Adedayo, Oluwasola Mary

Questioned digital documents: Identifying production technologies and tools

Abstract: From documents generated through optical character readers to documents with digitally captured signatures or images, and to documents that only exist in a fully digital format, the digital age has led to the emergence of digitally processed documents that forensic document examiners may be asked to examine [1-2]. Many businesses and countries now work with legally binding documents that are sometimes in a purely digital format or shared digitally.

Although digital documents often contain metadata that may be used for finding information about a document, particularly about its creation, research has shown that the metadata can be manipulated to obfuscate important details. For a questioned digital document, the identification of the production technology and the authentication of other digital information which are inherently part of the document is important.

This research addresses this issue by focusing on how existing foundational knowledge in document examination can be used as a basis for the examination of digital documents. We explore how emerging technologies such as machine learning may be integrated with this foundation knowledge to facilitate the identification of the production technology of a digital document. Our work focuses on the examination of PDF documents due to their popularity.

The first part of this work explores some of the foundational knowledge from a digital perspective. It highlights many advantages of the foundational knowledge and how they could be translated into use with digital documents. Our analysis shows that while some fundamental aspects are directly applicable in a digital sense, others may need to be more refined or may have an alternative interpretation. The second part of our work addresses the question of document origin from the perspective of a digital document. We focused on determining the production technology or the document creator tool by introducing techniques from machine learning into the fundamental idea that documents have characteristics that can be used in their identification together with ideas from tool mark analysis. Using features extracted from PDF documents with known production technology or tools, we could determine the production technology for other documents with unknown production technology with a high level of certainty. Our experiment shows that this approach is viable for identifying the production technology for PDF documents and may be applicable in other aspects of digital document examination. The ability to measure the accuracy of our model provides a measure of reliability in applying this approach. References [1] AAFS. Proceeding of the American Academy of Forensic Science (AAFS) 72nd annual scientific meeting, 2020. p. 966 – 968. [2] Adedayo OM, Olivier MS. Examination of Customized Questioned Digital Document. Manuscript submitted. Journal of Forensic Sciences. 2024.

Bio: Mary Adedayo is an Assistant Professor in the Department of Applied Computer Science at The University of Winnipeg, Canada. Before this, she was a faculty at the University of Pretoria in South Africa until 2016 and worked in the technology industry until she joined the University of Winnipeg in 2019. Mary obtained a PhD in Computer Science from the University of Pretoria in 2015. Her research interests are focused on digital forensics, database forensics, privacy, cybersecurity, and digital document examination. She is a member of the Institute of Electrical and Electronics Engineers (IEEE), the Association for Computing Machinery (ACM), the Organization for Women in Science for the Developing World (OWSD), and a member of the Digital and multimedia section of the AAFS.

Aginsky, Valery

Natural Aging of Ink and Ink Fading are Different Physical and Chemical Processes – A Document Dating Case Report

Abstract: In a probate matter, one of the key issues was whether a 3-page Will, dated 13 August 1999 (the "1999 Will"), was produced and signed on or around the date shown on the document, or whether this 3-page document or any of the first two pages of the document were produced and signed significantly later – e.g., as late as September 2018 when the Will was lodged with the High Court (Hong Kong Special Administrative Region) Probate Registry. The Plaintiff's expert found as follows: 1) the signatures on page 1 of the 1999 Will were written within 2 years before their examination in July 2019; and 2) the signatures on page 1 of the Will were written in blue ink of one formulation and the signatures on page 2 of the Will were written in blue ink of a different formulation. Based on these findings, the Plaintiff's expert opined that the 1999 Will "was not prepared in 1999 as indicated, but at multiple occasions more recently, [namely after] July of 2017." This author, retained as the Defendant's expert, determined that: 1) the signatures on pages 1 and 2 of the 1999 Will were written in blue ballpoint ink of the same formulation and likely with the same ballpoint pen; 2) the changes in the composition (ratios) of the dye components of the blue ballpoint ink on page 1, as well as the changes in the hue of this ink, are the results of a partial decomposition (N-demethylation) of certain dye components (triphenylmethane dyes) of the ink caused by the exposition of this page to light; and 3) the toner of the printed entries on all the three pages of the 1999 Will corresponds to the conventional 8- to 10-micron black toner that was widely used in commercially available printers and copiers in the late 1990s. The judge accepted the following ultimate conclusion made by the Defendant's expert: "The combined results of this examination provided evidence that supports the proposition that the 1999 Will was produced and signed on or around the date "13 August 1999" shown on the document (Hypothesis H1), and these examination results provided no evidence that would support a competing proposition that this 3-page document or any of the first two pages of the document were produced and/or signed at a much later point in time, e.g., in 2018 (Hypothesis H2)".

Bio: VaLery Aginsky is a forensic chemist working in the field of forensic document examination for 41 years. He received his Ph.D. in Analytical Chemistry in 1980 from the Military Academy of Chemical Defense in Moscow, U.S.S.R. His training was with the Forensic Science Center of the Ministry of the Interior of U.S.S.R. He is currently employed with Aginsky Forensic Document Dating Laboratory located in East Lansing, Michigan. Dr. Aginsky is the author of more than 30 peer-reviewed articles on ink analysis and document dating, including chapters in several books and encyclopedias.

Arès, Mathieu, Liv Cadola, François Nougarou, Cyril Muehlethaler

Analyzing Toner Particle Distribution to Sequence Pen and Laser Printer Writings

Abstract: This study investigates the role of muscular activity in quantifying handwriting variation, with significant implications for forensic document examination. Utilizing electromyography (EMG) to measure muscle activity during handwriting, we discovered substantial variations even when no visible differences were observed in the handwriting itself. This finding suggests that handwriting variation is more extensive than previously understood, as subtle muscular changes are not always reflected in the written output. The results underscore the potential of muscular analysis in revealing hidden aspects of handwriting variability.

Bio: Mathieu Arès is a finishing Master's student at Université du Québec à Trois-Rivières, soon to be a PhD student in forensic science. He is also a researcher in document and handwriting for the Canadian Border Service Agency. Mathieu is here to present his Master's project. This is his second time attending the ASQDE meeting, and it certainly won't be his last.

Arès, Mathieu, Liv Cadola, François Nougarou and Cyril Muehlethaler

Understanding Handwriting Variation: Are Muscles the Answer?

Abstract: This study investigates the role of muscular activity in quantifying handwriting variation, with significant implications for forensic document examination. Utilizing electromyography (EMG) to measure muscle activity during handwriting, we discovered substantial variations even when no visible differences were observed in the handwriting itself. This finding suggests that handwriting variation is more extensive than previously understood, as subtle muscular changes are not always reflected in the written output. The results underscore the potential of muscular analysis in revealing hidden aspects of handwriting variability.

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Butler, Kate

I Had a Case...Hiding in Plain Sight

Abstract: Oftentimes when communicating with investigators and attorneys, Forensic Document Examiners (FDE) may say something along the lines of, "Many seemingly insignificant documents involved in criminal or civil litigation may contain conclusive proof of certain facts." Meaning, many of those trained to investigate crimes may overlook evidence that trained FDEs may find valuable or may find contains value after examination. This is the tale of such a case. From beginning to end, document evidence lay hidden in plain sight.

Bio: Kate Butler is a Senior Crime Laboratory Analyst with the Florida Department of Law Enforcement Pensacola Crime Lab Document Examination Section. She has a Bachelor of Science degree in Forensic Chemistry from the University of Mississippi. She is a member of the Southeastern Association of Forensic Document Examiners, American Academy of Forensic Sciences Questioned Document Section, and the OSAC Working Group for Forensic Document Examination. She has testified as an expert witness in Forensic Document Examination in the State of Florida since 2012.

Holt, Melanie

Back to Basics – What are 'fundamental differences,' when do they apply and the importance of the intercomparison.

Abstract: This presentation will discuss two recent cases the author was involved in where both opposing examiners failed to follow standard methodology. Whilst very different cases, the first being a handwriting case and the second, a signature case, the mistakes made by both examiners were similar. In both cases, in the author's opinion, each examiner neglected to undertake a thorough intercomparison of the material provided leading, again in the author's opinion, to erroneous results. The errors were compounded by the lack of understanding of fundamental differences and their importance in an examination. The first case, led to extensive cross-examination of the author on what a fundamental difference is, when they apply and why they are significant in coming to a conclusion on authorship. The second matter involved likely contamination of the specimen signature samples. This presentation will recap the current literature on fundamental differences and their significance as well as provide real-life case examples where they formed an integral part of the examination and the conclusions reached.

Bio: Melanie Holt is a Forensic Document Examiner. She holds a Bachelor of Applied Science (Forensic Investigation). She started her career with the NSW Police Force before commencing her private practice, Documents in Dispute, in 2018. Melanie is a corresponding member of ASQDE, a committee member of ASFDE Inc. and is the only international examiner to be certified by the ABFDE. Melanie is now based in Queensland, Australia.

Hunter, Gina

Font Flexin' with Aptos: Is This Next Gen Typeface Slayin' or Playin'?

Abstract: The Aptos font, originally named Bierstadt, became available for public use in 2023. Developed by typeface designer Steve Matteson, Aptos is a contemporary sans-serif typeface known for its clean lines, balanced proportions, and modern aesthetic. The Aptos font emerges as a compelling contender in the realm of typefaces, drawing comparisons to the longstanding favorites Calibri and Arial. While Calibri and Arial have dominated digital communication for years with their widespread adoption and readability, Aptos brings a fresh perspective to the typographic landscape. This presentation will walkthrough some of the font characters and how they compare across the three typefaces.

Bio: Gina Hunter has been a Forensic Document Examiner at the San Diego County Sheriff's Department Crime Laboratory since 2015. Gina is certified by and a Director of the ABFDE, a Regular Member of the ASQDE, an Associate Member of the AAFS, and a member of the AAFS/ASQDE QD Steering Committee.

Kalantzis, Nikolaos (presented on behalf of co-authors Nicole Crown-Burri, Raymond Marquis, Carolyne Bird)

Illustrated Guide of Handwriting Features used by FHEs

Abstract: Forensic handwriting examination follows a four-step process named ACE-V, which stands for analysis, comparison, evaluation, and verification. Central to the analysis part of the process is the identification of handwriting features. Numerous references describe handwriting features that should be analysed. However, several authors may not use a common terminology. Often, feature and concept definitions are given without illustration, and sometimes definitions are vague, ambiguous, or at odds with other sources. To date there isn't an internationally used, comprehensive and fully illustrated list of handwriting features for forensic handwriting examination. This project presents a comprehensive depiction of writing features relating to handwritten texts and signatures, with high quality illustrations. The definitions have been set by consensus between the authors and based on relevant references.

This catalogue of characteristics is structured according to the principle recommending that forensic analysis follows a process going from the general to the particular. This project seeks to contribute to establishing a systematic and harmonised approach to forensic handwriting examination on an international level.

As a consequence, some laboratories or examiners refuse to examine non-original handwriting. Others only express opinions of lowest evidential strength. Nevertheless, information extracted from non-original documents, can still significantly assist the legal authorities, in some cases, even resulting in strong conclusions about the document's nature or the authorship of the questioned entries.

Based on real-life cases, we present a simple, straightforward and logical way of interpreting non-original handwriting and signature evidence under two pairs of competing propositions, one pair relating to the writer of the original handwritten entry, the other relating to the possibility of alterations made to the document during the reproduction process. This approach allows the FHE to report the evidential value of the observable handwriting characteristics in the questioned writing, taking into account the image quality of the reproduction, while incorporating any findings relating to the document as a whole (or the absence thereof) in the second pair of propositions. In many cases, this results in the examiner's reservations being shifted from the first question to the second, and clearly shows that the main source of the uncertainty lies in the absence of the original, a point currently often presented in the form of a disclaimer.

Kalantzis, Nikolaos, Nicole Crown-Burri, Erich Kupferschmid

Examination of non-original documents: a structured approach

Abstract: Nowadays, forensic examination of non-original documents, such as photocopies or scans, may play an important role in legal procedures. However, limitations need to be considered, because documents may be altered or manipulated in undetectable ways and, depending on the image quality, certain handwriting features may be difficult to assess properly. These limitations increase the uncertainty underlaying the examinations and may lead to misleading evidence if they are not properly considered.

As a consequence, some laboratories or examiners refuse to examine non-original handwriting. Others only express opinions of lowest evidential strength. Nevertheless, information extracted from non-original documents, can still significantly assist the legal authorities, in some cases, even resulting in strong conclusions about the document's nature or the authorship of the questioned entries.

Based on real-life cases, we present a simple, straightforward and logical way of interpreting non-original handwriting and signature evidence under two pairs of competing propositions, one pair relating to the writer of the original handwritten entry, the other relating to the possibility of alterations made to the document during the reproduction process. This approach allows the FHE to report the evidential value of the observable handwriting characteristics in the questioned writing, taking into account the image quality of the reproduction, while incorporating any findings relating to the document as a whole (or the absence thereof) in the second pair of propositions. In many cases, this results in the examiner's reservations being shifted from the first question to the second, and clearly shows that the main source of the uncertainty lies in the absence of the original, a point currently often presented in the form of a disclaimer.

Bio: Nikolaos (Niko) Kalantzis holds a BSc in Physics, a PgD in Forensic Science, an MSc in Questioned Documents, and a diploma (FSSocDip) from the Chartered Society of Forensic Science. He is a Professional Member of this society and a corresponding member of the American Society of Questioned Document Examiners (ASQDE). Niko serves the courts of Athens and Piraeus, manages the Chartoularios Institute, an associate member of ENFHEX, where he has been on the Steering Committee since 2019. He is also listed as an expert with the International Criminal Court and NRGD. Since 2018, Niko has been a researcher at Staffordshire University, participating in research projects and delivering lectures at undergraduate and postgraduate levels.

Kulbacki, Kevin

Introduction to Electronic Signatures for FDEs

Abstract: Electronic signatures and electronic records have legally accepted in the United States under laws such as the E-SIGN Act and the UETA for almost 25 years. These laws set a permissive framework under which a signature, contract, or other record relating to such transaction may not be denied legal effect, validity, or enforceability solely because it is electronic form. These laws did not however set forth technical requirements for electronic signatures and records and, as technology has advanced, many different implementations of electronic signatures have been utilized with varying levels of forensic reliability for determining authorship or attribution. This presentation will explore the diverse implementations of electronic signatures, focusing on their forensic reliability. Key topics will include defining relevant terms, understanding the concept of an original document in the context of electronic signatures, and examining the types of images used to visually represent electronic signatures. Additionally, the talk will introduce the information provided by digital certificates and audit trails that may aid Forensic Document Examiners for investigative purposes. Finally, a comprehensive methodology for the forensic examination of electronic signatures will be discussed, providing attendees with practical insights into this critical aspect of modern document verification.

Bio: Kevin Kulbacki is a Forensic Document Examiner with KDX Forensic Consulting, having received his initial training at Osborn & Son. He earned a Bachelor of Science Degree in Forensic Science from UCF, a Master of Science in Forensic Science from UF, and is certified as a Diplomate of the American Board of Forensic Document Examiners. Kevin is a member of ASQDE, the Chair of the AAFS Questioned Documents Section, and the Chair of the ASB Forensic Document Examination Consensus Body.

Lanners, Brenda, Dennis Ryan, Mark Goff, and Stephanie Kingsbury

Opening Doors: Rethinking Membership Requirements to Safeguard the Future of the ASQDE

Abstract: The Membership & Credentials (M&C) Committee of the ASQDE has been mindful of the persistent decline in Society membership and qualified applicants. Membership has dwindled from 136 members in 2017 to 96 members in 2024. The M&C Committee believes that changes are needed to maintain the ASQDE's status as the premier membership organization for Forensic Document Examiners.

In January, the Committee distributed two surveys: one to current ASQDE members and another to 167 non-members, including AGM invited guests, former ASQDE members, members of AAFS, SAFDE, SWAFDE, MAFS, and QD organizations outside the US. Based on survey results and Committee deliberations, we propose four changes aimed at immediately bolstering ASQDE membership. A panel discussion will present these proposals, inviting input from both members and non-members. All respectful dialogue will be allowed, and voting members will decide on these proposals at the business meeting.

Proposal #1: Modify Provisional Membership to allow members to remain Provisional indefinitely. Argument for: Provisional Members, like Corresponding Members, are fully vetted before membership approval and cannot vote. Currently, Provisional Members must promote to Regular Member within three years or face termination (Article II.8). Allowing Provisional Members to remain in this category accommodates qualified members who may lack the time or resources to advance.

Proposal #2: Add a requirement for Provisional Member applicants to have attended a meeting within the past 3 years, aligning with Corresponding Member requirements. Argument for: Currently to become Provisional, members must have presented within the past 3 years, but attendance within the past 3 years is not required. This addition would bring Provisional and Corresponding requirements in line with each other.

Proposal #3: Allow ABFDE certified examiners to become Regular Members without further testing or research. Argument for: The ASQDE has lost qualified, active, and engaged members because of the requirement for Provisional Members to test or conduct research to promote to Regular Member. Other qualified examiners have never applied to the ASQDE because of this requirement, one which is forced only on FDEs from the US and Canada. Examiners who have been subjected to the rigorous certification process conducted by the ABFDE should not have to undergo additional testing or research to prove that they are qualified examiners. The ABFDE is accredited by FSAB and the exams are validated by ACT.

Proposal #4: Create a University Student Member category. Argument for: Introducing a student membership tier would facilitate mentorship, leadership, and guidance for students interested in Questioned Documents and forensic disciplines. This initiative offers a pathway to attract new members into the ASQDE and the QD profession. Implementing these proposals would fortify the ASQDE's membership base and ensure its continued relevance and influence in the field of Forensic Document Examination.

Bio: Brenda Lanners is the Senior Forensic Document Examiner at the San Diego Sheriff's Crime Lab. She has been a member of the ASQDE since 2011, and currently serves as a Director and the Membership & Credentials Committee Chair. Brenda was certified by the ABFDE in 2014. She has a BS in Biology from San Diego State University, an AS in Forensic Technology from Grossmont College, and a Graduate Certificate in Forensic Document Examination from Oklahoma State University. Brenda was trained by Marie Durina and Dr. Linton Mohammed.

Dennis Ryan is an examiner in private practice with Applied Forensics LLC for the past twenty years. Prior to entering private practice Mr. Ryan was an examiner with the Nassau County Police Department in Mineola New York. Mr. Ryan is a Diplomate of the American Board of Forensic Document Examiners, a member of the American Society of Questioned Document Examiners and a member of the American Academy of Forensic Sciences.

Mark Goff is an FDE at the Michigan State Police Lansing Forensic Laboratory. He is a diplomate of the ABFDE, a member of the OSAC QD subcommittee and the ASB. He is also a member of AAFS QD section, ASQDE, SAFDE, (MAFS) Midwestern Association of Forensic Scientists where he was previously the Questioned Document Section Chair and a Director at FSAB. Mark was recipient of the MAFS new scientist award in 2014, the AAFS regional award in 2015, and the AAFS QD section Maureen Casey-Owens Award in 2021.

Stephanie Kingsbury has a BS in Chemistry and Criminal Justice from Carthage College, and a MS from George Washington University. Stephanie is the Senior Forensic Document Examiner at the U.S. Postal Inspection Service National Forensic Laboratory and is the Acting Assistant Laboratory Director for the Questioned Documents and Imaging section. Stephanie is an Adjunct Professor at George Washington University, where she teaches a course in Questioned Document Examination. Stephanie is a Diplomate of the ABFDE and is on the Executive Committee. She is a member of the ASQDE and AAFS. Stephanie is also an active member in the AAFS/ASQDE Sub-Committee Working Group.

Liu, Ning, Li Zhiyi, Han Yunong, Dong Yang, Han Huibing, Li Jiangchun

A Quantitative Research of the Three-dimensional Characteristics of Pen Marks for Identification of Tampering with Toner Laser Printers

Abstract: In Printed document examination, identification of sequence of handwriting and toner is frequently encountered. Due to the heat and pressure applied to the document by the fuser unit of the printer, the handwriting on a tampered document must undergo three-dimensional deformation. Initially, the hard tip of a pen would create grooves on the paper and cause subtle deformations to the surroundings. After the document went through the process of "hot-pressing", the three-dimensional structure of the strokes and its surroundings will be deformed again. In this paper, an innovative three-dimensional reconstruction method based on Reflection Transform Imaging was used to quantitatively analyze the signatures performed with gel pens and roller-ball pens. The focus of these experiments was to investigate the deformation signs before and after being "hot-pressed". It was observed that: 1. Various degrees of three-dimensional deformation took place on the strokes and their grooves. 2. The ridges of sister lines elevated to varying degrees after being printed. 3. Creases may appear on the paper which positions are relative to the strokes. It is more likely for creases to appear around the strokes with greater pen pressure, and the strokes are perpendicular to the fusing roller, due to the ironing and crushing line by line. The result of this study suggests that these three aspects of deformation can be indicators of printing-tampering. Meanwhile, the new three-dimensional reconstruction and quantitative analysis are proved to be a fine analysis technique for questioned document examiners, revealing the three-dimensional features of pen marks that cannot be detected by conventional means.

Bio: Liu Ning is an associate professor and retired teacher from the Department of Forensic Science at Jiangsu Police Institute. She graduated from the Criminal Investigation Police University of China and earned a Bachelor of Science degree in Forensic Science. She holds a Master of Arts degree from the Beijing Film Academy. She is a member of the ASQDE, and the AAFS.

Li Zhiyi is an IT technician at Nanjing Chaoweixing Technology Co., Ltd. He graduated from the California College of the Arts in the United States with a Master of Arts degree in Experimental Animation.

McGowan, Michael and Kevin Kulbacki

Better Together: Avoiding the Pitfalls of PDF Analysis through an Integrated Approach

Abstract: What do you do if you receive a PDF file with annotations added with a stylus? Did anything get lost in the email transfer? Can you trust the dates in the document metadata? What else might be hidden in the file? In this talk, Mike McGowan, a digital forensic examiner, and Kevin Kulbacki, a forensic document examiner, will discuss the benefits of combining both disciplines. We will show how PDF files can contain: 1. Past revisions not visible in a standard PDF reader, that may reveal erased or altered annotations. 2. Evidence of whether an image-based electronic signature was pasted in or drawn using a stylus or finger. 3. Information about the device used to annotate the document, such as an Apple iPad, Android phone, or computer. We will also provide practical guidance on handling PDF files from initial receipt to examination. PDFs are complex and often contain more than meets the eye. They are an important and growing source of evidence as users increasingly sign and annotate PDFs on tablets and other devices using basic annotations rather than secure digital signatures—either cryptographically-validated digital signatures or digitally captured signatures that also record biometric data. Attendees will learn how forensic document examiners and digital forensic examiners can work together effectively. We will cover how forensic document examiners can address document authentication questions and how digital forensic examiners can uncover metadata, revisions, and other hidden information within PDF files to support the document examination.

Bio: Mike McGowan runs Metafor, a digital forensic firm based in New York City. For over 20 years, Mike has resolved forensic issues involving electronic data; in particular, assessing whether electronic documents, emails, and text messages have been forged, backdated, or otherwise altered, and timelining activity on computers, smart phones, networks, and cloud platforms. Mike earned a Bachelor of Arts in Economics and Statistics from the University of Chicago and holds certifications in analysis of Windows computers (GCFE), mobile phones (GASF), auditing systems (CISA), and cryptocurrency tracing (CCFC).

Kevin Kulbacki is a Forensic Document Examiner with KDX Forensic Consulting, having received his initial training at Osborn & Son. He earned a Bachelor of Science Degree in Forensic Science from UCF, a Master of Science in Forensic Science from UF, and is certified as a Diplomate of the American Board of Forensic Document Examiners. Kevin is a member of ASQDE, the Chair of the AAFS Questioned Documents Section, and the Chair of the ASB Forensic Document Examination Consensus Body.

Olson, Larry

"Leopold-Loeb Revisited" Reprised: Document examiners help unravel "the Perfect Crime"

Abstract: To acquaint modern examiners with the facts of this historic case, from the forensic document examiner's point of view The year 2024 marks the 100th anniversary of the thrill-killing of Bobby Franks by Nathan F. Leopold, Jr., and Richard A. Loeb, two wealthy teenaged geniuses in Chicago. Due to the sensational elements of the crime and the presence of Clarence Darrow, an ardent opponent of the death penalty, for the defense, it was perhaps the first case to be dubbed "the Crime of the Century" and "the Trial of the Century." The story has been told and retold in many works of fiction as well as nonfiction. The physical evidence in the case included handwritten, hand printed, and typewritten documents. According to newspaper accounts, as many as nine "experts" in handwriting and typewriting may have been consulted at the behest of various parties, although only two questioned document examiners testified at trial. This presentation was first given at ASQDE in 2004. Since then, several additional books have been written about the case. One, The Leopold-Loeb Files, by Marilyn Barnett, was the first to show at least partial images of the documents in the case. However, who all the experts were and the roles they played have still been ignored in print. Keywords: questioned documents, handwriting, hand printing, typewriting, historic cases

Bio: Larry Olson is a Forensic Document Examiner retired from the IRS Center for Science and Design. He earned a B.S. Degree in Chemistry from the US Naval Academy and a M.S. in Forensic Science Degree from George Washington University. He received his training from the Immigration & Naturalization Service and Internal Revenue Service National Forensic Labs. Larry is a member of the ASQDE, the Questioned Document Section of the AAFS, MAFS, SWAFDE, and is a Diplomate of the ABFDE.

Orta, Raymond

"Forensic Validation of Historical Documents: Unveiling the Authenticity of the 'Somarsall' and 'King' Collections in the Context of the Venezuela-Guyana Esequibo Dispute"

Abstract: In 2022, the Orta Document Laboratory completed a forensic examination of two collections of historical documents known as "Somarsall" and "King," which surfaced in Venezuela. This study was conducted to authenticate these documents using a multifaceted analytical approach and to assess their relevance to the ongoing Venezuela-Guyana Esequibo territory dispute. The laboratory's detailed examinations of the paper and parchment materials, ink characteristics, and general writing features included analysis of vellums, fiscal stamps, dry seals, and both wax and lead seals. These elements were compared with public standards to assess their consistency with the materials and printing methods from the period when the documents were created. Additionally, the styles of handwriting in the documents were analyzed to determine their contemporaneity with the calligraphy typical of their production time. Extensive research was also carried out using bibliographic sources and virtual libraries from universities and public bodies worldwide, aiming to verify the historical accuracy of the events, origins, and provenance of the paper supports and other elements like fiscal stamps and seals. The contents of the documents were meticulously examined to ensure alignment with established historical data available in public and official repositories. The comprehensive analysis confirmed the authenticity of both the "Somarsall" and "King" document sets, establishing them as genuine historical artifacts. These documents are crucial for understanding the historical boundaries and rights within the context of the Venezuela-Guyana Esequibo dispute. This validation underscores the importance of sophisticated forensic methods in the authentication of historical documents, highlighting the role of detailed physical, calligraphic, and historical examinations in verifying the legitimacy of historical texts crucial to international disputes.

Bio: Raymond J. Orta Martínez is a Handwriting Expert with robust credentials in legal, forensic, and police sciences, holding specializations from the Central University of Venezuela and Nueva Esparta University. Registered with the Supreme Tribunal of Justice of Venezuela since 2000, he has made substantial contributions to the field as the founding president of SIPDO, an association of Spanish, French, and Portuguese-speaking forensic document examiners. His academic roles span professorships at leading Venezuelan institutions, where he organizes forensic seminars. Additionally, Raymond shares his expertise through a YouTube channel dedicated to forensic document examination.

Osborn, Kelsey and John Osborn

The Application of the Current Standard for Conclusion Terminology: A Look at Limiting Factors and Conclusions

Abstract: This presentation will focus on aspects of case review, examination of material, limiting factors, and the application of the current standard for conclusion terminology and the current standard for the examination of handwritten items. One author was asked to review a matter involving the examination of two questioned signatures that were allegedly executed by two different writers. He was asked to review the matter and potentially provide testimony to rebut another expert who opined with "certainty" that the two signatures were prepared by the same writer. The rebuttal testimony described the current ASB Standard for Examination of Handwritten Items and explained that the supplied evidence was insufficient to appropriately apply a conclusion expressing certainty due to a number of limiting factors. This work was reviewed and discussed by both authors, which prompted a conversation about the current conclusion terminology, the potential future conclusion terminology, and the "weight" of common limiting factors when reaching conclusions. The other author will be discussing these points in conjunction with the above case, as well as other potential situations an examiner may face in casework.

Bio: Kelsey Osborn is a 2019 graduate of the University of Central Oklahoma, where she earned a Bachelor of Science degree in Forensic Science and a Bachelor of Arts degree in English. She is currently working towards certification in the field of forensic document examination. Ms. Osborn completed training in 2021 under the supervision of John Paul Osborn, her uncle, at their family's private practice—which has been in operation since 1910. Ms. Osborn represents the fifth generation—and first woman—in her family to work in the field of forensic document examination. She is an active Trainee Affiliate of the American Academy of Forensic Science and an Affiliate member the American Society of Questioned Document Examiners. She also has two published articles in the Journal of Forensic Science.

John Paul Osborn is a forensic document examiner with over 40 years of experience with Osborn Associates. He was trained under the supervision of his late father, Paul Osborn, and granted certification by the American Board of Forensic Document Examiners in 1990. Mr. Osborn has been published in the Journal of Forensic Sciences and has presented research in the field to organizations including the American Academy of Forensic Sciences and the American Society of Questioned Document Examiners. Recently he was accepted as a Life Member in the ASQDE.

Singh, Anubhav and Surbhi Mathur

Revolutionizing Digital Document Security with Integrated Steganography and Cryptography

Abstract: This paper presents the development of a specialized program that improves the security and integrity of electronic documents by combining cryptography and hash value steganography in a novel way. Unlike conventional tools, this application combines strong cryptographic approaches with sophisticated steganography techniques to produce an all-inclusive safe encryption and data embedding solution. Steganography is a technique that may be used to discreetly conceal data from access in various electronic documents, such as text files, images, and PDFs. Simultaneously, the concealed data is encrypted using cryptography to prevent unauthorized access. Innovative symmetric and asymmetric encryption methods, such as AES and RSA, text, image, and PDF steganography algorithms, and digital signatures for non-repudiation and authentication are all included in the program. Integrating encrypted hash values into documents as a means of authentication and integrity checking is a crucial component of the application. A higher degree of protection is offered by this dual-layer security method, which guarantees that both the existence of concealed data and its contents are safe from malicious intruders. The capability of steganographic techniques, detectability issues, and performance optimization are among the practical features of the application that are covered in this study. Ethical and legal aspects have been looked at to guarantee technology can be utilized responsibly. Significant advancements in document verification, intellectual property protection, and secure communication are provided by the suggested application. This application creates an entirely novel standard for e-document security by combining encryption and steganography in an intuitive user interface. As a result, it protects sensitive data in an increasingly digital environment, making it an invaluable resource for people and companies.

Bio: Mr. Anubhav Singh is currently Pursuing a Ph.D. in Forensic Science from National Forensic Sciences University and He Has Bachelors and Masters in Forensic Science with a total of 20 Research Papers.

Tanaka, Tobin and Marc Gaudreau

Trainee Workshop: Illumination, optics, and evaluation of spectral examination results

Abstract: The variety of illumination and imaging equipment and methods available to document examiners has never been so diverse and plentiful. Certain techniques commonly in use today are available with greater flexibility, relatively low cost, and ease of application. The ease of equipment operation can mask the optical and physical complexity of the examinations being conducted. Modern equipment does not change the fundamental principles of optics and the interaction of inks, paper, and related materials for documents. While equipment is easier to use, the interpretation of observations and findings can seem to be abstract from the physical phenomena. This workshop will include the background of the electromagnetic spectrum as it applies to the visible, infrared, and ultraviolet portions of it. A practical discussion of optical systems, including sensors, filters, and illumination sources will be included in this along with references. Part of the trainee workshop will offer ideas on how to explain the concepts of luminescence, fluorescence, and types of illumination (ultraviolet, visible, and infrared) to laypersons. Complications, such as quenching, that can arise in different situations will be outlined. A hands-on workshop component will be the evaluation of various scenarios - how to interpret results from spectral comparators and other instruments such as handheld devices, how to explain these results to other examiners, to clients and to the courts. And how to withstand cross examination when questioned about the science. This workshop will enable junior examiners and trainees to understand the science behind spectral examinations and explain it correctly.

Bio: Tobin Tanaka is a forensic document examiner and president of Questioned Document Forensic Laboratory Inc, having recently entered private practice in Vancouver Canada after 30 years of Canadian government experience working in the field. His professional memberships include: the Document Section of the Canadian Society of Forensic Science, a regular member of the American Society of Questioned Document Examiners, a member of the Questioned Document Section of the American Academy of Forensic Sciences, a member of the Chartered Society of Forensic Sciences and a corresponding member of the Australasian Society of Forensic Document Examiners Inc. He is also certified by the American Board of Forensic Document Examiners.

Marc has worked as a forensic handwriting and document examiner, and a forensic science manager for over 40 years with various departments of the Canadian federal government including the Royal Canadian Mounted Police, the Canadian Security Intelligence Service, the Canada Revenue Agency, and the Canada Border Services Agency. In these last three departments Marc designed and set up the forensic laboratories, and managed the program and teams. In 2008 he moved to the private sector, Director of Research and Development at the Canadian Banknote Company (CBN), a security printing manufacturer and integrator. Marc has worked as a private forensic handwriting and document consultant throughout his career.

Tobin, David

F&F Diamond Sponsor Technical Presentation: VSCs: The Evolution Continues

Abstract: VSCs have progressed enormously since their invention over 40 years ago. This presentation will provide an overview of the latest capabilities that have been developed for recent VSC instruments.

Tolliver, Diane and Grant Sperry

Dear Friend

Abstract: "Dear Friend" is how Albert Sherman Osborn (ASO) and John Fawcett Tyrrell (JFT) often addressed one another in letters of correspondence. Sometimes JFT would address ASO as "Chief." This correspondence between these two pioneer forensic document examiners was located within the ASQDE Resource Center-Library boxes from JFT. These two master penmen, residing in different states, became very close colleagues and friends in those early days of the forensic document examination discipline. Their frequent communications by U.S. Mail were typed on letterhead and watermarked paper. Rarely, if ever, made available for viewing until now, these letters have been assembled in a searchable portfolio for members and guests of the 2024 ASQDE Annual General Meeting. These two FDEs discussed a range of professional subjects. They were also close enough to know each other's hobbies, families and vacation schedules. They even sent postcards to one another. Even more interesting was the sense of humor displayed by each of these giants in their letters. Poking fun at their own original signatures, the information in these letters is enlightening. One of these FDEs would nearly always dictate the letter to an office secretary. The typing habits of this person and the other FDE are interesting to note. About half of this collection contains original typed correspondence from ASO to JFT with original nib pen-ink signatures. The other half contains the carbon paper letters where the original was sent from JFT to ASO.

Bio: Diane Tolliver is a retired Forensic Document Examiner from the Indiana State Police Lab. She earned a Bachelor of Science degree in Criminology from Indiana State University and a Masters of Public Administration from Indiana University. She received her training from ISP FDEs Clarke Mercer and Doug Buck. She was supervisor of the Forensic Document Unit when she retired She is an ABFDE Diplomate, a Life Member of the ASQDE, and a retired fellow in the AAFS Questioned Document Section. She has also served as President of the ASQDE. Currently, she serves as the ASQDE Resource Center volunteer curator.

Grant is a past president and Life Member of the ASQDE. He also served as vice president, treasurer and Journal editor. He established the Society's original website and was curator of the ASQDE resource center. Grant is a Fellow of the AAFS, past member of the Forensic Science Foundation's Board of Trustees, charter member of SWGIT, a member of SAFDE, a Diplomate and past board member of the ABFDE, the recipient of the AAFS QD section's Ordway Hilton award and the Society's A.S. Osborn's Award of Excellence. Over the past 45 years, he's published numerous articles and presented or facilitated many FDE workshops and trainee sessions. Grant has been in private practice since 1995, after retiring from the USPIS and the US Army's CID lab.

Tu, Shun, Dai Xutong, Zeng Qi

A Study of the Quantitative Analysis of Pen Marks for the Inspection of Tampered Documents by Printing

Abstract: During a laser printing process, the heat and pressure applied by the fuser unit of the printer will distort the printed medium (paper) and the pen marks on it. Thus, studies in the deformation of pen marks caused by printing, can provide scientific basis in printed document examination. In this research, a writing robot was used to generate the writing samples to achieve controlled pen pressure. Samples created with various pen pressures and different paddings were analyzed before and after laser printing with a 3D reconstruction technique based on Reflectance Transform Imaging (RTI). The finding indicates: First, the harder the padding is, the less the writing is deformed after printing. Statistically, the ratio of the depth of the writing mark after printing to the original depth are 0.71 for soft padding, 0.83 for normal padding and 0.90 for hard padding. Second, the depth of pen marks can be affected by the properties of the stroke. The fluctuation of the depth ratio is affected by hardness of the padding. To be more specific, the standard deviation of depth ratio between different measuring point on same writing mark are 0.064 for soft padding, 0.036 for regular surfaces and 0.016 for hard padding. In conclusion, findings in this research can provide statistic support and scientific basis for determining the formation sequence of non-overlapping toner and writing.

Bio: Shun Tu, Doctor of Laws, associate professor of Southwest University of Political Science and Law in China. She was majored in forensic science, document examination and criminal investigation. She has been engaged in questioned documents examination and investigated over 1000 cases.

Vastrick, Thomas

Case Studies of Known Handwriting Specimens

Abstract: This presentation summarizes actual case examples of how adequate or inadequate known handwriting specimens can affect and examination and a conclusion. Multiple examples are provided that delve into the lessons learned to include whether the known specimens are actually known specimens, whether the known specimens have been tampered with, multiple staples of writing within the known specimens, what is needed to establish that a document is counterfeit, doctored evidence , and adequacy just to name a few. This presentation will discuss the unique factors in each case and how the matters were resolved by following the published standard processes without making unnecessary assumptions.

Bio: Thomas W Vastrick is a Life Member and current Secretary of ASQDE. He is also a Retired Fellow of the Questioned Documents Section of the AAFS. Mr. Vastrick is a Diplomate of ABFDE and has testified over 400 times. He has written one book and been a contributing author to four other books,

WORKSHOP

Belcastro, Peter Gregg Mokrzycki and Linda Eisenhart

Collection, Examination, and Preservation of Charred and Liquid Soaked Documents

Abstract: This forensic workshop at the ASQDE meeting in Atlanta will focus on the advanced analysis and recovery of documents severely damaged by fire and liquids. This session will delve into cutting-edge techniques for salvaging information from charred and liquid-soaked papers, including innovative methods for drying, cleaning, and stabilizing fragile documents. FBI experts will demonstrate the use of specialized equipment and techniques to recover obscured writing and printing on these types of documents. Through detailed case studies, participants will learn best practices for preserving the integrity of recovered documents and extracting critical intelligence. Emphasis will be placed on a collaborative hands-on approach to accurately recover, preserve, and stabilize charred and liquid-soaked documents.

Bio: Peter Belcastro has been employed with the Federal Bureau of Investigation for approximately 34 years. He was certified by the FBI Laboratory in 1997 and has been assigned to the Questioned Documents Unit (QDU) since 1995. Mr. Belcastro is currently the Technical Operations Program Manager for the QDU and has earned a Bachelor of Science degree from the University of Maryland and also carries a Master of Forensic Sciences degree from The George Washington University. Mr. Belcastro is a distinguished member of the Mid-Atlantic Association of Forensic Scientists (MAAFS) and is a member of the Midwestern Association of Forensic Scientists.

Gregg Mokrzycki earned a Bachelor of Arts Degree in International Relations from Johns Hopkins University and a Master of Forensic Science Degree from George Washington University. Since 1997, Mr. Mokrzycki has been employed by the Federal Bureau of Investigation Laboratory, beginning as a document analyst in the Questioned Documents Unit. Upon completing certification in 2000, Mr. Mokrzycki became a Forensic Document Examiner and is the program manager for the Matchmaker Reconstruction System. Mr. Mokrzycki is a distinguished member of the Mid-Atlantic Association of Forensic Scientists (MAAFS) and served as president of the organization from 2009-2010 and is a member of the Midwestern Association of Forensic Scientists.

Linda Eisenhart is a Supervisor Forensic Document Examiner with the FBI Laboratory's Questioned Documents Unit (QDU). After working for 10 years in private industry, she joined the FBI in 2013 and has been an examiner since 2015, conducting examinations on handwriting, printing, indented writing, alterations, polyethylene film and more. Linda is the program manager for research within the QDU. She has published numerous peer-reviewed journal

articles related to forensic document examination topics and is the recipient of the 2021 FBI Director's Award for Outstanding Scientific Achievement, the 2021 American Society of Crime Lab Director's Innovation Award and the 2018 FBI Medal of Excellence. Linda earned her Bachelor of Science degree in Chemistry from the University of Pittsburgh, her Master of Business Administration from DeVry University.