

JFI Abstracts from 2023

Issue 4: Oct - Dec 2023

Identifying the Shoe Model Based on its Impression in Blood Led to Finding DNA on the Shoe Upper

Author(s): Orit Daniel; Aviad Levi; Amit Cohen

Type: Case Report

Published: 2023, Volume 73, Issue 4, Page 309

Abstract: In 2019, a double murder was committed in Jerusalem. The forensics department recorded evidence at the scene, including eight bloody footwear impressions. To help identify possible suspects, the footwear impressions were submitted to the authors' laboratory to see whether they could identify the shoe model. The laboratory identified the outsoles as having been made by Hi Tec. The case investigators used this information to search for a lead, but were unsuccessful. A year later, the footwear expert discovered a shoe made by Nabel Inc. that was consistent in outsole design to that of the Hi Tec brand previously identified. Three years later, a suspect in another murder case was arrested. Relying on information obtained regarding the Nabel shoe model, the investigators found a pair of Nabel boots stained with blood from one of the 2019 double murder victims in the suspect's mother's house. These boots became central evidence against the suspect.

Using Infrared Light to Visualize Tire Marks on Clothing

Author(s): O'Sullivan, Carys; McCarthy, Colum; Carlisle-Davies, Felicity

Type: Article

Published: 2023, Volume 73, Issue 4, Page 319

Abstract: The value of trace evidence in a vehicle-pedestrian collision has been widely reported in forensic science. However, one evidence type that is routinely overlooked is tire marks (e.g., in traffic collision investigations). When an individual is run over by a vehicle, tire marks may be deposited on the clothing. These marks are generally unclear and difficult to visualize in natural light, yet very little research has focused on their enhancement. This work is one of the first to demonstrate the ability of infrared (IR) light to enhance tire marks on clothing. Various clothing items were driven over at a controlled speed and then visualized in IR using both the Video Spectral Comparator VSC6000/HS and the Crime-lite 82S. IR allowed visualization of numerous tire marks, 73% of which were not previously visible in normal white light. IR was also able to considerably improve the clarity of pattern details, even for marks that were visible in white light. The Video Spectral Comparator was compared to the Crime-lite 82S in its ability to enhance tire marks on clothing and was determined to have better visualization, more consistency, and less interference from shadows. This research has highlighted the ability of IR to improve visualization of this evidence type that may otherwise remain undetected.

LatentSleuth: An Emerging Latent Print Automated Searching Technology – A Validation Study

Author(s): Davis, Jessica J.; Hood, Mary M.; Cillessen, Sabrina S.

Type: Article

Published: 2023, Volume 73, Issue 4, Page 339

Abstract: Sciometrics LatentSleuth technology uses a ridge skeleton-matching algorithm to automate latent print searching. Incorporating all usable information within a latent print, rather than only minutiae as in traditional approaches, enables more challenging latent prints to be searched. Proprietary technology creates an overlay of the ridge geometry based on continuous short segments of ridges or furrows detected in both the latent and reference prints while adjusting for distortion in both. Accuracy of the overlays is determined, and a prioritized list is created. Prints that are distorted, prints that contain discontinuous ridges, prints that are of an unknown orientation, and prints containing limited minutia points may be searched.

Six hundred searches were conducted using 200 latent prints with true-mated reference prints. Latent print quality and comparison complexity (determined by the number of exemplars) were evaluated. Fifty latent prints of 4 different quality levels were searched against groups consisting of 3, 5, or 10 sets of reference images. Overall accuracy for high, medium high, medium low, and low latent prints was 98%, 95.3%, 98.7%, and 86.7%, respectively. Results were considered accurate if the true-mated reference image was one of the first five candidates on the prioritized list. The LatentSleuth software provided accurate results in all latent print quality levels against all evaluated levels of comparison complexity and was deemed suitable for use in casework. Implementation in casework may assist in limiting examiner fatigue, the identification of more challenging prints, and reducing case turnaround time by improving the efficiency of the comparison workflow process.

Evaluation of the RECOVER LFT System: Experiments on Metal Plates

Author(s): Craven, Nicolas; Youngling, Hailey; Walthall, Tina

Type: Article

Published: 2023, Volume 73, Issue 4, Page 357

Abstract: The commercial RECOVER LFT is a relatively new system that develops latent prints on metal surfaces. This article presents the results of six experiments: specificity, sensitivity, effects of prewashing prior to processing with the RECOVER, recovery of aged fingermarks, recovery of fingermarks after bleach, and comparison to a standard nonporous processing sequence. These tests were performed on controlled samples consisting of eccrine or a combination of eccrine and sebaceous matrices on smooth brass and steel metal plates. This was done in order to gain a baseline understanding of how the instrument performs. Initial testing indicated that the RECOVER consistently developed fingermarks on the brass samples regardless of matrix type. Eccrine and sebaceous-based fingermarks on brass had the strongest

development, followed by eccrine-based samples on brass. Results were less consistent on the steel samples, and development varied depending on the matrix type. The steel samples had weaker development than the brass samples, with the eccrine and sebaceous fingermarks on steel performing better than the eccrine-based fingermarks. The RECOVER can develop quality fingermarks on brass samples that are washed, but the washed brass samples did not consistently develop equal to or better than their unwashed counterpart. Prewashing of the steel samples proved to be detrimental to development. The RECOVER performed slightly better than the current Idaho State Police Forensic Services processing sequence. These findings are based on samples in optimal conditions. Further testing of semicontrolled and pseudo-operational samples is necessary to determine how to best utilize the RECOVER in casework.

Alice V. White Appointed Editor

Published: 2023, Volume 73, Issue 4, Page 395

Abstract: Alice V. White was appointed by the I.A.I. Board of Directors as the new editor of the Journal of Forensic Identification.

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Author(s): Siegel, Sandy, CLPE

Type: Article

Published: 2023, Volume 73, Issue 4, Page 398

Abstract: Funny finds from all over in their own words.

Issue 3: Jul - Sep 2023

Improving CSI Response: An Early Roadmap for the Increased Quality and Effectiveness of Crime Scene Investigations

Author(s): Treviño III, Joe C.; Kessler, Michael P.

Type: Correction

Published: 2023, Volume 73, Issue 3, Page 233

Abstract: On page 184 of the April–June 2023 issue of the Journal of Forensic Identification (volume 73, issue 2), Table 15 incorrectly indicated 0 for the County or County-Level Enforcement category. It should have read 6 for that category as shown below. The author apologizes for this error.

Recovering Fingerprints from Decomposing Human Remains Encased in Concrete

Author(s): Wiltsey, Michael T.; Sheganoski, Tiffany; Hood, Ian

Type: Article

Published: 2023, Volume 73, Issue 3, Page 235

Abstract: Obtaining identifiable fingerprints from decomposing human remains is often a difficult task. This technical note will explain a simple method for obtaining identifiable fingerprints from decomposing human hands that have been encased in concrete.

Applying Suitability Criteria to Past Latent Print Casework Analysis Mark-Ups

Author(s): Fox, Ashley

Type: Technical Note

Published: 2023, Volume 73, Issue 3, Page 241

Abstract: The application of suitability criteria in latent print casework can serve as a quality assurance measure while providing a baseline for examiners, which can in turn increase decision stability and reduce conflicts. This article will discuss the results of applying a set of suitability criteria (provided by Evolve Forensics) to a sample of past latent print casework analysis mark-ups from seven examiners. A total of 232 suitability determinations were observed from 77 cases. Overall, the examiners were fairly consistent (section average = 91.8%) with the set of suitability criteria applied, and trends were identified when inconsistencies with the criteria occurred.

Fingermark Development Techniques Before 1880: First Fingermark Development Techniques in History?

Author(s): Claveria, Sergi; Delgado, Raquel

Type: Article

Published: 2023, Volume 73, Issue 3, Page 255

Abstract: The forensic use of fingerprints began its trajectory in the last decades of the 19th century. Interestingly, before that period, some development techniques had already been documented, which enabled future optimization of fingerprint search techniques.

In this article, five fingermark development techniques documented before 1880 are presented, as well as a brief biography of their discoverers: Paul-Jean Coulier, Pierre François Aubert, and Adrien Charpy.

Hermann Welcker's Contribution to the Study of Friction Ridge Persistency

Author(s): Merlo, Jason

Type: Article

Published: 2023, Volume 73, Issue 3, Page 269

Abstract: The study of friction ridge persistency began in the mid-19th century. However, there is a lack of clarity in at least one authoritative text regarding who the first

person to begin a persistency study was. This paper employs a literature review to briefly examine the work of William Herschel, Francis Galton, and Hermann Welcker toward the establishment of friction ridge comparison as a valid means of personal identification through the study of friction ridge persistency. Because of its publication in German, Welcker's 1898 paper documenting his 41-year interval between palm impression recordings has received very little attention in the English-speaking world of friction ridge comparison. A summary of Welcker's paper is presented and its relevance is discussed, intending to clarify Welcker's role in the history of the study of friction ridge skin.

Organic Visualization Agents that Fluoresce Latent Fingerprints on Various Nonporous Substrates

Author(s): Henderson, Rachel Ashlyn

Type: Article

Published: 2023, Volume 73, Issue 3, Page 279

Abstract: Powder dusting an object for fingerprints that are not readily visible to the naked eye is a technique used around the world. However, some fingerprint powders on the market today may not be safe for users or may not be environmentally friendly. This research investigated organic powder alternatives that offer fluorescence and well-defined detail in the hopes of finding a substitute for the traditional chemical-based fluorescent fingerprint powders. Ten organic white powders were evaluated on fingerprints deposited on glass beer bottles, aluminum cans, and plastic reusable water bottles. The top performing organic white powder was determined and then was mixed in 0%, 20%, 40%, 60%, 80%, and 100% concentrations with either vitamin B1, vitamin B2, zinc, or chlorella because of their ability to naturally fluoresce. The most successful mixtures were vitamin B2 and zinc mixed with either xanthan gum or cream of tartar at concentrations between 60% to 100%. It is clear that competitive organic fluorescent fingerprint powders can be produced that may be safer.

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Author(s): Siegel, Sandy, CLPE

Type: Article

Published: 2023, Volume 73, Issue 3, Page 306

Abstract: Funny finds from all over in their own words.

Issue 2: Apr - Jun 2023

AMYG: Not Just Another Palmar Formation

Author(s): Schroeder, Corey

Type: Technical Note

Published: 2023, Volume 73, Issue 2, Page 113

Abstract: The hypothenar region of human palmar friction ridge skin can have numerous formations, one of which has not been adequately defined to allow an examiner to reliably analyze and describe the formation: the amygdaloid pattern. This research into amygdaloid patterns in the hypothenar gives a scientific definition (geometric shape) that describes this pattern type. After the analysis of thousands of palmprint impressions, the author provides a definition identifying this pattern.

From RAM to RhoMMeOH: Chemical Modification of the Cyanoacrylate Dye Stain RAM for Visualization of Latent Prints

Author(s): Mills, Dawn M.; Richard, Adam H.; Ahmadi, Armin; Roh, Kyung-Ho

Type: Article

Published: 2023, Volume 73, Issue 2, Page 123

Abstract: RAM is a combination cyanoacrylate dye stain used to visualize latent prints based on the luminescence properties of three fluorescent dyes: rhodamine 6G (R6G), Ardrex P133D, and 7-(p-methoxybenzylamino)-4-nitrobenz-2-oxa-1,3-diazole (MBD). This study investigates the chemical formulation of RAM in an effort to address the partitioning of its components due to a combination of immiscible solvents in order to enhance the overall performance of the cyanoacrylate dye stain solution. The solvent type, concentration of fluorescent dyes, and absorption and fluorescent characteristics were investigated to maximize performance. The modification of RAM resulted in a combination of R6G and MBD in methanol (RhoMMeOH). RhoMMeOH and RAM were applied to cyanoacrylate-fumed latent prints (split in half) collected from 11 donors in depletion series and aged at different time frames before processing (24 hrs to 8 weeks). Qualified latent print examiners evaluated the ridge detail in order to rate the latent prints based on performance of each dye stain solution. RhoMMeOH demonstrated an enhanced performance (up to 21% of the prints were evaluated to have improved visualization) due to its improved chemical formulation on a variety of substrates while reducing expenses and resources for latent print visualization.

Transfer of Latent Prints on Duct Tape

Author(s): Anderson, Elizabeth

Type: Article

Published: 2023, Volume 73, Issue 2, Page 143

Abstract: This research studied the transfer of latent prints from the adhesive side to the nonadhesive side of duct tape and vice versa. Initial trials were done to observe how easily this transfer occurs on an inexpensive type of duct tape and on a more expensive duct tape. The study was then expanded to include time trials and tape separation methods. Time trials tested transfer at 1 week, 6 weeks, and 3 months. Separation methods of tape included a freezer separation method and un-du (an adhesive neutralizer). The samples were processed for latent prints using cyanoacrylate fuming and a dye stain on the nonadhesive side of the tape and a powder suspension method on the adhesive side. Results showed that transfer occurred in both directions in most trials. This research illustrates that the comparison of latent prints from either side of

duct tape should be conducted as the prints were observed and as laterally reversed images.

Improving CSI Response: An Early Roadmap for the Increased Quality and Effectiveness of Crime Scene Investigations

Author(s): Joe C. Treviño III, Joe C.; Kessler, Michael P.

Type: Article

Published: 2023, Volume 73, Issue 2, Page 169

Abstract: The Crime Scene Investigation and Reconstruction Subcommittee within the Organization of Scientific Area Committees for Forensic Science (OSAC) has highlighted the need for empirical research on adequate crime scene investigator (CSI) staffing levels via crime scene response. A study was designed to investigate what CSIs considered adequate response via a survey with questions that targeted the factors affecting the quality and effectiveness of an investigation, what is feasible to handle alone without sacrificing quality and effectiveness, when extra staffing is needed, the barriers to hiring more personnel, and what the amount of extra staffing needed is within the focus established by the OSAC CSI Subcommittee. The survey was taken by both investigators and managers across many levels of government and in different areas of the United States. With few exceptions, there was consensus between investigator and manager responses throughout the study.

Employers and policymakers can use these data to address staffing or response according to agency-specific needs, thereby increasing the quality and effectiveness of crime scene investigations at a customizable scale.

See [Correction](#) for this article

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Author(s): Siegel, Sandy, CLPE

Type: Article

Published: 2023, Volume 73, Issue 2, Page 232

Abstract: Funny finds from all over in their own words.

Issue 1: Jan - Mar 2023

Letter to the Editor

Author(s): Kent, Terry

Type: Letter to the Editor

Published: 2023, Volume 73, Issue 1, Page 001

Dermatoglyphic Patterns in Monozygotic Twins with Zimmermann-Laband Syndrome

Author(s): Schwarz, Martin; Kanich, Ondřej; Berka, Miroslav; Havlovicová, Markéta; Drahanský, Martin

Type: Case Report

Published: 2023, Volume 73, Issue 1, Page 003

Abstract: Zimmermann-Laband syndrome is a rare genetic disorder. Patients show multiple phenotypic abnormalities, including skeletal abnormalities of fingers and toes and hypoplasia or aplasia of nails. We studied a pair of monozygotic twins with this syndrome, confirmed at the molecular level, and performed a dermatoglyphic analysis. The analysis showed unusually simple patterning on all fingertips of both individuals: all patterns were arches. There were additional anomalies on the palms. The observed anomalies most likely reflect disharmony in the development of mesodermal structures of the hand caused by the syndrome. Because dermatoglyphs are complex traits, more research is warranted to unravel the relationship between involved genes and palmar patterns.

Using Footwear Impressions to Link Crime Scenes

Author(s): Pertsev, Roman; Levi, Aviad; Daniel, Orit

Type: Case Report

Published: 2023, Volume 73, Issue 1, Page 014

Abstract: Linking seemingly unrelated crime scenes through forensic data analysis can contribute to more effective case investigations. This case report discusses how investigators were able to solve a series of burglaries in central Israel. Twelve crime scenes were linked based on an impression of a specific shoe model collected at nine of the sites.

pH Dependency of Powder Suspensions on the Development of Fingermarks on the Sticky Side of Adhesive Tapes

Author(s): Schwarz, Lothar; Klenke, Inga; Engel, Klara

Type: Technical Note

Published: 2023, Volume 73, Issue 1, Page 021

Abstract: The use of common powder suspension is a well-proven method for developing fingermarks deposited on the sticky side of pressure-sensitive adhesive tape. The starting point of this study was the question of whether the pH value of the type of powder suspension commonly used in Germany (i.e., a suspension of lamp black powder and ether sulfate) has an influence on the quality of the fingermarks developed.

The answer to this question is, yes. Optimum development was achieved at pH values ranging between pH 3 and pH 4. In this study, we present an improved powder suspension that is capable of developing fingermarks with good clarity and contrast and

without background discoloration. By using citric acid for pH adjustment, the preparation of the suspension is simple and affordable. Moreover, using this natural acid has a positive effect on workplace safety and environmental protection.

POSME - New Powder Suspension to Increase the Effectiveness of Powders in Aged Fingerprint Development

Author(s): Claveria, Sergi; Fernández, Patricia; Clares, Néstor; Heredia, Roger; Pomerol, Mar

Type: Technical Note

Published: 2023, Volume 73, Issue 1, Page 033

Abstract: The development of fingerprints with powders is one of the techniques most used by forensic teams for latent print detection at crime scenes on objects that cannot be collected and transported to the laboratory. The success of this fingerprint development is conditioned, among other factors, by the age of the latent fingerprint residues.

Our study shows that it is possible to increase the effectiveness of the development of aged fingerprints with powders by subsequently applying an iron oxide-based powder suspension. The application of this product resulted in a 26.5% increase in effectiveness in the development of 45-day-old fingerprints on five different nonporous surfaces.

The Effect of Time When Using Recover Latent Fingerprint Technology to Develop Fingerprints on Brass Cartridge Cases

Author(s): Wong, Yin-Fai Ian; Slaney, Jaclyn; Power, Cameron ; Oliverio, Mary

Type: Article

Published: 2023, Volume 73, Issue 1, Page 048

Abstract: This research looked at determining whether fingerprints would continue to develop over time after Recover Latent Fingerprint Technology (Recover LFT) treatment on brass cartridge cases. The research also aimed to determine whether the fingerprint deposition time prior to firing would affect the quality and quantity of fingerprints developed using Recover LFT. The research demonstrated that after development, the quality of fingerprints changed over time. Three time intervals after treatment were researched: immediate, 48 hours, and 7 days. In the first trial, 22 fingerprints (18.3%) increased in quality after 48 hours, and 35 fingerprints (29.2%) increased in quality after 7 days when compared to the initial examination. In the second trial, 23 fingerprints (19.2%) increased in quality after 48 hours, and 22 fingerprints (18.3%) increased in quality after 7 days when compared to the initial examination. Fingerprint deposition time prior to firing also proved to greatly affect the quality of developed fingerprints. In the first trial, fingerprints were deposited 24 hours prior to firing and 15 fingerprints (12.5%) were suitable for identification immediately after processing with Recover LFT. In the second trial, fingerprints were deposited 1 hour prior to firing. In this case, only 4

fingerprints (3.3%) were suitable for identification immediately after Recover LFT treatment.

Analyzing Fingerprint Distortion as it Appears in Developed Eccrine and Sebaceous Impressions

Author(s): Fagert, Michael

Type: Article

Published: 2023, Volume 73, Issue 1, Page 071

Abstract: Variability in multiple impressions of the same finger can be attributed to various factors (e.g., the pliability of the skin, the type and amount of fingerprint matrix that is present, substrate type, deposition pressure, movement of the finger or hand during deposit). The way these factors manifest in developed latent impressions is referred to as distortion. Previous efforts have been directed towards describing the elasticity of the skin, characterizing how distortion appears in latent impressions, and modeling fingerprint distortion for matching algorithms. This study expands upon previous research by analyzing distortion as it appears in ninhydrin-developed eccrine impressions under various deposition pressures, shearing stress, and torque movements. The distortion characteristics that were observed under these conditions were then compared to those that were observed in powder-developed sebaceous impressions. General trends and characteristics were shared between the two types of impressions; some differences arose from the matrix-substrate interactions.

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Author(s): Siegel, Sandy, CLPE

Type: Article

Published: 2023, Volume 73, Issue 1, Page 112

Abstract: Funny finds from all over in their own words.