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Liza Zvi and Mally Shechory Bitton

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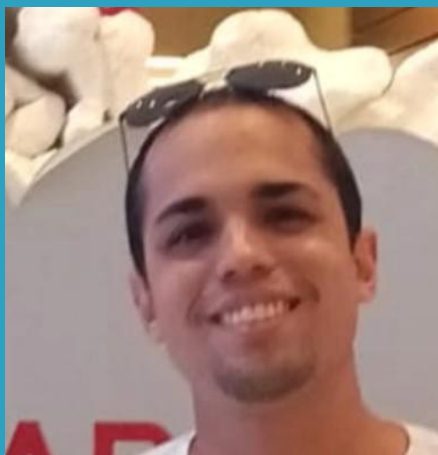
Police Perceptions of Rape Victims: Institutional Bias and Stereotypes Toward Sex-Working Victims

Abstract

This study examined whether police officers' perceptions of rape victims reflect a distinct institutional culture or broader societal attitudes, operationalized via comparison with a student sample. Drawing on theories of rape myths and the "ideal victim," the study focused on attitudes toward sex-working rape victims, who are often stigmatized and marginalized, yet constitute a population at high risk of experiencing sexual violence. A total of 450 participants - 220 police officers and 230 students - were presented with a vignette describing a rape case. The victim was identified as either a sex worker or not. Participants rated victim and perpetrator blame, sentencing, perceived victim resistance and harm, and their emotional responses toward the victim. Overall, victim-blaming was relatively low. However, significant group differences emerged. Police officers attributed more blame when the victim was identified as a sex worker, while students' blame attribution remained unaffected by the victim's status. Similarly, police officers were more lenient toward the perpetrator than students regarding punishment, particularly when the victim was identified as a sex worker. Police officers also perceived the victim as more capable of resisting and as suffering less harm, and expressed more negative and less positive feelings toward her. These findings suggest that police officers' perceptions of rape victims, particularly sex-working victims, reflect a unique institutional perspective, characterized by greater scepticism and reliance on stereotypes, rather than merely mirroring societal views. This highlights the need for targeted training programs aimed at reducing bias and enhancing empathy toward rape victims among law enforcement.

Biography

Liza Zvi is a senior lecturer at Ariel University and Deputy Head of the M.A. program in Clinical Criminology, where she also serves as supervisor and coordinator of clinical training. She is a licensed clinical criminologist with extensive experience as a forensic expert. As a researcher, she publishes on a range of topics related to forensic judgments.



Ivan Padron-Ramirez

Laboratório de Química Supramolecular e Nanotecnologia (LQSN), Instituto de Química, Universidade de São Paulo, Brasil

Engineered Magnetic Fluorescent Nanocomposite for Forensic Applications: Statistical Analysis of Fingerprint Development Efficiency Under Variable Conditions

Abstract

This study presents the synthesis, comprehensive characterization, and rigorous forensic evaluation of a novel multifunctional nanocomposite, $\gamma\text{-Fe}_2\text{O}_3\text{@PDA-Yellow-101}$, for the development of latent fingerprints. The material integrates a superparamagnetic maghemite core ($\gamma\text{-Fe}_2\text{O}_3$) for controlled application, a polydopamine (PDA) bio-adhesive shell for robust residue binding, and the photostable fluorophore Pigment Yellow 101 for high optical contrast. A single, standardized magnetic protocol was applied across five forensically relevant substrates: glass, ceramic, plastic, paper, and metal. Performance, quantified via Signal-to-Background Ratio (SBR), revealed a clear substrate-dependent hierarchy. Statistical analysis (Mann-Whitney U Test, $p < 0.001$) confirmed optimal results on non-porous surfaces, with glass, plastic, and ceramic yielding high-definition impressions ($\text{SBR} \approx 20$, Ridge Detail Level 3-4). The developed fingerprints exhibited exceptional durability, resisting adhesive tape lifting ($>90\%$ signal retention, T-test $p = 0.014$ and Wilcoxon $p = 0.007$), demonstrating effectiveness on 7-day-aged samples (Mann-Whitney $p = 0.06$) and photostability ($\approx 80\%$ signal retention). However, performance was moderated on paper, and a non-satisfactory result on metal. A dedicated interference study on glass, analyzed via parametric and non-parametric methods, showed the method to be robust against dust contamination but vulnerable to humidity exposure. These statistically validated findings position the $\gamma\text{-Fe}_2\text{O}_3\text{@PDA-Yellow-101}$ nanocomposite as a versatile and robust platform for latent fingerprint development, defining its optimal application niche on non-porous surfaces while highlighting specific environmental limitations for practical forensic use.

Biography

Iván Padrón Ramírez is a Cuban chemist and materials scientist who earned both his Bachelor's in Chemistry (2022) and Master's in Materials Science (2024) from the University of Havana. His thesis work focused on magnetic nanocatalysts for 1,4-dihydropyridine synthesis and gas adsorption on carbon nano-onions. Since 2023, he has worked as a Graduate Researcher at the Center for Technological Applications and Nuclear Development (CEADEN). In 2024, he participated in a summer school at the Joint Institute for Nuclear Research (JINR) in Dubna, Russia. His research spans nanotechnology (synthesis of plasmonic, magnetic, and carbon-based nanoparticles), organic synthesis, physical chemistry, computational chemistry (DFT calculations), and nanobiotechnology. He has co-authored five peer-reviewed publications and presented at numerous international conferences. His work includes projects on energy generation from carbon nanomaterials, nanocatalysis, and boron neutron capture therapy.

**Jeannie A. Golden, PhD, BCBA-D**

*Department of Psychology, East Carolina University
Greenville, NC 27858, USA*

Behavioral Perspectives of Criminal Activity and Implications for Innovative Treatment for Incarcerated Individuals

Abstract

Incarcerated individuals often present with emotional and behavioral dysregulation that are not comprehensively addressed through traditional cognitive-based therapies, which focus on increasing psychological flexibility and reducing emotional suffering by helping individuals change their relationship to thoughts, emotions, and behaviors. However, distress faced by incarcerated individuals are rooted in real histories of trauma, abandonment, systemic neglect, and survival-based behaviors that are functional in their environments. Incarcerated individuals are often expected to self-regulate in ways that ignore their biological, developmental, and social context resulting in treatment non-responsiveness, chronic dysregulation, or engagement in high-risk antisocial behaviors that are more functional for survival in their current context. This presentation will provide a behaviorally actionable model for intervention that teaches real-world decision-making skills that reflect the complexities of their environments: how to navigate gang-related activities, manage conflict without violence while surviving in a dangerous setting, and elevate one's social status to break systemic barriers that perpetuate poverty and violence. Incarcerated individuals often operate within constrained choices, so treatment must support small, achievable goals within their social context. A critical component of this work involves recognizing that gang involvement often fulfills legitimate psychological and social needs, such as belonging, identity, protection, and social status. The goal should not be to eliminate these needs or even eliminate gang involvement directly, but to encourage behaviors that provide sustainable avenues for social elevation.

Biography

Dr. Jeannie A. Golden is a Licensed Psychologist who received her Ph.D. in School Psychology from Florida State University in 1981. Dr. Golden has taught in the Psychology Department at East Carolina University for 44 years and became the first nationally Board Certified Behavior Analyst in North Carolina in 2000. Dr. Golden received ECU teaching awards in 2001 and 2009, the FABA Honorary Lifetime Membership Award in 1994, the NCABA Fred S. Keller Excellence in Behavior Analysis Award in 2005, the ECU Scholarship of Engagement Award in 2012, the NCABA Do Things Award for Outstanding and Sustained Contributions in 2013, the ECU Psychology Department Award for Distinguished Service in 2015, and the ECU Psychology Department Faculty Appreciation Award for Mentoring in 2017. Dr. Golden and colleagues received grants from Kate B. Reynolds Charitable Trust (2008-2011) and the Department of Health and Human Services (2011-2016) to provide school-based mental health services in two rural, impoverished counties in North Carolina. In March of 2018, Dr. Golden and colleagues were awarded the Creating New Economies Fund Grant by Resourceful Communities for the Greene County Community Advancement Project. Dr. Golden has been an invited speaker throughout the United States as well as internationally.



Dr. Debashis Das

Dr. Sudhir Chandra Sur Institute of Technology and Sports Complex, West Bengal, India

Fingerprint Biometric: Beyond User Authentication

Abstract

In the digital era, most of our personal information are mutually shared and transferred over the vulnerable digital transmission channel. Hence, there needs a highly secure environment to protect the data from a massive misuse. The biometric-based person identification and authentication are very much popular to achieve such data protection in various sectors like – i) Security and access control, ii) Law enforcement & forensics, iii) Banking & finance, iv) Healthcare, v) Mobile & Consumer electronics, vi) Government & Civil services, vii) Workforce management. Fingerprint biometric, amongst all other biometric traits, gains a large popularity due to its easy implementation, cost effectiveness and some other intrinsic properties. Therefore, an exhaustive research works have been carried out to make fingerprint-based biometric data protection system much more stronger in handling – security threats, liveness detection to protect spoofing, bio- cryptosystem, latent fingerprint analysis for criminal identification. However, few areas are still proved as very challenging and undiscovered where rigorous research focus is required such as – (a) Feature analysis from low quality latent fingerprint in criminal identification, (b) Powerful biometric authentication system design for infants along with a strong database construction, (c) Possibility of paternity testing from parent and offspring fingerprint analysis.

Biography

Dr. Debashis Das has received his PhD degree from the department of Computer Science & Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad in 2017. At present he is working as an Associate Professor in the department of Computer Science

& Engineering at Dr. Sudhir Chandra Sur Institute of Technology & Sports Complex, West Bengal, India. His research interest is in Image Processing, Image Steganography and Biometric Authentication. He has published 31 research articles in several conferences and journals of international repute. He has served as a reviewer, technical committee member of different reputed journals and conferences in India and abroad. He has completed one Government funded project sponsored by Defence Research & Development Organization, India. He is the life member of Indian Society of Technical Education) and member of IEEE since 2019. He is also associated with Institutions Innovation Council, Government of India as an Innovation Ambassador.



Karim Allaw

Forensic Science Department, Lebanese university faculty of science, American university of Beirut (AUB) with LEAF the Laboratories of environment food and agriculture, Lebanon

Soil Contamination from Military Activities in South Lebanon: A Forensic Investigation

Abstract

Armed conflicts generate long-term environmental impacts, particularly on soils exposed to explosives, heavy metals, and military-derived chemical pollutants. South Lebanon, repeatedly affected by armed conflicts, represents a critical post-conflict landscape where agricultural soils are increasingly threatened by contamination from military residues. Despite documented environmental degradation, systematic forensic investigations of post-conflict soils in this region remain limited.

The aim of this study was to assess the quality and forensic characteristics of agricultural soils in southern Lebanon following the 2006 war and subsequent military activities in the current conflict zone. Soil samples were collected in 2022 from 20 contaminated agricultural locations at depths of 0–15 cm, alongside a control (reference) area for baseline comparison. An integrated analytical approach was employed, combining advanced instrumental techniques with biological investigations.

Soil samples were analyzed using ICP-MS for heavy metal quantification and GC-MS/GC-ECD for the detection of nitroaromatic and cyclic nitramine explosives. Complementary microbiological analyses were conducted to evaluate impacts on microbial diversity and explore potential bioremediation strategies. Results revealed elevated concentrations of non-essential and toxic elements, including Pb, Ba, Ni, Cu, Zn, U, Cd, and As, exceeding permissible agricultural soil limits. Explosive residues such as TNT, RDX, and HMX were detected in several samples, with concentrations ranging from 73.563 to 150 ppb, surpassing regulatory thresholds even after more than a decade since active hostilities.

The absence of pre-existing industrial or agricultural pollution sources strengthens the forensic attribution of contamination to military activities. This study contributes to forensic environmental science by establishing a robust baseline database for conflict-related soil contamination in Lebanon and provides policy-relevant insights for risk assessment, agricultural safety, remediation planning, and post-conflict land recovery.

Keywords: forensic soil analysis; conflict-related pollution; explosive residues; heavy metals; bioremediation.

Biography

A Forensic scientist specializing in environmental forensics, soil contamination, and post-conflict pollution assessment. He holds a Master's degree in Industrial Chemical Analysis, a Master's degree in Biochemistry, and an MBA in Sustainable Development, providing a multidisciplinary foundation in analytical chemistry, biological systems, and environmental governance. His work focuses on the forensic identification of military-derived contaminants, including heavy metals and explosive residues, and the evaluation of their long-term impacts on ecosystems, agriculture, and human health. He has contributed to forensic research and field investigations in conflict-affected regions, applying advanced analytical techniques such as ICP-MS and GC-MS and ECD. He is actively engaged in developing forensic methodologies for environmental evidence interpretation, remediation assessment, and policy-relevant risk evaluation, bridging forensic science, environmental chemistry, and sustainability to support effective post-conflict land recovery strategies.

**Anik Tuladhar**

USA

Multimodal Preclinical Assessment of Glucocorticoid-Induced Disruption of Bone Remodeling in Sprague-Dawley rats

Abstract

Skeletal toxicity is a critical consideration during drug development arising from on-target mechanism and off-target effects. Standard histopathology is routinely used in preclinical toxicity studies which lacks the sensitivity to detect early or subtle skeletal alterations. Early detection of bone changes is essential for mitigating risk, especially in compounds with the potential to interfere with skeletal remodeling, growth, or maintenance. We characterized serum markers of bone formation (procollagen type I N-terminal propeptide and osteocalcin) and resorption (C-terminal telopeptide of type I collagen) across developmental age group (1-8 months) in naïve Sprague–Dawley rats and evaluated marker responsiveness in a positive-control prednisolone model (2-month rats, 14 and 28 days). Biomarkers were interpreted alongside proximal tibial growth plate histology and imaging by micro-computed tomography and dual-energy X-ray absorptiometry. Serum bone markers of formation and resorption decreased with age, along with physiological growth plate thinning. In prednisolone-treated rats, all three markers decreased at 14 and 28 days; histology demonstrated reduced growth plate thickness, increased marrow adiposity and imaging revealed deterioration in trabecular microarchitecture and bone mineral density relative to controls. These data indicate that serum bone biomarkers are sensitive to both normal maturational change and pharmacologic suppression of remodeling, and these biomarker shifts correspond with early structural deterioration induced by glucocorticoid exposure. We show that integrating serum biomarkers with histology and high-resolution imaging enhances early detection of skeletal toxicity in preclinical studies and informs selection of serum sampling time frame and translational monitoring strategies using imaging.



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Analysis of palm print in forensic identification

Abstract

Palm print, just like fingerprint, is one of the most valuable physical evidences for individual identification in forensic science. It plays an important role in linking the suspect or the action with crime. However, the application of palmprints is frequently challenged by the difficulties to locate their original area on palm since the palm prints are found incomplete. In this study 720 pairs of inked palm print samples were collected and evaluated. 22 types of papillary patterns were found and their frequency of occurrence in each areas of palm was calculated. The distribution features of triangles in tri-radiate area and the other accompanying patterns, such as stairs-like ridges and small upside-down loop in thenar area, were calculated. The shapes and the flow directions of papillary ridges, as well as the combined patterns formed in tri-radiate, thenar and hypothenar area were summarized. The features of palm print patterns in the three areas were also discussed according to gender and hands. The result showed that 3 to 7 triangles could be formed in tri-radiate area of palm and the number of triangles was related closely to the type and quantity of papillary patterns appearing in this area. 96% percent of the tri-radiate prints had one to three papillary patterns, in which the up-side-down loop beneath ring finger and little finger has the highest overall frequency. 8 types of single papillary patterns and 10 types of double combined papillary patterns have been found in the tri-radiate area, while 3 types of triple combined papillary patterns have been found in this area. The total occurrence frequency of the papillary patterns in the tri-radiate area was that of male higher than female and in right hand higher than in left hand. 9% of the thenar palm prints had papillary patterns, in which the inner sloping loop showed the highest frequency of occurrence. Stairs-like ridges were found above all of the inner sloping loops and outer

horizontal loops, while only few percentage of small upside-down loops appearing above the stairs-like ridges in thenar area. The total occurrence frequency of the papillary patterns in the thenar area was that of male higher than female and in left hand higher than in right hand. 14% of the hypothenar palm prints had papillary patterns, in which the outer sloping loop showed the highest frequency of occurrence. 8 types of single papillary patterns and 3 types of double combined papillary patterns have been found in the hypothenar area. The occurrence frequency of the papillary patterns in the hypothenar area was that of female higher than male and in left hand higher than in right hand. Due to the limited scope of sample collection, the statistical analysis of parameters such as the types and quantities of papillary patterns appearing in various areas of palm in this study may not be comprehensive enough. As a result, there might be small or large deviations in the calculation of various frequency values, which will be supplemented and corrected in future research.

Biography

Li Liu, Professor in Department of Forensic Science & Technologys, Criminal Investigation Police University of China. PhD from Northeat University of China. She has Published in excess of 30 papers in Fingerprint Detection and Identification.

**Dr. Faisal Hassan Alhosani**

*Head of Forensic Inspection and Biological Analysis
Branch, Sharjah, UAE*

Inheritance Study of Y-STR Markers Among the UAE Population

Abstract

The human Y chromosome, comprising roughly 2% of the genome, contains extensive non-recombinant regions marked by highly polymorphic Y-STR loci. Because these loci accumulate mutations across generations, providing clear context on how mutation rates influence forensic casework interpretation enhances understanding of their practical significance, especially when resolving male components in mixed samples and tracing paternal lineages.

In this study, 22 mutations were identified, including one microvariant, which can be particularly informative in forensic contexts. Mutation distribution across marker categories included seven mutations in Y-filer plus specific markers, 5 in RM-Yfiler Plus shared markers, and 11 in RM-specific markers, highlighting their relevance for forensic discrimination.

The resulting haplotypes demonstrated notable diversity, with several shared among individuals, including those presenting atypical case profiles. Population-level patterns revealed recurring haplotype structures with meaningful implications for forensic interpretation. These findings underscore the value of updated Y-STR mutation data in enhancing discrimination capacity, improving lineage resolution, and strengthening the evidentiary power of Y-chromosomal analysis in forensic investigations.

Biography

Holder of dual PhD degrees at the University of Sharjah in Molecular Medicine and Universität zu Lübeck in Human Biology, with advanced specialization in molecular pathways and genetics, immunology, and bioinformatics. Skilled in histochemistry, immunocytochemistry, and immunoassays, with proven ability to translate complex biological data into actionable insights for forensic as well as clinical applications. Bridging academic rigor with practical innovation, I integrate cutting-edge molecular techniques, biological data analysis, and forensic applications.

**Dr. HETRAM***FMT, J.L.N MEDICAL COLLEGE, AJMER*

Study For Estimation of Stature from Foot Length In Medico-Legal Autopsies Done At Jln Medical College Ajmer

Abstract

Objective: Examine the relationship between the foot lengths with stature in medico-legal autopsies.

Material and Method: Analysis of data from 40 dead bodies for autopsies at the J.L.N Hospital, AJMER from Jan. 2023 to Aug. 2023. Dead bodies having any significant congenital or acquired deformities including fractures of spinal column or long bones and segmented, charred, mutilated or decomposed bodies are excluded. The age ranged above 21 and years were 33 males and 17 males. Parson's correlation coefficient was used to examine the relationship between the internal organ weight with body weight and body length.

Observation

Religion	Males	%	Females	%	No of cases
Hindu	28	65	15	35	43
		%		%	
Muslim	3	75	1	25	4
		%		%	
Not Known	2	67	1	33	3
		%		%	
Total	33	66	17	34	50
		%		%	

Table 1: Distribution of cases according to sex and religion

Results: The mean $\pm$ -standard deviation (SD) were represented by males and females respectively; Right foot length (cm) 167.2

+4.58, 154.45 + 4.7 in cms, Left foot length

(cm) 23.61 + 1.02 21.37 + 0.9 in cms.

Correlation coefficient (r) in males and females respectively 0.752 – for right foot 0.731 – for right foot, 0.769 – for left foot 0.718 – for left foot. Regression co-efficient (b) in males and females respectively 3.40 - for right foot

Variables	Males	Females
Right foot length (cm)	167.2 +4.58	154.45 + 4.7
Left foot length (cm)	23.61 + 1.02	21.37 + 0.9
Correlation coefficient (r)	0.752 – for right foot	0.731 – for right foot
	0.769 – for left foot	0.718 – for left foot
Regression co-efficient (b)	3.40 - for right foot	3.61 - for right foot
	3.49 - for left foot	3.53 - for left foot
Value of constant (a)	86.96 – for right foot	77.35 - for right foot
	84.64 - for left foot	78.92 - for left foot

Table 2: Comparison of stature foot length between males and females

3.61 - for right foot heart 311 $\pm$ 66/278 $\pm$ 160 gm, lung 910 $\pm$ 347/675 $\pm$ 255 gm, liver 1439 $\pm$ 365/ 1214 $\pm$ 275 gm, spleen 103 $\pm$ 46/92.9 $\pm$ 48 gm, kidney 260 $\pm$ 68/230 $\pm$ 42 gm.

Conclusion: The relationship between internal organ weight and body weight showed each internal organ significantly correlated with body weight in males at p-value < 0.05, whereas in females it only correlated to liver, kidney and spleen at p-value < 0.05. For the correlation between internal organ weight and body length, it showed only brain, lung, liver and kidney correlated to the body length in males at p-value < 0.05, but not in females.

Biography

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Mohammed Rabiea Alkuwari

*Joaan Bin Jassim Academy for Defence Studies,
Doha, Qatar*

Hybrid Feature–Image Deep Learning for Forensic Analysis of Firing-Pin Impressions

Abstract

Firing-pin impressions on cartridge casings constitute distinctive physical evidence capable of linking a firearm to criminal activity. Advances in digital imaging and artificial intelligence (AI) have enabled forensic ballistics to incorporate surface characterization and deep learning to improve accuracy and reproducibility.

This study proposes a hybrid analytical framework integrating mechanically and physically derived structured feature matrices with image-based analysis using Convolutional Neural Networks (CNNs). The structured feature matrices represent a formalized and quantifiable expression of domain expertise derived from established firearm examination practices.

Data from the NIST Ballistics Toolmark Research Database were used to train, evaluate, and test three model configurations: feature-based, image-based, and hybrid. The hybrid model achieved the highest classification accuracy (96%), outperforming image-only (95%) and feature-only (82%) approaches. Training-loss convergence to 0.1 indicates stable learning and reduced overfitting. Principal Component Analysis (PCA) was employed to visualize feature distributions across firearm manufacturers, revealing distinct clustering for different firearms groups. PCA results show that morphological and toolmark features dominate variance, with environmental and mechanical attributes contributing secondary effects.

These findings demonstrate the value of feature-level data fusion in forensic ballistics,

showing that combining expert-informed structured features with CNN-based image representations enhances precision, robustness, and reproducibility. The proposed framework supports scalable and transparent firearm identification and facilitates expert training and cross-laboratory consistency in AI-assisted forensic practice.

Biography

Mr. Mohammed Rabiea Al-Kuwari is a Qatari forensic science expert with over 20 years of experience in firearms and toolmarks analysis. He holds a B.Sc. in Chemistry (Qatar University, 1997) and an M.Sc. in Forensic Science (Teesside University, UK, 2013). He is completing his doctoral dissertation on explainable AI for firing-pin impression analysis at the Joaan Bin Jassim Academy for Defence Studies. A former Director of the Center for Security Strategic Studies at the Ministry of Interior (2013–2021), he is a published researcher and member of the Association of Firearm and Tool Mark Examiners.



Dr. Monu Kumari

Forensic Science Laboratory (FSL), Delhi, India

Maintaining Evidence Integrity in Real-World Crime Scene Operations: Operational Challenges and Field-Driven Practices

Abstract

Preservation of evidence integrity is fundamental to reliable forensic analysis and judicial outcomes. In operational crime scene environments, particularly within metropolitan settings, practical challenges such as limited resources, dynamic scene conditions, inter-agency coordination, and variations in evidence handling practices can influence the continuity and management of forensic exhibits. Emphasis is placed on practical approaches to maintaining chain of custody, minimizing contamination risks, and ensuring accurate documentation from scene processing to laboratory submission. Field-informed insights and adaptive best practices highlight strategies that strengthen collaboration between forensic professionals and investigating agencies, ultimately enhancing the reliability and admissibility of forensic evidence.

Biography

Dr. Monu Kumari is a Scientific Officer at the Forensic Science Laboratory (FSL), Government of NCT of Delhi. She completed her Ph.D. in Life Sciences (Biotechnology) from PGIMER, Chandigarh, focusing on dye-based analytical approaches for biomarker detection and translational diagnostics. Her expertise spans clinical biochemistry, analytical methods, and applied forensic science. She has authored multiple peer-reviewed publications and received the Best Oral Presentation Award at ICMS 2024 (AIIMS, New Delhi). In her current role, she is involved in crime scene examination, evidence documentation, and scientific reporting, combining research-driven analytical expertise with practical forensic application.



Kalanjali.Y¹, Dr. Arjun Rao¹

1Department of Life Sciences, Christ Deemed to be University, Bangalore, India, 560029

Postmortem Microbiome dynamics: systematic review of forensic microbial clock

Abstract

Post mortem interval in forensic science has many challenges like investigation, estimation, and the use of few physical and entomological markers. However, these methods offer benefits and a few cons, like environmental variability, temporal constraints. Microbial succession during decomposition, also known as the "microbial clock," has been the subject of a growing body of research in recent years as a new and possibly more accurate indicator of PMI. It is clear from a thorough examination of more than 30 peer-reviewed studies involving human cadavers and animal models that microbial communities experience internal and external changes that are predictable and time-dependent. Strong temporal correlations between microbial taxa and particular stages of decomposition have been shown in controlled studies employing murine and porcine models; some models predict PMI within a 2- to 3-day range over a period of weeks. Complementary studies on human cadavers demonstrate regular patterns of microbial succession in postmortem organs, exposing organ-specific microbial signatures that change over time and can be impacted by variables such as the cause of death, the environment, and the health of the individual. It can be used for quantitative analysis and also a biological technique to estimate time of death. But to understand and use its full potential, it needs to be studied more to its full potential using few data sets and various postmortem indicators such as entomological evidences. This review mainly focuses on summarizing already found knowledge about this clock and consider all the ecological and practical considerations that need to be made to make a perfect postmortem clock that can be used in forensic practices.



Mohammad Haddadi

King Fahd Security College, Riyadh 13232, Saudi Arabia

Impact of Ballistic Evidence on Criminal Investigations in Selected Middle East Countries

Abstract

Ballistic evidence plays an important role in modern criminal investigations. Its ability to link projectiles and firearms to perpetrators and crime scenes leads to a more effective justice system. However, despite the technological and economic development today, most countries still struggle to implement this process or run it effectively, especially in the Middle East. This paper focuses on four Middle Eastern countries, Turkey, United Arab Emirates (UAE), Kingdom of Saudi Arabia (KSA), and Jordan, assessing their current use and subsequent impacts of forensic ballistics. The goal is to outline each country's forensic infrastructure, legal frameworks, and challenges in ballistic evidence collection, analysis, and admissibility. The study finds that although forensic capacities vary considerably, fueled mainly by each country's economic progress, regional collaboration and the use of technology have helped strengthen ballistic investigations, subsequently improving prosecution rates and reinforcing judicial confidence. Key challenges include resource disparities, standardization of protocols, and training deficits. Recommendations emphasize harmonized procedures, investment in advanced imaging systems, and capacity-building initiatives to optimize ballistic evidence utilization.

Biography

Mohammad Ali Haddadi is a dedicated PhD student in Criminal at King Saud University in Riyadh, prior to their doctoral studies, I earned a Master Degree in Crimnology from Saint Joseph University in USA, where they investigated challenges that faces countries which

have low-resource settings, in collecting and analyzing ballistic evidence.

Teaching experience: I have served as a teaching for forensic science in King Fahd Security College and collaborated with Firearms labs in police departments.



Chris Kronow Rasmussen

University of New Haven, NH, USA

You can bet on Money Laundering

Abstract

The convergence of money laundering and match-fixing within the sports betting industry represents a growing threat to the integrity of sports and the global financial system. This research explores the symbiotic relationship between these illicit activities and their exploitation by organised crime networks. Match-fixing serves as a dual-purpose mechanism, not only enabling criminals to manipulate betting markets for illicit profit but also providing a channel for laundering proceeds from other criminal enterprises such as drug trafficking, human smuggling, and cybercrime. The paper examines key case studies and regulatory responses, highlighting the vulnerabilities in both regulated and unregulated betting markets, particularly in jurisdictions with weak oversight. It further analyses the operational methods employed by organised crime syndicates, such as the use of mules, shell companies, and digital platforms, to obscure financial flows and exploit gaps in anti-money laundering regimes. The study advocates for an integrated approach to combating this nexus, including enhanced international cooperation, intelligence sharing, and the application of advanced monitoring technologies. Addressing the overlap between sports integrity and financial crime is essential to protecting the credibility of sports and fortifying global AML efforts.

Biography

Chris Kronow Rasmussen is an external lecturer and researcher specialising in financial crime, anti-money laundering, and match-fixing in the gambling sector. He teaches at institutions including the University of New Haven's Henry C. Lee College of Criminal Justice, bringing over a decade of experience across regulated industries such as banking, crypto, and gaming.

Chris has lectured widely across Europe, focusing on the intersection of sports integrity and financial crime, and has contributed to international initiatives with organisations like UEFA, FIFA, and the Council of Europe. His research explores suspicious betting patterns and the operational mechanics of organised crime within sports betting. He holds an MBA from Middlesex University, a Minor in Compliance & Risk Management from Copenhagen Business School, and a Diploma in Anti-Money Laundering from the University of Manchester.

**Steven Pavlovich***University of Technology Sydney*

A Novel Source Evaluation of 3D-Printed FDM Polymer Firearm Components Using Z-Axis Topographical Artifacts

Abstract

The production of illicit 3D-printed polymer firearm components is rapidly increasing. Concurrently, forensic responses and technical researchers are working toward a better understanding of the traces left by 3D printers as fundamental information vectors.

Geometric and dimensional variations are inherent and consistent characteristics of any 3D FDM printer. The combination of repetitive, programmed mechanical movements and incidental machine variability results in measurable consistency within mechatronic artifacts from the same printer and distinguishable differences from those of other machines. These artifacts and patternation features can be further leveraged to resolve source questions of 3D-printed objects.

3D FDM printers create z-axis topographic artifacts on the vertical surfaces of 3D-printed objects, which are caused by the mechanical characteristics of the 3D printer. These z-axis mechatronic artifacts reflect the build and machine setup characteristics of a 3D FDM printer and appear as irregular z-axis artifacts on the component's vertical surfaces. Using controlled illumination imaging techniques, these z-axis artifacts, also known as Vertical Fine Artifact (VFA) images, can be compared to assist in source evaluations.

Preliminary results indicate that Vertical Fine Artifacts (VFAs) can provide high discriminability when used to attribute source printers within single-blind test groups with print surface quality ranging from poor to excellent. This novel VFA profiling method

provides investigators with an additional dimension of forensic trace analysis, enabling further study of surface marks on 3D-printed parts that may be linked to a crime.

Biography

Steve Pavlovich is a retired member of the Western Australia Police Force, where he served for 39 years (1982–2022), including as an accredited forensic firearms examiner within a NATA-accredited laboratory. Throughout his career, he provided expert opinion and advice on firearms-related matters, conducted shooting scene reconstructions, and examined physical evidence to assist in offender identification and investigative support.

In 2023, he received a Master of Forensic Firearms Intelligence from Murdoch University in Perth.

He is currently pursuing a PhD at the University of Technology Sydney, Faculty of Science. His research, “Producibility Profiling of 3D-Printed Polymer and Polymer Hybrid Deposition Layers as Toolmarks for Forensic Source Comparison and Attribution,” explores the forensic value of 3D-printed firearm traces.

**Mr. Nitin Soni**

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Synergizing Cybersecurity and Forensic Science: Toward Effective Strategies for Cybercrime Detection and Response

Abstract

In the digital era, cybercrime has evolved into a sophisticated and persistent threat, targeting individuals, organizations, and even nations. As cybercriminals leverage advanced techniques to breach security systems, the need for an integrated approach combining cybersecurity and digital forensics has become more critical than ever. While cybersecurity focuses on preventing, detecting, and mitigating cyber threats, digital forensics plays a vital role in investigating incidents, tracing attackers, and gathering evidence for legal proceedings. This paper explores the synergistic relationship between these two fields and how their convergence enhances cybercrime investigations.

A holistic approach to cybersecurity and digital forensics involves real-time threat intelligence, proactive security mechanisms, and forensic methodologies that enable investigators to reconstruct cyber incidents accurately. Traditional cybersecurity strategies primarily emphasize network defense, encryption, and vulnerability management, whereas digital forensics delves into post-incident analysis, extracting and preserving digital evidence from compromised systems, networks, and storage devices. Bridging the gap between these disciplines ensures a more comprehensive strategy for tackling cybercrime, reducing response time, and improving threat attribution.

With the rise of AI-driven cyberattacks, ransomware, and deepfake technology, cybercriminals continuously adapt to security measures, making it challenging for organizations to stay ahead. This study highlights the importance of integrating artificial

intelligence (AI) and machine learning (ML) in cybersecurity and forensics to automate threat detection, enhance digital evidence analysis, and streamline incident response. Advanced forensic techniques, such as memory forensics, blockchain-based evidence verification, and forensic automation, are examined for their role in strengthening investigations.

Furthermore, the legal and ethical aspects of cybercrime investigations are discussed, emphasizing the need for standardized forensic procedures, international cooperation, and regulatory frameworks to ensure digital evidence integrity and admissibility in court. The paper also explores challenges such as encrypted communications, anti-forensic techniques used by cybercriminals, and jurisdictional complexities in cross-border cybercrime cases.

By adopting a multidisciplinary approach that blends cybersecurity, digital forensics, law enforcement, and AI-driven analytics, organizations can build robust defense mechanisms and enhance cyber resilience. This research contributes to the growing body of knowledge on cybercrime investigations and provides actionable insights for security professionals, forensic experts, and policymakers to bridge the gap between cybersecurity and digital forensics effectively.



Didier Mwez Muland

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Forensic Management Of Suspicious Deaths In The Democratic Republic Of Congo: Normative Framework, Hospital Practices And An Integrated Operational Model

Abstract

PROPOSED DETAILED OUTLINE

- Introduction
- Literature Review (forensic, hospital management of suspicious deaths, international standards)
- Normative Framework in DRC
- Methodology
- Results (current state, gaps, incidents, indicators)
- Proposed Operational Model (SOP, forms, alert flowcharts)
- Implementation and Evaluation (pilot, KPI, cost-benefit analysis)
- Discussion (validity, limits, transferability)
- Conclusion and Recommendations
- Appendices (SOP, forms, audit grids, autopsy report outline)

I. INTRODUCTION

Context: High prevalence of deaths of undetermined etiology, vulnerabilities in emergency–morgue circuits, lack of forensic infrastructure, issues of impunity, and public health risks.

Justification: Ensuring chain of custody integrity, public trust, and legal protection for healthcare teams.

Central Question: How can the forensic management of suspicious deaths in Congolese hospital settings be organized, documented, and traced?

Death is a universal phenomenon; however, when it occurs under suspicious circumstances, it becomes a medical, legal, social, and ethical issue.

The forensic management of suspicious deaths sits at a sensitive intersection of public health requirements, criminal justice demands, cultural and religious imperatives, and professional standards.

In a context like the Democratic Republic of Congo (DRC)—marked by diverse traditions, a healthcare system in transition, and complex security and legal challenges—this issue is of paramount importance.

Internationally, organizations such as the World Health Organization (WHO), Pan American Health Organization (PAHO), and International Committee of the Red Cross (ICRC) have issued precise guidelines regarding body management in disasters, pandemics, or violence.

These benchmarks emphasize human dignity, traceability, identification, and biosafety.

In many countries, these standards are integrated into national frameworks connecting forensic medicine, justice systems, and hospital infrastructure.

In the DRC, the reality is contrasting. The normative framework remains fragmented across health legislation, penal provisions, burial practice regulations, and recent initiatives aimed at institutionalizing forensic medicine.

On the ground, hospitals are on the front lines—receiving and preserving bodies showing signs of suspicious death—without standardized protocols, proper equipment, or specially trained personnel.

This gives rise to risks: medico-legal errors, violations of the deceased's dignity, disputes with families, and compromise of the judicial chain of custody.

Furthermore, socio-cultural factors are decisive: attitudes toward death, the influence of religious and customary leaders, resistance to autopsies, and distrust of institutions heavily influence the acceptability and effectiveness of forensic practices.

These dimensions necessitate an integrated approach combining scientific rigor, a clear legal framework, and cultural sensitivity.

This thesis proposes to analyze the forensic management of suspicious deaths in the DRC through three complementary pillars:

1. **Normative Framework:** Analyzing national legislation and applicable international standards.
2. **Hospital Practices:** Examining existing procedures, available resources, and operational challenges.
3. **Integrated Operational Model:** Harmonizing practices, strengthening inter-agency collaboration (health, justice, police, traditional leaders, civil society), and improving overall quality.

Ultimately, this research aims to contribute to consolidating forensic medicine in the DRC, securing the health system, and promoting a justice system that respects human rights. It operates at the intersection of criminological sciences, forensic medicine, and public health policy.

Research Summary

This study assesses the handling of suspicious deaths in the DRC through a forensic and hospital lens. It maps out the normative baseline, identifies procedural gaps in emergency rooms and morgues, and proposes an operational model (SOPs, forms, training, indicators) aligned with healthcare quality standards. The methodology combines document analysis, multi-stakeholder field surveys, case file reviews, and process audits. Expected deliverables include a procedural framework, chain of custody protocols, forensic documentation guides, and a QHSE implementation matrix.

Keywords: suspicious death, forensic autopsy, chain of custody, death certificate, medico-legal obstacle, emergency room, morgue, judicial police, prosecutor, ISO 9001, ISO 45001, ISO 7101, DRC.

PROBLEM STATEMENT

Fragmentation of legal texts and responsibilities (hospitals, judicial police, public prosecutor's office, forensic pathologists).

Weakness or absence of written protocols (death pronouncement, reporting, crime scene preservation, transport, autopsy, body release).

Lack of practical training (death certification, chain of custody, sampling, forensic reporting).

Legal and reputational risks (loss of evidence, legal disputes, civil/criminal litigation).

Managing suspicious deaths in the DRC faces several critical hurdles. The legal framework is fragmented across disparate statutes (penal code, code of criminal procedure, public health law, ministerial decrees, and customary norms). Hospital practices suffer from severe heterogeneity: absence of modern morgues in certain areas, lack of specialized training for healthcare workers, and insufficient identification/preservation systems. Lastly, social, religious, and customary pressures heavily impact procedures, often to the detriment of forensic and judicial imperatives.

These issues lead to a central dilemma: How can we ensure a forensic management system for suspicious deaths in the DRC that complies with international standards, adapts to local realities, and respects human rights and cultural sensibilities?

RESEARCH QUESTIONS

What is the current state of the DRC's normative framework regarding suspicious deaths, and how does it compare to international standards (WHO, ICRC, etc.)?

What hospital practices are currently implemented in the DRC for suspicious deaths, and what are the main operational challenges (infrastructure, human resources, logistics, judicial coordination)?

What are the social, cultural, and institutional barriers influencing forensic management in the DRC?

Based on these findings, what integrated operational model can be proposed to improve management, strengthen inter-sectoral collaboration, and guarantee the dignity of the deceased and family rights?

RESEARCH OBJECTIVES

General Objective

Evaluate the normative framework and hospital practices regarding suspicious deaths in the DRC to propose an integrated operational model compliant with forensic standards and adapted to the local socio-cultural context.

Specific Objectives

Analyze Congolese legal and regulatory texts on suspicious deaths and benchmark

them against international frameworks.

Study current hospital practices, identifying strengths and operational bottlenecks.

Explore social, religious, and customary perceptions surrounding autopsies, body preservation, and burials.

Propose an organizational and operational model integrating legal, medical, social, and cultural dimensions for harmonized management in the DRC.

METHODOLOGY OF RESEARCH

Design: Multicenter mixed-methods approach (quantitative + qualitative).

Field & Sampling: 3–5 representative hospitals (urban/rural, public/private) + public morgues using purposive sampling.

Data Sources

Documentary: Laws, regulations, protocols, registers.

Quantitative: Retrospective review of 150–300 death records (over 12–24 months).

Qualitative: 30–40 semi-structured interviews (nurses, doctors, magistrates, police officers, families).

Observation: Process audits in emergency departments, morgues, and autopsy suites.

Tools: Audit checklists, interview guides, compliance matrices, SOP checklists.

Data Analysis: Descriptive statistics (delays, document completeness, non-conformity rates), thematic content analysis, and data triangulation.

Ethical Considerations: Ethical committee approval, informed consent, anonymization, secure data management, and strict alignment with judicial mandates.

II. STRUCTURED LITERATURE REVIEW

1. International Level — Frameworks and Operational Guidelines

Key Frameworks: WHO, ICRC, and PAHO guidelines emphasize deceased dignity, chain of custody traceability, biosafety/PPE for handlers, and inter-agency coordination.

Academic Insights: Literature highlights the necessity of controlled environments, proper ventilation, restricted autopsy access during infectious outbreaks, and avoiding uncoordinated practices (e.g., undocumented mass burials).

Takeaways for Model: Incorporate standardized tracking forms, barcode labeling,

biosafety protocols, and structured family communication channels.

2. Regional / African Context — Lessons Learned and Constraints

Epidemic and disaster management in Africa shows that poor body handling causes social unrest; success lies in combining basic forensic techniques with respectful cultural adaptation of funeral rites.

Literature notes chronic infrastructure deficits (lack of cold storage, few forensic pathologists). Realistic responses focus on basic first-responder kits, staff training, and simplified documentation protocols.

3. National Level — Legal Framework and Practices in the DRC

Legal Baseline: Public Health Law No. 18/035 (Dec 13, 2018) outlines basic health system obligations. Older decrees, ordinances, and penal codes govern autopsies, burials, and judicial inquiries.

Identified Gaps: Fragmented regulations, limited physical/technical capacity, and strong socio-cultural resistance to autopsies.

III. NORMATIVE FRAMEWORK IN THE DRC

Constitutional and Legislative Texts

DRC Constitution (2006, as amended): Art. 16 (Right to life and physical integrity); Art. 61 (Non-derogable protection against severe violations of life).

Penal Code (Books I & II): Defines offenses against life (murder, manslaughter) and mandates investigating causes of suspicious death to trigger public prosecution.

Code of Criminal Procedure: Articles regulating death pronouncements, judicial investigations, and prosecutor-ordered autopsies.

Quality and Safety Standards (ISO Alignment)

- ISO 9001:2015: Quality management & traceability of forensic acts.
- ISO 45001:2018: Occupational health and safety in morgues and autopsy rooms.
- ISO 19011:2018: Guidelines for auditing management systems.
- ISO 7101:2023: Healthcare organization management systems.

International Instruments

Minnesota Protocol (2016): International standard on the investigation of potentially

unlawful deaths.

UN Convention Against Torture: Mandatory investigation of deaths in custody.

IV. PROPOSED INTEGRATED OPERATIONAL MODEL

Key Definitions

Suspicious Death / Violent Death: Death where circumstances, injuries, or socio-criminal context warrant a formal inquiry and forensic investigation.

Medico-Legal Obstacle: Formal hold placed on burial/cremation pending judicial decisions or autopsies.

Chain of Custody: Documented process tracking the custody, transfer, analysis, and disposition of bodies, personal effects, and biological samples.

Step-by-Step Operational Workflow

1. Detection & Alert: Triage trigger (incompatible injuries, unexpected death, suspected poisoning, death in custody). Nurse -> On-Duty Physician -> Hospital Admin -> Prosecutor/Judicial Police.

2. Scene & Body Preservation: Freeze scene, preserve intact clothing, place items under sealed evidence bags, take situational photos.

3. Pronouncement & Documentation: Complete Death Certificate with 'Medico-Legal Obstacle' flagged; fill out Suspicious Death Form (FORM-FDS-01); log entry into morgue register under Unique Custody Number (NUC).

4. Chain of Custody Execution: Use forms CC-02 (Body), CC-03 (Effects), and CC-04 (Samples) with tamper-evident barcodes.

5. Storage & Autopsy: Secure cold storage (2–4°C). Autopsies performed upon written judicial requisition using standardized three-cavity evisceration techniques.

6. Body Release: Post-autopsy body restoration, signed judicial clearance, and formal receipt release to families.

V. IMPLEMENTATION PLAN & KEY PERFORMANCE INDICATORS

Implementation Phases

Phase 1: Preparation (Months 1–2): Steering committee creation, needs assessment, SOP drafting.

Phase 2: Pilot Rollout (Months 3–6): Deploy in 2–3 pilot hospitals, train medical/police personnel, implement registry tools.

Phase 3: Evaluation & Scaling (Months 7–12): Review KPIs, refine protocols, integrate into national health policy.

Key Performance Indicators (KPI Matrix)

Domain	Key Performance Indicator (KPI)	Target Goal
Procedures	% of suspicious deaths correctly documented	> 90 %
Infrastructure	Number of morgues compliant with safety & hygiene standards	100 % in pilot sites
Competency	Taux/Rate of staff trained in forensic SOPs	> 80 %
Timeliness	Average delay between suspicious death & prosecutor alert	< 24 hours
Traceability	% of bodies with a complete medico-legal file & chain of custody	> 95 %
Legal Quality	Number of judicial inquiries initiated thanks to device	Measurable Increase
Satisfaction	Satisfaction of families and authorities (survey)	> 80 % favorable

Biography

Didier Mwez Muland is a multidisciplinary professional whose background combines emergency nursing, hospital quality management, and forensic criminology. As an emergency nurse, he brings extensive clinical experience in critical care settings. His work in healthcare quality focuses on implementing ISO standards (9001, 14001, 45001, 19011, 21001, and 7101) to

strengthen patient safety, operational efficiency, and hospital governance. His research in forensic criminology explores medical law, clinical risk, forensic integrity, and professional ethics. He is dedicated to advancing safer, transparent, and accountable healthcare systems in the Democratic Republic of Congo and internationally.



Thank You