



Douglas K. Shaffer
Forensic Chemist

■ Education

Master of Science (Thesis) Chemistry, 1977
American University, Washington, DC

Bachelor of Science (*cum laude*) Chemistry, 1972
University of Maryland, College Park, MD

■ Professional Experience

Applied Forensics LLC

Forensic Chemist, July 2015 to present

Forensic analysis and testing of document materials including papers, inks, plastics, and determination of printing processes for authentication and linking of questioned documents. Testimony as expert witness in forensic document cases involving inks and paper chemistry.

University of Maryland University College (UMUC) Criminal Justice System (CCJS)

Adjunct Faculty Instructor, January 2014 to present

Classroom and online undergraduate instruction of Investigative Forensics courses and methodologies.

U.S. Department of Homeland Security (DHS), U.S. Immigration and Customs Enforcement (ICE), Homeland Security Investigations Forensic Laboratory (HSI-FL)

Physical Scientist, October 2006 to January 2014

Conduct analyses and testing of document materials for authentication and linking of travel and identity documents. Provided technical support to government and law enforcement agencies and oversight of the development of a multidisciplinary program to create a searchable database for printing inks.

Provided testimony as expert witness for cases involving inks and papers associated with travel documents.

**U.S. Department of Homeland Security (DHS), U.S. Secret Service (USSS)
Forensic Services Division (FSD), Washington, DC**

Document Analyst (Chemist), June 2003 to October 2006

Forensic examination of questioned documents for authenticity and/or comparison with known exemplars. Chemical characterization of document materials including papers, inks, plastics, printing processes and security features using analytical instrumentation. Training and instruction conducted in forensic examination of questioned documents. Provided courtroom testimony as expert witness in document cases involving ink and paper chemistry.

Maryland State Police Crime Laboratory

Forensic Chemist, January 1996 to June 2003

Forensic analysis of trace evidence including gunshot residue, hairs, fibers, paints and glass evidence materials. Development of gunshot residue study for the sampling of fabric materials using automated SEM/EDS analysis. Forensic analysis of controlled dangerous substances (drugs). Provided courtroom testimony as expert witness for trace and CDS evidential materials.

Lockheed Martin Laboratories

Materials Scientist, April 1983 to January 1996

Research and development of aerospace materials, including the analysis of corrosion and thermal protection systems for Space Shuttle External Tank. Failure analysis of a wide variety of materials, including structural aerospace components, energetic rocket propellants, printed microcircuits, medical prosthetic devices and historical (museum) artifacts. Development of novel nonchemical surface treatment for high temperature titanium adherends and conventional aluminum substrates, and a bondment evaluation technique for NASA solid-rocket motors (patent applications). Technical publications (20+).

■ **Forensic Publications**

Proc. Society of Photographic Instrumentation Engineers (SPIE), Scanning Microscopy Scanning Microscopy 2009 Conference, Monterey, CA (May 2009).
"Forensic Document Analysis Using Scanning Microscopy."

Proc. NIP24/DF2008 Int. Conf. on Digital Printing Technologies (September 2008)
pp. 777-80. *"Forensic Analysis and Databasing of Toners and Inkjet Inks Used in the Production of Fraudulent Documents."*

J. Forensic Sci., Vol. 51, No. 6, November 2006, pp. 1334-1343. "Analytical Methods Used for the Discrimination of Substances Suspected to be Bar Soap: A Preliminary Study."

J. Forensic Sci., Vol. 51, No. 3, May 2006, pp. 689-692. "An Evaluation of Matching Unknown Writing Inks with the United States International Ink Library."

SCANNING Journal, Vol. 26, No. 2, March - April 2004, pp. 65-66. "Applications of SEM/EDXA at the United States Secret Service."

SCANNING Journal, Vol. 21, No. 2, March - April 1999, pp. 99-100. "A Comparison of Particle Transfer Efficiencies of Two Collection Methods for the Identification of Gunshot Residue on Fabric Surfaces Using Scanning Electron Microscopy / Energy Dispersive Spectrometry (SEM/EDS)."

■ **Forensic Presentations**

"Ballistics Evidence in the JFK Assassination: Just the Facts", (A196), American Academy of Forensic Sciences 65th Annual Meeting, Washington, DC (February 2013).

"Analytical Techniques Used in the Examination of Security Documents", U.S. Bureau of Engraving and Printing, Product and Technology Directorate, Washington, DC (July 2012).

"Examination of Questioned Documents Using High Resolution Optical Microscopy and Scanning Electron Microscopy", Mid-Atlantic Association of Forensic Scientists (MAAFS) Annual Meeting, Ellicott City, MD (May 2012).

"Discrimination of Toners by Pyrolysis-Gas Chromatography Mass Spectrometry and Laser Induced Breakdown Spectroscopy", Mid-Atlantic Association of Forensic Scientists (MAAFS) Annual Meeting, Virginia Beach, VA (May 2011).

"Long-standing and Innovative Techniques used for Ink and Toner Examinations within a Forensic Document Laboratory", 6th EDEWG Conference: New Developments in Toner and Ink Examination", Dubrovnik, Croatia (September 2010).

"Evidential Value of Adhesives in Questioned Document Examinations", (J15), American Academy of Forensic Sciences 62nd Annual Meeting, Seattle, WA (February 2010).

"The Need for Research into the Analysis of Pigmented Printing Inks", (J18), American Academy of Forensic Sciences 62nd Annual Meeting, Seattle, WA (February 2010).

"Micro-analytical Techniques Used in Questioned Documents Examination", The Library of Congress (LC) Summit on Research/Technology Transfer (SORTT): Exchanges with Cultural Heritage Preservation, Washington, DC (September 2009).

"Forensic Document Analysis Using Scanning Microscopy", Society of Photographic Instrumentation Engineers (SPIE) Scanning Microscopy 2009 Conference, Monterey, CA (May 2009).

"Forensic Analysis of Toners and Printing Inks Used in the Production of Fraudulent Documents", 1st International Eurasian Congress of Forensic Sciences: "Fight Against Terrorism", Istanbul (October 2008).

"Forensic Analysis and Databasing of Toners and Inkjet Inks Used in the Production of Fraudulent Documents", NIP24 24th International Conference on Digital Printing Technologies, Pittsburgh, PA (September 2008).

"The Forensic Characterization of Toners and Printing Inks", (Q14), Mid-Atlantic Association of Forensic Scientists Annual Meeting, Huntington, WV (April-May 2008).

"Methods of Assessment of True, Simulated and Counterfeit Watermarks", (J29), [Co-Author], American Academy of Forensic Sciences 60th Annual Meeting, Washington, DC (February 2008).

"A Comparison of the Physical and Chemical Characterization of Conventional Toners vs. Chemically Prepared Toners", (J14), American Academy of Forensic Sciences 59th Annual Meeting, San Antonio, TX (February 2007).

"The Forensic Characterization of Envelopes for Questioned Document Examinations", Mid-Atlantic Association of Forensic Scientists Annual Meeting, Richmond, VA (May 2006).

"Forensic Analysis of Security Documents at the U.S. Secret Service", Northwest Forensic Investigators Association, Portland, OR (May 2006).

"The Characterization of Envelopes for Questioned Document Examinations", (J15), American Academy of Forensic Sciences 58th Annual Meeting, Seattle, WA (February 2006).

"Forensic Applications of SEM/EDS at the United States Secret Service", SCANNING 2004 Annual Meeting, Washington, DC (April 2004).

"A Comparison of Particle Transfer Efficiencies of Two Collection Methods for the Identification of Gunshot Residue on Fabric Surfaces Using Scanning Electron Microscopy/ Energy Dispersive Spectrometry", SCANNING '99 Annual Meeting, IL (April 1999).

■ Instruction

"Investigative Forensics", University of Maryland University College (UMUC) Criminal Justice System (CCJS), College Park, MD (Fall 2013 to present).

"Orientation Training: Physical Sciences Capabilities at ICE HIS-FL," HSI-FL, McLean, VA (2008-2014).

"Chemistry in the Forensic Sciences", Guest Lecturer – Career Opportunities in Chemistry, Department of Chemistry, University of Maryland, College Park, MD (2005-2013).

"Forensic Analysis of Document Materials: Inks and Paper", Guest Lecturer, The George Washington University, Department of Forensic Sciences, Washington, DC (2004-2006).

"Characterization of Inks and Papers in Questioned Documents", Federal Law Enforcement Training Center (FLETC), Glynco, GA (2005).

"Analysis of Trace Evidence", ABC Exam Prep Session, Mid-Atlantic Association of Forensic Scientists Annual Meeting, Annapolis, MD (2003).

"Careers in Forensic Science", Guest Lecturer, University of Maryland Career Development Center, College Park, MD (2000-2002).

"Gunshot Residue Evidence", Montgomery County State's Attorneys Office, Rockville, MD (2002).

"Gunshot Residue Analysis Workshop", Annapolis Police Department, Annapolis, MD (2000-2001).

"Criminalistics", Community College of Baltimore County/Essex Campus, Rosedale, MD (Spring 2000).

■ **Specialized Training**

"Appleton Paper Workshop", McLean, VA (March 2012).

"Photoshop CS-5 Training", McLean, VA (November - December 2010).

"Inkjet Printing and Printer Recognition", 6th EDEWG Conference: New Developments in Toner and Ink Examination", Dubrovnik, Croatia (September 2010).

"Electrophotographic Printing and Toner Analysis", 6th EDEWG Conference: New Developments in Toner and Ink Examination", Dubrovnik, Croatia (September 2010).

"Papermaking, Coating Fundamentals, and Media for Digital Printing", NIP25 and Digital Fabrication 2009 International Conference, Louisville, KY (September 2009).

"Desktop Ink Jet Products Performance Study", NIP25 and Digital Fabrication 2009 International Conference, Louisville, KY (September 2009).

"Printing Ink Technology: Paste Inks + Fluid Inks", National Printing Ink Research Institute (NPIRI) 2009 Summer Course, Appleton, WI (July 2009).

"Advanced Technology for Pressure Sensitive Adhesive Tapes", Tape University (Advanced), Pressure Sensitive Tape Council, Orlando, FL (May 2009).

"Scanning Microscopy in Forensic Science", Society of Photographic Instrumentation Engineers (SPIE) Scanning Microscopy (SPIE) Scanning Microscopy Workshop, Monterey, CA (May 2009).

"Security Printing Technical Presentations", IMI 5th Security Printing Conference, Baltimore, MD (November 2008).

"Fusing Technologies and Toner Materials Relationships", NIP24 and Digital Fabrication 2008 International Conference, Pittsburg, PA (September 2008).

"Organic Photoreceptors in Electrophotography", NIP24 and Digital Fabrication 2008 International Conference, Pittsburg, PA (September 2008).

"Industrial Inkjet Technology for Printing and Fabrication", NIP24 and Digital Fabrication 2008 International Conference, Pittsburg, PA (September 2008).

"Document Restoration", Folger Shakespeare Library and Conservation Laboratory, Washington, DC (January 2008).

"Preparing for Testimony in a Daubert Hearing", DHS U.S. Immigration & Customs Enforcement, McLean, VA (October 2007).

"Introduction to Toner Technology", NIP23 and Digital Fabrication 2007 International Conference, Anchorage, AK (September 2007).

"Colorant Chemistry", NIP23 and Digital Fabrication 2007 International Conference, Anchorage, AK (September 2007).

"Liquid Toner Printing: Technology and Applications", NIP23 and Digital Fabrication 2007 International Conference, Anchorage, AK (September 2007).

"Digital Technology, Security of Documents, and Brand Protection", NIP 23 and Digital Fabrication 2007 International Conference, Anchorage, AK (September 2007).

"Forensic Analysis using FT-IR Spectroscopy" and "Polymer Characterization using FT-IR Spectroscopy", PerkinElmer Training Center, Shelton, CT (April 2007).

"Ink Jet Manufacturing", IMI Digital Printing Summer Camp, Cambridge, MA (July 2006).

"Production of Chemically Prepared Toners", IMI Digital Printing Camp, Cambridge, MA (July 2006).

"Security Features in Documents", Workshop: MAAFS Annual Meeting, Richmond, VA (May 2006).

"Production of Counterfeit Documents: A Case History (A Case of Identity Theft Involving a Walk Through From the Crime Scene to the Courtroom)", Workshop: American Academy of Forensic Sciences, Seattle, WA (February 2006).

Fourier Transform Infrared (FTIR) Microscopy and Imaging Training, PerkinElmer Corp., Shelton, CT (May 2005).

"Questioned Documents Training Program", U.S. Secret Service (2004).

"High Performance Thin Layer Chromatography (HPTLC) Techniques", CAMAG Scientific, Inc., Wilmington, NC (October 2004).

"Ink Jet Examination Workshop", NEAFS Annual Meeting, Mystic, CT (September 2004).

"Counterfeit Detection Seminar", U.S. Secret Service, Washington, DC (August 2004)

"Printing Process Identification and Image Analysis for Forensic Document Examiners", Rochester Institute of Technology, Rochester, NY ((June 2004).

"Paper Fiber Analysis", Integrated Paper Services, Appleton, WI (September 2003).

"Forensic Analysis of Paints and Tapes", Federal Bureau of Investigation, Quantico, VA (June 2002).

"Forensic X-ray Spectroscopy", SCANNING Annual Meeting, NY (May 2001).

"Forensic Examination of Hairs", National Forensic Science Training Center, St. Petersburg (June 1999).

"Forensic SEM Applications", SCANNING Annual Meeting, IL (May 1999).

"Automated SEM/EDS Gunshot Residue Analysis", Oxford Instruments, Concord, MA (October 1998).

"Forensic Analysis of Textiles and Fibers", MAAFS/SEAFS Joint Meeting, Raleigh, NC (October 1996).

"DEA Forensic Chemist Drug Analysis Training", DEA Special Testing and Research Laboratory, McLean, VA (June 1996).

■ **Professional Affiliations**

American Academy of Forensic Sciences (AAFS), Criminalistics Section, Fellow [1997-2014]

Mid-Atlantic Association of Forensic Scientists (MAAFS) [1996-2014]

Society for Imaging Science and Technology (SIST) [2006-2014]

Society of Photographic Instrumentation Engineers (SPIE)/SCANNING [1999-2014]

American Chemical Society [inactive]

The Adhesion Society [inactive]

Society for Advancement of Materials & Process Engineering [inactive]

Chemical Society of Washington, DC [inactive]