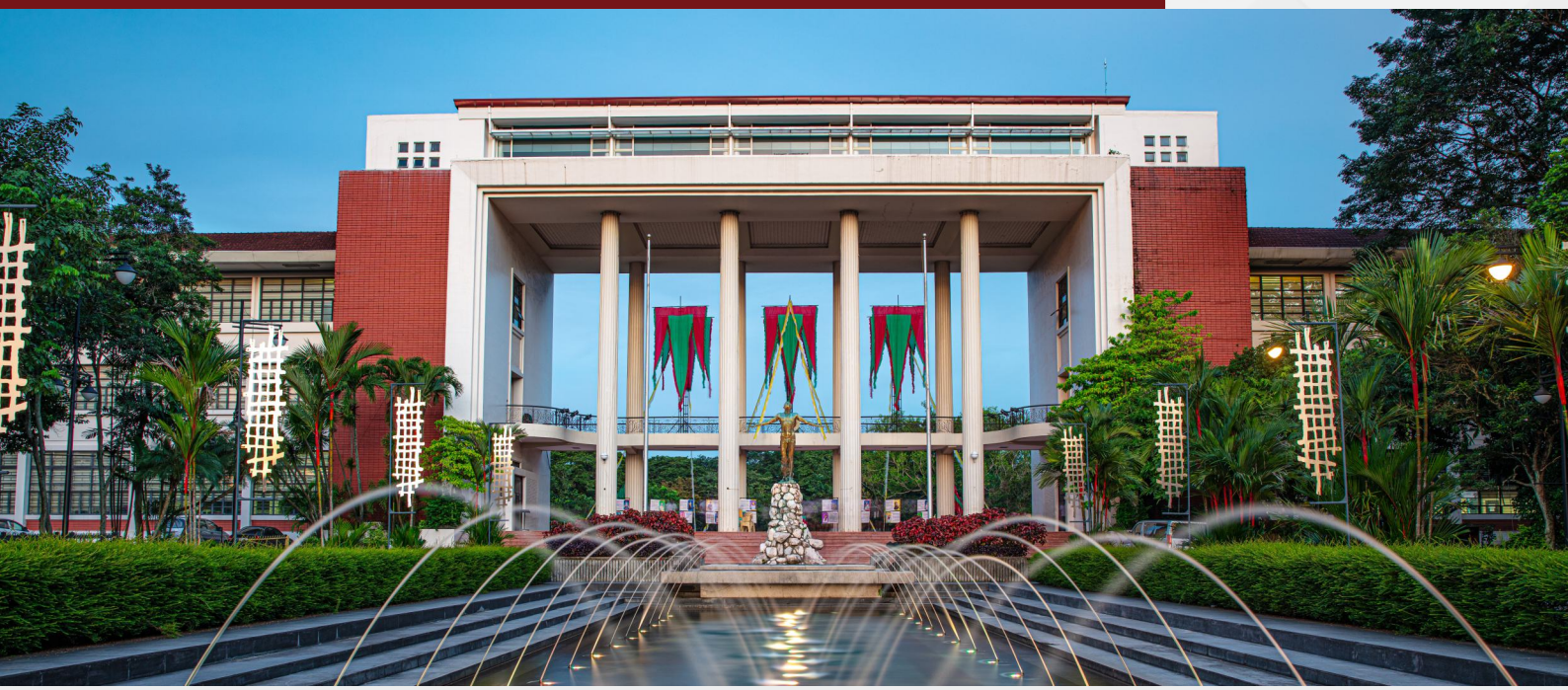
eConference Proceedings

6th International Forensic Science Conference

Humanitarian and Heritage Forensics in the Global South

01st–03rd DEC. 2025



Only Research Presentation (Online mode) 7th December 2025

About SIFS

The Sherlock Institute of Forensic Science (SIFS) India was set up in 2006 with the mission to make forensic education available to all and with a vision to make India a crime-free place to live by creating a skilled workforce of forensic experts to assist law enforcement agencies and the judiciary in bringing justice to the table within time. SIFS India offers comprehensive industry-specific and job-ready online and offline courses, trainings, internships, workshops, and research-based projects in the diverse forensic science domains, like cyber law, cyber and digital forensics, fingerprint verification, questioned document examination, and handwriting analysis, to name a few.

It has been a frontrunner in the field of forensic science. It has been conducting various events to maximize the reach of Knowledge of forensic science across the globe. It organizes various Conferences, Seminars and Workshops with the goal of sharing recent advancements and research happening around the globe with students and professionals to boost their knowledge and morale. Forensic science has been growing significantly over the past few decades; the essential demand for progress has been met with bright young minds putting their extensive efforts into advancements in the field.

SIFS India, along with other prominent organizations, have been substantial support pillars in establishing the mark of forensics in India and worldwide. The motive of constant learning and sharing recent studies and advancements has been met constantly with their continuous efforts.

IASR
INTERNATIONAL ASSOCIATION
OF SCIENTISTS & RESEARCHERS

About IASR

The International Association of Scientists and Researchers (IASR) has emerged as a pioneering organization dedicated to disseminating recent research and studies to avid learners and academics, particularly within the field of forensic science. This journey has been significantly bolstered by the steadfast support of the Sherlock Institute of Forensic Science (SIFS India). The field of forensic science has witnessed notable growth in recent decades, owing to the concerted efforts of talented individuals committed to advancing the discipline. SIFS India's pivotal role in supporting IASR has been instrumental in solidifying the prominence of forensic science in India and globally. Through initiatives such as the IASR International Conferences, which serve as platforms for researchers, academicians, and professionals to exchange ideas and insights, the organization aims to foster continuous learning and facilitate the dissemination of cutting-edge research in various domains of forensics. These include but are not limited to fingerprint analysis, questioned document examination, crime scene investigation, forensic odontology, forensic medicine and toxicology, forensic biology and serology, forensic psychology, cyber and digital forensics, as well as forensic physics and anthropology. By providing such avenues for collaboration and knowledge sharing, IASR and SIFS India are collectively contributing to the advancement and enrichment of forensic science on a global scale, thereby aiding in the effective application of forensic techniques in solving crimes and administering justice.

Greetings from the Organizing Desk!

The evolving global landscape in recent times has significantly transformed academic systems, institutions, and individual preparedness, encouraging innovative learning approaches and greater adaptability within the academic community. In this dynamic environment, young learners and academicians demonstrated commendable motivation, resilience, and a strong commitment to excellence.

Forensic Science, by virtue of its interdisciplinary nature, continues to thrive through collaboration and the collective exchange of knowledge. This was clearly reflected during the recently concluded International Conference on Forensic Science, where academicians, students, and professionals came together across disciplines and geographical boundaries. The conference successfully provided a platform for meaningful interaction, exchange of ideas, research insights, and discussions on technological advancements.

The enthusiastic participation and valuable contributions of science scholars and professionals made this scholarly endeavor impactful and enriching. The successful completion of the conference stands as a testament to collective effort and shared learning, further strengthening the path toward advancement and professional growth in the field of forensic science.

Dr. Ranjeet Kr. Singh
President
International Association of
Scientists and Researchers

Core People

Dr. Ranjeet Kr. Singh
President
International Association of
Scientists and Researchers

Afreen Tarannum

Pramod Kumar

Manish Sharma

Ridhi Khandelwal

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Winners Scientific Presentation

Undergraduate Paper Presentations

BUDIANTO

VANSHIKA

SREEVALLIKA ANUSURI

Postgraduate Paper Presentations

DEVA DERSAN C

EDURUPAKA DIVYA KEERTHANA

NAOREM NAOBUNGO

Scholar Paper Presentations

NANDINI MAHANKAR

CHANDRAYEE ROY

BHAGYASHREE KULKARNI

CHANDNI SRINIVASAN

PAPER (Undergraduate Category)

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  Biomarkers in sudden death syndromes: Differentiating Etiologies for targeted prevention
- **PUG02 | Nilanjana Roy**
  Beyond the scalpel: The role of forensic radiology in mass disaster identification
- **PUG03 | Dr. Natalia Muljadi**
  Specific and Non-specific Autopsy findings in drowning victims: A systematic review for medicolegal differential diagnosis
- **PUG04 | Budianto**
  Identification and Growth of Diatoms isolated from water gate regarding the discovery of drowning victim in Jagir
- **PUG05 | Srivallika Anusuri**
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- **PPG08 | Ketavathu Sankar Nayak**
  Monitoring of particulate matter pollution and it's associated health hazards among the population of Bilaspur and Andhra Pradesh

- **PPG09 | Reddimalli Vamsi**
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PAPER (Scholar Category)

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  A Scoping Review of Suicide in Indian Custodial Settings: Forensic Mental-Health Gaps, Reporting Challenges, and a Bayesian Framework for Evidence Synthesis

- **PSC02 | Dr. Sachita Shrikant**
  The Emerging Role of AI in Odontometric Analysis: Trends and Challenges in Forensic Odontology.

- **PSC03 | Rakshitha B M**
  Evaluation of the Applicability of Chaillet and Demirjian's Dental Age Estimation Methods in a Southern Karnataka Population

- **PSC04 | Bhagyashree Kulkarni**
  Gender differences on the impact of cyberbullying on general health amongst secondary school students in Mumbai.

- **PSC05 | Dr Baskaran M**
  Mental Health Assessments in Forensic Contexts

- **PSC06 | Glory. H**
  Effectiveness of Forensic Nursing Practices on Sexual Assault Cases: A Systematic Review

- **PSC07 | Deepa Rani**
  Evaluation of deviation in range of natural variation between Electronic and handwritten signatures: A comparative study

- **PSC08 | Deepa Rani**
  Electronic Signatures & Natural Variation: A Review Article

Identification and Growth of Diatoms Isolated from Water Gate regarding the discovery of drowning victim in Jagir

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Abstract

Diatoms are single-celled prokaryotic organisms that have the ability to photosynthesize so they can be classified as algae. One of the additional examinations carried out in suspected drowning cases is a microalgae or diatom examination. This is based on the theory that water containing diatoms will be inhaled by drowning victims so that the diatoms will enter the lungs and will eventually be carried by the systemic blood flow to other organs. This is important because not all bodies found in water are drowning victims. In some cases, there have been attempts to dump the bodies of crime victims into the water. Thus, diatoms are location and time specific. Some diatom species can even live only in certain regions (endemic). These characteristics of diatoms can be used to analyze a case as location of death.

Keywords: *Definition, Diatom examination, Drowning, Endemic Mikroalgae, and Speciment*

Specific and Non-Specific Autopsy Findings in Drowning Victims: A Systematic Review for Medicolegal Differential Diagnosis

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Abstract

Background: The postmortem diagnosis of drowning is one of the greatest challenges in forensic pathology practice, largely due to autopsy findings that are often non-specific and can be influenced by various confounding factors. This systematic review aims to critically analyze the scientific literature published in the last decade regarding specific and non-specific autopsy findings in drowning victims to establish an evidence-based framework for medicolegal differential diagnosis.

Methods: The research method follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, conducting a comprehensive literature search on major academic databases.

Results: The review results indicate that most "classic" macroscopic findings, such as froth in the airways and *emphysema aquosum*, have low specificity, and their value is often diminished by factors like decomposition, resuscitation efforts, and concomitant trauma. Modern ancillary examinations show significant potential but also have limitations. The diatom test, while theoretically robust for proving antemortem circulation, remains debated due to contamination issues and a lack of standardization. Postmortem Computed Tomography (PMCT) is useful for visualization but is unreliable for distinguishing drowning from other causes of asphyxia. Biochemical

and molecular markers, such as Surfactant Protein D (SPD) and microRNA (miRNA), are emerging as promising quantitative tools for detecting alveolar injury and vital responses but require further validation. The existing evidence strongly supports a multimodal diagnostic approach, where the integration of findings from the scene investigation, macroscopic autopsy, and a carefully selected series of ancillary tests can significantly enhance diagnostic accuracy and confidence.

Conclusion: It is concluded that drowning remains a diagnosis of exclusion, where certainty does not depend on a single pathognomonic sign but on a coherent synthesis of various pieces of evidence that collectively point to the drowning process as the cause of death.

Keywords: *Drowning, Forensic Pathology, Autopsy, Systematic Review, Medicolegal, Diatom Test, Postmortem Computed Tomography (PMCT), Biochemical Markers*

Beyond the scalpel: The Role of Forensic Radiology in Mass Disaster Identification

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Abstract

In cases of both natural and man-made mass disaster scenarios present profound challenges for the dignified, accurate identification of victims. Traditional means of identification may be slow, invasive, and hampered by the fragmented or commingled nature of remains. This paper highlights the critical and expanding role that forensic radiology plays as an indispensable tool in the modern DVI process. Forensic radiology, by employing modalities such as PMCT and PMMRI, offers a non-invasive, rapid, highly detailed method for documentation and analysis of human remains. The application of radiology in DVI is multifaceted. First and foremost, it is a potent tool for primary identification by comparing post-mortem radiographs against ante-mortem medical records, especially dental radiographs and unique skeletal features. It is also instrumental in disaster triage, enabling the virtual sorting and reconciliation of commingled remains. Radiology allows the documentation of identifying characteristics such as healed fractures, surgical implants, and unique anatomic variations. Beyond identification, it provides vital data for determining cause and manner of death through the visualization of traumatic injury, foreign objects, and disease pathologies while providing protection to the DVI personnel with the detection of hazardous materials embedded within the remains. In conclusion, the integration of forensic radiology into the standard DVI protocol is very important in increasing the efficiency, accuracy, and safety of the identification process. It does not only quicken victim repatriation with the creation of a permanent, objective, and detailed record, but it also maintains dignity in human identification amidst mass

fatality incidents. Further development and standardization of the process are essential for the future in disaster response.

Keywords: *Multi-Slice Computed Tomography (MSCT), Ante-mortem/Post-mortem Image Reconciliation, Virtual Anthropology, Radiographic Identification, Commingled Remains Analysis, Post-mortem Imaging (PMI)*

Comparative Analysis of Nanoparticle Applications in Latent Fingerprint Detection

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Abstract

Nanoparticle-based techniques have emerged as one of the most significant advancements in the development of latent fingerprints, outperforming standard powders and chemical reagents. Their customizable size, surface chemistry, and optical features enable selective engagement with sweat and oil residues, increased ridge contrast, and superior performance on difficult or multicolored surfaces. This review assesses the major nanoparticle families used in fingerprint development, which include gold and silver nanoparticles, semiconductor quantum dots, up conversion nanoparticles, magnetic iron-oxide systems, metal-oxide and carbon-based nanomaterial, and multifunctional hybrid formulations. Recent advancements includes near-infrared-excitable up conversion probes, luminescent-magnetic hybrids, surface-functionalized particles, green-synthesized nanoparticles, etc...Each category is examined based on its application mechanism, substrate compatibility, sensitivity, operational feasibility, and potential impact on downstream forensic analyses. Together, these technologies show how nan-scale materials can improve resolution, reduce background interference, and broaden the spectrum of surfaces on which fingerprints can be properly visualized. The analysis also identifies present limitations, such as formulation variability, poor cross-laboratory validation, and safety concerns,

as well as research goals for moving nan-enabled fingerprint development forward toward standardized, field-ready forensic instruments.

Keywords: *Nanoparticles, Latent Print, Fingerprint, Development, Ridge Enhancement*

Forensic Anthropology in Investigations of Crimes Against Humanity: Global Dimensions and the Mid-19th-Century Ajnala (India) Massacre

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Abstract

Throughout history, humanity has suffered from terrible crimes and acts of violence. In recent times, forensic anthropologists have played an important role in understanding these events. They study human remains to determine how victims died, the nature of the violence, and the circumstances surrounding the crimes. Their work helps confirm what happened during genocides and mass killings, offering scientific proof of events recorded in history. Forensic anthropologists also help families by locating, recovering, and identifying the bodies of missing loved ones. This support brings emotional closure and allows for proper and respectful burials. Over time, the field has expanded beyond traditional tasks like estimating age or sex of skeletons. Today, it forms a key part of humanitarian forensics, which focuses on helping communities affected by conflict, disasters, and human rights violations. This review highlights the major contributions of forensic anthropology in exposing crimes against humanity in different parts of the world. Cases from Guatemala, Cambodia, Bosnia, and other regions show how experts identify unknown victims and uncover evidence of war crimes, racial violence, and mass atrocities. These examples demonstrate that forensic anthropology is essential not only for justice but also for preserving historical truth and restoring dignity to victims and their families.

Keywords: *Ajnala (India) massacre, crimes against humanity, forensic anthropology, human rights violations*

Forensic Application of Urad Dal Powder: An Innovative and Sustainable Method for Developing Latent Prints on Glass

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Abstract

Latent fingerprint development remains a vital component of forensic investigations, especially on non-porous surfaces such as glass. This study presents an innovative approach by evaluating Urad dal powder as a natural, safe, and eco-friendly alternative to conventional commercial powders. The powder was washed, dried, finely ground, and applied using the standard dusting technique. Developed fingerprints were examined for clarity, contrast, ridge detail, adhesion, and time durability. Urad dal powder produced sharp, high-contrast ridge patterns with clear minutiae, demonstrating performance comparable to commercial white powder. It also showed notable durability, with fingerprints retaining clarity over extended time intervals. Being non-toxic, inexpensive, and widely available, Urad dal offers significant practical advantages for forensic laboratories, especially those seeking sustainable and cost-effective resources. The powder performed consistently across all samples, indicating strong reliability under routine conditions. Its natural composition minimizes health risks to forensic personnel and eliminates the need for chemical processing. Overall, the findings highlight Urad dal powder as a promising, sustainable, and accessible material for latent fingerprint development on glass, opening new possibilities for eco-friendly forensic practices.

Keywords: *Latent fingerprint, Urad dal powder, Ridge clarity, Visibility, Contrast, Time durability, non-toxic, Eco friendly*

Socio-Geographical Determinants of Victimization among the Kakkeri Tribal Community in Kerala

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Abstract

The Kakkeri tribal community in Kerala, faces ongoing victimization shaped by geographical isolation and socio-economic disadvantage. This study analyses how living conditions, education, healthcare access, and policy awareness contributed to social disadvantage and vulnerability. A descriptive research design was employed, and data were collected from 60 respondents using purposive and snowball sampling. Structured questionnaires and interviews were used as primary tools, and the data were analyzed using descriptive statistics through SPSS. Initial findings indicated substantial gaps in infrastructure, education, healthcare services, and awareness of welfare schemes, leading to continued tribal marginalization. Recent external data (2022–2024) further support and intensify these patterns: crime rates against Scheduled Tribes in Kerala have increased, with the state recording the highest crime rate per lakh of the tribal population in southern India in 2022, reflecting a rise in forms of victimization including assault, land-related conflicts, and gender-based violence. The results suggest that despite targeted policy frameworks, systemic inequalities and geographic isolation continue to shape adverse outcomes for tribal groups. The study underscored the need for localized intervention strategies, consistent policy execution, and community-centered approaches to reduce vulnerabilities and promote equitable access to rights and services.

Keywords: *Social Geography, Victimization, Tribal marginalization, Snowball sampling, SPSS*

Role of GABAA (α6) Polymorphism in the Development of Alcohol Use Disorder (AUD)

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Abstract

Background: Alcohol dependency and alcohol use disorder are linked to environmental and biological factors, including personal, family, social, and medico-legal issues. The neurobiological pathway of gamma-aminobutyric acid (GABA), which is involved in the immediate and long-term behavioral effects of ethanol, is the connection between alcohol consumption and alcohol dependent. GABA receptor subtypes A and B are the most common subtypes, and studies on GABA receptors have looked at the connection between alcoholism and the GABA system. Alcohol indirectly lowers glutamate transmission via interacting with a number of neurotransmitter systems, including serotonin, nicotinic acetylcholine, and GABA. GABAARs are a family of receptors that mediate inhibitory neurotransmission throughout the CNS. These complexes are hetero pentameric in nature.

Methodology: This study involved 160 non-alcoholic and 87 alcoholic volunteers, who were collected through EDTA vacutainers. Both informed and willing volunteers were included. At Guru Ghasidas Vishwavidyalaya Bilaspur's Department of Forensic Science, the study was carried out. For the previous five years, the volunteers had to drink 60 grams of alcohol per day. In this work, DNA fragments ranging in size from 100 bp to 25 kbp were separated using agarose gel electrophoresis. UV transilluminator was used to visualize DNA, and the GABA a6 gene primer was used for PCR amplification. We utilized the Nhel enzyme to break down the GABA a6 gene PCR product. With Graph Pad Prism 9.5.3, statistical analysis was done.

Results: The study extracted genomic DNA and amplify it using PCR-RFLP. The GABA a6 gene polymorphism was estimated using PCR-RFLP. The study analyzed genotype and allele frequencies in control and alcoholic populations, finding no significant association between the CC allele and alcohol-use disorder development. Both groups followed the Hardey-Weinberg equilibrium, with control having a GABRGA6 CC genotype and alcoholic having a GABRGA6 CT genotype. The GABA a6 allele was not statistically significant for alcohol-use disorder development, and the GABRA6 polymorphism frequencies did not significantly differ between the control and alcoholic groups.

Conclusion: The study found no significant correlation between alcohol-use disorders and the CC allele in control and alcoholic groups. The GABRA6 polymorphism

frequencies did not significantly differ between the groups, and the GABA a6 allele was not statistically relevant for alcohol-use disorders. The relationship between GABAA receptor genes and alcoholism is becoming clearer, but functional polymorphisms are still unknown. The study suggests a possible allelic relationship between dissocial alcoholism and GABRA polymorphism, but further replication studies are needed to verify the validity of these findings. Further data is needed to determine the allele frequency in the alcoholic population.

Keywords: *Alcohol use disorder, polymorphism, alcoholism.*

Telemedicine in Rural India: Review from a Half-Year Evaluation in Northern CHCs

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Abstract:

Telemedicine is increasingly integral to primary health care, offering safe, convenient, and cost-effective alternatives to traditional consultations. This study investigates its application in family medicine across Community Health Centres (CHCs) in Northern India, focusing on usage patterns, benefits, limitations, and infrastructural needs. Most consultations occurred via third-party audio applications, with laptops as the preferred hardware among physicians. Middle-aged males formed the predominant patient group, commonly presenting with gastrointestinal symptoms. Key challenges included poor follow-up compliance and difficulties among elderly patients in navigating digital platforms. Consultations primarily involved guidance on investigations and treatment, with physical services accessed at local hospitals. Telemedicine demonstrates significant potential to enhance access for remote and underserved populations while reducing healthcare costs. However, its effective integration into family medicine requires robust legal, technical, and cultural frameworks to ensure sustainability and equity in service delivery.

Keywords: *Telemedicine, Community Health Centres, laptops, consultations, family medicine.*

Efficiency of urea nitrate crystal test in detecting urine from mixed samples

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Abstract

The identification of urine is crucial in sexual assault investigations, violent crimes, and crime scene reconstruction, where body fluids provide valuable associative evidence between the victim and the suspect. The urea nitrate crystal test is a widely used microcrystalline test in which concentrated nitric acid reacts with urea, the major component of urine, forming characteristic needle-shaped or plate-shaped crystals. Although this test is reliable for pure urine samples, its performance in detecting urine within mixed biological materials such as urine–tear, urine–saliva, and urine–sweat combinations remains insufficiently explored. Since forensic evidence is frequently recovered in mixed or diluted forms, assessing the efficiency and reliability of this test in such scenarios is essential.

This study aims to evaluate the diagnostic capability of the urea nitrate test for mixed biological samples through microscopic characterization of crystal formation and morphology. Controlled laboratory experiments are conducted to observe possible alterations caused by dilution and interference from other body fluids. Pure urine samples are analysed in parallel to establish a standard reference for comparison. The findings of this research will contribute to determining whether the urea nitrate crystal test can serve as a reliable forensic tool for identifying urine in complex biological evidences. By addressing an existing research gap, the study aims to strengthen urine detection methodologies in forensic science and enhance the interpretation of evidence in criminal investigations.

Keywords: *Urea Nitrate Test, Urine Detection, Mixed Biological Samples, Microcrystalline Analysis, Forensic Science*

Spectral Classification of Human and Animal Hair by Using ATR- FTIR and Chemometric Analysis

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Abstract

The forensic differentiation of human and animal hair plays a critical role in criminal investigations, particularly in cases involving physical contact or trace evidence. In this study, Attenuated Total Reflectance-Fourier Transform Infrared (ATR-FTIR) spectroscopy was employed as a rapid, non-destructive analytical technique to obtain detailed molecular fingerprints of hair samples from three species: Humans, Dogs (Indian Pariah dogs), and Cats (Desi cats). The objective was to develop a spectral classification model capable of distinguishing between these species based on their intrinsic biochemical composition. Specifically, the research focused on two pairwise comparisons: Human vs Indian Pariah dog and Human vs Desi cat. Spectral data were collected from cleaned and standardized hair samples across the mid-infrared region (4000–400 cm^{-1}). Visual comparison of spectra using OriginPro 2025 revealed distinct absorption patterns among the three species, particularly in the amide I, amide II, and lipid-related regions.

To further enhance differentiation and explore latent structure within the spectral data, chemometric analysis using Principal Component Analysis (PCA) was performed in Unscrambler X. All 15 samples (five from each species) were combined into a single dataset and pre-processed with spectrometric alignment, baseline correction, normalization, and smoothing. PCA score plots revealed clear clustering corresponding to each species, indicating successful discrimination based on spectral variance. Loading plots identified key wavenumbers responsible for group separation, supporting the presence of species-specific biochemical markers.

This study demonstrates that ATR-FTIR spectroscopy, in combination with PCA, offers a powerful approach for the forensic classification of human and animal hair. The ability to distinguish between closely related biological samples such as Indian

Pariah dog and Desi cat hair enhances the evidentiary value of trace materials in forensic casework.

Keywords: *ATR- FTIR, Chemometric Analysis, Principal Component Analysis (PCA), Spectral Classification, Biochemical Markers, Spectral Fingerprinting, Species Differentiation, Human Hair, Indian Pariah Dog, Desi Cat.*

Heat induced fractures and UV fluorescence in burned bone: A forensic study

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Abstract

Burned bones undergo complex structural, chemical, and optical transformations that present major challenges in forensic identification and reconstruction of perimortem events. This study examined 90 human bone samples experimentally incinerated at temperatures ranging from 200°C to 1000°C for exposure periods of 30–90 minutes. UV fluorescence analysis and stereoscopic zoom microscopy were employed to document progressive colour changes, fluorescence variability, and morphological alterations associated with increasing thermal stress. UV examination revealed distinct, temperature-dependent fluorescence signatures, including shifts from natural bone fluorescence to diminished or altered emission patterns at higher burn temperatures. Microscopic assessment identified characteristic heat-induced fracture morphologies and heat induced changes such as patina fractures, stepping, transverse and longitudinal cracks, delamination, and warping each correlating with specific thermal stages and exposure durations. Together, these findings demonstrate the diagnostic value of integrating UV fluorescence with micro-morphological evaluation to infer burning conditions, estimate temperature exposure, and improve interpretation of thermally altered remains in forensic contexts. This research underscores the utility of non-destructive optical methods for enhancing accuracy in post-mortem analysis, especially in cases involving fire-related deaths or attempts at body destruction.

Keywords: *Burned bone, UV fluorescence, heat-induced fractures, stereomicroscopy, forensic anthropology, thermal alteration.*

Development of Latent Fingerprints on Different Types of Gloves by Using Physical and Chemical Methods

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Abstract

Fingerprints are a foundation of forensic evidence collected at crime scenes. But what if the perpetrator tries to be clever and wear gloves? Does this automatically mean no fingerprints will be found? Not quite. Latex gloves abandoned at crime scenes can be potential evidence that leaves the perpetrator's hidden fingerprints behind. However, despite their potential, gloves have proven to be a tricky surface for fingerprint development. This study explores the possibility of extracting fingerprints from gloves left behind by criminals. Sweat residues, dirt, and tiny particles trapped on the glove's inner surface can transfer a latent fingerprint, even if it's smudged. This smudged print can still hold valuable clues about the perpetrator. The study aims to observe the effectiveness of fingerprint development on various glove materials: latex, nitrile, cotton, plastic, and silicone. For this, a range of physical and chemical techniques were employed to reveal these hidden prints. Specialized chemicals like ninhydrin, iodine fuming, silver nitrate, Sudan black, and gentian violet were used to make the latent prints visible. Non-invasive approaches like fingerprint powders were also used to develop latent prints on the surface of gloves. This research highlights the ingenuity of forensic science in uncovering evidence even when criminals attempt to mask their identities.

Keywords: *Fingerprint Development; Latent Fingerprints; Gloves; Ninhydrin; Sudan Black.*

Monitoring of Particulate Matter Pollution and It'sAssociated Health Hazards Among the Population of Bilaspur and Andhrapradesh

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Abstract

Background: One of the main causes of the world's air pollution is particulate matter, or PM2.5, which is released into the atmosphere both directly from sources and through chemical reactions with other pollutant species. Particles of in size from 0.1 µm to 1 µm are mostly responsible for its mass concentration. The measured mass concentration is further influenced by secondary particulate matter, which is produced from precursor gases. PM2.5 has more microscopic particles, which means that it can absorb more toxic compounds and penetrate the lungs more deeply, causing more severe effects.

Methodology: To track and record air pollutants and meteorological characteristics, the Central Pollution Control Board (CPCB) of India has set up 136 continuous ambient air quality monitoring stations in key cities. The majority of stations only provide PM10 or PM2.5 data, and the data is available for weeks or months at a time. Two sample locations with more than 75% of daily data were the focus of a study carried out at Chhattisgarh's Guru Ghasidas Central University. 50 questionnaires were gathered for the study from each of 50 sites in Visakhapatnam and 50 in Bilaspur. An Excel spreadsheet was used to evaluate the data.

Results: The Visakhapatnam district of Andhrapradesh has high concentrations of PM2.5, PM10, NO, NO2, and NOx, while the Bilaspur area in Chattisgarh has significant amounts of SO2 and CO. The coal mining sector in Bilaspur affects the majority of residents, with high levels of metals, black carbon, and sulphur dioxide in coal-derived PM2.5. High exposure to SO2 and CO pollution can lead to cancer, heart disease, lung conditions, diabetes, obesity, and reproductive, neurological, and immune system problems. The poor air quality index in the area is attributed to industry stack emissions, poor road alignment, traffic rule violations, and poor vehicle maintenance.

Conclusions: The research shows that average PM assessments over time underestimate the health risks associated with high PM values, even for short intervals. It suggests the need for new models and technologies to monitor PM on an ad hoc basis. Despite Bilaspur's low pollution levels, the health effects of the coal industry's SO2 and CO deposition are high due to factors like low literacy rates, inadequate medical facilities, lack of preventive measures, poor hygiene, and inadequate healthcare.

Keywords: *Central pollution control board, particulate matter, air quality index, meteorological characteristics.*

A Comprehensive Analysis of Awareness Among the Email Users of Different Age Groups Regarding Cyber Crimes

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Abstract

Introduction: Email is crucial for communication, security, and cybercrime understanding. Email forensics Involves preserving, identifying, and documenting digital evidence. Cyberstalking is a complex crime with various forms and impacts. Investigate crimes involving email like phishing, identity theft, and cyberstalking. Analyze the effects of cybercrimes on victims. Online survey with Google Forms on email related crimes. Email forensics techniques for authorship attribution and fraud identification.

Methodology: 100 volunteers between ages 16-60 participated in an online survey. The survey was distributed via Google Forms, which was sent to participants through email and WhatsApp Convenience sampling was used to select the participants. The purpose of the survey was to understand users' opinions, knowledge, and experiences with email-related crimes such as identity theft, phishing, cyberstalking, and email spoofing. Survey on email crimes awareness, actions, and security risks among participants.

Result: A survey concluded that 61% were aware of cyberstalking, 55.2% were aware of online stalking, and 49.5% were aware of identity theft protection services. However, only 63.8% reported fraudulent transactions. The majority were concerned about security risks associated with spam and email bombing.

Conclusion: Study limitations Include sample size and focus on email-related cybercrimes. Cyber-stalking and phishing effects were examined with cybersecurity policy Implications. User education and email filtering can reduce cybercrime risks effectively. The study reveals that 28.6% of people are aware of email-related crimes, while 71.4% are not. Study limitations include sample size and scope, suggesting broader future research.

Keywords: *Cyberstalking, Email Spoofing, Cybersecurity policy Implications, Phishing, Fraudulent Transactions.*

Mental Health Assessments in Forensic Contexts

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Abstract

Background and Purpose: Forensic mental health assessments constitute specialized psychological evaluations conducted to assist legal decision-makers in addressing specific legal questions, fundamentally differing from therapeutic assessments through their objective, non-confidential nature and adherence to legal standards rather than clinical treatment goals.

Scope and Applications: This paper examines forensic assessment applications across criminal contexts including competency evaluations, criminal responsibility determinations, sentencing mitigation, and risk assessment, alongside civil applications encompassing commitment proceedings, capacity evaluations, custody determinations, and guardianship assessments.

Methodology and Process: The assessment methodology employs a rigorous multi-method approach incorporating comprehensive clinical interviews, systematic collateral information review from legal and medical records, and validated psychological testing instruments including general psychopathology inventories and specialized forensic assessment tools utilizing actuarial and structured professional judgment frameworks.

Critical Considerations: This paper identifies essential practice elements including response style evaluation for detecting malingering, maintaining strict impartiality and objectivity as neutral court experts, ensuring cultural competence in assessment interpretation, and navigating professional debates regarding ultimate issue testimony limitations.

Challenges and Implications: Forensic mental health assessments face inherent challenges including deception detection complexities, retrospective assessment difficulties, and balancing clinical expertise with legal authority, yet remain vital for providing reliable psychological data supporting fair legal outcomes while upholding ethical professional standards.

Keywords: *Forensic mental health assessment, competency to stand trial, risk assessment, malingering detection, expert witness testimony*

A Scoping Review of Suicide in Indian Custodial Settings: Forensic Mental-Health Gaps, Reporting Challenges, and a Bayesian Framework for Evidence Synthesis

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Abstract

Custodial suicide rates worldwide are far higher than the general population with men reporting three times higher and women reporting two times higher than the general population. Specifically, there is a lack of comprehensive studies in India that specifically focus on the prevalence and patterns of suicide in custodial settings. Individuals detained in prisons and police lock-ups often go through with heightened psychological vulnerability due to isolation, uncertainty, custodial stress, stigma, and limited access to mental-health services. Although the National Crime Record Bureau (NCRB) has reported a significant increase of suicide in custodial settings, several reports have suggested about the concerns related to underreporting, ambiguously characterized and unexplained medical deaths, which reflects on the point of reconsidering the mental health screening and assessments in forensic contexts and the institutional accountability to safeguard the well being of the inmates. The current study focuses on the examining patterns, risk factors, assessment practices, and investigative procedures related to suicide in Indian custodial settings to clarify the psychological, institutional, and legal policies needed to prevent custodial suicide in India. Additionally, because custodial-death data in India are sparse, inconsistent, and prone to reporting bias, a Bayesian explanatory framework is proposed for future suicide-risk estimation and evidence synthesis. A scoping review methodology was employed with searching various databases like PubMed, Scopus, Web of Science and several institutional sources, guided by PRISMA-ScR principles. The narrative thematic synthesis identified the issues like inconsistent psychological screening, lack of standardized suicide risk assessment tools in the custodial settings, a smaller number of mental health counsellors in the correctional settings, extraneous factors like overcrowding, prolonged pre-trial detention and lack of transparent post-incident

psychological autopsy or review mechanisms. The study has several implications other than integration of Bayesian methods in forensic mental health context such as development of suicide-risk protocol in Indian Custodial settings, proper training for the police personnels, policy reframe to correctional authorities.

Keywords: *Custodial suicide, scoping review, forensic psychology; prison mental health, Bayesian evidence synthesis, suicide-risk assessment, psychological autopsy, correctional policy*

Effectiveness of Forensic Nursing Practices on Sexual Assault Cases: A Systematic Review

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Abstract:

Background: Sexual Assault Nurse Examiners (SANEs) have become integral to the multidisciplinary response to sexual assault, providing specialized forensic care, evidence collection, and trauma-informed support to survivors.

Objective: To systematically review and synthesize evidence on the effectiveness of forensic nursing practices, specifically SANE programs, on sexual assault case outcomes published between 2015 and 2025.

Methods: A systematic literature review was conducted following PRISMA guidelines. Electronic databases were searched for peer-reviewed studies published from 2015 to 2025 examining SANE program effectiveness. Studies were assessed for quality, and data were extracted on patient outcomes, forensic evidence quality, healthcare delivery, and criminal justice outcomes.

Results: Twenty-seven studies met inclusion criteria. Evidence demonstrates that SANE programs significantly improve: (1) quality and completeness of forensic evidence collection (88-95% adherence to protocols vs. 71-80% for non-SANEs); (2) patient satisfaction and trauma-informed care delivery (>90% satisfaction rates); (3) healthcare service provision including emergency contraception and STI prophylaxis; (4) prosecution rates and case progression through the justice system; and (5) accessibility of services, particularly through telehealth innovations. However, SANEs face challenges including burnout, vicarious trauma, workforce shortages in rural areas, and need for enhanced training on serving marginalized populations.

Conclusions: SANE programs represent an evidence-based best practice for sexual assault response, improving both health and justice outcomes for survivors. Continued investment in SANE education, support systems, and program infrastructure is essential to meet the needs of all survivors, particularly in underserved communities.

Keywords: *Sexual Assault Nurse Examiner, SANE, forensic nursing, sexual violence, systematic review, trauma-informed care*

Gender differences on the impact of cyberbullying on general health amongst secondary school students in Mumbai

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Abstract:

A significant challenge in today's times that remains majorly in urban settings associated with extensive web access is of cyberbullying. The current research paper studies the gender differences on the impact of cyberbullying pertaining to general health amongst secondary school students in Mumbai. The sample comprised of 1622 students (Male= 823 Female=801) from 10 schools in the city. Cyberbullying scale by Stewart & John Young was used to measure cyberbullying and General Health Questionnaire by D. P. Goldberg and V. F. Hillier was used for this purpose. No significant difference was observed amongst male (M=10.15, SD=8.64) and female (M=9.53, SD=7.68) students, $t(1622) = 1.54$, $p>.05$

Findings suggest that that there is no significant difference when it comes to experiencing cyberbullying in the urban settings, as both genders are equally vulnerable as well as aware of the ramifications and physical and mental health issues associated. These findings facilitate exploring the psychological and social dynamics interplay in the experience of cyberbullying in Mumbai providing insight for tailored actions for forestalling and salubrity.

Keywords: *Cyberbullying, gender, teenagers, mental health.*

True Crime Narratives: Impact of Documentation, Podcasts and Films

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Abstract

True crime narratives can be both a fantasy and challenge depending on the target audience. When a film or documentary is taken there can be two types of audience who would like to watch, the first type being the thriller sensation group who watch but don't carry the message, it gives a sense of gratification of having watched a thriller film for three hours or so but forgotten once out of the theatre, the second being where students and professional of criminal and forensic investigative field would like to watch as a case study or rather get clues of evidence that could have been missed in the crime scene investigation and aid forensic analysis .The podcast does not have any visual content unless otherwise permission is sought to display visuals which could be disturbing for the public but the messages that podcast carry have to be very informative and the person who is delivering the message has to be very clear on the message he is conveying. Is the message conveyed to protect the people or awareness of crime in the society of create fear and panic or be overdramatic about a situation which may not have happened could be misleading. Many crimes committed recently have been based on films and actual narratives. For example, a documentary on a released prisoner could be a game changer for others to understand what actually commiting a crime would lead to and the amount of torment undergone the by offender in prison to have undergone the period of trial, to continue the rejection of the society on release. There have been success stories made as documentaries or podcasts of rehabilitation in prison system, educational degrees earned by the prisoners, skill training that can show the public that once defamed as an offender does not imply as a continuous habitual offender in the eyes of the criminal justice system.Documentaries,Podcasts and Films should be encouraged not just to defame the society or offender but to create healthy awareness and education of moral

lifestyle and upbringing of children that parents can avoid juvenile delinquency to make our society a safer place to live in .

Keywords: *Crime narrative, impact message, societal reforms, psychological implication.*

Effectiveness of Forensic Nursing Practices on Sexual Assault Cases: A Systematic Review

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healthcare service provision including emergency contraception and STI prophylaxis; (4) prosecution rates and case progression through the justice system; and (5) accessibility of services, particularly through telehealth innovations. However, SANEs face challenges including burnout, vicarious trauma, workforce shortages in rural areas, and need for enhanced training on serving marginalized populations.

Conclusions: SANE programs represent an evidence-based best practice for sexual assault response, improving both health and justice outcomes for survivors. Continued investment in SANE education, support systems, and program infrastructure is essential to meet the needs of all survivors, particularly in underserved communities.

Keywords: *Sexual Assault Nurse Examiner, SANE, forensic nursing, sexual violence, systematic review, trauma-informed care.*

Evaluation of the Applicability of Chaillet and Demirjian's Dental Age Estimation Methods in a Southern Karnataka Population

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Abstract

Introduction: Dental age estimation is a cornerstone of forensic identification, particularly in cases where authentic birth records are unavailable. Teeth serve as reliable biological indicators due to their predictable developmental stages and resistance to environmental factors. Among the established techniques, Demirjian's eight-teeth method has been widely applied. However, since dental development exhibits inter-population variability, it is essential to validate the method regionally before routine application.

Materials and Methods: A retrospective analysis of 59 digital orthopantomographs (OPGs) from individuals aged 7–25 years was conducted. The developmental stages of the left mandibular permanent teeth were assessed using Chaillet and Demirjian's criteria, and chronological age was obtained from birth records. Estimated and chronological ages were compared using mean absolute error (MAE), mean error (bias), percentage accuracy, and confidence intervals (95% and 99%). Subgroup analysis was performed for 7–15.99 years (validated range) and 16–25 years (extended range), with sex-specific evaluation.

Results: In this study for individuals aged 7–15.99 years, the method demonstrated minimal mean error (+0.08 years), low MAE, and 84.62% of estimates within 2 years of chronological age. Confidence intervals included zero, indicating absence of systematic error. Conversely, in the 16–25-year group, the method produced substantial underestimation (mean error = –6.5 years), high MAE, and no estimates within 2 years; confidence intervals excluded zero, reflecting consistent error.

Conclusion: Chaillet and Demirjian's 8-teeth method is accurate and unbiased within the validated range of 7–15.99 years, indicating no requirement for a new regional-specific formula in this age group. However, its extension to older adolescents and young adults (16–25 years) is unreliable due to significant underestimation.

Keywords: *Dental age estimation, Demirjian's method, Orthopantomograph (OPG), Forensic odontology.*

The Emerging Role of AI in Odontometric Analysis: Trends and Challenges in Forensic Odontology

Dr. Sachita Shrikant Naik

Abstract

Forensic odontology plays a vital role in human identification through the examination of dental evidence, particularly when other biological markers are unavailable or degraded. Odontometric analysis is done by measuring and comparing the dental dimensions, which severs as a key parameter in determining age, sex, and individual identity. Traditional odontometric methods are often time consuming, operator dependent, and subjected to human error. Recently artificial intelligence (AI), particularly machine learning and deep learning algorithms, have introduced new possibilities for automating and enhancing the precision of odontometric assessments. This paper explores the application of AI in odontometric analysis within forensic odontology, highlighting its potential to revolutionize identification processes. AI-driven image analysis systems can accurately segment, measure, and classify dental features from radiographs, photographs, and 3D scans, enabling rapid and objective evaluations. The integration of convolutional neural networks (CNNs) has shown promising results in predicting sex and age from dental metrics with high accuracy. Furthermore, AI models can handle large-scale datasets and uncover complex morphological patterns that are often undetectable through manual examination. Also, emphasizes the benefits of AI-based odontometric tools in improving reliability, reproducibility, and efficiency in forensic investigations, while also discussing the limitations, ethical considerations, and need for standardized datasets. Ultimately, the incorporation of AI in odontometric analysis represents a significant step toward a more scientific, data driven future in forensic odontology.

Keywords: *Artificial intelligence, odontometric analysis, forensic odontology*

Evaluation of deviation in range of natural variation between Electronic and handwritten signatures: A comparative study

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Abstract

Widespread use digitization in field of documentation led to change use of signatures from conventional way to electronic means the world is changing to paperless from paper. In present study a comparative analysis of electronic signatures w.r.t. handwritten signatures were performed for deviation in the range of natural variation in electronic signatures for characteristics like Size of overall signatures, Slants, Alignment, Relative size and proportion of letters, Relative Spacing between letters and Connecting strokes. It was concluded that despite deviation in range of natural variation in electronic signatures, there is possibility that authorship of the electronic signatures can be established with mentioned characteristics.

Electronic Signatures & Natural Variation: A Review Article

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Abstract

The present article is mainly focused on a critical review of electronic signatures and various feature variations already published by researchers in the past, and also reviews the challenges faced by Forensic document examiners during the examination of electronic signatures. This article also presents features of electronic signatures that are in consistent with features of handwritten signatures. In addition to this, available methodology for examination of electronic signatures is also reviewed to point out advancements in the field of forensic documents examination and also find out grey areas in the existing research so that further research can be carried by taking into consideration of gaps. The current article would provide an opportunity to new researchers to take up research projects, especially on the discovered areas of topic. Furthermore, researchers should continue exploring areas concerning electronic signatures and variation features so that they can cope with current scenarios of the research.

Keywords: *Electronic signatures, Forensic Documents Examiner, features variations, Handwriting Examination*

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