

Curriculum Vitae – November 2014

Michael Epstein

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Married, two children

Education:

B.S. in Chemistry, University of Maryland, 1969

Ph.D. in Analytical Chemistry, University of Maryland, 1976

Postdoctoral Associate in Laser Spectroscopy at University of Florida, 1978-1979

Computer Science Major, Montgomery Community College, 1982-84

Other education:

Modern Emission Spectroscopy (1974)

Oscilloscope Fundamentals (1977)

Microprocessors and Microcomputers in the Laboratory (1977)

Fundamentals of Microprocessing (1977)

Microprocessor Interfacing (1978)

Computer Programming For Scientists in the Basic Language (1980)

USDOC Management Seminar (1981)

Liquid Chromatography: Theory and Practice (1981)

Programming Languages in the Analytical Laboratory (1983)

Recent Advances in Chromatography (1984)

Selected Topics in Modern Atomic Spectroscopy (1985)

The Art of Sample Preparation (1987)

The Computer-Integrated Laboratory (1990)

Statistical Analysis using STATGRAPHICS (1990)

Statistics for Scientists and Engineers (1992)

Workshop on Process Education (1997)

Workshop on Religion and the Academic Life (1997)

Gas Chromatography DVCF Workshop (1998)

High Performance Liquid Chromatography DVCF Workshop (1998)

Introduction to LabVIEW (2000)

NSF-CWCS Course on Chemistry and Art (2004)

NSF-CWCS Course on Forensic Science (2004)

CMSC101 (Computer Technology - 2004)

FAMU 150A (Piano – 2004)

BIOCH405 (Biochemistry – 2005)

ENGL112 (War in Literature and Film – 2006)

NSF-CWCS Course on NMR Spectroscopy (2006)

THEOL 372 (World Religions – 2007)

CJUST320 (Guns and Crime – 2007)

Advanced NSF-CWCS Course on Chemistry and Art (2009)

Advanced NSF-CWCS Course on Forensic Science (2009)

BIOL 208 Nutrition (2011)

Military Service: U.S. Army, Highest rank: Specialist Five, Combat Engineer/Artillery, Sept 1969 - August 1971

Employment

- Quality Manager, Chemical Sciences Division, National Institute of Standards and Technology (present)
- Associate Professor, Mount Saint Mary's University, Emmitsburg, MD 21727, August 2010 to Dec 2013
- Assistant Professor, Mount Saint Mary's University, Emmitsburg, MD 21727, August 2003 to July 2010
- Research Chemist, 1972-2002, National Institute of Standards and Technology
 - Group Leader of Atomic Spectroscopy, 1989-90
 - Scientific Advisor to the Director, Chemical Science and Technology Laboratory, 1993-94; 2000-2002
- Adjunct Professor, Mount Saint Mary's College, Emmitsburg, MD 21727, 1996-97; 2000; 2002-2003
- Assistant Professor, Hood College, Frederick, MD 21701, 1998-99

Professional Activities/Awards

- Society for Applied Spectroscopy (SAS) – (former national treasurer, newsletter editor, member of various committees, held all Baltimore-Washington section offices - chairman, secretary, treasurer, program coord., current section webmaster)
- Federation of Analytical Chemistry and Spectroscopy Societies Annual Conference (symposium organizer and chairperson, registration chairman, budget committee)
- Editorial Advisory Boards, former member for *Journal of Analytical Atomic Spectroscopy*, *Talanta*, *Analytical Chemistry*, and *Progress in Analytical Atomic Spectroscopy*; Book Review Editor for the *Journal of Scientific Exploration* (2000-2001).
- ~50 archival publications including 4 book chapters (30 first or sole author), 60+ non-archival publications, and 60+ talks (40+ in the areas of chemistry, spectroscopy, and reference materials)
- Department of Commerce Bronze Medal (1989), 6 NBS/NIST Certificates of Recognition, Listed in 3rd Edition of *Who's Who in Science and Engineering*, SAS Baltimore-Washington Section Outstanding Member Award (1986), Office of Standard Reference Materials Measurement Services Award (1989), National SAS

Distinguished Service Award (1999), James Randi Foundation Award for promotion of critical thinking in education (1999).

- Involved in the certification of inorganic constituents in over 120 Standard Reference Materials (SRMs) at NIST
- Reviewed over 300 articles (1975-present) for journals such as Analytical Chemistry, Applied Spectroscopy, Journal of Chemical Education, and Talanta.

Educational Activities

- **Associate/Assistant Professor, Department of Science**, Mount Saint Mary's University, Emmitsburg, MD 21727

Courses:

- General Chemistry lecture/lab - Spring 1996
- Analytical Chemistry lecture/lab (1996, 2005, 2007, 2009, 2011)
- Instrumental Analysis, lecture/lab (2006, 2008, 2010, 2012)
- General Science/Physical Science (26 sections, 4 contact hours/week) 2002-2011
- Astronomy (2011 to present)
- Forensic Science (2011 to present)
- Bioanalytical Chemistry (2013)
- Forensic Chemistry lecture/lab (2004, 2006, 2008, 2010, 2012)

Committees:

- Faculty Governance Committee (2010 – present)
- Undergraduate Academic Committee (2007 – 2010)
- Technology Advisory Committee (2006 – 2008)
- Academic Subcommittee to the Technology Advisory Committee (chair) (2005 – 2008)
- Organizing Committee for the Callings Conference (2006)
- Education Department Content Advisory Committee, and the adhoc committee for Development of Distance Learning Technology (2007)
- Financial Advisory Committee (2007- 2010)

Other:

- Developed the laboratory curriculum that was used by all instructors teaching GNSCI 101 (Physical Science).
- Coordinated the application and acceptance of 10 students to the NIST Summer Undergraduate Research Fellowship Program over the last 7 years.
- Coordinated the application and acceptance of 3 students to the summer fellowship program at U.S. Pharmacopeia, two of whom were offered permanent positions with USP.
- Arranged for the contribution of a number of analytical instruments to the Department of Science from NIST, Activis, US Secret Service, US Dept of Agriculture, and Colorado College.
- **Assistant Professor, Department of Chemistry and Physics**, Hood College, Frederick, MD 21701 - General Chemistry, Quantitative Analysis, Instrumental Analysis, Fall 1998 (12+ contact hours) – Spring 1999 (12 contact hours)
- **Religious Education Instructor**, St. Paul's (Damascus) and St. Ignatius of Loyola (Urbana), various years.
- **Course director** for continuing education course in Atomic Spectroscopy, sponsored by the Society for Applied Spectroscopy; Instructor for Atomic Absorption Spectrometry Course, American Chemical Society
- **Teaching Assistant**, Department of Chemistry, University of Maryland (organic chemistry, quantitative analysis, electrochemistry, 71-74)

Supervision of Student Research:

- **Ashley Staley** (Fall 2013) – Construction of a mercury analysis instrument and determination of mercury in fish tissue.
- **Rachel Cutlip** (2012-2013) – Honors project “Comparison of Carcinogens in Second-Hand Cigarette Smoke and Incense”.
- **Brianne Keim** (2012-2013) – “Determination of Heavy Metals in Hookah Smoke”
- **Ashleigh Cook** (2009) – “Potentiometric Titration of Iron in Meteorites” and “Characterization of Air Rifle Bullets”
- **Regina Potter** (2009) – “GC-MS Analysis of Fingerprint Residues After Environmental Exposure” and “Dynamic Headspace Analysis of Alcoholic Beverages Using an Inexpensive Portable Breathalyzer”
- **Thad Mostwowtt** (2009) – “Potentiometric Titration of Iron in Meteorites”
- **Joseph Mardini** (2008-2009) – “Determination of Capsaicin in Hot Sauces by HPLC and the Scoville Method” (Honors Project)
- **Kelly Marciniak** (2008) – “HPLC of Inks”
- **Melanie Pistolas** (2007) – “The Bleaching Effects of Two Preservatives in Red Wine” (Honors Project)
- **Jenna Pattison** (2007) – “Thermal Effects on Fingerprint Recovery in Arson Cases”
- **Kathleen Coleman** (2005) – “Mercury Analysis in Environmental Samples by Cold Vapor Atomic Absorption Spectrometry”
- **Matt Reed** (2004) – “Studies of the Physical Developer for Fingerprint Identification & Methods for Validating Questioned Documents Using the Aging of Ink”
- **Jimmy Kiel** (2004) – “Study of the Radium Ore Revigator”
- **Megan Daschbach** (2002) – “Investigation of the Composition of Coins of Herod Agrippa I and II”
- **Maureen Foley** (Hood College, 1999) – “Use of the Crayfish *Procambarus Clarkii* as a Bioindicator of Cadmium Contamination” (student presented paper at ASLO meeting)
- **Sherie Love** (Hood College, 1998) – “A New Spectrochemical Calibration Technique” (student presented poster at Pittsburgh Conference)
- **Margaret Bullard and Bradley Buehler** (Mount Saint Mary’s College, 1996) – “Automation of a Method for Electrolyte Analysis in Serum” (published in *Talanta*)
- **Sarah Smith** (UVA, 1995) – “A New Method to Evaluate Lead Exposure Hazards in Parks and Playgrounds” (published as book chapter); numerous high school students involved in science fair projects.

Academic Grants and Awards:

- **2004 Faculty Summer Grant (\$1400)** for the study of coins of Herod Agrippa I
- **2005 Grant for Student Travel (\$500)** from Straneska, Inc.
- **2006 Presidential Scholarship Award (\$700)**
- **2007 Faculty Summer Grant (\$1280)** for the development of an analytical course based on the analysis of Campo del Cielo meteorites.
- **2013 Faculty Summer Grant (\$1400)** for study of toxic metal content of hookah smoke

Environmental Activities

- Involved in the certification of many environmental SRMs. Division Technical Coordinator for environmental SRMs such as SRM 2704 (Buffalo River Sediment), SRM 8400 (Sludge), and SRM 2709, 2710, 2711 (Soils).
- Member, ASTM D-19 committee on water (1977-91)
- As scientific advisor to CSTL director, coordinated multi-million dollar environmental science budget initiative at NIST for FY95 and wrote the director’s speech on lead work at NIST made to a congressional committee
- Participant, Interagency Environmental Technologies Exports Working Group, which prepared a report for the White House on how the US government can enhance development and exports of environmental technology: *Environmental Technologies Exports: Strategic Framework for U.S. Leadership* (November 1993)
- Participant, Subcommittee on Environmental Technology, Committee on Earth and Environmental Sciences, Federal Coordinating Council on Science and Engineering Technology (FCCSET) (1993)
- Participant, Subcommittee for Technology and Engineering Research, Committee on the Environment and Natural Resources, National Science and Technology Council (NSTC) (1994)

- Member, Advisory Panel, EPA - Lead Paint Poisoning Abatement Program (1990-93)
- Coordinated student groups evaluating the presence of radon, lead and other toxic heavy metals on the Hood College and Mount St. Mary's University Campuses.

Clinical Activities

- Research (collaboration with the FDA) to develop standards for microscopic immunofluorescence (1987)
- Consultant to the Experts Panel on Instrumentation of the International Federation of Clinical Chemists (1977-79)
- Co-author on Provisional Guidelines for Listing Specifications of Flame Emission and Atomic Absorption Spectrometers, *Clin. Chim. Acta*, 122, 111F (1982)
- Involved in the development and analysis of Clinical Reference Methods and Standard Reference Materials for blood, urine and tissue.
- Member, Subcommittee on Control of Preanalytical Variation in Trace Metal Analysis, National Committee for Clinical Laboratory Standards (1992-94)

Research Interests:

Archaeological chemistry; Forensic chemistry; Environmental chemistry; Improving the accuracy, sensitivity, and precision of spectrochemical methods of analysis; flow-injection technology; automation, control and miniaturization of analytical instrumentation; environmental and clinical analysis; computer-aided chemical education; ethics training in the sciences.

Archival Publications (reviewed publications in major journals):

- 1) Automatic Correction System for Light Scatter in Atomic Fluorescence Spectrometry, T. C. Rains, M. S. Epstein and O. Menis, *Anal. Chem.*, **46**, 207 (1974).
- 2) Determination of Cadmium and Zinc in Standard Reference Materials by Atomic Fluorescence Spectrometry with Automatic Scatter Correction, M. S. Epstein, T. C. Rains and O. Menis, *Can. J. Spectrosc.*, **20**, 22 (1975).
- 3) Improvements in Repetitive Scanning Techniques for Reducing Spectral Interferences in Flame Emission Spectrometry, M. S. Epstein and T. C. O'Haver, *Spectrochim. Acta*, **30B**, 135 (1975).
- 4) Evaluation of a Xenon-Mercury Arc Lamp for Background Correction in Atomic Absorption Spectrometry, M. S. Epstein and T. C. Rains, *Anal. Chem.*, **48**, 528 (1976).
- 5) Wavelength Modulation for Background Correction in Graphite Furnace Atomic Emission Spectrometry, M. S. Epstein, T. C. Rains and T. C. O'Haver, *Appl. Spectrosc.*, **30**, 324 (1976).
- 6) Waveform Effects in Wavelength Modulation Spectrometry, T. C. O'Haver, M. S. Epstein and A. T. Zander, *Anal. Chem.*, **49**, 458 (1977).
- 7) Determination of Barium in Calcium Carbonate Rocks by Carbon Furnace Atomic Emission Spectrometry, R. C. Hutton, J. M. Ottaway, T. C. Rains and M. S. Epstein, *Analyst*, **102**, 429 (1977).
- 8) Emission Spectra of Molecules Observed During Carbon Furnace Atomization, R. C. Hutton, J. M. Ottaway, M. S. Epstein and T. C. Rains, *Analyst*, **102**, 658 (1977).
- 9) A Timing Circuit to Monitor Baseline Absorbance Using the AS-1 Graphite Furnace Auto-Sampling System, M. S. Epstein, *At. Abs. Newslett.*, **16**, 75 (1977).
- 10) Determination of Several Trace Metals in Simulated Fresh Water by Graphite Furnace Atomic Emission Spectrometry, M. S. Epstein, T. C. Rains, T. J. Brady, J. R. Moody and I. L. Barnes, *Anal. Chem.*, **50**, 874 (1978).
- 11) The Direct Determination of Barium in Sea and Estuarine Water by Graphite Furnace Atomic Spectroscopy, M. S. Epstein and A. T. Zander, *Anal. Chem.*, **51**, 915 (1979).
- 12) Fluorescence Ratio of the Two D Sodium Lines in Flames for D1 and D2 Excitation, N. Omenetto, M. S. Epstein, J. D. Bradshaw, S. Bayer, J. J. Horvath and J. D. Winefordner, *J. Quant. Spectrosc. Radiat. Transfer*, **22**, 287 (1979).
- 13) Some Diagnostic and Analytical Studies of the Inductively-Coupled Plasma by Atomic Fluorescence Spectrometry, N. Omenetto, S. Nikdel, J. D. Bradshaw, M. S. Epstein, R. D. Reeves and J. D. Winefordner, *Anal. Chem.*, **51**, 1521 (1979).
- 14) Inductively-Coupled Argon Plasma as an Excitation Source for Flame Atomic Fluorescence Spectrometry, M. S.

- Epstein, S. Nikdel, N. Omenetto, R. D. Reeves, J. D. Bradshaw and J. D. Winefordner, *Anal. Chem.*, **51**, 2071 (1979).
- 15) Inductively-Coupled Argon Plasma as an Excitation Source for Flame Atomic Fluorescence Spectrometry, M. S. Epstein, N. Omenetto, S. Nikdel, J. D. Bradshaw and J. D. Winefordner, *Anal. Chem.*, **52**, 284 (1980).
- 16) Atomic and Ionic Fluorescence Spectrometry with Pulsed Dye Laser Excitation in the Inductively-Coupled Plasma, M. S. Epstein, S. Nikdel, J. D. Bradshaw, M. A. Kosinski, J. N. Bower and J. D. Winefordner, *Anal. Chim. Acta*, **113**, 221 (1980).
- 17) Application of Laser-Excited Atomic Fluorescence Spectrometry to the Determination of Iron, M. S. Epstein, S. Bayer, J. D. Bradshaw, E. Voigtman and J. D. Winefordner, *Spectrochim. Acta*, **35B**, 233 (1980).
- 18) Application of Laser-Excited Atomic Fluorescence Spectrometry to the Determination of Nickel and Tin, M. S. Epstein, J. D. Bradshaw, S. Bayer, J. Bower, E. Voigtman and J. D. Winefordner, *Appl. Spectrosc.*, **34**, 372 (1980).
- 19) Precision and Linearity of Determinations at High Concentrations in Atomic Absorption Spectrometry with Horizontal Rotation of the Burner, M. S. Epstein and J. D. Winefordner, *Talanta*, **27**, 177 (1980).
- 20) ATOMIC ABSORPTION SPECTROSCOPY, G. D. Christian and M. S. Epstein, American Chemical Society Audio Course, ACS, Washington DC (1980).
- 21) Comparison of Nebulizer-Burner Systems for Laser-Excited Atomic Fluorescence Flame Spectrometry, J. J. Horvath, J. D. Bradshaw, J. N. Bower, M. S. Epstein and J. D. Winefordner, *Anal. Chem.*, **53**, 6 (1981).
- 22) Wavelength-Modulated, Continuum-Source Excited Atomic Fluorescence Spectrometric System for Wear Metals in Jet Engine Lubricating Oils Using Electrothermal Atomization, T. F. Wynn, P. Clardy, L. Vaughn, J. D. Bradshaw, J. N. Bower, M. S. Epstein and J. D. Winefordner, *Anal. Chim. Acta*, **124**, 155 (1981).
- 23) Performance Characteristics of a Continuum-Source Echelle Wavelength-Modulated Atomic Absorption Spectrometer, J. D. Messman, M. S. Epstein, T. C. O'Haver and T. C. Rains, *Anal. Chem.*, **55**, 1055 (1983).
- 24) Determination of Ultratrace Levels of Lead in Reference Fuels by Graphite Furnace Atomic Absorption, M. S. Epstein, *At. Spectrosc.*, **4**, 62 (1983).
- 25) Summary of the Usefulness of Signal-to-Noise Treatment in Analytical Spectrometry, M. S. Epstein and J. D. Winefordner, *Prog. Analyt. Atom. Spectrosc.*, **7**, 67 (1984).
- 26) Investigation of a Precise Static Leach Test for the Testing of Simulated Nuclear Waste Materials, H. M. Kingston, D. J. Cronin and M. S. Epstein, *Nuclear and Chemical Waste Management*, **5**, 3 (1984).
- 27) Application of Atomic Absorption and Plasma Emission Spectrometry for Environmental Analysis, T. C. Rains, R. L. Watters, Jr. and M. S. Epstein, *Environment International*, **10**, 163 (1984).
- 28) Evaluation of a Direct-Current Argon Plasma as a Primary Pseudo-Continuum Radiation Source for Wavelength Modulated Atomic Absorption Spectrometry, J. D. Messman, T. C. O'Haver, and M. S. Epstein, *Anal. Chem.*, **57**, 416 (1985).
- 29) Atomic Spectrometric Methods, J. D. Winefordner and M. S. Epstein, Chapter 3 in PHYSICAL METHODS OF CHEMISTRY: VOL. IIIA - DETERMINATION OF CHEMICAL COMPOSITION AND MOLECULAR STRUCTURE - PART A, B. W. Rossiter and J. F. Hamilton, Eds., John Wiley and Sons, NY, 1987.
- 30) Comparison of Detection Limits in Atomic Spectroscopic Methods of Analysis, M. S. Epstein, Chapter 6 in DETECTION IN ANALYTICAL CHEMISTRY: Importance, Theory, and Practice, ACS Symposium Series 361, L. Currie, ed., American Chemical Society, Washington DC, 1987.
- 31) Determination of Phosphorus in Copper-Based Alloys Using Ion-Exchange Chromatography and Direct-Current Plasma Emission Spectrometry, M. S. Epstein, W. F. Koch, K. S. Epler, and T. C. O'Haver, *Anal. Chem.*, **59**, 2872 (1987).
- 32) Application of a ND:YAG Laser-Pumped Dye Laser to the Determination of Nickel in River Sediment Using Nonresonance Flame Atomic Fluorescence Spectrometry, M. S. Epstein, G. C. Turk, and J. C. Travis, *JAAS*, **3**, 523 (1988).
- 33) Precision of Wavelength-Modulated Atomic Absorption Measurements of High Calcium Concentrations in a Nitrous Oxide-Acetylene Flame, J. D. Messman, T. C. O'Haver, and M. S. Epstein, *Anal. Chem.*, **60**, 2707 (1988).
- 34) Luminescence Standards for Macro- and Microspectrofluorimetry, R. A. Velapoldi and M. S. Epstein, Chapter 7 in LUMINESCENCE APPLICATIONS in Biological, Chemical, Environmental, and Hydrological Sciences, M. C. Goldberg, ed, American Chemical Society, Washington, DC, 1989.
- 35) A New River Sediment Standard Reference Material, M. S. Epstein, B. I. Diamondstone and T. E. Gills, *Talanta*, **36**, 141 (1989).
- 36) Automated Slurry Sample Introduction for Analysis of a River Sediment by Graphite Furnace Atomic Absorption Spectrometry, M. S. Epstein, G. R. Carnrick, W. Slavin and N. J. Miller-Ihli, *Anal. Chem.*, **61**, 1414 (1989).
- 37) The Independent Method Concept for Certifying Chemical-Composition Reference Materials, M. S. Epstein,

- Spectrochim. Acta*, **46B**, 1583 (1991).
- 38) Definitive Measurement Methods, J. R. Moody and M. S. Epstein, *Spectrochim. Acta*, **46B**, 1571 (1991).
- 39) The Determination of Low Concentrations of Sodium in Cement By Flame Emission Spectrometry Without Sample Preparation, M. S. Epstein and T. A. Rush, *Applied Spectrosc.*, **45**, 1568 (1991).
- 40) Better Blood Through Chemistry: A Laboratory Replication of a Miracle, M. S. Epstein and L. Garlaschelli, *Journal of Scientific Exploration*, **6**, 233 (1992).
- 41) Determination of Mercury in a Zinc Ore Reference Material using Flow Injection and Atomic Absorption Spectrometry, R. Saraswati, C. Beck, and M. S. Epstein, *Talanta*, **40**, 1477 (1993).
- 42) A Spectral Interference in the Determination of Arsenic in High-Purity Lead and Lead-Base Alloys using Electrothermal Atomic Absorption Spectrometry and Zeeman-Effect Background Correction, M. Epstein, G. Turk, and L. Yu, *Spectrochim. Acta*, **49B**, 1681 (1994).
- 43) Application of a Novel Slurry Furnace AAS Protocol for Rapid Assessment of Lead Environmental Contamination, M. Epstein, S. Smith, and J. Breen, Chapter 30 in *Lead Poisoning: Exposure, Abatement, Regulation*, J.J. Breen and C.R. Stroup, eds., CRC Press, Boca Raton, FL, 1995.
- 44) The Critical Role of Analytical Science in the Study of Anomalies, M. Epstein, *Journal of Scientific Exploration*, **9(1)**, 63 (1995).
- 45) Using Bad Science To Teach Good Chemistry”, *Journal of Chemical Education*, **75**, 1399-1404, Nov 1998
- 46) Evaluation of the precision and accuracy of an automated sample introduction accessory for the flame atomic absorption spectrometric measurement of calcium in serum”, *Talanta*, **47**, 95-102, 1998 (co-author with Mount Saint Mary’s College students Margaret Bullard and Bradley Buehler)
- 47) Myocardial protection during ventricular fibrillation by reduction of proton-driven sarcolemmal sodium influx”, *J. Lab. Clin. Med.*, Vol 137, 1, 2001. (co-author)
- 48) Persistent Organochlorine Pollutants and Elements Determined in Tissues of Rough-Toothed Dolphins Banked from a Mass Stranding Event, NISTIR, August 2001 (co-author)
- 49) Concentrations of Polychlorinated Biphenyls (PCB’s), Chlorinated Pesticides, and Heavy Metals and Other Elements in Tissues of Belugas, *Delphinapterus leucas*, from Cook Inlet, Alaska, *Marine Fisheries Review*, **62(3)**, 2000. (co-author)
- 50) What Were They Drinking? A Critical Study of the Radium Ore Revigator, M. Epstein, D. Miles, and L. Yu, *Applied Spectrosc.*, **63**, 1406 (2009).
- 51) The SRM Effect, M. Epstein *Talanta*, **80**, 1467 (2010).
- 52) Herod Agrippa I and II Coins: Attribution Using X-Ray Fluorescence and Lead Isotope Ratio Analyses, M. Epstein, D. Hendin, L. Yu, and N. Bower, *Applied Spectrosc.*, **64**, 384 (2010).
- 53) “Biblical” bronze coins: new insights into their timing and attribution using copper and lead isotopes”, N. Bower, D. Hendin, C. Lundstrom, M. Epstein, A. Keller, A. Wagner, and Z. White, *Archaeology and Anthropological Science*, December 2012.
- 53) Dynamic Headspace Analysis of Alcoholic Beverages Using an Inexpensive Portable Breathalyzer, M. Epstein, R. Potter, and D. Miles (in revision)

Non-Archival Publications

- 1) Wavelength Modulation for Background Correction and Signal-to-Noise Ratio Enhancement in Emission Spectrometry, M. S. Epstein, Ph. D. Dissertation, University of Maryland, College Park, MD (1976).
- 2) The Preparation and Analysis of a Trace Elements in Water Standard Reference Material, J. R. Moody, H. L. Rook, P. J. Paulsen, T. C. Rains, I. L. Barnes and M. S. Epstein, *Proceedings of the 8th Materials Research Symposium*, National Bureau of Standards, Washington DC (1977).
- 3) A Comparison of Factors Affecting Accuracy in Atomic Emission and Atomic Absorption Spectrometry Using a Graphite Furnace for Trace Element Analysis in Water, M. S. Epstein, T. C. Rains and T. C. O'Haver, *Proceedings of the 8th Materials Research Symposium*, National Bureau of Standards, Washington DC (1977).
- 4) Book Review - *Trace Analysis: Spectroscopic Methods for Elements*, M. S. Epstein, *Appl. Optics*, **16**, 9 (1977).
- 5) Correspondence Concerning the Application of Wavelength Modulation to the Inductively-Coupled Argon Plasma, M. S. Epstein, *ICP Info. Newslett.*, **3**, 360 (1978).
- 6) Provisional Guidelines for Listing Specifications of Flame Emission Spectrometers, G. Bechtler, M. S. Epstein, T. D. Geary, W. Havemann and P. Attoe, *Clin. Chim. Acta*, **122**, 111F (1982).
- 7) Provisional Guidelines for Listing Specifications of Atomic Absorption Spectrometers, M. S. Epstein, T. D. Geary, G. Gower, W. Tausch, K. J. Mills and D. Pelt, *Clin. Chim. Acta*, **122**, 117F (1982).
- 8) An Examination of the MCC-1 Leach Test Method, Part 2: Experimental Technique, H. M. Kingston, D. J. Cronin and M. S. Epstein, *Proceedings of the Workshop on the Leaching Mechanisms of Nuclear Waste Forms*, Gaithersburg, MD (1982).
- 9) Automation and Application of a Direct Current Plasma Emission Spectrometer, M. S. Epstein, R. E. Jenkins, K. S. Epler, and T. C. O'Haver, *Proceedings of the Symposium on Accuracy in Trace Analysis - Accomplishments, Goals and Challenges*, *J. Res. Nat. Bur. Stand.*, **93**, 458 (1988).
- 10) A New River Sediment Standard Reference Material, M. S. Epstein, B. I. Diamondstone, T. E. Gills and J. R. Adams, *Proceedings of the Symposium on Accuracy in Trace Analysis - Accomplishments, Goals and Challenges*, *J. Res. Nat. Bur. Stand.*, **93**, 234, (1988).
- 11) Book Review - *Separation and Spectrophotometric Determination of Elements*, M. S. Epstein, *Anal. Chem.*, **60**, 631A (1988).
- 12) Living with Radon, Part II, M. S. Epstein and H. Smeller, *DEAIHA Newslett.*, **4**, 3 (1988).
- 13) Book Review - *Lasers: Principles and Applications*, M. S. Epstein, *Anal. Chem.*, **61**, 658A (1989).
- 14) Reference Materials, M. S. Epstein, *Amer. Lab.*, March 1990, pp 112-113.
- 15) Skeptics Visit the Not-So-Amazing World of Kreskin, M. S. Epstein, *Skeptical Eye*, **5/1**, 1 (1991).
- 16) A Look at Our Scientific Future: Judging a Science Fair for NCAS, M. S. Epstein, *Skeptical Eye*, **5/1**, 10 (1991).
- 17) A Cure for I.N.S. Phobia: Adoption Finalization and Naturalization, M. S. Epstein, *Thursday's Child*, Spring 1991, p 8.
- 18) What Color is Love: Interracial Adoption, M. S. Epstein, *Thursday's Child*, Spring 1991, p 10.
- 19) SIXTY MINUTES Profiles Rumania Adoptions, M. S. Epstein, *Thursday's Child*, Spring 1991, p. 14.
- 20) Determination of Transition Metals in Aluminum Fluoride using Zeeman electrothermal AAS and Slurry Sample Introduction, Final Report on NRL Contract Research, March 1991.
- 21) PREFACE to Special Issue of *Spectrochimica Acta B* on Reference Materials, M. S. Epstein and W. Slavin, *Spectrochim. Acta*, **46B**, 1569 (1991).
- 22) Lost Boys, Wicked Stepmothers, and Hatching Eggs ... A Look at Adoption in Children's Literature, M. S. Epstein, *Thursday's Child*, Fall 1991, pp. 18.
- 23) Critical Thinking, Anomalies, and Science Fairs, M. S. Epstein, *The Explorer (SSE)*, **Vol. 8**, No. 1, Winter 1992, p. 8.
- 24) Debunking the Satanic Panic, M. S. Epstein, *Skeptical Eye*, **6/1**, 1 (1992).
- 25) Better Blood Through Chemistry, M. S. Epstein, *Skeptical Eye*, **6/2**, 1 (1992).
- 26) Book Review - *The Vatican, The Law, and the Human Embryo*, M. S. Epstein, *Perspectives on Science and Christian Faith*, **45**, 144 (1993).
- 27) The Skeptical Perspective, M. S. Epstein, *Journal of Scientific Exploration*, **6**, 213 (1992).
- 28) The Skeptical Perspective, M. S. Epstein, *Journal of Scientific Exploration*, **6**, 307 (1992).
- 29) Book Review - *Beyond the Body: An Investigation of Out-of-the-Body Experiences*, M. S. Epstein, *Journal of Scientific Exploration*, **6**, 401 (1992).
- 30) Eye on Local Groups, M. S. Epstein, *Skeptical Eye*, **6/4**, 5, (1992).
- 31) Scientific Exploration: The 1992 Meeting of the SSE and a Visit to the PEAR Lab, M. S. Epstein, *Skeptical Eye*, **6/4**, 5, (1992).

- 32) The Skeptical Perspective, M. S. Epstein, *Journal of Scientific Exploration*, **7**, 15 (1993).
- 33) Reply to Cooper on Better Blood Through Chemistry, M. S. Epstein and L. Garlaschelli, *Journal of Scientific Exploration*, **7**, 90 (1993).
- 34) The Skeptical Perspective, M. S. Epstein, *Journal of Scientific Exploration*, **7**, 111 (1993)
- 35) The Skeptical Perspective, M. S. Epstein, *Journal of Scientific Exploration*, **7**, 311 (1993).
- 36) Creationist Missteps -The Paluxy River Footprints, M. S. Epstein, *Skeptical Eye*, **7/2**, 10, (1993).
- 37) Sir Arthur Conan Doyle: Skeptic at Heart, Believer in Spirit, M.S. Epstein, *Skeptical Eye*, **7/3**, 8, (1993).
- 38) From the Archives: Skeptical Activities Around the World, M. S. Epstein, *Skeptical Eye*, **7/4**, 14, (1993).
- 39) Barney Speaks Out on Dinosaur and Human Coexistence, M. S. Epstein, *Skeptical Eye*, **7/4**, 15, (1993).
- 40) Helping Hands? A Look at Facilitated Communication, M. S. Epstein, *Skeptical Eye*, **7/4**, 18, (1993).
- 41) The Skeptical Perspective, M. S. Epstein, *Journal of Scientific Exploration*, **7**, 435 (1993).
- 42) Comments on Biological Transmutation of Elements, M. S. Epstein, *Journal of Scientific Exploration*, **7**, 446 (1993).
- 43) Personal Profile - Dr. Willie E. May, M.S. Epstein, *Chemical Science and Technology Laboratory Update*, March 1993.
- 44) Past Life Regression - Chemistry at NBS, M.S. Epstein, *Chemical Science and Technology Laboratory Update*, March 1993.
- 45) Book Review - *Betrayers of the Truth: Fraud and Deceit in the Halls of Science*, M.S. Epstein, *Chemical Science and Technology Laboratory Update*, March 1993.
- 46) Getting the Lead Out, M.S. Epstein, *Chemical Science and Technology Laboratory Update*, April 1993.
- 47) Hoover's Commerce, M.S. Epstein, *Chemical Science and Technology Laboratory Update*, April 1993.
- 48) Looking Back: A History of NBS/NIST, M.S. Epstein, *Chemical Science and Technology Laboratory Update*, April 1993.
- 49) Book Review - *Maybe Yes, Maybe No: A Guide for Young Skeptics*, M.S. Epstein, *Chemical Science and Technology Laboratory Update*, Summer 1993.
- 50) Book Review - *The Short Life and Weird Times of Cold Fusion*, M.S. Epstein, *Chemical Science and Technology Laboratory Update*, Autumn 1994.
- 51) The Skeptical Perspective, M. S. Epstein, *Journal of Scientific Exploration*, **8**, 125, (1994).
- 52) Another Opinion on the Experimental Reexamination of the Law of Conservation of Mass in Chemical Reactions, M. S. Epstein and J. E. Himes, *Journal of Scientific Exploration*, **8**, 251, (1994).
- 53) The Skeptical Perspective, M. S. Epstein, *Journal of Scientific Exploration*, **8**, 275, (1994).
- 54) The Skeptical Perspective, M. S. Epstein, *Journal of Scientific Exploration*, **8**, 403, (1994).
- 55) Book Review - *The Cult Experience*, M. S. Epstein, *Perspectives on Science and Christian Faith*.
- 56) Our Lady of Akita, M. S. Epstein, *Skeptical Eye*, **8/1**, 18, (1994).
- 57) Book Review - Looking for a Miracle: Weeping Icons, Relics, Stigmata, Visions and Healing Cures, M. S. Epstein, *Skeptical Eye*, **8/2**, 18, (1994).
- 58) Book Review - *A History of the Paranormal*, M. S. Epstein, *Journal of Scientific Exploration*, **9**, (1995).
- 59) Reply to Volkammer on the Experimental Reexamination of the Law of Conservation of Mass in Chemical Reactions, M. S. Epstein and J. E. Himes, *Journal of Scientific Exploration*, **9**, (1995).
- 60) History of Spectroscopy: N-Rays, Real or Imaginary?, M. S. Epstein, *The SAS Spectrum*, **23/1**, 32 (1996).
- 61) Spectroscopist Profile: Remembering Louis Owen, M. S. Epstein, *The SAS Spectrum*, **23/1,2** (1996).
- 62) Resources for Teaching Youngsters the Scientific Method, M. S. Epstein, *The SAS Spectrum*, **23/1**, 30 (1996).
- 63) History of Spectroscopy: The Allison Effect, The Magneto-Optic Method of Spectrochemical Analysis, M. S. Epstein, *The SAS Spectrum*, **23/2**, 24 (1996).
- 64) Spectroscopist Profile: Bourdon Scribner, M. S. Epstein and Marvin Margoshes, *The SAS Spectrum*, **23/2**, 5 (1996)
- 65) Essay in *The Role of Religion in Catholic Science Education*, Proceedings of a Workshop on Religion and Academic Life, Mount Saint Mary's College, Emmitsburg, Md, 1996.
- 66) Spectroscopist Profile: John Dean, *The SAS Spectrum*, **24/1**, 5 (1997)
- 67) Book Review - *The Conscious Universe*, M. S. Epstein, *Journal of Scientific Exploration*, **12**, (1998).
- 68) Lecoq de Boisbaudran, The Unknown Spectroscopist, *The SAS Spectrum* (2000).
- 69) MIS-WIRED - The Return of Anomalous Water (with D. Miles), Newsletter of the James Randi Educational Foundation (2000).
- 70) Book Review - Contact the Other Side: Seven Methods for Afterlife Communication, *Journal of Scientific Exploration*, **15**, 2 (2001)

- 71) Book Review – *High Resolution Continuum Source Atomic Absorption Spectrometry*, *Applied Spectroscopy*, **59**, 189A (2005).
- 72) Examining Extrasensory Perception (ESP) in a Course on Physical Science, M. Epstein, *Skeptical Eye*, **20/1**, 16, (2009).

Talks or Conference Posters

- 1) Comparison of Atomic Absorption and Atomic Fluorescence Spectrometry with Automatic Scatter Correction as Analytical Techniques, Paper 1f, 15th Eastern Analytical Symposium, NY, 1973.
- 2) The Use of Repetitive Scanning Techniques for Reducing Spectral Interferences in Flame Emission Spectrometry, Paper 196, Pittsburgh Conference, 1974.
- 3) The Determination of Sulfur in Metal Alloys by Molecular Emission on a Carbon Cup Atomizer, Paper 143, Pittsburgh Conference, 1975.
- 4) Some Considerations for Precision and Accuracy for the Determination of Mercury in Standard Reference Materials by Cold-Vapor Atomic Absorption, FACSS, Indianapolis, IN, 1975.
- 5) Atomic Emission Spectrometry by Repetitive Scanning with a Carbon Furnace Atomizer, Paper 39, Pittsburgh Conference, 1976.
- 6) An Evaluation of Interferences in the Application of Wavelength Modulation Graphite Furnace Atomic Emission Spectrometry to Sample Analysis, FACSS, Philadelphia, PA, 1976.
- 7) The Influence of Emission and Absorption Line Shapes on Analytical Results using Graphite Furnace Atomic Spectroscopy, Paper 155, Pittsburgh Conference, 1977.
- 8) A Comparison of Factors Affecting Accuracy in Atomic Emission and Atomic Absorption Spectrometry using a Graphite Furnace for Trace Element Analysis in Water, 8th Materials Research Symposium, National Bureau of Standards, Washington DC, 1977.
- 9) The Application of Wavelength Modulation Techniques for Background Correction and Signal-to-Noise Ratio Enhancement in Emission Spectrometry, XX C.S.I. and 7th I.C.A.S., Prague, Czechoslovakia, 1977.
- 10) The Application of Wavelength Modulation to Emission Spectroscopy, Department of Chemistry, Strathclyde University, Glasgow, Scotland, 1977, (invited).
- 11) Evaluation of Techniques Used to Solve Background Correction Problems in Atomic Absorption Spectrometry Using Electrothermal Atomization, 12th ACS Middle Atlantic Regional Meeting, Baltimore, MD, 1978.
- 12) Future Developments in Atomic Absorption Spectrometry, Department of Chemistry, University of Florida, 1979 (invited).
- 13) Applications of ICAP-Excited Atomic Flame Fluorescence, FACSS, Philadelphia, PA, 1979 (invited).
- 14) Real Sample Analysis Using Laser-Excited Atomic Fluorescence Spectrometry: Fallacies, Fantasies, and Facts, FACSS, Philadelphia, PA, 1979 (invited).
- 15) An Evaluation of Noise Sources Which Limit Precision in the Optimum Analytical Range of Atomic Spectroscopic Methods, FACSS, Philadelphia, PA, 1980.
- 16) Some Developments in Atomic Absorption and Emission Spectroscopy at the National Bureau of Standards, Cincinnati Section, Society for Applied Spectroscopy, Cincinnati, OH, 1980 (invited).
- 17) Considerations for Obtaining the Utmost in Accuracy Using a DC Plasma, FACSS, Philadelphia, PA, 1981 (invited).
- 18) Analysis of Nuclear Waste Leachates for Trace Elements by Atomic Spectrometry: Problems and Solutions, FACSS, Philadelphia, PA, 1981 (invited).
- 19) Some Unique and Not-So-Unique Applications of Plasmas to Analytical Atomic Spectroscopy, Perkin-Elmer Corporation, Norwalk, CT, 1981 (invited).
- 20) Problems (and a Few Solutions) Using a DC Plasma/Echelle Spectrometer, Inorganic Analytical Research Division Seminar, National Bureau of Standards, 1981 (invited).
- 21) Aspects of Quality Control in the Use of a DC Plasma for the SRM Certification Process, Conference on Plasma Spectrochemistry, Orlando, FL, 1982 (invited).
- 22) Some Applications of Dye Lasers to Analytical Atomic Spectroscopy, Villanova University, Department of Chemistry Seminar, Villanova, PA, 1982 (invited).
- 23) Multi-Element Characterization of Simulated Nuclear Waste Leachates Using a DC Plasma, Paper 293, FACSS, Philadelphia, PA, 1982 (invited).
- 24) Laser-Excited AFS in Florida, Paper 100, FACSS, Philadelphia, PA, 1983 (invited).
- 25) Atomic Spectroscopy in the Certification of Reference Materials For Environmental Analysis, FACSS, Philadelphia, PA, 1984 (invited).
- 26) Evaluation of ND-YAG and Copper-Vapor Pumped Dye Lasers as Excitation Sources for Atomic Fluorescence Spectrometry FACSS, Philadelphia, PA, Paper 312, 1985 (invited).
- 27) Luminescent Microsphere Standards for Microspectrofluorimetry, Pittsburgh Conference, Atlantic City, NJ, Paper 592, 1986.

- 28) Evaluation of Uranyl-doped Glass Microspheres as Standards for Fluorescence Immunoassay, American Society for Microbiology Annual Meeting, Paper C-212, 1986.
- 29) Comparison of Detection Limits in Spectroscopic Methods of Analysis, ACS National Meeting, New York, NY, 1986 (invited).
- 30) The Certification and Use of Standard Reference Materials - An Analyst's Viewpoint, Cincinnati Society for Applied Spectroscopy, Cincinnati, OH, 1986 (invited).
- 31) Progress in the Development of a New River Sediment Reference Material, Symposium on Chemical and biological Characterization of Sediments, Cincinnati, OH, 1986.
- 32) A Scientific Bulletin Board System to Serve the Analytical and Spectroscopy Communities, Pittsburgh Conference, Atlantic City, NJ, March 9, 1987.
- 33) Automation and Application of a Direct-Current Plasma Emission Spectrometer, Symposium on Accuracy in Trace Analysis - Accomplishments, Goals and Challenges, Gaithersburg, MD, Paper WP6, Sept 1987.
- 34) Computer Communication and Information Services for the Scientist, Department of Chemistry and Biochemistry Seminar, University of Maryland, College Park, MD, Oct 1987. (invited)
- 35) Homogeneity Evaluation of Reference Materials Using Slurry Sampling for GFAAS, 72nd Canadian Chemical Conference, Paper 69, Victoria, BC, Canada, June 5, 1989. (invited)
- 36) The Independent Method Concept for Certifying Reference Materials: How Realistic?, Paper 369, FACSS XVI, Chicago, IL., Oct 3, 1989 (invited).
- 37) Advances in Slurry Sample Analysis, University of Florida, Department of Chemistry Seminar, Gainesville, FL., Nov 1989 (invited).
- 38) A Critical Examination of the Evidence for Life After Death, University of Maryland Honors Program, Issues in Critical Thinking, College Park, MD, Oct 1991 (invited).
- 39) Investigating Miracles, Eleventh Annual Meeting of the Society for Scientific Exploration, Princeton, NJ, June 1992.
- 40) Blood, Shroud, and Tears: Science Investigates Miracles, National Capital Skeptics Monthly Meeting, Falls Church, VA, July 1992 (invited).
- 41) Taking the Slurry-Sampling Method to the Limit ... Determining Ultratrace Constituents in High-Purity Materials, FACSS XIX, Philadelphia, PA, Sept 1992 (invited).
- 42) A Critical Examination of the Evidence for Life After Death, University of Maryland Honors Program, Issues in Critical Thinking, College Park, MD, Oct 1992 (invited).
- 43) Skepticism: Virtue or Vice?, Frederick Unitarian Fellowship, Frederick, MD, Dec 1992 (invited).
- 44) The Critical Role of Analytical Chemistry in the Investigation of Anomalies, 13th Annual Meeting of the Society for Scientific Exploration, Austin, TX, June 1994.
- 45) Application of a Novel Slurry Furnace AAS Protocol for Rapid Environmental Assessments, American Chemical Society Annual Meeting, Washington DC, August 23, 1994 (invited).
- 46) NIST and Collaborative Research: Following the Shifting Paradigm, Workshop on Funding a Research Program, FACSS XXI, St. Louis, MO, Oct 2, 1994.
- 47) The Lessons of Pathological Science: Misuse of Analytical Chemistry and Spectroscopy in Search of a Paradigm-Shift, Paper 366, FACSS XXI, St. Louis, MO, Oct 4, 1994.
- 48) Certification of a Mercury in Water Standard Reference Material, Paper 815, FACSS XXI, St. Louis, MO, Oct 7, 1994.
- 49) Slurry-Sample Introduction for Rapid Environmental Assessments using Graphite Furnace Atomic Absorption Spectrometry, Paper 819, FACSS XXI, St. Louis, MO, Oct 7, 1994.
- 50) Pathological Science: The Misuse of Analytical Chemistry and Spectroscopy, Baltimore-Washington Section of the Society for Applied Spectroscopy, Ft. Meade, MD, Nov 1, 1994 (invited).
- 51) Science Investigates Miracles, University of Maryland Honors Program, Issues in Critical Thinking, College Park, MD, Nov 6 1994 (invited).
- 52) Characterization of Bi-Pb-Sr-Ca-Cu Oxide Materials and Precursors Using Atomic Spectrometry: Achieving Better than 1% Precision and Accuracy, Wire Development Group Meeting, NIST, Gaithersburg, MD, March 6, 1995.
- 53) Facilitated Communication, National Capital Skeptics Monthly Meeting, Chevy Chase, MD, June 1995 (invited).
- 54) Don't Believe Everything You Read in the Scientific Literature, Department of Science Seminar, Mount Saint Mary's College, Emmitsburg, MD, Sept 29, 1995 (invited)
- 55) Science Investigates Miracles, University of Maryland Honors Program, Issues in Critical Thinking, College Park, MD, Oct 9, 1995 (invited).

- 56) A Rapid Survey Method for Evaluating Hazardous Levels of Lead In and Around Dwellings, FACSS XXII, Cincinnati, OH, Oct 19, 1995.
- 57) Using Anomalies to Teach Science, 15th Annual Meeting of the Society for Scientific Exploration, Charlottesville, VA, May 1996.
- 58) Using Pseudoscience to Teach Chemistry, FACSS XXIII, Kansas City, MO, Oct 1996.
- 59) Evaluating Methods to Improve the Speed and Accuracy of Atomic Absorption Determinations, FACSS XXIII, Kansas City, MO, Oct 1996.
- 60) Don't believe everything you read in the *scientific* literature, Department of Chemistry, University of Maryland, Oct 18, 1996 (invited).
- 61) Optimizing Methods of Calibration and Standardization in Atomic Spectrometry, Winefordner Award Symposium, Eastern Analytical Symposium, Somerset, NJ, Nov 1996 (invited).
- 62) Evaluating Developments for Enhancing Sample Introduction in Flame Atomic Absorption Spectrometry, Pittsburgh Conference, Atlanta, GA, March 1997.
- 63) Mainstreaming Quantitative Analysis: A View From Both Sides of the Fence, ACS Meeting, Boston, MA, August 1998.
- 64) Application of Internal Standardization in Fast Sequential Atomic Absorption, FACSS, Austin, TX, Oct 1998.
- 65) SAS: Forty Years of Leadership in Spectroscopy, FACSS, TX, Oct 1998.
- 66) Reference Methods for Serum Electrolytes: A New Approach, Pittsburgh Conference, March 1999.
- 67) Improving Precision and Accuracy in Flame Atomic Absorption Spectrometry (with D. Shrader), Pittsburgh Conference, March 1999.
- 68) The Use of Spectroscopic Data in Support of Bad Science, Chicago SAS Meeting, Chicago, IL, Dec 1999.
- 69) The Use and Misuse of Reference Material Certificate Values in the Chemical Literature, 8th International Symposium on Biological and Environmental Reference Materials, NIH, Bethesda, MD, September 2000.
- 70) Analysis of Radon Decay Kinetics (with D. Miles), 34th Middle Atlantic Regional ACS Meeting, June 2001.
- 71) Science and the Soul, Mount Saint Mary's College Department of Science Seminar, Nov 2001.
- 72) Solving a Numismatic Mystery: The Coin of Herod Agrippa I, Mount Saint Mary's College Student/Faculty Research Forum, April 2003 (with Megan Daschbach)
- 73) How and Why Should We Teach Chemistry for Non-Science Majors?, Winter 2004 CONFCEM, On-line conference organized by the ACS Division of Chemical Education's Committee on Computers in Chemical Education, January 2004
- 74) Using Spectrochemical Analysis to Solve an Ancient Numismatic Mystery, Pittsburgh Conference, March 2005.
- 75) When Radioactivity was Good: An Examination of the Radium Ore Revigator, Pittsburgh Conference, March 2005.
- 76) Fakes, Forgeries and Fourees: Some Numismatic Oddities Useful for Teaching Analytical Chemistry from a Forensic Perspective (with N. Bower, Colorado College), March 2005
- 77) Skepticism and Belief in Science and Nonsense: My two decades of travel through the wilderness, Meredith Science and Culture Dinner Speech, March 2005
- 78) A Chemical-Numismatic Analysis of Coins from the Holocaust (Sho'ah) – collaboration with N. Bower of Colorado College, Pike's Peak Chapter of Sigma Xi, May 2, 2005.
- 79) Teaching Skepticism in a Physical Science Class for Non-Science majors, National Capital Area Skeptics, Bethesda, Md, October 2005
- 80) Nobel Prize Seminar 2006: Physics, Mount Saint Mary's University, November 17, 2006.
- 81) Critical Thinking and the Use of Technology in the Classroom, July 27, 2007, NIST Summer Institute for Middle School Teachers.
- 82) "Leadership in Government, Industry, Academia and the Military" at the Student Leadership Development Series, November 5, 2008.
- 83) "What are the Reasonable Limits to Scientific Investigation?", J. H. Miles Honor Society Dinner and Discussion, November 19, 2008.
- 84) Critical Thinking and the Use of Technology in the Classroom, July 2009, NIST Summer Institute for Middle School Teachers.
- 85) Critical Thinking and the Use of Technology in the Classroom, July 2010, NIST Summer Institute for Middle School Teachers.

Community Activities

- Editor, Thursday's Child, Newsletter of the Montgomery County Chapter of Families Adopting Children Everywhere
- (FACE) (1990-1991)
- Delegate to the Governing Board of Central FACE (Families Adopting Children Everywhere) from the Montgomery County and Frederick County Chapters of FACE (1990-1991, 1993)
- Science Fair Judge in Frederick County, Montgomery County, Prince Georges County, Northern Virginia, and Washington DC at various times from 1971 - present.
- Religious Education Instructor, Saint Paul's Church, Damascus, Md, 5th and 6th grades (1991-1993) - Certification as
- Level I catechist, Archdiocese of Washington, June 1993; Saint Ignatius Church, Urbana, Md., First Eucharist instruction (1995); 3rd grade (1995-1996); 5th grade (2001)
- Member, American Legion
- Member, Vietnam Veterans of America

Reference Material Work

STANDARD REFERENCE MATERIALS ANALYZED

SRM Name	Years	SRM Numbers	Element(s) Measured
Trace Elements in Coal Fly Ash	1972, 73	1633	Cd, Hg
Trace Elements in Coal	1973, 75, 78	1632, 1632a, 1635	Hg, Mg, V, Ti, Cu
Mercury in Water	1974, 76	1641, 1642	Hg
Copper Benchmark	1974, 81, 82	394, 396, 398, 454, 498, 1251, 1252, 1252a, 1253, 1253a	Ag, Mn, Cd, Fe, Cd, Al, P, Mg, Ti, Zr
Mercury Coal	1975	1630	Hg
Orchard Leaves	1975	1571	Fe, Ni, As
Magnesium Gluconate Dihydrate	1975	929	Mg
Mercury in Urine	1975	2672	Hg
Trace Elements in Spinach	1975, 76	1570	Hg, Cu, Mn, Zn
Trace Elements in Tomato Leaves	1975, 76	1573	Hg, Cu, Mn, Zn
Trace Elements in Pine Needles	1975, 76	1575	Hg, Cu, Mn, Zn
Trace Elements in Water	1975, 76, 77	1643	Pb, Mn, Cd, Cr, Be, As, Se, Hg, Ba, Al, Mo, Cu, Ni
Urban Particulate Matter	1976, 77, 83	1648	Mn, Al, Ni, Fe, Zn, Pb, Cu, Cd
Trace Elements in Rice Flour	1977	1568	Na, Ca, K
Trace Elements in Wheat Flour	1977	1567	Na, Ca, K
River Sediment	1977, 81	1645	V, Hg, Mn, Co, Al, Mg
Trace Elements in Residual Fuel Oil	1977, 83	1634, 1634b	V, Na, Ni
Aluminum Alloy	1978	1258, 1259	Be, Cu, Fe, Mn, Ni, Ti, Zn
Blast Furnace Iron	1978	1144	Te
White Iron	1978	1147, 1174, 1174a	Te
Oyster Tissue	1978	1566	Hg, Rb, Mn, K, Cd, Ag, Ni, Fe
Steel (Cr-V) SAE6150	1979	30F	V
Lead on Filter Media	1979	2674	Pb
Bovine Liver	1979, 80, 82, 83	1577a	Cu, Fe, Mg, K, P, Al
Steel	1979, 82	6150 IPT	V, P, Al
Trace Elements in Water	1979, 82	1643a	Al, Fe, As, Zn
Alloy Cast Irons	1980	890, 890a, 891, 891a, 892, 892a	Zr
High Alloy Steels	1980, 81, 82	1287, 1287a, 1288, 1288a, 1289, 1289a	Zr, V, Ti, Zn, Al
Wear Metals in Oil	1980, 82, 82	1083, 1084, 1085	Al, Cu, Cr, Fe, Pb, Mg, Ni, Si, Ti, Sn, V
Estuarine Sediment	1981	1646	P, V
Reduced Iron Oxide	1982	691, 691a	Ti, Mn, P
Stainless Steel	1982	1151, 1151a, 1152, 1152a, 1153, 1153a, 1154, 1154a	Zn, Al
Special Ingot Irons/Low Alloy Steels	1982	1226, 1228, 1270, 1285, 1285a, 1286	Al
Reference Fuel/n-Heptane	1982	1815a	Pb
Reference Fuel/n-Isooctane	1982	1816a	Pb
Lead in Reference Fuel	1982, 86, 87	1636a, 1638b	Pb
Toxic Metals in Freeze-Dried Urine	1982, 83	2670	Ca, Cu, K, Ni, Zn, Mn
Inconels and Incolloys	1983	864, 865, 866, 867, 1244, 1246, 1247	Ti, Al, Co, Mn, Cu, Ni, Cr, Fe, As, Se
Trace Elements in Coal Fly Ash	1983	1633a	Al, Ba, Mn, e, Ca, Fe, K, Se, Sr, Ti, V
Non-Fat Milk Powder	1983	1549	Cu, Mn, P, Si, Sn
Trace Elements in Water	1983, 84	1643b	Zn, B, Ba, Be, Fe, Mn, Mo, Na, Ni, Sr
Quartz on Filter Media	1984	2679a	Si
Spectrometric Standard Solutions	1984	2123	Rb
Red Brick Clay	1984	679	Ti, Si, P, Fe, Al, Mg, Li, Ba, Sr, Na, Cr
Simulated Rainwater	1985	2694	Ca
Trace Elements in Rice Flour	1985, 86	1568a	Mg, Mn, P, Al, Fe
Trace Elements in Wheat Flour	1985, 86	1567a	Mg, Mn, P, Al, Fe
Trace Elements in Fly Ash	1985, 86	2689, 2690, 2691	Mg, P, Si
Trace Elements in Bovine Serum	1986	1598	K, Na, Mg, Ca
Thin Film Glass Standards	1986	2063	Si, Fe, Ca, Mg
Buffalo River Sediment	1986, 87, 88	2704	P, Si, Ca, Ni, Al, Fe, Cr, Mn, Mg, Na, K, Ba, V, S, Se, Co, As, Hg, Ti, U
Calcium 2-Ethylhexanoate	1988	1074b	Ca
Oyster Tissue	1988	1566a	Na, Mg, P, Ca, Mn, Fe, Cu, Zn, Sr
Lead in Blood	1988	955	Pb
Bullet Lead, Lead-based Alloy, High-Purity Lead	1988	C2416, C2417, C2418	As, Te, Sb
Portland Cement	1989	1884, 1885, 1886, 1887, 1888, 1889	Na, Al, Mg, Mn
Simulated Fused Clay	1989	1834	Ca
Wear Metals in Oil	1990, 91	1084, 1085a	Al, V
Trace Elements in Water	1990, 91	1643c	Al, V, Na, Zn, Ag, As, Be, Bi, Ca, Cd, Co, Cr, Li, Mn, Ni, Rb, Se, Te, B, Ba, Mo, Sr
Peach and Apple Leaves	1990, 91	1515, 1547	Pb, Si, Fe, Rb, P
Lead in Blood	1991	955a	Pb
Zinc-Sulfide Coated Filters	1991	2708	Zn
USGS River Water	1991	1037	Pb, Li
Soil	1990, 91	2709, 2710, 2711	Al, Ca, Fe, Ba, Cr, Mn, Sb, P, Ti
Spinach Leaves	1992	1570a	Hg, Na
Trace Elements in Fly Ash	1992	1633b	Hg, As, Cd, Lu, K, Mn, Na, Ni, Pb, Rb, Sb, Se,
Zinc Ore	1992	113b	Hg
Tomato Leaves	1992	1573a	Hg, Na
Mercury in Water	1993	1641c	Hg
Domestic Sewage Sludge	1993	2781	Hg
Industrial Sludge	1994	2782	Cr, Be
Petroleum Coke	1995	2718	Ca, Fe, Ni
JOAP Reference Oil	1995	Contract	Fe, As
Cr/Ni wafers	1996	2135	Cr, Ni
Spectrometric Standard Solutions	1996	31xx (discrepancy)	Na, Li, Ba, Ni
EPA/NHEXAS solutions	1996	Contract	As, Pb, Cr, Cd, Ni
Pb-contaminated soil	1997	2586, 2587	Hg, Pb, As, Cr
Trace Elements in Coal	1997	1632c	Hg
Lead in Bovine Serum	1997	955c	Pb

Served as Technical Champion (technical division coordinator) on following SRMs:

Rice and Wheat Flour - SRM 1567a, 1568a; Buffalo River Sediment - SRM 2704; Soil - SRMs 2709, 2710, 2711; Wear Metals in Oil - SRM 1084a, 1085a; Domestic Sludge - SRM 2781

Methodologies used: Hg analysis by cold-vapor atomic absorption spectrometry; As and Se using hydride generation atomic absorption spectrometry

Other elements by Direct Current Plasma Emission Spectrometry, Flame Emission Spectrometry, Atomic Absorption Spectrometry (flame or graphite furnace)