]. Also available at Google books and on Amazon *Kindle*. Reviewed at *Analytical Chemistry* as "...an exceptionally lucid, easy-to-read presentation... would be an excellent addition to the collection of every analytical chemist. I recommend it with great enthusiasm." This second edition and the first edition are widely cited in chemometrics texts and research publications, and have been used as texts for graduate courses in chemometrics. The *Amazon* page description reads: "Now available is the second edition of a book which has been described as "...an exceptionally lucid, easy-to-read presentation... would be an excellent addition to the collection of every analytical chemist. I recommend it with great enthusiasm." (*Analytical Chemistry*). The scope of the first edition has been revised, enlarged and expanded. Approximately 30% of the text is new. The book first introduces the reader to the fundamentals of experimental design. Systems theory, response surface concepts, and basic statistics serve as a basis for

the further development of matrix least squares and hypothesis testing. The effects of different experimental designs and different models on the variance-covariance matrix and on the analysis of variance (ANOVA) are extensively discussed. Applications and advanced topics (such as confidence bands, rotatability, and confounding) complete the text. Numerous worked examples are presented. The clear and practical approach adopted by the authors makes the book applicable to a wide audience. It will appeal particularly to those with a practical need (scientists, engineers, managers, research workers) who have completed their formal education but who still need to know efficient ways of carrying out experiments. It will also be an ideal text for advanced undergraduate and graduate students following courses in chemometrics, data acquisition and treatment, and design of experiments.”

SHORT COURSE TEXTBOOKS

1. S. N. Deming and S. L. Morgan, *Sequential Simplex Optimization*, Educational Activities Division, American Chemical Society, Washington, D.C., 210 pages, revised, 1975-2007. A 200-page course manual for a two-day intensive short course.
2. S. N. Deming and S. L. Morgan, *Fundamentals of Experimental Design*, Educational Activities Division, American Chemical Society, Washington, D.C., 400+ pages, 1981-2016. A 400+-page course manual for a three-day intensive short course. URL: <http://proed.acs.org/course-catalog/courses/experimental-design-for-productivity-and-quality-in-research-development/>.
3. S. N. Deming and S. L. Morgan, *Fundamentals of Experimental Design*, ACS Audio Course C-88, American Chemical Society, Washington, D.C., 1986.
4. S. N. Deming and S. L. Morgan, *Sequential Simplex Optimization*, ACS Audio Course C-97, American Chemical Society, Washington, D.C., 1987-2007, 200 page text, includes computer program diskette.
5. S. N. Deming and S. L. Morgan, *Statistical Analysis of Laboratory Data*, Educational Activities Division, American Chemical Society, Washington, D.C., 500+ pages, 1993-2016. A 500+-page course manual for a three-day intensive short course. URL: <http://proed.acs.org/course-catalog/courses/statistical-analysis-of-laboratory-data/>.
6. S. N. Deming and S. L. Morgan, *Basic Statistical Analysis of Laboratory Data*, American Chemical Society, Washington, D.C., 1998-2002. This was the first Self-Paced American Chemical Society Internet Course. The 15 modules comprise approx. 1800 web pages.
7. S. N. Deming and S. L. Morgan, *Statistics for Implementing Q1E: Evaluation of Drug Stability Data*, continuing education short course, 2002-2007, Statistical Designs, Houston, TX. (URL: <http://www.statisticaldesigns.com>).
8. Stephen L. Morgan, *Chromatography: The Separation Science*, Department of Chemistry & Biochemistry, The University of South Carolina, Columbia, SC, 1995-2010; Self-published text for the graduate course, Chemistry 723 (<http://www.chem.sc.edu/analytical/chem723>) at the University of South Carolina, 25 chapters, 450+ pages. The text is a graduate level introduction to separation methods including distillation, extraction, gas liquid chromatography, and liquid chromatography. These laboratory techniques are used to accomplish separations of complex mixtures in diverse areas such as quality control of petrochemicals, analysis of water and air samples for environmental pollution, and characterization of biological samples. I am considering publication of this book.
9. S. N. Deming and S. L. Morgan, *Statistical Analysis of Laboratory Data*, American Chemical Society, Washington, D.C., 1998-2003. This was one of the first ACS Internet Courses. The 15 modules comprise approx. 1800 web pages. Sessions of the course were taught as instructor-led on-line courses using WEBEX from September 1998-2003 (<http://www.proed.acs.org/>).
10. S. L. Morgan, John V. Goodpaster, Dr. Edward G. Bartick, *The Use of Multivariate Statistics in Trace Evidence Examinations*, Manual for full-day workshop, 2009 NIJ/FBI Trace Evidence Symposium, Clearwater, FL, 8 August 2009, 166 pages.

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11. Stephen L. Morgan, John V. Goodpaster, Edward G. Bartick, *Statistical Methods for Forensic Decision-Making*, Manual for full-day workshop, 2011 NIJ/FBI Trace Evidence Symposium, Kansas City, KS, 7 August 2011, 188 pages.
 12. S. L. Morgan, John V. Goodpaster, Dr. Edward G. Bartick, *Statistical Methods for Forensic Decision-Making*, full-day workshop, 2011 NIJ/FBI Trace Evidence Symposium, Kansas City, KS, 7 August 2011. At the plenary introductory session of the August 2011 NIJ/FBI Trace Evidence Symposium [<http://projects.nfstc.org/trace/2011/agenda.htm>], Professor Michael Risinger of the Seton Hall University School of Law (also lawyer for the Innocence Project), referred to this workshop in his talk [http://projects.nfstc.org/trace/2011/videos/Day1DebatingMerits_MichaelR_309.html]:

“You should attend a program on statistical concepts by Stephen Morgan. I attended an all-day program yesterday. He is the master at taking very complicated mathematical concepts and putting them into understandable graphical representations, and I recommend that if he gives that program again, you go to it.”
 13. S. L. Morgan, John V. Goodpaster, *Statistical Methods for Forensic Decision-Making*, Manual for full-day workshop, 2015 NIJ/FBI Trace Evidence Symposium, San Antonio, TX, 24 August 2015, 197 pages.
 14. S. L. Morgan, *Statistics for Decision-making in Toxicology*, Manual for full-day workshop presented at the Society of Forensic Toxicologists Annual Meeting, Atlanta, GA, 20 October 2015.
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COMPUTER SOFTWARE

1. S. N. Deming and S. L. Morgan, “Synthesis-I, a computer program for Optimizing Synthetic Chemical Reactions,” *Statistical Programs*, Houston, TX, 1984.
 2. S. N. Deming and S. L. Morgan, “Synthesis-II, a computer program for the Simultaneous Optimization of Several Synthetic Chemical Reactions,” *Statistical Programs*, Houston, TX, 1984.
 3. S. N. Deming and S. L. Morgan, “t- and F-tests, a Computer Program for Statistical Hypothesis Testing,” *Statistical Programs*, Houston, TX, 1984.
 4. S. N. Deming and S. L. Morgan, *Instrumentune-up* (a Computer Program for Improving Instrument Response, Elsevier Scientific Software, Amsterdam, 1984. Two versions in print (Apple II and IBM PC). IBM PC version, ISBN 0-444-42330-3, 85 pages.
 5. S. N. Deming and S. L. Morgan, “Simplex-V, an interactive program for Sequential Simplex Optimization”, *Statistical Programs*, Houston, TX, 1986.
 6. S. L. Morgan, “MatFit, a program for regression analysis and analysis of variance for linear models,” Morgan Consulting & Software, Columbia, SC, 1988-2000.
 7. S. L. Morgan, FIBEX, a tool for the exploration of patterns and relationships in fiber spectra using principal component and linear discriminant analysis, Version 2.0228 (released 28 February 2008); a product related to a research grant from the Trace Evidence Laboratory, Federal Bureau of Investigation, Quantico, VA.
 8. S. L. Morgan, SPX, a tool for the exploration of patterns and relationships in spectral data using principal component and discriminant analysis, Version 3 February 2012.
 9. S. L. Morgan, CALX, a tool for calibration validation with weighted least squares, Version: 8 September 2015.
 10. David Birt and Stephen L. Morgan, A Microsoft SQL Web-based program for a Forensic Trace Fiber Spectral Database. A paper is in preparation for publication.
 11. Nathan Fuenfing, and Stephen L. Morgan, “MATSA: A User Friendly Software Program for magnetic audio tape Spectra Analysis. A paper in preparation for submission (8/2016).
 12. Nathan Fuenfing, and Stephen L. Morgan, “FiSCoTo: Fiber Spectrum Comparison Tool. A paper in preparation for submission (10/2016).
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PATENT DISCLOSURES

1. S. L. Morgan S. R. Goode, N. R. Meruva, and L A. Metz, Patent disclosure for "A method to identify microscopic quantities of organic components in biological, forensic, synthetic, and natural materials," September 2002. The provisional patent disclosure was evaluated and assigned to 'category 2' for USC to assume responsibility for patent rights. Two companies (Agilent and Eastman Kodak) expressed interest in the invention.
 2. Michael L. Myrick, Heather Brooke, Stephen L. Morgan. Patent application title: Chemically-Selective Detector and Methods Relating Thereto, Patent application number: 20090250613 (URL: <http://www.faqs.org/patents/app/20090250613>). This patent was been licensed to one company for limited applications, and partial rights sold to another company.
 3. Myrick, M. L.; Brooke, H.; Morgan, S. L.; Baranowski, M.; McCutcheon, J. Multi-mode Imaging in the Thermal Infrared for Chemical Contrast Enhancement. Patent 8,823,802. USC 00811. September 9, 2014.
 4. Myrick, M. L.; Brooke, H.; Morgan, S. L.; Baranowski, M.; McCutcheon, J. Detecting Surface Stains Using High Absorbance Spectral Regions in the mid-IR. Patent 13/695,831 (US), 2,798,312 (Canada), 121986.1 (UK), 112011101565.8 (Germany). USC 00826. February 22, 2013.
 5. Myrick, M. L.; Brooke, H.; Morgan, S. L.; Baranowski, M.; McCutcheon, J. Detecting Heat Capacity Changes Due to Surface Inconsistencies using High Absorbance Spectral Regions in the mid-IR. Patent 13/695,835 (US), 2,798,255 (Canada), 1219865.1 (UK), 112011101562.3 (Germany). USC 00827. February 22, 2013.
 6. Cassidy, B. M.; Lu, Z.; Witherspoon, K. A.; Bensussan, A.; Martin J.; DeJong, S. A.; O'Brien, W.; Morgan, S. L.; Myrick, M. L. A Reproducible Sample Preparation Method for Quantitative Stain Detection. Provisional Patent USC-467-P (1146), April 25, 2015. Application filed 4/22/2016, Appl. Serial No. 15/136,217.
 7. Lu, Z.; Cassidy, B. M.; Witherspoon, K., DeJong, S. A.; Raymond, B.; Morgan, S. L.; Myrick, M. L. A Reproducible Sample Preparation Using 3D Printing. Provisional Patent USC-467-P (1152), April 25, 2015.
 8. O'Brien, W.; Myrick, M.; Cassidy, B.; Belliveau, R.; Lu, Z. Methods of Detecting Latent Stains on a Surface. Patent 14/158,075. USC 01006. January 17, 2014.
 9. O'Brien, W.; Myrick, M.; Boltin, N.; Hoy, S. J.; Morgan, S. L. Infrared Light Sources and Methods of Their Use and Manufacture. Patent 14/175,201. USC 00988. February 10, 2014.
 10. Lu, Z.; Cassidy, B. M.; Witherspoon, K., DeJong, S. A.; Raymond, B.; Morgan, S. L.; Myrick, M. L. A Reproducible Sample Preparation Using 3D Printing. Provisional Patent USC-467-P (1152), April 25, 2015.
 11. O'Brien, W.; Myrick, M.; Cassidy, B.; Belliveau, R.; Lu, Z. Methods of Detecting Latent Stains on a Surface. Patent 14/158,075. USC 01006. January 17, 2014.
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WEB SITES

My research group web page to document my research and teaching activities and to provide educational assistance to analytical chemistry students at USC

(<http://www.chem.sc.edu/faculty/morgan>). I also have a Chemistry & Biochemistry sponsored page at http://sc.edu/study/colleges_schools/chemistry_and_biochemistry/our_people/morgan_stephen.php.

I created and maintained a web page to support analytical chemistry at USC

[<http://www.chem.sc.edu/analytical>]. This site has supported undergraduate chemistry courses taught by the analytical division faculty (Chemistry 112, 321, 401, 621, 622, 723, 729). I have also created web sites specifically to support the teaching of quantitative analysis and instrumental analysis. In 2010, with Dr. Myrick's assistance, I dictated an Adobe Breeze web research presentation for the USC Chemistry analytical division which is available at this site as well at <http://breeze.sc.edu/ac>.

The Chemical Hygiene Plan that I authored for the Department of Chemistry & Biochemistry at USC

[<http://www.chem.sc.edu/faculty/morgan/safety/>] is used in a modified form by several academic departments and organizations across the country, including the Forensic Laboratory of the State Law Enforcement Division

(Columbia, SC). The link to the above safety page appears on the second page of hits on 'chemical hygiene plan' search on Google.

An on-line paper at ChemConf'98 on teaching forensic analytical chemistry at USC was the number 1 hit on the Google search for 'forensic analytical chemistry' for more than 10 years. The former link to the presentation was [<http://www.inform.umd.edu/EdRes/Topic/Chemistry/ChemConference/ChemConf98/>], but is no longer active. Copies available on request.

My tutorial [<http://www.chem.sc.edu/faculty/morgan/resources/sigfigs>] on the use of significant figures in calculations has been consistently among the first several top hit on a Google search of the phrase 'Tutorial on the use of significant figures' since the 1990's. I typically respond to about 10-20 email messages a month from high school and college students, chemistry and physics educators, and working professionals on this topic. With my permission, multiple copies in PPT or PDF format are available on the web at various universities.

My tutorial on acid-base equilibria is the top hit for 'acid-base equilibria tutorial' on Google:[<http://www.chem.sc.edu/faculty/morgan/resources/acidbase>].

My presentation on "Chemical Warfare: History and Chemistry is also in the top several hits on a Google search for 'chemical warfare history' [<http://www.chem.sc.edu/faculty/morgan/resources/cw/cw.pdf>]. This lecture was presented on 19 February 2002, in a Physics 599 course at USC (organized by Dr. Joe Johnson).

NEWS ARTICLES AND OTHER ACHIEVEMENTS:

1. Mary D. Warner, Associate Editor, Analytical Chemistry, Editorial review (of research by S. L. Morgan and A. Fox), "Identification of microorganisms by GC/MS," *Analytical Chemistry* **1986**, 58, 1310A-1316A.
2. Michael J. Root, "Biotechnology breeds new diagnostic probes," review (of research by S. L. Morgan and A. Fox), *Industrial Chemist*, 38-42, December 1987.
3. "Criminals Beware: USC Researchers Work to Perfect Forensic Techniques to Nab the Bad Guys," *USC Times*, article, 9 January 1998.
4. S. L. Morgan, Strengthening Pattern Recognition Methods for Identifying Toner Samples and Other Trace Evidence, *NIJ Journal*, 2003.
5. Pat Berman, "The Smallest Witness," *The State Newspaper*, Columbia, SC, 9 January 2003, pages D1-D3.
6. My research was profiled in the COSMOS, "Making Careers in Forensic Science: Graduate Students Find Unique and Exciting Research Opportunities at USC," Summer 2004, the newsletter of the College of Science & Mathematics, University of South Carolina, Columbia, SC.
7. Brittany Hartzell-Baguley, Rachael Hipp, Neal R. Morgan, Stephen L. Morgan. "GC-MS Characterization of Chemical Composition in Latent Fingerprints," paper 1700-2 presented at the 57th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Orlando, FL, 14 March 2006. This paper was cited in the 3 April 2006 issue of *Chemical & Engineering News* in their summary article, "Private Eye in the Lab," on PittCon 2006. This full article can be accessed at: [URL: http://www.chem.sc.edu/faculty/morgan/students/images/CEN_040306.pdf].
8. An article about undergraduate research at USC in the *Carolinian Magazine*, spring 2006 issue, mentioned the work of Rachael E. Hipp, a USC undergraduate in the Morgan lab. Her work with Dr. Hanno zur Loye was also highlighted. Rachael has four research publications at this time based on her work at USC (one from the Morgan laboratory). [URL: <http://www.chem.sc.edu/faculty/morgan/students/images/RachaelHipp2006.jpg>].
9. Following the ACS Division of Analytical Chemistry Symposium, "Analytical Chemistry for Crime Scene Investigation," organized and chaired by Dr. Morgan at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy (New Orleans, LA, 4 March 2008), *Chemical and Engineering News* published a cover

story article (24 March 2008). [URL: <http://pubs.acs.org/cen/coverstory/86/8612cover3.html>].

10. An article on the Myrick and Morgan project for blood stains detection by thermal IR imaging was published in the *NIJ Annual Report*, 2007-2008, July 2008 [URL: <http://www.ncjrs.gov/pdffiles1/nij/223597.pdf>].

11. "Chemistry professors developing camera for crime-scene blood detection," article about Morgan and Myrick research to develop IR detection of blood stains, *USC Times*, June 2008. [URL: http://www.sc.edu/usctimes/articles/2008-06/blood_detecting_camera.html].

12. The University of South Carolina released a news item on the Innovista web site on 18 June 2008, "Chemistry professors developing camera for crime-scene blood detection." [URL: <http://innovista.sc.edu/news/20080618.aspx>].

13. Following the publication of three papers in the journal *Analytical Chemistry* describing our forensic blood imaging research, the American Chemical Society published a press release on 11 November 2010. [The following URL, because of its length, requires cutting and pasting into the address dialog box of a web browser:

http://portal.acs.org/portal/acs/corg/content?nfpb=true&pageLabel=PP_ARTICLEMAIN&node_id=223&content_id=CNBP_026046&use_sec=true&sec_url_var=region1&uuid=e23dbfb6-547b-4aee-99ae-c3c5f4c3b043.

14. The University of South Carolina published a news release (15 November 2010), "Chemistry Researchers Create New Tool to Visualize Blood Stains," on the USC Media Relations web site [URL: <http://www.sc.edu/news/newsarticle.php?nid=1409>]. This news item includes a video demonstration of the forensic imaging instrument running in Professor Myrick's laboratory, along with an interview with graduate student Megan Baranowski Pearl. The story link was also on the *University News* list at the USC web page for two weeks.

15. New Scientist [URL: <http://www.newscientist.com/article/dn19722-blood-camera-to-spot-invisible-stains-at-crime-scenes.html>] has published a news item on the forensic blood imaging project by the Morgan and Myrick groups (12 November 2010). Other news organizations have also picked up the story including SC Public Radio, and Discovery Channel/Canada.].

16. Dr. Morgan was interviewed concerning our thermal imaging of blood work on Ali Velshi's CNN *PM Newsroom* program for the segment titled *The Big I* on Monday, 22 November 2010, at 1:45pm. The video was posted on *You Tube*.

17. Dr. Morgan was interviewed concerning the Myrick and Morgan project for infrared blood stain detection for the *Carolina Minute* radio program on 29 November 2010 . Three one-minute interviews [[1](#), [2](#), [3](#)] were broadcast by the local NPR Affiliate, SC Public Radio.

18. A local Columbia SC TV station, WLTX, did a video interview with Dr. Morgan and graduate student Megan Baranowski Pearl in Dr. Myrick's laboratory in front of our prototype instrument. The interview will be broadcast on the WLTX *Evening News* on Monday, 29 November 2010 URL: <http://www.wltx.com/news/story.aspx?storyid=110006>].

19. The local NBC-affiliate Columbia SC TV station, *WIS*, also did an interview on 12 December 2010.

20. Web sites picking up on the Morgan-Myrick IR imaging research in 2010-2011 include:

<http://www.msnbc.msn.com/id/40335765>

<http://news.discovery.com/tech/blood-stain-camera-tech.html>

<http://www.engadget.com/2010/11/15/researchers-develop-blood-camera-to-spot-crime-scene-stains-in/>

<http://www.technewsdaily.com/new-csi-camera-sees-invisible-blood-stains-1657/>

<http://www.gizmag.com/infrared-camera-detects-blood-stains/16934/>

<http://timesofindia.hotklix.com/link/News/World/CSI-Like-Camera-Reveals-Hidden-Blood>

<http://www.sciencedaily.com/releases/2010/11/101110123943.htm>

<http://www.physorg.com/news/2010-11-invisible-csi-tool-visualizes-bloodstains.html>

<http://checkswag.com/2010/11/14/save-your-luminol-%E2%80%93-new-csi-camera-detects-bloodstains/>

<http://nanopatentsandinnovations.blogspot.com/2010/11/camera-sees-invisible-new-csi-tool.html>

<http://www.image-acquire.com/spot-invisible-evidence-at-a-crime-scene-with-the-blood-camera/>

http://www.redorbit.com/news/technology/1948345/seeing_the_invisible_new_csi_tool_visualizes_bloodstains_and_other/index.html

http://www.redorbit.com/news/business/1953877/chemistry_researchers_create_new_tool_to_visualize_bloodstains/index.html

<http://www.southcarolinaradionetwork.com/2010/11/16/usc-chemists-create-camera-that-spots-invisible-bloodstains-audio/>

21. Additional web sites (accessed 12 January 2011) that have picked up on our IR imaging research include: Checkswag, Nanopatents and Innovations, Image aquire, Redorbit, The Writer's Forensic Blog, Medical Daily, Homeland Security Newswire, Switched, The Money Times, Zedomax, The Future of Things, TechGawk, FrontSideBus, Nexgadget, David Icke.com, Slyck, Tech Spotlight, PC District, ZGeek, Tech Gadget Reviews, Technology Info, Mavarte Update, DownloadAtoZ, FooYah:Science and Tech, Science Codex, Physorg.com, Photonics Online, e! Science News, NewsGuide.us, Laboratory Equipment, Medcompare, ScienceBlog.com, Gizmodo, BrightSurf, BioPortfolio, Surfmax Government News, IHeartChaos, 9gadgets.com, JustNetNews, Forensics Report, a Forensic course page at Syracuse University, Newswise, Worldnews, TechRevu, and EarthTimes. Most of the later web articles are blog entries that cite previous web sources.

22. Dr. Morgan was interviewed about his and Dr. Myrick's research on IR imaging of bloodstains by Ira Flatow on the National Public Radio show "Science Friday" on 28 January 2011. The audio and transcript of the interview is at <http://www.npr.org/2011/01/28/133306349/Blood-Spotting-Made-Easier>.

23. A documentary segment about 2 minutes long concerning our development of an infrared camera for blood detection has been filmed for inclusion in a program by the Smithsonian Channel in their Forensic Firsts series (<http://www.smithsonianchannel.com/site/sn/show.do?series=826>). The film shows a USC student operating the current version of our system and detecting 'invisible' blood stains on a textile fiber. The contact person for the production is Lee Anne Gillan (gillan@forensicfirsts.com). We do not yet know when the show will air on the Smithsonian Channel. The description sent to us by Ms. Gillan, after the final edits is: "Forensic Firsts is a show for the Smithsonian Channel on the history of forensics science, now in its second season. In the past we have filmed at the National Institute of Standards and Technology, the ATF, the Georgia State Police Academy, the Bohart Museum of Entomology, the University of Glasgow, and various branches of the Smithsonian Institution. For the bloodstain analysis episode we worked with Bart Epstein, formerly of the Minnesota Bureau of Public Apprehension (where we shot for several days), Mike Perkins, Crime Scene Analyst Supervisor at Las Vegas Metro Police, and Brian Wentzell, who is a Bloodstain Pattern Analyst with the RCMP. We cover two criminal cases and how bloodstain analysis contributed to their resolution. Then we talk briefly about how bloodstain analysts might work in the future, which is where the camera comes in."

24. My collaborator with NIJ IR blood imaging research, Dr. Michael L. Myrick won the Gerald S. Birth Award of the Council for Near Infrared Spectroscopy for best work in diffuse spectroscopy published in 2010 to 2011. The announcement read: "Dr. Myrick has worked on the development of an instrument for imaging forensic samples in the thermal infrared. The work is detailed in a series of 3 papers titled "Multimode Imaging in the Thermal Infrared for Chemical Contrast Enhancement". The three papers were published back-to-back in Analytical Chemistry (2010) 82: 8412-8420, 8421-8426 and 8427-8431. Part 1 described the instrumentation and methodology, Part 2 reported on simulation-driven design and Part 3 described how blood could be visualized on fabrics. The papers were co-authored with Heather Brooke, Megan R. Baranowski, Jessica N. McCutcheon, and Stephen L. Morgan. The award, lecture and symposium was be presented at the 16th International Conference on Diffuse Reflectance (IDRC) at Chambersburg, PA August 2012. The award included a trophy and honorarium sponsored by Unity Scientific, Inc.

25. Brianna M. Cassidy, a 3rd year graduate student in the Morgan group, was featured in an on-line article posted 14 January 2014 on the University of South Carolina website entitled, "Science in Art Preservation." See URL: <http://gradschool.sc.edu/aboutus/subpage.asp?eventid=530> and http://www.sc.edu/uofsc/stories/2014/1_brianna_cassidy_audio_tape_preservation_ir_steve_morgan.php#.VA4DHvldVcg.
26. The USC-funded Magellan scholar project of Adam Glenn, an undergraduate working in the Morgan laboratory on identification of pigments on medieval illuminated manuscripts, was presented in a short article on the USC website at the Office of the Vice President for Research at URL: http://sc.edu/about/offices_and_divisions/research/news_and_pubs/breakthrough_magazine/gwaraga.php, and in the Fall 2014 issue of the USC Alumni Magazine at URL: http://www.chem.sc.edu/faculty/morgan/pubs/CAROLINIAN_Fall_2014.pdf.
27. At the recent SCIX 2015 conference (<https://www.scixconference.org/>) held September 27 - October 2 at the Rhode Island Convention Center in Providence, RI, graduate students from the Myrick, Angel, and Morgan research groups won a number of awards for their scientific presentations.
28. Stephanie DeJong, from the Myrick research group, won the Tomas Hirschfeld Scholar Award for an outstanding paper submitted to the conference by a graduate student. The paper, "Reversible Gap Derivative and their Integration," (coauthored with Zhenyu Lu, Brianna Cassidy, Stephen L. Morgan, and M.L. Myrick), which has accepted for publication in *Applied Spectroscopy*.
29. DeJong also won the Coblenz Society Student Award for outstanding research in vibrational spectroscopy, based on her oral presentation, "Integration of Higher-order Gap Derivatives," (coauthored with Zhenyu Lu, Brianna Cassidy, Stephen L. Morgan, and Michael L. Myrick).
30. Zhenyu Lu, from the Morgan research group, won the FACSS Student Poster Award in Spectroscopy for his poster presentation titled "Estimation of the Age of Bloodstains under Different Environmental Conditions with Fourier Transform Infrared Spectroscopy and Multivariate Statistical Analysis," (coauthored with Brianna Cassidy, Stephanie Dejong, Katherine Witherspoon, Michael L. Myrick, and Stephen L. Morgan).
31. At the 2014 SCIX meeting (Reno, NV, 28 September-3 October 2014), Stephanie DeJong won a 1st place FACSS student Poster award, and the International travel Grant Award to attend the 2013 International Council for Near Infrared Spectroscopy, France in 2015.
32. Brianna Cassidy, won the Federation of Analytical Chemistry and Applied Spectroscopy Student Poster Award for her poster, "An Experimental Study of the Forensic Luminol Test for Detection of Bloodstains," presented at SCIX 2015, Providence, RI, 30 September 2015.
33. At SCIX 2015 (RI, 27 October-2 September 2015), Stephanie DeJong also won two awards: (a) the 2015 Coblenz Society Student Award for Outstanding Research in Vibrational Spectroscopy, based her body of work on this NIJ-funded blood detection research research; and, (b) the Tomas Hirschfeld Scholar Award for an outstanding paper submitted to the conference by a graduate student. The paper was "Integration of Higher-Order Gap Derivatives", with Zhenyu Lu, Brianna Cassidy, Stephen Morgan, and M.L. Myrick.
34. At the University of South Carolina (Columbia, SC), Stephanie DeJong also won a 2015 USC Breakthrough Graduate Scholar Award for recognition of exceptional graduate students, 11 December 2105. This award was one of seven given across the University.
35. Our blood imaging research has already made a substantial impact on the development of the field of IR imaging in forensic science as well as other areas. Ten of our papers are indexed by the Web of Science; of these, the most recent 5 were published in 2015 alone. Being so recent, there has been almost no time for them to be incorporated in the citations of other scientists yet. The five papers published between 2010-2011 have been cited 50 times by other indexed, peer-reviewed literature. Some highlights include:
- The manuscript "Multimode Imaging in the Thermal Infrared for Chemical Contrast Enhancement. Part 3: Visualizing Blood on Fabrics" (2010) has been cited 14 times. Most of these citations are in the field of forensic science, and include papers on how to design filters such as those we describe, identifying semen, identifying

other bodily fluids, enhancing footwear impressions on fabric, detecting blood on construction materials, and determining bloodstain age.

The manuscript “The Kubelka-Munk Diffuse Reflectance Formula Revisited” (2011) has already been cited 14 times. Most of these citations are in material science, where the results are used to interpret data, and in mathematics, where the results have been extended using radiation transport theory.

The earliest citations for the first papers IR imaging began about 6 months after their publication dates. The first of the five papers published in 2015 appeared in June (“Optimization of Gap Derivatives”) and has just received its first two citations. The others were later and have not yet been cited (as of January 2016).

One of the 2015 papers has received notice outside the scientific literature through a USC press release. To date, “Chemical Contrast Observed in Thermal Images of Blood-Stained Fabrics Exposed to Steam” published in the July 2015 issue of *Analyst* is now ranked in the top 2% in terms of online attention among the nearly 4.6 million scientific articles indexed by Altmetric. “Steaming out some of luminol’s wrinkles” was written for general audiences about this manuscript and was picked up by 6 news outlets – Homeland Security News Wire; R&D; Gizmodo; Phys.Org; Sciences Newline; and EurekAlert. (to see some of the articles, google “Steaming out some of luminol’s wrinkles”)

[see http://www.sc.edu/uofsc/posts/2015/10_steam_thermography_myrick_morgan.php#.Vo6_vkrKHs].

Although it is too early for the article on which the press release was based to have received citations in the peer-reviewed literature, we note that *Analyst* is the premier analytical chemistry journal of the British Royal Society of Chemistry. Its impact factor (IF) of 4.1 places it just behind the ACS journal *Analytical Chemistry*, and well above the journals *Forensic Science International* (IF = 2.1), *Applied Spectroscopy* (IF = 2.0) and *Journal of Forensic Sciences* (IF = 1.2).

36. The University of South Carolina published a story on our success with IR imaging titled “Steaming out some of luminol’s wrinkles,” on the USC News page at

http://www.sc.edu/uofsc/posts/2015/10_steam_thermography_myrick_morgan.php#.Vwf6UPkrKHs

37. The Forensic Science Technology Center of Excellence (NIJ-funded) published a news release, “NIJ and University of South Carolina—Improving Detection of Crime Scenes: Infrared Camera Rapidly Identifies Blood Stains for Collection and Analysis,” based on recent Morgan and Myrick IR chemical imaging research. See:

<https://rti.connectsolutions.com/p4mn5tfl1ue/>

38. The University of South Carolina published a story on our success with detecting degraded magnetic tape in our collaborative research with the Library of Congress titled “Born to run off the reels” at

http://www.sc.edu/uofsc/posts/2015/10_steve_morgan_audiotape_sticky_shed_syndrome.php#.Vwf8vvkrKHs

PAPERS PRESENTED AT PROFESSIONAL MEETINGS (contributed and invited)

[<http://www.chem.sc.edu/faculty/morgan/talks.html>]

1. S. N. Deming and S. L. Morgan, "Simplex Optimization of a Colorimetric Method for Cholesterol in Blood Serum," paper no. 90 presented at the 25th Southeastern Regional Meeting, American Chemical Society, Charleston, SC, 9 November 1973.
2. S. L. Morgan and S. N. Deming, "Optimization Strategies for the Development of Gas-liquid Chromatographic Methods," paper no. 206 presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Cleveland, OH, 4 March 1975.
3. S. L. Morgan and S. N. Deming, "Optimization Strategies for the Development of Gas-liquid Chromatographic Methods," presented at the 10th International Symposium-- Advances in Chromatography, Munich, West Germany, 4 November 1975.
4. S. L. Morgan, L. R. Parker, Jr., A. S. Olansky, and S. N. Deming, "Stability of Peristaltic Pump Tubing in Continuous Flow Systems," paper no. 132 presented at the 28th National Meeting, American Association of Clinical Chemists, Houston, TX, 3 August 1976; Abstract published in *Clinical Chemistry*, 22(7), 1185 (1976).
5. S. N. Deming and S. L. Morgan, "Advances in the Application of Optimization Methodology in Chemistry," paper no. 29 presented at the 172nd National Meeting, American Chemical Society, San Francisco, CA, 2 September 1976.
6. S. N. Deming, A. S. Olansky, L. R. Parker, Jr., and S. L. Morgan, "Automated Development of Continuous Flow Methods," paper no. 176 presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Cleveland, OH, 1 March 1977.
7. S. L. Morgan, "Multifactor Experiments in Analytical Methods Development," paper presented at the Annual Meeting, Southeastern Association of Analytical Chemists, Duke University, Durham, NC, 16 April 1977.
8. S. L. Morgan and C. A. Jacques, "Response Surface Methodology in Gas Chromatography," paper no. 212 presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Cleveland, OH, 28 February 1978.
9. S. L. Morgan, C. A. Jacques, S. R. Goode, and R. J. Matthews, "Response Surface Methodology Applied to the Development of Analytical Chemical Methods," invited paper at the International Conference on Computers and Optimization in Analytical Chemistry, Amsterdam, The Netherlands, 7 April 1978.
10. S. L. Morgan and D. W. Fritz, "Systematic Investigations of Nucleotide Separations by Reversed-phase High Performance Liquid Chromatography," paper no. 8 presented at the 30th Southeastern Regional Meeting, American Chemical Society, Savannah, GA, 8 November 1978.
11. C. A. Jacques and S. L. Morgan, "Pyrolysis Gas Chromatography of Carbohydrates," paper no. 34 presented at the 30th Southeastern Regional Meeting, American Chemical Society, Savannah, GA, 9 November 1978.
12. C. A. Jacques and S. L. Morgan, "The Use of Glass Capillary Columns in Pyrolysis Gas Chromatography," paper no. 582 presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Cleveland, OH, 8 March 1979.
13. R. C. Parker, M. D. Walla, and S. L. Morgan, "Computer-assisted Calibration Techniques in Analytical Chemistry," paper presented at the Annual Meeting, South Carolina Academy of Science, Columbia, SC, 6 April 1979.
14. S. L. Morgan, M. D. Walla, and R. C. Parker, "Computer-assisted Calibration Techniques in Analytical Chemistry," paper no. 704 presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlantic City, NJ, 13 March 1980.
15. S. L. Morgan, "The Design and Evaluation of a Cold Trap and Rapid Reinjection System for Pyrolysis Gas Chromatography," paper presented at the Annual Meeting, Southeastern Association of Analytical Chemists, University of Georgia, Athens, GA, 12 April 1980.
16. S. L. Morgan, "An Introduction to the Interpretation of Experimentally Determined Response Surfaces," invited plenary lecture at the 33rd Annual Summer Symposium on Analytical Chemistry, Correlation Techniques and Optimization Methods in Analysis, Duke University, Durham, NC, 6 June 1980.

17. S. L. Morgan, E. E. Mercer, C. A. Jacques, and M. D. Walla, "Application of Computer Graphics for Data Treatment in Analytical Chemistry," invited paper at EXPOCHEM '80, Houston, TX, 9 October 1980.
18. E. E. Mercer and S. L. Morgan, "The Use of Least Squares for Experimental Design," paper no. 58 presented at the Southeast-Southwest Regional Meeting, American Chemical Society, New Orleans, LA, 10 December 1980.
19. S. L. Morgan and C. A. Jacques, "A Precolumn Cold Trap and Rapid Reinjection System for Pyrolysis Gas Chromatography with Capillary Columns," paper no. 63 presented at the Southeast-Southwest Regional Meeting, American Chemical Society, New Orleans, LA, 11 December 1980.
20. L. W. Eudy, S. L. Morgan, and W. F. Kinard, "Structure and Quantitation of Crown Ethers using Analytical Pyrolysis Gas Chromatography," paper no. 65 presented at the Southeast-Southwest Regional Meeting, American Chemical Society, New Orleans, LA, 11 December 1980.
21. S. L. Morgan and C. A. Jacques, "Interpreting and Displaying Chromatographic Similarity," paper no. 67 presented at the Southeast-Southwest Regional Meeting, American Chemical Society, New Orleans, LA, 11 December 1980.
22. J. R. Hudson and S. L. Morgan, "Glass Capillary Column Connection Techniques for High Resolution Gas Chromatography," paper no. 79 presented at the Southeast-Southwest Regional Meeting, American Chemical Society, New Orleans, LA, 11 December 1980.
23. D. W. Fritz and S. L. Morgan, "Practical Considerations in the Packing of High Performance Liquid Chromatographic Columns, paper no. 82 presented at the Southeast-Southwest Regional Meeting, American Chemical Society, New Orleans, LA, 11 December 1980.
24. M. D. Walla and S. L. Morgan, "Teaching Acid-base Equilibria with a Programmable Calculator and Computer Graphics," paper no. 196 presented at the Southeast-Southwest Regional Meeting, American Chemical Society, New Orleans, LA, 11 December 1980.
25. S. L. Morgan, J. R. Hudson, and A. Fox, "Rapid Detection of Bacterial Infections Using Analytical Pyrolysis GC-MS," paper no. 658 presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlantic City, NJ, 12 March 1981.
26. S. L. Morgan, C. A. Jacques, and M. D. Walla, "Characterization of Carbohydrates by Analytical Pyrolysis Gas Chromatography," paper no. 659 presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlantic City, NJ, 12 March 1981.
27. S. L. Morgan, "Analytical Pyrolysis: Some Applications in Qualitative and Quantitative Analysis," invited lecture at the Atlanta Chromatography Discussion Group, Atlanta, GA, 19 March 1981.
28. S. L. Morgan, "Structure Correlation and Pattern Recognition in Analytical Pyrolysis," invited paper at the Macromolecular Secretariat Symposium, 181st National Meeting, American Chemical Society, Atlanta, GA, 30 March 1981.
29. S. L. Morgan, "Computer Graphics and Acid-base Equilibria," paper presented at the Annual Meeting, Southeastern Association of Analytical Chemists, Charleston, SC, 24 April 1981.
30. S. L. Morgan, "Correlating Pyrolysis Gas Chromatography with Chemical Structure," paper presented at the Annual Meeting, Southeastern Association of Analytical Chemists, Charleston, SC, 25 April 1981.
31. J. R. Hudson, S. L. Morgan, and A. Fox, "Pyrolysis GC-MS Studies of Bacterial Peptidoglycan," paper presented at the 3rd Atlanta Chromatography Discussion Group Symposium, Atlanta, GA, 13 May 1981.
32. S. N. Deming and S. L. Morgan, "Teaching the Fundamentals of Experimental Design," paper presented in the Symposium on Interpreting Complex Chemical Data: Teaching Chemometrics, 182nd National Meeting, American Chemical Society, New York, 23 August 1981.
33. S. L. Morgan, M. D. Walla, and J. D. Baker, "A Comparison of Methods for the Computer-assisted Display of Multidimensional Data," paper no. 26 presented at EXPOCHEM '81, Houston, TX, 2 September 1981.
34. J. R. Hudson, M. Przybyciel, and S. L. Morgan, "Baked-on Stationary Phases for Glass Capillary Gas Chromatography," paper no. 28 presented at the 33rd Annual Southeastern Regional Meeting, American Chemical Society, Lexington, KY, 5 November 1981.

35. J. R. Hudson, S. L. Morgan, and A. Fox, "Improvements in the Gas Chromatography of Neutral and Amino Sugars," paper no. 29 presented at the 33rd Annual Regional Meeting, American Chemical Society, Lexington, KY, 5 November 1981.
36. J. R. Hudson, S. L. Morgan, and A. Fox, "Application of Pyrolysis Gas Chromatography-Mass Spectrometry to the Identification of Microorganisms," paper no. 20 presented at the Annual Meeting, South Carolina Section, American Society for Microbiology, Columbia, SC, 13 November 1981.
37. E. E. Mercer, S. E. Hufstetler, and S. L. Morgan, "Information Content-- Useful Concept in Least Squares," paper no. 56 presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlantic City, NJ, 8 March 1982.
38. S. L. Morgan, J. R. Hudson, and A. Fox, "The Separation of Aldonitrile Acetates of Neutral and Amino Sugars by Capillary GC-MS," paper no. 87 presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlantic City, NJ, 8 March 1982.
39. S. L. Morgan, P. Y. Lau, A. Fox, A. Brown, and M. Lema, "Capillary GC Applied to the Chemotaxonomic Characterization of the Legionellaceae," paper presented at the Spring meeting, Southeastern Section, American Association for Clinical Chemistry, Savannah, GA, 19 March 1982.
40. S. L. Morgan, "Linear and Nonlinear Least Squares on the HP-41C," paper presented at the PPC East Coast Conference, Philadelphia, PA, 17 April 1982; 8 page article published in the Proceedings of the Conference.
41. S. L. Morgan, "Biopolymer Analysis by Capillary GC", paper presented at the Annual Meeting, Southeastern Association of Analytical Chemists, University of North Carolina-Greensboro, Greensboro, NC, 24 April 1982.
42. S. L. Morgan, M. D. Walla, L. W. Eudy, and P. Y. Lau, "Biopolymer Profiling by Capillary GC-MS," paper presented at the 4th Annual Symposium, Atlanta Chromatography Discussion Group, Atlanta, GA, 19 May 1982.
43. M. Przybyciel, M. D. Walla, and S. L. Morgan, "GC-MS Analysis of Fuel Oil Residues in Contaminated Mangrove Plants," paper presented at the 4th Annual Symposium, Atlanta Chromatography Discussion Group, Atlanta, GA, 19 May 1982.
44. J. S. Kiel, R. K. Abramson, and S. L. Morgan, "Tricyclic Antidepressant Drug Monitoring by HPLC," paper presented at the 4th Annual Symposium, Atlanta Chromatography Discussion Group, Atlanta, GA, 19 May 1982.
45. S. L. Morgan, "Experimental Design and Computer Modeling: Applications in Chemistry," invited paper in a symposium on "Computers in Chemistry" at the 1982 Scientific Conference, Corn Refiners Association, Chicago, IL, 18 June 1982; paper published in the conference proceedings.
46. S. L. Morgan and A. Fox, "Chemotaxonomic Characterization of Microorganisms and Chemical Detection of Infectious Diseases by Capillary GC, Pyrolysis GC-MS, and Solid Phase RIA," invited paper presented at the 2nd Biodetection Workshop, Army Research Office, Raleigh, NC, July 1982.
47. S. L. Morgan, "Optimization Techniques in Analytical Chemistry: a State of the Art Review," invited plenary lecture at the 2nd International Symposium on Chemometrics, Petten, The Netherlands, 15 September 1982.
48. M. D. Walla, L. W. Eudy, J. D. Baker, and S. L. Morgan, "Characterization of Biologically Important Compounds by Pyrolysis GC-MS," paper no. 245 at the 9th Annual Meeting, Federation of Analytical Chemistry and Spectroscopy Societies, Philadelphia, PA, 19 September 1982.
49. M. Przybyciel, K. B. Sentell, and S. L. Morgan, "Experimental Design Applied to the Systematic Development of Column Preparation Techniques for Capillary GC," paper no. 247 at the 9th Annual Meeting, Federation of Analytical Chemistry and Spectroscopy Societies, Philadelphia, PA, 19 September 1982.
50. S. L. Morgan, M. D. Walla, L. W. Eudy, and A. Fox, "Systematic Studies of Biopolymer Components by Analytical Pyrolysis with High Resolution Capillary GC and GC-MS," invited plenary lecture at the 5th International Symposium on Analytical Pyrolysis, Vail, CO, 29 September 1982.
51. P. Y. Lau, Z.-T. Zhu, A. Fox, S. L. Morgan, A. Brown, and M. Lema, "Carbohydrate Profiling of the Legionellaceae by Gas Chromatography," paper presented at the Annual Meeting, Southeastern and South Carolina Branches, American Society for Microbiology, Jekyll Island, GA, 30 September 1982.

52. J. S. Kiel, S. L. Morgan, and R. K. Abramson, "A Review of HPLC Methods for Tricyclic Antidepressants," an invited paper presented at the 2nd Symposium on HPLC sponsored by Waters Associates and the Research Triangle Chromatography Discussion Group, Greenville, NC, 13 October 1982.
53. S. L. Morgan, M. D. Walla, L. W. Eudy, and J. D. Baker, "Structure Correlations of Nonvolatile Thermally Labile Materials by Analytical Pyrolysis GC-MS," paper no. 41 presented at the 34th Southeastern Regional Meeting, American Chemical Society, Birmingham, AL, 4 November 1982.
54. L. W. Eudy, S. L. Morgan, and A. Fox, "Simplified Assay for the Trace Detection of Muramic Acid by Single Ion Monitoring GC-MS," paper no. 50 presented at the 34th Southeastern Regional Meeting, American Chemical Society, Birmingham, AL, 4 November 1982.
55. M. Przybyciel, K. B. Sentell, M. D. Walla, and S. L. Morgan, "High Resolution Capillary GC and GC-MS Analysis of Oil Residues in Contaminated Mangrove Plants," paper no. 56 presented at the 34th Southeastern Regional Meeting, American Chemical Society, Birmingham, AL, 4 November 1982.
56. J. S. Kiel, R. K. Abramson, and S. L. Morgan, "HPLC Monitoring of Tricyclic Antidepressant Drugs and Selected Metabolites," paper no. 157 presented at the 34th Southeastern Regional Meeting, American Chemical Society, Birmingham, AL, 5 November 1982.
57. J. Groves, J. S. Kiel, R. K. Abramson, S. L. Morgan, S. R. Batey, and E. A. Burch, "Plasma Amitriptyline Concentrations: Correlations with Hydroxylated Metabolites," paper presented at the Mid-year Meeting, American Society of Hospital Pharmacists, Los Angeles, CA, December 1982.
58. L. W. Eudy, M. D. Walla, S. L. Morgan, "Correlation of Bacterial Structure with Model Compounds by Pyrolysis Gas Chromatography-Mass Spectrometry," paper no. 179 presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlantic City, NJ, 8 March 1983.
59. J. S. Kiel, A. B. Jordan, and S. L. Morgan, "A Critical Evaluation of Mobile Phase Amine Modifiers in Reversed Phase HPLC," paper no. 351 presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlantic City, NJ, 9 March 1983.
60. S. L. Morgan, M. Przybyciel, K. B. Sentell, and M. D. Walla, "High Resolution Capillary GC and GC-MS Analysis of Hydrocarbon Residues in Plant Material," paper no. 918 presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlantic City, NJ, 11 March 1983.
61. S. L. Morgan, "Research in Analytical Chemistry at the University of South Carolina," invited talk at the Chemistry Careers Day Conference sponsored by the New York Section of the American Chemical Society, Manhattan College, New York, 12 March 1983.
62. S. L. Morgan and M. D. Walla, "Computer-assisted Display of Multivariate Analytical Chemical Data," invited paper presented at the Symposium on Chemometrics and Data Treatment in Environmental Analysis, National Meeting, American Chemical Society, Seattle, WA, 23 March 1983.
63. S. L. Morgan, P. Y. Lau, M. D. Walla, L. W. Eudy, A. Fox, A. Brown, and M. Lema, "Profiling Microorganisms by Capillary GC and GC-MS," paper presented at the Fifth Annual Symposium, Atlanta Chromatography Discussion Group, Atlanta, GA, 18 May 1983.
64. L. W. Eudy, M. D. Walla, S. L. Morgan, A. Fox, A. Brown, and M. Lema, "Correlating Bacterial Structure with Pyrolysis GC-MS," paper presented at the Fifth Annual Symposium, Atlanta Chromatography Discussion Group, Atlanta, GA, 18 May 1983.
65. J. Kiel, S. L. Morgan, and R. K. Abramson, "Mechanisms of Surface Interaction in Reversed Phase HPLC," paper presented at the Fifth Annual Symposium, Atlanta Chromatography Discussion Group, Atlanta, GA, 18 May 1983.
66. A. Fox, P. Y. Lau, Z.-T. Zhu, S. L. Morgan, A. Brown, and M. Lema, "Carbohydrate Profiling of the Legionellaceae by Capillary Gas Chromatography-Mass Spectrometry," paper presented at the 2nd International Symposium on Legionella, Atlanta, GA, 19 June 1983.
67. S. L. Morgan, "Analytical Pyrolysis with High Resolution Capillary Gas Chromatography: Applications to Biological Compounds," invited lecture at the Gordon Conference on Analytical Pyrolysis, Holderness School, NH, July 1983.
68. S. L. Morgan, "Advances in Data Treatment for Analytical Pyrolysis," invited plenary lecture at the Gordon Conference on Analytical Pyrolysis, Holderness School, July, 1983.
69. P. Y. Lau, S. L. Morgan, A. Fox, A. Brown, and M. Lema, "Differentiation and Identification of Legionella Organisms by Capillary GC and GC-MS," paper no. 121 presented at the 35th National Meeting of the

- American Association for Clinical Chemistry, New York, July 26, 1983; Abstract in *Clinical Chemistry*, 29(6), 1180 (1983).
70. S. L. Morgan, "Some Biomedical Applications of Capillary GC and GC-MS," invited lecture at the Gordon Conference on Analytical Chemistry, New Hampton School, NH, August 1983.
 71. S. L. Morgan, M. D. Walla, M. Przybyciel, and J. Kiel, "Computer-automated Chromatography," invited paper, No. 137 in a Symposium on Computers and Lab Automation, presented at the 10th Annual Meeting, Federation of Analytical Chemistry and Spectroscopy Societies, Philadelphia, PA, 27 September 1983.
 72. J. S. Kiel, A. Jordan, S. L. Morgan, and R. K. Abramson, "Mechanisms of Surface Interaction in Reversed Phase Liquid Chromatography," paper no. 279 presented at the 10th Annual Meeting, Federation of Analytical Chemistry and Spectroscopy Societies, Philadelphia, PA, 28 September 1983.
 73. M. Przybyciel, M. D. Walla, M. A. Santangelo, and S. L. Morgan, "Experimental Comparisons of Injection Conditions for High Resolution Capillary GC," paper no. 438 presented at the 10th Annual Meeting, Federation of Analytical Chemistry and Spectroscopy Societies, Philadelphia, PA, 30 September 1983.
 74. S. L. Morgan, J. S. Kiel, R. K. Abramson, "Systematic Investigations of Mobile Phase Mechanisms in HPLC Using Automated Instrumentation," invited paper in the Symposium on High Performance Liquid Chromatography, paper no. 82 presented at the 35th Southeast Regional Meeting, American Chemical Society, Charlotte, NC, 10 November 1983.
 75. A. Jordan, J. S. Kiel, S. L. Morgan, R. K. Abramson, and C. S. Bryan, "High Performance Liquid Chromatography of Cephalosporin Antibiotics," paper no. 92 presented at the 35th Southeast Regional Meeting, American Chemical Society, Charlotte, NC, 10 November 1983.
 76. J. S. Kiel, R. S. Whiton, S. L. Morgan, and R. K. Abramson, "Comparison of Data Handling Methods for High Performance Liquid Chromatography", paper no. 93 presented at the 35th Southeast Regional Meeting, American Chemical Society, Charlotte, NC, 10 November 1983.
 77. M. Przybyciel, C. L. Shaw, M. D. Walla, and S. L. Morgan, "Preparation of Columns with Silica Whisker Surfaces for High Resolution Gas Chromatography," paper no. 272 presented at the 35th Southeast Regional Meeting, American Chemical Society, Charlotte, NC, 11 November 1983.
 78. M. Przybyciel, C. L. Haw, and S. L. Morgan, "Coating and Application of a High Temperature Liquid Crystal Stationary Phase for Capillary Gas Chromatography," paper no. 273 presented at the 35th Southeast Regional Meeting, American Chemical Society, Charlotte, NC, 11 November 1983.
 79. S. L. Morgan, R. S. Whiton, and F. L. Bayer, "Analytical Pyrolysis GC-MS of Amino Acids and Polypeptides," paper no. 274 presented at the 35th Southeast Regional Meeting, American Chemical Society, Charlotte, NC, 11 November 1983.
 80. S. L. Morgan, M. D. Walla, and C. Saiz-Jimenez, "Pyrolysis GC-MS of Lignin Polymers," paper no. 275 presented at the 35th Southeast Regional Meeting, American Chemical Society, Charlotte, NC, 11 November 1983.
 81. P. Y. Lau, M. D. Walla, S. L. Morgan, and A. Fox, "Application of Capillary GC and GC-MS to the Characterization and Classification of Microorganisms," paper no. 276 presented at the 35th Southeast Regional Meeting, American Chemical Society, Charlotte, NC, 11 November 1983.
 82. S. L. Morgan, M. D. Walla, and M. Przybyciel, "Computerized Data Handling in Chromatography," invited paper in the Laboratory Information Management Systems Symposium, paper no. 57 presented at the Eastern Analytical Symposium, New York City, NY, 16 November 1983.
 83. S. L. Morgan, "Chromatography Data Systems", invited lecture presented to the Atlanta Chromatography Discussion Group, Emory University, Atlanta, GA, 15 March 1984.
 84. J. S. Kiel, S. L. Morgan, and R. K. Abramson, "Development of a HPLC Separation Using Computer-assisted Experimental Design and Optimization Strategies," paper no. 162 presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlantic City, NJ, 5 March 1984.
 85. S. L. Morgan and A. Fox, "Applications of GC-MS, Pyrolysis GC-MS, and Immunoassay in Biodetection", invited paper at the Biodetection Workshop sponsored by the Army Research Office, Raleigh, NC, 25 April 1984.
 86. S. L. Morgan, "Biomedical Applications of Capillary GC," invited paper, 3rd Annual Triangle Chromatography Symposium, Raleigh, NC, 1 May, 1984.

87. M. Przybyciel and S. L. Morgan, "Selective Liquid Crystal Stationary Phases for Fused Silica Capillary GC," 3rd Annual Triangle Chromatography Symposium, Raleigh, NC, 1 May, 1984.
88. J. S. Kiel, S. L. Morgan, and R. K. Abramson, "Methods Development Using Optimization Strategies in Reversed Phase HPLC," Sixth Atlanta Chromatography Symposium, Atlanta, GA, 16 May 1984.
89. M. Przybyciel and S. L. Morgan, "Liquid Crystal Stationary Phases for Capillary GC Separations of Polyaromatics," Sixth Atlanta Chromatography Symposium, Atlanta, GA, 16 May 1984.
90. M. D. Walla, P. Y. Lau, S. L. Morgan, A. Fox, and A. Brown, "Capillary Gas Chromatography-Mass Spectrometry of Carbohydrate Components of Legionellae and Other Bacteria," Sixth Atlanta Chromatography Symposium, Atlanta, GA, 16 May 1984.
91. M. Przybyciel and S. L. Morgan, "Crosslinked Superox-4: a High Temperature Polar Phase for Capillary GC," Sixth Atlanta Chromatography Symposium, Atlanta, GA, 16 May 1984.
92. S. L. Morgan, "Pattern recognition Techniques Applied to Gas Chromatography and Gas Chromatography-Mass Spectrometry," invited paper at the International Conference on Forensic Analytical Chemistry, sponsored by the FBI, Quantico, VA, 31 July 1984.
93. S. L. Morgan, "Chemometrics in Teaching Analytical Chemistry," invited paper, 8th Summer Conference on Chemical Education, Storrs, CT, 8 August 1984.
94. S. L. Morgan, "Optimization Strategies for Liquid Chromatography," invited paper, Waters Chromatography Symposium, Burroughs-Wellcome, Research Triangle Park, NC, 17 October 1984.
95. S. L. Morgan and M. Przybyciel, "Selective Stationary Phases for High Resolution Gas Chromatography," invited paper, Symposium on High Resolution Capillary Chromatography, Southeast Regional ACS Meeting, Raleigh, NC, 24 October 1984.
96. S. L. Morgan, "Chemometrics on Microcomputers," invited paper, Eastern Analytical Symposium, New York, 14 November 1984.
97. S. L. Morgan, "Chemical Pattern Recognition in Gas Chromatography and Gas Chromatography-Mass Spectrometry," invited paper, Conference on Spectral Pattern Recognition, U. S. Army Edgewood-Aberdeen Proving Ground, MD, 11 December 1984.
98. S. L. Morgan and J. S. Kiel, "Strategies for Multifactor Optimization in Reversed Phase HPLC," invited paper, HPLC Optimization Techniques Symposium, 10th Annual AOAC Spring Training Workshop, Dallas, TX, 8 April 1985.
99. S. L. Morgan and M. D. Walla, "Computer Techniques for the Evaluation of Chromatographic Performance," invited paper at the Scientific Computing & Automation Conference, Atlantic City, NJ, 2 May 1985.
100. C. S. Smith, R. K. Abramson, and S. L. Morgan, "An Investigation of the Metabolism of Amitriptyline Using High Performance Liquid Chromatography," 6th Annual Research Triangle Park Liquid Chromatography Symposium, Burroughs-Wellcome Research Laboratories, Research Triangle Park, NC, 16 October 1985.
101. S. L. Morgan and A. Fox, "Pattern Recognition Methods in Analytical Pyrolysis," invited paper at the Biodetection Workshop, Chemical Research and Defense Center, Aberdeen, MD, 18 November 1985.
102. A. Fox and S. L. Morgan, "GC-MS Methods for the Detection of Microorganisms," invited paper at the Biodetection Workshop, Chemical Research and Defense Center, Aberdeen, MD, 18 November 1985.
103. S. L. Morgan and A. Fox, "GC-MS Characterization of Microorganisms," invited paper at the Scientific Conference on Chemical Defense Research, Aberdeen, MD, 19 November 1985.
104. S. L. Morgan, "Programming Languages for Microcomputers," invited talk in the EAS Short Course, "Introduction to Laboratory Microcomputers," Eastern Analytical Symposium, New York, 20 November 1985.
105. S. L. Morgan, "GC-MS Characterization of Microorganisms," South East Academic Analytical Chemists Meeting, Athens, GA, 20 April 1985.
106. S. L. Morgan and R. S. Whiton, "Pyrolysis GC-MS of Microorganisms and other Biopolymers," 7th Annual Atlanta Chromatography Symposium, Atlanta, GA, 15 May 1985.
107. R. S. Whiton and S. L. Morgan, "New Developments in the Alditol Acetate Method for the Analysis of Muramic Acid and Other Sugars," 7th Annual Atlanta Chromatography Symposium, Atlanta, GA, 15 May 1985

108. S. L. Morgan, R. S. Whiton, and A. Fox, "GC-MS Characterization of Microorganisms," paper presented at the 12th Annual Meeting, Federation of Analytical Chemistry and Spectroscopy Societies, Philadelphia, PA, 30 September 1985.
109. J. Gilbert, A. Fox, R. S. Whiton, and S. L. Morgan, "Tissues as Determined by Selected Ion Monitoring GC-MS," 71st Annual Meeting of SEB-American Society Microbiology, Atlanta, GA, 18 October 1985.
110. C. S. Smith, R. K. Abramson, and S. L. Morgan, "A rapid solid phase extraction HPLC method for chlorpromazine, amitriptyline, and other tricyclic antidepressants," Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlantic City, NJ, 13 March 1986.
111. A. Fox and S. L. Morgan, "Biochemical Markers for Microorganisms," invited paper at the 4th Army Research Office Biodetection Workshop, Cashiers, NC, 16-18 April 1986.
112. S. L. Morgan, "Differentiation of Streptococci by Pyrolysis Gas Chromatography Mass Spectrometry," invited paper at the Sixth International Symposium on Analytical Pyrolysis, University of Reading, England, 18 September 1986.
113. S. L. Morgan, C. S. Smith, M. Abdalla, M. D. Walla, and A. Fox, "Differentiation of Microorganisms by Pyrolysis Gas Chromatography-Mass Spectrometry with Computer-assisted Pattern Recognition Techniques," invited paper at the Symposium on Analytical Pyrolysis, Federation of Analytical Chemistry and Spectroscopy Societies, 13th Annual Meeting, 30 September 1986, St. Louis, MO.
114. S. L. Morgan, "Pattern recognition applications in chromatography and gas chromatography mass spectrometry," invited paper at the Scientific Computing and Automation Conference, Atlantic City, NJ, 6 November 1986.
115. A. Fox, S. L. Morgan, and J. Gilbert, "Applications of Derivatization GC-MS in the Trace Detection of Chemical Markers for Microorganisms", invited paper at the 1986 U.S. Army Conference on Chemical Defense Research, Aberdeen, MD, 18-21 November 1986.
116. S. L. Morgan, A. Fox, and C. S. Smith, "Microorganism Differentiation by Analytical Pyrolysis GC-MS with Computer-assisted Pattern Recognition Techniques", invited paper at the 1986 U.S. Army Conference on Chemical Defense Research, Aberdeen, MD, 18-21 November 1986.
117. J. Gilbert, C. Parks, A. Fox, C. S. Smith, and S. L. Morgan, "Differentiation of Group A and Group B streptococci by Pyrolysis GC-MS," Joint Meeting of the Kentucky, TN, NC, and SC Section of the American Society for Microbiology, Knoxville, TN, November 1986.
118. S. V. Greene and S. L. Morgan, "Differentiation of Normal and Malignant Mouse Thymocytes by Pyrolysis GC-MS", 1987 Western Carolina Chromatography Discussion Group Symposium, 5 May 1987, Greenville, SC.
119. S. L. Morgan, "Identification of chemical markers for bacteria: chemical derivatization vs. pyrolysis," invited paper at the 17th Annual EPA Symposium on Pollutants, Jekyll Island, 18 May 1987.
120. A. Fox, J. Gilbert, and S. L. Morgan, "GC-MS Methods for the Detection and Quantitation of Chemical Markers for Bacteria and Bacterial Components", invited plenary presentation at the First International Symposium on the Interface between Analytical Chemistry and Microbiology, University of South Carolina, Columbia, SC, 3 June 1987.
121. S. L. Morgan and Alvin Fox, "Analytical Pyrolysis GC-MS Profiling of Chemical Signatures for Microorganisms," invited plenary presentation at the First International Symposium on the Interface between Analytical Chemistry and Microbiology, University of South Carolina, Columbia, SC, 4 June 1987.
122. J. Gilbert, A. Fox, and S. L. Morgan, "Persistence and Slow Degradation of Peptidoglycan-polysaccharide Complexes in Mammalian Tissues as determined by Single Ion Monitoring GC-MS," poster presentation at the First International Symposium on the Interface between Analytical Chemistry and Microbiology, University of South Carolina, Columbia, SC, 4 June 1987.
123. J. Gilbert, A. Fox, and S. L. Morgan, "Rapid identification of Group B Streptococci by a Unique Chemical Marker and Pyrolysis GC-MS with Selected Ion Monitoring," poster presentation at the First International Symposium on the Interface between Analytical Chemistry and Microbiology, University of South Carolina, Columbia, SC, 4 June 1987.
124. J. C. Rogers, S. L. Morgan, and M. D. Walla, "Chromatographic pattern recognition", poster presentation at the First International Symposium on the Interface between Analytical Chemistry and Microbiology, University of South Carolina, Columbia, SC, 4 June 1987.

125. J. Gilbert, J. Harrison, A. Fox, and S. L. Morgan, "Derivatives for GC-MS profiling of carbohydrates and amino acids," presentation at the First International Symposium on the Interface between Analytical Chemistry and Microbiology, University of South Carolina, Columbia, SC, 5 June 1987.
126. S. V. Greene, S. L. Morgan, and E. A. Thompson, Jr., "Differentiation of normal and malignant mouse thymocytes by pyrolysis gas chromatography mass spectrometry," poster presentation at the First International Symposium on the Interface between Analytical Chemistry and Microbiology, University of South Carolina, Columbia, SC, 4 June 1987.
127. S. L. Morgan and S. R. Goode, "Calibration at the limit of detection", invited paper presented at the National Meeting of the American Chemical Society, New Orleans, LA, 1 September 1987.
128. S. L. Morgan, "Chemometrics and Statistical Quality Control," invited keynote presentation at the Workshop on Statistical Quality Control, sponsored by Hewlett-Packard at the Gulf Coast Analytical Chemistry Meeting, Houston, TX, 29 September 1987.
129. S. L. Morgan, "Chemistry for the Future at USC", invited keynote presentation representing the Department of Chemistry, USC, at a National Chemistry Day Symposium, 2 November 1987, USC-Aiken, Aiken, SC; sponsored by the Savannah River Section, American Chemical Society. The two other keynote speakers were D. Desmarteau (Clemson University) and L. B. Rogers (University of Georgia).
130. S. L. Morgan and Alvin Fox, "Strategies for automated identification of microorganisms using analytical pyrolysis," paper presented at the 1987 U. S. Army Conference on Chemical Defense Research, Aberdeen, MD, 18 November 1987.
131. S. L. Morgan, "Biomedical applications of GC-MS at USC," South Carolina Mass Spectrometry User's Group Meeting, Columbia, SC, sponsored by Hewlett-Packard, 22 January 1988.
132. A. Fox and S. L. Morgan, "Applications of Derivatization GC-MS in the Trace Detection of Chemical Markers for Microorganisms", invited paper at the 1988 Biodetection and Biological Research Workshop sponsored by the U.S. Army Office of Research, Cashiers, NC, 25 April 1988.
133. S. L. Morgan and A. Fox, "Chemical Markers for Microorganisms by Analytical Pyrolysis GC-MS", invited paper at the 1988 Biodetection and Biological Research Workshop sponsored by the U.S. Army Office of Research, Cashiers, NC, 25 April 1988.
134. B. E. Watt, J. C. Rogers, S. L. Morgan, and A. Fox, "A Pyrolysis GC-MS Study of Chemical Markers for Bacterial Classification and Identification," Tenth Atlanta Chromatography Symposium, 15 June 1988, Atlanta, GA.
135. J. C. Rogers, B. E. Watt, D. Woodberry, and S. L. Morgan, "Computer-automated Comparison of Chromatograms," Tenth Atlanta Chromatography Symposium, 15 June 1988, Atlanta, GA.
136. K. Ueda, S. L. Morgan, and A. Fox, "Negative Ion Chemical Ionization GC-MS Detection of D-alanine, a chemical marker for bacteria," Tenth Atlanta Chromatography Symposium, 15 June 1988, Atlanta, GA.
137. S. L. Morgan, J. Gilbert, B. Christensson, and A. Fox, "GC-MS methods for profiling and trace detection of bacteria," Tenth Atlanta Chromatography Symposium, 15 June 1988, Atlanta, GA.
138. S. L. Morgan, J. C. Rogers, B. E. Watt, and A. Fox, "Identification of Chemical Markers for Microorganisms by Pyrolysis GC-MS," invited paper at the 15th Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Boston, 31 October 1988.
139. J. C. Rogers, B. E. Watt, and S. L. Morgan, "Computer-assisted Comparison of Chromatograms," paper at the 15th Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Boston, 31 October 1988.
140. S. L. Morgan, J. C. Rogers, and B. E. Watt, "Computer-assisted Classification and Identification of Chromatograms," paper at the SE Regional Meeting of the American Chemical Society, Atlanta, GA, 5 November 1988.
141. S. L. Morgan and A. Fox, "Identification of Chemical Markers for Microorganisms by Analytical Pyrolysis Gas Chromatography-Mass Spectrometry," paper at the 1988 Scientific Conference on Chemical Defense Research, Aberdeen Proving Grounds, MD, 17 November 1988.
142. J. C. Rogers, M. D. Walla, S. L. Morgan, and A. Fox, "GC-MS characterization of unusual sugar components in Legionella," Atlanta Chromatography Discussion Group Symposium, 21 September 1989 in Atlanta, GA.

143. S. L. Morgan, K. Ueda, and A. Fox, "Trace Detection of bacteria using D-amino acid markers by negative ion chemical ionization GC-MS", Atlanta Chromatography Discussion Group Symposium, 21 September 1989 in Atlanta, GA.
144. S. L. Morgan, K. Ueda, and A. Fox, "The origin of a chemical marker for group B streptococci produced by pyrolysis," Atlanta Chromatography Discussion Group Symposium, 21 September 1989 in Atlanta, GA.
145. S. L. Morgan, J. C. Rogers, K. Ueda, and A. Fox, "Gas chromatographic/mass spectrometric determination of carbohydrate and amino acid chemical markers for bacteria", paper at the 16th Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Chicago, 6 October 1989.
146. S. L. Morgan, B. E. Watt, K. Ueda, and A. Fox, "Pyrolysis gas chromatography mass spectrometry as a tool for detection and identification of chemical markers for bacteria", paper at the 16th Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Chicago, 6 October 1989.
147. R. S. Sahota and S. L. Morgan, "A Computer-assisted strategy for recognizing the presence of chemical markers in complex data sets", American Statistical Association local symposium, Department of Statistics, University of South Carolina, Columbia, SC, 25 May 1990.
148. S. L. Morgan, "Characterization of chemical markers for bacteria by pyrolysis gas chromatography/mass spectrometry," invited paper, 9th International Conference on Fundamental Aspects, Analytical techniques, Processes, and Applications of Pyrolysis, Norwijkhoek, the Netherlands, June 11-15, 1990.
149. B. E. Watt, S. L. Morgan, and A. Fox, "What is a chemical marker", poster presented at the 9th International Conference on Fundamental Aspects, Analytical techniques, Processes, and Applications of Pyrolysis, Norwijkhoek, the Netherlands, June 11-15, 1990.
150. R. S. Sahota, S. L. Morgan, K. E. Creek, and L. Pirisi, "Pyrolysis/gas chromatography/mass spectrometry and pattern recognition for discrimination of virally transformed mammalian cells and their normal counterparts", poster presented at the 9th International Conference on Fundamental Aspects, Analytical techniques, Processes, and Applications of Pyrolysis, Norwijkhoek, the Netherlands, June 11-15, 1990.
151. R. S. Sahota and S. L. Morgan, invited speaker at a chemometrics symposium, "A Computer-assisted strategy for recognizing the presence of chemical markers in complex data sets", Federation of Analytical Chemistry and Spectroscopy Societies, Cleveland, OH, 11 October 1990.
152. R. S. Sahota and S. L. Morgan, "Vector representation, feature selection, and fingerprinting: An application of pattern recognition to pyrolysis gas chromatography/mass spectrometry of nucleosides", Federation of Analytical Chemistry and Spectroscopy Societies, Cleveland, OH, 12 October 1990.
153. Stephen L. Morgan and Alvin Fox, "Chemical markers for the differentiation and identification of microorganisms, including *Bacillus anthracis*, by pyrolysis-gas chromatography/mass spectrometry", Chemical Research Development and Engineering Center Conference on Chemical Defense, Aberdeen Proving Ground, MD, 15 November 1990.
154. Alvin Fox and Stephen L. Morgan, "Characterization of chemical markers for microorganisms using derivatization GC/MS and 16s-rRNA profiling", Chemical Research Development and Engineering Center Conference on Chemical Defense, Aberdeen Proving Ground, MD, 15 November 1990.
155. S. L. Morgan, R. S. Sahota, J. C. Rogers, B. E. Watt, and A. Fox, "Computer-assisted strategies for the detection and identification of chemical markers for microorganisms generated by pyrolysis", invited speaker, Symposium on Analytical Pyrolysis, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Chicago, IL, March 1991.
156. A. Fox and S. L. Morgan, "Identification of Chemical Markers for *Bacillus Anthracis* by Mass Spectrometry", invited speaker, U. S. Army Research Office Workshop on Spectrometry & Spectroscopy for Biologicals, (held at High Hampton Inn, Cashiers, NC, 28 April 1991), Army Research Office, Research Triangle Park, NC, 1991.
157. S. L. Morgan, A. Fox, and B. E. Watt, "Rapid profiling of lipid and carbohydrate content in microorganisms by pyrolysis gas chromatography/mass spectrometry", invited speaker, Second International Symposium on the Interface between Analytical Chemistry and Microbiology, University of Lund, Lund, Sweden, 13 June 1991.

158. S. L. Morgan and R. S. Sahota, "Recognition of chemical markers in GC/MS data: Feature selection, fingerprinting, and discriminant analysis", Second International Symposium on the Interface between Analytical Chemistry and Microbiology, University of Lund, Lund, Sweden, 13 June 1991.
159. S. L. Morgan, "Chemical markers for microorganisms by pyrolysis gas chromatography/mass spectrometry", invited speaker, Gordon Research Conference, Analytical Pyrolysis: The Thermal Processes of Materials, New Hampton School, New Hampton, NH, 26 June 1991.
160. A. Fox and S. L. Morgan, "Differentiation of Microorganisms by GC/MS profiling and 16s-rRNA profiling," invited speaker, European Workshop on Pyrolysis Mass Spectrometry, Biosensors, and Data Analysis, Setubal, Portugal, 16-20 September 1991.
161. S. L. Morgan and A. Fox, "Chemical markers for the differentiation and identification of microorganisms, including *Bacillus anthracis*, by pyrolysis gas chromatography/mass spectrometry", invited speaker, European Workshop on Pyrolysis Mass Spectrometry, Biosensors, and Data Analysis, Setubal, Portugal, 16-20 September 1991.
162. S. L. Morgan and R. S. Sahota, "Recognition of chemical markers for biodetection in GC/MS data: feature selection, fingerprinting, and discriminant analysis," European Workshop on Pyrolysis Mass Spectrometry, Biosensors, and Data Analysis, Setubal, Portugal, 16-20 September 1991.
163. S. L. Morgan and A. Fox, "Capillary GC/MS characterization of microorganisms," invited speaker, Western Carolinas Chromatography Discussion Group, 6th Annual Chromatography Conference, Greenville, NC, 5 November 1991.
164. E. Nimz and S. L. Morgan, "An on-line capillary GC derivatization method for the determination of fatty acid mixtures," Western Carolinas Chromatography Discussion Group, 6th Annual Chromatography Conference, Greenville, NC, 5 November 1991.
165. S. L. Morgan, R. S. Sahota, and A. Fox, "Recognition of chemical markers for biodetection in GC/MS data: feature selection, fingerprinting, and discriminant analysis," Chemical Research Development and Engineering Center Conference on Chemical Defense, Aberdeen Proving Ground, MD, 20 November 1991.
166. A. Fox and S. L. Morgan, "Characterization of chemical markers for microorganisms using derivatization GC/MS and 16s-rRNA profiling," Chemical Research Development and Engineering Center Conference on Chemical Defense, Aberdeen Proving Ground, MD, 20 November 1991.
167. S. L. Morgan, "Capillary GC/MS characterization of microorganisms," invited speaker, Western Carolinas Chromatography Discussion Group, 6th Annual Chromatography Conference, Greenville, NC, 5 November 1991.
168. E. L. Nimz and S. L. Morgan, "On-line derivatization for complex fatty acid mixtures by capillary gas chromatography/mass spectrometry," Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, LA, March 1992.
169. Melinda K. Denny, Stephen L. Morgan, and Alvin Fox, "Factor Analysis of Electron Impact Mass Spectra for Differentiation of Isomeric Alditol Hexaacetates," Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, LA, March 1992.
170. Stephen L. Morgan, Bruce E. Watt, Erik L. Nimz, and Alvin Fox, "Characterization of Carbohydrates for microbial detection by pyrolysis gas chromatography mass spectrometry," Chemical Research Development and Engineering Center Conference on Chemical Defense, Aberdeen Proving Ground, MD, 18 November 1992.
171. Y. Xiang, W. Zhao, B. E. Watt, and S. L. Morgan, "Computer-assisted selection of groups and ions for multiple ion monitoring in GC/MS" paper 15P presented at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Chicago, IL, 27 February 1994.
172. R. Galipo, J. F. Aust, M. K. Higgins, M. L. Myrick, and S. L. Morgan, "Curing of polymers studied by pyrolysis GC/MS", paper 24P presented at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Chicago, IL, 27 February 1994.
173. Y. Xiang, W. Zhao, and S. L. Morgan, "Noise reduction in gas chromatography/mass spectrometry data," paper 547 presented at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Chicago, IL, 1 March 1994.

174. S. L. Morgan and M. K. Higgins, "Reduction of dimensionality concepts for spectroscopic and chromatographic data", paper 642 presented at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Chicago, IL, 27 February 1994.
175. K. E. Chike, M. L. Myrick, W. Egan, and S. L. Morgan, "Comparison of Raman and evanescent Raman spectroscopies in the cure of an epoxy resin," paper 826 642 presented at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Chicago, IL, 27 February 1994
176. J. F. Aust, M. K. Higgins, W. Egan, S. L. Morgan, and M. L. Myrick, "Fiber optic FT-Raman studies of a polyimide curing reaction", paper 1141 642 presented at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Chicago, IL, 27 February 1994.
177. R. Galipo, J. F. Aust, M. K. Higgins, M. L. Myrick, and S. L. Morgan, "A study of polymer curing by chemometric analysis of data from Raman spectroscopy and pyrolysis GC/MS", paper 357 at Federation of Analytical Chemistry & Spectroscopy Societies meeting, St. Louis, MO, 4 October 1994.
178. W. J. Egan, L. Lloyd, S. M. Angel, and S. L. Morgan, "Evaluation of neural networks for calibration and dimensionality reduction of Raman Spectra from chlorinated hydrocarbon mixtures," paper 359 at Federation of Analytical Chemistry & Spectroscopy Societies meeting, St. Louis, MO, 4 October 1994.
179. S. L. Morgan, "Designing experiments and interpreting data: The analytical perspective", paper 479, invited keynote paper in Chemometrics symposium, Federation of Analytical Chemistry & Spectroscopy Societies meeting, St. Louis, MO, 5 October 1994.
180. S. L. Morgan, B. E. Watt, M. K. Higgins, and E. L. Nimz, "Carbohydrate mixture and polymer analysis using pyrolysis/high resolution gas chromatography/mass spectrometry", invited paper in Microcolumn Chromatography Symposium, Southeast Regional ACS Meeting, Birmingham, AL, 18 October 1994.
181. M. K. Higgins and S. L. Morgan, "Experimental design and multivariate data analysis for carbohydrate mixture and polymer analysis using pyrolysis /high-resolution gas chromatography/mass spectrometry", 1995; poster paper presented at International Symposium: Frontiers in Pyrolysis and Biomass Processing, Breckenridge, CO, June 1995.
182. S. L. Morgan and M. K. Higgins, "Experimental designs for mixtures applied to multivariate calibration with spectroscopic data", invited paper presented at the Federation of Analytical Chemistry and Spectroscopy Societies Annual Meeting, Cincinnati, OH, October, 1995
183. W. J. Egan, L. Lloyd, S. L. Morgan, and S. M. Angel, "Neural network calibration for trace chlorinated hydrocarbon contamination", abstract submitted and accepted for presentation at the 1995 Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, LA, March 1995.
184. S. L. Morgan and M. K. Higgins, "Three-mode principal component analysis of pyrolysis-gas chromatography/mass spectrometry data for oligosaccharides using a molecular mixture design", Paper 889, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, LA, March 1995.
185. Y. Xiang, M. K. Higgins, and S. L. Morgan, "Quantitation and identification of multiple components in contaminated samples using pattern recognition and principal component analysis", Paper 1388, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, LA, March 1995.
186. S. L. Morgan, Y. Xiang and R. C. Galipo, "A Pattern Matching Software Filter for Component Similarity in Gas Chromatography/Mass Spectrometry," Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Chicago, IL, 4 March 1996.
187. S. L. Morgan, W. J. Egan, L. Lloyd, and S. Michael Angel, "Improving the chemical interpretation of neural networks: A new methodology", Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Chicago, IL, 6 March 1996.
188. Y. Xiang, S. L. Morgan, V. Van Brunt, and Y. Jin, "Quantitative turbidimetric determination of tetraphenylborate," Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Chicago, IL, 7 March 1996.
189. W. J. Egan, S. L. Morgan, W. E. Brewer, and K. H. Habben, "Analysis of carboxyhemoglobin levels in blood using multivariate statistics," PittCon '97, March 18, 1997, Atlanta, GA.
190. R. C. Galipo, S. L. Morgan, W. E. Brewer, and K. H. Habben, "Supercritical fluid extraction of hair samples for the analysis of drugs of abuse", PittCon '97, March 18, 1997, Atlanta, GA.

191. K. Kochanowski, R. J. Galipo, W. J. Egan, S. L. Morgan, E. G. Bartick, R. A. Merrill, R. Mothershead, "Discrimination of photocopy toners using multivariate statistics," Pittcon '97, March 18, 1997, Atlanta, GA.
192. S. L. Morgan, W. J. Egan, S. M. Angel, T. H. Skinner, "Multivariate data analysis in optical imaging," Pittcon '97, March 18, 1997, Atlanta, GA.
193. S. L. Morgan and Y. Xiang, "Algorithms for enhancing signal-to-noise ratio and information content in gas chromatography/mass spectrometry," invited paper at Annual meeting of the American Society for Mass Spectrometry, Palm Springs, June 1997.
194. E. G. Bartick, R. A. Merrill, W. J. Egan, B. K. Kochanowski, and S. L. Morgan, "Forensic Discrimination of Photocopy Toners by FT-Infrared Reflectance Spectroscopy," International Conference on Fourier Transform Spectroscopy, Athens, GA, 13 August 1997.
195. S. L. Morgan, W. J. Egan, E. G. Bartick, R. A. Merrill, "Statistical Pattern Recognition Applied to Forensic Analytical Methods," paper presented at the Federation of Analytical Chemistry & Spectroscopy Societies meeting, Providence, RI, October 1997.
196. S. L. Morgan, "Validation of Pattern Recognition Methods Applied to Forensic Analytical Chemical Data," invited presentation, National Institute of Justice Workshop at the 1998 American Academy of Forensic Sciences Meeting, San Francisco, CA, 9 February 1998.
197. K. W. Sellers, S. L. Morgan, A. G. Simmons, G. A. Layton, and W. E. Brewer, "Systematic comparison of activated charcoal strip and solid-phase microextraction sampling for chromatographic analysis of arson debris," 1998 American Academy of Forensic Sciences Meeting, San Francisco, CA, 13 February 1998.
198. S. L. Morgan, E. G. Bartick, R. A. Merrill, W. J. Egan, and B. K. Kochanowski, "Forensic discrimination of photocopy toners by FT-infrared reflectance spectroscopy," 1998 American Academy of Forensic Sciences Meeting, San Francisco, CA, 12 February 1998.
199. K. W. Sellers, S. L. Morgan, A. G. Simmons, G. A. Layton, and W. E. Brewer, "Solid-phase microextraction sampling for chromatographic analysis of fire debris," Paper 886, PittCon '98, New Orleans, LA, 12 March 1998.
200. B. K. Kochanowski, S. L. Morgan, and W. E. Brewer, "Breath analysis using solid phase microextraction," PittCon '98, New Orleans, LA, 9 March 1998.
201. W. E. Brewer, R. C. Galipo, and S. L. Morgan, "Sensitivity Enhancement for Sample Introduction in Chromatographic Analyses Using a Sample Concentrator for Improved Sensitivity", PittCon '98, 10 March 1998, New Orleans, LA.
202. K. W. Sellers, S. L. Morgan, A. G. Simmons, G. A. Layton, and W. E. Brewer, "Systematic comparison of activated charcoal strip and solid-phase microextraction sampling for chromatographic analysis of arson debris," SC Academy of Science Meeting, Clemson, SC, 17 April 1998.
203. B. K. Kochanowski, S. L. Morgan, and W. E. Brewer, "Alcohol breath analysis by solid-phase microextraction compared to DataMaster results," SC Academy of Science Meeting, Clemson, SC, 17 April 1998.
204. J. Chance Carter, William J. Egan, Rajesh B. Nair, Catherine J. Murphy, Stephen L. Morgan and S. Michael Angel, "Fiber-optic imaging for in-situ chemical measurements," SPIE Conference, Boston, MA, 1-5 November 1988 (published as SPIE Proceedings 1998, Vol. 3540-34, 1-5 November 1998, Boston, MA).
205. S. L. Morgan, "Validation of pattern recognition methods applied to forensic analytical chemical data," invited presentation, NIJ Workshop, Annual Meeting of the National Academy of Forensic Sciences, Orlando, FL, 15 February 1999.
206. W. E. Brewer, K. W. Sellers, S. L. Morgan, "Disposable capillary extraction of drugs of abuse from biological specimens," American Academy of Forensic Sciences Annual Meeting, Orlando, FL 15 February 1999.
207. B. K. Kochanowski and S. L. Morgan, "Forensic Discrimination of Automotive Paint Samples Using Pyrolysis Gas Chromatography/Mass Spectrometry with Multivariate Statistics," paper 600, PittCon '99, Orlando, FL, March 1999.
208. T. A. Williams, M. B. Riddle, S. L. Morgan, and W. E. Brewer, "High speed gas chromatographic forensic screening for drugs of abuse," paper 104, PittCon '99, Orlando, FL, March 1999.

209. K. W. Sellers, R. C. Galipo, S. L. Morgan, and W. E. Brewer, "Supercritical fluid extraction and GC/MS analysis of cocaine and benzoylecognine from hair," PittCon '99, Orlando, FL, March 1999.
210. K. W. Sellers, T. A. Williams, S. L. Morgan, G. A. Layton, and W. E. Brewer, "Solid phase microextraction and Flash GC for rapid profiling of volatile signatures from arson debris," PittCon '99, Orlando, FL, March 1999.
211. W. E. Brewer, K. W. Sellers, T. A. Williams, and S. L. Morgan, "A new technique for rapid solventless extraction using disposable capillary columns," PittCon '99, Orlando, FL, March 1999.
212. W. J. Egan, S. L. Morgan, and S. M. Angel, "Rapid optimization and minimal complexity in neural network multivariate calibration of chlorinated hydrocarbons using Raman Spectroscopy," paper 242, PittCon '99, Orlando, FL, March 1999.
213. S. L. Morgan, "Forensic Analytical Chemistry: From Sherlock to Fast Drug Analysis," invited luncheon speaker, South Association of Chemistry Teachers Annual Meeting, Heathwood Hall Academy, Columbia, SC, April 1999.
214. S. L. Morgan, T. H. Richardson, and B. K. Kochanowski, "Using multivariate calibration to assist analytical problem solving: An overview," invited paper, Chemometrics Symposium, Eastern Analytical Symposium, NJ, 16 November 1999.
215. S. L. Morgan, "Weird Science," invited speaker, 1999-2000 Junior Science & Humanities Symposium, The University of South Carolina, Columbia, SC, 6 December 1999. Voted best science talk.
216. S. L. Morgan, "Validation of Pattern Recognition Methods Applied to Forensic Chemical Data," National Institute of Justice Workshop, American Academy of Forensic Sciences Annual Meeting, Reno, NV, February 2000.
217. V. R. Kinton and S. L. Morgan, "Classification and regression trees for Analytical Decision Making," paper presented at PittCon 2000, New Orleans, LA, 13 March 2000.
218. S. M. DuBose, W. J. Hames, and S. L. Morgan, "Chemometric Comparison of two separation methods," paper presented at PittCon 2000, New Orleans, LA, 13 March 2000.
219. K. W. Sellers and S. L. Morgan, E. G. Bartick, R. A. Merrill, and M. L. Miller, "Forensic characterization and discrimination of electrical and ducts tapes by pyrolysis GC/MS," paper presented at PittCon 2000, New Orleans, LA, 14 March 2000.
220. K. W. Sellers, S. L. Morgan, Catrechia M. Towns, U. H. F. Bunz, and L. Kloppenburg, "Characterization of high molecular weight poly (p-phenylenethynylene)s by pyrolysis gas chromatography/mass spectrometry," paper presented at PittCon 2000, New Orleans, LA, 14 March 2000.
221. N. K. Meruva, S. R. Goode, and S. L. Morgan, "Fast polymer analysis by gas chromatography/time-of-flight mass spectrometry," paper presented at PittCon 2000, New Orleans, LA, 14 March 2000.
222. N. K. Meruva, K. W. Sellers, and S. L. Morgan, and William E. Brewer, "Comparisons of chromatographic performance and data quality using fast gas chromatography," paper presented at PittCon 2000, New Orleans, LA, 17 March 2000.
223. S. L. Morgan, "Forensic Analytical Chemistry: From Sherlock to Fast Gas Chromatography," invited talk to a joint meeting of the Western Carolina local section of the American Chemical Society and the Western Carolinas Chromatography Discussion Group, Furman University, Greenville, SC, 21 March 2000.
224. N. K. Meruva, L. A. Grabill, S. R. Goode, S. L. Morgan, "Performance comparison of heated filament and laser pyrolysis techniques for fast polymer analysis by gas chromatography/time-of-flight mass spectrometry," paper presented at the Federation of Analytical Chemistry and Spectroscopy Societies Meeting, Nashville, TN, September 2000.
225. S. L. Morgan, K. W. Sellers, and J. Powell, "Discrimination of natural fibers and other polymers of forensic relevance by pyrolysis gas chromatography/mass spectrometry," paper presented at the Federation of Analytical Chemistry and Spectroscopy Societies Meeting, Nashville, TN, September 2000.
226. S. L. Morgan Validation of Pattern Recognition Methods Applied to Forensic Chemical Data, National Institute of Justice Workshop at the 2001 American Academy of Forensic Sciences Meeting, Seattle, WA, 21 February 2001.

227. N. K. Meruva, L. A. Grabill, S. R. Goode, S. L. Morgan, and E. L. Nimz, Rapid characterization of biopolymeric samples using pyrolysis fast gas chromatography/time-of-flight mass spectrometry, paper 787 presented at PittCon 2001, New Orleans, LA, March 2001.
228. C. R. Mubarak, B. Twenter, K. W. Sellers, U. H. F. Bunz, and S. L. Morgan, "Comparisons of polymer stability by analysis of thermal degradation rates using pyrolysis gas chromatography/mass spectrometry," paper 943 presented at PittCon 2001, New Orleans, LA, March 2001.
229. S. L. Morgan, "Validation of Pattern Recognition Methods Applied to Forensic Chemical Data," National Institute of Justice Workshop at the 2001 American Academy of Forensic Sciences Meeting, Seattle, WA, 21 February 2001.
230. S. L. Morgan and V. R. Kinton, "Chemometrics and spectrophotometry in the instrumental analysis laboratory: multicomponent mixtures and principal component analysis," Paper 194, invited paper at the Chemical Education Symposium at the South East Regional Meeting of the American Chemical Society (SERMACS), Savannah, GA, 24 September 2001.
231. S. L. Morgan and T. H. Richardson, "Significant Figures and Acid-base Equilibria as Prototypes for Interactive Web-base Learning," Paper 214, invited paper at the Chemometrics Symposium at the South East Regional Meeting of the American Chemical Society (SERMACS), Savannah, GA, 25 September 2001.
232. N. K. Meruva, L. A. Grabill, S. R. Goode, and S. L. Morgan, Performance Comparison of Heated Filament and Laser Pyrolysis Techniques for Fast Polymer Analysis by Gas Chromatography/Time-of-flight Mass Spectrometry, paper presented at the Federation of Analytical Chemistry & Spectroscopy Societies Meeting, Detroit, MI, October 2001.
233. N. K. Meruva, V. R. Kinton, S. R. Goode and S. L. Morgan, Rapid Characterization Of Isomeric Compounds Using Ion Abundance Ratios And Multivariate Data Analysis By Fast Gas Chromatography/Time-Of-Flight Mass Spectrometry, Paper 508, Eastern Analytical Symposium, Atlantic City, NJ, 1 October 2001.
234. S. L. Morgan and T. H. Richardson, "Teaching acid-base equilibria with JavaScript," invited paper presented at the Southeast Association of Academic Analytical Chemists (SEAAC), Columbia, SC, 3 November 2001.
235. S. L. Morgan, "Pattern Recognition applied to mass spectrometric differentiation of isomers," paper presented at the Southeast Association of Academic Analytical Chemists (SEAAC), Columbia, SC, 2 November 2001.
236. N. K. Meruva, L. A. Grabill, S. R. Goode, and S. L. Morgan, "Rapid polymer characterization using pyrolysis/fast gas chromatography/time-of-flight mass spectrometry," Poster paper presented at the Southeast Association of Academic Analytical Chemists (SEAAC), Columbia, SC 2 November 2001.
237. Andrea Thomas, Alexander A. Nieuwland, Stephen L. Morgan, and Scott R. Goode, "Discrimination of ammunition fragments using laser induced breakdown spectroscopy and canonical variate analysis," Poster paper presented at the Southeast Association of Academic Analytical Chemists (SEAAC), Columbia, SC 2 November 2001.
238. A. Thomas, A. Nieuwland, S. L. Morgan and S. R. Goode, "Using Laser Induced Breakdown Spectroscopy to Identify Materials: Classification Of Ammunition Samples," Winter Conference on Plasma Spectrochemistry, Scottsdale, AZ, January 2002.
239. S. L. Morgan, "Validation of Pattern Recognition Methods Applied to Forensic Chemical Data," National Institute of Justice Workshop, 2002 American Academy of Forensic Sciences Meeting, Atlanta, GA, 12 February 2002.
240. N. K. Meruva, V. R. Kinton, S. R. Goode, and S. L. Morgan, Rapid Characterization of Chiral Compounds Using Ion Abundance Ratio and Multivariate Analysis by Fast Gas Chromatography/Time-of-Flight Mass Spectrometry, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, March 2002.
241. N. K. Meruva, L. A. Grabill, S. R. Goode, and S. L. Morgan, Development of Pyrolysis Fast Gas Chromatography/Time-Of-Flight Mass Spectrometry: Applications to Synthetic Polymers, Paper 883, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, March 2002.

242. C. R. Mubarak, R. W. Zeigler, and S. L. Morgan, Fast automated Characterization of polymers using Py-GC/MS, Paper 1601P, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, March 2002.
243. L. A. Grabill, N. K. Meruva, S. R. Goode, and S. L. Morgan, Comparing Laser and Heated Filament Pyrolysis as Sample Introduction Techniques for Rapid Characterization of Polymers by Gas Chromatography/Time-of-Flight Mass Spectrometry, Paper 1391P, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, March 2002.
244. A. Nieuwland, S. L. Morgan, W. E. Brewer, Improving Gas Chromatography Sensitivity with Multiple Injections, Paper 127, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, March 2002.
245. A. Thomas, A. A. Nieuwland, S. L. Morgan and S. R. Goode, Discrimination of ammunition samples using Laser Induced Breakdown Spectroscopy and pattern recognition, Paper 1468P, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, March 2002.
246. Sara E. McFadden, Martha E. Miller, Christopher R. Mubarak, and Stephen L. Morgan, "Fourier Transform Infrared Spectroscopy for the Forensic Identification of Fibers", Oral paper presented at the SC Academy of Science, Undergraduate research session, USC Aiken, Aiken, SC, 12 April 2002.
247. Angela C. Powell, Christopher R. Mubarak, Stephen L. Morgan, and Demi Garvin "Profiling of Contaminants in Illicit Drug Samples for Source Identification", Oral paper presented at the SC Academy of Science, Undergraduate research session, USC Aiken, Aiken, SC, 12 April 2002.
248. S. R. Goode, A. Thomas, A. Nieuwland, and S. L. Morgan, "Identification of Ammunition by Laser Induced Breakdown Spectroscopy," Laser Induced Breakdown Spectroscopy 2002, Orlando, FL, September 2002.
249. S. R. Goode, A. Thomas, A. Nieuwland, S. L. Morgan, "Discrimination of Ammunition Fragments by Laser Induced Breakdown Spectroscopy," FACSS, Providence, RI, November 2002.
250. Christopher R. Mubarak, Lori A. Metz, Scott R. Goode, Stephen L. Morgan, "Analysis of natural and synthetic fibers by two microscopic techniques: laser pyrolysis fast gas chromatography/time-of-flight mass spectrometry and Fourier transform infrared microscopy," paper 90-19p, PittCon 2003, Orlando, FL, 10 March 2003.
251. Richard M. Hoskins, Scott R. Goode, and Stephen L. Morgan, "Quantitative elemental analysis of steel composition using laser Induced breakdown spectroscopy and multivariate calibration," paper 90-29p, PittCon 2003, Orlando, FL, 10 March 2003.
252. Christopher R. Dockery, Michael F. Bachmeyer, Scott R. Goode, Stephen L. Morgan, and Alexander A. Nieuwland, "Determination of gunshot residue by laser induced breakdown spectroscopy," paper 90-18P, PittCon 2003, Orlando, FL, 10 March 2003.
253. Stephen L. Morgan, Vanessa R. Kinton, and Narendra K. Meruva, "Multivariate data analysis for differentiation of mass spectra from Isomeric compounds," paper 730-8, PittCon 2003, Orlando, FL, 10 March 2003.
254. Christopher R. Mubarak and Stephen L. Morgan, "High performance liquid chromatography/mass spectrometry for the Forensic identification of ink components from inkjet printers," paper 1800-5p, PittCon 2003, Orlando, FL, 10 March 2003.
255. Andrea A. Thomas, Scott R. Goode, Stephen L. Morgan, Alexander A. Nieuwland, "Discrimination of ammunition fragments using laser induced breakdown Spectroscopy and linear discriminant analysis," paper 1800-11p, PittCon 2003, Orlando, FL, 10 March 2003.
256. Brandi L. Clelland, William E. Brewer, and Stephen L. Morgan, "On-line derivatization for GC/MS with electronic pressure control," paper 2000-2, PittCon 2003, Orlando, FL, 10 March 2003.
257. Lori A. Metz, Christopher R. Mubarak, Scott R. Goode, and Stephen L. Morgan, "Spatially resolved examination of polymeric surfaces by UV laser Pyrolysis-fast gas chromatography/time-of-flight mass spectrometry," paper 2000-8, PittCon 2003, Orlando, FL, 10 March 2003.
258. Steven M. DuBose, David H. Eagerton, Alejandra G. Lewis, and Stephen L. Morgan, "Forensic analysis of benzodiazepines in body fluids by multigradient High performance liquid chromatography/mass spectrometry," paper 2520-3, PittCon 2003, Orlando, FL, 10 March 2003.

259. Alexander A. Nieuwland, Steven M. DuBose, David H. Eagerton, Alejandra G. Lewis, and Stephen L. Morgan, "Forensic analysis of benzodiazepines in blood and urine samples by fast gas chromatography/mass spectrometry," paper 2520-4, PittCon 2003, Orlando, FL, 10 March 2003.
260. S. R. Goode, C. Dockery, M. Bachmeyer, A. Nieuwland, A. Thomas, and S. L. Morgan, "Forensic applications of laser-induced breakdown spectroscopy," National Meeting of the American Chemical Society, New Orleans, LA, 24 March 2003.
261. S. R. Goode, R. Hoskins, and S. L. Morgan, "Multivariate calibration for the analysis of alloys by laser-induced breakdown spectroscopy," National Meeting of the American Chemical Society, New Orleans, LA, 24 March 2003.
262. S. L. Morgan, "Relative Discriminating Power of Visible, UV/Visible, UV/Fluorescence, and Raman Spectrometry of Dyed Textile Fibers," invited presentation (one of two academic speakers invited), 2003 Research Partners Symposium, Federal Bureau of Investigation, Minneapolis, MN, 22 September 2003.
263. Stephen L. Morgan, Christopher R. Mubarak, James E. Hendrix, and Edward G. Bartick, "Relative Discriminating Power of Visible, UV/Visible, and UV/Fluorescence Microspectrophotometry for Forensic Analysis of Dyed Textile Fibers," invited paper, FACSS Annual Meeting, Ft. Lauderdale, FL, 20 October 2003.
264. Edward G. Bartick, William Pearman, Brandi L. Clelland, James E. Hendrix, Stephen L. Morgan, and S. Michael Angel, "Forensic Raman Microscopy of Fibers: Evaluation of Mounting Media," invited paper, FACSS Annual Meeting, Ft. Lauderdale, FL, 20 October 2003.
265. Stephen L. Morgan, "Feature selection and discrimination for chromatographic and spectroscopic applications of pattern recognition," invited paper, FACSS Annual Meeting, Ft. Lauderdale, FL, 21 October 2003.
266. Alexander A. Nieuwland, Stephen L. Morgan, Alexandra Lewis, David H. Eagerton, and Steven M. Dubose, "Forensic Analysis of Benzodiazepines in Blood and Urine Samples by Fast Gas-Chromatography/Mass Spectrometry," FACSS Annual Meeting, Ft. Lauderdale, FL, 21 October 2003.
267. Elizabeth M. Enlow, Jennifer L. Kennedy, Shana B. Burnett, Alexander A. Nieuwland, Christopher M. Mubarak, Stephen L. Morgan, "Discrimination of Nylon Subclasses using FTIR Microscopy and Multivariate Statistical Techniques," FACSS Annual Meeting, Ft. Lauderdale, FL, 21 October 2003.
268. Stephen L. Morgan, William E. Brewer, Stephen J. Lambert, and Scott R. Goode, "Forensic Analytical Chemistry: Exposing Students to Explosive Problems," invited paper, FACSS Annual Meeting, Ft. Lauderdale, FL, 22 October 2003.
269. S. L. Morgan, "Forensic Analytical Chemistry at the University of South Carolina," invited presentation at the Southeastern Regional Counterterrorism meeting, 15 January 2004, Savannah River Laboratory, Aiken, SC.
270. E. G. Bartick, B. L. Clelland, W. F. Pearman, K. Chen, S. M. Angel, J. E. Hendrix, and S. L. Morgan, "Analysis of dyed fibers by Raman microspectroscopy," invited paper at PittCon 2004, Chicago, IL, 11 March 2004.
271. B. L. Clelland, B. J. Vasser*, E.G. Bartick, S. L. Morgan and S. M. Angel, "An Investigation Into the Use of anti-Stokes micro-Raman Spectroscopy to Reduce Fluorescence in the Forensic Analysis of Dyed Fibers," PittCon 2004, Chicago, IL, March 2004.
272. B.J. Vasser*, E.M. Enlow*, D. I. Strauch*, A.A. Nieuwland, C. R. Mubarak, S. L. Morgan, and J. E. Hendrix, "UV-Vis and Fluorescence Microspectrophotometry for the Forensic Analysis of Fluorescent Brighteners on Textile Fibers", poster 22000-100 presented at PittCon 2004, Chicago, IL, March 2004.
273. S. L. Morgan, C. R. Mubarak, J. E. Hendrix, B. J. Vasser*, and E. M. Enlow*, "Forensic discrimination of dyed textile fibers using UV-vis and fluorescence microspectrophotometry: Selection of mountants," paper 11600-300 presented at PittCon 2004, Chicago, IL, 11 March 2004.
274. M. A. Baron*, C. R. Dockery, S. L. Morgan, and C. J. Murphy, "Characterization of Organic Ligand Coated Nanorods by Fourier Transform Infrared Spectroscopy and Analytical Pyrolysis-Gas Chromatography/Time of Flight Mass Spectrometry," paper presented at PittCon 2004, Chicago, IL, 11 March 2004.

275. B. L. Clelland, A. R. Stefan, C. R. Mubarak, and S. L. Morgan, "Analytical Pyrolysis GC/MS and FTIR Spectroscopy for the Forensic Discrimination of Synthetic and Natural Polymers," paper 11600-100, Pittcon 2004, 9 March 2004.
276. S. L. Morgan, A. A. Nieuwland, C. R. Mubarak, J. E. Hendrix, E. M. Enlow*, B. J. Vasser*, and E. G. Bartick, "Forensic Discrimination of Dyed Textile Fibers using UV-VIS and Fluorescence Microspectrophotometry," invited paper at Proceedings of the European Fibres Group (Annual Meeting, Prague, Czechoslovakia, 25 May 2004).
277. S. L. Morgan, "Relative Discriminating Power of Visible, UV/Visible, UV/Fluorescence, and Raman Spectrometry of Dyed Textile Fibers," invited oral presentation (only academic speakers invited), 2004 Federal Bureau of Investigation Research Partners Symposium, 32st Annual Symposium on Crime Laboratory Development, Minneapolis, MN, 2 September 2004.
278. S. L. Morgan, "Relative Discriminating Power of Visible, UV/Visible, UV/Fluorescence, and Raman Spectrometry of Dyed Textile Fibers," invited poster presentation (only academic speakers invited), 2004 Federal Bureau of Investigation Research Partners Symposium, 32st Annual Symposium on Crime Laboratory Development, Minneapolis, MN, 2 September 2004.
279. S. L. Morgan, "Capillary Electrophoresis of Textile Fiber Dyes," invited oral presentation, 2004 Federal Bureau of Investigation Research Partners Symposium, 32st Annual Symposium on Crime Laboratory Development, Minneapolis, MN, 2 September 2004; poster presentation.
280. S. L. Morgan, "Capillary Electrophoresis of Textile Fiber Dyes," invited poster presentation, 2004 Federal Bureau of Investigation Research Partners Symposium, 32st Annual Symposium on Crime Laboratory Development, Minneapolis, MN, 2 September 2004.
281. B. L. Clelland, S. M. Angel, B. J. Vasser*, W. E. Pearman, and S. L. Morgan, "Forensic Analysis of Dyed Fibers by Micro-Raman Spectroscopy," Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), 6 October 2004, Portland, OR.
282. S. L. Morgan, "Fast gas chromatography/mass spectrometry: Applications in forensics and polymer analysis," invited paper in the Advances in Chromatography Symposium, South East Regional Meeting of the American Chemical Society (SERMACS), Raleigh, NC, 11 November 2004.
283. Amy R. Stefan, Christopher R. Dockery, Alexander A. Nieuwland, Samantha N. Roberson*; James E. Hendrix, Stephen L. Morgan, Mark L. Miller, "Combinatorial Optimization of the Extraction of Dyes From Textile Fibers, paper B149. Annual Meeting of the American Academy of Forensic Sciences, New Orleans, 25 February 2005
284. Brandi L. Clelland, Alexander A. Nieuwland, James E. Hendrix, Stephen L. Morgan, Mark L. Miller, "Capillary Electrophoresis/Diode Array Detection/Mass Spectrometry for the Forensic Analysis of Fiber Dyes," paper B150. Annual Meeting of the American Academy of Forensic Sciences, New Orleans, 25 February 2005
285. Stephen L. Morgan, Alexander A. Nieuwland, Elizabeth M. Enlow*, James E. Hendrix, PhD; Edward G. Bartick, UV-Visible and Fluorescence Microspectrophotometry for the Forensic Analysis of Fluorescent Brighteners on Textile Fibers, paper B151. Annual Meeting of the American Academy of Forensic Sciences, New Orleans, 25 February 2005.
286. Stephen L. Morgan, Alexander A. Nieuwland, Christopher R. Mubarak, James E. Hendrix, Elizabeth M. Enlow*, Bryan J. Vasser*; Edward G. Bartick, "Forensic Discrimination of Dyed Textile Fibers Using UV-Vis and Fluorescence Microspectrophotometry," paper B152. Annual Meeting of the American Academy of Forensic Sciences, New Orleans, 25 February 2005
287. Brandi L. Clelland; Bryan J. Vasser*; Michael Angel, Stephen L. Morgan, Edward G. Bartick, "Discrimination of Dyed Fibers Using Raman Microspectroscopy for Forensic Analysis," paper D70. Annual Meeting of the American Academy of Forensic Sciences, New Orleans, 25 February 2005
288. Brandi L. Clelland; Bryan J. Vasser*; Michael Angel, Stephen L. Morgan, Edward G. Bartick, Discrimination of Dyed Fibers Using Raman Microspectroscopy for Forensic Analysis, paper 730-2, paper at Pittcon 2005, Orlando, FL, 1 March 2005.
289. Stephen L. Morgan, William E. Brewer, Stephen J. Lambert, and Scott R. Goode, "Using Forensic Science to teach undergraduate analytical chemistry: Problem solving in the real world," invited paper 880-2, at Pittcon 2005, Orlando, FL, 1 March 2005.

290. Amy R. Stefan, Alexander A. Nieuwland, Brandi L. Clelland, James E. Hendrix, Stephen L. Morgan, Mark L. Miller, PhD, "Capillary Electrophoresis/Diode Array Detection/Mass Spectrometry for the Forensic Analysis of Dyes Extracted from Textile Fibers," paper 1520-6, at Pittcon 2005, Orlando, FL, 2 March 2005.
291. Stephen L. Morgan, Alexander A. Nieuwland, James E. Hendrix, and Edward G. Bartick, "Multivariate Statistical Approaches for the Discrimination of Textile Fibers using UV-visible and Fluorescence Microspectrophotometry," invited paper at Sixth International Conference on Forensic Statistics, Arizona State University, College of Law, AZ, 17 March 2005.
292. Anthony R. Trimboli, Brandi L. Clelland, Amy R. Stefan, James E. Hendrix, and Stephen L. Morgan, and Edward G. Bartick, "Forensic Discrimination of Weathered Textile Fibers using UV-Vis and Fluorescence Microspectrophotometry," invited poster presentation, 2005 Federal Bureau of Investigation Research Partners Symposium, 33rd Annual Symposium on Crime Laboratory Development, Minneapolis, MN, 4 August 2005.
293. Amy R. Stefan, Brandi L. Clelland, Brittany Hartzel-Baguley, Stephen L. Morgan, and Mark L. Miller, "Capillary Electrophoresis/Mass Spectrometry for the Forensic Analysis of Dyes Extracted from Textile Fibers," Paper B77, Annual Meeting of the American Academy of Forensic Sciences, Seattle, 23 February 2006.
294. Stephen L. Morgan, Brandi L. Clelland, Amy R. Stefan, Anthony R. Trimboli, Brittany Hartzell-Baguley, James E. Hendrix, and Edward G. Bartick, "Environmental Effects on Textile Fibers", Paper B78, Annual Meeting of the American Academy of Forensic Sciences, Seattle, 23 February 2006.
295. Stephen L. Morgan, Brandi L. Clelland, Amy R. Stefan, Anthony R. Trimboli, Alexander A. Nieuwland, James E. Hendrix, "Multivariate Statistical Approaches for the Discrimination of Textile Fibers by UV/visible and Fluorescence Spectrophotometry," Paper B79, Annual Meeting of the American Academy of Forensic Sciences, Seattle, 23 February 2006.
296. Brandi L. Clelland, Brittany Hartzell-Baguley, Amy R. Stefan, and Stephen L. Morgan, "An improved sheath-flow interface for the analysis of textile dyes using capillary electrophoresis/diode array detection/mass spectrometry," paper 1410-1 presented at the 57th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, 15 March 2006.
297. Brittany Hartzell-Baguley, Brandi L. Clelland, Amy R. Stefan, and Stephen L. Morgan, "Simplex Optimization of a Capillary Electrophoresis-Diode Array Detection-Mass Spectrometry Method for the Analysis of Cationic Dyes," paper 1410-5 presented at the 57th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, 15 March 2006.
298. Brittany Hartzell-Baguley, Rachael Hipp, Neal R. Morgan, Stephen L. Morgan. "GC-MS Characterization of Chemical Composition in Latent Fingerprints," paper 1700-2 presented at the 57th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Orlando, FL, 14 March 2006. Note: this paper was cited in the 3 April 2006 issue of Chemical & Engineering News in their summary article on PittCon 2006. This full article can be accessed at: http://www.chem.sc.edu/faculty/morgan/students/images/CEN_040306.pdf.
299. Brandi L. Clelland, S. Michael Angel, Bryan J. Vasser, William E. Pearman, and Stephen L. Morgan, and Edward G. Bartick, "Discrimination of polyamide fibers using Raman microspectroscopy and multivariate statistics," poster paper 1870-29 presented at the 57th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, 15 March 2006.
300. Amy R. Stefan, Brandi L. Clelland, Brittany Hartzel-Baguley, Stephen L. Morgan, and Mark L. Miller, "Capillary Electrophoresis/Mass Spectrometry for the Forensic Analysis of Dyes Extracted from Textile Fibers," paper 2310-1 presented at the 57th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, 16 March 2006.
301. Anthony R. Trimboli, Stephen L. Morgan, Brandi L. Clelland, Amy R. Stefan, Brittany Hartzell-Baguley, James E. Hendrix, and Edward G. Bartick, "Environmental Effects on Textile Fibers", paper 2310-4 presented at the 57th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, 16 March 2006.
302. Stephen L. Morgan, Brandi L. Clelland, Amy R. Stefan, Anthony R. Trimboli, Alexander A. Nieuwland, James E. Hendrix, "Discrimination of Textile Fibers by UV/visible and Fluorescence

- Microspectrophotometry and Multivariate Statistics," paper 2310-3 presented at the 57th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, 16 March 2006.
303. Anthony R. Trimboli, Brandi L. Clelland, Amy R. Stefan, Brittany Baguley, James E. Hendrix, Stephen L. Morgan, and Edward G. Bartick, "Environmental Effects on Textile Fibers," invited poster presented at the 34th Annual Symposium on Crime Laboratory Development, 10 May 2006.
 304. Amy R. Stefan, Brandi L. Clelland, Brittany Baguley, and Stephen L. Morgan, "Microextraction/Capillary Electrophoresis/Mass Spectrometry for the Forensic Analysis of Textile Fiber Dyes," invited paper presented in the symposium titled "Recent Advances in Forensic Science I," at the Federation of Analytical Chemistry and Spectroscopy Societies, Lake Buena Vista, FL, 26 September 2006.
 305. Anthony R. Trimboli, Allyson A. Wells, Heather M. Taylor, Amy R. Stefan, Brandi L. Clelland, and Stephen L. Morgan, "Forensic studies of dye and fiber degradation during environmental exposure by microspectrophotometry and capillary electrophoresis/mass spectrometry," invited paper presented in the symposium titled "Recent Advances in Forensic Science I," at the Federation of Analytical Chemistry and Spectroscopy Societies, Lake Buena Vista, FL, 26 September 2006.
 306. Stephen L. Morgan, Amy R. Stefan, Anthony R. Trimboli, and Edward G. Bartick, "Advances in identification of dyed textile fibers using capillary electrophoresis/mass spectrometry," invited paper presented in the symposium titled, "Spectroscopy and Mass Spectrometry in Forensic Science I," at the Federation of Analytical Chemistry and Spectroscopy Societies, Lake Buena Vista, FL, 27 September 2006.
 307. Edward G. Bartick, Stephen L. Morgan, Suzanna H. Hall, and Anthony R. Trimboli, "UV-visible, Fluorescence, and Raman Microspectrophotometry for Identification of Dyed Textile Fibers," invited paper presented in the symposium titled "Spectroscopy and Mass Spectrometry in Forensic Science I," at the Federation of Analytical Chemistry and Spectroscopy Societies, Lake Buena Vista, FL, 27 September 2006.
 308. Anthony R. Trimboli, Allyson A. Wells, Jennifer J. Yiu, Heather M. Taylor, Amy R. Stefan, Brandi L. Clelland, Stephen L. Morgan, "Forensic Studies of Dye and Fiber Degradation during Environmental Exposure by Microspectrophotometry and Capillary Electrophoresis/Mass Spectrometry," paper B5 at the American Academy of Forensic Sciences, 59th Annual Meeting, San Antonio, TX, 21 February 2007.
 309. Stephen L. Morgan and Edward G. Bartick, "Validation of computer-assisted classification of trace evidence data: lies, damned lies, and multivariate statistics," paper presented at the American Academy of Forensic Science, San Antonio, TX, 22 February 2007.
 310. Brandi L. Clelland, S. Michael Angel, Stephen L. Morgan, and Edward G. Bartick, "Raman microspectroscopy for forensic discrimination of nylon polymer subclasses and quantitation of titanium dioxide on textile fibers," paper presented at the American Academy of Forensic Science, San Antonio, TX, 22 February 2007.
 311. J. L. Schroeder, L. J. Marinetti, W. E. Brewer, B. L. Clelland, and S. L. Morgan, "Rapid Analysis of THC and Metabolites Using Disposable Pipette Extraction", paper presented at the American Academy of Forensic Science, San Antonio, TX, 22 February 2007.
 312. Anthony R. Trimboli, Allyson A. Wells, Jennifer J. Yiu, Heather M. Taylor; Amy R. Stefan, Brandi L. Clelland, Stephen L. Morgan, "Forensic Studies of Dye and Fiber Degradation during Environmental Exposure by Microspectrophotometry and Capillary Electrophoresis/Mass Spectrometry," Poster 820-22 presented at the 58th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Chicago, IL February 2007.
 313. Stephen L. Morgan, Amy R. Stefan, Anthony R. Trimboli, Brandi L. Clelland, Brittany Hartzell-Baguley, "Forensic identification of dyes on 1-2 mm fibers by capillary electrophoresis/mass spectrometry," paper presented at the 58th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Chicago, IL, 27 February 2007.
 314. Sparkle T. Ellison, Bryan Oliver, and Stephen L. Morgan, "Multivariate Calibration of Pyrolysis Temperatures using Kraton® as a Molecular Thermometer," Paper 1040-1, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (PITTCO 2007), Chicago, 27 February 2007.
 315. Heather M. Taylor, Anthony R. Trimboli, and Stephen L. Morgan, "Validation Studies for the Detection of Blood on Substrates of Forensic Relevance by Fourier-Transform Infrared (FT-IR) Spectroscopy,"

- oral paper submitted for the SC Academy of Science, Annual Meeting, Columbia, SC, 20 April 2007 [http://www.erskine.edu/cgi-bin/scas/abstract_form.cgi].
316. Amanda C. Kesler, Amy R. Stefan, and Stephen L. Morgan, "Forensic discrimination of ballpoint pen ink using UV/Visible microspectrophotometry and multivariate statistics," paper at the SC Academy of Science, Annual Meeting, Columbia, SC, 20 April 2007.
 317. Holly T. Herro, Kristi L., Wright, Stephen L. Morgan, "Determination of Ink Chemistry Prior to Stabilization of Historic Documents Written with Ballpoint Ink," paper presented at the American Institute for Conservation of Historic and Artistic Works, 35th Annual Meeting, Richmond, VA, 18 April 2007.
 318. Heather M. Taylor, Anthony R. Trimboli, and Stephen L. Morgan, "Validation Studies for the Detection of Blood on Substrates of Forensic Relevance by Fourier-Transform Infrared (FT-IR) Spectroscopy," poster submitted for the University of South Carolina Discovery Day undergraduate research poster competition, 27 April 2007.
 319. Amanda C. Kesler, Amy R. Stefan, and Stephen L. Morgan, "Forensic discrimination of ballpoint pen ink using UV/Visible microspectrophotometry and multivariate statistics," poster submitted for the University of South Carolina Discovery Day undergraduate research poster competition, 27 April 2007.
 320. Stephen L. Morgan, Suzanna H. Hall, James E. Hendrix, and Edward G. Bartick, "Pattern Recognition Methods For The Classification Of Trace Evidence Textile Fibers From UV/visible And Fluorescence Spectra," invited paper presented at the FBI Trace Evidence Symposium, Clearwater, FL, 15 August 2007.
 321. Stephen L. Morgan, Brandi C. Vann, Brittany M. Baguley, and Amy R. Stefan, "Advances in Discrimination of Dyed Textile Fibers using Capillary Electrophoresis/Mass Spectrometry", invited paper presented at the FBI Trace Evidence Symposium, Clearwater, FL, 16 August 2007.
 322. Stephen L. Morgan and Edward G. Bartick. "Pushing the Envelope for Fiber Analysis by UV/visible and Fluorescence Microspectrophotometry," invited paper presented at the Symposium on Molecular Spectroscopy in Forensic Science, Paper 187, 34th annual meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Memphis, TN, 15 October 2007.
 323. Stephen L. Morgan, Amy R. Stefan, Brittany M. Baguley, and Brandi C. Vann, "Capillary Electrophoresis/Mass Spectrometry for Analysis and Comparisons of Dyed Fibers", invited paper presented at the Advances in Spectroscopy and Mass Spectrometry in Forensic Sciences, 34th annual meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Memphis, TN, 15 October 2007.
 324. Brandi L. Vann, S. Michael Angel, Stephen L. Morgan, and Edward G. Bartick, "The Merits and Pitfalls of the Forensic Analysis of Dyed Textile Fibers using Raman Spectroscopy ", invited paper presented at the Symposium on Molecular Spectroscopy in Forensic Science, 34th annual meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Memphis, TN, 15 October 2007.
 325. Anthony R. Trimboli, Heather M. Taylor, Dorekia K. Schultz, Stephen L. Morgan, "Validation Studies for Detection of Blood on Substrates of Forensic Relevance by Fourier-Transform Infrared (FT-IR) Spectroscopy," paper presented at the 34th annual meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Memphis, TN, 15 October 2007.
 326. S. T. Ellison, W. E. Brewer, and S. L. Morgan, "Comprehensive Analysis of Drugs and Metabolites in Urine with Automated Disposable Pipette Extraction", SOFT Annual Meeting, Oct. 2007, Durham, NC.
 327. William E. Brewer, Frederic Foster, and E. Pfannkoch, "Automated Disposable Pipette Extraction of Pesticides from Fruits and Vegetables", Eastern Analytical Symposium, November 2007, Somerset, NJ.
 328. Sparkle T. Ellison, Jessica L. Michaud, Kristen W. S. Pate, Edward G. Bartick and Stephen L. Morgan, "Discrimination of black electrical tape using attenuated total reflectance and pyrolysis-gas chromatography mass spectrometry," paper B151 presented at the Academy of Forensic Sciences 60th Anniversary Meeting, Washington, DC, 22 February 2008.

329. Anthony R. Trimboli and Stephen L. Morgan, "Infrared spectroscopy for characterization of bloodstain age using the amide spectral regions from blood proteins," paper B127 presented at the Academy of Forensic Sciences 60th Anniversary Meeting, Washington, DC, 22 February 2008.
330. Stephen L. Morgan, "Capillary electrophoresis/mass spectrometry and microspectrophotometry for trace forensic analysis of fibers," invited paper 1350-4 in the ACS Division of Analytical Chemistry Symposium, "Analytical Chemistry for Crime Scene Investigation," presented at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy (Pittcon 2008), New Orleans, LA, 4 March 2008.
331. Anthony R. Trimboli, Jessica N. McCutcheon, and Stephen L. Morgan, "Validation of diffuse reflectance infrared spectroscopy (DRIFTS) as a means to discriminate blood from forensically relevant substrates," paper 1490-3 presented at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy (Pittcon 2008), New Orleans, LA, 4 March 2008.
332. Hongxia Guan, Lynn R. Musgrove, William E. Brewer, Stephen L. Morgan, "Determination of organophosphate pesticides and fungicides in fruits and vegetables by disposable pipette extraction (DPX) and gas chromatography/mass spectrometry," paper 2010-11P presented at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy (Pittcon 2008), New Orleans, LA, 5 March 2008.
333. Sparkle T. Ellison, William E. Brewer, Stephen L. Morgan, "Comprehensive analysis of drugs of abuse in urine with automated disposable pipette extraction," paper 2200-4 presented at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy (Pittcon 2008), New Orleans, LA, 5 March 2008.
334. Michael L. Myrick, Stephen L. Morgan, Anthony R. Trimboli, Jessica N. McCutcheon, Heather Brooke, and Megan Baranowski, "Early stage report on the infrared visualization of blood stains on fabrics based on sensitized thermal detectors," Technical Working Group on Trace Evidence, Falls Church, VA, 7 April 2008.
335. William E. Brewer, Hongxia Guan, and Stephen L. Morgan, "Validation studies of disposable pipette extraction of pesticides in fruit and vegetables", Southern Section of AOAC International Regional Meeting, Atlanta, GA, April 2008.
336. Jessica Michaud and Stephen L. Morgan "Forensic discrimination of black electrical tape using attenuated total reflectance and pyrolysis gas chromatography/mass spectrometry", poster presented at the University of South Carolina Discovery Day undergraduate research poster competition, 20 April 2008.
337. Heather Taylor and Dorekia Schultz and Stephen L. Morgan, "Determination of the age of bloodstains by attenuated total reflectance infrared spectroscopy," poster presented at the University of South Carolina Discovery Day undergraduate research poster competition, 20 April 2008.
338. Ashley Bagwell and Stephen L. Morgan, "Comprehensive analysis of drugs of abuse in urine with automated disposable pipette extraction," poster presented at the University of South Carolina Discovery Day undergraduate research poster competition, 20 April 2008.
339. William E. Brewer, Hongxia Guan, Stephen L. Morgan, S. T. Garris, and C. Craft, "Multi-residue pesticide analysis on incurred produce samples using variations of disposable pipette extraction", Florida Pesticide Residue Workshop, 21 July 2008, St. Pete Beach, FL.
340. Megan Baranowski, Heather Brooke, Jessica N. McCutcheon, Anthony R. Trimboli, Stephen L. Morgan, Michael L. Myrick, "Validation experiments for infrared visualization of blood stains on fabrics based on sensitized thermal detectors," poster paper, Federation of Analytical Chemistry & Spectroscopy Societies Annual Meeting, Reno, NV, 30 September 2008.
341. Heather Brooke, Megan Baranowski, Jessica N. McCutcheon, Anthony R. Trimboli, Stephen L. Morgan, Michael L. Myrick, "Performance evaluation of a sensitized thermal detector for infrared forensic visualization of blood stains on fabrics using chemometrics-driven simulations, invited oral paper, Federation of Analytical Chemistry & Spectroscopy Societies Annual Meeting, Reno, NV, 30 September 2008.
342. Heather Brooke, Megan Baranowski, Jessica N. McCutcheon, Anthony R. Trimboli, Stephen L. Morgan, Michael L. Myrick, "MatLab simulations for infrared visualization of blood stains on fabrics based on

- sensitized thermal detectors," poster paper, Federation of Analytical Chemistry & Spectroscopy Societies Annual Meeting, Reno, NV, 30 September 2008.
343. Stephen L. Morgan, "Forensic applications of multivariate statistical methods for discrimination of trace evidence," invited oral paper, Federation of Analytical Chemistry & Spectroscopy Societies Annual Meeting, Reno, NV, 30 September 2008.
344. Stephen L. Morgan, Sparkle T. Ellison, and Pakritsadang Kaewsuya, "Experimental design, optimization and pattern recognition in chromatography: applications and perspectives," invited oral paper, Federation of Analytical Chemistry & Spectroscopy Societies Annual Meeting, Reno, NV, 1 October 2008.
345. William E. Brewer, Sparkle T. Ellison, Stephen L. Morgan, J. R. Stuff, and F. D. Foster, "Completely automated GC/MS analysis of drugs and metabolites using disposable pipette extraction with cooled injection system", Society of Forensic Toxicologists, Inc. (SOFT) Annual Meeting, 27 October 2008, Phoenix, AZ.
346. Sparkle T. Ellison, Anthony P. Gies, David M. Hercules and Stephen L. Morgan, "MALDI-TOF/TOF CID study of polysulfone fragmentation reactions," paper 64353, Southeast Regional meeting of the American Chemical Society (SERMACS 2008), Nashville, TN, 12 November 2008.
347. Frederick D. Foster, Sparkle T. Ellison, Stephen L. Morgan, William E. Brewer, E. A. Pfannkoch, J. R. Stuff, J. Whitecavage, "Analysis of Drugs and Metabolites in Blood and Urine using Automated Disposable Pipette Extraction", Eastern Analytical Symposium, November 2008, Somerset, NJ.
348. Stephen L. Morgan, Michael L. Myrick, Heather Brooke, Jessica N. McCutcheon, Megan Baranowski, Anthony R. Trimboli, "Forensic discrimination of blood on various substrates by diffuse reflectance infrared spectroscopy (DRIFTS) and visualization using a sensitized thermal detector", paper A10 presented at the Academy of Forensic Sciences 61st Anniversary Meeting, Denver, CO, 19 February 2009.
349. Stephen L. Morgan, Michael L. Myrick, Heather Brooke, Jessica N. McCutcheon, Megan Baranowski, Anthony R. Trimboli, "Design, development, and evaluation of a sensitized camera based on thermal detection by diffuse reflectance infrared spectroscopy for forensic visualization of trace blood", invited paper at the National Institute of Justice General Forensics R&D Grantee meeting, Denver, CO, 17 February 2009.
350. Heather Brooke, Megan Baranowski, Jessica N. McCutcheon, Stephen L. Morgan, Michael L. Myrick, "Performance evaluation of a sensitized thermal detector for Infrared forensic Visualization of Blood Stains on Fabrics using chemometrics-driven simulations," Poster 560-10P presented at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Chicago, IL, 9 March 2009.
351. Megan Baranowski, Heather Brooke, Jessica N. McCutcheon, Stephen L. Morgan, Michael L. Myrick, "Validation experiments for infrared visualization of blood stains on fabrics based on sensitized thermal detectors," Poster 560-2P to at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Chicago, IL, 9 March 2009.
352. Sparkle T. Ellison, William E. Brewer, Stephen L. Morgan, John R. Stuff, "Completely automated GC/MS analysis of benzodiazepines in blood and urine using disposable pipette extraction with on-column derivatization," paper 800-5 presented at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy (Pittcon 2009), Chicago, IL, 9 March 2009.
353. Sparkle T. Ellison, William E. Brewer, Stephen L. Morgan, Frederick D. Foster, "Comprehensive analysis of drugs of abuse in blood and urine with automated disposable pipette extraction and HPLC/MS/MS," paper 2290-16 presented at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy (Pittcon 2009), Chicago, IL, 11 March 2009.
354. Hongxia Guan, William E. Brewer, Stephen L. Morgan, Jacqueline A. Whitecavage, "Automated multi-residue pesticide analysis in high fat content samples by disposable pipette extraction (DPX) and gas chromatography/mass spectrometry," poster 1980-12 presented at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy (Pittcon 2009), Chicago, IL, 11 March 2009.
355. Hongxia Guan, William E. Brewer, Stephen L. Morgan, John R. Stuff, Jacqueline A. Whitecage, Frederick D. Foster, "Automated multi-residue pesticide analysis in fruits and vegetables by disposable pipette extraction (DPX) and gas chromatography/mass spectrometry," poster 1980-13 presented at

- the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy (Pittcon 2009), Chicago, IL, 11 March 2009.
356. Jessica N. McCutcheon, Anthony R. Trimboli, Michael L. Myrick, Stephen L. Morgan, "Estimation of bloodstain age on polymer substrates by diffuse reflectance spectroscopy," Paper presented at the South Carolina Academy of Science Annual Meeting, Columbia, SC, April 14-16, 2009.
 357. Frederick D. Foster, William E. Brewer, Sparkle T. Ellison, Stephen L. Morgan, Tom Gluodenis, "Analysis of drugs of abuse using automated disposable pipette extraction and LC/MS/MS," paper 2466 presented at the 57th ASMS Conference on Mass Spectrometry, Philadelphia, PA, 31 May-4 June 2009.
 358. William E. Brewer, Sparkle T. Ellison, Stephen L. Morgan, and Frederick D. Foster, "Rapid and automated chromatographic analysis of drugs and metabolites in biological specimens using disposable pipette extraction (DPX), American Association for Clinical Chemistry, July 2009, Chicago, IL.
 359. Stephen L. Morgan, John Goodpaster, and Elisa Liszewski, "The Use of Multivariate Statistics in Trace Evidence Investigations," organizer and main presenter of a full-day workshop presented at the Trace Evidence Symposium, Interpretation of Trace Evidence: The Present and the Future" (sponsored by the National Institute of Justice, Washington, DC), Clearwater Beach, FL, 4 August 2009.
 360. Stephen L. Morgan and Michael L. Myrick, "Performance evaluation of a sensitized thermal detector for infrared forensic visualization of blood stains on fabrics using chemometric-driven simulations," invited paper at the 2009 General Forensics R&D Grantees Meeting, held at the International Association for Identification Annual Meeting, Clearwater, FL, 18 August 2009.
 361. Heather Brooke, Megan Baranowski, Jessica N. McCutcheon, Stephen L. Morgan, Michael L. Myrick, "Novel infrared imaging system for the detection of blood stains," invited oral paper at the Federation of Analytical Chemistry & Spectroscopy Societies Annual Meeting, Louisville, KY, 18 October 2009.
 362. Megan Baranowski, Jessica N. McCutcheon, Stephen L. Morgan, and Michael Myrick, "Determination of the relationship between the thickness of thin Films on fabrics and the resulting spectrum based on diffuse reflectance infrared Fourier transform spectroscopy," oral paper at the Federation of Analytical Chemistry & Spectroscopy Societies Annual Meeting, Louisville, KY, 18 October 2009.
 363. Jessica N. McCutcheon, Heather Brooke, Megan Baranowski, Michael L. Myrick, and Stephen L. Morgan, "Performance evaluation of IR imaging for the discrimination of bloodstains," oral paper submitted for presentation at the Federation of Analytical Chemistry & Spectroscopy Societies Annual Meeting, Louisville, KY, 18 October 2009.
 364. William E. Brewer, Hongxia Guan, Sparkle T. Ellison, Stephen L. Morgan, and Fred D. Foster, "Completely Automated LC/MS/MS Analyses of Drugs and Metabolites Using Disposable Pipette Extraction (DPX)", SOFT Annual Meeting, October 2009, Oklahoma City, OK.
 365. Stephen L. Morgan, "Discovering patterns and validating measurements: Chemometric tools for forensic analytical chemistry," invited paper, Symposium on Computational Pattern Recognition in Forensics, Eastern Analytical Symposium, Somerset, NJ, 16 November 2009.
 366. Fredrick D. Foster, John R. Stuff, Edward A. Pfannkoch, Sparkle T. Ellison, William E. Brewer, and Stephen L. Morgan, "Analysis of drugs of abuse using automated disposable pipette extraction and LC/MS/MS," Eastern Analytical Symposium, 15 November 2009, Somerset, NJ.
 367. Stephen L. Morgan, "Chemometrics 101: Theory and practice," invited, Workshop on chemometrics for forensic scientists, American Academy of Forensic Science, 62nd Annual meeting, Seattle, WA, 23 February 2010.
 368. Oscar G. Cabrices, Stephen L. Morgan, James E. Hendrix, Pakritsadang Kaewsuya, and Micheline Goulart, "Forensic Identification of Fluorescent Brighteners on Trace Evidence Fibers by Capillary Electrophoresis," paper A113, American Academy of Forensic Sciences, Seattle, WA, 25 February 2010.
 369. William E. Brewer, Hongxia Guan, and Stephen L. Morgan, "Analysis of Melamine and Cyanuric Acid in Milk Products," Paper 660-3P, Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy (PittCon) 2010, Orlando, FL. 1 March 2010.
 370. Stephen L. Morgan, "Forensic Analytical Chemistry: Basic Research behind CSI," invited lecture, Sigma Xi chapter, Fairfield University, Fairfield, CT, 29 March 2010.

371. Stephen L. Morgan, "Chemometrics 101: Why all chemists (including students) should care about statistics," invited lecture to analytical chemistry students and faculty, Department of Chemistry, Fairfield University, 30 March 2010.
372. William E. Brewer, Pakritsadang Kaewsuya, Stephen L. Morgan, Alexander J. Krynitsky and John A.G. Roach, "Analysis of Melamine and Cyanuric Acid in Milk Products," AOAC Southern Regional Meeting, Atlanta, GA, 19 April 2010.
373. Stephen L. Morgan, "Chemical information: the multivariate view," invited seminar, Department of Chemistry, Tennessee Tech University, 29 April 2010.
374. Stephen L. Morgan, "Forensic Analytical Chemistry: Basic Research behind CSI," invited lecture, Sigma Xi Annual Awards Banquet, Tennessee Tech University, 29 April 2010.
375. Stephen L. Morgan, "Forensic discrimination of dyed textile fibers using UV/visible and fluorescence microspectrophotometry and micro-extraction/capillary electrophoresis/mass spectrometry," invited seminar, Department of Chemistry, East Carolina University, Greenville, NC, 19 May 2010
376. Stephen L. Morgan, "Forensic Analytical Chemistry: Basic Research behind CSI," invited lecture, Sigma Xi Annual Awards Banquet, East Carolina University, Greenville, NC, 19 May 2010.
377. William E. Brewer, Pakritsadang Kaewsuya, Mike Walla, Stephen L. Morgan, Alexander J. Krynitsky and John A.G. Roach, "Disposable Pipette Extraction (DPX) Tips for Rapid Cleanup for Simultaneous Analysis of Melamine and Cyanuric Acid using GC/MS/MS and LC/MS/MS," Florida Pesticide Residue Workshop, 20 July 2010, St. Pete Beach, FL.
378. Stephen L. Morgan, Jessica N. McCutcheon, Megan R. Baranowski, Heather Brooke, Michael L. Myrick, "Multivariate analysis of variance for forensic trace evidence decision-making," invited paper in "Chemometrics in Forensics" symposium, Federation of Analytical Chemistry & Spectroscopy Societies, Raleigh, NC, 19 October 2010.
379. Michael L. Myrick, Heather Brooke, Megan R. Baranowski, Jessica N. McCutcheon, Stephen L. Morgan, "The design of an infrared imaging system for blood stains at crime scenes using a chemometrics simulation-driven process," invited paper in "Chemometrics in Forensics" symposium, Federation of Analytical Chemistry & Spectroscopy Societies, Raleigh, NC, 19 October 2010.
380. Megan R. Baranowski, Michael L. Myrick, Heather Brooke, Jessica N. McCutcheon, Stephen L. Morgan, "Coating Effects on Fabric Infrared Reflectance Spectra," paper presented at the Federation of Analytical Chemistry & Spectroscopy Societies, Annual Meeting, Raleigh, NC, 19 October 2010.
381. Oscar G. Cabrices, William E. Brewer, and Stephen L. Morgan, "Comprehensive Analysis of Drugs of Abuse in Whole Blood Using Cleanup Tips and LC/MS/MS", Society of Forensic Toxicologists (SOFT) Annual Meeting, 21 October 2010, Richmond, VA.
382. Oscar Cabrices, William E. Brewer, and Stephen L. Morgan, "Automated and Comprehensive Analysis of Drugs of Abuse in Whole Blood Using Cleanup Tips and LC/MS/MS" Society of Forensic Toxicologists, Annual Meeting, Richmond, VA, 10 October 2010.
383. Oscar Cabrices, William E. Brewer, and Stephen L. Morgan, "Automated and Comprehensive Analysis of Drugs of Abuse in Whole Blood Using Cleanup Tips and LC/MS/MS," paper K13, Toxicology section, American Academy of Forensic Sciences, Annual Meeting, Chicago, IL, 22 February 2011.
384. Oscar Cabrices, William E. Brewer, and Stephen L. Morgan, "Automated and Comprehensive Analysis of Drugs of Abuse in Whole Blood Using Cleanup Tips and LC/MS/MS" paper K13, Toxicology section, American Academy of Forensic Sciences, Annual Meeting, Chicago, IL, 22 February 2011.
385. Oscar Cabrices, Anthony R. Trimboli, James E. Hendrix and Stephen L. Morgan, Liquid Chromatography/Mass Spectrometry, "Investigations of Dye and Fiber Degradation Resulting from Environmental Exposure," paper A181, Criminalistics section, American Academy of Forensic Sciences, Annual Meeting, Chicago, IL, 24 February 2011.
386. Stephen L. Morgan, Michael L. Myrick, Heather Brooke, Megan R. Baranowski, Jessica N. McCutcheon, "Design of a prototype mid-IR imaging system for visualizing blood at crime scenes," paper A208, Criminalistics section, American Academy of Forensic Sciences, Annual Meeting, Chicago, IL, 25 February 2011.
387. Oscar Cabrices, Eric J. Reichard, William E. Brewer, and Stephen L. Morgan, "Automated analysis of anabolic steroids in human urine using cleanup tips and GC/MS," Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Annual Meeting, Atlanta, GA, 16 March 2011.

388. Pakritsadang Kaewsuya, Elison Sparkle, William E Brewer, Stephen L Morgan. Analysis of benzodiazepines in human urine using disposable pipette extraction (DPX) and LC-MS/MS. The Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlanta, Georgia, March 13-18, 2011.
389. Pakritsadang Kaewsuya, William E Brewer, Mike Walla, Alexander J. Krynitsky, Stephen L Morgan. Automated Analysis of Melamine and Cyanuric Acid Using LC/MS/MS and GC/MS/MS. Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlanta, Georgia, March 13-18, 2011.
390. William E. Brewer, Pakritsadang Kaewsuya and Stephen L. Morgan, "Automated QuEChERS with LC/MS/MS and GC/MS Analysis," paper presented at the Southern Section of AOAC, 256th Annual Meeting, Atlanta, GA, 12 April 2011.
391. Stephen L. Morgan, "Every contact leaves a trace: Forensic analytical chemistry and CSI," invited lecture as Awardee, 2011 Outstanding Chemist, South Carolina Section of the American Chemical Society, Orangeburg, SC, 20 April 2011.
392. Molly R. Burnip, Oscar G. Cabrices, and Stephen L. Morgan, "Investigations of dye and fiber degradation resulting from environmental exposure by LC/MS," poster at the University of South Carolina Discovery Day, Undergraduate Research Symposium, Columbia, SC, 22 April 2011.
393. Stephen L. Morgan, Oscar G. Cabrices, Scott J. Hoy, and James E. Hendrix, "Forensic discrimination of dyed textile fibers using UV/visible microspectrophotometry and micro-extraction/liquid chromatography/mass spectrometry," paper presented at the California Association of Criminalist spring meeting 2011, Long Beach, CA, 18 May 2011.
394. Stephen L. Morgan, Michael L. Myrick, Heather Brooke, Megan R. Baranowski, Jessica N. McCutcheon, "Visualizing latent blood at crime scenes using a prototype mid-IR imaging system," invited keynote lecture at the California Association of Criminalist spring meeting 2011, Long Beach, CA, 18 May 2011.
395. Stephen L. Morgan, Oscar G. Cabrices, and Scott J. Hoy, "Forensic Characterization and Chemical Identification of Dyes Extracted from Millimeter-length Fibers," invited poster, FBI/NIJ Trace Evidence Symposium: Science, Significance, and Impact, Kansas City, KS, 10 August 2011.
396. Stephen L. Morgan, John V. Goodpaster, and Edward G. Bartick, "Evaluation of statistical measures for fiber comparisons by interlaboratory studies," invited paper, FBI/NIJ Trace Evidence Symposium: Science, Significance, and Impact, Kansas City, KS, 10 August 2011.
397. Stephen L. Morgan, Oscar G. Cabrices, Scott J. Hoy, James E. Hendrix, "Forensic analysis of dyes on trace evidence fibers by liquid chromatography", paper presented at the Federation of Analytical Chemistry and Spectroscopy Societies, Annual Meeting, 4 October 2011.
398. Stephen L. Morgan, John V. Goodpaster, and Edward G. Bartick, "Forensic comparisons of trace evidence fibers by infrared spectroscopy and UV/visible microspectrophotometry using statistical measures," paper presented at the Federation of Analytical Chemistry and Spectroscopy Societies, Annual Meeting, 4 October 2011.
399. Stephen L. Morgan, Michael L. Myrick, Heather Brooke, Megan R. Baranowski, Jessica N. McCutcheon, "Visualizing latent blood at crime scenes using a prototype mid-IR imaging system," invited keynote lecture at the Northeast Association of Forensic Chemists, Annual Meeting, Newport, RI, 2 November 2011.
400. Stephen L. Morgan, Oscar G. Cabrices, Scott J. Hoy, Andrei Kovaltshuk, Molly R. Burnip, and Nicholas M. Riley, "Forensic Characterization and Identification of Dyes Extracted from Millimeter-length Fibers using Ultra-Performance Liquid Chromatography/Mass Spectrometry," oral paper at the American Academy of Forensic Sciences, Annual Meeting, Atlanta, GA, 20-25 February 2012.
401. Kevin Roberts, Edward G. Bartick, Stephen L. Morgan, and John V. Goodpaster, "A Statistical Approach Using Multivariate Analysis on Visible Spectra to Determine the Matching and Discriminating Capabilities for the Forensic Examination of Question and Known Fibers," poster presented at the Annual Meeting of the American Academy of Forensic Sciences, Atlanta, GA, 23 February 2012.
402. Scott J. Hoy, Molly R. Burnip, Stephen L. Morgan, "Microextraction and ultra performance liquid chromatography for dye profile analysis from millimeter-length trace evidence cotton fibers," poster presented at the 2012 Graduate Student Poster Competition, Department of Chemistry and Biochemistry, Columbia, SC, 3 March 2012.

403. Gianna Mancuso, Edward G. Bartick, Stephen L Morgan, John V. Goodpaster, "Can Fiber Evidence Ever be Individualized?", poster presented at the National meeting of the American Chemical Society, San Diego, CA, 12-15 March 2012.
404. Eric Breitung, Samantha Skelton, and Stephen L. Morgan, "Rapid Identification of 'Sticky Shed Syndrome' in Magnetic Tape Using ATR-FTIR and Multivariate Statistics," 10th Biennial International Conference of the Infrared and Raman Users Group, Barcelona, Spain, 29 March 2012.
405. Edward G. Bartick, Kevin Roberts; Stephen L Morgan, and John Goodpaster, "Multivariate Analysis of Acrylic Fibers," paper presented at SWGMAT meeting, Fredericksburg, VA, 16-19 April 2012.
406. Andrei Kovaltshuk and Nicholas M. Riley, (Molly R. Burnip and Stephen L. Morgan, mentors), "Forensic characterization and chemical identification of dyes extracted from millimeter-length fibers," poster presented at the University of South Carolina Undergraduate Discovery Day poster competition, 20 April 2012.
407. Alexis N. Keller, Emory Straub, and Emma Spencer, "Infrared spectroscopy for the non-destructive detection of latent fingerprints," University of South Carolina Discovery Day Undergraduate Research Poster competition, Columbia, SC, 20 April 2012 [Stephen L. Morgan and Brianna M. Cassidy, mentors).
408. Eric M. Breitung, Briana Cassidy, Juan Rodriguez, Samantha Skelton, Jeanette Adams, Peter Alyea, and Stephen Morgan, "Rapid, Minimally Invasive, Identification of Degraded Audio and Video Magnetic Tapes," oral paper at the American Institute for Conservation of Historic and Artistic Works, 41st Annual Meeting, Albuquerque, NM, 11 May 2012.
409. Pakritsadang Kaewsuya, Jie Gao, William E. Brewer, James Chapman, Kevin Carnevale, and Stephen L. Morgan, "Penetration of N-Nitrosornicotine (NNN) Across Porcine Esophageal Tissue in the Presence of Ethanol, Menthol, Ethanol- Menthol, and Acetaldehyde Ex Vivo by HPLC/MS/MS." poster presented at the Southern Section of AOAC, 26th Annual Meeting, Atlanta, GA, 30 April 2012.
410. Stephen L. Morgan, "Rapid Visualization of Biological Fluids at Crime Scenes using Optical Spectroscopy," Invited speaker at "panel "Upstream Screenings for Downstream Savings Forensically Relevant Biological Evidence Identification at the Front End of a Forensic Investigation", The NIJ Conference 2012, Arlington, VA, 18-20 June 2012.
411. Scott J. Hoy, Molly R. Burnip, and Stephen L. Morgan, "Validation of Forensic Characterization and Chemical Identification of Dyes from Millimeter-length Fibers," poster presented at The NIJ Conference 2012, Arlington, VA, 19 June 2012.
412. Stephen L. Morgan, Michael L. Myrick, Anthony R. Trimboli, Jessica McCutcheon, and Megan Baranowski, "Validating Forensic Comparisons with Chemometrics," invited presentation in the Gerald S. Birth Award Session, International Diffuse Reflectance Conference, Chambersburg, PA, 2 August 2012.
413. Michael L. Myrick and Stephen L. Morgan, Heather Brooke, Megan Baranowski Pearl, Jessica N. McCutcheon, Wayne O'Brien, Stephanie DeJong, Nicholas Boltin, Brianna M. Cassidy and Zhenyu Lu, "Multimode Imaging in the Thermal Infrared: Ideas, Prototyping, Modeling, Theory and Development," invited presentation as awardee for the Gerald S. Birth Award Session, International Diffuse Reflectance Conference, Chambersburg, PA, 2 August 2012.
414. Scott J. Hoy, Molly R. Burnip, and Stephen L. Morgan, p, "Validation of Forensic Characterization and Chemical Identification of Dyes from Millimeter-length Fibers," poster at the American Chemical Society POLY/PMSE Student Chapter Poster Competition and Industrial Networking Event , University of South Carolina, Columbia, SC 10 August 2012.
415. Stephen L. Morgan, Edward G. Bartick, John V. Goodpaster, David L. Birt, Molly R. Burnip, Eric J. Reichard, and Kevin Roberts, "Chemometrics and databases for comparisons of spectral data from trace evidence," invited paper at SciX 2012 (sponsored by the Federation of Analytical Chemistry and Spectroscopy Societies), Kansas City, MO, Kansas City, MO, 2 October 2012.
416. Stephen L. Morgan, Scott J. Hoy, Molly R. Burnip, and Oscar G. Cabrices, "Ultra Performance Liquid Chromatography and Mass Spectrometry for Forensic Characterization of Dyes Extracted from Millimeter-length Textile Fibers," invited paper at SCIX 2012 (sponsored by the Federation of Analytical Chemistry and Spectroscopy Societies), Kansas City, MO, 2 October 2012.

417. Scott J. Hoy, Molly R. Burnip, and Stephen L. Morgan, "Forensic profiling of dye extracts from millimeter-length cotton fibers using ultra performance liquid chromatography and mass spectrometry," poster presented at SCIX 2012 (sponsored by the Federation of Analytical Chemistry and Spectroscopy Societies), Kansas City, MO, 3 October 2012.
418. Nick Boltin, Scott Hoy, Stephanie DeJong, Stephen L. Morgan, Michael L. Myrick, "Evaluation of Thermal Infrared Sources for AC Imaging Applications," poster presented at SCIX 2012 (sponsored by the Federation of Analytical Chemistry and Spectroscopy Societies), Kansas City, MO, 2 October 2012.
419. Stephanie DeJong, Wayne O'Brien, Brianna M. Cassidy, Zhenyu Lu, Stephen L. Morgan, Michael L. Myrick, "Detection Limits for Blood on Fabrics using Diffuse Reflection Infrared Spectroscopy," poster presented at SCIX 2012 (sponsored by the Federation of Analytical Chemistry and Spectroscopy Societies), Kansas City, MO, 2 October 2012.
420. Michael L. Myrick, Stephen L. Morgan, Heather Brooke, Megan Baranowski, Jessica McCutcheon, Wayne O'Brien, Nicholas Boltin, Stephanie DeJong, Brianna M. Cassidy, Zhenyu Lu, "Multimode Imaging in the Thermal Infrared: An Overview," invited paper at SCIX 2012 (sponsored by the Federation of Analytical Chemistry and Spectroscopy Societies), Kansas City, MO, 4 October 2012.
421. Eric J. Reichard, John V. Goodpaster, Stephen L. Morgan, and Edward G. Bartick, "Differentiation of yellow polyester fibers with different dye uptakes using microspectrophotometry and chemometrics," paper submitted for presentation at the 65th Annual Meeting of the American Academy of Sciences, Washington, DC, 18-23 February 2013.
422. Stephen L. Morgan, Edward G. Bartick, and John V. Goodpaster, "Statistical Measures for Comparisons of Fiber Spectra: Forensic Database and Statistical Software," paper submitted for presentation at the 65th Annual Meeting of the American Academy of Sciences, Washington, DC, 18-23 February 2013.
423. Edward G. Bartick, Kevin Roberts, Stephen L. Morgan, and John V. Goodpaster, "A Statistical Approach to Discrimination and Match Capability to Provide Scientific Basis for Estimating Significance of Fiber Associations in Forensic Practice," paper presented at the 65th Annual Meeting of the American Academy of Sciences, Washington, DC, 18-23 February 2013.
424. Scott J. Hoy, Molly R. Burnip, Stephen L. Morgan, Wendy C. Bell, Tracy A. McKinnon, and Jennifer M. Stoner, "Microextraction and analysis of direct and reactive dye formulations from cotton fibers using ultra-performance liquid chromatography and mass spectrometry," paper 2190-18P, presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Philadelphia, PA, 20 March 2013.
425. Brianna M. Cassidy, Zhenyu Lu, Juan Rodrigues, Stephen L. Morgan, Eric M. Breitung, Samantha Skelton, "Rapid non-destructive identification of magnetic tape degradation products using infrared spectroscopy and DART mass spectrometry with multivariate statistics," paper 890-8P presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Philadelphia, PA, 18 March 2013.
426. Zhenyu Lu, Brianna M. Cassidy, Emory Straub, Michael L. Myrick, Stephen L. Morgan, "Validation of Infrared Spectroscopy for Non-Destructive Detection of Latent Fingerprints," paper 860-30P presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Philadelphia, PA, 18 March 2013.
427. Yujing Wen, William E. Brewer, Stephen L. Morgan, "Vitamin D Metabolites Analysis by Disposable Pipette Extraction (DPX) and Liquid Chromatography-Tandem Mass Spectrometry," paper 1190-1P at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Philadelphia, PA, 19 March 2013.
428. Laura Schneider, Edward G. Bartick, Stephen L. Morgan, John G. Goodpaster, "Still another look at the classification of acrylic fibers by FTIR microscopy," paper 1382-CHED at the 245th National Meeting of the American Chemical Society, New Orleans, LA, 7 April 2013. See: Abstracts Of Papers Of The American Chemical Society, 2013, Vol. 245, Meeting Abstracts.
429. Tanya C. Jones and Alena V. Bensussan, "Fourier Transform Infrared Spectroscopy and its Application to Determining Bloodstain Age: Preliminary Study with Emphasis on Method Development," poster at USC Discovery Day Undergraduate Research Conference, 26 April 2013.

430. Emory Straub and Hao Shi, "Thermal Infrared Imaging for Visualization of Blood at Crime Scenes," poster at USC Discovery Day Undergraduate Research Conference, 26 April 2013.
431. Eric M. Breitung, Samantha Skelton, Juan Rodriguez, Peter Alyea, and Stephen L. Morgan, Non-destructive Identification of Polymeric Binder Degradation in Audio and Video Tapes, oral presentation at 47th Association for Recorded Sound Collections, Kansas City, MO, 16 May 2013.
432. Stephanie DeJong, Wayne O'Brien, Zhenyu Lu, Brianna Cassidy, Stephen Morgan, Michael Myrick, "Detection Limits for Blood on Fabrics using Diffuse Reflection Infrared Spectroscopy," poster at the 16th International Conference on Near Infrared Spectroscopy, Montpellier-La Grande-Motte, France, 2-7 June 2013.
433. Eric M. Breitung, Samantha Skelton, Juan Rodriguez, Zhenyu Lu, Brianna M. Cassidy, Peter Alyea, and Stephen L. Morgan, oral presentation at Tape Symposium, Library of Congress, Washington, DC, 11 June 2013.
434. Eric J. Bringley, Eric M. Breitung, and Stephen L. Morgan, "Understanding the Chemical Differences Between Degraded and Non-Degraded Magnetic Tapes," oral presentation at the Preservation Research and Testing Division, Library of Congress, Washington, DC, 29 July 2013.
435. Molly R. Burnip, Kaylee R. McDonald, Scott J. Hoy, Stephen L. Morgan, "Validation of UPLC/MS methods for trace analysis of dyes extracted from acrylic, nylon and polyester fibers," oral paper at SCIX 2013 (sponsored by FACSS), Milwaukee, WI, 30 Sept.-4 Oct. 2013.
436. Kaylee R. McDonald, Molly R. Burnip, Scott J. Hoy, and Stephen L. Morgan, Limits of detection from the viewpoint of statistical hypothesis testing, poster at SCIX 2013 (sponsored by FACSS), Milwaukee, WI, 2 Oct. 2013.
437. Stephen L. Morgan, Michael Myrick, Wayne O'Brien, Nicholas D. Boltin, Raymond G. Belliveau, Emory J. Straub, Stephanie A. DeJong, Brianna M. Cassidy, and Zhenyu Lu, "Latent Heat Thermography Imaging: A New Visualization Tool for Forensic Science," paper at the 66th Annual Scientific Meeting of the American Academy of Forensic Sciences, Seattle, WA, 20 February 2014.
438. Molly R. Burnip, Kaylee R. McDonald, Scott J. Hoy, and Stephen L. Morgan, "Validation of liquid chromatography methods for trace analysis of dyes extracted from acrylic, cotton, nylon, and polyester fibers using UV/visible and mass spectrometric detection," poster at the American Academy of Forensic Sciences Annual Meeting, Seattle, WA, 21 February 2014.
439. Stephen L. Morgan, Michael L Myrick, Wayne O'Brien, Nicholas D. Boltin, Zhenyu Lu, Brianna M. Cassidy, Stephanie A DeJong, Emory J. Straub, Shi Hao, and Raymond G. Belliveau, "Blood Detection by Infrared Imaging Using Latent Heat Thermography: Instrument Design and Performance," invited paper at the Forensic Analysis in the Lab and Crime Scene Symposium (arranged by Igor K. Lednev, University at Albany, SUNY), PITTCON 2014, Chicago, IL, 6 March 2014.
440. Nathan C. Fuenffinger and Stephen L. Morgan, "Forensic Discrimination of Cotton Fibers by Derivative Preprocessing of UV/visible Spectra and Multivariate Statistics," paper 2270-8 P (poster) at PITTCON 2014, Chicago, IL, 6 March 2014.
441. Alena V. Bensussan and Katherine A. Witherspoon (undergraduate researchers), Brianna M. Cassidy and Zhenyu Lu (graduate student mentors), Stephen L. Morgan (faculty mentor), "Using Fourier Transform Infrared Spectroscopy to Estimate Blood Age Under Different Environmental Conditions," poster at the University of South Carolina Discover Day Undergraduate Research Symposium, Columbia, SC, 25 April 2014.
442. Eric J. Bringley (undergraduate researcher), Stephen L. Morgan, and Eric M. Breitung (Mentors), "Identification of Audio Tape Degradation Using Infrared Spectroscopy with Mass Spectrometric Validation," paper at the University of South Carolina Discover Day Undergraduate Research Symposium, Columbia, SC, 25 April 2014.
443. Tanya C. Jones, Abigail W. Snyder, Eric J. Bringley, Andrew G. Fogner, and Nichole M. Witten, "Observation of Natural and Artificial Magnetic Tape Aging Using Acid Titration and Infrared Spectroscopy," poster at the University of South Carolina Discover Day Undergraduate Research Symposium, Columbia, SC, 25 April 2014. Winner of best poster award in Chemistry.
444. Nicholas Boltin (undergraduate researcher), Ray Belliveau, Brianna Cassidy, Stephanie DeJong, Zhenyu Lu, Wayne O'Brien, Emory Straub (undergraduate researcher), Stephen L. Morgan, M.L. Myrick, "LabVIEWTM programming of AC reflectance and thermal infrared imaging for forensic

- science.," poster at the University of South Carolina Discover Day Undergraduate Research Symposium, Columbia, SC, 25 April 2014.
445. Tanya C. Jones, Abigail W. Snyder, Eric J. Bringley, Andrew G. Fogner, and Nichole M. Witten, "Observation of Natural and Artificial Magnetic Tape Aging Using Acid Titration and Infrared Spectroscopy," poster at the 4th Annual Andrews Graduate Research Symposium, Department of Chemistry, Mississippi State University, Starkville, MS, 20-21 May 2014. *Winner of best poster presentation award.*
446. Stephanie A. DeJong, Stephen L. Morgan, and Michael L. Myrick, "Optimization of gap derivatives for measuring blood concentration on fabric from vibrational spectroscopy," poster at Chemometrics in Analytical Chemistry XIV International Conference, Richmond, VA, 10 June 2014.
447. Stephanie A. DeJong, Stephen L. Morgan, Michael L. Myrick, "Optimization of Gap Derivatives for Measuring Blood Concentration on Fabric from Vibrational Spectroscopy," poster at the International Diffuse Reflectance Conference 2014, Chambersburg, PA, 5 August 2014.
448. Brianna M. Cassidy, Zhenyu Lu, Eric J. Bringley, Linhchi Nguyen, Juan Rodriguez, Samantha Skelton, Eric M. Breitung, Stephen L. Morgan, "Rapid non-destructive identification of magnetic tape degradation using infrared spectroscopy and multivariate statistics," paper presented at the 248th National Meeting of the American Chemical Society, San Francisco, CA, 10 August 2014.
449. Zhenyu Lu, Brianna M. Cassidy, Alena V. Bensussan, Katie A. Witherspoon, Tanya Jones, Stephen L. Morgan, "Using Fourier Transform Infrared Spectroscopy to Estimate Blood Age under Different Environmental Conditions," paper presented at the 248th National Meeting of the American Chemical Society, San Francisco, CA, 10 August 2014.
450. Stephanie A. DeJong, Stephen L. Morgan, Michael L. Myrick, "Detection Limits for Blood on Fabrics Using Diffuse Reflection Spectroscopy in Mid- and Near-Infrared Spectral Windows", poster paper presented at SciX 2014, Reno-Tahoe, NV, 30 September 2014.
451. Stephanie A. DeJong, Stephen L. Morgan, Michael L. Myrick, "Optimization of Gap Derivatives for Measuring Blood Concentration on Fabric from Vibrational Spectroscopy," oral paper presented at SciX 2014, Reno-Tahoe, NV, 30 September 2014.
452. Stephen L. Morgan, Nathan C. Fuenffinger, Edward G. Bartick, John V. Goodpaster, Eric J. Reichard, "Feature Selection and Validation Issues for Forensic Applications of Multivariate Statistics," invited oral paper in the Chemometrics/Data Analysis for Forensics Session (organized by Stephen L. Morgan), presented at SciX 2014, Reno-Tahoe, NV, 30 September 2014.
453. Edward G. Bartick, Stephen L. Morgan, and Kevin Roberts, "Discriminating Power of Fiber Associations in Forensic Examination Practice," invited oral paper presented at the Eastern Analytical Symposium, Bridgewater, NJ, 17 November 2014.
454. Stephen L. Morgan, "Meeting Forensic Analytical Challenges with Liquid Chromatography and Mass Spectrometry, invited oral paper at the American Society for Mass Spectrometry, Security and Forensic Applications of Mass Spectrometry, Sanibel Conference, Clearwater Beach, FL, 25 January 2015.
455. Kaylee R. McDonald, William E. Brewer, Stephen L. Morgan, "A Novel Extraction Methodology for the Analysis of Lorazepam and Oxazepam Glucuronide Hydrolysis in Meconium," paper submitted to the American Academy of Forensic Sciences, Annual Meeting, New Orleans, LA, 19 February 2015.
456. Nathan C. Fuenffinger and Stephen L. Morgan, "Comparisons of Multivariate Preprocessing Techniques for the Forensic Discrimination of Cotton Fibers by UV/visible Microspectrophotometry," paper submitted to the American Academy of Forensic Sciences, Annual Meeting, New Orleans, LA, 16-20 February 2015.
457. Brianna M. Cassidy, Zhenyu Lu, Ilish Dewitt, K. Andrews, K., Eric M. Breitung, Stephen L. Morgan, "A Novel Method for Rapid, Non-Destructive Identification of Degraded UMatc Tape: ATR-FTIR Spectra Analyzed with Multivariate Statistics," paper at Pittcon 2015, New Orleans, LA, 3-8 March 2015.
458. Stephen L. Morgan, Nathan C. Fuenffinger, David L. Birt, and Edward G. Bartick, "Evaluation of Statistical Measures for Forensic Fiber Comparisons: Databases and Intra- and Inter-laboratory Comparisons," invited paper at the Data Analysis in Forensics Symposium (organized by Stephen L. Morgan), Pittcon 2015, New Orleans, LA, 3-8 March 2015.

459. Nathan C. Fuenffinger and Stephen L. Morgan, "Model transfer for multivariate discrimination of textile fibers by UV/visible microspectrophotometry," paper presented at Pittcon 2015, New Orleans, LA, 3-8 March 2015.
460. Zhenyu Lu, Brianna M. Cassidy, Katherine A. Witherspoon, Tanya C. Jones, Alena V. Bensussan, Michael L. Myrick, and Stephen L. Morgan, "Using Fourier Transform Infrared Spectroscopy Paired with Multivariate Statistical Analysis to Estimate Blood Age Under Different Environmental Conditions," oral paper at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, LA, (2015).
461. Katherine E. Kilgore, Brianna M. Cassidy; Zhenyu Lu; Jennifer P. Martin; Shawna K. Tazik; Stephen L. Morgan, and Michael L. Myrick, "Optimum Case Detection Limit of the Forensic Luminol Test for Bloodstains," Summer Symposium for Research Interns (SPRI), University of South Carolina, Columbia, SC 15 July 2015.
462. Nathan C. Fuenffinger, John V. Goodpaster, Edward G. Bartick, and Stephen L. Morgan, "Fusion of UV-Visible Absorption and Fluorescence Data for Forensic Discriminations of Dyed Textile Fibers," invited paper presented in the Chemometrics/Data Analysis For Forensics Symposium (organized by Stephen L. Morgan), at SCIX 2015, Providence, RI, 30 September 2015.
463. Nathan C. Fuenffinger, Brianna M. Cassidy, Zhenyu Lu, Michael L. Myrick, Eric M. Breitung, Stephen L. Morgan, "MATSA: A User-Friendly Software Program for Magnetic Audio Tape Spectral Analysis," poster 289 presented at SCIX 2015, Providence, RI, 29 September 2015.
464. Stephanie DeJong, from the Myrick research group, won the Tomas Hirschfeld Scholar Award for an outstanding paper submitted to the conference by a graduate student. The paper, "Reversible Gap Derivative and their Integration," (coauthored with Zhenyu Lu, Brianna Cassidy, Stephen L. Morgan, and M.L. Myrick), SCIX 2015, Providence, RI.
465. Raymond Belliveau, Stephanie DeJong , Lu Zhenyu , Brianna Cassidy , Stephen Morgan , Michael Myrick, Detection of Trace Evidence Particles by Mid-Infrared Laser Reflectance Imaging, Paper 79, presented at SCIX 2015, Providence, RI, 29 September 2015.
466. Katherine E. Kilgore, Brianna M. Cassidy; Zhenyu Lu; Jennifer P. Martin; Shawna K. Tazik; Stephen L. Morgan, and Michael L. Myrick, "Optimum Case Detection Limit of the Forensic Luminol Test for Bloodstains," 27th Annual Research Colloquium, South Carolina Governor's School for Science & Mathematics, Hartsville, SC, 30 January 2016.
467. Stephen L. Morgan, Brianna M. Cassidy; Zhenyu Lu; Jennifer P. Martin; Shawna K. Tazik; Katherine A Witherspoon; Stephanie A. DeJong; Mackenzie A. Meece-Rayle; Raymond G. Belliveau III; Katherine E. Kilgore; Samantha Ervin, and Michael L. Myrick, "Optimum Case Detection Limit of the Forensic Luminol Test for Bloodstains," oral paper B185 in Criminalistics, Advances in Biological Screening, AAFS Annual Meeting, Las Vegas, NV, 25 February 2016.
468. Stephen L. Morgan, "Imparting Meaningful Applications of Statistics to Forensic Scientists," invited presentation for the AAFS Criminalistics Special Session, organized by Vincent J. Desiderio, AAFS Annual Meeting, Las Vegas, NV, 25 February 2016.
469. Richard Simpson, Alyssa Abraham, Nilmini H. Ratsasena, Stephen L. Morgan, "Determining a quarter inch magnetic tape's playability based off the spectra given by ATR-FTIR," Summer Symposium for Research Interns (SPRI), University of South Carolina, Columbia, SC 15 July 2016.
470. Stephen L. Morgan, "Challenges and Opportunities in Database Design and Inter-Laboratory Studies on Trace Evidence," invited presentation at the Trace Evidence Data Workshop: Improving Technology and Measurement in Forensic Science, National Institute of Standards and Technology, Gaithersburg, MD 19 July 2016.
471. Stephen L. Morgan, "To Bayes, or not to Bayes?" presentation at SCIX 2016, Minneapolis, MN, 18-September 2016.
472. R. Belliveau, S. DeJong, B. Cassidy, Z. Lu, S.L. Morgan, M. Myrick, "Applications of steam thermography to the detection of forensic evidence," Oral paper 130, 68th Southeastern Regional Meeting of the American Chemical Society, Columbia, SC, 23 October 2016.
473. Molly R. Burnip and S.L. Morgan, "Forensic characterization of environmentally weathered textile fibers by liquid chromatography with UV/visible detection," Oral paper 132, 68th Southeastern Regional Meeting of the American Chemical Society, Columbia, SC, 23 October 2016.

474. Kaylee. R. Mastrianni, W.E. Brewer, S.L. Morgan, S.J. Marin, G. McMillin, "Fast, simple method for the analysis of benzodiazepines in meconium and an interlaboratory method comparison," Oral paper 196, 68th Southeastern Regional Meeting of the American Chemical Society, Columbia, SC, 23 October 2016.
475. Alyssa A. Abraham, N. Fuenffinger, B. Cassidy, N. Ratnasena, T. Burdette, A. Singleton, M. Myrick, E. Breitung, S.L. Morgan, "Classification of magnetic audio tape degradation for various tape chemistries using spectroscopy and chemometrics," Oral paper 197, 68th Southeastern Regional Meeting of the American Chemical Society, Columbia, SC, 23 October 2016.
476. N. Fuenffinger, J.V. Goodpaster, E.G. Bartick, S.L. Morgan, "Multivariate classification model transfer of UV/visible spectral data from acrylic fibers without standards," Oral paper 199, 68th Southeastern Regional Meeting of the American Chemical Society, Columbia, SC, 23 October 2016.

INVITED RESEARCH SEMINARS AT COLLEGES AND UNIVERSITIES

1. S. L. Morgan, "Automated optimization of continuous flow analytical methods," invited seminar, Department of Chemistry, University of Georgia, Athens, GA, 2 February 1977.
2. S. L. Morgan, "Simplex optimization," invited seminar, Department of Chemistry, Duke University, Durham, NC, 12 October 1978.
3. S. L. Morgan, "Analytical pyrolysis of carbohydrates," invited seminar, Department of Chemistry, Duke University, Durham, NC, 23 October 1978.
4. S. L. Morgan, "Simplex optimization," invited seminar, Department of Chemistry, Belmont Abbey College, Charlotte, NC, 14 April 1979.
5. S. L. Morgan, "Pyrolysis Gas Chromatography-Mass Spectrometry," invited seminar, Department of Chemistry, Tufts University, 23 March 1981.
6. S. L. Morgan, "Pyrolysis Gas Chromatography-Mass Spectrometry", invited seminar, Department of Chemistry, University of Alabama-Birmingham, Birmingham, AL, 17 April 1981.
7. S. L. Morgan, "Pyrolysis Gas Chromatography-Mass Spectrometry of Biological Materials", invited seminar, Department of Chemistry, University of Georgia, Athens, GA, 17 May 1981.
8. S. L. Morgan, "Analytical Separations from Moonshine to Capillary Gas Chromatography", invited seminar, Department of Chemistry, University of North Carolina-Greensboro, Greensboro, NC, 30 April 1982.
9. S. L. Morgan, "Biomedical Applications of Capillary GC-MS", invited seminar, Department of Chemistry, Emory University, Atlanta, GA, 19 April 1983.
10. S. L. Morgan, "Analytical Separations from Moonshine to Capillary Gas Chromatography," invited seminar, Department of Chemistry, Davison College, Davison, NC, 30 September 1983.
11. S. L. Morgan, "Applications of Computer Graphics in Analytical Chemistry," invited seminar, Department of Chemistry, Erskine College, Erskine, SC, 14 October 1983.
12. S. L. Morgan, "Application of Computer Graphics in Analytical Chemistry," invited seminar, Department of Chemistry, University of North Carolina at Asheville, Asheville, NC, 29 March 1984.
13. S. L. Morgan, "High Resolution Capillary GC", invited seminar, Department of Chemistry, University of Alabama, Tuscaloosa, AL, 18 October 1984.
14. S. L. Morgan, "Biomedical Applications of Capillary GC-MS", invited seminar, Department of Chemistry, East Carolina University, Greenville, NC, 19 October 1984.
15. S. L. Morgan, "Experimental Design, Optimization, and Modeling in Chemistry," invited speaker, Department of Chemistry, Hope College, Holland, MI, 8 March 1985.
16. S. L. Morgan, "Gas Chromatography-Mass Spectrometry of Biopolymers," invited seminar, Department of Chemistry, University of Tennessee, Knoxville, TN, 25 September 1985.
17. S. L. Morgan, "Chemical Laboratory Safety", invited seminar, Department of Chemistry, University of Tennessee, Knoxville, TN, 24 September 1985.
18. S. L. Morgan, "Chemical Separations from Moonshine to Glass Capillary," invited seminar, Department of Chemistry, Wofford College, Spartanburg, SC, 28 October 1985.
19. S. L. Morgan, "Chemical Hazards and Laboratory Safety," invited seminar, Department of Chemistry, Georgia Southern College, Statesboro, GA, May 1986.

20. S. L. Morgan, "Differentiation of Microorganisms by Capillary GC-MS with Pattern Recognition," invited seminar, Department of Chemistry, Georgia Institute of Technology, Atlanta, GA, 23 October 1986.
21. S. L. Morgan, "Identification and characterization of microorganisms by gas chromatography-mass spectrometry," invited seminar, Department of Pharmacy, University of South Carolina, 1 April 1988.
22. S. L. Morgan, "Identification and characterization of microorganisms by gas chromatography-mass spectrometry," invited seminar, Department of Chemistry, University of North Carolina, Chapel Hill, NC, 4 April 1988.
23. S. L. Morgan, "Chemometrics: Optimization and Experimental Design in Analytical Chemistry", invited seminar, Department of Chemistry, University of North Carolina, Chapel Hill, NC, 4 April 1988.
24. S. L. Morgan, "Chemometrics: Experimental design and pattern recognition in chemistry", invited seminar, Department of Statistics, University of South Carolina, Columbia, SC, 5 April 1990.
25. S. L. Morgan, "Identification and characterization of microorganisms by gas chromatography-mass spectrometry", invited seminar presented to the School of Medicine, Department of Pathology, McMaster University, Hamilton, Ontario, Canada, 23 May 1990.
26. S. L. Morgan, "Validation of chemical markers for biological materials using GC/MS and pattern recognition", invited seminar presented to the Department of Chemistry, West Virginia University, Morgantown, WV, 23 January 1991.
27. S. L. Morgan, "Capillary GC/MS characterization of microorganisms", invited speaker, Western Carolinas Section of the American Chemical Society and Western Carolinas Chromatography Discussion Group, Wofford College, Spartanburg, SC, 4 February 1992.
28. S. L. Morgan, "Chemical hazards and safety in the academic chemical laboratory", invited seminar presented to the Department of Chemistry, University of North Carolina-Asheville, Asheville, NC, 4 February 1992.
29. S. L. Morgan, "Sequential Simplex Optimization: A tool for research", invited seminar presented to the Department of Chemistry, Appalachian State University, Boone, NC, 13 November 1992.
30. S. L. Morgan, "Separating chemical signals from noise", invited seminar, Department of Chemistry, East Carolina University, Greenville, NC, 1 May 1998.
31. S. L. Morgan, "Separating signals from noise; chemometrics at USC," invited seminar presented to the Department of Statistics, The University of South Carolina, Columbia, 11 February 1999.
32. S. L. Morgan, "Forensic Analytical Chemistry: From Sherlock to Fast Gas Chromatography," invited talk to a joint meeting of the Western Carolina local section of the American Chemical Society and the Western Carolinas Chromatography Discussion Group, Furman University, Greenville, SC, 21 March 2000.
33. S. L. Morgan, "Analytical problem solving using multivariate statistics", invited seminar, Department of Chemistry, University of North Carolina at Greensboro, Greensboro, NC, 22 April 2000.
34. S. L. Morgan, "Forensic Analytical Chemistry: From Sherlock to Fast Gas Chromatography," invited seminar, Department of Chemistry, University of North Carolina at Greensboro, Greensboro, NC, 22 April 2000.
35. S. L. Morgan, "Forensic Analytical Chemistry: From Sherlock to Fast Gas Chromatography," invited talk to the SC ACS Affiliates, University of South Carolina, Columbia, SC; 20 September 2001.
36. S. L. Morgan, "Pathological Science", 7 February 2002, invited seminar presented to the ACS Student Affiliates group, Department of Chemistry, University of South Carolina, Columbia, SC.
37. S. L. Morgan, "Forensic analytical chemistry at USC", 7 November 2002, invited seminar presented to the ACS Student Affiliates group, Department of Chemistry, University of South Carolina, Columbia, SC.
38. S. L. Morgan, "Chemical Warfare: History and Chemistry," invited lecture, 19 February 2002, in "Physics 599: Counterterrorism" (Dr. Joe Johnson), Department of Physics and Astronomy, University of South Carolina, Columbia, SC.
39. S. L. Morgan, "Forensic chemistry at USC," invited seminar at Columbia College, Columbia, SC, 31 March 2003.
40. S. L. Morgan, "Forensic Analytical Chemistry: From Sherlock to Fast Gas Chromatography and Microspectrometry," USC Department of Chemistry and Biochemistry Seminar Program, Columbia, SC, Friday, 25 April 2003.
41. S. L. Morgan, Forensic Analytical Chemistry for Trace Evidence, USC Summer Outreach Program, 3 hours of lectures and laboratory tour, 10 June 2004.

42. Stephen L. Morgan, "Microspectroscopy and Capillary Electrophoresis/Mass Spectrometry for Forensic Trace Fiber Analysis, invited seminar, Department of Chemistry & Biochemistry, College of Charleston, Charleston, SC, 20 October 2005.
43. Stephen L. Morgan, "Advances in forensic trace fiber analysis by microspectrophotometry and capillary electrophoresis/mass spectrometry," invited seminar, Department of Chemistry & Biochemistry, Georgia Southern University, Statesboro, GA, 24 October 2005.
44. S. L. Morgan, "Forensic analytical chemistry at USC," invited seminar for the ACS Undergraduate Affiliates, Department of Chemistry & Biochemistry, Columbia, SC, 25 October 2005.
45. Stephen L. Morgan, "Multivariate Statistical Methods for Modeling and Discrimination of Analytical Chemical Data" invited seminar at Department of Chemistry & Biochemistry, Kennesaw State University, Kennesaw, GA, 30 March 2006.
46. Stephen L. Morgan, "Every Contact Leaves a Trace: Forensic Analytical Chemistry at USC," invited lecture at USC Chemistry Day, Department of Chemistry & Biochemistry, University of South Carolina, Columbia, SC, 7 October 2006.
47. Heather M. Taylor and Stephen L. Morgan, "Undergraduate Research in the Department of Chemistry & Biochemistry at the University of South Carolina", invited presentation to the College of Arts and Sciences Advisory Council, 2 November 2006, University of South Carolina, Columbia, SC.
48. Stephen L. Morgan, "Forensic Analytical Chemistry: Basic Research Behind CSI," invited seminar, Department of Chemistry, Physics, and Geology, Winthrop University, Rock Hill, SC, 31 October 2007.
49. Stephen L. Morgan, "Forensic discrimination of dyed textile fibers using UV/visible and fluorescence microspectrophotometry and microextraction/capillary electrophoresis/mass spectrometry," invited seminar, Textile Engineering, Chemistry, and Science, North Carolina State University, Raleigh, NC, 4 November 2008.
50. Stephen L. Morgan, "Forensic Analytical Chemistry: Basic Research behind CSI," Sigma Xi Annual Awards Banquet, Mississippi State University, Mississippi State, MS, 11 April 2008; invited Sigma Xi Distinguished Lecturer (<http://www.sigmaxi.org/programs/lectureships/host.shtml>).
51. Stephen L. Morgan, Statistics for forensic scientists, invited 3 day workshop funded by the National Institute of Justice, Cedarcrest College, Allentown, PA, 24-27 June 2008.
52. Stephen L. Morgan, "Forensic discrimination of dyed textile fibers using UV/visible and fluorescence microspectrophotometry and microextraction/capillary electrophoresis/mass spectrometry," invited seminar, Textile Engineering, Chemistry, and Science, North Carolina State University, Raleigh, NC, 4 November 2008.
53. Stephen L. Morgan, "Forensic Analytical Chemistry: Basic Research behind CSI," invited Sigma Xi Distinguished Lecturer, Mercer University, local chapter of the Sigma Xi, Macon, GA, 5 November 2009.
54. Stephen L. Morgan, "Forensic Analytical Chemistry: Basic Research behind CSI," invited Sigma Xi Distinguished Lecturer, Fairfield University, local chapter of the Sigma Xi, Fairfield, CT, 28 March 2010.
55. Stephen L. Morgan, "Chemometrics 101: Why all chemists (including students) should care about statistics," invited seminar to the Chemistry Department, Fairfield University, 29 March 2010.
56. Stephen L. Morgan, "Forensic Analytical Chemistry: Basic Research behind CSI," invited Sigma Xi Distinguished Lecturer, Tennessee State University, local chapter of the Sigma Xi, Cookeville, TN, 29 April 2010.
57. Stephen L. Morgan, "Chemical information: the multivariate view," invited seminar to the Chemistry Department, Tennessee State University, local chapter of the Sigma Xi, Cookeville, TN, 29 April 2010.
58. Stephen L. Morgan, "Forensic Analytical Chemistry: From the laboratory to CSI," invited Sigma Xi Distinguished Lecturer, East Carolina University, Greenville, NC, 19 May 2010.
59. Stephen L. Morgan, "Forensic discrimination of dyed textile fibers using UV/visible and fluorescence microspectrophotometry and micro-extraction/capillary electrophoresis/mass spectrometry," invited seminar to the Chemistry Department, East Carolina University, Greenville, NC, 19 May 2010.
60. Stephen L. Morgan, "Careers in Chemistry: Forensic Analytical Chemistry," Invited seminar, USCL Chemistry Club, Department of Chemistry, University of South Carolina/Lancaster, Lancaster, SC, 21 September 2010.
61. Stephen L. Morgan, "Forensic Analytical Chemistry: From the laboratory to CSI," invited seminar, NC A&T University, Greensboro, NC, 23 September 2010.

62. Stephen L. Morgan, "Forensic analytical chemistry: From research to CSI," invited keynote lecture and discussion, faculty/Student Research Conference, Mercer University, Atlanta, GA, 16 April 2011.
63. Stephen L. Morgan, "Every contact leaves a trace: Forensic analytical chemistry and CSI" invited talk at the Gamma Sigma Chemistry Club, spring induction ceremonies, Catawba College, Salisbury, NC, 27 April 2011.
64. Stephen L. Morgan, "Statistical Methods for Forensic Decision-Making," invited full-day workshop at the John Jay College of Criminal Justice, New York, NY, 8 June 2011.
65. Stephen L. Morgan, "Forensic trace evidence research: fiber discrimination and blood detection," invited seminar at the Department of Chemistry and Biochemistry, Florida International University, Miami, FL, 14 October 2011.
66. Stephen L. Morgan, "Analytical chemistry research for forensic and cultural heritage decision-making," invited seminar, Department of Chemistry and Biochemistry, University of South Carolina, Columbia, SC, 18 January 2013.
67. Stephen L. Morgan, "Analytical Chemistry for Forensic Trace Analysis and Crime Scene Blood Imaging," invited seminar, Department of Chemistry, University of Mississippi, Oxford, MS, 28 March 2013.
68. Stephen L. Morgan, "Analytical Chemistry for Forensic Trace Analysis and Crime Scene Blood Imaging," invited seminar, Department of Chemistry, University at Albany, State University of New York, Albany, NY, 29 April 2013.
69. Stephen L. Morgan, Alena V. Bensussan, Tanya C. Jones, and Eric J. Bringley, "Undergraduate Research at USC: Real-world Applications of Chemistry", invited presentation to the Board of Trustees, University of South Carolina, Columbia, SC, 17 December 2013.

OTHER INVITED SEMINARS

1. S. L. Morgan, "Methods Development Using Optimization Strategies in Reversed Phase HPLC", Waters Associates, Milford, MA, 13 October 1984.
2. S. L. Morgan, "Sequential Simplex Optimization," Carolina Eastman, Columbia, SC, 13 March 1986.
3. S. L. Morgan, "Chemical Laboratory Safety," Irmo High School, Irmo, SC, 2 April 1987.
4. S. L. Morgan, "Chemical Laboratory Safety," Lexington High School, Lexington, SC, 7 September 1989.
5. S. L. Morgan, "Chemometrics: Experimental design and pattern recognition in chemistry", Eastman Kodak Company, Rochester, NY, 24 May 1990.
6. S. L. Morgan and A. Fox, "Chemical markers for the differentiation and identification of microorganisms, including Bacillus anthracis, by pyrolysis-gas chromatography/mass spectrometry", invited seminar speaker, Chemical Research Development and Engineering Center, Aberdeen Proving Ground, MD, April 1991.
7. S. L. Morgan, "Chemical Laboratory Safety," Gilbert High School, Gilbert, SC, 12 August 1992.
8. S. L. Morgan, "Separation sciences and data analysis", talk presented at the In Process Analysis in Pharmaceutical Industry Emerging Technologies Symposium, Roche Carolina Symposium, Florence, SC, 25-27 May 1994.
9. S. L. Morgan, "Chemical Laboratory Safety," conducted half-day safety workshop for high school chemistry teachers at Kingstree High School, Williamsburg County, 26 September 1994.
10. S. L. Morgan, E. G. Bartick, R. A. Merrill, W. J. Egan, R. C. Galipo, and B. K. Kochanowski, "Forensic discrimination of photocopy toners by FT-infrared reflectance spectroscopy, pyrolysis GC/MS, and SEM", invited seminar, Forensic Science Research and Training Center, FBI Laboratory, Quantico, VA, 8 April 1998.
11. S. L. Morgan, "Science and math at the fringe: the good, the bad, and the silly", invited luncheon speaker, Presidential Awards for Excellence in Mathematics and Science Teaching, South Carolina Department of Education, SC State Museum, Columbia, SC, 7 July 1998.
12. S. L. Morgan and B. K. Kochanowski, "Forensic discrimination of automobile paints by pyrolysis GC/MS and pattern recognition methods", invited lecturer, FBI Workshop on Forensic Analysis of Paint, Forensic Science Research and Training Center, FBI Laboratory, Quantico, VA, 15 October 1998.
13. S. L. Morgan, "Forensic Analytical Chemistry: From Sherlock to Fast Drug Analysis," invited luncheon speaker, South Association of Chemistry Teachers Annual Meeting, Heathwood Hall Episcopal School, Columbia, SC, 13 March 1999.

14. S. L. Morgan, "Weird Science," invited speaker, 1999-2000 Junior Science & Humanities Symposium, The University of South Carolina, Columbia, SC, 6 December 1999.
15. S. L. Morgan, invited speaker at Irmo Middle School. Columbia, SC, 10 May 2000.
16. S. L. Morgan, "Chemistry Demonstrations," invited speaker, Irmo Middle School, Columbia, SC, 20 September 2000.
17. S. L. Morgan, "Forensic problem solving using multivariate statistics", invited seminar, FBI Academy, Quantico, VA, 2 April 2001.
18. S. L. Morgan, "Validation of Pattern Recognition Methods Applied to Forensic Chemical Data," invited seminar, FBI Laboratory, Washington, DC, 8 May 2001.
19. S. L. Morgan, "Pathological Science", 7 February 2002, seminar presented to the ACS Student Affiliates group, Department of Chemistry, University of South Carolina, Columbia, SC.
20. S. L. Morgan, "Forensic analytical chemistry at USC", 7 November 2002, seminar presented to the ACS Student Affiliates group, Department of Chemistry, University of South Carolina, Columbia, SC.
21. S. L. Morgan, "Forensic chemistry at USC," invited talk at Ninety-Six High School, Ninety-Six, SC, 8 April 2003.
22. C. R. Mubarak, W. Pearman, L. A. Grabill, J. E. Hendrix, S. M. Angel, S. L. Morgan, "Relative Discriminating Power of Visible, UV/Visible, and UV/Fluorescence Microspectrophotometry for Forensic Analysis of Dyed Textile Fibers," and "Forensic Raman Microscopy of Fibers: Evaluation of Mounting Media," FBI Laboratory, Quantico, VA, 10 April 2003.
23. S. L. Morgan, S. M. Angel, C. R. Mubarak, W. E. Pearman, "Raman Microspectrophotometry for Forensic Analysis of Dyed Textile Fibers," invited presentation at the FBI Laboratory, Quantico, VA, 10 April 2003.
24. S. L. Morgan, Visible, UV/Visible, UV/Fluorescence, and Raman Microspectrophotometry for Forensic Analysis of Dyed Textile Fibers," invited presentation at the FBI Laboratory, Quantico, VA, 22 November 2003.
25. S. L. Morgan, "Forensic Analytical Chemistry at the University of South Carolina," invited presentation at the Southeastern Regional Counterterrorism meeting, 15 January 2004, Savannah River Laboratory, Aiken, SC.
26. S. L. Morgan and J. E. Hendrix, Capillary Electrophoresis Analysis of Fiber Dyes," invited presentation at the FBI Laboratory, Quantico, VA, 7 July 2004.
27. Amy R. Stefan, Christopher R. Dockery, James E. Hendrix, Alexander A. Nieuwland, Brandi L. Clelland, and Stephen L. Morgan, "Capillary Electrophoresis Analysis of Fiber Dyes: Extraction," invited presentation at the FBI Laboratory, Quantico, VA, 7 July 2004.
28. Alexander A. Nieuwland, Brandi L. Clelland, Amy R. Stefan, Christopher Dockery, P. Lee Ferguson, James E. Hendrix, and Stephen L. Morgan. "Capillary Electrophoresis Analysis of Fiber Dyes: CE-DAD and CE-DAD-MS," invited presentation at the FBI Laboratory, Quantico, VA, 7 July 2004.
29. Brandi L. Clelland, Stephen L. Morgan, Alexander A. Nieuwland, Amy R. Stefan, and James E. Hendrix, "Capillary Electrophoresis Analysis of Fiber Dyes: Mass spectroscopy of fiber dyes," invited presentation at the FBI Laboratory, Quantico, VA, 7 July 2004.
30. Brandi Clelland, Bryan Vasser, Shana B. Burnett, William E. Pearman, S. Michael Angel, "Analysis of dyed fibers by Raman microspectroscopy," invited presentation at the FBI Laboratory, Quantico, VA, 7 July 2004.
31. Stephen L. Morgan, Alexander A. Nieuwland, Christopher R. Mubarak, James E. Hendrix, Elizabeth M. Enlow, and Bryan J. Vasser, "UV/Fluorescence, and Raman Microspectrophotometry for Forensic Analysis of Dyed Textile Fibers," invited presentation at the FBI Laboratory, Quantico, VA, 7 July 2004.
32. S. L. Morgan, "Forensic analytical chemistry for trace evidence," invited seminar for the ACS Undergraduate Affiliates, Department of Chemistry & Biochemistry, Columbia, SC, 8 October 2004.
33. S. L. Morgan, "Forensic analytical chemistry at USC," invited talk, COSM and the College of Liberal Arts, USC College of Liberal Arts National Advisory Council Meeting, 8 October 2004, University of South Carolina.
34. Stephen L. Morgan, James E. Hendrix, Alexander A. Nieuwland, Brandi L. Clelland, Amy R. Stefan, and Christopher Dockery, "Dyeing and Finishing Fabric for Environmental Exposure," invited presentation at the FBI Laboratory, Quantico, VA, 23 November 2004.

35. Stephen L. Morgan, James E. Hendrix, Alexander A. Nieuwland, Brandi L. Clelland, Amy R. Stefan, and Christopher Dockery, "Environmental Exposure of Fabric Samples," invited presentation at the FBI Laboratory, Quantico, VA, 23 November 2004.
36. Alexander A. Nieuwland, Stephen L. Morgan, Brandi L. Clelland, Amy R. Stefan, Christopher Dockery, and James E. Hendrix, "Capillary Electrophoresis Analysis of Fiber Dyes," invited presentation at the FBI Laboratory, Quantico, VA, 23 November 2004.
37. Stephen L. Morgan, Alexander A. Nieuwland, Christopher R. Mubarak, James E. Hendrix, Elizabeth M. Enlow, and Bryan J. Vasser, "Relative Discriminating Power of UV-visible and Fluorescence Spectrophotometry of Dyed Textile Fiber," invited presentation at the FBI Laboratory, Quantico, VA, 23 November 2004.
38. Brandi L. Clelland, Brittany Baguley, Amy R. Stefan, Christopher Dockery, James E. Hendrix, and Stephen L. Morgan. "Capillary Analysis of Fiber Dyes," invited presentation at the FBI Laboratory, Quantico, VA, 9 September 2005.
39. Brandi L. Clelland, Stephen L. Morgan, James E. Hendrix, and S. Michael Angel, "Discrimination of dyed fibers using Raman microspectroscopy for forensic analysis," invited presentation at the FBI Laboratory, Quantico, VA, 9 September 2005.
40. James E. Hendrix, Stephen L. Morgan, Anthony R. Trimboli, Brandi L. Clelland, Amy R. Stefan, and Brittany Baguley, "Environmental Effects on Textile Fibers," invited presentation at the FBI Laboratory, Quantico, VA, 9 September 2005.
41. Stephen L. Morgan, Alexander A. Nieuwland, James E. Hendrix, and Edward G. Bartick, "Multivariate Statistical Approaches for the Discrimination of Textile Fibers using UV-visible and Fluorescence Microspectrophotometry," invited presentation at the FBI Laboratory, Quantico, VA, 9 September 2005.
42. Stephen L. Morgan, "Every Contact Leaves a Trace: Forensic Analytical Chemistry at USC," invited talk to the Columbia Rotary Club, at the Palmetto Club, Columbia, SC on 8 January 2006.
43. Amy R. Stefan, Brandi L. Clelland, Brittany Hartzell-Baguley, Christopher Dockery, James E. Hendrix, and Stephen L. Morgan, "Capillary Electrophoresis Analysis of Fiber Dyes," invited, FBI Laboratory, Quantico, VA, 16 October 2006.
44. Anthony R. Trimboli, Allyson A. Wells, Jennifer J. Yiu, Heather M. Taylor, Amy R. Stefan, Brandi L. Clelland, James E. Hendrix, Stephen L. Morgan, "Forensic studies of dye and fiber degradation during environmental exposure by UV/visible and fluorescence microspectrophotometry," invited, FBI Laboratory, Quantico, VA, 16 October 2006.
45. Stephen L. Morgan, Suzanna H. Hall, Anthony R. Trimboli, Jennifer J. Yiu, and Heather M. Taylor, "UV/visible and Fluorescence Microspectrophotometry for Discrimination of Dyed Textile Fibers," invited, FBI Laboratory, Quantico, VA, 16 October 2006.
46. Stephen L. Morgan, "Every Contact Leaves a Trace: Forensic Analytical Chemistry at USC," invited presentation to the Columbia Rotary Club, at the Palmetto Club, Columbia, SC on 8 January 2006.
47. Heather M. Taylor (with assistance from Stephen L. Morgan), "Undergraduate Research in the Department of Chemistry & Biochemistry at the University of South Carolina", invited presentation to the College of Arts and Sciences Advisory Council, 2 November 2006, University of South Carolina, Columbia, SC.
48. Stephen L. Morgan, "Software pattern recognition methods for the classification of trace evidence fibers using UV/visible and fluorescence microspectrophotometry," invited seminar, Fiber Trace Evidence Laboratory, Federal Bureau of Investigation, Quantico, VA, 21 February 2008.
49. Stephen L. Morgan, "Forensic analytical chemistry," lecture for Quantitative Analysis Chemistry 321 course taught by John L. Ferry, 23 April 2008.
50. Stephen L. Morgan, "Forensic Analytical Chemistry: Basic Research behind CSI," invited dinner speaker for Science Café, sponsored by EngenuitySC, Columbia, SC, 13 July 2010.
51. Stephen L. Morgan, "Forensic Analytical Chemistry: Basic Research behind CSI," invited talk to high school science students (3 groups of 5-100 students each), Spring Valley High School, Columbia, SC, 10 December 2010. I was invited by a high school chemistry student to speak to her class; the engagement morphed into a three one-hour presentations back-to-back with over 150 students total participating.
52. Stephen L. Morgan, Careers in Forensic Chemistry, invited talk to University 101 class, University of South Carolina, Columbia, SC, 5 November 2010.

53. Stephen L. Morgan, "Avoiding Univariate Thinking in a Multivariate World: Forensic Analytical Chemistry Perspectives," invited seminar, Naval Research Laboratory, Washington, DC, 21 January 2011.
54. Eric J. Breitung, Samantha Skelton, and Stephen L. Morgan, "Non-Destructive Identification of Sticky Shed: Multivariate Statistical Analysis Applied to Spectroscopic Classification of Degraded Magnetic Tape," presentation to Motion picture Broadcasting and Recorded Sound Division, Library of Congress, Washington, DC, 2 November 2011.
55. Stephen L. Morgan, "Every contact leaves a trace: Forensic analytical chemistry and CSI," invited talk in Chemistry 622 course, University of South Carolina, Columbia, SC, 23 October 2012.
56. Stephen L. Morgan, "Every Contact Leaves a Trace," invited talk to a University 101 class, University of South Carolina, Columbia, SC, 21 November 2013.
57. Stephen L. Morgan, "Every Contact Leaves a Trace: Problem Solving in the Real World," invited talk to Chemistry 622, Forensic Analytical Chemistry, University of South Carolina, Columbia, SC, 14 November 2013.
58. Stephen L. Morgan, "Every Contact Leaves a Trace: Problem Solving in the Real World," seminar lecture given to Chemistry 622 (Forensic analytical chemistry) students at USC, 13 November 2014.

SESSIONS CHAIRED OR ORGANIZED AT PROFESSIONAL MEETINGS

1. Organizer, Computer Workshop on Optimization, Experimental Design, and Modeling, 33rd Annual Summer Symposium on Analytical Chemistry, Correlation Techniques and Optimization Methods in Analysis, Duke University, Durham, NC, 6 June 1980.
2. Session chairman, Symposium on Laboratory Automation and Data Treatment, EXPOCHEM '80, Houston, TX, 9 October 1980.
3. Session chairman, Southeast-Southwest Regional American Chemical Society Meeting, Analytical Chemistry Symposium, New Orleans, LA, 10 December 1980.
4. Organized and co-lectured in a two-day short course, "Optimization and Experimental Design for the Georgia Section of the American Chemical Society," April, 1982.
5. Session chairman, Symposium on HPLC Methodology, 4th Annual Symposium, Atlanta Chromatography Discussion Group, Atlanta, GA, 19 May 1982.
6. Session chairman, Symposium on Modern Trends in Chromatography, 9th Annual Meeting, Federation of Analytical Chemistry and Spectroscopy Societies, Philadelphia, PA, 19 September 1982.
7. Session chairman, Symposium on Gas Chromatography, 5th Annual Symposium, Atlanta Chromatography Discussion Group, Atlanta, GA, 18 May 1983.
8. Organizer and chairman of a Lecture and Discussion Section, "Advances in Data Processing and Pattern Recognition for Analytical Pyrolysis," at the Gordon Research Conference on Analytical Pyrolysis, New Hampton School, Plymouth, NH, July 1983.
9. Organizer and co-lecturer (with Dr. Harold McNair, VPI) in a workshop on "Capillary Gas Chromatography", sponsored by Perkin-Elmer Corporation, Columbia, SC 15-16 September 1983.
10. Program Committee 1983-84, SC Section American Chemical Society. Organized the local SC Section ACS meeting in Columbia, 14 February 1984; chaired the after dinner talk, presented overview comments, and organized the program consisting of 3 speakers on the subject of "Computers in Chemistry".
11. Organizing Committee (with R. H. Philp, S. R. Goode) for the 1984 Meeting of the South East Association of Analytical Chemists (SEAAC), Columbia, SC, 27-28 April 1984.
12. Session Chairman, Symposium on Gas Chromatography, 5th Annual Symposium, Atlanta Chromatography Discussion Group, Atlanta, GA, 16 May 1984.
13. Host of a Perkin-Elmer Symposium on "Headspace Capillary Gas Chromatography", Department of Chemistry, University of South Carolina, Columbia, SC, 15 June 1984. Dr. Leslie Ettre of Perkin-Elmer was the main speaker. Over 50 people attended the meeting.
14. Organizer and Chairman of session on HPLC Optimization methods (4 speakers), National AOAC Meeting, 9 April 1985, Dallas, TX.
15. Organizing Committee and Session Chairman for Scientific Computing and Automation Conference, session on "Data Handling Methods in Chromatography" (4 speakers), 2 May 1985, Atlantic City, NJ.
16. Session chairman, Symposium on Gas Chromatography, 6th Annual Symposium, Atlanta Chromatography Discussion Group, Atlanta, GA, 15 May 1985.

17. I organized and taught by myself two single-day workshops on "Optimization and Experimental Design" for the Westchester NY Section of the American Chemical Society, 20-21 May 1985; over 100 people attended from industry and academia.
18. Chairman, 1985-86, Program Committee, SC Section of the American Chemical Society; this involved organizing and hosting 2 meetings of the SC Section of the ACS in Columbia.
19. Organizing committee and co-lecturer (with S. N. Deming, R. Deming) of a Workshop on Laboratory Microcomputers, presented at the Eastern Analytical Symposium, 20 November 1985.
20. Session chairman, First Symposium on Pattern Recognition Methods in Analytical Spectroscopy, Snowbird, Salt Lake City, UT, 16-18 June 1986.
21. Co-organizer and co-lecturer (with H. L. C. Meuzelaar, W. Windig, and P. Kistemaker) of a Workshop on Pattern Recognition Methods, in conjunction with the First Symposium on Pattern Recognition Methods in Analytical Spectroscopy, University of Utah, Salt Lake City, UT, 19 June 1986.
22. Originator and organizer (with A. Fox) of the "First International Symposium on the Interface between Analytical Chemistry and Microbiology: Applications of Chromatography and Mass Spectrometry," held 3-5 June 1987 at the University of South Carolina, Columbia, SC. The meeting involved 5 days of papers, and 85 people attended from 7 different countries. I obtained financial support for the meeting from 6 instrument companies. The budget of this international meeting was approximately \$13,000. This successful meeting broke new ground and a second international conference is being planned in Sweden for 1989 or 1990.
23. Local arrangements Chairman, SC ACS meeting in Columbia, 15 April 1987 (hosting Walter McCrone) and 16 September 1987 (hosting Kodak speaker from Eastman Kodak).
24. Organizer and chairman of an invited session of 5 speakers on "Data Handling in Chromatography" for the Computers in Chemistry Division of the ACS, at the National Meeting of the American Chemical Society, New Orleans, LA, 1 September 1987.
25. Organizer and chairman of a full-day symposium session on "Laboratory Applications of Pattern Recognition," at the Scientific Computing & Automation Conference, Atlantic City, NJ, Session 206A: 8:45 am-10 am, Thursday, 5 November 1987, and Session 206B: 1:00 pm- 2:15 pm, Thursday, 5 November 1987, 6 invited speakers (Edmund R. Malinowski, Stevens Institute of Technology; Paul J. Gemperline, East Carolina University; Wilhelm Windig, U. S. Army Chemical Research, Development and Engineering Center; Peter Jurs, Pennsylvania State University; William J. Dunn, University of Illinois at Chicago; and Robert R. Meglen, University of Colorado).
26. Organizer and chairman of a full-day Workshop on Statistical Quality Control, sponsored by Hewlett-Packard at the Gulf Coast Analytical Chemistry Meeting, Houston, TX, 29 September 1987.
27. Organized and spoke at a South Carolina Mass Spectrometry User's Group Meeting, Columbia, SC, sponsored by Hewlett-Packard, 22 January 1988.
28. Local arrangements Chairman, SC ACS meeting in Columbia, 15 April 1988.
29. Organizer, seminar by Dr. Paul Sadek of Baxter Healthcare Corp., Burdick & Jackson Div., on "Considerations in the development of quantitative HPLC coupled with solid phase extraction sample processing," 9 November 1988.
30. Chair, Symposium session on "Gas Chromatography", Tenth Atlanta Chromatography Symposium, Atlanta, GA, 15 June 1988.
31. Co-organizer and co-lecturer (with H. L. C. Meuzelaar, and P. Kistemaker) of a Workshop on Pattern Recognition Methods, in conjunction with the Second Symposium on Pattern Recognition Methods in Analytical Spectroscopy, University of Utah, Salt Lake City, UT, 30-31 May 1988.
32. Organizer and chairman of a half-day session on "Data Handling and Chemometrics in Chromatography," at the FACCS meeting, Philadelphia, PA, 31 October 1988; 5 speakers.
33. Co-chairman (with Brian Bidlingmeyer of Waters/Millipore Corp.) of the Chromatography Division for the 16th Annual Meeting, Federation of Analytical Chemistry and Spectroscopy Societies, Chicago, IL, 2-6 October 1989.
34. Session chairman and organizer, half-day session on "Applications of chromatography to analytical microbiology & biotechnology", 16th Annual Meeting, Federation of Analytical Chemistry and Spectroscopy Societies, Chicago, IL, 6 October 1989.

35. Organizing committee member for the "Second International Symposium on the Interface between Analytical Chemistry and Microbiology: Applications of Chromatography and Mass Spectrometry," June 1991 at the University of Lund, Lund, Sweden.
36. Organized and sponsored one-day short course on high performance liquid chromatography taught by Cindy Seaver of Baxter, held in room 404, Physical Sciences Building, on 10 June 1993; attended by over 35 people from our department, from other departments at USC, and from local industry.
37. Organized and sponsored one-day short course on capillary gas chromatography taught by Paul Silvas of Restek, held in room 006, Physical Sciences Building, which was attended by over 45 people from our department, from other departments at USC, and from local industry.
38. I was the local arrangements chairman for the SC section meeting of the American Chemical Society, Columbia, SC, 5 October 1993.
39. Organized and sponsored one-day short course on capillary gas chromatography taught by Cynthia Seavor of Baxter held in our department and attended by over 40 people from our department, from other departments at USC, and from local industry, 6 October 1994.
40. Organized and sponsored one-day short course on capillary gas chromatography taught by Walter Jennings, of J&W Scientific, sponsored by Baxter Scientific, held in our department and attended by over 30 people from our department, from other departments at USC, and from local industry, 4 April 1995.
41. Symposium Chair, Chemometrics, Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Chicago, IL, 2 March 1994.
42. Symposium Chair, Chemometrics, Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, New Orleans, LA, March 1995.
43. Symposium Chair, Chemometrics, at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Chicago, IL, 2 March 1996.
44. Symposium Chair, Chemometrics, Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Atlanta, GA, March 1997.
45. Symposium Chair, Chemometrics, at the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, New Orleans, LA, March 1998.
46. Symposium Chair, Chemometrics, Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Orlando, FL, March 1999.
47. Session Chair, Chemometrics Session, Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy (PittCon '99), Orlando, FL, March 1999.
48. Co-Chairman, Organizing Committee for Chemometrics Symposium at the Eastern Analytical Symposium, NJ, 16 November 1999. As the organizer of this Symposium, I raised \$1,000 in contributions to support travel for speakers. This international symposium involved 10 speakers from industrial, academic, and government laboratories.
49. Chair, Session 1: Using Chemometrics to Assist Analytical Problem Solving, Eastern Analytical Symposium, New Jersey, 16 November 1999.
50. Chair, Session 2: Using Chemometrics to Assist Analytical Problem Solving, Eastern Analytical Symposium, New Jersey, 16 November 1999.
51. Chair, Session on Chemometrics, Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Orlando, FL, March 2000.
52. Chair, Session on Chemometrics, Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Orlando, FL, March 2001.
53. Chair, Session on Gas chromatography Applications, Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, Orlando, FL, March 2003.
54. I was invited by Dr. Isaiah Warner, Chair of the Program Committee for the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, to write a proposal to organize a symposium on forensic analytical chemistry for the 2008 Conference. I did so, and the proposal was approved. I organized the full-day symposium, titled "Analytical Chemistry for Crime Scene Investigation." Eight invited speakers were involved in the 4 March 2008 symposium at the PittCon meeting in New Orleans, LA. Gabor Patonay of Georgia State University co-chaired the afternoon session, but was minimally involved in the program approval process or organization (he was out of the country). The symposium was sponsored by the ACS Division of Analytical Chemistry.

55. I organized and chaired a half-day invited symposium, titled "Forensic analytical chemistry applications of chemometrics," with six invited speakers at the Federation of Analytical Chemistry & Spectroscopy Societies Annual Meeting, Reno, NV, 30 September 2008 (see attachment).
56. Organizer and co-presenter of a full-day workshop on "The use of multivariate statistics in trace evidence investigations," at the Trace Evidence Symposium on the Interpretation of Trace Evidence: the Present and Future (sponsored by the U. S. Department of Justice, the National Institute of Justice, NIST, and FBI), Clearwater Beach, FL, 4 August 2009. Other speakers included Dr. John Goodpaster and Elisa Liszewski (IUPUI, Indianapolis, IN).
57. I helped to organize (with three collaborators), and presented a 40 minute lecture at a half-day workshop on "Chemometrics for Forensic Scientists: the Good, the Bad, and the Misleading," at the National Meeting of the American Academy of Sciences, Seattle, WA, 23 February 2010.
58. S. L. Morgan, "The use of multivariate statistics in trace evidence investigations," at the Trace Evidence Symposium on the Interpretation of Trace Evidence: the Present and Future (sponsored by the U. S. Department of Justice, the National Institute of Justice, NIST, and FBI), Clearwater Beach, FL, 4 August 2009. Other speakers included Dr. John Goodpaster and Elisa Liszewski (IUPUI, Indianapolis, IN).
59. By invitation, I participated in a two day workshop with 20 participants, Introduction to Chemometrics for Forensic Scientists and Analytical Chemists," held at John Jay College of Criminal Justice, for the Research Foundation of the City University of New York, New York, NY. I lectured for a full day on the second day of the course.
60. S. L. Morgan, John V. Goodpaster, Dr. Edward G. Bartick, Statistical Methods for Forensic Decision-Making, full-day workshop, 2011 NIJ/FBI Trace Evidence Symposium, Kansas City, KS, 7 August 2011.
61. At the plenary introductory session of the August 2011 NIJ/FBI Trace Evidence Symposium [<http://projects.nfstc.org/trace/2011/agenda.htm>], Professor Michael Risinger of the Seton Hall University School of Law (also lawyer for the Innocence Project), referred to this workshop in his talk [http://projects.nfstc.org/trace/2011/videos/Day1DebatingMerits_MichaelR_309.html]: "You should attend a program on statistical concepts by Stephen Morgan. I attended an all-day program yesterday. He is the master at taking very complicated mathematical concepts and putting them into understandable graphical representations, and I recommend that if he gives that program again, you go to it."
62. I chaired a half-day invited symposium, titled "Chromatography, Related Techniques, and Bioprocessing," with seven invited speakers at the Federation of Analytical Chemistry & Spectroscopy Societies Annual Meeting, Reno, NV, 4 October 2011.
63. I served on the Scientific Program Organizing Committee of the International .SCIX meeting (formerly the Federation of Analytical Chemistry & Spectroscopy Societies, or FACSS) for the October 2014 meeting (Reno, NV, 28 September-3 October 2014). I solicited papers for Security/Forensics program and organized a half day symposium on Chemometrics/Data Analysis for Forensics with five invited speakers (all NIJ grant fundees). I chaired the symposium on 30 September 2014 at SCIX, and gave a paper in the symposium.
64. I chaired a half-day session on Chemometrics at, PITTCON 2014, Chicago, IL, 6 March 2014.
65. With Jose Almirall (Florida International University) and Igor Lednev (State University of New York-Buffalo, I wrote a proposal for half-day Forensics Symposium at the 2015 Pittsburgh Conference (New Orleans, March 2015). I chaired and organized half-day session with 5 invited speakers at Pittcon (12 March 2015): "Statistics and Data Analysis for Forensic Decision-making." Chair and Organizer (5 invited speakers).
66. I served on the Scientific Program Organizing Committee of the International SCIX conference (formerly the Federation of Analytical Chemistry & Spectroscopy Societies, or FACSS) for the October 2015 meeting (Providence, RI, 28 September-3 October 2014). I organized and chaired a half-day Security/Forensics symposium on Chemometrics/Data Analysis for Forensics with five invited speakers (all NIJ grant fundees). I chaired the symposium on 30 September 2015.
67. I served on the Scientific Program Organizing Committee of the International SCIX conference (formerly the Federation of Analytical Chemistry & Spectroscopy Societies, or FACSS) for the September 18-23, 2016 (Minneapolis, MN). I solicited papers, organized and chaired a half day symposium on Chemometrics/Data Analysis for Forensics with five invited speakers; I will chair the symposium.
68. I organized two sessions (am and pm) on Advances in Forensic Chemistry at the 68th Southeastern Regional Meeting of the American Chemical Society, Columbia, SC, 23 October 2016.

OTHER PROFESSIONAL ACTIVITIES

1983-88, Committee on Chemical Laboratory Safety, SC Section American Chemical Society, Chair 1983-87.

1984-88, Editorial Board member, *Journal of Analytical and Applied Pyrolysis*, Elsevier Scientific Publishing Co., Inc., Amsterdam.

1985-86, Chairman-elect (Program Chair), SC Section, American Chemical Society.

1985-86, Program Chairman, SC Section, American Chemical Society.

Past-Chairman, SC Section, American Chemical Society, 1987-88.

Member, Executive Committee, SC Section, American Chemical Society, 1986-88.

1984, advisor to Elsevier, Scientific Software Publishers

1985-1988, Autoclave/Chemical Data Systems, advisor, several occasions.

1986-87, Chairman, SC Section, American Chemical Society.

7/86, Waters/Millipore, Separation Advisory Council member.

12-86, Lockite Corporation, consultant.

1988, Somatagen, advisor (maker of pyrolysis instrument).

Advisor to Autoclave (Chemical Data Systems) on pyrolysis instrumentation development, September, 1988.

Advisor to Somatagen Inc., on pyrolysis instrumentation development, summer, 1988,

Consultant, Richland County Public Defender's Office, 21 February 1991.

Adviser to Research Corporation on modified silica gels for LC, March 1992.

Chair, Panel on Laboratory Performance Data Base (LPD), Office of Research & Development, Environmental Monitoring Systems Laboratory, United States Environmental Protection Agency-Las Vegas, NV, Fall 1992. This entailed a 2-day site visit to EMSL-LV in September 1992 and authoring a 28 page 'Report of the Review Panel', Jan. 1993.

Member, Editorial Board, *Computers in Chemistry Buyers Guide*, published by the American Chemical Society, Washington, DC, 1993-94 (attended Board meetings in Washington, DC).

Advisor to U.S. EPA, Cincinnati, OH, on chemometrics job descriptions, July 1993.

Wrote 1-page proposal to be Keynote speaker for Undergraduate Faculty Enhancement Program at Georgia State University, Atlanta, GA, June 1994; funded by NSF.

Organizing committee member for the "Third International Symposium on the Interface between Analytical Chemistry and Microbiology: Applications of Chromatography and Mass Spectrometry," June 1995.

Advisor to J. J. Glajch, Dupont-Merck, MA, on analytical methods validation, 1995.

Advisor to Federal Public Defender's office re crack cocaine analysis, 19 October 1994.

Organized first aid and CPR courses for personnel from Chemistry & Biochemistry on several occasions: 1978, 1979, 10-11 January 1994.

On the University Health & Safety Oversight Committee, I wrote a review and recommendation document on the USC Hazardous Material Control Program, 3 November 1994.

On the College of Science & Mathematics Computer Advisory Committee, I was instrumental in departmental acquisition of computers for faculty and staff in Chemistry in 1994.

I nominated my graduate student, M. K. Higgins, for a USC award, Outstanding Paper by a Woman Scientist. She won this University-wide competitive award in May 1994; the article was published in the premier analytical chemistry journal, *Analytical Chemistry*, in 1994.

1995-2003: Expert consultant to Lord, Bissell, & Brock (Chicago, IL), regarding a drug patent issue.

Since 1992, I have served as an external reviewer for ten tenure and promotion panels, eight at Universities in the United States, one at a foreign university, and one industrial review. Four of these cases were for promotion to full professor.

I have hosted numerous departmental seminar speakers. Recently, these speakers include, for example: Dr. David Hercules (Vanderbilt University), February 1998; Dr. Richard Sacks (University of Michigan), October 1998; Dr. James Jorgenson (UNC-Chapel Hill), September 1999, Dr. Edward G. Bartick (FBI Laboratory), February 2002; Dr. Larry Bottomly (Georgia Tech), April 2002; Dr. José R. Almirall (Florida International Univ., 2010).

1991-2000: Each Spring I taught one week of laboratory classes in South Carolina College Chemistry 104 on "Sequential Simplex Optimization"; this was a computer-based experimental design and statistics lab exercise that I designed for the Honors Chemistry Program involving optimization and characterization of a chemical reaction.

I served as the Senior Faculty Mentor for the Sensor Group (Angel, Murphy, Morgan) of the DOE/EpSCoR project from 1995-1999. Every quarter during the year, I wrote the Quarterly Progress Reports and organized our presentation at two DOE/EPSCOR Review panel meetings. In January 1997 and January 1999, I coordinated and wrote the DOE/EPSCOR renewal proposal for the sensor group (which was renewed for 2 additional years of funding in 1997, and a final 2 years of funding from 1999-2001).

At the invitation of Kitty Farnell (Science Coordinator, Lexington School District 2), I served on the SC Science Standards SSI Objective 2.3 Standards Workshop committee to help define new K-12 science standards in the State of South Carolina, 1998-2000. (New standards were adopted 12 January 2000).

Fall 2000-Spring 2001: I and Dr. S. R. Goode co-chaired the Department's Ad Hoc Committee on Statistical Studies to address a proposal from the Department of Statistics to institute a college-wide undergraduate program requirement for 3 credit hours in statistics. We authored a document outlining the Department of Chemistry and Biochemistry's current teaching of statistics in Chemistry 103L-104L, 321, 321L, and 621 and describing the Department position on this proposal. I also served on the College of Science & Mathematics Committee on Statistical Studies to further consider these issues.

As Chair of the Department of Chemistry & Biochemistry safety committee, I present a 1 hour program on "Chemical Safety in the Laboratory" to incoming graduate students as part of their orientation activities yearly in August. This program is always presented in August each year for incoming students, faculty, and other laboratory personnel; I have often taught it in January and May as well. These lectures serve as OSHA-required safety and hazard notification training for these USC employees. During 2001-2006 I presented a one-hour safety training program each June for the undergraduate research students participating in our Department's Research Experience for Undergraduates Nanoscience program.

I designed and taught a workshop on "Moving Safely", attended by all faculty, staff, research faculty, postdoctoral students, and graduate students. The training provided information on acceptable moving practices for relocation of laboratories from PSC to GSRC. The workshop was conducted 1-2 pm every Friday afternoon, from 12 May to 23 June 2000 (six sessions). The complete presentation can be found on the web at URL: <http://www.chem.sc.edu/faculty/morgan/safety/>. I also responded to multiple safety issues related to the move to GSRC throughout the year.

In May 2000, I created a "Safety Information" web page for the Departmental web site. URL: <http://www.chem.sc.edu/faculty/morgan/safety>. The page has been updated multiple times to add additional information as needed. In June 2001, I added a PowerPoint presentation titled "Introduction to Chemical Laboratory Safety" which is linked to by the REU page for their program. This presentation is also available on the web for anyone to use as a safety presentation for laboratory classes.

I served as a presentation judge for graduate student papers at the SC Academy of Science, Annual Meeting, Newberry College, March 2000.

Poster Session judge at the USC Discovery Day Undergraduate Research Fair, held in the spring at University of South Carolina, Columbia, SC; 2003-2014.

Judge for the South Carolina Junior Academy of Science scientific paper competition in January 2006-2011. I served as a judge for the South Carolina Junior Academy of Science (high school) scientific paper competition in January 2009. I reviewed five written papers and presided as a judge for a session of oral papers presented by high school students at the South Carolina Junior Academy of Science Symposium in January 2009.

I judged/reviewed four written papers submitted to the South Carolina Junior Academy of Science Symposium in January 2010. I served as a judge and presided over an afternoon session of 6 papers for the South Carolina Junior Academy of Science (high school) scientific paper competition in January 2010.

2006-2009, member of the Award Selection Committee (chaired by Dr. John Yates of the Scripps Institute) for the 2008 *American Chemical Society Award in Analytical Chemistry*. This award is a prestigious one, given each year to the outstanding analytical chemist in the nation.

2006-2009, member of the Award Selection Committee (chaired by Christie G. Enke and Laurie E. Locascio (NIST).) for the Analytical Chemistry Division of the American Chemical Society for the 2008 *Arthur Findeis Award in Analytical Chemistry*. This award is a prestigious one, given each year to the outstanding young (within 10 years of obtaining their Ph.D.) analytical chemist in the nation

Along with an undergraduate who has worked for me for 3 years (Heather Taylor), I participated in the USC Center for Teaching Excellence program on "Paths to Excellence in Undergraduate Research Mentoring" on 28 September 2007. This program was streamed on the internet.

I was invited by the Chair of the Program Committee for the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy to write a proposal to organize a symposium on forensic analytical chemistry for the 2008 Conference. I organized the full-day symposium with 8 invited speakers for the March 2008 PittCon meeting in New Orleans, LA.

In 2008-2009, I served on a five member USP Chemometric Working Group to prepare a 'stimulus' guideline document on the use of chemometrics in the pharmaceutical industry.

I served as Second Reader on the SC Honors College Thesis of Ryan Brunner, B.S. Chemistry, 2009.

I coauthored a Health and Safety Policy document, "Volunteer participation agreement and acknowledgement of risks," for the Department of Chemistry & Biochemistry," 2010-2011.

In November 2009, I co-authored and edited, with Brian Hahn of USC Environmental Health & Safety, a proposed guideline for minors working on special projects in laboratories at USC. This document was submitted to the USC Legal Affairs Office for review and has been implemented.

Founding member of the Forensic section of the Society for Applied Spectroscopy, involved in writing by-laws of this section, 2009.

Member, Fiber subgroup of the *Special Working Group on Materials (SWGMA)*, sponsored by the Department of Justice (National Institute of Justice) and The Federal Bureau of Investigation, 2010-present.

Consultant to North Carolina State University proposal for a National Forensic Center of Excellence, May, 2011.

I was invited in October 2011 to participate as a faculty mentor in the USC proposal from the Office of Undergraduate Research to the Beckman Scholars Program, 15 October 2011. The proposal will provide up to 3 years support for an undergraduate to work in my laboratory.

Nicholas M. Riley (Undergraduate student, McNair and Magellan Scholar) and Stephen L. Morgan, "Improving Reliability of Forensic Trace Fiber Matches by Chemical Identification of Dyes," proposal to the Council on Undergraduate Research for 16th annual Undergraduate Research Posters on the Hill session, Washington, DC, spring 2012. Over 950 proposals were submitted; unfortunately, our proposal was not one of the 64 selected.

The National Forensic Science Commission was established in fall 2014. I was appointed as one of 15 members of the Chemistry/Instrumental Analysis Scientific Area Committee, as one of the two academic scientists on the committee. This committee serves as an oversight committee for the Organization of Special Advisory Committees (OSAC) to review recommendation of the six subcommittees that report to it (Controlled Substances, Fire Debris and Explosives, Geological Materials, Gunshot Residue, Materials (Trace evidence), and Toxicology) and to recommend approval of standards and guidelines related to forensic policies and practices. I am assigned to the Materials (trace) and Toxicology committees. See:

http://www.nist.gov/forensics/osac_102914.cfm. I have attended meetings of the NFSC OSAC in Norman, OK, 12-15 January 2015; in Orlando, FL; in Gaithersburg, MD, in July 2015, and in Leesburg, VA, in January 2016.

Every August, I present a 2 hour program on "Chemical Laboratory Safety," on 21 August 2015 to incoming graduate students, postdoctoral fellows, and new faculty as part of their orientation activities. These lectures served as OSHA-required safety and hazard notification training for these USC employees; the list of attendees is posted on the Department safety web to certify attendance. I also periodically advertise regularly scheduled safety training offered by USC EHS personnel.

In 2015, I also served on the University Safety Committee, representing Chemistry & Biochemistry, along with Dr. Scott Goode, from Chemistry.

I maintain the departmental laboratory safety pages and chemical hygiene plan (CHP). The plan is downloadable from the safety web site in Word and Adobe Acrobat formats. The CHP, which I update every year as needed, is used as an exemplar CHP by USC Health & Safety. Modified versions of it are used by several other organizations including the South Carolina State law Enforcement Division Forensic Laboratory and other universities.

JOURNAL REVIEWER

Analytica Chimica Acta
Analytical Chemistry
Analytical and Bioanalytical Chemistry
Applied Spectroscopy
Chemometrics and Intelligent Laboratory Systems
Forensic Science International
IEEE Transactions on Information Forensics and Security
Journal of Agricultural Chemistry
Journal of Analytical & Applied Pyrolysis
Journal of Analytical Toxicology
Journal of Chemical Education
Journal of Chemometrics
Journal of Chromatographic Science
Journal of Chromatography
Journal of Chromatography A
Journal of Chromatography B
Journal of Forensic Sciences
Journal of Polymer Science
Journal of the Association of Official Analytical Chemists
Reviews in Analytical Chemistry
Spectrochimica Acta A
Spectrochimica Acta B
Trends in Analytical Chemistry

GRANT REVIEWER

National Science Foundation

U.S. Civilian Research and Development Foundation

DOD

ONR

National Institute of Justice, multiple different research programs

National Institute of Justice, Coverdell Laboratory Improvement Program

National Institute of Justice (U. S. Department of Justice): I served on panels for several different NIJ funding programs and reviewed a total of 23 proposals in 2009, 9 in 2010, 9 in 2011, and 12 in 2012; 2 in 2013, 2 in 2014. I also served on an on-site National Institute of Justice review panel for the evaluation of 11 proposals, Gaithersburg, MD, 20-21 July 2009.

USC Magellan Undergraduate Research Scholar Program (typically reviewing 3-5 proposals a year)

I have served as a tenure and promotion reviewer for over 25 universities.

RESEARCH SUPERVISION [<http://www.chem.sc.edu/faculty/morgan/alumni.html>]

POST-DOCTORAL RESEARCH

1. Zhu Zhong-Tao, Visiting Scholar from Shanxi University, Taiyuan, Peoples' Republic of China. "Capillary gas chromatography of carbohydrates." January 1982-December 1983.
2. Dr. James Gilbert. Post-doctoral fellow, co-advisor with Dr. Alvin Fox, Department of Microbiology & Immunology. "Gas chromatography/mass spectrometry applications in analytical microbiology." January 1986-Dec. 1988. Employed at Smith-Kline-Beecham Pharmaceuticals, London, England.
3. Dr. Bertil Christensson. M.D. from University of Lund, Lund, Sweden, co-advisor with Dr. Alvin Fox, Department of Microbiology & Immunology. "Detection of trace levels of bacteria in tissues and fluids using NICI-GC/MS." June 1987-June 1988.
4. Zhu Zhong-Tao, Visiting Scholar from Shanxi University, Taiyuan, Peoples' Republic of China. "Chemometric modeling of UV-Vis spectra." November 1989-May 1991.
5. Dr. Thomas Richardson, Associate Professor, The Citadel, Charleston, SC. Visiting professor on sabbatical. "Pyrolysis gas chromatography/mass spectrometry for structure determination of polymers." January-July 1999.
6. Brittany Hartzell-Baguley, Ph. D., postdoctoral fellow, January 2005-June 2006. Capillary electrophoresis of textile dyes extracts. Presently employed at the Reno (NV) Crime Laboratory.
7. Dr. James E. Hendrix, Postdoctoral researcher and Research Assistant Professor, University of South Carolina. Textile dye chemistry, microspectroscopy of textile fiber dyes, extraction and capillary electrophoresis of dyes, September 2002-present.
8. SELİM ERDOĞAN, Associate Professor of Analytical Chemistry, Department of Faculty of Pharmacy, Inonu University, Malatya, Turkey. Visiting international scholar.

DOCTORAL RESEARCH

1. Christopher A. Jacques, Ph.D., Analytical Chemistry, University of South Carolina, August 1980. "Optimization and interpretation of chromatographic methods in gas chromatography and analytical pyrolysis." Employed at Amway Corporation, Ada, MI.
2. Joseph R. Hudson, Ph.D., Analytical Chemistry, University of South Carolina, May 1982. "Characterization of biopolymers by Capillary GC and pyrolysis GC-MS." Employed at Bayer Crop Sciences, Research Triangle Park, NC.
3. Larry W. Eudy, Ph.D., Analytical Chemistry, University of South Carolina, December 1983. "Analytical pyrolysis and derivatization methods combined with gas chromatography-mass spectrometry for the characterization of bacteria and other nonvolatile materials." Employed at Syngenta, Greensboro, NC.
4. Michael D. Walla, Ph.D., Analytical Chemistry, University of South Carolina, August 1984. "Characterization of biopolymers by gas chromatography-mass spectrometry." Employed at the Mass Spectrometry Laboratory, Department of Chemistry & Biochemistry, University of South Carolina, Columbia, SC.
5. Jeffrey S. Kiel, Ph.D., Analytical Chemistry, University of South Carolina, August 1984. "Optimization and methods development in reversed phase high performance liquid chromatography of ionic solutes." President, Kiel Laboratories, Gainesville, GA.
6. Pauline Y. Lau, Ph.D., Analytical Chemistry, University of South Carolina, August 1984. "Improved methods for carbohydrate analysis by gas chromatography and gas chromatography-mass spectrometry for the characterization of microorganisms and other biopolymers." Previously at Boehringer-Mannheim, Indianapolis, IN.
7. Matthew Przybyciel, Ph.D., Analytical Chemistry, University of South Carolina, December 1984. "High resolution capillary column development for selective separations in gas chromatography." Employed at Rohm and Haas Company, Spring House, PA.
8. Andrew Jordan, left program without degree, June 1985, "High performance liquid chromatography of antibiotics." Formerly: Employed at Forensic Services Laboratory, and Information Technology Division, South Carolina State Law Enforcement Division, Columbia, SC; retired, 2010.
9. Robert S. Whiton, Ph.D., Analytical Chemistry, University of South Carolina, December 1985. "Trace

- analysis of biopolymer components by capillary gas chromatography-mass spectrometry." Employed at Research Triangle Institute, Research Triangle Park, NC (1987)
10. Cynthia Smith Shaw, Ph.D., Analytical Chemistry, University of South Carolina, December 1986. "Sample preparation and computer assisted data handling techniques for chromatographic analyses of trace components in complex mixtures." Employed at Research Triangle Institute, Research Triangle Park, NC (1987).
 11. Kimio Ueda, Ph.D., Analytical Chemistry, University of South Carolina, August 1989. "Trace analysis and identification of bacterial constituents including D-alanine, D-glutamic acid, and glucitol phosphate by negative ion chemical ionization gas chromatography-mass spectrometry and analytical pyrolysis." Employed at Proctor & Gamble, Kyoto, Japan.
 12. James C. Rogers, Ph.D., Analytical Chemistry, University of South Carolina, December 1989. "Identification of carbohydrate chemical markers for Legionellae and other microorganisms as deuterated alditol acetates by gas chromatography-mass spectrometry." Employed at RJR-Nabisco, Winston-Salem, NC.
 13. Rachhpal S. Sahota, Ph.D., Analytical Chemistry, University of South Carolina, May 1991. "Computer pattern recognition applied to pyrolysis-gas chromatography/mass spectrometry for the detection of cancer markers." Presently: Proctor & Gamble, Cincinnati, OH (1992-present).
 14. Bruce E. Watt, Ph.D., Analytical Chemistry, University of South Carolina, May 1991. "Identification and characterization of chemical markers produced from microorganisms including Bacillus anthracis by pyrolysis-gas chromatography/mass spectrometry." Presently: President, Columbia Analytical Labs, 3005 Broad River Rd., Columbia, SC 29210.
 15. Erik L. Nimz, Ph.D., Analytical Chemistry, University of South Carolina, August 1993, "Capillary gas chromatography/mass spectrometry following analytical transformation of molecules of biological significance." Previously: Pfizer, Inc., Groton, CT (1993-2004); Presently: AlCon Laboratories, Ft. Worth, TX (2004-present).
 16. Melinda K. Higgins, Ph.D., Analytical Chemistry, University of South Carolina, August 1994, "Chemometric analysis of gas chromatographic/mass spectrometric data for classification and modeling of chemical structure and composition." Presently at principal research scientist in the Georgia Tech Research Institute and is the primary technical lead and program manager of the NGB Technology Consortium; also Senior Statistician; and Research Professor, Emory University, Atlanta, GA.
 17. Xiang Yuan, Ph. D., Analytical Chemistry, University of South Carolina, May 1995, "Protocols and algorithms for gas chromatographic/mass spectrometric analysis of complex environmental samples." Presently at Analytical Consulting, Inc., Oakland, CA.
 18. Randy C. Galipo, Ph. D., Analytical Chemistry, University of South Carolina, May 1997, "Sampling protocols for the analysis of intractable samples by gas chromatography and mass spectrometry." Presently: Analytical Chemist, Eastman Kodak Co., Rochester, NY.
 19. William J. Egan, Ph. D., Analytical Chemistry, University of South Carolina, August 1998, "Development and application of pattern recognition and calibration methods for multivariate analytical chemical data." Previously at Argonne National Laboratory; at Novartis Institutes for Biomedical Research, Boston, MA; Research Scientist, Pharmacopeia, Princeton, NJ; Staff Investigator/co-Project Head at Vertex Pharmaceuticals, Boston, MA; Technical Staff/Lead at MIT Lincoln Laboratory, Boston, MA.
 20. Brian Kochanowski, Ph. D., Analytical Chemistry, University of South Carolina, May 1999, "Pyrolysis gas chromatography/mass spectrometry for characterization of polymers of forensic interest." Presently: Waters, Inc., Milford, MA.
 21. Kristen W. Sellers, Ph. D., Analytical Chemistry, University of South Carolina, August 2000, "Gas chromatography and gas chromatography/mass spectrometry methods for polymeric and forensic analysis." Presently: Grants Administrator, Office of Sponsored Programs, University of Virginia, Charlottesville, VA.
 22. Vanessa R. Kinton, Ph.D., Analytical Chemistry, University of South Carolina, December 2001. "Chemometric techniques for classification and modeling of mixture composition of multivariate analytical chemical data." Presently at Alcohol & Tobacco Tax and Trade Bureau (ATTB), Ammendale, MD.

23. Steven M. DuBose, Ph.D., Analytical Chemistry, University of South Carolina, August 2002. "Analytical Methods Development and Troubleshooting for High Performance Liquid Chromatography and Fast Gas Chromatography." Presently at Alcon Laboratories, Ft. Worth, TX.
24. Narendra K. Meruva, Ph.D., Analytical Chemistry, University of South Carolina, August 2002. "Development of Analytical Methods for Characterization of Complex Chemical Samples Using Fast Gas Chromatography/Time-Of-Flight Mass Spectrometry." Presently at Altria (formerly Phillip Morris), Richmond, VA.
25. Christopher R. Mubarak, Ph.D., Analytical Chemistry, University of South Carolina, August 2003. "Analysis of Natural and Synthetic Polymers by Analytical Chemical Chromatographic and Spectroscopic Methods." Presently at Coca-Cola, Atlanta, GA.
26. Alexander A. Nieuwland, Ph.D., Analytical Chemistry, University of South Carolina, December 2004, "Applications of Chromatography, Spectroscopy, and Capillary Electrophoresis to the Analysis of Forensic Samples." Presently employed at Eastman Chemical Company (Vordian plant site), Columbia, SC.
27. Brandi L. Clelland, Ph. D., Analytical Chemistry, University of South Carolina, August 2006, "Forensic Applications of Raman Microspectroscopy, Capillary Electrophoresis, Chromatography, and Mass Spectrometry for Drugs, and Anticoagulant Rodenticides." 2006-2007: Postdoctoral researcher at Counterterrorism and Forensic Science Research Unit, FBI Academy, Quantico, VA; 2007-present: Contracts Management, DARPA.
28. Amy R. Stefan, Ph.D., Analytical Chemistry, University of South Carolina, August 2007. "Extraction and capillary electrophoresis/mass spectrometry of textile fiber dyes," Presently: Senior Scientist, Polymathic Analytical Labs (a Zeus Company), Orangeburg, SC.
29. Anthony R. Trimboli, Jr., Ph. D., Analytical Chemistry, University of South Carolina, August 2008. "Evaluation of forensic spectroscopic analyses of weathered, laundered, and bloodstained textiles by chemometric methods." Presently Assistant Professor, Department of Chemistry, Christian Brothers University, Memphis, TN 38104.
30. Sparkle T. Ellison, Ph. D., Analytical Chemistry, University of South Carolina, August 2009. "Applications of chromatography, mass spectrometry, and spectroscopy for composition and trace analysis of polymeric and forensic samples."
31. HongXia Guan, Ph. D., Analytical Chemistry, University of South Carolina, August 2009. "Pesticides and adulterants in food products: challenges and solutions for sample preparation for gas chromatography/mass spectrometry." Presently Assistant Professor at Western Illinois University, Macomb, IL.
32. Jessica McCutcheon, Ph. D., Analytical Chemistry, University of South Carolina, August 2010. "Forensic Discrimination, Age Estimation, and Spectral Optimization for Trace Detection of Blood on Textile Substrates Using Infrared Spectroscopy and Chemometrics." Presently Assistant Professor at Frances Marion University, Florence, SC.
33. Oscar Cabrices, Ph. D., Analytical Chemistry, University of South Carolina, August 2011. "Forensic Analysis of Trace Evidence Fibers and Drugs of Abuse in Biological Matrices using Chromatographic and Mass Spectrometric Methods, applications of chromatography, electrophoresis, and mass spectrometry." Presently Applications Chemist at Gerstel, Baltimore, MD.
34. Pakritsadang Kaewsuya, Ph. D., Analytical Chemistry, University of South Carolina, May 2012. "Analysis of drugs of abuse, melamine and cyanuric acid, steroids, and pesticides and mycotoxins by liquid chromatography and mass spectrometry," Presently Postdoctoral at SC State University, Orangeburg, SC.
35. Yujing (Wendy) Wen, Ph. D., Analytical Chemistry, December 2012. "Applications of disposable pipette extraction for analysis of drugs of abuse, vitamin d metabolism, testosterone and inborn errors of metabolism by gas and liquid chromatography/mass spectrometry." Presently working at Firstchoice Health Care, Florence, SC.
36. Scott Hoy, Ph.D., Analytical Chemistry, University of South Carolina, August 2013, "Development and Figures of Merit for Microextraction and Ultra-Performance Liquid Chromatography for Forensic Characterization of Dye Profiles on Trace Acrylic, Nylon, Polyester, and Cotton Textile Fibers."

37. Brianna M. Cassidy, Ph.D., Analytical Chemistry, University of South Carolina, December 2015, "Spectroscopy and Chemometrics for Cultural Heritage and Forensics: Conservation of Magnetic Tape by Identifying Degraded Polymer Signatures; and Characterizing the Chemiluminescent Reaction of Luminol with Blood."
38. Zhenyu Lu, Ph.D., Analytical Chemistry, December 2015, "Applications of Attenuated Total Reflectance Infrared Spectroscopy for Forensic Analysis."
39. Nathan C. Fuenffinger, Ph.D., Analytical Chemistry, December 2015, "Optical Spectroscopy and Chemometrics for Discriminations of Dyed Textile Fibers and Audio Tapes."
40. Kaylee R. McDonald, Ph. D., June 2016, "Applications of Disposable Technologies with MS/MS for Forensic and Clinical Analyses for Biological Matrices," June 2016.
41. Molly R. Burnip, Ph. D., "Forensic Characterization of Synthetic Textile Dyes From Fibers Exposed to Outdoor and Laundering Effects by Ultra-Performance Liquid Chromatography and Spectral Analysis," December 2016.
42. Allyssa M. Abraham, "Detection of magnetic tape degradation by infrared spectroscopy", November 2015-present.
43. Nilmini H. Ratnasena, "Chemical Imaging and magnetic tape characterization," December 2015-present.

MASTERS RESEARCH

1. David W. Fritz, M. S., University of South Carolina, May 1980. Thesis title: "A Systematic Investigation of the Separation of Several Nucleotides by Ion-Pair Reversed Phase Liquid Chromatography." Presently at Protein Design Labs, Fremont, CA.
2. Luisa Santos Dougan, M. S., University of South Carolina, August 1997, "Validation of Analytical Methods using Experimental Design." Employed at Eden Bioscience, Bothell, WA.
3. Tricia Williams, M.S., Analytical Chemistry, University of South Carolina, May 1999, "Forensic applications of fast gas chromatography." Employed at Milliken, Inc., Spartanburg, SC.
4. Alexander A. Nieuwland, International Student Exchange, M.S., University of Utrecht, The Netherlands, "Rapid derivatization solid-phase microextraction: forensic applications," 8/00-12/00. Finished Ph. D. in Morgan lab (see above).
5. Russell W. Zeigler IV, M.S., University of South Carolina, August 2002, "Use of Gas Chromatography/Mass Spectrometry and Fourier Transform Infrared Spectroscopy in Forensic Analytical Chemistry." Analytical chemist in NC.
6. Suzanna Heath Hall, M.S., Analytical Chemistry, University of South Carolina, August 2006 "Relative discriminating ability of UV/visible and Fluorescence Microspectrophotometry for Fiber Classification." High school science teacher in Camden, SC.

CO-ADVISING GRADUATE STUDENTS

1. Co-advisor with M. L. Myrick for Heather Brooke, Ph.D., Analytical Chemistry, August 2010, IR Imaging of Blood.
2. Co-advisor with M. L. Myrick for Megan Baronowski, Ph.D., Analytical Chemistry, August 2010, IR Imaging of Blood.
3. Co-advisor with M. L. Myrick for Stephanie A. DeJong, Ph.D., Analytical Chemistry, December 2015, "Optical Spectroscopy and Chemometrics for Discriminations of Dyed Textile Fibers and Magnetic Audio Tapes."
4. Co-advisor with M. L. Myrick for Raymond Belliveau, Ph.D. in progress, Chemical Imaging of Trace Evidence with IR Thermal Detectors.

UNDERGRADUATE RESEARCH

From 1977-2016, over 130 undergraduate students have been involved in undergraduate research in the Morgan laboratory.

1. Daniel Hanle, "Optimization methods in chemistry," 1/77-6/77.
2. Ronnie C. Parker, "Modeling in chemistry," 9/78-6/79.
3. John D. Baker, "Pyrolysis gas chromatography/mass spectrometry of carbohydrates," 6/81-6/82.
4. Karen Sentell, "Capillary gas chromatography column preparation," 6/82-9/83. Ph. D., Analytical Chemistry, University of Florida, Gainesville, FL.
5. Michael Santangelo, "Capillary gas chromatography column preparation," 6/82-9/84.
6. Renee Weatherwalks, "Gas chromatography," 9/82-12/82.
7. Susan Propst, "Principal component analysis of mass spectra data," 9/82-12/82.
8. Bartley C. Rogers, "Computer applications in analytical chemistry," 9/84-12/84.
9. Tammy K. Brown, "Liquid chromatography of antibiotics," 9/84-5/86.
10. Michael D. Abdalla, "Computer assisted optimization in liquid chromatography," 7/85-5/86.
11. Donita Woodberry, "Pyrolysis Gas Chromatography for forensic identification of automobile paints," 9/86-6/87.
12. C. Parks, USC Student, "Streptococcus B chemical markers by GC/MS," 09-12/87. One paper.
13. Jennifer Simmons (visiting summer student from Wooster College), "Forensic applications of pyrolysis gas chromatography," 7/87-8/87.
14. Aisha Simmons (SCAMP summer intern), "Solid-phase microextraction for arson analysis," 6/97-9/97.
15. Scott Johnson, "HPLC of caffeine," 6/97-9/97.
16. Michelle B. Riddle, Newberry College, summer intern, "Forensic applications of fast GC," 6/98-9/98.
17. Shawn Gerald, "HPLC method development for caffeine analysis," 8/98-12/98.
18. Lindsay Revere, "Environmental applications of solid-phase microextraction," 9/98-5/99.
19. Tracy Stealey, USC student, "Calibration for gasoline, diesel, and kerosene mixtures by GC/MS," 1/99-5/99.
20. Reka Kovacs, "Identification of gasoline, diesel, and kerosene mixtures by GC/MS," 1/99-5/99.
21. Catrechia Towns, SC State, Research Experience for Undergraduates Program, "Polymer characterization," 6/99-8/99. One paper published.
22. Caroline Parler, "Pyrolysis GC/MS for characterization of polymer end groups," 8/99-12/99.
23. Marion Wiegly, Visiting student from England, "Forensic comparison of duct tapes," 8/99-12/99.
24. Constantine Pournaras, "GCpeak, a program for vector representation, feature selection and fingerprinting with gas chromatography/mass spectrometry", 8/99-5/00.
25. Andres Moreno, "Javascript-enabled web pages for a tutorial on pH calculations for monoprotic acid aqueous solutions," 1/00-5/00.
26. John Church, "Javascript-enabled web pages for a tutorial on pH calculations for monoprotic acid aqueous solutions," 1/00-5/00.
27. Barry Twenter, undergraduate from Northern Illinois University participating in the Department's Research Experience for Undergraduates Program, "Nanoscience research project in polymer stability," 6/00-8/00.
28. John Dantzler, "Fiber optic spectroscopy and chemometrics," and "Instructional computing in the Chemistry Laboratory," 8/00-present.
29. Elizabeth Donovan, "DNA Degradation: Determining the Age of Bloodstains," 8/00-12/00.
30. Ashley Jones, Carolina Scholar's mentor, USC Provost's Program, 8/00-2004.
31. Maxcy Stroman, "Algae growth and its effect on pH measurements in wastewater treatment ponds," 5/01-11/01.
32. Betsy Jean Olsen, "Comparisons of polymer stability by analysis of thermal degradation rates using pyrolysis gas chromatography/mass spectrometry," Research Experience for Undergraduates student, 7/2001-9/2001; now employed at the FDA, Gaithersburg, MD.
33. Sara E. McFadden, "Attenuated Total Reflectance FTIR for the Identification of Automobile Paint," 8/01 to 12/02, USC senior; Mentor for South Carolina Honors College Honors thesis.
34. Martha E. Miller, "Fourier Transform Infrared Spectroscopy for the Forensic Identification of Fibers," 8/01 to 5/02.

35. Angela C. Powell, "Profiling of Contaminants in Illicit Drug Samples," 8/01 to 5/02.
36. Christopher D. Barker, "High Performance Liquid Chromatography / Ultraviolet Spectroscopy for the Forensic Identification of Ink Components from Ink-jet Printers", 05-08/02.
37. Brigitte Robinson, "Pyrolysis GC/MS for polymer characterization," undergraduate from University of Evansville, IL, participating in the Department of chemistry & Biochemistry Research Experience for Undergraduates Program, 6/02-8/02.
38. Shanna Burnette, "Discrimination of Nylon Subclasses Using FT-IR Microscopy and Multivariate Statistical Techniques," 1/03 to 5/03; MS Analytical Chemistry, USC; employed at State Law Enforcement Division Forensic Laboratory, Columbia SC.
39. Kristen Kirkland, "Nylon fiber analysis by spectrophotometry," 8/03-05/04; employed at North Carolina Bureau of Investigation, Raleigh, NC.
40. Katherine Robinson, Hammond high School and Duke, "Forensic UV/visible microspectroscopy for fiber analysis," 5/03 to 7/03.
41. Michelle Baron, "Characterization of Organic Ligand Coated Nanorods by FT-IR and Analytical Pyrolysis GC/MS," undergraduate from King's College, PA, participating in the Department of Chemistry & Biochemistry Research Experience for Undergraduates Program, 6/02-8/02.
42. Jennifer L. Kennedy, USC Honors College Research Awardee, "Discrimination of Nylon Subclasses Using FT-IR Microscopy and Multivariate Statistical Techniques," USC junior-senior 9/02-5/04, SCHC Honors thesis mentor. One paper published. Medical School, University of Tennessee.
43. April Temples, "Textile fiber spectroscopy," 1/04-05/04.
44. Elizabeth M. Enlow, "Forensic UV/vis and FT-IR microspectroscopy for fiber analysis," 1/03 to 5/04; SCHC Honors thesis mentor. One paper published. Ph.D., University of North Carolina-Chapel Hill, 2009; employed at Kala Pharmaceuticals, Boston., MA.
45. Demetria Ileana Strauch, "UV/visible fluorescence microspectroscopy of fiber dyes," 8/03-5/04.
46. Kate Dooley, "Elemental analysis of coal fly ash using laser-induced breakdown spectroscopy," summer REU student, 6/04-8/04 (co-advisor with S. R. Goode).
47. Anand S. Patel, "High performance liquid chromatography for dye characterization, 8/04-12/04."
48. Caryn Marmillion, Clemson, "Microspectrophotometry for forensic analysis," 5/05-08/05.
49. Sally C. Stephens, "Forensic analytical chemistry for arson analysis," 10/04-05/05.
50. Neal R. Morgan, Clemson, "GC/MS analysis of the chemical composition of fingerprints", 5/05-8/05, One paper published; graduate school, University of Virginia.
51. Brian J. Vasser, USC Honors College Research Awardee, "Forensic Raman microspectroscopy of fibers and fiber dyes," 5/03-5/06; SCHC Honors thesis mentor; graduate school.
52. Samantha N. Roberson, "Extraction of fiber dyes for trace evidence analysis," 1/04-05/06.
53. Alison M. Bush, "Forensic UV/vis and FT-IR microspectroscopy for fiber analysis," 5/04-05/06.
54. Drew T. Krena, Howard Hughes Research Fellow, "Forensic fingerprints for dyed fibers: extraction of vat dyes from cotton," 9/04-05/07.
55. Jacob T. Minsky, "Analysis of dyes by fluorescence microspectroscopy," 1/05-05/06.
56. Reem Sadik, Sewanee student, "Polarizing light microscopy for fiber analysis," 1/05-08/06.
57. Krissy Schleibaum, "Forensic fiber analysis," 8/05-05/06; Stanford University, MS in Science Teaching.
58. Christina Lockhart, "Forensic analysis for fibers ", 01/06-5/06.
59. Lavetta M. Milton, "Analysis of blood by FT-IR", 1/06-5/06.
60. Perry McGriff, "Forensic analytical chemistry for polymer analysis", 1/06-5/06.
61. Tuong-Vy Nguyen, "Forensic analytical chemistry for dye analysis", 1/06-5/06.
62. Jeanette K. Chartier, "Forensic analytical chemistry of dyes using UV/visible spectroscopy", 07/06-8/06.
63. Allyson A. Wells, SC Honors College Research Fellow, "Forensic analytical chemistry", 08/04-08/06. SCHC Honors Thesis mentor; Emory University Medical School.
64. Heather M. Taylor, 2005 Magellan Scholar, USC student, Senior, "IR analysis of bloodstains, UV/visible spectrophotometry of fibers," 5/05-12/08.
65. Jennifer Yiu, 2005 Magellan Scholar, "Forensic microspectrophotometry for fiber analysis", 05/06-08/06; graduate school at University of California- Sacramento.
66. Rachael E. Hipp, Beckman Scholars Program awardee, "GC/MS analysis of the chemical composition of fingerprints," 8/06-12/06. One paper published.

67. Natalya O. Hall, 2006 USC Magellan Scholar, "Discrimination of ball-point pen inks by microspectrophotometry, 1/06-5/06.
68. Jeanette K. Nangreave, "Forensic analysis of dyes using UV/visible spectroscopy", 08/06-12/06.
69. Bryan K. Oliver, "Polymer analysis by FT/IR: the molecular thermometer concept", 08/06-12/06.
70. Kimberly Painter, "Analysis of fluorescent brighteners by UV/Visible spectroscopy and capillary electrophoresis", 08/06-12/06; graduate school at University of Central-Florida, MS in forensic analytical chemistry.
71. Henry M. Hall, "Polymer analysis by FT-IR." 1/07-05/07.
72. Melinda Sandifer, "Fiber dye analysis." 1/07-5/07.
73. Amanda C. Kesler, "Forensic analysis of ink," 7/06-5/08.
74. Ashley N. Aylesworth, "Fiber analysis by UV/visible MSP," 1/07-05/07,
75. Ashley L. Bagwell, "Fiber analysis by UV/visible MSP." 1/07-5/08.
76. Jessica Michaud, 2008 Magellan Scholar, "Forensic analysis of black electrical tape by FT-IR." 05/07-5/08.
77. Meredith Allen, "Forensic fiber analysis," 8/07-12/07.
78. Jeffrey Moore, "GC/MS drug analysis," 8/07-12/07.
79. Katherine Lewis, "Textile fibers analysis," USC junior, 5/08-12/08.
80. Andrew Wodarczyk, "GC/MS analysis, 7/07-8/07.
81. William J. Amador, "IR spectroscopy of blood," 1/08-5/08.
82. Ellen N. Heath, "IR spectroscopy of blood," 1/08-5/08.
83. Rachel E. Hyatt, "IR spectroscopy of blood," 1/08-5/08.
84. Laquisha Nelson, "Calibration of blood aging by IR spectroscopy," 1/08-5/08.
85. Dorekia Schultz, "Blood detection by ATR IR spectroscopy," 1/08-5/08.
86. Micheline F. Goulart, 'Capillary Electrophoresis of textiles dyes." 2009 Magellan Scholar, 5/07-12/10; medical school.
87. Amanda M. Craig, USC student, Magellan Scholar, 1/08-05/10; medical school.
88. Nicholas M. Riley, 2008 Magellan Scholar, "Blood detection with diffuse reflectance IR spectroscopy", and "Extraction of textile dyes for forensic analysis." 1/07-present.
89. Rocio Pellerano, "Extraction and capillary electrophoresis of fiber dyes," 1/09-5/09.
90. Pierre Laferrier, "Discrimination of fibers by UV/visible spectroscopy." 01/09-05/09.
91. Zhiren Qian, "GC/MS of diesel, kerosene, and gasoline mixtures." 8/09-12/09.
92. C. Rashay Johnson, "Identification of xylene isomers by mass spectrometry," 8/09-12/09.
93. S. Javon Johnson, "Identification of xylene isomers by mass spectrometry," USC senior, 8/09-12/09.
94. Patricia Shelley, 2010 Magellan Scholar, "Derivative spectroscopy for enhancement of discrimination with IR spectroscopy of fibers," and "Use of ROC plots for forensic decision making." USC sophomore-senior, 1/09-5/11.
95. Brandi Jefferson, Junior at SC State University, Orangeburg, SC, "Derivative spectroscopy for enhancement of discrimination with IR spectroscopy of modacrylic fibers," Summer Undergraduate Research Opportunity in the Department of Chemistry and Biochemistry (program director: Dr. Wayne Outten), 07/2009.
96. Eric Reichard, 2009 Magellan Scholar, Profiling of arson debris by GC/MS, 1/10-05/11; graduate school in forensic chemistry, Indiana University-Purdue University-Indianapolis.
97. Joshua Ferring, "Analysis of caffeine using disposable pipette extraction, UV/visible spectrophotometry, and gas chromatography/chromatography," 5/10-05/11; graduate school in analytical chemistry, UNC-Chapel Hill.
98. Alysa Hugine, "Analysis of caffeine using disposable pipette extraction, UV/visible spectrophotometry, and gas chromatography," Junior at SC State University, Orangeburg, SC, Summer Undergraduate Research Opportunity in the Department of Chemistry and Biochemistry (program director: Dr. Wayne Outten), 06-07/10.
99. Audrey Fennell, "Textile Fiber and dye databases," USC junior-senior, 8/10-09/11.
100. Samantha Skelton, "ATR IR spectroscopy for detection of sticky shed degradataion of magnetic tape," USC senior, 1/11-5/11. Collaborated with her and colleague during internship at Library of Congress, 06/11-08/11; graduate school in art conservation, University of Delaware.

101. Madeline St. Juliene, "Mass spectrometric data processing for proteomics applications and high dimensional data," 05-08/11; graduate school in Biology, University of South Carolina.
102. Molly Burnip, "Extraction/liquid chromatography of textile dyes," USC senior, 1/11-present.
103. Andrei Kovaltshuk, 2011 Magellan Scholar, Forensic Characterization of Dye Extracts from Millimeter-Length Textile Fibers," USC junior-senior, 01/11- present.
104. Lauren E. Stephens, 2011 Magellan Scholar, "Protein-based Mass Spectrometric Investigation of Breast Cancer Cell Lines," USC junior-senior, 01/11- May 2012. Now in Pharmacy graduate school.
105. William J. Huntington, 2011 Magellan Scholar applicant (10/18/11), "Forensic Detection of Latent Blood by Raman Spectroscopy," August 2011-May 2012. Now at USC for graduate school.
106. Alexis N. Keller, 2011 Magellan Scholar, "Infrared Spectroscopy for Non-destructive Remote Detection of Latent Fingerprints," August 2010-May 2012. Award for Best Poster in Chemistry Category, USC Discovery Day, April 2012. Now at Teach for America.
107. Emory Straub, 'Infrared detection of sweat on textile fabrics," 1/2012-2013. Award for Best Poster in Chemistry Category, USC Discovery Day, April 2012. Co-author on paper.
108. Emma Spencer, 'Infrared detection of sweat on textile fabrics," 1/2012-2013. Award for Best Poster in Chemistry Category, USC Discovery Day, April 2012.
109. Alex Dineson, 'Infrared detection of sweat on textile fabrics," 5/2012-9/2012.
110. Furman Marshall, "IR spectroscopy of tape," USC Junior, 05/12-8/13.
111. Alena Bensussan, "IR spectroscopy of magnetic tape," USC Freshman, 1/13-present. Co-author on patent.
112. David L. Birt, "Fiber database design and implementation," USC Senior, 1/12-present.
113. Eric Bingley, "IR spectroscopy of dyes on fibers," summer 2011-present. Also collaborating as a summer intern on IR spectroscopy of magnetic tape with Co-PI at the Library of Congress Conservation and Preservation Lab, summer 2013. 112. Philip Hart, "IR spectroscopy of tape," USC Junior, 09/12-12/2013.
114. Tonya C. Jones, "IR spectroscopy of tape," and "Blood Age estimation by IR spectroscopy," 2012-2015.
115. Hao Shi, "IR spectroscopy of tape," USC Senior, 1/13-7/13.
116. Alena Bensussan, "Systematic blood aging studies," 9/13-5/14.
117. Philip Hart, "IR spectroscopy of tape," USC Senior, 1/13-7/13.
118. Nichole M. Witten, "IR spectroscopy of tape," USC Junior, 1/13-7/15.
119. Adam Glenn, USC senior, Magellan Scholar, "Identification of mineral pigments in medieval illuminated manuscripts," spring 2014-2015.
120. Abigail W. Snyder, "Blood Age estimation by IR spectroscopy," 2014-2015.
121. Katherine Witherspoon, ""Fourier Transform Infrared Spectroscopy and its Application to Determining Bloodstain Age: Preliminary Study with Emphasis on Method Development." Co-author on paper and patent, 3/14-4/15.
122. Alena V. Bensussan, ""Fourier Transform Infrared Spectroscopy and its Application to Determining Bloodstain Age: Preliminary Study with Emphasis on Method Development."
123. Andrew G. Fogner, "IR spectroscopy of tape," USC Junior, 1/14-7/15.
124. Mackenzie Reece-Rayle, "Detection of magnetic tape degradation and determination of blood stain age," 8/14-present.
125. Jennifer P. Martin, "An Experimental Study of the Forensic Luminol Test for Detection of Bloodstains," co-author on paper and patent, 8/14-12/15.
126. Nick Boltin, "An Experimental Study of the Forensic Luminol Test for Detection of Bloodstains", co-author on paper, 8/12-8/14.
127. LaQuin Darnt, "Magnetic tape chemistry by IR", Columbia College, summer 2014.
128. Lucy Quirk, "Magnetic tape degradation tests," high school student intern, 2015.
129. Amber Olbon, "Magnetic tape playability testing," 9/14-/15.s
130. Ilish DeWitt, Library of Congress Fellow with Dr. Eric M. Brietung, summer 2014.
131. Trette Burdette, "Detection of magnetic tape degradation in tapes that are not polyester-polyurethane, Fall 2015-present. Magellan Proposal funded from Office of Undergraduate Research.
132. Jessica Rotheiser, "Detection of magnetic tape degradation in tapes that are not polyester-polyurethane, Fall 2015-present. Magellan Proposal funded from Office of Undergraduate Research.

133. Honors Thesis Committee member for Nichole M. Witten, The Chemistry of Photography, SC Honors College, University of South Carolina, April 2016; also undergraduate research.

UNDERGRADUATE RESEARCH AWARDS, GRANTS, AND ACCOMPLISHMENTS, 2005-2016

From about 1980- 2000, I sponsored 10-12 undergraduates to do research in my laboratory at USC. Starting in 2004, I began a systematic and sustained recruitment of undergraduates to work alongside graduate students and receive joint authorship on publications that resulted.

2000-2004

Carolina Scholar Mentor for Ashley A. Jones, University of South Carolina.

2004

Jennifer L. Kennedy, "Forensic fiber analysis by IR," USC Honors College Research Awardee, \$2,500.

Drew T. Krena, "Forensic fingerprints for dyed fibers: extraction of vat dyes from cotton," Howard Hughes Research Fellow, University of South Carolina, 2004-2005.

June 2005-June 2007

I obtained funding for a program for student DNA analysis employment at SC State law Enforcement Division (SLED) Forensic DNA laboratory. This program was set up as a service to USC students and the SC State law Enforcement Division (SLED) Forensic DNA laboratory (DOJ funding) and enabled SLED to catch up with its DNA analysis sample load. Up to 12 students worked at SLED during 2005-2007 in the forensic DNA laboratory. One of these individuals (Theresa Hooks) was hired by SLED after graduation and was promoted to DNA Examiner in the SLED DNA lab. Other students included Sarah Clyburn, Erin Cosme, Lavetta Milton, Megan Mittelstadt, and Trinette Mullineaux.

2005

Samantha N. Roberson, "Combinatorial optimization of extractions and capillary electrophoresis for forensic analysis of dyes from textile fibers," Second place award in the Physical Science category at Discovery Day undergraduate research poster competition, University of South Carolina, 22 April 2005. Samantha also won the Hiram and Lawanda Award and the South Carolina Section of the American Chemical Society for performance as the Senior Outstanding Undergraduate Chemistry Major in spring 2005.

Rachael E. Hipp, Beckman Scholars Program awardee, University of South Carolina, 2004-2006. Co-author on paper.

2006

Allyson Wells (senior 2005-2006) received the College of Science and Math Senior Year Scholarship for 2005-2006.

Heather M. Taylor and Jennifer J. Yiu, "Systematic investigations of Environmental effects on textile fibers for forensic fiber examinations," award in the category of Top Three Posters, Discovery Day undergraduate research poster competition, University of South Carolina, 21 April 2006.

Rachel Hipp, "Chemical composition of latent fingerprints by gas chromatography/mass spectrometry," award in the category of Top Three Posters, Discovery Day undergraduate research poster competition, University of South Carolina, 21 April 2006. Co-author on paper.

Amanda C. Kesler, "Forensic discrimination of ballpoint pen ink using UV/visible microspectrophotometry and multivariate statistics," award in Physical Sciences category, Discovery Day undergraduate research poster competition, University of South Carolina, 20 April 2008.

Samantha N. Roberson, Hiram and Lawanda Award, South Carolina Section of the American Chemical Society for performance as the Senior Outstanding Undergraduate Chemistry Major, May 2006.

Jennifer J. Yiu, "Systematic Investigation for the Forensic Analysis of Fiber Dyes by Raman Microspectroscopy," Magellan Undergraduate Research Award, University of South Carolina, \$3,000, May 2006.

Natalya O. Hall, "Characterization of Ball-point Pen Ink for Improvements in Document Conservation," Magellan Undergraduate Research Award, University of South Carolina, \$3,000, May 2006.

Rachel Hipp, "Characterization of the Chemical Composition of Latent Fingerprints by Gas Chromatography/Mass Spectrometry," Sigma Xi Outstanding Undergraduate Research Award in Chemistry and Biochemistry for paper presentation, SC Academy of Science, Annual Meeting, Columbia, SC, 24 March 2006.

Heather M. Taylor, "Validation of IR Spectroscopy for Forensic Detection of Blood and Semen at Crime Scenes," Magellan Undergraduate Research Award, University of South Carolina, \$3,000, May 2006.

Allyson A. Wells, B.S. Chemistry, graduated with honors South Carolina Honors College, May 2006. South Carolina College Honors Thesis: "UV/visible and fluorescence microspectrophotometry investigation of the forensic significance of changes in textile fibers upon exposure to laundry detergents." I was her Thesis Mentor.

2007

Amanda C. Kesler, "UV/visible and fluorescence microspectrophotometry of ball point pen inks for forensic document examination and conservation," Howard Hughes Undergraduate Research Scholarship, \$3,000, May 2007.

Amanda C. Kesler, "Forensic discrimination of ballpoint pen ink using UV/visible microspectrophotometry and multivariate statistics," 2nd place award in the Natural Sciences category, Discovery Day undergraduate research poster competition, University of South Carolina, 20 April 2007.

Jessica Michaud, "Discrimination of Black Electrical Tape using Attenuated Total Reflectance and Pyrolysis-Gas Chromatography/Mass Spectroscopy," Magellan Undergraduate Research Award, University of South Carolina, \$3,000, December 2007.

2008

Jessica Michaud, an undergraduate working in the Morgan laboratory, won a 2nd place award for research in the Chemistry and Materials Science category for her work, "Forensic discrimination of black electrical tape using attenuated total reflectance and pyrolysis gas chromatography/mass spectrometry", presented at the University of South Carolina Discovery Day undergraduate research poster competition, 20 April 2008.

Heather Taylor, American Institute of Chemists Foundation Award, and the SC Section ACS Outstanding Undergraduate Senior Award, April 2008. After working in my lab since 2004, Heather graduated with highest honors in December 2008 with a triple major in Chemistry, Russian, and Criminal Justice.

2009

Nicholas M. Riley was a USC finalist for a Goldwater fellowship in fall 2009, based on research he did in my laboratory.

Amanda M. Craig, "Rapid qualitative identification of polymer and dye types for forensic analysis of trace fibers," 2009 USC Magellan Undergraduate Research Award (\$3,000). 4/2009-5/2010.

Micheline Goulart, "Capillary Electrophoresis for the Forensic Identification of Fluorescent Brighteners on Trace Evidence Fibers," 2009 USC Magellan Undergraduate Research Award (\$3,000). 12/2008-5/2010.

Nicholas M. Riley, "Validation Studies for Forensic Detection of Patent and Latent Blood Stains by Diffuse Reflectance Infrared Spectroscopy using a Sensitized Camera," 2009 USC Magellan Undergraduate Research Award (\$3,000). 12/2009-8/2011.

First year Scholar Mentor, Nicholas Riley.

2010

Micheline F. Goulart, 2010 Analytical Chemistry Award of the South Carolina Section of the American Chemical Society, USC Awards Day, Columbia, SC, 15 April 2010.

Nicholas M. Riley, College of Arts and Sciences Rising Senior Award, USC Awards Day, Columbia, SC, 15 April 2010.

Micheline Goulart, 2nd place (Chemistry and Chemical Engineering category) for poster presentation at Discovery Day undergraduate research poster competition, University of South Carolina, 21 April 2010.

Patricia M. Shelley, "Use of ROC plots for forensic decision making." USC 2009 Magellan Scholar Award (\$3,000), 4/2010-12/2010.

Eric J. Reichard won a USC 2009 Magellan Scholar Award (\$3,000) for his proposal, "Profiling of arson debris by GC/MS," April 2010. Later went to graduate school at IUPUI (Indianapolis) and completed a MS degree in Forensic science; co-author on paper.

Alysa R. Hugine, a sophomore at SC State University, Orangeburg, SC, "Quantitation of caffeine in beverages using disposable pipette extraction (DPX)," Summer Undergraduate Research Opportunity in the Department of Chemistry and Biochemistry (program director: Dr. Wayne Outten), June-July 2010. Alyssa won 2nd place in the fall 2010 Undergraduate Research Symposium at SC State at which she presented this work.

2011

Andrei Kovaltshuk, "Forensic Characterization of Dye Extracts from Millimeter-Length Textile Fibers," USC 2011 Magellan Scholar Award (\$3,000), 5/20/11-5/16/2012.

Lauren E. Stephens, "Protein-based Mass Spectrometric Investigation of Breast Cancer Cell Lines," USC 2009 Magellan Scholar Award (\$3,000), 5/2011-5/2012.

Eric Reichardt, one of the Magellan Scholars working in my laboratory, won 2nd place in the Chemistry and Chemical Engineering category for his poster presentation at the USC Discovery Day, Columbia, SC, 22 April 2011.

Samantha Skelton, won a summer Junior Fellows internship award at the Preservation Research and Testing Division, Library of Congress for her proposal for "Non-Destructive Identification of Sticky Shed: Multivariate Statistical Analysis Applied to Spectroscopic Classification of Degraded Magnetic Tape", 06/11-08/11. She will be a co-author on the resulting collaborative research paper with Eric Breitung at the Library of Congress. Samantha began graduate school for a graduate degree in Art Conservation at the University of Delaware in fall 2011. Co-author on paper, now at the Museum of Fine Arts (Houston, TX).

At USC Awards Day, 22 April 2011, the following undergraduate research students in the Morgan lab won awards:

Alexis Keller, a rising senior, Victor Laurie Senior Year Scholarship;

Nicholas Riley, a rising senior, American Institute of Chemists Foundation Award;

Eric Reichard- ACS Division of Inorganic Chemistry Undergraduate Award in Inorganic Chemistry and Hiram and Lawanda Allen Award for Excellence in Chemistry, Department of Chemistry & Biochemistry 2010;

Lauren Stephens, Analytical Chemistry Award of the American Chemical Society, Department of Chemistry & Biochemistry, 2014.

Nicholas M. Riley was a USC finalist for a Rhodes Scholarship fellowship in fall 2011. He went to graduate school in analytical mass spectrometry at the University of Wisconsin, where he won a NSF Graduate Fellowship.

2012

Alexis N. Keller, "Infrared Spectroscopy for Non-destructive Remote Detection of Latent Prints," USC 2011 Magellan Scholar Award (\$2,500), 1/15/12-5/16/2012.

Two posters were presented by undergraduate researchers from my laboratory at the USC Discovery Day undergraduate poster competition:

Alexis Keller, Chemistry – Senior; Emma Spencer, Chemistry – sophomore; Emory Straub, Biological Sciences; Mentor: Dr. Stephen Morgan, Chemistry and Biochemistry. First place Chemistry & Biochemistry poster, "Infrared Spectroscopy for Non-destructive Remote Detection of Latent Fingerprints." Mentor: Dr. Stephen Morgan, Chemistry and Biochemistry. University of South Carolina Discovery Day, Undergraduate Research Poster Competition, 20 April 2012. A paper on this work has accepted (pending revisions) for publication in *Caravel*, the new online journal of undergraduate research at the University of South Carolina.

Andrei Kovaltshuk, Chemistry – Senior; Nicholas M. Riley, Chemistry – Senior; Mentor: Dr. Stephen Morgan, Chemistry and Biochemistry. "Forensic Characterization and Identification of Dyes Extracted from Millimeter-length Fibers using Ultra-Performance Liquid Chromatography/Mass Spectrometry." Mentor: Dr. Stephen Morgan, Chemistry and Biochemistry. University of South Carolina Discovery Day, Undergraduate Research Poster Competition, 20 April 2012.

2013

At the USC Undergraduate Research Discovery Day on 26 April 2013, two groups of undergraduates presented posters: Tanya C. Jones and Alena V. Bensussan, "Fourier Transform Infrared Spectroscopy and its Application to Determining Bloodstain Age: Preliminary Study with Emphasis on Method Development"; and, Emory Straub and Hao Shi, "Thermal Infrared Imaging for Visualization of Blood at Crime Scenes."

Eric M. Bringley, an undergraduate research student in the Morgan laboratory, spent 2 months working with Dr. Eric Breitung in the Conservation and Preservation Laboratory of the Library of Congress in Washington, DC. He worked on methods for identifying audio tape degradation using IR spectroscopy and pyrolysis GC/MS. Eric also won a 2014-2016 *Goldwater Fellowship*, based on his work in the Morgan laboratory on detection of sticky shed syndrome in degraded magnetic tape. Co-author on paper.

2014

At the USC Undergraduate Research Discovery Day on 25 April 2014, Tanya C. Jones, Abigail W. Snyder, Eric J. Bringley, Andrew G. Fogner, and Nichole M. Witten (all undergraduate researchers) won the top poster presentation award in Chemistry and Engineering for their poster titled, "Observation of Natural and Artificial Magnetic Tape Aging Using Acid Titration and Infrared Spectroscopy."

Tanya C. Jones also won the best poster presentation award at the 4th Annual Andrews Graduate Research Symposium, Department of Chemistry, Mississippi State University (Starkville, MS, 20-21 May 2014) (co-authors: Abigail W. Snyder, Eric J. Bringley, Andrew G. Fogner, and Nichole M. Witten) for their poster on "Observation of Natural and Artificial Magnetic Tape Aging Using Acid Titration and Infrared Spectroscopy." Co-author on paper.

Tanya C. Jones, undergraduate researcher accepted a research assistantship for graduate work in chemistry at the University of Mississippi (Oxford, MS).

Eric Bringley was named one of two USC *Goldwater Scholars* in 2014.

2015

Katherine A. Witherspoon, Jennifer P. Martin, Samantha Ervin, and Mackenzie Meece-Rayle won the best poster presentation award in Chemistry and Engineering for their poster titled, "An Experimental Study of the Forensic Luminol Test for Detection of Bloodstains," 17 April 2015. Co-author on paper.

2016

In January 2016, Eric M. Bringley was awarded a *Gates-Cambridge Scholar Award*, which provides a full scholarship to Cambridge University for graduate school. Eric is a co-author on our *Analytical Chemistry* paper on detection of sticky shed in magnetic tape.

Other Research Programs (including collaborations)

1. Susan V. Greene, Graduate laboratory research assistant, "Liquid chromatography of antibiotics, pyrolysis GC-MS of cancer cells," 10/85-6/87. Employed at Ethyl Corporation, Richmond, VA.
 2. Rick Risener, Laboratory research assistant, collaboration with Dr. Roy Wuthier, "Gas chromatography/mass spectrometry of fatty acids," 6/87-8/87.
 3. Jason Hames, Rising senior at the SC Governor's School for Science and Mathematics (Hartsville, SC), Summer Program; "HPLC analysis of caffeine in beverages," summer 1999.
 4. Saxon Unrue, Rising senior at Irmo High School, participating in the SC Governor's School for Science and Mathematics (Hartsville, SC) Summer Program, "Research project in fiber optic spectroscopy," 5/00-9/01/00.
 5. Katherine Robinson, High school student at Heathwood Hall Episcopal School, Columbia, SC, mentor for Senior thesis project, "Forensic DNA Analysis", 9/00-8/01; graduated from Duke University; employed by SC Engenuity, Columbia, SC.
 6. Rose Chinni, Ph.D., Analytical Chemistry, University of South Carolina, May 2002, "Resonance enhanced Raman spectroscopy for analysis of chlorinated hydrocarbons," coauthored 2 chapters with student from research group of Dr. S. M. Angel. Employed at Savannah River Laboratory, Aiken, SC.
 7. Andrea A. Thomas, Ph.D., Analytical Chemistry, University of South Carolina, August 2002, "Calibration, Optimization and Discrimination for Metals Analysis Using Atomic Absorption and Laser Induced Breakdown Spectroscopy," coauthored 4 chapters with and co-advised student from group of Dr. Scott R. Goode. Wilkesboro Community College, Wilkesboro, NC.
 8. Lori A. Metz (nee Grabill), Ph.D., Analytical Chemistry, University of South Carolina, August 2003. "UV laser pyrolysis-fast gas chromatography/time-of-flight mass spectrometry for rapid characterization of polymers: development, optimization, and application," coauthored 3 chapters and co-advised student from research group of Dr. Scott R. Goode. Employed at Pacific Northwest Laboratories, WA.
 9. Christopher R. Dockery, Ph. D., Analytical chemistry, University of South Carolina, August 2005. Worked on automated extraction of dyes from textile fibers. Shared graduate student with S. R. Goode (2003-2005). Associate Professor, Kennesaw State University, Kennesaw, GA.
 10. Heather Brooke, Ph.D., Analytical chemistry, University of South Carolina, May 2010. Worked on blood visualization project and was supported by NIJ grant with Dr. Michael L. Myrick. Post-doctoral fellow at Naval Research Laboratory, Washington, SC, 2010-present.
 11. Megan Pearl Baronowski, Ph.D., Analytical Chemistry, University of South Carolina, May 2011. Worked on blood visualization project and was supported by joint NIJ grant with Dr. Michael L. Myrick. Employed at Sandia National Laboratory.
 12. Eric Bringley, Irmo High School (Columbia, SC) student, "ATR Infrared spectroscopy of dyed fibers," September 2011-present. Eric won first place in the chemistry Division at the District 5 Science Fair, 25 February 2012.
 13. David L. Birt, USC graduate 2012, "Forensic Fiber database development," January 2013-present.
 14. Katherine Kilgore, June-July 2015, summer intern for SPRI program from the South Carolina School for Science and Math (Hartsville, SC) in a summer research program administered by the USC Office of Undergraduate Research.
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RESEARCH COLLABORATORS AND TOPICS

1976-86

- Ruth K. Abramson (William S. Hall Psychiatric Institute, Columbia, SC). Liquid chromatography of antidepressants, several papers.
- Forrest Bayer (Coca-Cola Company, Atlanta, GA). Analytical pyrolysis of biopolymers; one book chapter.
- Arnold Brown (USC School of Medicine). Analytical microbiology; several papers.
- Charles S. Bryan (USC School of Medicine and Richland County Hospital). Liquid chromatography of antibiotics; two papers.
- Stanley N. Deming (Department of Chemistry, University of Houston, Houston, TX). Chemometrics, experimental design and optimization. Several papers.
- Alvin Fox (Microbiology and Immunology, USC School of Medicine). Analytical microbiology; numerous papers.
- Scott R. Goode (Department of Chemistry, University of South Carolina). Experimental design and optimization. One paper.
- John C. Voris (Department of Pharmacy, University of South Carolina). Liquid chromatography of antidepressants; one paper.

1987-1996

- Ruth K. Abramson (William S. Hall Psychiatric Institute, Columbia, SC). Liquid chromatography of antidepressants, several papers.
- Robert S. Bly (Department of Chemistry, University of South Carolina). Mass spectrometry; one paper.
- Kim E. Creek (Department of Chemistry, University of South Carolina). Analytical biochemistry. One paper.
- Stanley N. Deming (Department of Chemistry, University of Houston, Houston, TX). Chemometrics, experimental design and optimization. Three textbooks and several papers.
- Alvin Fox (Microbiology and Immunology, USC School of Medicine). Analytical microbiology; numerous papers, multiple book chapters, and one book.
- Karen Fox (Microbiology and Immunology, USC School of Medicine). Analytical microbiology; one paper.
- Michael L. Myrick (Department of Chemistry, University of South Carolina). Fourier transform Raman spectroscopy and polymer analysis; one paper.
- David G. Pritchard (University of Alabama-Birmingham, Birmingham, AL). Analytical microbiology; One paper.
- Charles S. Bryan (USC School of Medicine and Richland County Hospital). Liquid chromatography of antibiotics; two papers.
- Anders Sonnesson, Lennart. Larsson, and Goran Odham (University of Lund, Lund, Sweden). Analytical microbiology; one paper, and one book.

1997-2006

- Edward G. Bartick, Forensic Science and Counterterrorism Research Unit, Federal Bureau of Investigation, Quantico, VA). Forensic analytical chemistry; several papers.
- William E. Brewer (Forensic Toxicology, State Law Enforcement Division, Columbia, SC). Forensic analytical chemistry; several papers.
- U. H. F. Bunz (Department of Chemistry, University of South Carolina). Analytical pyrolysis of polymers; one paper.
- John L. Ferry (Department of Chemistry, University of South Carolina). Environmental analysis; one paper.
- Scott R. Goode (Department of Chemistry, University of South Carolina). Laser pyrolysis GC/MS; LIBS of metals; gunshot residue analysis; 4 papers.
- Kenneth Habben (Forensic Toxicology, State Law Enforcement Division, Columbia, SC). Forensic analytical chemistry; one paper.
- James E. Hendrix, postdoctoral fellow, consultant, Spartanburg, SC; textile fiber analysis; several papers published.
- Stephen J. Lambert (Forensic DNA, State Law Enforcement Division, Columbia, SC). Forensic analytical chemistry; one paper.
- Michael L. Myrick (Department of Chemistry, University of South Carolina). Fourier transform Raman spectroscopy and polymer analysis; one paper.

Thomas H. Richardson (Department of Chemistry, The Citadel, Charleston, SC); post-doctoral fellow; analytical pyrolysis; one book chapter.

2007-2010:

S. Michael Angel (Department of Chemistry, University of South Carolina). Raman analysis of textile fibers; two papers published, one paper pending acceptance; co-mentor on Magellan proposal.

Edward G. Bartick (Director, Forensic Science Program, Department of Chemistry and Biochemistry, Suffolk University, Boston, MA); forensic fiber analysis; collaborator on NIJ grant, 2010-present; one book chapter.

Robert D. Blackledge (former director of NCIS forensic laboratory, San Diego, CA); IR spectroscopy of textile fibers using synchrotron radiation at the UC-Berkeley Radiation Laboratory, Berkeley, CA. Potential future research. Bob edited a book in which I published an invited chapter.

Eric Breitung, Preservation Research and Testing Division, Library of Congress. Non-Destructive Identification of Sticky Shed: Multivariate Statistical Analysis Applied to Spectroscopic Classification of Degraded Magnetic Tape. IMLS proposal funded October 2012.

William E. Brewer (Department of Chemistry, University of South Carolina). Rapid drug and pesticide analysis. Several papers published; several papers at meetings.

James Chapman, College of Pharmacy; James R. Hebert, School of Public Health, USC. Analysis of esophageal cancer markers; NIH proposal submitted.

Fredrick D. Foster, John R. Stuff, Edward A. Pfannkoch, Jacqueline A. Whitecage, Gerstel, Inc., Baltimore, MD; rapid extraction and GC/MS, one paper.

Sherry T. Garris, SC Department of Agriculture; one paper published); J. L. Schroeder, L. J. Marinetti, R. K. (Montgomery County Coroner's Office-Miami Valley Regional Crime Laboratory, 361 West Third Street, Dayton, Ohio 45402); rapid drug analysis, one paper.

Scott. R. Goode (Department of Chemistry, University of South Carolina). Laser pyrolysis GC/TOF-MS of polymers. Paper in preparation.

2010-2015

John V. Goodpaster (Chemistry and Chemical Biology/Forensic and Investigative Sciences Program, Indiana University Purdue University Indianapolis, IN). Collaborator on NIJ grant, 2010-2014. John V. Goodpaster (Chemistry and Chemical Biology/Forensic and Investigative Sciences Program, Indiana University Purdue University Indianapolis, IN). Collaborator on NIJ grant, 2010-2014. Several papers.

Edward G. Bartick (Department of Forensic Sciences, George Washington University, Washington, DC). Collaborator on NIJ grant, 2010-2014. Several papers.

James E. Hendrix, postdoctoral fellow, consultant, Spartanburg, SC; textile fiber analysis; several papers published.

David M. Hercules (Department of Chemistry, Vanderbilt University, Nashville, TN); MALDI-TOF-MS and pyrolysis GC/MS of polymers; Two papers.

Michael L. Myrick (Department of Chemistry, University of South Carolina). Visualization of blood stains using diffuse reflectance IR spectroscopy and sensitized thermal detectors. Co-PI of two NIJ grants, 2007-2015; multiple papers published.

Qian Wang (Department of Chemistry, University of South Carolina). Co-author on one Magellan proposal and a preapplication for DoD funding, as well as an SBIR proposal.

Selim Erdoğan, Associate Professor of Analytical Chemistry, Department of Faculty of Pharmacy Inonu University, Malatya, Turkey. Visiting International Scholar. Paper in preparation on detection of textile dyes on weathered fibers.

Fennella France, Director of Conservation and Preservation Laboratory, Library of Congress, Washington, DC. Collaborator on detection of magnetic tape degradation using infrared spectroscopy and machine learning.

Eric M. Breitung, Scientific Conservation Laboratory, Metropolitan Museum of Art, New York, NY. Collaborator on detection of magnetic tape degradation using infrared spectroscopy and machine learning.

TEACHING HIGHLIGHTS

Additional information on my teaching can be found at <http://www.chem.sc.edu/faculty/morgan/teach.html>.

Chemistry 723, Separation methods in analytical chemistry. I usually teach this course every fall semester. The course is taken by almost every incoming graduate student as well as 4-7 students each semester from other departments including Geology, Chemical Engineering, Biology, and Pharmacy. The enrollment in the course is usually about 30 students but has gone as high as 37 in Fall 1997; few other graduate courses in the Department come close to these enrollment numbers. The course is designed to be broadly applicable to different disciplines and special projects in the course permit the student to tailor the learning experience somewhat to their interests. Performing chemical separations is at the heart of many chemical disciplines including synthetic organic chemistry, biochemistry, and chemical engineering. The course covers modern techniques for analytical separations both individually and collectively in terms of basic theory and practical application. The course focuses primarily on the theory of separations, analytical gas chromatography (especially high resolution capillary GC), and modern high performance liquid chromatography (especially reversed phase LC). Time permitting, interfacing chromatographic separations to mass spectrometry will also be included. Discussion covers the driving force of each technique, instrumentation, factors influencing quality of separation, as well as interpretation and validation of results. I wrote the text for the course: 25 chapters covering separation theory, distillation, extraction, capillary gas chromatography, and liquid chromatography. This unpublished text is copied at cost for the students. In previous years, I instituted some hands on lab experience with capillary gas chromatography, liquid chromatography, and gas chromatography/mass spectrometry in the course. Having everyone in a graduate-level course do two or three lab experiments is a concept that might not work unless the students are motivated; judging from the student comments this idea was highly successful. This course is well-populated and consistently rated with other top graduate courses in the Department.

Chemistry 729, Chemometrics. Experimental design and optimization in Analytical Chemistry (graduate). I have taught this course 5-6 times at USC. It covers much of the same material that I teach as continuing education courses for the American Chemical Society. The course addresses chemical applications of experimental design and modeling. Much of the driving force and popularity of this course comes from the modern quality movement. Statistical Process Control (SPC) and Statistical Quality Control (SQC) are undeniably useful tools for improving the quality of today's products and manufacturing processes. But while we blindly focus our attention on trying to improve the quality of existing products and processes, researchers in other parts of the world are already designing quality into those products and processes they will place on the market five or ten years from now. In the current atmosphere of intense international competition, rapid development of new products and processes that provide exceptional quality characteristics is necessary for the survival and growth of many industries. Optimization strategies and experimental designs provide efficient tools for achieving this competitive posture. The course is structured to introduce the use of statistics and experimental designs for achieving improved productivity and quality in research, development, and manufacturing. No previous experience with process control, statistics, or experimental design methodology is necessary. Intensive lectures and laboratory exercises deal with basic statistics for the laboratory scientist or technician, statistical process control, process development strategies, optimization techniques, and statistical experimental designs. Throughout the courses, emphasis is placed on matching appropriate statistical techniques and experimental designs to real-world problems. When I have been able to teach this course, it has been among the highest rated courses in the Department; for example, in spring 1997, the course received the highest course evaluation in the Department.

Chemistry 621, Instrumental analysis. Until 1997, our department did not have a course in instrumental analysis. Because we had insufficient faculty in analytical chemistry, we had always "gotten by" by doing some instrumental experiments in the physical chemistry laboratory courses. In spring 1998, I developed 10 new instrumental analysis lab experiments and authored a new course proposal to change the definition of Chemistry 621 and to add a lab component (Chemistry 621L). The course was formally approved in 2000; all intensive chemistry majors are now required to take this course and, before VCM, we were getting a relatively high enrollment from other departments including chemical engineering, geology, and biology. I taught the class the first three times it was offered. The last few years, I have alternated for 2 years at a time with Dr. S. M. Angel to teach the course. This is a course about chemical measurements using instrumental techniques.

The topics include introductory electronics for instrumentation, signal processing and statistical analysis, molecular and atomic spectroscopy, chromatography, and mass spectrometry. Both the lecture and laboratory course are required for ACS Certified majors. Although the lab course is not required for other majors, Chem 621L is recommended for those individuals that are interested in expanding their options for employment in the chemical industry and elsewhere.

Chemistry 622, Forensic analytical chemistry. The course was taught with great success as an experimental course in spring 1997 with an enrollment of 58 students. The instructors were two forensic chemists (Dr. William E. Brewer and Dr. Stephen J. Lambert) from the South Carolina State Law Enforcement Division (SLED) in collaboration with Professors Stephen L. Morgan and Scott R. Goode (Department of Chemistry & Biochemistry, USC). Goode and Morgan lectured approximately 2-3 weeks in the course and Brewer and Lambert lectured the remaining time. Enrollment is high for an undergraduate elective course (over 40 students) and student evaluations are usually excellent (for example: overall progress 3.58/4, overall instructor 3.75/4, and overall instructor 3.61/4) with the course rated in the top two or three courses every semester it is taught. This course represented a new area of education for the Department. I authored the new course proposal for Chemistry 622 and it was taught again in spring 1999, fall 2000, and fall 2002, with enrollments of 50 or more students each time. The course also represents a collaborative venture with forensic scientists at SLED. We believe that it will continue to be well received by chemistry majors (both undergraduate and graduate) with an interest in real-world applications of analytical chemical concepts to criminalistics. The course offers students a unique opportunity to apply basic skills within the problem-solving environment of forensic investigations. Students will become acquainted with an area of science that offers many chemists (and other scientists such as biologists) challenging and rewarding career opportunities. Students learn various methods of analysis that are amenable to other areas of chemistry and biology. An article describing our involvement and results with this course is available on the Internet, as part of a Chemical Education Conference in 1998; the paper was the top hit for searches on "forensic analytical chemistry" with *Google* for over 10 years. Since 2005, the course has been taught every year; Dr. Brewer teaches with Dr. Demi Garvin and Dr. Stephen Lambert (Richland County Sheriff's Office, Forensic Laboratory, Columbia, SC), and I give 1-2 lectures each semester in the course.

I organized and facilitated (as the professor of record) Chemistry 729, *Special topics in analytical chemistry: DNA Statistics*, which met for 20 hrs, 10-12 July 2000, taught by Dr. George Carmody (Carleton Univ., Ottawa, Canada), organized by Dr. Morgan. This 3-day short course was attended by 25+ students including 22 DNA Lab employees of the State Law Enforcement Division Forensic Laboratory, 3 forensic DNA scientists from the North Carolina Forensic Laboratory (Charlotte, NC), and two USC Biology graduate students.

I organized and facilitated (as the professor of record) Chemistry R729A, *Special topics in analytical chemistry: Interpretation of Mass Spectra*, which met for 25 hrs., 13-15 June 2001, taught by Dr. O. David Sparkman (American Chemical Society Instructor). This 3-day short course was attended by 24 students from the State Law Enforcement Division (SLED) Forensic Laboratory and 7 graduate students from USC.

On 19 February 2002, I presented an invited lecture on "Chemical Warfare: History and Chemistry" in Physics 599: Counterterrorism (organized by Prof. Joe Johnson). The presentation is at URL:

<http://www.chem.sc.edu/faculty/morgan/resources/cw/cw.pdf>, and includes a PDF version of my *PowerPoint* slides. This web page now appears as one of the first few hits in *Google* searches for "Chemical Warfare chemistry". I have been contacted by about a half dozen people, including military trainers and rapid response personnel wanting to use this presentation, and writers for a PBS documentary.

I worked with Scott Goode and Bill Brewer to facilitate the creation of our new freshman chemistry course for non-majors (Chemistry 107, An Introduction to Forensic Science), which was taught for the first time in spring semester 2005. This course is now taught every year by Brewer and Garvin.

Chemistry 401E: Industrial Chemistry. As a result of discussion with the Department of Chemistry & Biochemistry I initiated and facilitated a "capstone course" for senior chemistry majors on industrial chemistry. The course was taught for the first time in fall 2003. Although I was the professor of record, Dr. James Hendrix, a former industrial chemist who works with me a postdoctoral researcher, has been formally in charge of the course. The purpose of the course is to assist students in preparing for future roles in the private sector or for graduate studies. Students will develop and participate in class team projects to profile career opportunities, explore the relationship between chemistry and other disciplines, develop skills in self-assessment, develop a

portfolio of skills and experiences, develop a career plan and prepare an effective resume. The classroom environment assumed the form of teams working together to accomplish the objectives of the course. The objective was for students to become skilled in planning, presentation and execution of team projects. We also have had 10 industrial speakers from industries across South Carolina, Alabama, and North Carolina. Funding for the course came initially from the University 101/401 program (\$3,000), as well as from industrial donors (~\$3,000); more recently, the USC Evening School has provided a salary for Dr. Hendrix and I have assisted without compensation. The web site for the course can be viewed at

<http://www.chem.sc.edu/analytical/chem401>. The course was profiled in the fall 2005 *USC Chemist*.

This course is about *careers in chemistry* and chemistry-related fields. CHEM 401/701 is designed for all chemists and biochemists, not just future industrial chemists. By the term "chemical industry" we refer to the broad spectrum of career opportunities for chemists and biochemists, which includes manufacturing, marketing/sales and research and other jobs in industrial, medical, government and academic environments. Products of these environments may range from pharmaceuticals to plastics. The course objective is to prepare students for making more informed decisions about their prospective careers, and to help them to find job opportunities more effectively. The course design provides for students to work in teams to complete projects, rather than just attending lectures. By working in teams, much more can be accomplished than an individual could do alone. Teams will complete three projects, report on the projects orally to the class, and report in written form to the Instructor. By selecting the focus of each project to match your own interests, you can tailor the course to provide insight into your particular career choice. The projects are:

1. Identify companies, organizations, institutions, etc. that hire chemists and biochemists. Learn about what these companies do, where they are, how they are organized, what products they produce and what chemists and biochemists in these companies do.
2. Understand the chemistry/biochemistry practiced by one company, lab or institution; and profile a product of the company (e.g., drug, dyestuff, plastic) from conception to marketplace.
3. Develop a personal portfolio of skills and experiences, career plan, and effective resume.

Instead of the traditional classroom lecture, students work in teams to accomplish the objectives of this course. Individuals become skilled in planning, presentation and execution of team projects. Projects range from "topics in industrial chemistry" to "targeting job opportunities for chemistry graduates." Guests from industry, government, and academia visit the class, consult with students on their projects, and share their real-life career experiences with the class. Course learning objectives include:

- a) prepare for future roles in the private sector or for further graduate studies; gain insight into the industrial chemistry sector;
- b) explore the relationship between chemistry and other disciplines; learn team participation skills by working together on class team projects; develop skills in oral and written communications;
- c) an individual portfolio of skills and experiences; a career plan and prepare a resume; and
- d) develop interview and job-seeking skills.

PROFESSIONAL EDUCATION AND CONSULTING ACTIVITIES

In collaboration with Dr. Stanley N. Deming (Professor Emeritus, Department of Chemistry, University of Houston; President, Statistical Designs, Houston, TX), I have taught several short courses: *Experimental Design for Quality and Productivity in R&D* (since 1978) and *Sequential Simplex Optimization* (since 1975), and *Statistical Analysis of Laboratory Data* (since 1991). These courses have been sponsored since 1982 by the American Chemical Society URL: <http://www.proed.acs.org/>], several times by the American Institute of Chemical Engineers (substitute lecturers from George P. Box and J. S. Hunter, 1984, 1985, and 1987), and the American Association for Clinical Chemistry (1978-79). Venues have included National ACS meetings, the Pittsburgh Conference on Analytical Chemistry & Applied Spectroscopy, the Federation of Analytical Chemistry & Spectroscopy Societies Annual Meeting, as well as local sections of the American Chemical Society (a recent course was sponsored by the Cincinnati local ACS section; see <http://www.che.uc.edu/acs/archives/cintacs/vol40no7/vol40no7.pdf>). We have also taught courses with great success as ACS Continuing Education Courses and on a consulting basis in-house at many different industrial companies including: Since 1982 we have taught almost exclusively through the American Chemical Society, and thereby contributed substantially to the financial affairs of the ACS. The courses listed below total 691 two- or three-day short courses to more than 10,000 professional participants.

Teaching these courses has brought national and international recognition for my work at the University of South Carolina, has provided a perspective on industrial research to complement my academic research, and has substantially influenced conduct of research and development activities in the chemical industry. Students from my research group regularly participate in these activities, thereby broadening their experience. Each course was evaluated using a standardized teaching evaluation which, if desired, could be provided for any one of these courses. We have received outstanding reviews and our courses are among the most successful continuing education courses offered by the ACS. The following listing is up-to-date as of October 2013.

SEQUENTIAL SIMPLEX OPTIMIZATION

[http://www.statisticaldesigns.com/sc_optim.htm]

This course presents the theory and application of sequential simplex optimization, an evolutionary operation (EVOP) technique that adjusts many continuous factors simultaneously to rapidly achieve optimal response from a system.

* Sponsored by the Education Division, American Chemical Society

- 139. Dupont-Dow, Freeport, TX, 30 November 2004
- 138. Dendreon, Seattle, WA, 26-27 September 2002
- 137. Statistical Designs Regional Offering, Houston, TX, 14 May 2001
- 136. Statistical Designs Regional Offering, Fullerton, CA, 5 February 2001
- 135. Cargill, Blair, NE, 30 November 2000
- 134. Statistical Designs Regional Offering, Houston, TX, 3 November 2000
- 133. Statistical Designs Regional Offering, Houston, TX, 12 May 2000
- 132. Statistical Designs Regional Offering, Houston, TX, 13-14 December 1999
- 131. MultiSimplex, Karlskrona, SWEDEN, 8-9 June 1999
- 130. Statistical Designs Regional Offering, Houston, TX, 24-25 May 1999
- 129. Statistical Designs Regional Offering, Houston, TX, 7 December 1998
- 128. Naval SWC, Dahlgren, VA, 10 August 1998
- 127. Statistical Designs Regional Offering, Houston, TX, 11 May 1998
- 126. Statistical Designs Regional Offering, Houston, TX, 8 December 1997
- * 125. Eastman Kodak Company, Rochester, NY, 6 October 1997
- 124. Statistical Designs Regional Offering, Houston, TX, 12 May 1997
- * 123. Eastman Kodak Company, Rochester, NY, 5 May 1997
- 122. Statistical Designs Regional Offering, Houston, TX, 9 December 1996

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- * 121. Eastman Kodak Company, Rochester, NY, 7 October 1996
 - 120. Statistical Designs Regional Offering, Houston, TX, 13 May 1996
 - * 119. Eastman Kodak Company, Rochester, NY, 6 May 1996
 - 118. Statistical Designs Regional Offering, Houston, TX, 4 December 1995
 - * 117. Eastman Kodak Company, Rochester, NY, 9 October 1995
 - 116. Statistical Designs Regional Offering, Houston, TX, 15 May 1995
 - * 115. Eastman Kodak Company, Rochester, NY, 8 May 1995
 - 114. Statistical Designs Regional Offering, Houston, TX, 5-6 December 1994
 - * 113. Eastman Kodak Company, Rochester, NY, 10-11 October 1994
 - 112. Statistical Designs Regional Offering, Freeport, TX, 19-20 September 1994
 - 111. Statistical Designs Regional Offering, Houston, TX, 16-17 May 1994
 - * 110. Eastman Kodak Company, Rochester, NY, 9-10 May 1994
 - 109. Dow Chemical Company, Midland, MI, 11-12 April 1994
 - 108. Dow Chemical USA, Freeport, TX, 14-15 March 1994
 - 107. Ciba Vision, Atlanta, GA, 24-25 January 1994
 - 106. Statistical Designs Regional Offering, Houston, TX, 6-7 December 1993
 - * 105. Eastman Kodak Company, Rochester, NY, 11-12 October 1993
 - 104. Dow Chemical USA, Freeport, TX, 19-20 July 1993
 - 103. First Chemical Corporation, Pascagoula, MS, 27-28 May 1993
 - 102. Statistical Designs Regional Offering, Houston, TX, 17-18 May 1993
 - * 101. Eastman Kodak Company, Rochester, NY, 10-11 May 1993
 - 100. Ciba Vision, Atlanta, GA, 14-15 April 1993
 - 99. Ciba Vision, Atlanta, GA, 14-15 December 1992
 - 98. Statistical Designs Regional Offering, Houston, TX, 7-8 December 1992
 - * 97. Eastman Kodak Company, Rochester, NY, 12-13 October 1992
 - 96. Dow Chemical USA, Freeport, TX, 20-21 July 1992
 - 95. Statistical Designs Regional Offering, Houston, TX, 11-12 May 1992
 - * 94. Eastman Kodak Company, Rochester, NY, 4-5 May 1992
 - 93. Southeastern Texas Section, American Chemical Society, Rice University, Houston, TX, 26-27 March 1992
 - 92. Statistical Designs Regional Offering, Houston, TX, 9-10 December 1991
 - 91. Syntex Pharmaceuticals, Freeport, BAHAMAS, 2 December 1991
 - 90. Environmental Monitoring Systems Laboratory, United States Environmental Protection Agency, Las Vegas, NV, 4-6 November 1991
 - * 89. Eastman Kodak Company, Rochester, NY, 21-22 October 1991
 - 88. Dow Chemical USA, Freeport, TX, 29-30 July 1991
 - 87. Dow Chemical USA, Freeport, TX, 22-23 July 1991
 - 86. Statistical Designs Regional Offering, Houston, TX, 20-21 May 1991
 - * 85. Eastman Kodak Company, Rochester, NY, 13-14 May 1991
 - 84. Sterling Research Group, Rensselaer, NY, 15-16 April 1991
 - 83. SmithKline Beecham, King of Prussia, PA, 4-5 February 1991
 - 82. Shell Development, Houston, TX, 10-11 January 1991
 - 81. Statistical Designs Regional Offering, Houston, TX, 10-11 December 1990
 - * 80. Eastman Kodak Company, Rochester, NY, 15-16 October 1990
 - 79. Glaxo Pharmaceuticals Limited, Hertingfordbury, ENGLAND, 24-25 September 1990
 - 78. Dow Chemical USA, Freeport, TX, 6-7 August 1990
 - * 77. Eastman Kodak Company, Rochester, NY, 21-22 May 1990
 - 76. Statistical Designs Regional Offering, Houston, TX, 14-15 May 1990
 - 75. Tennessee Valley Authority, National Fertilizer Development Center, Muscle Shoals, AL, 12-13 February 1990
 - 74. Statistical Designs Regional Offering, Houston, TX, 11-12 December 1989
 - 73. Tennessee Valley Authority, National Fertilizer Development Center, Muscle Shoals, AL, 23-24 October 1989

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- * 72. Eastman Kodak Company, Rochester, NY, 16-17 October 1989
 71. Statistical Designs Regional Offering, Houston, TX, 18-19 September 1989
 - * 70. Ciba-Geigy Corporation, Ardsley, NY, 10-11 July 1989
 69. Scientific Symposia, Ltd., Leamington Spa, ENGLAND, 26-27 June 1989
 - * 68. Santa Clara Valley Section, American Chemical Society, Lockheed, Sunnyvale, CA, 22-23 May 1989
 67. Statistical Designs Regional Offering, Houston, TX, 15-16 May 1989
 - * 66. Eastman Kodak Company, Rochester, NY, 8-9 May 1989
 65. Glaxo Pharmaceuticals Limited, Harrogate, ENGLAND, 13-14 March 1989
 64. Statistical Designs Regional Offering, Houston, TX, 12-13 December 1988
 - * 63. Eastman Kodak Company, Rochester, NY, 17-18 October 1988
 62. Scientific Symposia Ltd., Harrogate, ENGLAND, 4-5 July 1988
 61. Statistical Designs Regional Offering, Houston, TX, 9-10 May 1988
 - * 60. Eastman Kodak Company, Rochester, NY, 14-15 March 1988
 59. Sandoz Ltd., Basle, SWITZERLAND, 28 January 1988
 58. Scientific Symposia Ltd., Harrogate, ENGLAND, 23-24 November 1987
 57. California State University, Fullerton, CA, 19-20 November 1987
 56. Statistical Designs Regional Offering, Houston, TX, 26-27 October 1987
 - * 55. Eastman Kodak Company, Rochester, NY, 19-20 October 1987
 - * 54. Eastman Kodak Company, Rochester, NY, 22-23 June 1987
 - * 53. Tennessee Eastman, Kingsport, TN, 24-25 January 1987
 - * 52. Eastman Kodak Company, Rochester, NY, 12-13 January 1987
 - * 51. Tennessee Eastman, Kingsport, TN, 30-31 October 1986
 - * 50. Eastman Kodak Company, Rochester, NY, 6-7 October 1986
 - * 49. Tennessee Eastman, Kingsport, TN, 7-8 August 1986
 - * 48. Eastman Kodak Company, Rochester, NY, 21-22 July 1986
 - * 47. AT&T Bell Laboratories, Allentown, PA, 3-4 June 1986
 - * 46. Eastman Kodak Company, Rochester, NY, 19-20 May 1986
 - * 45. Eastman Kodak Company, Rochester, NY, 10-11 March 1986
 - * 44. Eastman Kodak Company, Rochester, NY, 27-28 February 1986
 - * 43. Tennessee Eastman Company, Kingsport, TN, 14-15 January 1986
 - * 42. Eastman Kodak Company, Rochester, NY, 14-15 October 1985
 - * 41. Eastman Kodak Company, Rochester, NY, 11-12 June 1985
 40. Scientific Symposia Ltd., Danbury Park, ENGLAND, 18-20 March 1985
 39. South Florida Chromatography Discussion Group, Miami, FL, 19 February 1985
 38. Smith Kline & French Laboratories, Swedeland, PA, 15-16 January 1985
 - * 37. Union Oil Company, Brea, CA, 25-26 October 1984
 - * 36. American Chemical Society Special Short Courses, Chicago, IL, 3-4 October 1984
 35. SmithKline Chemicals, Philadelphia, PA, 10-11 September 1984
 34. California State University, Fullerton, CA, 25-26 June 1984
 - * 33. American Chemical Society Special Short Courses, New York, NY, 8-9 May 1984
 32. California State University, Fullerton, CA, 30-31 January 1984
 - * 31. Standard Oil Company, Cleveland, OH, 16-17 January 1984
 - * 30. American Chemical Society National Meeting, Washington, DC, 27-28 August 1983
 29. California State University, Fullerton, CA, 16-17 May 1983
 28. University of Houston, Houston, TX, 9-10 May 1983
 27. University of Houston, Houston, TX, 4-5 October 1982
 26. U. S. Borax, Anaheim, CA, 26-27 April 1982
 25. California State University, Fullerton, CA, 14-15 January 1982
 24. University of Houston, Houston, TX, 2-3 December 1981
 23. Georgia Section, American Chemical Society, Atlanta, GA, 13-14 November 1981
 22. University of Houston, Houston, TX, 13-14 May 1981
 21. University of Houston, Houston, TX, 3-4 December 1980

20. University of Houston, Houston, TX, 5-6 December 1979
19. American Association for Clinical Chemistry National Meeting, New Orleans, LA, 15-16 July 1979
18. University of Houston, Houston, TX, 14-15 May 1979
17. Smith Kline & French Laboratories, Philadelphia, PA, 15-16 January 1979
16. University of Houston, Houston, TX, 4-5 December 1978
15. Smith Kline & French Laboratories, Philadelphia, PA, 25-26 September 1978
14. American Association for Clinical Chemistry National Meeting, San Francisco, CA, 23-24 July 1978
13. Shell Development, Houston, TX, 19-20 June 1978
12. University of Houston, Houston, TX, 22-23 May 1978
11. University of Houston, Houston, TX, 16-18 January 1978
10. Smith Kline & French Laboratories, Philadelphia, PA, 7-8 December 1977
9. Centers for Disease Control, Atlanta, GA, 19-23 September 1977
8. University of Houston, Houston, TX, 23-25 June 1977
7. University of Houston, Houston, TX, 10-12 January 1977
6. Monsanto, Texas City, TX, 18-20 October 1976
5. University of Houston, Houston, TX, 29-31 July 1976
4. University of Houston, Houston, TX, 3-5 May 1976
3. University of Houston, Houston, TX, 12-14 January 1976
2. University of Houston, Houston, TX, 22-24 September 1975
1. University of Houston, Houston, TX, 4-6 June 1975

EXPERIMENTAL DESIGN FOR PRODUCTIVITY AND QUALITY IN RESEARCH & DEVELOPMENT

[http://www.statisticaldesigns.com/sc_expde.htm]

[<http://proed.acs.org/course-catalog/courses/EXPD/>]

This course presents the theory and application of classical experimental designs: factorial designs, fractional factorial designs, screening designs, Taguchi designs, central composite designs, and mixture designs.

* Sponsored by the Professional Education Division, American Chemical Society
Substitute lecturers for J. S. Hunter and/or W. G. Hunter, "Statistical Design of Engineering Experiments," sponsored by the Educational Services Division, American Institute of Chemical Engineers.

- * 315. American Chemical Society Regional Offering, Philadelphia, PA, 4-6 May 2015
- 314. U. S. Navy Surface Weapons Warfare Center, Dahlgren, VA, 27-29 April 2015.
- * 313. American Chemical Society Regional Offering, Denver, CO, 20-22 March 2015
- 311. Immunogen, Norwood, MA, 11-13 February 2015
- * 310. American Chemical Society Regional Offering, Boston, MA, 6-8 October 2014
- * 309. American Chemical Society Regional Offering, La Jolla, CA, 27-29 January 2014
- 308. Geokinetics, Houston, TX, 30 July - 1 August 2013
- 307. Genencor/Danisco, Palo Alto, CA 17-19 July 2013
- * 306. American Chemical Society Regional Offering, Cincinnati, OH, 24-26 June 2013
- 305. Novartis, Lincoln, NE, 9-10 May 2013
- * 304. American Chemical Society National Meeting, New Orleans, LA, 6-8 April 2013
- 303. Grifols Biologicals, Los Angeles, CA, 30 January-1 February 2013.
- 302. American Chemical Society Regional Offering, Houston, TX, 4-6 December 2012.
- 301. American Chemical Society National Meeting, Philadelphia, PA, 18-20 August 2012.
- * 300. American Chemical Society Regional Offering, Houston, TX, 6-7 December 2011

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- * 299. American Chemical Society National Meeting, Denver, CO, 27-29 August 2011
 - * 298. American Chemical Society Regional Offering, Philadelphia, PA, 1-3 May 2011
 - * 297. American Chemical Society Regional Offering, Woodbridge, NJ, 22-24 February 2011
 - 296. Boehringer Ingelheim Pharmaceuticals, Inc., Ridgefield, CT, 1-3 December 2010
 - * 295. American Chemical Society National Meeting, Boston, MA, 23-25 August 2010
 - 294. American Chemical Society Regional Offering, Philadelphia, PA, 23-25 June 2010
 - 293. American Chemical Society Regional Offering, St. Louis, MO, 19-21 April 2010
 - 292. American Chemical Society National Meeting, San Francisco, CA, 20-22 March 2010
 - 291. American Chemical Society National Meeting, Washington, DC, 18-20 August 2009
 - 290. Boehringer Ingelheim Pharmaceuticals, Inc., Ridgefield, CT, 1-3 June 2009
 - 289. Naval SWC, Dahlgren, VA, 11-13 March, 2009
 - 288. Baker Petrolite, Houston, TX 7-9 January 2009
 - 287. Ciba Vision, Atlanta, GA 15-17 October 2008
 - * 286. American Chemical Society National Meeting, Philadelphia, PA 19-21 August 2008
 - 285. Seattle Genetics, Bothell, WA 23-25 July 2008
 - 284. Genencor, Palo Alto, CA 11-13 June 2008
 - * 283. American Chemical Society National Meeting, New Orleans, LA, 8-10 April 2008
 - * 282. American Chemical Society Regional Offering, Woodbridge, NJ, 11-13 February 2008
 - * 281. American Chemical Society Regional Offering, La Jolla, CA, 4-6 December 2007
 - * 280. American Chemical Society Regional Offering, Durham, NC, 14-16 November 2007
 - 279. Acambis, Cambridge, MA, 29-30 October, 29 November 2007
 - * 278. American Chemical Society National Meeting, Boston, MA, 20-22 August 2007
 - * 277. American Chemical Society Regional Offering, New Brunswick, NJ, 26-28 June 2007
 - * 276. American Chemical Society Local Section, Cincinnati, OH, 30 April - 2 May 2007
 - * 275. American Chemical Society Regional Offering, Houston, TX 6-8 February 2007
 - * 274. American Chemical Society Regional Offering, Durham, NC, 6-8 December 2006
 - * 273. American Chemical Society National Meeting, San Francisco, CA, 12-14 September 2006
 - * 272. Genencor, Palo Alto, CA 17-19 May 2006
 - * 271. American Chemical Society National Meeting, Atlanta, GA, 28-30 March 2006
 - 270. Merichem, Houston, TX, 9-10 February 2006
 - 269. Alpharma, Elizabethtown, NJ, 6-8 December 2005
 - * 268. Mannkind Pharmaceuticals, Danbury, CT, 27-29 September 2005
 - 267. Par Pharmaceuticals, Spring Valley, NY, 15-16 September 2005
 - * 266. American Chemical Society National Meeting, Washington, DC, 29-31 August 2005
 - 265. Transform Pharmaceuticals, Lexington, MA, 20-21 April 2005
 - * 264. American Chemical Society National Meeting, San Diego, CA, 14-16 March 2005
 - 263. Naval AWC, China Lake, CA, 11-13 January 2005
 - 262. Dupont-Dow, Freeport, TX, 1, 16, 18 November 2004
 - * 261. American Chemical Society National Meeting, Philadelphia, PA, 23-25 August 2004
 - 260. Codexis, Redwood City, CA, 23-25 June 2004
 - * 259. American Chemical Society Local Section, Boston, MA, 10-11 May 2004
 - 258. Li-Cor, Lincoln, NE, 14-16 April 2004
 - 257. (Name withheld by request), Irvine, CA, 24-26 February 2004
 - 256. Cell Genesys, Foster City, CA, 7-9 July 2003
 - * 255. Bristol-Myers Squibb, Hopewell, NJ, 20-22 May 2003
 - * 254. American Chemical Society Local Section, Cincinnati, OH, 13-15 May 2003
 - 253. (Name withheld by request), Irvine, CA, 17-18 April 2003
 - * 252. American Chemical Society National Meeting, New Orleans, LA, 24-26 March 2003
 - * 251. Pittsburgh Conference, Orlando, FL, 7-9 March 2003
 - 250. Naval SWC, Dahlgren, VA, 11-13 December 2002
 - 249. IBC Biological Assay Development and Validation Symposium, London, ENGLAND, 6 November 2002
 - 248. Alcon, Fort Worth, TX, 30 October - 1 November 2002

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- 247. Aventis, Swiftwater, PA, 8-10 October 2002
 - * 246. American Chemical Society National Meeting, Boston, MA, 19-21 August 2002
 - 245. Watson Laboratories, Salt Lake City, UT, 19-21 June 2002
 - 244. IBC Biological Assay Development and Validation Symposium, San Francisco, CA, 6 May 2002
 - 243. Johnson & Johnson Pharmaceutical Research & Development, Raritan, NJ, 15-17 April 2002
 - * 242. American Chemical Society National Meeting, Orlando, FL, 8-10 April 2002
 - * 241. Pittsburgh Conference, New Orleans, LA, 14-16 March 2002
 - 240. Atofina, King of Prussia, PA, 23-25 October 2001
 - * 239. American Chemical Society National Meeting, Chicago, IL, 27-29 August 2001
 - 238. Champion Technologies, Fresno, TX, 6-8 June 2001
 - 237. Statistical Designs Regional Offering, Houston, TX, 15-18 May 2001
 - 236. Aventis, Swiftwater, PA, 1-4 May 2001
 - 235. IBC Biological Assay Development and Validation Symposium, San Diego, CA, 25 April 2001
 - 234. Amgen, Medford, MA, 17-20 April 2001
 - * 233. American Chemical Society National Meeting, San Diego, CA, 2-4 April 2001
 - * 232. Arch Chemicals, North Kingstown, RI, 13-15 March 2001
 - * 231. Pittsburgh Conference, New Orleans, LA, 1-3 March 2001
 - 230. Statistical Designs Regional Offering, Fullerton, CA, 6-9 February 2001
 - 229. Statistical Designs Regional Offering, Houston, TX, 30 October - 2 November 2000
 - * 228. American Chemical Society National Meeting, Washington, DC, 17-19 August 2000
 - 227. Statistical Designs Regional Offering, Houston, TX, 8-11 May 2000
 - * 226. American Chemical Society National Meeting, San Francisco, CA, 23-25 March 2000
 - * 225. Pittsburgh Conference, New Orleans, LA, 9-11 March 2000
 - 224. Statistical Designs Regional Offering, Houston, TX, 8-10 December 1999
 - * 223. American Chemical Society National Meeting, New Orleans, LA, 19-21 August 1999
 - 222. Ciba Specialty Chemicals, McIntosh, AL, 6-8 July 1999
 - 221. Ato Findley, Wauwatosa, WI, 30 June - 2 July 1999
 - 220. Statistical Designs Regional Offering, Houston, TX, 19-21 May 1999
 - * 219. Procter and Gamble, Cincinnati, OH, 7-9 April 1999
 - * 218. American Chemical Society National Meeting, Anaheim, CA, 18-20 March 1999
 - * 217. American Chemical Society Local Section, Milwaukee, WI, 10-12 March 1999
 - * 216. Pittsburgh Conference, Orlando, FL, 4-6 March 1999
 - 215. Statistical Designs Regional Offering, Houston, TX, 8-11 December 1998
 - * 214. American Chemical Society National Meeting, Boston, MA, 20-22 August 1998
 - 213. Naval SWC, Dahlgren, VA, 11-14 August 1998
 - 212. Valspar, Pittsburgh, PA, 13-16 July 1998
 - 211. Statistical Designs Regional Offering, Houston, TX, 12-15 May 1998
 - 210. Huntsman Corporation, Austin, TX, 28-29 April 1998
 - 209. IDEC Pharmaceuticals, San Diego, CA, 22-24 April 1998
 - * 208. American Chemical Society National Meeting, Dallas, TX, 26-28 March 1998
 - * 207. Pittsburgh Conference, New Orleans, LA, 26-28 February 1998
 - 206. Statistical Designs Regional Offering, Houston, TX, 9-12 December 1997
 - * 205. Eastman Kodak Company, Rochester, NY, 7-10 October 1997
 - * 204. Occidental Chemical Corp., Grand Island, NY, 24-26 September 1997
 - * 203. American Chemical Society National Meeting, Las Vegas, NV, 5-7 September 1997
 - * 202. Occidental Chemical Corp., Grand Island, NY, 18-20 June 1997
 - 201. Statistical Designs Regional Offering, Houston, TX, 13-16 May 1997
 - * 200. Eastman Kodak Company, Rochester, NY, 7-9 May 1997
 - * 199. American Chemical Society National Meeting, San Francisco, CA, 10-12 April 1997

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- * 198. Pittsburgh Conference, Atlanta, GA, 13-15 March 1997
 - 197. Statistical Designs Regional Offering, Freeport, TX, 29-31 January 1997
 - * 196. Occidental Chemical Corp., Grand Island, NY, 7-9 January 1997
 - 195. Statistical Designs Regional Offering, Houston, TX, 10-13 December 1996
 - * 194. Eastman Kodak Company, Rochester, NY, 8-11 October 1996
 - * 193. American Chemical Society National Meeting, Orlando, FL, 22-24 August 1996
 - 192. Ciba Polymers, Tarrytown, NY, 10-12 June 1996
 - 191. Rhone Poulenc Rohrer Pharmaceutical Company, Arcola, PA, 20 May, 10-12 July 1996
 - 190. Statistical Designs Regional Offering, Houston, TX, 14-17 May 1996
 - * 189. Eastman Kodak Company, Rochester, NY, 7-10 May 1996
 - * 188. American Chemical Society National Meeting, New Orleans, LA, 21-23 March 1996
 - * 187. Pittsburgh Conference, Chicago, IL, 29 February - 2 March 1996
 - 186. Statistical Designs Regional Offering, Houston, TX, 5-8 December 1995
 - * 185. Eastman Kodak Company, Rochester, NY, 10-13 October 1995
 - 184. Statistical Designs Regional Offering, Freeport, TX, 19-21 September 1995
 - * 183. American Chemical Society National Meeting, Chicago, IL, 17-19 August 1995
 - * 182. National Renewable Energy Laboratory (NREL), Golden, CO, 19-21 June 1995
 - 181. Statistical Designs Regional Offering, Houston, TX, 16-19 May 1995
 - * 180. Eastman Kodak Company, Rochester, NY, 9-12 May 1995
 - 179. Bristol Meyers Squibb, Seattle, WA, 5-7 April 1995
 - * 178. American Chemical Society National Meeting, Anaheim, CA, 30 March - 1 April 1995
 - * 177. American Chemical Society Local Section, Cincinnati, OH, 27-29 March 1995
 - * 176. Pittsburgh Conference, New Orleans, LA, 3-5 March 1995
 - 175. Statistical Designs Regional Offering, Houston, TX, 6-9 December 1994
 - * 174. American Chemical Society Local Section, Loch Haven, PA, 16-18 November 1994
 - * 173. Eastman Kodak Company, Rochester, NY, 11-14 October 1994
 - 172. Americhem, Cuyahogo Falls, OH, 27-29 September 1994
 - 171. Statistical Designs Regional Offering, Freeport, TX, 20-23 September 1994
 - * 170. American Chemical Society National Meeting, Washington, DC, 18-20 August 1994
 - 169. Statistical Designs Regional Offering, Houston, TX, 17-20 May 1994
 - * 168. Eastman Kodak Company, Rochester, NY, 10-13 May 1994
 - 167. BASF, Freeport, TX, 3-5 May 1994
 - 166. Dow Chemical USA, Freeport, TX, 15-18 March 1994
 - * 165. American Chemical Society National Meeting, San Diego, CA, 10-12 March 1994
 - * 164. Pittsburgh Conference, Chicago, IL, 25-27 February 1994
 - 163. Ciba Vision, Atlanta, GA, 25-28 January 1994
 - 162. Statistical Designs Regional Offering, Houston, TX, 7-10 December 1993
 - * 161. Sun Chemical, Carlstadt, NJ, 15-17 November 1993
 - 160. International Specialty Products, Wayne, NJ, 25-27 October 1993
 - * 159. Eastman Kodak Company, Rochester, NY, 12-15 October 1993
 - * 158. American Chemical Society Local Section, Valencia, CA, 4-6 October 1993
 - * 157. American Chemical Society National Meeting, Chicago, IL, 19-21 August 1993
 - 156. Dow Chemical USA, Freeport, TX, 20-23 July 1993
 - 155. Statistical Designs Regional Offering, Houston, TX, 18-21 May 1993
 - * 154. Eastman Kodak Company, Rochester, NY, 11-14 May 1993
 - 153. Ciba Vision, Atlanta, GA, 15-16, 19-20 April 1993
 - * 152. American Chemical Society Local Section, Cincinnati, OH, 6-8 April 1993
 - * 151. American Chemical Society National Meeting, Denver, CO, 26-28 March 1993
 - * 150. Pittsburgh Conference, Atlanta, GA, 5-7 March 1993
 - 149. Ciba Vision, Atlanta, GA, 15-18 December 1992
 - 148. Statistical Designs Regional Offering, Houston, TX, 8-11 December 1992

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- * 147. Valspar Corporation, Pittsburgh, PA, 9-11 November 1992
 - 146. R. W. Johnson Pharmaceutical Research Institute, Spring House, PA, 26-28 October 1992
 - * 145. Eastman Kodak Company, Rochester, NY, 13-16 October 1992
 - * 144. American Chemical Society National Meeting, Washington, DC, 21-23 August 1992
 - 143. Tnemec, North Kansas City, MO, 12-14 August 1992
 - 142. Dow Chemical USA, Freeport, TX, 21-24 July 1992
 - 141. Statistical Designs Regional Offering, Houston, TX, 12-15 May 1992
 - * 140. Eastman Kodak Company, Rochester, NY, 5-8 May 1992
 - * 139. American Chemical Society National Meeting, San Francisco, CA, 3-5 April 1992
 - * 138. Pittsburgh Conference, New Orleans, LA, 6-8 March 1992
 - 137. Schering-Plough Drug Company, Kenilworth, NJ, 6-7 February 1992
 - 136. Statistical Designs Regional Offering, Houston, TX, 10-13 December 1991
 - 135. Syntex Pharmaceuticals, Freeport, BAHAMAS, 3-4 December 1991
 - * 134. Eastman Kodak Company, Rochester, NY, 22-25 October 1991
 - * 133. Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Anaheim, CA, 10-12 October 1991
 - * 132. American Chemical Society National Meeting, New York, NY, 23-25 August 1991
 - 131. Dow Chemical USA, Freeport, TX, 30 July - 2 August 1991
 - 130. Dow Chemical USA, Freeport, TX, 23-26 July 1991
 - 129. Statistical Designs Regional Offering, Houston, TX, 21-24 May 1991
 - * 128. Eastman Kodak Company, Rochester, NY, 14-17 May 1991
 - 127. Sterling Research Group, Rensselaer, NY, 16-19 April 1991
 - * 126. American Chemical Society National Meeting, Atlanta, GA, 12-14 April 1991
 - * 125. ManLabs, Cambridge, MA, 3-5 April 1991
 - * 124. Pittsburgh Conference, Chicago, IL, 1-3 March 1991
 - 123. SmithKline Beecham, King of Prussia, PA, 5-8 February 1991
 - 122. Statistical Designs Regional Offering, Houston, TX, 11-14 December 1990
 - 121. Environmental Monitoring Systems Laboratory, United States Environmental Protection Agency, Las Vegas, NV, 26-28 November 1990
 - 120. SmithKline Beecham Pharmaceuticals, King of Prussia, PA, 14-16 November 1990
 - * 119. Eastman Kodak Company, Rochester, NY, 16-19 October 1990
 - 118. Glaxo Pharmaceuticals Limited, Hertingfordbury, ENGLAND, 26-28 September 1990
 - * 117. American Chemical Society National Meeting, Washington, DC, 24-26 August 1990
 - 116. Dow Chemical USA, Freeport, TX, 8-10 August 1990
 - 115. Scientific Computing and Automation Conference (Europe), Maastricht, THE NETHERLANDS, 11-12 June 1990
 - * 114. Eastman Kodak Company, Rochester, NY, 23-25 May 1990
 - 113. Statistical Designs Regional Offering, Houston, TX, 15-18 May 1990
 - * 112. Solar Energy Research Institute, Golden, CO, 2-4 May 1990
 - * 111. American Chemical Society National Meeting, Boston, MA, 20-22 April 1990
 - 110. Syncrude, Edmonton, Alberta, CANADA, 12-15 March 1990
 - * 109. Pittsburgh Conference, New York, NY, 2-4 March 1990
 - 108. Exxon Chemical Company, Houston, TX, 26-28 February 1990
 - 107. Exxon Chemical Company, Houston, TX, 21-23 February 1990
 - 106. Tennessee Valley Authority, National Fertilizer Development Center, Muscle Shoals, AL, 14-16 February 1990
 - 105. Statistical Designs Regional Offering, Houston, TX, 13-15 December 1989
 - 104. Tennessee Valley Authority, National Fertilizer Development Center, Muscle Shoals, AL, 25-27 October 1989
 - * 103. Eastman Kodak Company, Rochester, NY, 18-20 October 1989
 - 102. Scientific Computing and Automation Conference and Exposition, Philadelphia, PA,

10 October 1989

101. Statistical Designs Regional Offering, Houston, TX, 20-22 September 1989
- * 100. American Chemical Society National Meeting, Miami Beach, FL, 8-10 September 1989
- * 99. Ciba-Geigy Corporation, Ardsley, NY, 12-14 July 1989
98. Scientific Symposia, Ltd., Leamington Spa, ENGLAND, 28-30 June 1989
- * 97. GAF Chemicals Corporation, Wayne, NJ, 19-21 June 1989
96. Boehringer Mannheim Corporation, Indianapolis, IN, 25-26 May 1989
95. Statistical Designs Regional Offering, Houston, TX, 17-19 May 1989
- * 94. Eastman Kodak Company, Rochester, NY, 10-12 May 1989
- * 93. American Chemical Society National Meeting, Dallas, TX, 7-9 April 1989
92. Boehringer Mannheim Corporation, Indianapolis, IN, 27-28 March 1989
91. Glaxo Pharmaceuticals Limited, Harrogate, ENGLAND, 15-17 March 1989
- * 90. Pittsburgh Conference, Atlanta, GA, 3-5 March 1989
89. Boehringer Mannheim Corporation, Indianapolis, IN, 27-28 February 1989
- * 88. Los Alamos National Laboratory (LANL), Los Alamos, NM, 8-10 February 1989
87. Boehringer Mannheim Corporation, Indianapolis, IN, 16-17 January 1989
- * 86. S. C. Johnson & Son, Racine, WI, 9-11 January 1989
85. Statistical Designs Regional Offering, Houston, TX, 14-16 December 1988
- * 84. Eastman Kodak Company, Rochester, NY, 19-21 October 1988
- * 83. Cincinnati Section, American Chemical Society, Cincinnati, OH, 12-14 October 1988
- * 82. Eastern Analytical Symposium, New York, NY, 30 September-2 October 1988
- * 81. American Chemical Society National Meeting, Los Angeles, CA, 23-25 September 1988
- * 80. AT&T Bell Laboratories, Allentown, PA, 14-16 September 1988
- * 79. Eli Lilly and Company, Indianapolis, IN, 1-2 August 1988
- * 78. Texaco, Houston, TX, 27-29 July 1988
77. Scientific Symposia Ltd., Harrogate, ENGLAND, 6-8 July 1988
76. Statistical Designs Regional Offering, Houston, TX, 11-13 May 1988
- * 75. American Chemical Society National Meeting, Toronto, Ontario, CANADA, 3-5 June 1988
- * 74. AT&T Bell Laboratories, Allentown, PA, 23-25 May 1988
- * 73. Tennessee Eastman, Kingsport, TN, 6-8 April 1988
- * 72. Eastman Kodak Company, Rochester, NY, 16-18 March 1988
- * 71. Pittsburgh Conference, New Orleans, LA, 19-21 February 1988
70. Sandoz Ltd., Basle, SWITZERLAND, 29 January 1988
- * 69. Tennessee Eastman, Kingsport, TN, 8-10 December 1987
68. Scientific Symposia Ltd., Harrogate, ENGLAND, 25-27 November 1987
- # 67. American Institute of Chemical Engineers National Meeting, New York, NY, 12-13 November 1987
66. Statistical Designs Regional Offering, Houston, TX, 28-30 October 1987
- * 65. Eastman Kodak Company, Rochester, NY, 21-23 October 1987
64. California State University, Fullerton, CA, 8-9 October 1987
- * 63. Eastern Analytical Symposium, New York, NY, 11-13 September 1987
- * 62. American Chemical Society National Meeting, New Orleans, LA, 28-30 August 1987
- * 61. Eastman Kodak Company, Rochester, NY, 24-26 June 1987
- # 60. American Institute of Chemical Engineers National Meeting, Houston, TX, 26-27 March 1987
- * 59. Pittsburgh Conference, Atlantic City, NJ, 6-8 March 1987
58. California State University, Fullerton, CA, 19-20 February 1987
- * 57. Dow Chemical USA, Freeport, TX, 4-6 February 1987
- * 56. Eastman Kodak Company, Rochester, NY, 14-16 January 1987
- * 55. AT&T Bell Laboratories, Allentown, PA, 15-17 December 1986.
[With John K. Taylor, NIST]
- * 54. Cincinnati Section, American Chemical Society, Cincinnati, OH, 4-5 December 1986
- * 53. Union Carbide Corporation, Tarrytown, NY, 16-17 October 1986

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- * 52. Eastman Kodak Company, Rochester, NY, 8-10 October 1986
 - * 51. American Chemical Society National Meeting, Anaheim, CA, 5-7 September 1986
 - * 50. Signetics Corporation, Sunnyvale, CA, 4-5 August 1986
 - * 49. Eastman Kodak Company, Rochester, NY, 23-25 July 1986
 48. Dow Chemical, Freeport, TX, 29-30 May, 11 June 1986
 - * 47. Eastman Kodak Company, Rochester, NY, 21-23 May 1986
 46. Dow Chemical, Freeport, TX, 24-25 April, 9 May 1986
 - * 45. Eastman Kodak Company, Rochester, NY, 12-14 March 1986
 - * 44. Pittsburgh Conference, Atlantic City, NJ, 7-9 March 1986
 - * 43. AT&T Bell Laboratories, Allentown, PA, 5-7 February 1986
 - * 42. Eastman Kodak Company, Rochester, NY, 16-18 December 1985
 41. Nelson Analytical, Cupertino, CA, 10-11 October 1985
 - * 40. Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Philadelphia, PA, 26-28 September 1985
 - * 39. American Chemical Society Special Short Courses, Chicago, IL, 6-8 September 1985
 - * 38. Eastman Kodak Company, Rochester, NY, 7-8 August 1985
 - * 37. Parker Chemical Company, Troy, MI, 23-24 May 1985
 - * 36. American Chemical Society National Meeting, Miami, FL, 26-28 April 1985
 35. Glaxo Operations UK Ltd., Barnard Castle, ENGLAND, 25-27 March 1985
 34. Scientific Symposia Ltd., Danbury Park, ENGLAND, 20-22 March 1985
 - * 33. Pittsburgh Conference, New Orleans, LA, 22-24 March 1985
 - * 32. Santa Clara Valley Section, American Chemical Society, Stanford University, Palo Alto, CA, 26-27 January 1985
 31. SmithKline Chemicals, Philadelphia, PA, 12-13 September 1984
 30. California State University, Fullerton, CA, 27-28 June 1984
 - * 29. Union Oil Company, Brea, CA, 31 May - 1 June 1984
 - # 28. American Institute of Chemical Engineers National Meeting, Anaheim, CA, 17-18 May 1984
 - * 27. American Chemical Society Special Short Courses, New York, NY, 10-11 May 1984
 - * 26. American Chemical Society National Meeting, St. Louis, MO, 7-8 April 1984
 - * 25. Pittsburgh Conference, Atlantic City, NJ, 3-4 March 1984
 24. California State University, Fullerton, CA, 1-2 February 1984
 - * 23. American Chemical Society Special Short Courses, Houston, TX, 15-16 November 1983
 - # 22. American Institute of Chemical Engineers National Meeting, Washington, DC, 27-28 October 1983
 - * 21. American Chemical Society National Meeting, Washington, DC, 30-31 August 1983
 - * 20. Ford Motor Company, Mount Clemens, MI, 24-25 May 1983
 19. California State University, Fullerton, CA, 18-19 May 1983
 - * 18. American Chemical Society National Meeting, Seattle, WA, 19-20 March 1983
 - * 17. Pittsburgh Conference, Atlantic City, NJ, 5-6 March 1983
 - * 16. Standard Oil Company, Cleveland, OH, 22-23 February 1983
 - * 15. Eastern Analytical Symposium, New York, NY, 15-16 November 1982
 - * 14. American Chemical Society Special Short Courses, Chicago, IL, 29-30 October 1982
 - * 13. American Chemical Society National Meeting, Kansas City, MO, 11-12 September 1982
 12. Monsanto, Texas City, TX, 10-12 August 1982
 11. Monsanto, Texas City, TX, 23-25 June 1982
 - * 10. Goodyear, Akron, OH, 24-25 May 1982
 - * 9. Pittsburgh Conference, Atlantic City, NJ, 6-7 March 1982
 8. University of Houston, Houston, TX, 30 November - 1 December 1981
 7. University of Houston, Houston, TX, 11-12 May 1981
 6. University of Houston, Houston, TX, 1-2 December 1980
 5. EXPOCHEM 80, Houston, TX, 4-5 October 1980
 4. University of Houston, Houston, TX, 5-6 May 1980
 3. Michigan Section, American Association for Clinical Chemistry, Detroit, MI,

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- 25-26 April 1980
 2. University of Houston, Houston, TX, 3-4 December 1979
 1. University of Houston, Houston, TX, 16-17 April 1979
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STATISTICAL ANALYSIS OF LABORATORY DATA

[http://www.statisticaldesigns.com/sc_stata.htm]

[<http://proed.acs.org/course-catalog/courses/STAT/>]

This course presents the theory and application of statistics, including outlier testing, calibration, t-tests, F-tests, one-way ANOVA, outlier detection, specification testing, sampling, interlaboratory testing, statistical process control, calibration, limits of detection, and exploratory data analysis. We also include several modules on bioassay statistics for interested groups.

237. U. S. Navy Surface Weapons Warfare Center, Dahlgren, VA, 29 April-1 May 2015.
- * 236. American Chemical Society Regional Offering, New Orleans, LA, 8-10 April 2015
235. Immunogen, Norwood, MA, 1-2 April 2015
- * 234. American Chemical Society Regional Offering, Houston, TX, 2-4 December 2014
- * 233. American Chemical Society National Meeting, Dallas, TX, 17-19 March 2014
- * 232. American Chemical Society Regional Offering, Houston, TX, 3-5 December 2013
231. S. C. Johnson and Sons, Racine, WI, 11-12 November 2013
- * 231. American Chemical Society National Meeting, Indianapolis, IN, 7-9 September 2013.
230. Geokinetics, Houston, TX, 30 July-1 August 2013.
229. Genencor/Danisco, Palo Alto, CA, 15-17 June 2013.
229. Roche Carolina, Florence, SC, 16-17 May 2013.
- * 228. American Chemical Society Regional Offering, La Jolla, CA, 10-12 February 2013
227. Grifols Biologicals, Los Angeles, CA, 28-30 January 2013
- * 226. American Chemical Society National Meeting, Philadelphia, PA, 18-20 August 2012
225. Merck Vaccines, Landsdale, PA, 24-26 July 2012
224. Grifols Biologicals, Los Angeles, CA, 2-3 April 2012
- * 223. American Chemical Society National Meeting, San Diego, CA, 24-26 March 2012
- * 222. American Chemical Society Regional Offering, La Jolla, CA, 7-9 November 2011
- * 221. American Chemical Society Regional Offering, La Jolla, CA, 7-9 November 2011
220. Merck, West Point, PA, 19-21 October 2011.
219. Biogen Idec, Research Triangle Park, NC, 12-13 September 2011
- * 218. American Chemical Society National Meeting, Denver, CO, 27-29 August 2011
- * 217. New York City Police Department Forensic Laboratory, Jamaica, NY, 6 June 2011
- * 216. American Chemical Society Regional Offering, Cincinnati, OH, 23-25 May 2011
- * 215. American Chemical Society National Meeting, Anaheim, CA, 26-28 March 2011
- * 214. American Chemical Society Regional Offering, Houston, TX, 6-8 December 2010
- * 213. American Chemical Society Regional Offering, La Jolla, CA, 1-3 November 2010
- * 212. American Chemical Society National Meeting, Boston, MA, 23-25 August 2010
211. Health Protection Agency, Centre for Emergency Preparedness & Response, Porton Down, Salisbury, England, 9-10 March 2010
- * 210. American Chemical Society Regional Offering, Woodbridge, NJ, 8-10 February 2010
- * 209. American Chemical Society Regional Offering, La Jolla, CA, 2-4 November 2009
208. Gilead Sciences, Foster City, CA, 28-30 October 2009
- * 207. American Chemical Society Regional Offering, Tampa, FL, 20-22 July 2009
- * 206. American Chemical Society Regional Offering, Durham, NC, 4-6 May 2009
- * 205. American Chemical Society National Meeting, Salt Lake City, UT, 23-25 March 2009
204. Naval SWC, Dahlgren, VA, 9-11 March, 2009

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- * 203. American Chemical Society Regional Offering, Woodbridge, NJ, 9-11 February 2009
 - 202. Baker Petrolite, Houston, TX 5-6 January 2009
 - * 201. American Chemical Society Regional Offering, La Jolla, CA, 3-5 December 2007
 - 200. Ciba Vision, Atlanta, GA 14 October 2008
 - * 199. American Chemical Society Regional Offering, Durham, NC 1-3 October 2008
 - 198. Pall Corporation, Port Washington, NY 4-5 September 2008
 - * 197. American Chemical Society National Meeting, Philadelphia, PA 19-21 August 2008
 - 196. Cargill, Blair, NE 12-14 August 2008
 - 195. Seattle Genetics, Bothell, WA 21-23 July 2008
 - 194. Genencor, Palo Alto, CA 9-11 June 2008
 - * 193. American Chemical Society Regional Offering, Foster City, CA, 21-23 May 2008
 - * 192. American Chemical Society National Meeting, New Orleans, LA, 8-10 April 2008
 - 191. Alkermes, Cambridge, MA, 2-4 April 2008
 - 190. Alkermes, Cambridge, MA, 5-7 March 2008
 - * 189. American Chemical Society Regional Offering, Woodbridge, NJ, 11-13 February 2008
 - 188. Marathon Petroleum Company, Columbus, OH, 11-13 December 2007
 - * 187. American Chemical Society Regional Offering, La Jolla, CA, 3-5 December 2007
 - * 186. American Chemical Society Regional Offering, Durham, NC, 12-14 November 2007
 - 185. Health Protection Agency, Centre for Emergency Preparedness & Response, Porton Down, Salisbury, ENGLAND, 3-5 October 2007
 - * 184. American Chemical Society National Meeting, Boston, MA, 19-21 August 2007
 - * 183. American Chemical Society Regional Offering, New Brunswick, NJ, 25-27 June 2007
 - 182. Maxygen, Redwood City, CA, 14-16 May 2007
 - * 181. American Chemical Society National Meeting, Chicago, IL, 25-26 March 2007
 - * 180. American Chemical Society Regional Offering, Houston, TX, 5-7 February 2007
 - 179. Statistical Designs Regional Offering, Anaheim, CA, 29-31 January 2007
 - * 178. American Chemical Society Regional Offering, Durham, NC, 5-7 December 2006
 - * 177. American Chemical Society National Meeting, San Francisco, CA, 11-13 September 2006
 - * 176. American Chemical Society Regional Offering, Woodbridge, NJ, 709 August 2006
 - 175. (Name withheld by request), Irvine, CA, 6-8 May 2006
 - * 174. Genencor, Palo Alto, CA 15-17 May 2006
 - 173. Cell Genesys, South San Francisco, CA 2-4 May 2006
 - * 172. American Chemical Society National Meeting, Atlanta, GA, 27-29 March 2006
 - 171. Statistical Designs Regional Offering, Anaheim, CA, 26-27 January 2006
 - * 170. Metrics, Greenville, NC, 9-11 January 2006
 - * 169. New York City Police Department Forensic Laboratory, Jamaica, NY, 9-11 January 2006
 - * 168. American Chemical Society Regional Offering, Somerset, NJ, 7-9 November 2005
 - * 167. American Chemical Society Regional Offering, Burlingame, CA, 30 November 2 December 2005
 - * 166. Merck, West Point, PA, 1-3 November 2005
 - * 165. American Chemical Society Regional Offering, Chicago, IL, 18-20 October 2005
 - 164. Solvay Advanced Polymers, Alpharetta, GA, 20-21 September, 31 October 2005
 - * 163. American Chemical Society National Meeting, Washington, DC, 25-27 August 2005
 - 162. Health Protection Agency, Centre for Emergency Preparedness & Response, Porton Down, Salisbury, ENGLAND, 11-13 July 2005
 - * 161. US Army ANCDF, Anniston, AL, 6-8 June 2005
 - 160. California Department of Food and Agriculture, Sacramento, CA, 27-29 April 2005
 - * 159. Alkermes, Cambridge, MA, 21-23 March 2005
 - * 158. Pittsburgh Conference, Orlando, FL, 25-27 February 2005
 - 157. ZymoGenetics, Seattle, WA, 15-17 December 2004
 - * 156. American Chemical Society Regional Offering, Atlanta, GA, 1-3 December 2004
 - * 155. American Chemical Society Regional Offering, Burlingame, CA, 3-5 November 2004
 - 154. Protein Design Labs, Minneapolis, MN, 26-28 October 2004

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153. IBC Biological Assay Development and Validation Symposium, Berlin, GERMANY, 18 October 2004
 152. Protein Design Labs, Fremont, CA, 22-24 September 2004
 - * 151. American Chemical Society National Meeting, Philadelphia, PA, 19-21 August 2004
 150. Tyco Healthcare/Mallinckrodt, St. Louis, MO, 12-22 July 2004
 - * 149. American Chemical Society National Meeting, Anaheim, CA, 25-27 March 2004
 - * 148. Pittsburgh Conference, Chicago, IL, 5-7 March 2004
 147. Cell Genesys, San Diego, CA, 9-11 February 2004
 - * 146. American Chemical Society Regional Offering, Burlingame, CA, 3-5 December 2003
 - * 145. American Chemical Society Local Section, Boston, MA, 20-21 November 2003
 - * 144. American Chemical Society Regional Offering, Somerset, NJ, 12-14 November 2003
 143. Dendreon, Seattle, WA, 4-6 November 2003
 142. Maxygen, Redwood City, CA, 23-24 October 2003
 141. Codexis, Redwood City, CA, 15-17 October 2003
 - * 140. Gillette, Needham, MA, 1-3 October 2003
 139. Atofina, King of Prussia, PA, 16-18 September 2003
 - * 138. American Chemical Society National Meeting, New York, NY, 4-6 September 2003
 137. Protein Design Labs, Plymouth, MN, 28-30 July 2003
 136. IDEC Pharmaceuticals, San Diego, CA, 14-16 July 2003
 135. IBC Biological Assay Development and Validation Symposium, Bethesda, MD, 5 May 2003
 134. Givaudan, Cincinnati, OH, 28-30 April 2003
 133. Cargill Dow, Blair, NE, 22-23 April 2003
 132. (Name withheld by request), Irvine, CA, 15-16 April 2003
 - * 131. American Chemical Society National Meeting, New Orleans, LA, 20-22 March 2003
 - * 130. Pittsburgh Conference, Orlando, FL, 6-8 March 2003
 - * 129. Bristol-Myers Squibb, Hopewell, NJ, 4-6 February 2003
 128. Cell Genesys, Foster City, CA, 18-19 December 2002
 127. Naval SWC, Dahlgren, VA, 9-11 December 2002
 - * 126. American Chemical Society Regional Offering, San Mateo, CA, 4-6 December 2002
 - * 125. American Chemical Society Regional Offering, Somerset, NJ, 13-15 November 2002
 - * 124. American Chemical Society Regional Offering, Chicago, IL, 23-25 October 2002
 123. Procter & Gamble, Cincinnati, OH, 16-17 September 2002
 - * 122. Bayer, Raleigh, NC, 26-27 August 2002
 - * 121. American Chemical Society National Meeting, Boston, MA, 15-17 August 2002
 - * 120. Alkermes, Cambridge, MA, 10-12 June 2002
 - * 119. Elan Drug Delivery, King Of Prussia, PA, 5-6 June 2002
 118. DOW Chemical USA, Freeport, TX, 21 May 2002
 - * 117. American Chemical Society Local Section, Cincinnati, OH, 23-24 April 2002
 - * 116. American Chemical Society National Meeting, Orlando, FL, 4-6 April 2002
 - * 115. Lorillard Tobacco, Greensboro, NC, 2-4 April 2002
 - * 114. Pittsburgh Conference, New Orleans, LA, 15-17 March 2002
 - * 113. New York City Police Department Forensic Laboratory, Jamaica, NY, 25-26 February 2002
 - * 112. American Chemical Society Regional Offering, San Francisco, CA, 6-7 December 2001
 - * 111. Lorillard Tobacco, Greensboro, NC, 5-7 November 2001
 - * 110. American Chemical Society Regional Offering, Somerset, NJ, 1-2 November 2001
 - * 109. American Chemical Society National Meeting, Chicago, IL, 23-25 August 2001
 108. Bostik Findley, Wauwatosa, WI, 14-16 August 2001
 107. Aradigm, Hayward, CA, 16-18 July 2001
 106. Aradigm, Hayward, CA, 11-13 July 2001
 105. Sulzer Biologics, Wheat Ridge, CO, 20-22 June 2001
 104. Statistical Designs Regional Offering, Houston, TX, 9-11 May 2001
 - * 103. American Chemical Society National Meeting, San Diego, CA, 29-31 March 2001
 - * 102. American Chemical Society Local Section, Milwaukee, WI, 7-9 March 2001

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- * 101. Pittsburgh Conference, New Orleans, LA, 2-4 March 2001
 - 100. Specialty Brands, Ontario, CA, 20-22 February 2001
 - 99. Beckman Coulter, Brea, CA, 12-14 February 2001
 - 98. Statistical Designs Regional Offering, Fullerton, CA, 31 January - 2 February 2001
 - 97. Promega, Madison, WI, 9-11 January 2001
 - 96. Aradigm, Hayward, CA, 11-13 December 2000
 - * 95. American Chemical Society Regional Offering, Chicago, IL, 6-8 December 2000
 - 94. Cargill, Blair, NE, 28-29 November 2000
 - * 93. American Chemical Society Regional Offering, Boston, MA, 8-10 November 2000
 - 92. Statistical Designs Regional Offering, Houston, TX, 25-27 October 2000
 - * 91. Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Nashville, TN, 28-29 September 2000
 - 90. Procter & Gamble, Cincinnati, OH, 21-22 September 2000
 - 89. EPA Chemometrics Conference, Las Vegas, NV, 16-17 September 2000
 - * 88. American Chemical Society National Meeting, Washington, DC, 20-22 August 2000
 - 87. Phoenix Water Board, Phoenix, AZ, 18-19 July 2000
 - 86. Cargill, Blair, NE, 20-21 June 2000
 - 85. Statistical Designs Regional Offering, Houston, TX, 15-18 May 2000
 - 84. Aventis Pasteur, Swiftwater, PA, 3-4 May 2000
 - 83. Aventis Pasteur, Swiftwater, PA, 1-2 May 2000
 - * 82. American Chemical Society National Meeting, San Francisco, CA, 26-27 March 2000
 - * 81. Pittsburgh Conference, New Orleans, LA, 11-12 March 2000
 - * 80. American Chemical Society Regional Offering, San Francisco, CA, 9-10 December 1999
 - 79. Statistical Designs Regional Offering, Houston, TX, 6-7 December 1999
 - 78. Procter & Gamble, Cincinnati, OH, 10-11 November 1999
 - 77. Merck, West Point, PA, 2-3 November 1999
 - * 76. World Pharmaceutical Conference, Philadelphia, PA, 28-29 October 1999
 - * 75. American Chemical Society Regional Offering, Chicago, IL, 19-20 October 1999
 - 74. Kerr-McGee, Oklahoma City, OK, 23-24 September 1999
 - * 73. American Chemical Society National Meeting, New Orleans, LA, 21-22 August 1999
 - 72. Promega, Madison, WI, 12-14 July 1999
 - 71. Statistical Designs Regional Offering, Houston, TX, 17-18 May 1999
 - 70. Analytical Products Group, Belpre, OH, 30 March - 2 April 1999
 - * 69. American Chemical Society National Meeting, Anaheim, CA, 20-21 March 1999
 - * 68. Pittsburgh Conference, Orlando, FL, 6-7 March 1999
 - * 67. Clark County Sanitation District, Las Vegas, NM, 25-26 February 1999
 - 66. Promega, Madison, WI, 28-29 January 1999
 - 65. Statistical Designs Regional Offering, Houston, TX, 14-15 December 1998
 - * 64. American Chemical Society Regional Offering, San Francisco, CA, 3-4 December 1998
 - * 63. Eastman Kodak Company, Rochester, NY, 3-4 December 1998
 - * 62. American Chemical Society Regional Offering, Boston, MA, 19-20 November 1998
 - * 61. American Chemical Society Regional Offering, Chicago, IL, 26-27 October 1998
 - * 60. Gulf Coast Conference, Galveston, TX, 17-18 September 1998
 - * 59. American Chemical Society National Meeting, Boston, MA, 22-23 August 1998
 - * 58. Eastman Kodak Company, Rochester, NY, 25-26 June 1998
 - 57. Statistical Designs Regional Offering, Houston, TX, 18-19 May 1998
 - * 56. Pharmaceutical Ingredients U. S. (PhIUS) Meeting, Philadelphia, PA, 12-13 May 1998
 - * 55. American Chemical Society National Meeting, Dallas, TX, 28-29 March 1998
 - * 54. Pittsburgh Conference, New Orleans, LA, 28 February - 1 March 1998
 - 53. Statistical Designs Regional Offering, Houston, TX, 15-16 December 1997
 - * 52. Eastman Kodak Company, Rochester, NY, 4-5 December 1997
 - 51. Abbott Laboratories, Abbott Park, IL, 19-20 November 1997
 - * 50. American Chemical Society Regional Offering, Chicago, IL, 13-14 October 1997

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- * 49. Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Providence, RI, 30-31 October 1997
 - * 48. Gulf Coast Conference, Galveston, TX, 11-12 September 1997
 - * 47. American Chemical Society National Meeting, Las Vegas, NV, 7-8 September 1997
 - * 46. Merck, West Point, PA, 30-31 July 1997
 - * 45. Merck, Rahway, NJ, 28-29 July 1997
 44. Alkermes, Blue Ash, OH, 22-23 July 1997
 43. Warner-Lambert/Parke-Davis, Holland, MI, 9-10 June 1997
 42. Statistical Designs Regional Offering, Houston, TX, 19-20 May 1997
 - * 41. Eastman Kodak Company, Rochester, NY, 5-6 May 1997
 - * 40. Pharmaceutical Ingredients U. S. (PhIUS) Meeting, Philadelphia, PA, 23-24 April 1997
 - * 39. American Chemical Society National Meeting, San Francisco, CA, 12-13 April 1997
 - * 38. Pittsburgh Conference, Atlanta, GA, 15-16 March 1997
 37. Statistical Designs Regional Offering, Freeport, TX, 27-28 January 1997
 - * 36. Steris Chemical Company, Mentor, OH, 18-19 December 1996
 - * 35. American Chemical Society Regional Offering, San Francisco, CA, 5-6 December 1996
 34. Ethyl Corporation, Pasadena, TX, 21-22 November, 3 December 1996
 - * 33. American Chemical Society Regional Offering, Boston, MA, 13-14 November 1996
 - * 32. U. S. Army Aberdeen Proving Ground, St. Louis, MO, 6-7 November 1996
 - * 31. Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Kansas City, KS, 4-5 October 1996
 - * 30. Gulf Coast Conference, Galveston, TX, 12-13 September 1996
 - * 29. Pharmaceutical Ingredients U. S. (PhIUS) Meeting, Philadelphia, PA, 5-6 September 1996
 - * 28. American Chemical Society National Meeting, Orlando, FL, 24-25 August 1996
 27. G. D. Searle, Skokie, IL, 19-20 June 1996
 - * 26. Cargill, Eddyville, IA, 18-19 April 1996
 25. Statistical Designs Regional Offering, Freeport, TX, 25-27 March 1996
 - * 24. American Chemical Society National Meeting, New Orleans, LA, 23-24 March 1996
 - * 23. Pittsburgh Conference, Chicago, IL, 2-3 March 1996
 22. Autoimmune, Lexington, MA, 5-6 February 1996
 21. ISK Magnetics, Houston, TX, 9-11 January 1996
 - * 20. American Chemical Society Regional Offering, Boston, MA, 2-3 November 1995
 - * 19. American Chemical Society Regional Offering, Research Triangle Park, NC, 26-27 October 1995
 - * 18. American Chemical Society Regional Offering, Newark, NJ, 23-24 October 1995
 - * 17. Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Cincinnati, OH, 20-21 October 1995
 - * 16. Gulf Coast Conference, Galveston, TX, 14-15 September 1995
 15. Scios Nova, Mountain View, CA, 24-25 August 1995
 - * 14. American Chemical Society National Meeting, Chicago, IL, 19-20 August 1995
 - * 13. Mylan Pharmaceuticals, Morgantown, WV, 13-14 July 1995
 12. Arthur D. Little, Cambridge, MA, 10-11 April 1995
 - * 11. American Chemical Society National Meeting, Anaheim, CA, 1-2 April 1995
 - * 10. Procter and Gamble, Norwich, NY, 16-17 February 1995
 - * 9. Procter and Gamble, Norwich, NY, 1-3 February 1995
 - * 8. American Chemical Society Regional Offering, Boston, MA, 1-2 December 1994
 - * 7. American Chemical Society Regional Offering, St. Louis, MO, 31 October –1 November 1994
 - * 6. American Chemical Society Regional Offering, Columbus, OH, 27-28 October 1994
 - * 5. American Chemical Society National Meeting, Washington, DC, 20-21 August 1994
 - * 4. Procter and Gamble, Norwich, NY, 19-20 July 1994
 - * 3. Procter and Gamble, Cincinnati, OH, 25-26 April 1994
 - * 2. Federation of Analytical Chemistry and Spectroscopy Societies, Detroit, MI, 22-23 Oct. 1993
 - * 1. Procter and Gamble, Cincinnati, OH, 4-5 May 1993