

# Reliable, Relevant and Valid Forensic Science: Eleven Sections—One Academy

## The AAFS Questioned Documents Section Plays a Principal Role in the Substantiation of the Validity and Reliability of Forensic Document Examination

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In my experience, there are differing views on what encompasses the domain of a forensic document examiner. The American Society for Testing and Materials (ASTM) Standard Guide for Scope of Work of Forensic Document Examiners E444-09 describes an examiner as one who "... makes scientific examinations, comparisons, and analyses of documents in order to: (1) establish genuineness or non genuineness, or to expose forgery, or to reveal alterations, additions, or deletions, (2) identify or eliminate persons as the source of handwriting, (3) identify or eliminate the source of typewriting or other impressions, marks, or relative evidence, and (4) write reports or give testimony, when needed, to aid the users of the examiner's services in understanding the examiner's findings." Examples of examining identifying marks include those on photocopies, impressions from rubber stamps, and dry seals. An example of an examination for source is indentations in paper. The differentiation of inks is a common exam for document dating purposes. The work of those who claim personality and character assessment from handwriting is contrary to that of document examination.

As a charter section of the American Academy of Forensic Sciences, the Questioned Document Section has, as of this writing, 212 members, and we are pleased that we have several trainee affiliates among our ranks. Regarding training, the AAFS Questioned Document Section, along with the American Society of Questioned Document Examiners, and the American Board of Forensic Document Examiners, Inc., recognizes the ASTM Standard Guide for Minimum Training Requirements for Forensic Document Examiners E2388-05. This guide, published in 2005, established basic qualifications for trainees and trainers as well as an extensive listing of training topics. Forensic handwriting examination has been regarded as a valid and reliable expertise for over 100 years in U.S. courts through repeated admissibility, federal statute (1913 U.S. Statute), laws (*Frye* ruling (1923)), and the Federal Rules of Evidence (specifically Rule 901(b)(3)). As the Supreme Court's 1993 *Daubert* decision suggests, there are additional factors which may be applied to determine the reliability of an expertise. Applying these factors to forensic handwriting examination has resulted in over thirty-five successful federal *Daubert* decisions, and garnered twenty-four affirmations of admissibility by U.S. Appellate Courts.

The members of the forensic document examination discipline have addressed the *Daubert* factors as follows:

1. **Standards:** As mentioned, questioned documents utilizes ASTM as its publishing body for nationally

recognized standards. The committee dedicated to forensic science (E30), contains a subcommittee dedicated to forensic document examination (E30.02). This subcommittee was established in the early 1970s and has seen its membership grow continually, recently breaching the 230 mark. The E30.02 subcommittee, which includes forensic handwriting examination, has published more ASTM standards (18) than any other forensic discipline, with several additional standards ready for ballot. ASTM Standard E2290 - 03, the Standard Guide for the Examination of Handwritten Items, articulates the systematic method used for decades by FDEs in handwriting examinations. Development of these standards has been due in large part to the Scientific Working Group for Document Examiners (SWGDOC), which meets twice a year to draft and revise standard terminologies and guides. SWGDOC is comprised of both government examiners and private consultants.

Certification available since 1977 by the American Board of Forensic Document Examiners (ABFDE) determines whether a forensic document examiner candidate has satisfied the minimum standards of competency. ABFDE is accredited by the Forensic Specialties Accreditation Board (FSAB). The American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB) is an accrediting board of peers that determines whether a forensic laboratory complies with specific standards. ASCLD/LAB includes the inspection and accreditation of forensic document laboratory sections.

2. **Error Rate/Reliability:** Although no critical error rate in any forensic field has been substantiated, numerous studies conducted since the early 1990s have confirmed that FDEs are significantly more reliable than non-experts at reaching correct conclusions in the examination of handwriting, hand printing, and signatures, both natural and disguised (see Kam, JFS 1994 39: 5-14, JFS 1997, Vol. 42, No. 5 \*, JFS 2001 46: 884-888, JFS 2003 48: 1391-1395; Found, 2002 Vol. 47, No. 5). In fact, Kam \* found that non-experts are six times more likely to identify the wrong writer than an expert.

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3. **Testing of Basic Principles:** One of the basic principles of forensic handwriting examination is that no two persons with mature, individualized handwriting will share the same combination of handwriting characteristics. Studies that support this principle are:

- a. Studies of the handwriting of identical twins. There are at least three published studies, one involving 50 sets of identical twins (Beacom, MS, "A Statistical Study of Handwritings by Twins and Other Persons of Multiple Births," *Journal of Forensic Sciences*, (1960) 5: 121-131), one involving 58 sets of identical twins (Gamble, D.J., "The Handwriting of Identical Twins," *Canadian Society of Forensic Journal* (1980) 13: 11-30), and one involving 95 sets of twins (Boot, D., "An Investigation into the Degree of Similarity in the Handwriting of Identical and Fraternal Twins in New Zealand," *Journal of the American Society of Questioned Document Examiners* (1998) 70-81).

All of these works came to the same conclusion: with a sufficient amount of handwriting samples, it was always possible to distinguish the handwriting of identical and fraternal twins.

- b. The United States Secret Service (USSS) and The Federal Criminal Police Office of Germany (BKA) maintain databases known as the Forensic Information System for Handwriting (FISH), with the USSS version containing handwriting specimens from a combined 110,000+ writers. To date, no two writers have been found to have the same combination of handwriting characteristics.
- c. The Center of Excellence for Document Analysis and Recognition (CEDAR), at the State University of New York, continues to conduct studies using computer software to measure handwriting features. In a published study of over 1,500 writers (Srihari et al., 2002 *JFS*, Vol. 47, No. 4), the computer system was able to identify the correct writer with a 95% confidence level.
- d. A recent study utilized a group of writers from the same New York neighborhood and elementary school and concluded that forensic document examiners were able to ascertain inter-writer variation and identify significant characteristics towards identification. The examiners rendered definitive conclusions of authorship with an overall accuracy score of 98%. Durina, M. and Caligiuri, M.P., "The Determination of Authorship from a Homogenous Group of Writers," *Journal of the American Society of Questioned Document Examiners*, (2009) 12: 77-90

4. **Peer Review and Publication:** Numerous articles that address forensic document examinations have been published in the following peer-reviewed journals:

- *Journal of Forensic Sciences*
- *Journal of the American Society of Questioned Document Examiners*
- *International Journal of Forensic Document Examiners*
- *Canadian Society of Forensic Science Journal*
- *Journal of Forensic Identification*
- *Forensic Science International*
- *Journal of Police Science and Administration*
- *Journal of the Forensic Science Society*
- *Journal of Criminal Law and Criminology*

5. **General Acceptance in the Forensic Community:** Forensic handwriting examination was one of the original sections of the American Academy of Forensic Sciences and has had its own national organization, the American Society of Questioned Document Examiners (ASQDE), since 1942. It is an expertise that is provided in all major law enforcement organizations, and numerous state and local agencies.

Forensic document sections are also included in the following multi-discipline organizations:

- International Association of Identification (IAI)
- Mid-Atlantic Association of Forensic Scientists (MAAFS)
- Midwestern Association of Forensic Scientists (MAFS)
- Northeastern Association of Forensic Scientists (NEAFS)
- British and Canadian Forensic Science Societies

Forensic document examination is or has been a part of the curriculum taught at the following schools:

- The George Washington University
- Michigan State University
- John Jay College
- National University (San Diego)
- University of Alabama at Birmingham
- University of New Haven
- University of Central Oklahoma
- University of Illinois at Chicago
- Oklahoma State University

Research continues in our field and is being conducted in various areas of document examination, especially in the areas of ink and handwriting examination. Currently, there is additional research in the area of handwriting that is similar to Dr. Srihari's work using computer software to measure handwriting features. This extensive research, presented at the AAFS annual meeting, is called Forensic Language-Independent Analysis System for Handwriting Identification (FLASH-ID) and is being conducted by the FBI, George Mason University, and Gannon Technologies. FLASH-ID software performs

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critical assessments of handwriting features using graphemes. Thus far, the system has returned a significant matching rate on even short samples. As forensic document examiners and members of the AAFS, we endorse and promote on-going research, and encourage independent scientific groups to continue

their endeavors in the field. We are especially proud of the education gained through presentations and workshops conducted annually at the Academy's Annual Scientific Meeting. It is our hope that as education and technologies advance, new horizons in our discipline will be reached.

## Strengthening Forensics Through Dedicated Membership con't.

program. The dedication of these participants ensures the quality of forensic science laboratories around the world.

The Forensic Science Education Programs Accreditation Commission (FEPAC) brings standards, reliability, and quality assurance to forensic science education. In 2001, based upon recommendations by the National Institute of Justice, the Technical Working Group for education and training in forensic sciences (TWGED) was formed to establish national standards for forensic science education and to create minimum curriculum recommendations for forensic science degree programs. The members of the American Academy of Forensic Sciences, recognizing the significance of forensic science education, created FEPAC from the initial foundation of TWGED. FEPAC, utilizing the TWGED recommendations, created accreditation standards against which to assess forensic science degree programs. To date, 29 Forensic Education Programs across the United States and Canada have been accredited by the FEPAC.<sup>4</sup> The accreditation process involves a thorough review of the school's admissions, curriculum, and support services; on-site evaluations; and interviews with students and faculty. Coursework requirements include core natural science courses and specific forensic science courses, including quality assurance standards and ethics. The Members of FEPAC consist of an equal distribution of academicians and forensic practitioners to ensure a balanced program review.

**Valid** - Ongoing research and review of practices and procedures is the most effective method of ensuring valid forensic science practices. The American Academy of Forensic Sciences provides

several forums for demonstrating the validity of science and testing methods.

Over the past ten years, the Criminalistics Section averaged nearly 175 presentations during the scientific sessions of the AAFS Annual Scientific Meeting. The presentations cover a wide range of topics. Some broadly span the eleven sections of the Academy, many specific to the numerous subdisciplines of Criminalistics; all are an integral component of the scientific process. The oral and poster presentations allow for peer review of the science being conducted in crime labs and universities around the world. The setting of the scientific sessions allows researchers to present their ideas, results, and findings to an appropriate audience of peers, and to subject their work to comment and criticism.

Valid scientific research is crucial to the improvement of the field of forensic science. Ensuring the accuracy, reliability, and validity requires the scientific research to be subjected to a peer-review system. The dedication of the AAFS membership to the peer review process is evident in the composition of editorial board of the *Journal of Forensic Sciences*. Over 80 members of the Academy are on the editorial board and participate in the review of over 700 papers annually.

We have been very proactive in regulating our profession. It is up to us to demonstrate to the courts and the critics the progress made in *Strengthening Forensic Science* and ensuring that our work product is Relevant, Reliable, and Valid. By supporting all eleven sections and working as one Academy, we will achieve these goals.

1. Turner, William (1903), *History of Philosophy*, Ginn and Company, Boston, MA. See especially: Aristotle

2. <http://www.astm.org>

3. <http://www.asclt-lab.org>

4. [http://www.aafs.org/dcdefault.asp?section\\_id=resources&page\\_id=accredited\\_programs](http://www.aafs.org/dcdefault.asp?section_id=resources&page_id=accredited_programs)

## What Could Be More Relevant Than Forensic Toxicology? con't.

Forensic Science: Eleven Sections—One Academy” is so apropos because we as forensic toxicologists do not work alone. The need for our specialty is called upon by many of our fellow forensic scientists and practitioners: forensic pathologists performing their autopsies and trying to determine the cause and manner of death in their cases; lawyers litigating their cases involving potential impairment of an individual from drugs and/or ethanol; forensic psychiatrists determining if their patient is psychotic and/or under the influence of drugs; and criminal investigators determining if their case was a crime of drug facilitated sexual assault. In these and many others forensic examples, the cumulative product of the forensic sciences is only as strong as the individual parts provided by each of our disciplines. This is why it is so important that the principles of reliability and validity be applied to the ethical practice of all the forensic sciences. The American Academy of Forensic Sciences gives all of us such a platform in which to interact and to do just that.