

Preparing for a Daubert Hearing: A Study Guide for Forensic Document Examiners

Abstract:

The Daubert decision handed down in 1993 established five factors for the determination of the admissibility of scientific and technical expertise. The purpose of this paper is to help answer the question, “How do I prepare the attorney and myself for this hearing?” This paper builds on the wealth of information gathered by the Daubert group for forensic document examiners and provides direction on where to begin in the preparation process and what to study. There will be a discussion on how forensic document examinations meet the five Daubert factors and a section for how to prepare and assist the attorney. This paper will assist the examiner by providing a study guide for a successful Daubert hearing and include relevant information beyond the five factors.

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Introduction

The role of a judge as the gatekeeper in a court of law for the determination of the admissibility of scientific and technical expertise is now firmly entrenched into the laws of the United States of America. The 1993 decision in *Daubert v. Merrill Dow Pharmaceuticals, Inc.* proffered five suggested criteria that the judge should consider when determining the admissibility of scientific and technical expertise:

1. Whether the proffered theory or technique has been tested,
2. Whether there are established standards controlling the technique's operation,
3. Whether the theory or technique has been subjected to peer review and publication,
4. Whether the theory or technique has been acceptance within the relevant scientific and technical community, and
5. Whether there is a known or potential error rate.

When a forensic document examiner (FDE) is informed that a motion to suppress documentary evidence has been filed and a Daubert hearing has been scheduled, one of the first questions to answer is: "How do I prepare the attorney and myself for this hearing?"

There is currently a wealth of knowledge available to the FDE to prepare for a Daubert hearing. The forensic document community has been working diligently since 1993 to address how the discipline of forensic document examination and the FDE meet the five prongs of Daubert. However when the call to arms is issued, the FDE may not have a great deal of time to wade through the vast amount of information available. The purpose of this study guide is to give the FDE direction on where to begin in the preparation process, what to study in order to address the challenges in a Daubert hearing, and how to prepare the attorney.

This study guide was created as the result of the preparation by the authors that was required before the Daubert hearing in *State of Indiana v. Steven R. Farrell* held in Benton County, IN on October 19, 2010. The Daubert hearing for the forensic document examination occurred in conjunction with a Daubert hearing regarding the forensic firearms examination involved in this case.

The majority of the articles listed in this study guide are provided on the 2011 American Society of Questioned Document Examiners meeting DVD. If the articles and study guide below do not specifically address your case, then contact Jan Seaman Kelly (qdwatdog@aol.com) or Kathleen Storer (KathleenStorer@comcast.net) of the Daubert Group. The Daubert Group has the most current information. They also track hearings to keep current. Additionally, they have many articles on specific topics including (but not limited to):

- the Daubert case itself and subsequent case decisions (Kuhmo, Fuji, etc.)
- statistics, probability and frequency studies in FDE
- discussions on individuality and the handwriting comparison process
- discussions on expert witnesses, transcripts and the articles and responses to critics
- error rate discussions
- proficiency testing discussions
- the NAS report, responses and motions based on it.

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1. Where to Begin?

The FDE needs to first be prepared for the basic questions about forensic document examinations that may be asked in a Daubert hearing. Some of the answers will rely on the foundation provided in training about the forensic document examination process and how to provide effective testimony. This section briefly contains some introductory information and resources.

During the actual hearing, the FDE will still need to become qualified as an expert witness. The attorney should be provided a list of qualifying questions and a current Curriculum Vitae. The qualification questions should cover training, publications, presentations, professional memberships, and information regarding certification and accreditation, if applicable. The Daubert hearing is as much about the courts accepting the FDE as an expert as asking the court to accept the discipline of forensic document examination.

1.1. History and Basics

1.1.1. What is science, forensic science, and is handwriting identification a science?

An excellent place to start to answer this question is with the following article:

Casey Owens, Maureen. “Is Handwriting Identification a Science?”; Unpublished technical article; Presented at the 1968 American Society of Questioned Document Examiners Conference (QDAD #2597).

This article begins:

“Handwriting identification is a science because it contains a body of accepted knowledge, this body of knowledge is organized and systematized and is based upon the operation of general truths which enjoy universal acceptance by those qualified to understand their bases. It employs the concepts of the method of science in its general research and a scientific approach to its practical problems. It is constantly developing, it is research attempting to solve new problems which are presented to it, it is a continuous search for truth.” – Maureen Casey Owens

1.1.2. What is a Daubert hearing and how did it develop?

The article “Handwriting Evidence in Federal Court – From Frye to Kumho” offers a summary of the admissibility of handwriting expertise in the federal courts from Frye to Kumho.

Zlotnick, J. and Lin Jr. Handwriting Evidence in Federal Courts – From Frye to Kumho. Forensic Science Review 13:87; 2001.

Chapter 35 of the *Scientific Examination of Questioned Documents*, 2nd Ed. offers an excellent overview for addressing the five Daubert prongs.

Kelly, J.S and B. Lindblom, Editors, Scientific Examination of Questioned Documents, Second Edition, CRC Press, Boca Raton, FL. 2006

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An article in *Academy News* in July of 2010 by Carl McClary also offers an excellent overview for addressing the five Daubert prongs.

McClary, Carl R., The American Academy of Forensic Sciences (AAFS) Questioned Document Section Plays a Principal Role in the Substantiation of the Validity and Reliability of Forensic Document Examination; Academy News; July 2010; Pgs. 7, 31-32.

The history of the admissibility of forensic document examination testimony and any past Daubert decisions in the FDE's state or Federal District should be known. Unfortunately, the attorney working on a case with the FDE may not know the answer. The attorney and/or the FDE may need to research this.

The website "Daubert on the Web", www.daubertontheweb.com, may be a good place to find information about a specific state, however this website has not been updated in recent years. Additional case information may also be found on the Scientific Working Group for Forensic Document Examination (SWGDOC) website, www.swgdoc.org, under the Resources Section.

1.1.3. What are the Federal Rules of Evidence regarding admissibility of expert testimony?

The FDE should know the rules of evidence and the admissibility tests for the state where he or she works or will be testifying. The book "Forensic Science in Court: Challenges in the Twenty-First Century" contains a complete list of the states (including Washington, D.C.), the rules of evidence, and the admissibility tests applied, as of 2009. In summary, 24 states are considered Daubert states, 8 address portions of the Daubert factors, 10 are Frye states, 3 are a combination of Daubert and Frye, 1 is a Frye/Mack state, 1 is a Frye/Kelly state, and 3 use their own unique set of factors.

Sheldon, Donald. "Forensic Science in Court: Challenges in the Twenty-First Century". Lanham, Rowman & Littlefield Publishers, Inc. 2011. Page 19-20.

The Federal Rules of Evidence for 2011 may be found online at <http://federalevidence.com/downloads/rules.of.evidence.pdf>, but it should be noted that these are subject to change.

1.2. Preparing for the Daubert Hearing

If a Daubert hearing has not been scheduled, it should be suggested to the attorney to argue that a hearing may not be necessary because of established precedent. Information regarding the history of the admissibility of forensic document examination testimony and any past Daubert decisions in the FDE's state or Federal District should be provided to the attorney. [Appendix A](#) of this study guide contains a partial list of Daubert hearings involving forensic document examinations.

Once the Daubert hearing has been scheduled, the FDE will need to devote a significant amount of time preparing for the challenges specific to the case. Ask the attorney for a copy of the motion to suppress and any other memorandums filed that support the motion. Read through these documents and make an outline of the main points of the argument. Understanding the

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motion at hand may not be straight forward, though. The attorney may be able to provide additional information. If possible, ask other FDEs for assistance. Perhaps the verbiage in the motion has been used in a previous hearing. If so, the FDE may be able to obtain helpful strategies from the paperwork or transcripts of these hearings.

One point to remember when preparing for a Daubert hearing, the FDE is there to represent the discipline, the laboratory, and him or herself. The FDE should not expect anyone else to prepare for the hearing but a proper preparation will include working diligently with the attorney.

Once the main points of the argument for the motion to suppress have been outlined, the next step is to work through them one by one to offer counterpoints to the argument.

The FDE also needs to find out if there will be an opposing expert, and if so, who it is. Ask colleagues for information on this individual, such as his or her training and experience and whether or not his or her testimony has been excluded before. The FDE may assist the attorney in preparing cross examination questions for the opposing expert.

The rest of this study guide walks the FDE through the five prongs of Daubert as well as additional information beyond the five prongs. These sections should be used in preparing the counterpoints to the argument outlined in the motion to suppress. This study guide incorporates and builds upon the previous work of numerous FDEs, such as Lisa Hanson, Karen Runyon, Jan Seaman Kelly, Kirsten Singer, and Kathleen Storer, as well as the American Board of Forensic Document Examiners (ABFDE), and the Scientific Working Group for Forensic Document Examination (SWGDOC). Without their work, this study would not be possible.

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2. Daubert Factor #1: “Theories and Techniques Tested”

There are two theories in forensic document examinations regarding handwriting examinations that are typically the point of attack in a Daubert hearing:

- A. Handwriting is unique.
 - No two people write exactly alike.
 - No one person writes exactly the same way twice.
 - All individuals have a natural variation in their handwriting, which means they possess a normal or usual deviation (or range) of writing that can be found in repeated writing specimens.
- B. Given a sufficient quantity and quality of writing, handwriting is identifiable by a qualified FDE, and his/her expertise may assist the trier of fact.

These theories can be supported in many different ways and from many different articles, such as the established history of forensic document examination, the study of handwriting in twins, computer-based research, and more.

Goals of this section: To be able to explain the foundation and techniques of handwriting comparison as standardized and scientific. Understand the empirical data (the testing) that handwriting is unique based on the twin studies and computer-based research. Understand how the Kam, La Trobe, and Durina studies support the theory that FDEs can reliably identify or eliminate an author.

The article “Meeting the Daubert Challenge: A Bibliography of Handwriting Articles for the Forensic Document Examiner” contains a bibliography of 80 articles that address these two theories regarding handwriting examinations. These 80 articles range in date from 1915 to 2002. **Harrison, Diana and Seiger Danielle P. Meeting the Daubert Challenge: A Bibliography of Handwriting Articles for the Forensic Document Examiner. Forensic Science Communications, January 2003; Vol. 5, No. 1.**

2.1. Handwriting is Unique

2.1.1 Twin Studies

Studies have been conducted on twins and individuals of multiple births to determine if their writing displays uniformity or if the writing of each twin can be differentiated. The studies listed below confirm that with a sufficient amount of handwriting samples, it was possible to distinguish the handwriting of identical twins, fraternal twins, and individuals of multiple births.

Beacom, M. A Statistical Study of Handwritings by Twins and Other Persons of Multiple Births. Journal of Forensic Sciences, Jan. 1960; Vol 5 No. 1.

This article details a study of the handwriting of 50 different pairs of fraternal and identical twins. Comparisons of the writings revealed differences in letter forms, connections, letter sizes, pressure, slant, spacing and alignments, even among identical twins who received the same upbringing and education.

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Gamble, D. “The Handwriting of Identical Twins,” Canadian Society of Forensic Science Journal. 1980.

This paper examines the handwriting of identical twins to determine whether their handwriting displays uniformity or is the writing of each twin distinctive and identifiable. The following handwriting characteristics were used in comparing the handwriting of 58 pairs of twins:

1. General appearance or “pictorial effect”
2. Size of writing
3. Writing slope
4. Writing speed
5. Writing quality
6. Letter proportions
7. Individual letter forms

The study “confirmed that even though the handwriting of some of these twins had the same general appearance and some similar letter forms, there remained a sufficient number of differences for the experienced examiner to distinguish between the writings of each of the twins in a set and, as a result, the basis of handwriting identification is still valid.” The author further concludes: “This research has strengthened the science of handwriting identification by demonstrating that no matter how similar two persons may write, who have similar genetic backgrounds and developing environments, adequate handwriting samples will always contain sufficient material by which their individuality may be established.”

Boot, David. An Investigation into the Degree of Similarity in the Handwriting of Identical and Fraternal Twins in New Zealand. ASQDE Journal, 1998.

The author reports that a document examination case involving the handwriting of identical twins showed a striking degree of similarity in their handwriting. Following this observation, research was undertaken to gauge the degree of handwriting similarity in a larger sample of identical and fraternal twins' handwriting. Handwriting samples and questionnaires allowed the investigation of factors such as genetically linked similarity, schooling, and handedness. The results showed that none of the twins wrote exactly alike, however, in some cases there was a marked degree of similarity. No evidence was found to suggest that identical twins write with more similarity than fraternal twins. While the effect of genetic factors on handwriting could not be truly judged, the study did highlight the need for care and thoroughness in any examination of handwriting.

Srihari, Sargur, Huang Chin, and Srinivasan, Harish. On the Discriminability of the Handwriting of Twins. Journal of Forensic Science, 2008; Vol 53, No. 2, p. 430-446.

In this study, 1236 verification samples of handwriting of pairs of twins and 1648 verification samples of handwriting of non-twins comparing macro-, micro-, and style features resulted in a “verification correct” rate of 87% for twins and 96% for non-twins. Computer error rates were lower than those of laypersons but higher than those of forensic document examiners.

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Additional studies have been done outside of the forensic field regarding the handwriting of twins:

Newman, H., Freeman, F.N., Holzinger, K. Twins: A Study of Heredity and Environment, Chicago: University of Chicago Press, 1937.

Excerpts were also published in the **Journal of the American Medical Association, 1938; 110(10):764.**

In this book, handwriting individuality among twins is discussed in Chapter VI entitled “Resemblance in Handwriting of Identical and Fraternal Twins Reared Together”. Studies done by the authors and an additional study done by Francis Galton are reported on as follows: “In both cases the feature of handwriting which was studied was its general appearance – its individuality, the sum total of characteristics which enable us to identify the handwriting of an individual amid all the variations which occur from time to time, and to distinguish it from that of other individuals. We might, perhaps, expect identical twins to resemble each other especially in this characteristic in somewhat the same way as they resemble each other in facial appearance, and to a great degree than in speed or quality. But such is not the case.” It is important to note that this book is used in the field of educational psychology. It is not a book authored by or targeted for forensic document examiners, yet it still supports the validity of individuality in handwriting.

Portions of this section were provided by Marie Durina, ABFDE Diplomate.

2.1.2. Computer-based Programs

There are three computer-based applications that are either utilized in case work or for research purposes. These applications are the Forensic Information System for Handwriting (FISH), the Center of Excellence for Document Analysis and Recognition (CEDAR) computer software, and the Forensic Language-Independent Analysis System for Handwriting Identification (Flash-ID). These computer-based programs demonstrate that with a sufficient amount of search features, it is possible to differentiate writers within a large group.

FISH: Forensic Information System for Handwriting

The FISH is a database housed and maintained by the United States Secret Service (USSS) Forensic Laboratory since 1991. The FISH database was developed in the 1970’s by the German Federal Police for crimes that involve handwritten documents. The FISH database is a tool for casework based on handwriting individuality. FISH operates similar to the Automated Fingerprint Identification System (AFIS) for fingerprints. Questioned and known writing is entered, measured, and searched against the database. A list of candidate writers is provided. The FDE then determines whether any of the candidates wrote the questioned writing. The USSS FISH database contains handwriting samples of approximately 13,000 individuals, and the German database contains handwriting samples of more than 100,000 individuals.

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CEDAR: Center of Excellence for Document Analysis and Recognition

The Center of Excellence for Document Analysis and Recognition (CEDAR), at the State University of New York, in Buffalo, conducted a handwriting study, funded by the National Institute of Justice. The study confirmed one of the basic premises of handwriting examination: handwriting is individualistic. Computer software was used to measure 8 handwriting features in 1,500 writers from 5 states. The computer software was able to identify each writer with a 98% confidence level. When statistically inferred over the entire United States population, the computer system validated handwriting individuality with a 95% confidence level and further stated that by considering more than 8 writing characteristics, the confidence level would approach 100%.

Srihari, Sargur N. The Individuality of Handwriting. Journal of Forensic Science, July 2002, Vol. 47, No. 4.

Flash-ID: Forensic Language-Independent Analysis System for Handwriting Identification

Flash-ID converts handwriting into mathematical graphs. These graph topologies and feature measurements are used to quantify handwriting. Graph topologies are the internal structure of the character – their edges and vertices, links and nodes, and their quantity and connectivity. Feature measurements are the shapes of curves, angles, and distances among graph components. These measurements establish a profile for the distribution of letter/graph pairs of a handwriting sample. This profile is then compared to other profiles in the database.

There are three technical papers written by researchers and mathematicians which can be downloaded from the internet regarding the theory and current research behind Flash-ID. These articles can be downloaded at <http://www.gannontech.com>. Click on “Publications and Press” and then click on “White Papers”. A prompt for personal information will then be given. Enter the requested information and then the papers can be downloaded.

Gantz, D., Miller, J., and M. Walch. Multi-Language Handwriting Derived Biometric Identification.

Gantz, D. and M. Walch. Pictographic Matching: A Graph-based Approach Towards a Language Independent Document Exploitation Platform. HPD '04. November 14, 2004. Washington, DC, USA.

Gantz, D., Miller, J., and M. Walch. Application of Pictographic Recognition Technology for Spotting Handwritten Chinese Words.

2.2. Given a sufficient quantity and quality of writing, handwriting is identifiable by a qualified FDE, and his/her expertise can assist the trier of fact.

2.2.1. The established history of forensic document examinations

Historically, FDEs could cite their own experience and that of colleagues who, after looking at writing samples for years, have not found two writings from different authors to contain the same combination of writing characteristics. Some lawyers would argue this concept falls short of the

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empirical data needed to support the theory that handwriting is unique. However, there is still a point to be made.

The theory that handwriting is unique is tested with every single case that an FDE works. Although FDEs have searched, no two writings by different authors have been found to be exactly alike (even though, admittedly, not every single sample of handwriting has or could be examined).

2.2.2. Large Sample Searches

Below are articles that can be cited regarding the FDE's ability to search and, at times, find an author within a large group. The amount of known writers searched in each case varied but when using appropriate search criteria, these cases support the theory that handwriting is unique and that it is possible to identify or eliminate an individual as being the writer of a questioned document.

Shiver, Farrell. Case Report: The Individuality of Handwriting Demonstrated Through the Field Screening of 1000 Writers. 1996.

Welch, John. A Review of Handwriting Search Cases as an Indicator of the Individuality of Handwriting. International Journal of Forensic Sciences 1999; Vol. 5.

Baxendale, D. and Renshaw I.D. The Large Scale Searching of Handwriting Samples. Journal of Forensic Science Society, 1979;19, 245.

Holland, Sid. The Weinberger Kidnapping. 1956.

2.2.3. FDEs can correctly identify or eliminate an individual as being the writer better than the layperson.

A popular criticism of the discipline is "Sure you say you can identify an author but are you really better at it than the layperson. Prove it with data!" The studies of Dr. Kam and from La Trobe University provide statistical data validating that an FDE will more reliably give a correct conclusion regarding the identification or elimination of an individual as a writer than a layperson. A summary of these studies and more can be found in [Appendix F](#).

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3. Daubert Factor #2: “Established Standards”

There are, in general, three levels of standards relevant to a Daubert discussion: those within the discipline, the laboratory and those that affect the FDE.

Goals of this section: Understand and explain the purpose of the Scientific Working Group for Forensic Document Examination (SWGDOC) and American Society of Testing and Materials (ASTM) International to the discipline and the FDE. If the FDE’s laboratory is accredited, know about the accreditation program (the year the laboratory was first accredited, the accreditation requirements, the quality assurance standards maintained, and what is required to maintain accreditation). If the FDE is certified or plans to be, know the purpose and requirements for certification.

3.1. The Discipline

At the time of the Daubert ruling, a large portion of the techniques and language used in handwriting identification lacked consistency. This received some attention from critics at that time, and there has been continued criticism of the discipline over the years. In response to the Daubert decision and the criticism, the forensic document discipline was motivated to begin writing and publishing sub-discipline specific operating procedures for use during forensic document examinations.

A list of major critical articles concerning the forensic document discipline may be found in [Appendix B](#).

Currently, standards for the forensic document discipline are drafted, reviewed, and revised by the SWGDOC. The SWGDOC publishes through ASTM International since their documents are reviewed by practitioners in many different forensic disciplines. ASTM International has a formalized process of mandatory review and update of accepted standards.

The SWGDOC operates using sub-groups consisting of approximately five to seven individuals. These sub-groups draft, or update, standards for specific sub-disciplines within the forensic document expertise. These drafts are reviewed by other sub-groups and then submitted to ASTM International for balloting and eventual publication. As of June of 2011, SWGDOC has written and submitted for formal ASTM E30 Main Committee review and publication 21 standards. There are currently 10 draft standards in various stages of development.

From the SWGDOC’s website, www.swgdoc.org:

SWGDOC is the collaboration of federal, state, local, and private FDEs. The standards that are generated through SWGDOC are submitted for peer review and final publication to ASTM International in order to promote the admissibility of forensic document examinations.

SWGDOC is composed of a chairperson and numerous government and private forensic document examiners from throughout the United States. The government examiners are from

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federal, state, and county laboratories. SWGDOC began in 1997 as TWGDOC (Technical Working Group for Questioned Documents), was renamed SWGDOC in 1999, and was reorganized in 2001 to its current form of operation.

The mission of SWGDOC is to:

- Define the scope and practice of areas of the profession.
- Standardize operating procedures, protocols, and terminology.
- Consolidate and enhance the profession.
- Promote self regulation, documentation, training, continuing education, and research in the area of forensic document examination.

The goals of SWGDOC are to:

- Strengthen the content and the enforcement of published performance standards.
- Continue to write and foster the publication of performance standards for sub-discipline examinations.
- Publish and maintain the Daubert Factors for Attorneys and Daubert Factors for Forensic Document Examiners presentations (as they relate to forensic document examination).
- Participate in and support a Human Factors Working Group for Forensic Document Examination.
- Expand the participant pool to include academicians, statisticians, legal professionals, and practitioners from other forensic disciplines.

Summarized from the ASTM International Website, www.astm.org:

ASTM International was formed in 1898 and is one of the largest voluntary standards development organizations in the world and a trusted source for technical standards for materials, products, systems, and services. ASTM International standards have an important role in the information infrastructure that guides design, manufacturing, and trade in the global economy.

Standards developed at ASTM International are the work product of over 30,000 ASTM members. These technical experts represent producers, users, consumers, government and academia from over 120 countries. Participation in ASTM International is open to all with a material interest, anywhere in the world.

The committee in ASTM International for Forensic Science is designated E30. The following is the Scope of E30:

- The promotion of knowledge and development of standards (test methods, guides, practices, classifications, and terminology) for, but not limited to, definitions, methods and standard reference materials for the collection, preservation, scientific examination, preparation and reports relating to physical evidence for forensic purposes; and the general practice of forensic science; and other areas as determined by the scope.

Each main committee in ASTM International is composed of subcommittees that address specific segments within the general subject area covered by the technical committee.

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E30 is divided into seven subcommittees:

- E30.01 Criminalistics
 - o 28 Active Standards and 4 Proposed Standards
- E30.02 Questioned Documents
 - o 21 Active Standards and 10 Proposed Standards
- E30.11 Interdisciplinary Forensic Science Standards
 - o 7 Active Standards and 2 Proposed Standards
- E30.12 Digital and Multimedia Evidence
 - o 2 Active Standards and 2 Proposed Standards
- E30.90 Executive
- E30.92 Terminology
 - o 1 Active Standard
- E30.93 Awards

As of 2010, E30 had over 800 members, with more than half of the members working for local, state or federal agencies and the remainder working in private practice. Around 35 members worked for universities or other associations. E30.02 had approximately 230 members.

A brief summary of the voting process for an ASTM standard:

Once a standard has been created or an existing standard has been revised, it is ready to be balloted. Standards may be submitted for balloting from any member of ASTM. For E30.02, most standards are created and revised by the SWGDOC. An entire standard or just a portion of a standard can be balloted. New standards and major revisions are first voted on by the subcommittee. The requirements for a ballot to pass subcommittee includes a 60% ballot return rate, a 67% affirmative vote, and all negative votes addressed or found non-persuasive or non-related. Once a standard has been approved by the subcommittee, the standard is then sent to the main committee for balloting and to the Society for review. Ballots are open for a minimum of 30 days, and voting is mainly done online. There is a checks and balance system in place for the voting process. More details on this can be found on the ASTM International's website. The requirements for a ballot to pass main committee include a 60% ballot return rate, a 90% affirmative vote, and all negative votes addressed or found non-persuasive. After a standard has passed the main committee vote and Society review, the Committee on Standards determines whether or not procedures were followed correctly, and if so, the standard is published.

[Appendix C](#) contains a list of the current ASTM Standards and Proposed Standards for E30.02. This list continually changes as existing standards are revised and new standards are published. A complete list of standards can be found at www.astm.org.

3.2. The Laboratory

Laboratory policies include standard operating procedures, examination guidelines or test methods, and a quality assurance program. Each of these policies is influenced by the accreditation process and established standards within the discipline. Many laboratories are

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accredited by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB).

During a Daubert hearing, the FDE needs to be prepared to answer questions about the laboratory's standard operating procedures, examination guidelines or test methods, and the quality assurance program.

Additionally, the FDE needs to know how long the laboratory has been accredited and understand the purpose of the accreditation process.

From the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB) Website, <http://www.ascl-d-lab.org/>:

The objectives of the ASCLD/LAB accreditation program are as follows:

- To improve the quality of laboratory services provided to the criminal justice system.
- To develop and maintain criteria which may be used by a laboratory to assess its level of performance and to strengthen its operation.
- To provide an independent, impartial, and objective system by which laboratories can benefit from a total operational review.
- To offer to the general public and to users of laboratory services a means of identifying those laboratories which have demonstrated that they meet established standards.

ASCLD/LAB Guiding Principles of Professional Responsibility for Crime Laboratories and Forensic Scientist is posted on their website. These principles provide a framework for describing ethical and professional responsibilities in the forensic laboratory community.

3.3. The Forensic Document Examiner

Kelly and Lindblom advise on page 391 in the *Scientific Examination of Questioned Documents, Second Edition* textbook that if the FDE works in an ASCLD/LAB laboratory, "testimony regarding the policies and procedures that must be adhered to should be given. Evidence handling, case notes, safety and peer review are established procedures to be followed as a member of an accredited laboratory. By describing these procedures, the FDE is letting the judge know that he or she follows a standard or protocol in every facet of the examination process."

If the FDE is certified by the American Board of Forensic Document Examiners (ABFDE or the Board), then he or she has had to meet the minimum standards set forth by this organization to become a Diplomat. The FDE must also earn continuing education credits to maintain his or her certification every five years. A summary regarding the certification process and the ABFDE is located in the "Peer Review and Publication" section.

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4. Daubert Factor #3: “Peer Review and Publication”

Peer review and publication comes in various forms, which can also be broken down by the discipline, the laboratory, and the FDE. Peer review at the discipline level gives the relevant scientific community the chance to detect problems in the theory of recent research and is achieved not only through the publication process of most major journals but also incorporated through presentations at society/organizational meetings and training courses. Laboratories are reviewed as part of the accreditation process. The FDE’s work is peer reviewed at the laboratory level, through certification, and through the completion of external proficiency tests.

Goals of the section: Be able to explain how the discipline is subject to peer review. Understand the review process that a laboratory goes through to receive and maintain accreditation. Provide to the attorney a list of peer reviewed journals that publish forensic document examination articles and organizations where FDEs present research for peer review. Be able to explain the process of peer review in casework and through the completion of external proficiency testing.

4.1. The Discipline

Articles about forensic document examinations are published in forensic, law-based and non-forensic peer reviewed journals. A list of these journals is provided in [Appendix D](#).

Technical articles are also presented and peer reviewed at annual professional meetings, see the list of professional organizations in [Appendix E](#).

ASTM standards, prior to publication, are peer reviewed during the balloting process by the members of the E.30 committee (which includes, but is not limited to, forensic document examiners, forensic scientists of other disciplines, and members of academia) . The list of ASTM standards is provided in [Appendix C](#).

4.2. The Laboratory

The American Society of Crime Laboratory Directors – Laboratory Accreditation Board (ASCLD/LAB) is an accrediting board that determines whether a forensic laboratory complies with specific standards. Questioned Documents is one of the disciplines that ASCLD/LAB evaluates and accredits. The accreditation process is a form of peer review for both the implemented laboratory policies and the FDE’s casework.

4.3. The Forensic Document Examiner

The FDE’s work is peer reviewed during the certification process, annual inspections, and through reviews of case work.

Review of case work is generally laboratory specific; therefore the FDE should be able to explain their case review process. Case reviews can range from an administrative review, a

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technical review, case consultation, verification, or blind verification.

Durina discussed the benefit for having casework peer reviewed in the following article:
Durina, M. and Caligiuri, M.P., The Determination of Authorship from a Homogeneous Group of Writers. Journal of the American Society of Questioned Document Examiners. Vol. 12, No. 2 Dec. 2009; Pg 77-90.

Many FDEs complete external proficiency examination provided by Collaborative Testing Services (CTS). When the manufacturer's answer set is released by CTS for a particular test, the answer set for each FDE is reviewed by the FDE's laboratory and ASCLD/LAB (if applicable). Should the FDE's answer fall outside of the manufacturer's answer set, an inquiry is conducted to determine if corrective action is needed. More information about CTS can be found on their website at www.collaborativetesting.com.

Portions of the application and testing process for certification of an FDE by the American Board of Forensic Document Examiners (ABFDE or the Board) are evaluated by peers. The summary of ABFDE below includes a description of the purpose and the process for certification.

From the ABFDE website, www.abfde.org:

The objectives of the Board are to establish, enhance, and maintain standards of qualification for those who practice forensic document examination and to certify, as qualified specialists, those voluntary applicants who comply with the requirements of the Board. In this way, the Board aims to make available to the judicial system and others in the public a practical and equitable system for readily identifying those persons professing to be specialists in forensic document examination who possess the requisite qualifications and competence. ABFDE is accepted and accredited by the Forensic Specialties Accreditation Board (FSAB).

Certification is based upon the candidate's personal and professional education, training, experience, and achievement, as well as on the results of a formal examination. The process to become certified includes a written examination that covers general knowledge of the forensic document examination disciplines, the completion of five written case practicals, and an oral presentation to members of the Board on the examination process and conclusions reached during completion of the practicals. Once satisfied that the applicant successfully completes each section, they are awarded a certificate and the status of Diplomate with the ABFDE. A certified FDE must be recertified every five years. Recertification is obtained through earning a specific amount of continuing education credits.

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5. Daubert Factor #4: “General Acceptance in the Relevant Scientific Community”

The forensic document discipline is offered as a service in major law enforcement organizations worldwide, has been accepted in the court of law for over 100 years, is a part of numerous professional organizations, and is taught in various universities and textbooks.

Goal of this section: To be able to provide a list of where the discipline and the FDE have been accepted including the courts, organizations, journals, universities, and textbooks.

5.1. By the Courts:

Forensic document examination expertise has been recognized in courts for over 100 years. In the United States of America court system, there are four methods of proof of the validity of a scientific theory and technique:

- Judicial Notice
 - o Greenberg Gallery, Inc. v. Bauman 817 F.Supp. 167 (DDC 1993), affirmed, 36 F.3d 127 (DC Cir. 1994) “It can be judicially noted that handwriting, like fingerprints, is subject to established objective tests, expert opinions about which are admissible.”
- Statutory Recognition
 - o FRE 901(b)(3) permits the comparison of handwriting by expert witnesses with specimens which have been authenticated.
- Stipulation
 - o In numerous cases, the examination results to which the examiner will testify are stipulated to by the opposing party. In the State v. Dean, 307 N.W. 2d 628 (Wis. 1981) the court stated “(T)he primary effect of the stipulation is that it operates as a waiver of objection...to the validity of the basic theory...and eliminates the necessity of...the parties to establish a foundation in each case to satisfy the trial court of the basic theory and validity...”
- Evidentiary Tests/Cross Examination

Handwriting examination has met all four methods of proof and has been generally accepted by the court.

Ellen Schuetzner, a private FDE in Chicago, IL, maintains a database of testimonies by forensic document examiners provided to the courts at the state and federal level. This database was originally started by Tom Vastrick and lists court cases in which FDEs have testified since the 1993 Daubert decision. As of June 2011, this database included over 2450 testimonies.

If an FDE has testified and would like to contribute his or her testimony to the database, please email the following information to Ms. Schuetzner at ejsqde@sbcglobal.net:

- The title of the case (Daubert v. Merrill Dow Pharmaceuticals, Inc.),
- The date the testimony was provided,
- The city or county the testimony was provided,
- The state the testimony was provided,

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- The type of hearing or court (Daubert, Arbitration, Superior, Circuit, Federal, etc.), and
- The types of examinations discussed in the testimony.

Ms. Schuetzner is interested in receiving all testimonies provided by FDEs since the 1993 Daubert decision. A portion of the database is available on the SWGDOC website in the Resources Section. Any additional questions regarding this database may be obtained by contacting Ms. Schuetzner.

There have been numerous Daubert challenges regarding forensic document examinations across the United States of America since 1993. [Appendix A](#), though not all inclusive, lists motions denied in the Federal Circuit Appellate Courts and the United States District Court. This list also includes motions resulting in limiting the FDE's testimony, motions resulting in complete exclusion of the FDE's testimony, and a list of other important cases.

Additional case information can be found on the SWGDOC website (www.swgdoc.org) under the Daubert Resources section and on the Daubert on the Web (www.daubertontheweb.com) website.

5.2. Professional Organizations

Organizations on the international, national, and regional level have Forensic Document Sections. [Appendix E](#) contains a list of some of these organizations.

There are also organizations specific to forensic document examinations at the national and regional level:

- Scientific Working Group for Forensic Document Examinations (SWGDOC), 1997
- American Society of Questioned Document Examiners (ASQDE), 1942
- Southwestern Association of Forensic Document Examiners (SWAFDE), 1981
- Southeastern Association of Forensic Document Examiners (SAFDE), 1988

5.3. Universities

Various universities throughout the United States offer forensic science programs at the undergraduate and graduate level, which include the study of forensic document examinations. [Appendix E](#) contains a list of some of these universities.

5.4. Textbooks

There have been numerous textbooks written by both FDEs and non-forensic FDEs that address the discipline. [Appendix E](#) contains a list of some of these textbooks.

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6. Daubert Factor #5: “Known or Potential Error Rate”

Typically there are two types of error rates that are discussed within the forensic document community: the known error rate of the FDE and the known or potential error rate of the forensic document community.

Goals of this section: To understand the semantics of having an “error rate” and the difference between the FDE community error rate and an individual’s error rate. Know and be able to provide a list of important studies regarding error rate. If the FDE is participating in a peer review process of casework and proficiency tests, the FDE should know the policies of casework review, the basics of the proficiency test program in which he or she participates in, and the statistics within those programs.

6.1. The Forensic Document Community Error Rate

Beginning in 1994, Dr. Moshe Kam, a Professor at Drexel University in the School of Engineering and Applied Sciences, published a series of studies which validates that an FDE will more reliably give a correct conclusion regarding the identification or elimination of an individual as a writer than a layperson.

A study by Jodi Sita, Dr. Bryan Found, and Dr. Douglas Rogers from La Trobe University in Australia addressed the performance of FDEs and laypersons in signature comparisons. This study found that laypersons were 5.6 times more likely to make an error than an FDE.

Additional information and resources regarding the forensic document community error rate can be found in [Appendix F](#).

6.2. The Forensic Document Examiner

6.2.1. What is an “error rate”?

This topic has been addressed by several other FDEs with the purpose of pointing out that a “rate of error regarding how many times an FDE is incorrect in casework” is basically unattainable because of the variety of casework.

Larry Olson particularly addresses the semantics of an “error rate” when he writes: “If asked, “what is your error rate,” or “do you have an error rate”, one could just say “no” or “one is not required in my field”, at which the attorney will undoubtedly make this seem like a shortcoming. One could also simply ask the attorney, “what do you mean by an error rate?” Nine times out of ten, I’ll be that the attorney (after some fumbling) will say, “well, have you ever made a mistake?” Now THAT is a question that, although still vague, everyone (including the jury) can understand. It is one our training and/or experience should have prepared us for, and for which we probably have a hatful of answers...”

Olson, L. Letter to Editor. ABFDE News, May 2006, Volume XIX, Number 2, p. 20.

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Additionally, Jane Lewis took a survey of the eleven sections of the American Academy of Forensic Sciences (AAFS) in 2009 and presented the results at the meeting of the American Society of Questioned Document Examiners in 2010 in Victoria, B.C. In conclusion, she found that “Advocates, social scientists and uninformed forensic critics certainly have had some fun trying to use error rates against forensic scientists, but according the scientists who participated in my survey, error rates appear to be one of the 5 flexible Daubert admissibility standards that don’t apply to the 11 forensic disciplines in the AAFS.”

Lewis, J. Error Rates. Presented at the ASQDE Meeting, 2010, Victoria, B.C., p. 10.

6.2.2. Prevention of errors

The FDE needs to be able to explain when testifying what procedures are in place to safeguard against errors being made in casework. These procedures include laboratory policies and discipline standards concerning training, casework, quality assurance, proficiency testing, case review, and certification and laboratory accreditation, if applicable. The purpose of these policies and standards should be explained.

6.2.3. The Individual’s Error Rate

If the FDE participates in proficiency testing, he or she may be able to answer the question “What is your error rate?” The FDE could state that his or her answers for ‘x’ number of tests in ‘y’ number of years have been satisfactory. Although these tests attempt to mirror actual casework, Lewis pointed out that CTS issued the following statement on March 30, 2010 regarding the use of Proficiency Testing Data for error rate determination: “While CTS understands the interest in error rate data, we also recognize that the determination of error rates properly requires studies that are specifically designed for this purpose. The design of an error rate study would differ considerably from the design of a proficiency test. Therefore, the results found in CTS’ Summary Reports should not be used to determine forensic science discipline error rates.”

Lewis, J. Error Rates. Presented at the ASQDE Meeting, 2010, Victoria, B.C., p. 10.

Lastly, a laboratory accredited under the ASCLD/LAB International program is required to keep documentation of significant errors in casework detected during the peer review process.

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7. Beyond the Daubert Factors

7.1. The Critics

Goals of this section: To understand who the critics are, what their arguments against the discipline are, and how the forensic document community has defended the critics since the 1990's.

Criticism of the reliability of FDEs was paramount in the 1990's and was spearheaded by the 1989 Risinger, Denbeaux and Saks scathing review of the field in the article "Exorcism of Ignorance as a Proxy for Rational Knowledge: The Lessons of Handwriting Identification Expertise." Since this article was published in the University of Pennsylvania Law Review, the authors have continued the discussion in numerous publications and testify in court in an attempt to impeach the testimony of the FDE.

Kelly and Lindblom state on page 396 in the "Scientific Examination of Questioned Documents, Second Edition" textbook that "critics are usually from the academia field – Ph.Ds in areas of study separate from the forensic sciences. ...As a rule, the critic does not possess an understanding of terminology and examination methodologies of the forensic discipline. A limited literature review results in a narrow scope of understanding, causing the critic to reach a conclusion that obviously reflects an inability to discern information in its proper context...Additionally, the critics overlook current literature...Therefore, the FDE must include these studies in direct or redirect testimony so the judge will know that forensic document examination practitioners use contemporary methodology that is not based on antiquated information, but rather on ongoing research that has a historical progression."

A list of major critical articles, including a response to a critic from Dr. Srihari, concerning the forensic document discipline may be found in [Appendix B](#).

7.2. The NAS Report

Goals of this section: To understand the objective of the 2009 report "Strengthening Forensic Science in the United States: A Path Forward" published by the National Academy of Sciences (NAS Report). Know the response from the FDE's laboratory, if applicable. Have responses prepared for Daubert challenges based on content from the NAS Report. Understand how, as a result of the NAS Report, improvements are being made and research is being done in the forensic document discipline.

The NAS Report was viewed by some as additional criticism of the sub-disciplines within forensic sciences, including forensic document examinations. In summary, the report was the product of a National Academy of Sciences committee tasked by the United States Senate to identify the needs of the forensic science community. The NAS Report contained 13 recommendations for the future of forensic sciences. The complete NAS Report may be found online at <http://www.ncjrs.gov/pdffiles1/nij/grants/228091.pdf>. An executive summary of the

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report, including the 13 recommendations, may be found online at <http://www.forensicdna.com/~Media/NAS2009.pdf>.

The NAS Report was intended to strengthen forensic science and not to provide additional criticism. The report did not say that any forensic discipline addressed within it was invalid. Specifically, the NAS committee in creating the report “was not charged with determining the admissibility or assessing the admissibility of any type of forensic science evidence.” This statement is from Dr. Jay Siegel, a member of the NAS committee and a Professor for the Forensic and Investigative Sciences Program at Indiana University-Purdue University. He provided an affidavit detailing his opinion regarding the NAS Report.

This affidavit and the statement made by Kenneth E. Melson, Acting Director of the Bureau of Alcohol, Tobacco, Firearms, and Explosives, on May 13, 2009 to the United States House of Representatives Subcommittee on Crime, Terrorism, and Homeland Security regarding the NAS Report should be provided to the attorney when the NAS Report is being used in a Daubert challenge. The affidavit and the statement are provided on the 2011 ASQDE meeting DVD.

The laboratory in which the FDE is employed may have issued a response to the NAS Report. It is important for the FDE to know the response of the laboratory, and it would also be important to provide the attorney with the response.

Below are some excerpts from the NAS Report with additional comments. If a motion to suppress forensic document examinations specifically addresses the NAS Report, reading the executive summary and the portion of the NAS Report that refers to forensic document examinations is highly recommended.

This is the Summary Assessment of forensic document examinations from page 5-30 of the NAS Report:

“The scientific basis for handwriting comparisons needs to be strengthened. Recent studies have increased our understanding of the individuality and consistency of handwriting and computer studies and suggest that there may be a scientific basis for handwriting comparison, at least in the absence of intentional obfuscation or forgery. Although there has been only limited research to quantify the reliability and replicability of the practices used by trained document examiners, the committee agrees that there may be some value in handwriting analysis.

Analysis of inks and paper, being based on well-understood chemistry, presumably rests on a firmer scientific foundation. However, the committee did not receive input on these fairly specialized methods and cannot offer a definitive view regarding the soundness of these methods or of their execution in practice.”

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This is the list of sources cited in the NAS Report and may be found on pages 5-27 through 5-30:

- ASTM E444-98 Standard Descriptions of Scope of Work Relating to Forensic Document Examiners
- ASTM E1422-01 Standard Guide for Test Methods for Forensic Writing Ink Comparison
- ASTM E 1658-04 Standard Terminology for Expressing Conclusions of Forensic Document Examiners
- ASTM E1789-04 Standard Guide for Writing Ink Identification
- ASTM E2290-03 Standard Guide for Examination of Handwritten Items
- S.N. Srihari and G. Leedham. 2003. A survey of computer methods in forensic document examination. Proceedings of the 11th International Graphonomics Society Conference, pp. 278-281. Available at www.ntu.edu.sg/sce/labs/forse/PDF/docExam_7.pdf.
- R.A. Huber and A. M. Headrick. 1999. Handwriting Identification: Facts and Fundamentals. Boca Raton, FL: CRC Press.
- M. Kam, G. Fielding, and R. Conn. 1997. Writer identification by professional document examiners. Journal of Forensic Sciences 42(5):778-786,
- Sita, B. Found, and D. Rogers. 2002. Forensic handwriting examiners' expertise for signature comparison. Journal of Forensic Sciences 47:1117. That study found that professional handwriting examiners erred in 3.4 percent of their judgments.
- E.g., S.N. Sargur, S.-H. Cha, H. Arora, and S. Lee. 2002. Individuality of handwriting. Journal of Forensic Sciences 47(4):1-17.

The NAS Report recognized 5 of the 21 published ASTM International standards, and the additional sources cited do not encompass the voluminous amount of research that has been done in the discipline for over 100 years.

The NAS Report also outlines the fundamental principles of the scientific method. Handwriting examinations are typically the most challenged in a Daubert hearing. Therefore, the following outlines how handwriting examinations meet the fundamental principles of the scientific method. The following quotes are from page 4-1 of the NAS Report addressing the fundamental principles of the scientific method.

- “The scientific method presumes that events occur in consistent patterns that can be understood through careful comparison and systematic study.”
 - o Handwriting is a consistent pattern that can be understood through study and comparison.
- “Knowledge is produced through a series of steps during which data are accumulated methodically, strengths and weaknesses of information are assessed, and knowledge about causal relationships is inferred.”
 - o The series of steps followed in a handwriting examination are addressed in ASTM Standard E2290.
 - o Data is accumulated methodically and strength and weaknesses are assessed.
 - o The questioned and then known writing is examined for naturalness, internal consistencies, class and individual characteristics, and range of variation.

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- Next, a side by side comparison of the questioned and known writing is conducted to assess similarities, differences, absent characteristics, and individuality.
- “In the process, scientists also develop an understanding of the limits of that knowledge (such as the precision of the observations), the inferred nature of relationships, and key assumptions behind the inferences.”
 - The limitations are assessed, such as disguise/distortion, limited questioned or known writings, document quality, etc.
- “Hypotheses are developed, are measured against the data, and are either supported or refuted.”
 - Conclusions rendered in a handwriting examination are rendered per ASTM Standard E1658.

7.2.1. The NAS Report was a Conduit for Research:

In 2010, the U.S. Department of Justice (DOJ), Office of Justice Programs (OJP), National Institute of Justice (NIJ) released a solicitation for research “to improve the understanding of the accuracy, reliability, and measurement validity of forensic science disciplines. Research studies should focus on expanding the scientific basis of forensic methods, development of quantifiable measures of the reliability and accuracy of forensic analyses, and development of an understanding of human factors that may affect forensic analyses.”
(<http://www.ncjrs.gov/pdffiles1/nij/s1000909.pdf>)

The following research projects were accepted under that call and a summary of each project follows:

Statistical Examination of Handwriting Characteristics using Automated Tools

Agency: Research Foundation of SUNY
Principal Investigator: Dr. Sargur Srihari
Award Number: 2010-DN-BX-K037

Project Description: The project proposes to provide further previous research on the statistical basis of reporting results of handwriting examinations by questioned document (QD) examiners. As a facet of QD examination, the analysis and reporting of handwriting examination suffers from the lack of statistical data concerning the frequency of occurrence of combinations of particular handwriting characteristics.

The research proposes to use previously created databases of handwriting samples that are representative of the United States population. Existing feature lists of characteristics for different letter combinations, as well as new ones to be provided by QD examiners, will be used as the basis to determine frequency of the characteristics. Existing and new algorithms will be used to automatically extract those characteristics from the data base (e.g., a software tool for extracting most of the characteristics from the most common letter pair “th” is already available). For each letter combination, frequencies of their characteristics will be evaluated. Based on statistical dependencies of the characteristics a method of evaluating the probability of any given

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letter formation will be given. The resulting algorithms will be incorporated into an existing automatic system for writer verification/identification, CEDARFOX.

Outcome/Impact: This research will provide a statistical basis for courtroom presentation of handwriting evidence by providing information on the frequency of certain handwritten character formations occurring in a database of handwriting samples representative of the national population.

Validity, Reliability, Accuracy, and Bias in Forensic Signature Identification

Agency: Kentucky State University

Principal Investigator: Dr. Mara Merlino

Award Number: 2010-DN-BX-K271

Project Description: This research will address several of the most important areas of forensic document examination presently at issue in state and federal courts. The proposed research uses a multi-modal approach to investigate the existence and nature of expertise related to forensic document examination, the evaluation and interpretation of the salient features of signature specimens, and the relationship between social influences inherent in the context of forensic document examination (e.g., information about prior examination outcome) on the outcomes of document examination.

A sample of 120 forensic document examiners will be asked to participate in a preliminary survey assessing the nature and extent of their education, training, and experience, and other credentials in the field. They will also be asked to share their views about the present methods of FDE education and training. Using the eye-tracking methodology, the researchers will explore how FDEs and laypeople extract information from handwritten signatures. They will also verbally elicit via semi-structured interviews information about examiners' and laypeople's opinions concerning the evidential value of the features within the signatures they evaluate. This combination of quantitative and qualitative information will allow them to quantitatively analyze the visual and cognitive steps that FDEs and laypeople employ to render decisions and to obtain an understanding of the relationship between the kind and extent of evidential information contained in signature specimens and the accuracy of examiner and layperson decision making about the source of the questioned signatures.

Outcome/Impact: This research will address several critical issues that are currently facing forensic document examiners, such as expectancy and biasing effects, development of standardized training and proficiency testing, measures of reliability in signature identification, and method transparency.

Frequency Occurrence of Handwriting and Hand-Printing Characteristics

Agency: University of Central Florida

Principal Investigator: Ms. Carrie Whitcomb and Mr. Tom Vastrick

Award Number: 2010-DN-BX-K273

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Project Description: Forensic document examination has long held, as a basis for the discipline, no two people share the exact same set of handwriting characteristics. There have been numerous studies involving small groups of the general population and small sub-groupings of populations as to the uniqueness of handwriting and of frequency occurrence of characteristics. However, to date, there have been no large-scale studies involving a statistically appropriate sampling the overall U.S. population or sub-grouping. It is the purpose of this research project to develop statistically valid frequency ratios of characteristics of handwriting and hand printing based on specimen samples throughout the United States, to provide practitioners of forensic document examination with statistical basis for reliability and measurement validity to accurately state their conclusions, and to provide courts with the reliable data needed to understand the underlying scientific basis for the examinations and the conclusions.

Outcome/Impact: This research will develop frequency estimates for handwriting characteristics of the general U.S. population to establish valid confidence levels for inferring uniqueness.

Development of Individual Handwriting Characteristics in ~1800 Students: Statistical Analysis and Likelihood Ratios that Emerge over an Extended Period of Time

Agency: Minnesota Bureau of Criminal Apprehension

Principal Investigator: Ms. Lisa Hanson

Award Number: 2010-DN-BX-K212

Project Description: The Minnesota Bureau of Criminal Apprehension (MNBCA) is proposing a study that would begin to answer requests from recent reports, including the NAS report published in February, 2009, for scientific research and studies in the pattern recognition sciences, in this case specifically, Forensic Handwriting Examination.

The MNBCA will gather large amounts of handwriting and hand printing samples in order to measure individual handwriting characteristics (departures from the instructed copybook style), using CEDAR-FOX software. After collecting the measurement data, it will be statistically analyzed for subsequent likelihood ratios of various individual handwriting characteristics in bodies of writing. It is believed that information developed from these likelihood ratios will begin to answer critical questions about the accuracy and reliability of Forensic Handwriting Examinations.

Outcome/Impact: This research intends to provide a scientific basis of what needs to be involved during a forensic handwriting examination and will also provide statistical data that supports the conclusions reached from such examinations.

Additionally, the “Subcommittee on Forensic Sciences” (SoFS) was formed as a response to the NAS report. Patricia Manzolillo will be making a presentation titled “National Science and Technology Council Subcommittee on Forensic Sciences and Interagency Working Group on Accreditation and Certification: Considerations for Forensic Document Examiners” at the 2011 ASQDE meeting.

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The abstract state that her “presentation will discuss the organization of the Subcommittee on Forensic Sciences (SoFS), and its objectives. The SoFS was established in April 2009 by the White House National Science and Technology Council in response to the National Academy of Sciences (NAS) 2009 report "Strengthening Forensic Science in the United States: A Path Forward." Over the past two years, the SoFS and its five Interagency Working Groups (IWGs); Standards, Practices and Protocols; Accreditation and Certification; Research, Development, Testing and Evaluation; Education and Ethics; and Outreach have worked to address the 13 recommendations of the NAS report through the collaboration and collective expertise of individuals from various forensic science backgrounds. The SoFS and IWGs have diligently attempted to address the diverse nature of the many forensic science disciplines, its practitioners and organizational structures while recommending changes to improve forensic sciences as a whole. Topics for discussion will include considerations for, and the impact on, the forensic document community if mandatory certification and accreditation requirements were enforced. Activities of the SoFS and IWGS will be discussed in general terms since the information is pre-decisional and there are restrictions on the details that can be released.”

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8. Preparing the Attorney

This study guide will assist the attorney in preparing for Daubert hearing and includes relevant information beyond the five factors.

Acronyms:

FDE (Forensic Document Examiner),

ASTM (American Society of Testing and Materials),

ASCLD/LAB (American Society of Crime Laboratory Directors/Laboratory Accreditation Board),

ASQDE (American Society of Questioned Document Examiners),

ABFDE (American Board of Forensic Document Examiners)

Preparation:

If a Daubert hearing has not been scheduled, it may be possible to argue that a hearing may not be necessary because of established precedent. This argument will be based on information regarding the history of the admissibility of forensic document examination testimony and any past Daubert decisions in the FDE's state or Federal District. [Appendix A](#) of this study guide contains a partial list of Daubert hearings involving forensic document examinations.

The website "Daubert on the Web", www.daubertontheweb.com, may be a good place to find information about a specific state, however this website has not been updated in recent years. Additional case information may also be found on the Scientific Working Group for Forensic Document Examination (SWGDOC) website, www.swgdoc.org, under the Resources Section.

The Daubert Hearing

The attorney will need to devote some time in preparing for the challenge specific to the case. The FDE needs to be given a copy of the motion to suppress and any other memorandums filed that support the motion. He or she can help prepare responses to the technical issues within those documents.

Find out and inform the FDE if there will be an opposing expert, and if so, who it is. Ask the FDE for information on this individual, such as his or her training and experience and whether or not his or her testimony has been excluded before. The FDE may assist the attorney in preparing cross examination questions for the opposing expert.

The Script for the Hearing

During the actual hearing, the FDE will still need to become qualified as an expert witness.

The attorney should be provided a list of qualifying questions and a current Curriculum Vitae. The qualification questions should cover training, publications, presentations, and information regarding certification and accreditation, if applicable. The Daubert hearing is as much about the

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courts accepting the FDE as an expert as asking the court to accept the field of forensic document examination.

The rest of this study guide walks through the five prongs of Daubert as well as additional information beyond the five prongs. These sections should be used in preparing the counterpoints to the argument outlined in the motion to suppress.

1) Theories/techniques tested

There are two theories in forensic document examinations that are typically the point of attack:

- A. Handwriting is unique.
 - No two people write exactly alike.
 - No one person writes exactly the same way twice.
 - All individuals have a natural variation in their handwriting, which means they possess a normal or usual deviation (or range) of writing that can be found in repeated writing specimens.
- B. Given a sufficient quantity and quality of writing, handwriting is identifiable by a qualified FDE, and his/her expertise can assist the trier of fact.

These theories can be supported in many different ways and from many different articles, such as the established history of forensic document examination, the study of handwriting in twins, computer-based research, and more.

Twin Studies: Studies have been conducted on twins and individuals of multiple births to determine if their writing displays uniformity or if the writing of each twin can be differentiated. The studies have confirmed that with a sufficient amount of handwriting samples, it was possible to distinguish the handwriting of identical twins, fraternal twins, and individuals of multiple births.

Computer-based Programs: There are three computer-based applications that are either utilized in case work or for research purposes. These applications are the Forensic Information System for Handwriting (FISH), the Center of Excellence for Document Analysis and Recognition (CEDAR) computer software, and the Forensic Language-Independent Analysis System for Handwriting Identification (Flash-ID). These computer-based programs demonstrate that with a sufficient amount of search features, it is possible to differentiate writers within a large group.

The established history of forensic document examinations: Historically, FDEs could cite their own experience and that of colleagues who, after looking at writing samples for years, have not found two writings from different authors to contain the same combination of writing characteristics. Some lawyers would argue this concept falls short of the empirical data needed to support the theory that handwriting is unique. However, there is still a point to be made. The theory that handwriting is unique is tested with every single case that an FDE works. Although FDEs have searched, no two writings by different authors have been found to be exactly alike (even though, admittedly, not every single sample of handwriting has or could be examined).

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Large sample searches: FDEs have conducted large samples searches in an attempt to locate an author of a questioned document. The amount of known writers searched in each case varied but when using appropriate search criteria, these cases supports the theory that handwriting is unique and that it is possible to identify or eliminate an individual as being the writer of a questioned document.

FDEs can correctly identify or eliminate an individual as being the writer better than the layperson: A popular criticism of the discipline is “Sure you say you can identify an author but are you really better at it than the layperson. Prove it with data!” The studies of Dr. Kam and from La Trobe University provide statistical data validating that an FDE will more reliably give a correct conclusion regarding the identification or elimination of an individual as a writer than a layperson. A summary of these studies and more can be found in [Appendix F](#).

2) Established Standards

There are, in general, three levels of standards relevant to a Daubert discussion: those within the discipline, the laboratory and those that affect the FDE.

Field: Currently, standards for the forensic document discipline are drafted, reviewed, and revised by the SWGDOC. The SWGDOC publishes through ASTM International since their documents are reviewed by practitioners in many different forensic disciplines.

[Appendix C](#) contains a list of the current ASTM Standards and Proposed Standards for E30.02. This list continually changes as existing standards are revised and new standards are published. A complete list of standards can be found at www.astm.org.

Lab: Laboratory polices include standard operating procedures, examination guidelines or test methods, and a quality assurance program. Each of these policies is influenced by the accreditation process and established standards within the discipline. Many laboratories are accredited by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB).

FDE: Kelly and Lindblom advise on page 391 in the *Scientific Examination of Questioned Documents, Second Edition* textbook that if the FDE works in an ASCLD/LAB laboratory, “testimony regarding the policies and procedures that must be adhered to should be given. Evidence handling, case notes, safety and peer review are established procedures to be followed as a member of an accredited laboratory. By describing these procedures, the FDE is letting the judge know that he or she follows a standard or protocol in every facet of the examination process.”

If the FDE is certified by the American Board of Forensic Document Examiners (ABFDE or the Board), then he or she has had to meet the minimum standards set forth by this organization to become a Diplomat. The FDE must also earn continuing education credits to maintain his or her certification every five years.

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3) Peer Review and Publication

Peer review and publication comes in various forms, which can also be broken down by the discipline, the laboratory, and the FDE. Peer review at the discipline level gives the relevant scientific community the chance to detect problems in the theory of recent research and is achieved not only through the publication process of most major journals but also incorporated through presentations at society/organizational meetings and training courses. Laboratories are reviewed as part of the accreditation process. The FDE's work is peer reviewed at the laboratory level, through certification, and through the completion of external proficiency tests.

Field: Articles about forensic document examinations are published in forensic, law-based and non-forensic peer reviewed journals. A list of these journals is provided in [Appendix D](#).

Technical articles are also presented and peer reviewed at annual professional meetings, see the list of professional organizations in [Appendix E](#).

ASTM standards, prior to publication, are peer reviewed during the balloting process by the members of the E.30 committee (which includes, but is not limited to, forensic document examiners, forensic scientists of other disciplines, and members of academia). The list of ASTM standards is provided in [Appendix C](#).

Lab: The ASCLD/LAB is an accrediting board that determines whether a forensic laboratory complies with specific standards. Questioned Documents is one of the disciplines that ASCLD/LAB evaluates and accredits. The accreditation process is a form of peer review for both the implemented laboratory policies and the FDE's casework.

FDE: The FDE's work is peer reviewed during the certification process, annual inspections, and through reviews of case work.

Review of case work is generally laboratory specific, therefore the FDE should be able to explain their case review process. Case reviews can range from an administrative review, a technical review, case consultation, verification, or blind verification.

Portions of the application and testing process for certification of an FDE by the ABFDE are evaluated by peers.

4) General Acceptance

The forensic document discipline is offered as a service in major law enforcement organizations worldwide, has been accepted in the court of law for over 100 years, is a part of numerous professional organizations, and is taught in various universities and textbooks.

Court: In the court system, there are four methods of proof of the validity of a scientific theory and technique:

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- Judicial Notice
 - o Greenberg Gallery, Inc. v. Bauman 817 F.Supp. 167 (DDC 1993), affirmed, 36 F.3d 127 (DC Cir. 1994) “It can be judicially noted that handwriting, like fingerprints, is subject to established objective tests, expert opinions about which are admissible.”
- Statutory Recognition
 - o FRE 901(b)(3) permits the comparison of handwriting by expert witnesses with specimens which have been authenticated.
- Stipulation
 - o In numerous cases, the examination results to which the examiner will testify are stipulated to by the opposing party. In the State v. Dean, 307 N.W. 2d 628 (Wis. 1981) the court stated “(T)he primary effect of the stipulation is that it operates as a waiver of objection...to the validity of the basic theory...and eliminates the necessity of...the parties to establish a foundation in each case to satisfy the trial court of the basic theory and validity...”
- Evidentiary Tests/Cross Examination

Handwriting examination has met all four methods of proof and has been generally accepted by the court.

Ellen Schuetzner, a private FDE in Chicago, IL, maintains a database of testimonies by FDEs provided to the courts at the state and federal level. This database lists court cases in which FDEs have testified since the 1993 Daubert decision. As of June 2011, this database included over 2450 testimonies.

There have been numerous Daubert challenges regarding forensic document examinations across the United States of America since 1993. [Appendix A](#), though not all inclusive, lists motions denied in the Federal Circuit Appellate Courts and the United States District Court. This list also includes motions resulting in limiting the FDE’s testimony, motions resulting in complete exclusion of FDE’s testimony, and a list of other important cases.

Professional Organizations: Organizations on the international, national, and regional level have Forensic Document Sections and there are also national and regional organizations specific to forensic document examinations. [Appendix E](#) contains a list of some of these organizations.

Universities: Various universities throughout the United States offer forensic science programs at the undergraduate and graduate level, which include the study of forensic document examinations. [Appendix E](#) contains a list of some of these universities.

Textbooks: There have been numerous textbooks written by both forensic document examiners and non-forensic document examiners that address the discipline. [Appendix E](#) contains a list of some of these textbooks.

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5) Error Rate

Typically there are two types of error rates that are discussed within the forensic document community: the known error rate of the FDE and the known or potential error rate of the forensic document community.

The FDE Community Error Rate:

Beginning in 1994, Dr. Moshe Kam, a Professor at Drexel University in the School of Engineering and Applied Sciences, published a series of studies which validates that an FDE will more reliably give a correct conclusion regarding the identification or elimination of an individual as a writer than a layperson.

A study by Jodi Sita, Dr. Bryan Found, and Dr. Douglas Rogers from La Trobe University in Australia addressed the performance of FDEs and laypersons in signature comparisons. This study found that the laypersons were 5.6 times more likely to make an error than an FDE.

Additional information and resources regarding the forensic document community error rate can be found in [Appendix F](#).

The Forensic Document Examiner:

What is an ‘error rate’?

This topic has been addressed by several other FDEs with the purpose of pointing out that a “rate of error regarding how many times an FDE is incorrect in casework” is basically unattainable because of the variety of casework.

Larry Olson particularly addresses the semantics of an “error rate” when he writes “If asked, “what is your error rate,” or “do you have an error rate”, one could just say “no” or “one is not required in my field”, at which the attorney will undoubtedly make this seem like a shortcoming. One could also simply ask the attorney, “what do you mean by an error rate?” Nine times out of ten, I’ll be that the attorney (after some fumbling) will say, “well, have you ever made a mistake?” Now THAT is a question that, although still vague, everyone (including the jury) can understand. It is one our training and or experience should have prepared us for, and for which we probably have a hatful of answers...”

Olson, L. Letter to Editor. ABFDE News, May 2006, Volume XIX, Number 2, p. 20.

Additionally, Jane Lewis took a survey of the eleven sections of the American Academy of Forensic Sciences (AAFS) in 2009 and presented the results at the meeting of the American Society of Questioned Document Examiners in 2010 in Victoria, B.C. In conclusion, she found that “Advocates, social scientists and uninformed forensic critics certainly have had some fun trying to use error rates against forensic scientists, but according the scientists who participated in my survey, error rates appear to be one of the 5 flexible Daubert admissibility standards that don’t apply to the 11 forensic disciplines in the AAFS.”

Lewis, J. Error Rates. Presented at the ASQDE Meeting, 2010, Victoria, B.C., p. 10.

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Prevention of errors: The FDE needs to be able to explain when testifying what procedures are in place to safeguard against errors being made in casework. These procedures include laboratory policies and discipline standards concerning training, casework, quality assurance, proficiency testing, case review, and certification and laboratory accreditation, if applicable. The purpose of these policies and standards should be explained.

The Individual's Error Rate: If the FDE participates in proficiency testing, he or she may be able to answer the question "What is your error rate?" The FDE could state that his or her answers for 'x' number of tests in 'y' number of years have been satisfactory.

Although these tests attempt to mirror actual casework, Lewis pointed out that CTS issued the following statement on March 30, 2010 regarding the use of Proficiency Testing Data for error rate determination: "While CTS understands the interest in error rate data, we also recognize that the determination of error rates properly requires studies that are specifically designed for this purpose. The design of an error rate study would differ considerably from the design of a proficiency test. Therefore, the results found in CTS' Summary Reports should not be used to determine forensic science discipline error rates." **Lewis, J. Error Rates. Presented at the ASQDE Meeting, 2010, Victoria, B.C., p. 10.**

Lastly, a laboratory accredited under the ASCLD/LAB International program is required to keep documentation of significant errors in casework caught by the peer review process.

Beyond the Daubert Factors

The Critics: A list of major critical articles, including a response to a critic from Dr. Srihari, concerning the forensic document discipline may be found in [Appendix B](#).

The NAS Report: The 2009 report "Strengthening Forensic Science in the United States: A Path Forward" published by the National Academy of Sciences was viewed by some as additional criticism of the sub-disciplines within forensic sciences, including forensic document examinations. In summary, the report was the product of a National Academy of Sciences committee tasked by the United States Senate to identify the needs of the forensic science community. The NAS report contained 13 recommendations for the future of forensic sciences. The complete NAS report can be found online at <http://www.ncjrs.gov/pdffiles1/nij/grants/228091.pdf>. An executive summary of the report, including the 13 recommendations can be found online at <http://www.forensicdna.com/~Media/NAS2009.pdf>.

The NAS Report was intended to strengthen forensic science and not to provide additional criticism. The report did not say that any forensic discipline addressed within it was invalid. Specifically, the NAS committee in creating the report "was not charged with determining the admissibility or assessing the admissibility of any type of forensic science evidence." This statement is from Dr. Jay Siegel, a member of the NAS committee and a Professor for the

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Forensic and Investigative Sciences Program at Indiana University-Purdue University. He provided an affidavit detailing his opinion regarding the NAS report.

This affidavit and a statement made by Kenneth E. Melson, Acting Director of the Bureau of Alcohol, Tobacco, Firearms, and Explosives, on May 13, 2009 to the United States House of Representatives Subcommittee on Crime, Terrorism, and Homeland Security regarding the NAS Report may be provided to the attorney when the NAS Report is being used in a Daubert challenge.

If a motion to exclude forensic document examinations specifically addresses the NAS Report, reading the executive summary and the portion of the NAS Report that refers to forensic document examinations is highly recommended.

The NAS Report was a Conduit for Research: In 2010, the U.S. Department of Justice (DOJ), Office of Justice Programs (OJP), National Institute of Justice (NIJ) released a solicitation for research “to improve the understanding of the accuracy, reliability, and measurement validity of forensic science disciplines. Research studies should focus on expanding the scientific basis of forensic methods, development of quantifiable measures of the reliability and accuracy of forensic analyses, and development of an understanding of human factors that may affect forensic analyses.” (<http://www.ncjrs.gov/pdffiles1/nij/sl000909.pdf>)

The following research projects were accepted under that call:

Statistical Examination of Handwriting Characteristics using Automated Tools

Agency: Research Foundation of SUNY
Principal Investigator: Dr. Sargur Srihari
Award Number: 2010-DN-BX-K037

Validity, Reliability, Accuracy, and Bias in Forensic Signature Identification

Agency: Kentucky State University
Principal Investigator: Dr. Mara Merlino
Award Number: 2010-DN-BX-K271

Frequency Occurrence of Handwriting and Hand-Printing Characteristics

Agency: University of Central Florida
Principal Investigator: Ms. Carrie Whitcomb and Mr. Tom Vastrick
Award Number: 2010-DN-BX-K273

Development of Individual Handwriting Characteristics in ~1800 Students: Statistical Analysis and Likelihood Ratios that Emerge over an Extended Period of Time

Agency: Minnesota Bureau of Criminal Apprehension
Principal Investigator: Ms. Lisa Hanson
Award Number: 2010-DN-BX-K212

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Appendix:

[Appendix A:](#) Daubert Hearings involving Forensic Document Examinations

[Appendix B:](#) Major Critical Articles of the Forensic Document Discipline

[Appendix C:](#) Current ASTM Standards and Proposed Standards for Forensic Document Examinations

[Appendix D:](#) Peer Reviewed Journals

[Appendix E:](#) General Acceptance

[Appendix F:](#) Sources addressing the Forensic Document Community Error Rate

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Appendix A: Daubert Hearings involving Forensic Document Examinations

There have been numerous Daubert challenges regarding forensic document examinations across the United States of America since 1993. Though not all inclusive, this list includes motions denied in the Federal Circuit Appellate Courts and the United States District Court. This list also includes motions resulting in limiting the FDE's testimony, motions resulting in complete exclusion of FDE's testimony, and a list of other important cases. Cases involving ABFDE Diplomates are denoted with an asterisk(*).

Federal Circuit Appellate Courts - Daubert Motions Denied:

- US v. Jawara, No. 05-30266 (9th Cir. Sept. 15, 2006).
- US v. Tunde Adeyi (2nd Cir 2006) No. 05-1722-cr.
- US v. Al James Smith, (4th Cir, 2005), 2005 U.S. App. LEXIS 23798.*
- US v Judson Brown, (2nd Circuit, April 2003), 2005 U.S. App. LEXIS 22703.*
- US v. Christopher Mornan (3rd Cir, 2005), No. 04-1319.*
- US v. Chris Rutland and Barbara Grams, (3rd Cir., 2004), Crim. No. 02-494(DRD).*
- U.S. v. Demanjuk, (6th Circ., 2004), 1:99CV1193, U.S District Court, Cleveland, Ohio. *
- US v. Prime, 02-30375, (9th Cir.2004), D.C. No. CR-01-00310-RSL.*
- US v. Crisp, 324 F.3d 261, 271 (4th Cir. 2003) (fingerprints and handwriting). *
- US v. Martha Elena Gonzales, aka Marta Gonzales., 95-3261: US v. Jose Ramiro Valenzuela-Obeso, aka Ramiro Valenzuela, 95-3263: US v. Juan Manuel Valenzuela-Obeso, aka Kiki, and aka Miti, and 95-3370: US v. Patricia Camerina Lopez, (8th Circuit, 2003).
- US v. Dennis J. Mooney, 315 F.3d 54, 520-63 (1st Cir. 2002).*
- US v. Hernandez, (10th Cir. 2002), 2002 U.S. App. LEXIS 12153; 89 A.F.T.R.2d (RIA) 3049. Affirmed district court's decision to allow the FDE to describe physical mechanics of writing and similarities only.*
- US v. Kehoe, 310 F. 3d 579, 593 (8th Cir. 2002).*
- US v. Johnson, 39 Fed. Appx. 685, 2002 WL 44242 (9th Cir.2002) (unpublished op.)
- US v. Elmore, 56 M.J. 533 (Navy-Marine Ct. App 2001).*
- US v. Jeremiah Bryant Och, (9th Cir. 2001) U.S. App. LEXIS 17077,*;16 Fed. Appx. 666, No. 00-10351.*
- US v. Jolivet, 224 F.3d 902, 905-06 (8th Cir 2000).*
- US v. Battle, 188 F.3d 519, 1999 WL 596966 (10th Circ. 1999) (unpublished op.)
- US v. Paul, 175 F.3d 906, 910-11 (11th Cir. 1999). Denbeaux excluded from trial.*
- US v. Mohamed Ijaz Chohan, (2d Cir. 1997) U.S. App. LEXIS 17487, No. 97-1010.
- US v. Jones, 107 F.2d 1147, 1156-60 (6th Cir. 1997).
- US v. Rosario, 118 F.3d 160, 163-64 (3d Cir. 1997).
- US v. Ruth, 46 M.J. 1 (Armed Forces Ct. App. 1997). *
- US v. Velasquez, 64 F.3d 844 (3rd Cir. 1995), 848-50.*

United States District Courts - Daubert Motions Denied:

- US v. Hanner (3rd Cir June 2007) HW, Pr Pro, TW
- US v. Stephen Yagman (9th Cir May 2007). *
- US v. Weiss (10th Cir, April 2007), Criminal Case No. 05cr00179LTB

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- US v. David Lin (9th Cir., Jan 2007), Case No. CR 01-20071 RMW.
- US v. Juan Pena and Maria D. Pena, (5th Cir., Aug 2006)
- US v. William C. Campbell, (11th Cir, Feb 2006), Civil Action No. 1:04-CV-0424-RWS, 2006 US Dist LEXIS 7442
- US v Ramon Fashola (11th Cir, Feb 2006), Crim No 1:04-CR-372-JEC, NDGA.*
- US v. Ferguson (6th Cir, Aug 2004), Case No. 3:03cr019.*
- US v. Pirchesky (11th Cir, Aug 2004) Case No. 01-608-CR-SEITZ.*
- US v. Jeffrey H. Feingold (9th Cir, April 2004), CR 02-0976-PHX-SMM.*
- US v. Shawn Joshua Johnson, (5th Cir, April 2004), (hand printing identified).
- US v. William E. Lecroy, Jr., (11th Cir, January 2004), Criminal Indictment No. 2:02-CR-038).*
- US v. Bobby R. Smart, (11th Circuit, September 2003).
- US v. Jose de Jesus Garcia-Flores, et al., (5th Circuit, August 2003).
- US v. Henry Xie, (9th Cir. 2003), California, CR 03-00137 CRB, Full testimony admitted, including issues involving hand printing and Asian class characteristics.
- US v. Jack Robert Urich, (9th Cir. 2003) CR-S-02-454-RLH (LRL).
- Commodity Futures Trading Commission and Timothy D. Moratzka v. Leonard G. Nauman, (8th Cir., 2002), US Bankruptcy Court, District of Minnesota, BKY No. 00-45285-NCD ADV. NO. 01-4272-NCD.
- United States v. Sanders, No. 01-2646 (6th Cir. Mar. 7, 2003) (unpublished).
- US v. Roberto Morejon, (11th Circuit, July 2003), Case No.99-717-CR-Seitz.
- US v. Janet Thornton, 10th cir., Wichita, KS (Jan. 2003).*
- US v. Giorgies, 29 Fed. Appx. 472, 2002 WL 89728 (9th Cir. 2002) (unpublished op.)
- US v. Gricco, 2002 WL 746037 (3rd Cir. 2002).*
- US v. Broten, (2nd Cir. 2002), NY, Case No. 01-CR-411 (DNH).*
- US v. Frank M. Patti, Sr.and Alice G. Guy, (11thCir, 2002) Judge Lacey Collier. (based in part on US v. Paul).*
- US v. Lindsey, US District (9th Circ.2002), CR No. 00-00482DAE.*
- US v. Laphonse Akilo Young, Criminal No. 02-0075-CB, (11th Cir. 2002)
- US v. Ramos, EDNY 01 CR 0015 (ARR), September 30, 2002. *
- U.S. vs. Terry Kirby, (11th Cir., 2001),1:01-CR-642, US District Court, Georgia. Judge filed report on 5/10/02. Decision based in part on US v. Gricco. *
- US v. Kenneth Richmond, (5th Cir., 2001) WL 1117735, LA.
- US v. Steger (9th Cir., 2001), Phoenix, AZ.
- US v. Brenda K. Johnson, Alexandria, VA. (4th Cir., 2001).
- US v. Starzeczyzel, 880 F.Supp 1027 (S.D.N.Y. 1995). *
- US v Gilreath, US District Court, NDGA, NO. 1:96-CR-472 JTC, December 4, 1997. This was a federal magistrate court judge's favorable ruling for the admissibility of not only QD but FA/TM and tire impressions. *
- US v. Pham, #CR99-297, (9th Cir, 2000).
- US v Reginald Keith Humphery, No. 1:94-CR-447-JEC, (11th Cir, 1997).*

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Daubert motions resulting in limited FDE testimony (conclusion not expressed):

- Legacy Vision, LLC v. Gary Yeaman (10th), Case No. CIV-04-1320-M, WD OK, June 2005.
- US v. Yb-Lem Oskowitz, (294 F. Supp. 2d 379, 384 (E.D.N.Y. 2003); AUSA did not inform FDE that Daubert motion had been filed. *
- Wolf v. Ramsey 1:00-CV-1187 (N.D. Ga. March 31, 2003). FDE allowed to testify but could not give an opinion (although there was no testimony because the judge granted summary judgment and the case was dismissed).*
- US v. Hidalgo, Phoenix, AZ, US Dist., CR-01-1011-PHX-FJM, Proficiency of FDEs accepted; uniqueness of writing not proven.(2002) *
- US v. Wanijiku Thiongo, Concord, NH. Daubert hearing waived by judge. June 2002.
- US v. Kurtzke, January 2002, Chicago, IL.
- US v. Janeek Wiggan, Apr 2000, Federal District Court, Southern District of West Virginia, Charleston, WV., 4th Circuit. Wiggan was charged with drug violations. The judge limited the testimony of the FDE without having a Daubert hearing.
- US v. Rutherford, (8th Cir. 2000), 8:99CR120, US DistCt, 8th Cir.
- US v. Hines, (1st Cir 1999), Criminal No. 97-10336 NG, Massachusetts.
- US v. Santillan, (9th Cir 1999), WL 1201765 (N.D. Cal).*
- US v. Brown, No. CR 99-184 ABC, C.D. Cal. (unreported) check forgery case in which the defendant disputed the reliability of the government's handwriting expert's testimony that the defendant authored the forged signature. After holding a Daubert/Kumho hearing, the court (Judge Collins), adopts the Hines/McVeigh approach by permitting the proffered expert to testify without rendering "an ultimate conclusion on who penned the questioned writings." December 1999.
- US v. McVeigh, No. 96-CR-68. Judge Matsch's decision in McVeigh has been influential even though it was promulgated without formal opinion. It was also influential in the McVeigh case itself, as the prosecution chose not to call its document examiner after the court made a ruling limiting his testimony. The oral argument that led to Judge Matsch's decision is reported at 1997 WL 47724, but it does not reveal sufficient facts to determine exactly what task was at issue in the case, beyond the fact that some documents were going to be attributed to McVeigh by a document examiner. February 1997.

Daubert motions resulting in the complete exclusion of the FDE's testimony:

- US v. Fujii, (7th Cir, 2000), No. 00CR17, WL 33357453, September 2000.
- US v. Saelee, (9th Cir. 2001), NO. A01-0084 CR (HRH).
- US v. Terry L. Brewer, No. 01 CR 892, N.D. Illinois, 2002 U.S. Dist. LEXIS 6689, April 2002. FDE not present for hearing and unaware that hearing took place. Decision criticized by judge in US v. Kirby.
- US v. Edward Lee Lewis, Criminal Action No. 2:02-00042, in Southern District of West Virginia at Charleston, WV, August 2002, the judge, Honorable Joseph R. Goodwin.
- In Re Townsend vs. Morequity (3rd Cir), Bankruptcy No. 01-26777 Chapter 13, Judge found examiner (Thelma Greco) was not qualified to testify as an expert because "she does not possess the requisite qualifications of a questioned document examiner to offer

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an opinion as to the genuineness of Debtor's signature on the mortgage; and secondly, on the basis that the methodology she employed for evaluating the questioned document was flawed and has not been accepted by her peers in the questioned document community." There was additional testimony by Ms. Greco that there are no national standards for "question forensic document examiners". However, there are at least two professional organizations in existence to which she does not belong. One is the American Academy of Forensic Science, the report of a committee of which was the basis for the American Society for Testing and Materials' ("ASTM") Standard Terminology for Expressing Conclusions of Forensic Documents Examiners. She admitted that she was not aware of the national ASTM standard but opined that it was not necessary to meet it.

MISCELLANEOUS

- US v. Garza, (Appellate 5th Cir., 2006), No. 04-41244, exclusion affirmed for NADE examiner called by defense as not reliable under FRE 702 because she examined photocopies and could not confirm generation of copies. "...as the district court points out, in this case, the expert was not even sure how many times the signatures had been photocopied. Furthermore, even if the district court was in error for excluding the expert testimony, such error was harmless and did not effect Garza's substantial rights. To offset any potential prejudice to the defense, the district court allowed the copies of the signatures to be admitted into evidence so that the jury could compare the signatures and draw their own conclusions."
- US v. Nowlin, Sept 27, 2001, Appeal from Superior Court of the District of Columbia. NOTE: This case is remarkable in that the Federal Appellate Court for the District of Columbia, in their reversal, chastises the Government for not having a FDE (handwriting expert) examine the writings and testify.
- Gebrendrias v. Ashcroft, (7th Cir. 2003) U.S. App. LEXIS 21013, No. 02-4254 (unpublished), the 7th Circuit Court of Appeals found that Daubert does not apply to immigration hearings. Gebrendrias, an Ethiopian woman seeking asylum, had challenged the testimony of FDE Larry Ziegler. The challenge failed and admissibility of the evidence was affirmed.
- Progressive Business Systems, et al. v. Superior Federal Bank, Crawford County Circuit No. CIV 2000-30 June 24-25, 2004. This was a civil case that had to do with the examination of signatures on copies of checks. Denbeaux excluded from trial.
- State of Nevada vs. Warren, Tracy Morrell, (2004) County No. 02F15712X, Metro No. 020828-0764, Daubert hearing, QD admitted, *Saks excluded from trial*.
- *Denbeaux excluded*: US v. Paul, Progressive Systems v. Superior Fed Bank, Estate of Acuff v. Olinger

Additional case information can be found on the SWGDOC website (www.swgdoc.org) under the Daubert Resources section and on the www.daubertontheweb.com website.

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Appendix B: Major Critical Articles of the Forensic Document Discipline

This appendix was provided by Marie Durina, ABFDE Diplomate.

D. Michael Risinger, D. Michael; Denbeaux, Mark P., and Saks, Michael J. Exorcism of Ignorance as a Proxy for Rational Knowledge: The Lessons of Handwriting Identification “Expertise. University of Pennsylvania Law Review, Vol. 137, No. 3, 1989.

This article, written by 3 law professors, raised serious doubts concerning the reliability of handwriting examination. These critics raised issues in their assessment and asked questions never before addressed to document examiners in the field. Criticisms of the profession of forensic document examination included:

1. “No cases have ever examined, much less determined, whether these “experts” can do what they claim”;
2. There existed almost no studies of its claims in any academic literature;
3. Studies that were conducted raise serious questions about its validity.
4. The law has resisted requiring presentation of the asserted expertise in ways that would expose its validity problems.

To support these allegations, the experts cited 4 studies from the 1980s (Forensic Science Foundation 1984, 1985, 1986 and 1987 SF), one study from the 1970s (Forensic Science Foundation test in 1975) Crime Laboratory Proficiency Testing, and another from the 1930s (Lay Witness Identification of Handwriting, Inbau (1939). Although none of these studies were designed for the purpose of validation and were rife with defects and flaws, the critics concluded “Document examiners were correct 57% of the time and incorrect 45% of the time.” At the time of the publication of this paper, document examiners paid little attention to it. The authors had no forensic or scientific training, no technical knowledge in the field, and were not considered a threat. However, a landmark court ruling in 1993 (Daubert v. Merrell Dow Pharmaceuticals Inc., 113 S. Ct. 2786) would result in new challenges to expert testimony regarding handwriting evidence, and the criticisms made in this article were soon resurrected in the courts.

Risinger, D. Michael with Saks, Michael J. Science and Nonsense in the Courts: Daubert Meets Handwriting Identification Expertise. Iowa Law Review, 82, 21-74, 1996.

This article again cites the earlier FSF tests as support for the unreliability of handwriting expertise, and also critiques the first Kam study involving FBI document examiners and lay persons. The article suggests that handwriting identification is strongly influenced by context cueing, and that the courts should “attempt to require adequate testing of each individual examiner, to ensure that person’s ability to do what she or he claims to be able to do.”

Saks, Michael J. The Aftermath of Daubert: An Evolving Jurisprudence of Expert Evidence., 40 Jurimetrics Journal, 2000.

This essay examines the jurisprudence of expert evidence under the Federal Rules of Evidence by reviewing the Supreme Court’s holdings in its post-Daubert scientific evidence cases. In particular, it considers the questions of the standard of appellate review, the distinction between methodology and conclusions, and Daubert’s applicability to claims of nonscientific expertise.

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The essay suggests that testimony be excluded for those that do not provide adequate empirical support for what the experts are claiming. It calls for a “black-box solution” – tests where although the principles used by the expert may be unknown, known inputs can be compared with known outputs (solutions) so that proficiency of the testifying expert can be verified.

Mnookin, Jennifer. Scripting Expertise: The History of Handwriting Identification Evidence and the Judicial Construction of Reliability. University of Virginia School of Law, Vol. 87, 2001.

A lengthy article that covers the history of handwriting evidence in the courts and alleges that expert handwriting identification and fingerprint identification do not withstand scrutiny under Daubert. Mnookin discusses the role the courts play in determining what constitutes reliability in expert testimony and the forensic sciences.

Mnookin, Jennifer. Of Black Boxes, Machines, and Experts: Problems in the Assessment of Legal and Scientific Validity”.

This paper examines recent controversies over what kinds of testing are (and ought to be) required to establish legal validity for a scientific or expert technique, with a particular focus on recent controversies surrounding latent fingerprint identification evidence and breath test detection of alcohol. Specific focus is on focus on two strains of reasoning in some tension with one another, one of which emphasizes the adequacy of input/output testing in which the technique or method at issue is shown to get correct results when tested multiple times with known exemplars; and the other of which rejects treating the technique or machine as a 'black box' and instead insists that validation requires the existence and disclosure of a formally-specified method of analysis.

Saks, Michael. Commentary on: Srihar SN, Cha S-H, Arora H., Lee S. Individuality of Handwriting (from JFS 2002; 47(4)) J. Forensic Sci., July 2004, Vol. 48, No. 4.

This is a critical article about Dr. Srihari’s study that utilized CEDAR FOX software to support that the writing of every person is distinguishable from any other persons and was able “to validate handwriting individuality with a 95% confidence.” Saks finds the study flawed for the following reasons: the structure of the writing sample included a diverse group of 1568 writers from states in the U.S. and therefore ensured differences within the writings; the size of the writer population used in the study was too large; the content of writing sample itself was too large and “artificially maximized the ability to distinguish writers”, and number of intra-writer samples was too small; the study was restricted to cursive writing samples only; and the study did not involve human examiners.

Srihari, S. Author’s Response to Commentary by Saks, Journal of Forensic Sciences, July 2003, 48(4), 919-920. This response is a rebuttal to criticisms raised by M. Saks in his Commentary on Srihari’s Individuality of Handwriting research (See Journal of Forensic Sciences, July 2003, Vol.48. No 4.) In this response, Srihari addresses criticisms by Saks of Srihari’s research (see above: Individuality of Handwriting”) regarding: diversity of samples; extrapolation of results from a limited sample to a general population, size of the writing sample used by Srihari; number of intra-writer samples; the type of writing used in the study, and the issue of human ability when compared to the computer program.

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Appendix C: Current ASTM E30.02 Standards and Proposed Standards for Forensic Document Examinations,

Active Standards*

- E444 Standard Guide for Scope of Work of Forensic Document Examiners
- E1422 Standard Guide for Test Methods for Forensic Writing Ink Comparison
- E1658 Standard Terminology for Expressing Conclusions of Forensic Document Examiners
- E1789 Standard Guide for Writing Ink Identification
- E2195 Standard Terminology Relating to the Examination of Questioned Documents
- E2285 Standard Guide for Examination of Mechanical Checkwriter Impressions
- E2286 Standard Guide for Examination of Dry Seal Impressions
- E2287 Standard Guide for Examination of Fracture Patterns and Paper Fiber Impressions on Single-Strike Film Ribbons and Typed Text
- E2288 Standard Guide for Physical Match of Paper Cuts, Tears, and Perforations in Forensic Document Examinations
- E2289 Standard Guide for Examination of Rubber Stamp Impressions
- E2290 Standard Guide for Examination of Handwritten Items
- E2291 Standard Guide for Indentation Examinations
- E2325 Standard Guide for Non-destructive Examination of Paper
- E2331 Standard Guide for Examination of Altered Documents
- E2388 Standard Guide for Minimum Training Requirements for Forensic Document Examiners
- E2389 Standard Guide for Examination of Documents Produced with Liquid Ink Jet Technology
- E2390 Standard Guide for Examination of Documents Produced with Toner Technology
- E2494 Standard Guide for Examination of Typewritten Items
- E2710 Standard Guide for Preservation of Charred Documents
- E2711 Standard Guide for the Preservation of Liquid Soaked Documents
- E2765 Standard Practice for Use of Image Capture and Storage Technology in Forensic Document Examination

Proposed New Standards*

- New Guide for the Classification of Conventional Printing Processes
- New Practice for the Case Review of Forensic Document Examinations
- New Guide for Examination of Counterfeit Documents.
- New Classification for Typewritten Text
- New Practice for Collection of Request Writing
- New Guide for the Forensic Examination of Intersections on Documents
- New Guide for the Examination of Documents Produced with Thermal Printing Technology.
- New Guide for the Minimum Requirements For Forensic Document Examination Notes
- New Guide for Dating of Documents
- New Guide for the Classification of Writing Instruments

*This list will need to be updated when needed for a Daubert hearing by visiting www.astm.org.

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Appendix D: Peer Reviewed Journals

Numerous articles addressing forensic document examinations are published in forensic or law based 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
- Science and Justice
- Forensic Science Review
- Australian Journal of Forensic Science
- Journal of Forensic Document Examination, Mannheimer Hefte

Articles addressing forensic document examinations are also published in peer reviewed journals outside of the forensic community:

- Journal of Educational Research Publication
- Journal of Criminal Law and Criminology
- Journal of Applied Psychology
- Institute of Electrical and Electronics Engineers (IEEE), Transactions on Computers
- Journal of Applied Psychology
- Publications that publish forensic document articles

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Appendix E: General Acceptance

Organizations on the international, national, and regional level have Forensic Document (Questioned Document) Sections.

- International Level
 - The International Association of Identification (IAI), 1915
 - British Academy of Forensic Sciences Society (BAFS), 1965
 - American Society of Crime Laboratory Directors (ASCLD)
 - Forensic Science Society (FFS), 1959
 - International Association of Forensic Sciences (IAFS), 1957
 - The Canadian Society of Forensic Science (CSFS), 1953
 - The Australian and New Zealand Forensic Science Society (ANZFSS), 1971
 - European Network of Forensic Handwriting Experts (ENFHEX), 1998
 - European Network of Forensic Science Institutes (ENFSI), 1995
 - Gesellschaft für Forensische Schriftuntersuchung (GFS)
 - The Indo-Pacific Association on Legal Medicine and Science (IPAL), 1983
 - International Graphonomics Society (IGS), 1982
 - American Society of Testing and Material (ASTM) International, 1898
 - Main Committee: Forensic Science (E30), 1970
 - Subcommittee: Questioned Documents (E30.02)
- National Level
 - The American Academy of Forensic Sciences (AAFS) is the only national forensic science organization; it was established in 1948, and the Questioned Document Section was one of the first disciplines to be part of this national forensic organization.
 - The American Society of Crime Laboratory Directors – Laboratory Accreditation Board (ASCLD/LAB) evaluates forensic science laboratories to determine whether each discipline meets specific standards. Questioned Documents is one of the disciplines evaluated. ASCLD/LAB evaluates laboratories on the national and international level.
- Regional Level
 - Mid-Atlantic Association of Forensic Scientists (MAAFS), 1972
 - Mid-Western Association of Forensic Sciences (MAFS), 1972
 - Northeastern Association of Forensic Sciences (NEAFS)
 - Southern Association of Forensic Scientists, (SAFS), 1966
 - Southwestern Association of Forensic Scientists, (SWAFS), 1977

There are also organizations specific to forensic document examinations.

- Scientific Working Group for Forensic Document Examinations (SWGDOC), 1997
- American Society of Questioned Document Examiners (ASQDE), 1942
- Southwestern Association of Forensic Document Examiners (SWAFDE), 1981
- Southeastern Association of Forensic Document Examiners (SAFDE), 1988

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Universities: Various universities throughout the United States offer forensic science programs at the undergraduate and graduate level, which include the study of forensic document examinations:

- 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
- Arcadia University (Pennsylvania)
- Chaminade University (Hawaii)

Textbooks: There have been numerous textbooks written by both forensic document examiners and non-forensic document examiners that address the discipline.

- Written by FDEs
 - o Ames on Forgery, 1899, Daniel T. Ames
 - o Questioned Documents, 1911 and 1929, Albert S. Osborn
 - o The Problem of Proof, 1922 and 1926, Albert S. Osborn
 - o Questioned Document Problems, 1944 and 1946, Albert S. Osborn and Albert D. Osborn
 - o Suspect Documents, 1958, Wilson R. Harrison
 - o Scientific Examination of Questioned Documents, 1956 and 1982, Ordway Hilton
 - o Evidential Documents, 1959, James V. P. Conway
 - o The Scientific Examination of Documents Method and Techniques, 1989, David Ellen
 - o Introduction to Handwriting Examination and Identification, 1992, Russell R. Bradford and Ralph B. Bradford
 - o Handwriting Identification: Facts and Fundamentals, 1999, Roy A. Huber and A.M. Headrick
 - o Forensic Handwriting Identification, 2000, Ron Morris
 - o Questioned Documents A Lawyer's Handbook, 2001, Jay Levinson
 - o Scientific Examination of Questioned Documents: Second Edition, 2006, Edited by Jan Seaman Kelly and Brian S. Lindblom
- Written by Non-FDEs that include information on forensic document examinations
 - o Criminalistics and Scientific Investigation, 1980, Fredrick Cunliffe
 - o Criminal and Civil Investigation Handbook, 1981, Joseph J. Grau
 - o Scientific and Expert Evidence, 1981, Edward J. Imwinkelried
 - o Forensic Science; An introduction to criminalistics, 1983, Peter DeForest
 - o Fundamentals of Criminalistics, 1987, R. Belkin and Yu Korukhov
 - o Fundamentals of Criminal Investigation, 1994, Charles E. O'Hara
 - o Criminalistics: An introduction to forensic science, 1995, Richard Saferstein
 - o Scientific Evidence, 1995, Paul C. Gianelli

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Appendix F: Resources addressing the Forensic Document Community Error Rate

Kam, M., Wetstein, J., and Conn, R. Proficiency of Professional Document Examiners in Writer Identification. *Journal of Forensic Sciences* 1994; 39(1): 5–14

- This was the Kam pilot study which included the examination of both cursive and hand printing. Seven FDEs from the FBI and 10 laypersons (control group) participated in study.
- False ID (Incorrect Identification):
FDEs: 0.14285% laypersons: 8.0%
- False Elimination (Incorrect Elimination):
FDEs: 0.45857% laypersons: 16.7%
- Laypersons were about 56 times more likely to wrongly associate handwriting than FDEs.
- Laypersons were about 36 times more likely to wrongly differentiate handwriting than FDEs.
- Forensic document examiners are significantly better than college educated non-experts in performing writer identification.
- The probability of document examiners and laypersons having the same proficiency in performing writer identification was less than 0.001.

Kam, M., Fielding, G., and Conn, R. Writer Identification by Professional Document Examiners. *Journal of Forensic Sciences* 1997; 42(5): 778–786.

- This was a large scale handwriting study which included the examination of both cursive and hand printing. There were 105 FDEs and 41 laypersons (control group) participated in this study.
- Correctly identified the writer: FDEs: 87.9% laypersons: 87.7%
- Incorrectly identified the writer: FDEs: 6.5% laypersons: 38.3%
- Laypersons were about 6 times more likely to wrongly identify handwriting than FDEs.

M. Kam, G. Fielding, and R. Conn. The Effect of Monetary Incentives on Document Examination by Nonprofessionals. *Journal of Forensic Sciences* 1998; 43 (5): 1000–1004.

This study utilized the concept of variable monetary incentives to determine if an improvement in the layperson's performance could be observed. It found that variable monetary incentives made no statistical difference in laypersons' performance.

Kam, M., Gummadidala, K., Fielding, G., and Conn, R. Signature Authentication by Forensic Document Examiners. *Journal of Forensic Sciences* 2001; 46(4): 884–888.

- This study compared the ability of FDEs and laypersons to examine questioned signatures to determine whether the signatures were genuine or simulations (forgeries). There were 69 FDEs and 50 laypersons (control group) that participated in this study.
- **For Genuine signatures**
Called it genuine (correct): FDEs: 85.89% laypersons: 70.0%
- Called it simulation (wrong): FDEs: 7.05% laypersons: 26.1%

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- Laypersons about 3½ times more likely to call a good signature bad than FDEs.
- **For Non-Genuine signatures (simulations)**
Called it simulation (correct): FDEs: 96.06% laypersons: 92.0%
Called it genuine (wrong): FDEs: 0.49% laypersons: 6.47%
- In this study, laypersons were nearly 13 times more likely than FDEs to incorrectly declare a simulated signature to be genuine.

Kam M. and Lin, E. Writer Identification using Hand printed and Non-Hand printed Questioned Documents”. *Journal of Forensic Sciences* 2003; 48(6), 1391-1395.

- In this study, the data from the 1997 study was reanalyzed and the hand printing results were separated out. There were 90 FDEs and 34 laypersons (control group) that participated in this study.
- **The results of the hand printed documents, only:**
Correct ID: FDEs: 88.5% laypersons: 93.85%
FALSE ID: FDEs: 9.3% laypersons: 40.45%
- Laypersons are about 4.35 times more likely to wrongly identify hand printing than FDEs.
- **The results of the non-hand printed documents, only, which included both cursive and mixed cursive/hand printed:**
Correct ID: FDEs: 87.9% laypersons: 87.7%
FALSE ID: FDEs: 5.5% laypersons: 38.3%
- Laypersons are about 7 times more likely to wrongly identify non-hand printing than FDEs.

Sita, J., Found, B. & Rogers, D. Forensic Handwriting Examiner’s Expertise for Signature Comparison, *Journal of Forensic Sciences* 2002, 47(5), 1117-1124.

- This was a signature study from La Trobe University in which 17 FDEs (from Australia & New Zealand) and 13 laypersons (control group) examined 150 signatures to determine if the signatures were genuine or a simulation.
- FDEs: Correct 54.8% Inconclusive 41.8%, Incorrect: 3.4%
Laypersons: Correct: 57.4% Inconclusive: 23.6. % Incorrect: 19.3%
- Laypersons were about 5.6 times more likely to make a mistake than FDEs.
- The 3.4% and 19.3% error rates (uncalled) permitted inconclusive opinions.
- The 5.8% and 25.3% error rates (called) did not permit inconclusive opinions.

Durina, M. E. and Caligiuri, M. Ph.D. The Determination of Authorship from a Homogenous Group of Writers, *Journal of the American Society of Questioned Document Examiners, Inc., Vol. 12, Number 2, December 2009.*

A research project was conducted in which samples were obtained from 52 adult writers who grew up in the same neighborhood, were taught the same copybook style, at the same Catholic elementary school, by the same teachers, approximately 4 decades earlier. The specimen writings were subsequently examined by 49 FDEs throughout the world. The FDEs rendered conclusions of authorship with an overall accuracy rate of 98%. Factors that contributed to the error rate included the length of the questioned document and the geographic location of the FDEs. Results of the study offer evidence to support that there is a high degree of inter-wrtier

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variation among writers even in populations where the driving forces for variation were low. The research addresses criticisms (by Saks) that earlier studies on the individuality of handwriting (by Srihari) did not include populations from homogeneous writing communities and relied on computer analysis of handwriting rather than human examiners.

Portions of this section were provided by Marie Durina, ABFDE Diplomate.