The ICONIC MEETINGS
.....Meet Influential People.....

ICFSR-2025

International Conference on Forensic Science and Research

June 09-11, 2025 | Osaka, Japan

Abstract Book

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Forensic Science and Research
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ICFSR-2025

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Yadong Guo, M.D., Ph. D
Central South University, China
Advancing Forensic Entomology: Insights, Case Analyses, and Standardization Proposals

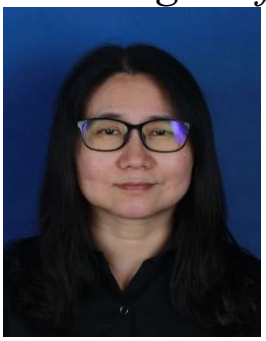
Abstract

Entomological evidence offers forensic practitioners unique insights and analytical pathways, particularly in the determination of postmortem interval (PMI). It provides novel investigative angles and critical threads for the successful resolution of criminal cases. This article reviews forensic cases handled by the Department of Forensic Medicine at Central South University over the past five years, where insect evidence was employed for PMI estimation. It thoroughly examines the common necrophagous insect species identified in these cases and their temporal distribution. Through detailed case analyses, the article compares the accuracy of various developmental time estimation methods. Furthermore, the lack of unified and standardized formats and protocols for entomological case reports, influenced by differences in national legal frameworks, poses challenges to the field. This article outlines the essential components that should be included in such reports, evaluates key analytical criteria and their inherent limitations, and presents a flexible template adaptable to specific contexts. These recommendations aim to enhance the utility of entomological evidence, supporting the development of globally recognized standards for its practical application in forensic science.

Biography

Yadong Guo, M.D, Ph.D, Professor of Forensic Pathology, is the Associate Dean of the School of Basic Medical Sciences. After earning his doctorate at Central South University, he specialized in forensic pathology and entomology, particularly the use of necrophagous flies for postmortem interval estimation. A leader in forensic entomology research in China, he strives to align domestic studies with international standards

and has been recognized as a "Young Changjiang Scholar." Dr. Guo serves as Director and Chief Forensic Scientist at the Hunan Forensic Identification Center of Xiangya and holds prominent roles in several professional associations, including the Chinese Forensic Medicine Association. He has led multiple national and provincial research projects and published extensively in top journals such as Mol Ecol Resour and Int J Legal Med. Additionally, he provides forensic expertise in autopsy and medical disputes, supporting law enforcement in resolving conflicts and advancing forensic science practice.



Dong Hongmei, Professor
Huazhong University of Science and Technology, China

The cardiac injury following blunt chest trauma: the forensic challenges

Abstract
Blunt chest trauma (BCT) could cause cardiac injuries, affecting myocardium, pericardium, endocardial structures, and most rarely, coronary arteries. Blunt cardiac injuries are commonly caused by traffic accidents, followed by falling from significant heights and the sports. Although rare, the blunt cardiac injuries due to fight can occur which is needed to be paid more attention because of complicated legal issues might be involved. The cardiac injuries following BCT are usually accompanied by external and internal chest injuries such as bruises, rib

fractures, sternum fractures, pulmonary contusions, and bronchial injuries. However, in some blunt cardiac injuries, no obviously accompanying chest injuries can be observed. In forensic practice, some blunt cardiac injuries are challenging to differentiate. The underlying cardiac disease and cardiopulmonary resuscitation need to be distinguished carefully. Here, we present the topic about cardiac injury following BCT, including cardiac contusion, commotio cordis, cardiac rupture, and coronary artery injury. We also discussed the key points for these kinds of forensic cases. This report underscores the importance of correct diagnosis for delineating legal responsibility in judicial practice.

Dong Zhao, Professor
China University of Political Science and Law, China

The cardiac injury following blunt chest trauma: the forensic challenges

Abstract

Postmortem diagnosis of drug-induced anaphylactic shock is challenging in forensic practice due to the lack of characteristic morphological changes. As the key mediator of type I hypersensitivity, the determination of allergen-specific IgE can provide information on the atopic disposition of the particular

allergen. However, the wide variety of drugs and the effects of postmortem changes make the postmortem determination of drug-specific IgE particularly difficult. In this study, a novel approach was proposed for postmortem determination of drug-specific IgE by integrating pull-down assays (compound of specific IgE and drug-allergen captured by anti-IgE antibody conjugated on carboxylated microsphere) with LC-MS (detection of the drug structures making up allergen). The animal allergy model was established by sensitizing rats with BSA and penicilloic acids hapten conjugates. Blood samples were collected, and serum and hemolyzed samples were prepared. The samples were divided into three groups: the allergic group, which consisted of serum and hemolyzed blood from allergic rats; the false positive group, which included serum and hemolyzed blood from control rats mixed with BSA and penicilloic acid hapten conjugates solution; and the control group, comprising serum and hemolyzed blood from control rats. Our results showed the penicilloic acid was only detected in the allergic group, other two groups were negative, indicating the specificity of the method and the efficiency in both serum and hemolyzed blood samples. Given the versatility of LC-MS for drug detection, the method proposed in this study may serve as a general and effective approach for the postmortem determination of drug-specific IgE.

Biography

Professor Dong Zhao graduated from the Department of Forensic Medicine, Osaka City University in 2007. He is mainly engaged in research on the molecular pathology mechanism of sudden death, genetic polymorphism and comparison of forensic systems. He has published more than 100 articles and 11 books

in forensic biology and forensic pathology, including more than 30 SCI articles. Professor Dong Zhao is a distinguished scholar of forensic science.

Kritika,
Independent Researcher, India

Cognitive Clues: Integrating Neuroscience into Forensic Practices

Abstract

The intersection of forensic science and neuroscience presents a transformative opportunity to enhance our understanding of criminal behavior, memory reliability, and the implications of brain function in legal contexts. The presentation aims to outline an interdisciplinary approach that integrates insights from neuroscience into forensic methodologies, exploring how brain imaging, neuropsychological assessments, and cognitive science can inform investigative processes and courtroom proceedings. Also, examine the role of neural mechanisms in decision-making, memory recall, and emotional responses, highlighting how these factors can influence eyewitness testimony and the reliability of confessions. Additionally, discuss the ethical considerations and potential limitations of applying neuroscientific evidence in legal settings. By fostering collaboration between forensic scientists, neuroscientists, and

legal professionals, this approach aims to create more accurate, informed, and equitable outcomes in the justice system. Participants will gain a comprehensive understanding of how integrating these disciplines can lead to innovative practices in forensic investigation and legal adjudication.

Biography

Ms. Kritika is an accomplished researcher specializing in the intersection of cybersecurity and neuroscience. She has made significant contributions to the field through a diverse array of publications, including peer-reviewed articles, book chapters and books. Her expertise lies in uncovering new insights and best practices in cybersecurity, particularly, through the lens of Generative AI, neuroeconomics, good governance, neuroethics and neuro-driven technologies. She has solely authored 2 books, 15+ research papers and 10+ book chapters. Her achievements include winning the Young Engineer Award and Young Researcher Award. She has also been recognized for her academic excellence with gold medals in international mathematics olympiad. Currently, she serves as an independent interdisciplinary researcher, book reviewer for IGI Global, and journal reviewer for 10+ scopus indexed journals and holds memberships in prominent organisations such as WiCys India Affiliate and the International Association of Engineers(IAENG).

Marek Kotrly, PhD

Institute of Criminalistics, Prague, Czech Republic

New possibilities of X-ray and multimodal methods in the forensic field

Abstract

The analysis and study of internal structure, structures and composition is widely used for a range of expertise and inspections. Examples include investigating the causes of industrial accidents and explosions, accidents in aviation and automobile transport, investigating the causes of fires, etc. However, similar methods are also used in the analysis of suspected forgeries of art objects (paintings, plaques, sculptures). One of the options is the use of robotic scanners with various multimodal detectors. The system is currently being developed and integrates the existing X-ray scanner with other analytical modalities (XRD, XRF, multispectral imaging and others). System is based on Radalytica's multi-robot imaging platform. System measures nearly all conventional 2D and 3D trajectories of X-ray imaging with precisely calibrated and repeatable geometrical accuracy leading to a spatial resolution of up to 50 µm.

Platform allows combining several imaging modalities with any required number of robots. Such modalities range from visible light imaging, UV, IR, to 3D surface profiling, air-coupled ultrasound to 2D X-ray imaging, and CT.

Another of the tested modalities is energy dispersive X-ray diffraction (EDXRD). The spectral sensitivity of every pixel in AdvaPIX TPX3 camera with high resolution Timepix3 chip enables polychromatic X-ray beam to be used for EDXRD resulting in fast and compact system. A polychromatic X-ray

beam generated by a standard X-ray tube with simple (dual stage collimator) without need of monochromator yields high intensity enabling faster and smaller system, much less complex. The high resolution detector placed close to the sample covering a large solid angle => mechanical angular scanning is not needed => fast data accumulation. Broad energy range (3 - 150keV) allows that even very absorbing samples can be analyzed (stainless steel, heavy metals and minerals).

The result will be a versatile multimodal system that will enable non-destructive analysis of a wide range of objects. The dual robot, or more general multi-robot, based on RadalyX imaging platform is proving itself not only as a highly flexible non-destructive testing tool but also as versatile research equipment. It also opens new possibilities and scan approaches impossible otherwise. New possibilities are brought by the tested significant extension of analytical modalities, in particular XRF, XRD, multispectral imaging and others. The system brings completely new possibilities for forensic analysis, material analysis, art research and industrial inspection.

Biography

Dr. Marek Kotrly is a graduate of the Faculty of Science, Charles University Prague. He has been working in the forensic science field for 30 years in Institute of Criminalistics. Specializes in optical and electron microscopy, microanalysis, multispectral and hyperspectral imaging, and X-ray diffraction. Is the author of over 90 professional publications, worked on more than 25 research projects, is an external lecturer at Charles University and The University of Chemistry and Technology Prague.

Chider Chen
University of Peensylvania, USA

Repurposing Ferumoxytol Nanoparticles to Activate Orofacial Stem Cells for Autotherapies

Abstract

The advancement of regenerative medicine has provided many new potential treatments for craniofacial bone defects, in which mesenchymal stem/progenitor cells (MSCs) play a critical role in maintaining constant remodeling of tissue architecture. The neural crest derived orofacial MSCs (OMSCs), such as stem cells from apical papilla (SCAP) are attractive postnatal stem cells for hard tissue regeneration, based on their superior osteogenic properties compared to their bone marrow counterparts. However, clinical translation remains challenging due to limited knowledge about the mechanisms of action. Ferumoxytol, an FDA-approved iron oxide nanoparticle formulation, exhibits several biomedical properties including anticancer and immunomodulation, based on its inherent physicochemical properties that activates cell proliferation, migration, and differentiation. Given these properties, ferumoxytol could be applied in MSC-based tissue regeneration, an unexplored avenue. Specifically, our goal is to identify whether ferumoxytol can activate orofacial MSCs and promote their multipotent differentiation capabilities and immunomodulation for endogenous tissue regeneration. Using RNA sequencing (RNA-seq) analysis and in vitro MSC

characterization, we found intriguing data demonstrating that: 1) ferumoxytol significantly promotes stemness of SCAP through elevation of MSC markers and osteogenic progenitor markers, 2) proliferation and osteogenic capabilities are highly activated in SCAP after ferumoxytol treatment, 3) ferumoxytol largely increased immunomodulation of SCAP via PGE2/IDO cascades, and 4) YAP/TAZ are required mediators in ferumoxytol-mediated metabolic reconfiguration of SCAP for tissue regeneration. This translational study extends our knowledge in activating somatic stem cell abilities through repurposing an FDA approved nanoformulation for a new biomedical application.

Biography

Dr. Chider Chen received his Ph.D. in Craniofacial Biology from the University of Southern California and a post-doctoral training in stem cell biology at the University of Pennsylvania. He is an Assistant Professor of the Department of Oral and Maxillofacial Surgery/Pharmacology at the University of Pennsylvania, School of Dental Medicine. He has authored more than 90 peer-reviewed articles in a variety of high-impact scientific journals and received several research awards from NIH including an K99/R00 Pathway to Independent Award. Dr. Chen is working on mesenchymal stem cell-based therapy in craniofacial disorders and identifies several novel physiological mechanisms. He also interests in bone biology and dissects the

role of mesenchymal stem cells in bone and marrow homeostasis. These findings identify novel targets for disease management and have been applied in several pilot clinical studies to treat human patients.

Liu Qian

Tongji Medical College of Huazhong University of Science and Technology, Wuhan, China

Autopsy of aortic dissection: molecular autopsy and histopathology can bring more details

Abstract

Thoracic aortic dissection is an extremely dangerous cardiovascular condition with a high mortality rate, particularly in young individuals. Studies have shown that the pathogenesis of thoracic aortic dissection is closely related to genetics. This study reports a case of a 17-year-old male patient who died due to the rupture of a thoracic aortic dissection, revealing a novel genetic etiology through comprehensive molecular and histopathological analyses. Whole-exome sequencing of the index patient's blood sample revealed a novel c.155_162delinsGCACA mutation in the ACTA2 gene. This complex mutation lost 3 bases, resulting in 3 amino acid changes and 1 amino acid loss. This mutation was inherited from the index patient 's mother and were also detected in his sister. The novel c.155_162delinsGCACA mutation segregated with the thoracic aortic dissection phenotype within the family. This mutation was classified as pathogenic under ACMG guidelines, with absent frequencies in population databases (ExAC, 1000 Genomes) and high conservation scores (PhastCons=1). ACTA2 gene mutations are closely related to the contraction function of aortic vascular smooth muscle cells

and are a significant genetic factor leading to thoracic aortic dissection. Histopathological examination of the aortic wall demonstrated severe medial degeneration, elastic fiber fragmentation, and reduced α-SMA expression, consistent with vascular smooth muscle cell dysfunction. Familial screening revealed cosegregation of the mutation with aortic pathology, including diffuse calcified plaques in carriers, implicating ACTA2 in both thoracic aortic dissection and vascular calcification—a phenotype mechanistically underexplored. Notably, the proband's non-carrier twin sister exhibited no abnormalities, underscoring the mutations' causative role. This study highlights: (1) The first report of c.155_162delinsGCACA mutation in the ACTA2 gene driving familial non-syndromic thoracic aortic dissection; (2) The imperative for postmortem genetic testing in young thoracic aortic dissection cases to guide familial risk assessment; and (3) Potential links between ACTA2 dysfunction and vascular calcification, warranting further investigation. Our findings reinforce ACTA2 screening in thoracic aortic dissection families and advocate proactive surveillance for at-risk relatives to mitigate catastrophic outcomes.

Keywords: thoracic aortic dissection; ACTA2 gene; gene mutation; vascular smooth muscle cell; genetic screening; aortic calcification

Biography

Prof. Liu received the Medical bachelor's degree in clinical medicine from Huazhong University of Science and Technology (HUST) in 2003, the Doctoral Degree in Forensic Medicine from HUST in 2009. She is currently a Professor with the

Department of Forensic Medicine, Tongji Medical college, HUST. Her research interests include Sudden Cardiac Death, Computational Pathology, Molecular Autopsy. Prof. Liu serves as the member of the Legal Medicine Professional Committee of the Chinese Medical Association, and member of the Pathology Professional Committee of the Chinese Medical Association.

Jinsu Kim
Republic of Korea

Abstract

Among fire incidents caused by electrical factors, electrical fires resulting from incomplete contact often leave behind distinct electrical traces, such as the growth patterns of copper(I) oxide (cuprous oxide) and electrical melting marks. These specific characteristics are primarily found at connection points such as wires and terminals. Traditionally, the determination of cuprous oxide growth has been based on observations such as the thinning of individual wire strands, the presence of fragile reddish-purple oxides, and elemental composition analysis using SEM-EDS (Scanning Electron Microscopy with Energy Dispersive Spectroscopy). Additionally, electrical melting marks observed on terminals have been identified through visual inspection of the boundary between the melted and unmelted areas, as well as the shape of the melted region.

In this study, we analyzed material property data using samples

of incomplete contact collected from actual fire sites, utilizing techniques such as X-ray diffraction (XRD) and SEM-EDS. XRD pattern analysis can confirm the formation of cuprous oxide at the connection point, while SEM-EDS analysis of the contact area can reveal changes in elemental composition at the boundary of the melted region. This enables estimation of the causes of melting mark formation and the temperature conditions at the time of occurrence. By applying such physical and chemical analytical methods to incomplete contact areas, it is expected that objective and highly reliable results can be provided for forensic investigations.

Biography

Jinsu Kim holds a Ph.D. in Physics from Sogang University, where he studied magnetically doped topological insulators and their quantum transport properties. His research focused on phase transitions and novel phenomena in topological materials. Since 2020, he has served as a forensic investigator at the National Forensic Service of Korea, specializing in fire origin analysis. Dr. Kim combines his expertise in experimental physics with practical forensic methods to conduct thorough investigations and uncover fire causes with scientific precision.

Tae-Hun Kim
Republic of Korea

Analysis of Fire Incidents Involving Vehicle PTC Heaters

Abstract

As the automotive industry transitions toward electrification, the heating systems inside vehicles have also evolved. While conventional internal combustion engine vehicles utilize waste heat for heating, diesel, hybrid, and electric vehicles have adopted electric heating systems, notably Positive Temperature Coefficient (PTC) heaters. These heaters, based on ceramic materials, exhibit a sharp increase in resistance above certain temperatures, thereby limiting current flow and allowing for efficient self-regulating heating. However, the increasing use of PTC heaters raises concerns over fire hazards and safety. PTC heaters operate at high power and may overheat due to insulation breakdown, poor contact, or internal faults. This study analyzes two real-world fire incidents involving PTC heaters in vehicles. The first occurred in 2020 in Gyeongsangbuk-do, where fire was localized near the front passenger side and dashboard without spreading to the engine compartment. The heater exhibited localized damage and insulation melting, with evidence of electrical melting at the power connector. The second incident, in 2024 in Gangwon-do, occurred in a parked vehicle awaiting inspection, showing a similar burn pattern and signs of thermal damage due to copper oxide propagation. Likely contributing factors include increased local resistance from poor contacts, contamination by moisture or dust, vibration, impact, and aging degradation. This study proposes preventive measures such as low-resistance contact design, real-time voltage and current monitoring, temperature sensing, fuse integration, and periodic connector inspection to improve vehicle fire safety.

Biography

Tae-Hun Kim holds a Master's degree in Physics from Chonnam National University, obtained in 2019. Since then, he has been serving as a fire investigation officer at the National Forensic Service (NFS) in Korea. His expertise lies in analyzing fire scenes and identifying causes of ignition, particularly in vehicle and electrical fire incidents. Through his forensic evaluations, he contributes to improving public safety and advancing fire investigation practices. With years of hands-on experience and technical insight, he continues to support national forensic operations with accuracy and professionalism.

Jiang Ling, Ph.D
Central South University, China

Sensitive detection and primary metabolism analysis of flualprazolam in blood

Abstract
Flualprazolam, a new benzodiazepine psychoactive substance recently sold online, has been often used out of control list by criminals for rape and robbery. In this paper, the flualprazolam was successfully identified by gas chromatography-mass spectrometry (GC-MS), liquid chromatography-quadrupole time-of-flight mass spectrometry (LC-Q-TOF-MS) and nuclear magnetic resonance (NMR). Moreover, LC-Q-TOF-MS analysis method was proposed for the determination of flualprazolam in whole blood using the rabbit perfusion model successfully. After

metabolism analysis, a monohydroxylated metabolite 3-hydroxy-flualprazolam was found in the primary mass spectrum of metabolites. Meanwhile, the time effect curve of the flualprazolam in rabbit's blood was explored and the detection window was about 36 hours. Moreover, the sensitivity of the established LC-Q-TOF-MS method was investigated with the limit of detection of 0.03 ng/mL. The successfully analysis of the actual forensic case with this established method suggests that it might provide a reference method for drug detection or supervise in law enforcement agencies and identification institutions.

Biography

Jiang Ling received his Ph.D. degree in forensic medicine from the School of Basic Medicine, Central South University in 2023. He is currently a lecturer in School of Basic Medicine, Central South University. His research areas are construction of sensing technologies and toxic drug analysis and detection. He has Published in excess of 8 papers in rumored diaries.

Huang Qingqing

Shandong University of Political Science and Law, China

Y-STR analysis of highly degraded DNA from skeletal remains over 70 years old

Abstract

Although current international DNA individual identification technology has achieved high-precision matching, it still faces

technical difficulties when dealing with old samples that are extremely degraded and severely contaminated (such as bone samples over 70 years old). This study focuses on the homology identification of Y-STR loci between the skeletal samples of missing individuals (left for more than 70 years) and their suspected relatives, and aims to break through the problems of DNA degradation and contamination caused by complex burial environments (shallow burial, microbial contamination). We proposed a three-stage innovative strategy to improve the DNA extraction efficiency and detection sensitivity of teeth. Firstly, we conducted pre-experiments on tooth samples of different preservation conditions for 20-50 years and summarized a relatively ideal DNA extraction scheme through a large number of pre-experiments. Secondly, in the PCR amplification stage, we performed gradient amplification to achieve the best amplification effect. Finally, in the detection stage, we used a combination of first-generation electrophoresis and second-generation sequencing to obtain as many STR loci as possible. Among them, in the first-generation electrophoresis, we selected three commercial kits and used a combination of them to make up for the disadvantage of fewer detected loci in a single kit. Ultimately, the Y-STR genotypes obtained from these individuals identified as relatives were completely identical to each other, and the alleles at more than 28 loci were consistent with the consensus profile of the missing individuals.

Sharifah Mastura Syed Mohd Daud, Ph.D
University Technology MARA (UiTM), Malaysia

Enhancing Victim Identification in Disasters with Drone Technology Through Secondary Identifiers

Abstract

Conventional methods in disaster victim identification, such as manual ground searches, often rely on visual cues and the recovery of evidence at the scene to locate and identify victims. In such scenarios, secondary identifiers like scars, tattoos, injuries, clothing, or personal belongings become crucial. Secondary identifiers are supplementary characteristics used to establish a victim's identity when primary identifiers are unavailable or insufficient. This study explores the use of drones to locate mass disaster victims and assist in early identification directly in the field using secondary identifiers, without waiting for victims to be transported. Drones are small aircraft that fly autonomously and available for a variety of applications but the evidence of its use in mass disasters is still unclear and scarce. A randomised simulation study was conducted using 20 mannequins and DJI Matrice 300 RTK drones. Our study demonstrated that drone was statistically significantly faster ($p = .000$) than the conventional methods with 70.5 % and 88.0% accuracy in victim identification. Although 100% accuracy was not achieved, the study demonstrated a high level of agreement among observers in identifying distinguishing features such as scars, tattoos, and injuries on the victims. These findings highlight the reliability of the method in recognising secondary identifiers, which are crucial for supporting victim identification processes. This study is the first to explore drone usage in DVI, highlighting their transformative potential in efficiently locating

and identifying individuals in disaster scenarios.

Biography

Author is a passionate researcher who has submitted her PhD thesis and is awaiting her viva voce. With a strong academic background and a focus on interdisciplinary studies, she has published two impactful papers in WoS Q2 journals. Her primary research areas include entomology, disaster victim identification (DVI), criminalistics, and chemistry, reflecting her dedication to solving complex scientific and forensic challenges. Through her work, she aims to bridge the gap between science and real-world applications, contributing to advancements in her fields of expertise.

Ozlem SIMSEK
Istanbul University, Turkey

RGB Analysis for the determination of caffeine content in commercial energy drink, soft drinks, tea and Turkish coffee

Abstract

Caffeine, a naturally occurring compound in tea, coffee, and energy drinks, is widely consumed due to its pleasant taste and stimulant effects. The analysis of caffeine content in various beverages, including teas, soft drinks, and energy drinks, has

garnered significant attention due to discrepancies between labeled and actual caffeine levels, as well as its potential health implications.

Several analytical methods have been utilized for caffeine determination. In one study, reverse-phase high-performance thin-layer chromatography (HPTLC) was developed using an ethanol-water (55:45 v/v) mobile phase, with detection at 275 nm. This method effectively quantified caffeine in commercial energy drinks (21.02−37.52 mg/100 mL). Another approach involved gas chromatography-mass spectrometry (GC-MS) for caffeine quantification in nine energy drink samples. The method was precise, accurate, and linear ($r^2 = 0.999$), detecting caffeine in the range of 20.82−33.72 mg/100 mL, within ±10% of the labeled amounts and within the USFDA's safe daily limits.

A UV/Vis spectrophotometric method was also used to analyze teas, carbonated drinks, and energy drinks. Using chloroform as a solvent, caffeine concentrations were measured at 274 nm. Results revealed high caffeine content in black teas (up to 1,471 ppm) and energy drinks (Hell Energy Drink: 394.67 ppm), with most samples falling within permissible limits except for certain brands.

In another study, thin-layer chromatography (TLC) was employed for caffeine determination in teas. Samples underwent lead(II) acetate treatment to remove tannins, followed by liquid-liquid extraction with dichloromethane. The method used silica gel plates and two different mobile phases: glacial acetic acid-ethyl acetate (95:5 v/v) and ethyl acetate-ethanol (80:20 v/v),

with Rf values of 0.36 and 0.86, respectively. Among the tested teas, green tea exhibited the highest caffeine content (2.04%), while black and white teas showed lower levels.

In this study, TLC results for 15 samples comprising energy drinks, green tea, Turkish coffee, and soft drinks were analyzed using image processing techniques combined with TLC. Detailed results and interpretations will be presented as a poster in the conference.

Biography

She earned her bachelor's degree in chemistry from Istanbul University, one of Turkey's leading academic institutions. Following this, she completed two master's degrees—one in Forensic Sciences specializing in ink dating at Istanbul University (2017) and the other focusing on tobacco analysis at Ondokuz Mayis University (2019). She is pursuing PhD stduies in Forensic Sciences at Üsküdar University, and also has been serving as a Research Assistant in the Chemical Engineering Department at the same univeristy. She is a Member of Royal Society of Chemistry, UK and has affliate membership at The Chartered Society of Forensic Sciences, UK.

Nurhan Soylu
Üsküdar Üniversitesi, Turkey
digital evidence and forensic computer science

Abstract

Adli bilişim, dijital delillerin tespiti, toplanması ve analiz

edilmesi süreçlerini kapsayan kritik bir disiplindir. Bu çalışmada, dijital delil analiz yöntemleri sistematik olarak incelenmiş ve midcult yasal çerçeve bağlamında değerlendirilmiştir. CMK 134. madde hükümleri doğrultusunda, dijital delillere el konulması sürecinde karşılaşılan sorunlar ve çözüm önerileri detaylandırılmıştır. Araştırmada, adli bilişim uzmanlarının daha etkili delil analizleri yapabilmesi için gerekli olan standartlar ve metodolojiler ele alınmıştır. Sonuç olarak, dijital delillerin güvenilirliği ve mahkemede kabul edilebilirliği açısından bazı yasal ve teknik iyileştirmeler önerilmiştir.

Biography

Nurhan Soylu, İstanbul Emniyet Müdürlüğü'nde adli bilişim uzmanı olarak görev yapmaktadır. 1978 doğumlu olan Soylu, Üsküdar Üniversitesi Adli Bilimler Anabilim Dalı'nda yüksek lisans yapmış ve 'Adli Bilişim ve Dijital Deliller' başlıklı tezini tamamlamıştır. Adli bilişim ve dijital delil analizi konularında çeşitli sertifikalara sahiptir ve adli bilişim alanında doktora yapmayı planlamaktadır.

Emine Kıraç
Üsküdar Üniversitesi, Turkey

Abstract

Crime, defined as prohibited human behavior, constitutes a key area of investigation within the interdisciplinary field of Forensic Sciences. Following the occurrence of a crime,

detailed examinations are conducted at the crime scene by specialized teams to document and preserve the scene in its original state. As part of this documentation process, visual data is collected to ensure accurate records. Modeling, in its broadest sense, refers to the creation of an object with specific geometric properties in a digital environment. Data, findings, and measurements of objects at the scene, recorded by crime scene investigation teams in compliance with forensic photography principles, enable the reconstruction of the crime scene in three dimensions (3D) through the use of high-resolution images and advanced digital software. This approach allows for the representation of physical evidence in its true dimensions, facilitating comprehensive analysis from various perspectives. Furthermore, it supports the visual corroboration of witness statements and aids in assessing their accuracy. This study explores the methodologies used in 3D modeling within forensic sciences and examines the benefits of these techniques through an applied scenario-based example.

Yumeng Zhuo

Shandong University of Political Science and Law, China

Education of Forensic Science in China: Comparison and Reflection

Abstract

Forensic science plays an irreplaceable role in criminal

investigation. Through DNA analysis, fingerprint recognition, electronic evidence identification and other technical means, it provides a scientific basis for judicial adjudication, which directly affects the accuracy and fairness of the determination of case facts. In such circumstance, the construction of education of forensic science cannot be neglected. Forensic science has existed as a course for a long time in many overseas universities, however, it was firstly included in the list of new undergraduate courses of colleges and universities in 2022 in China. Subsequently, discipline construction of forensic science has rapidly become a hotspot. In overseas universities, an effective, mature educational path has already been built for forensic science and its relative disciplines, but China is still in the very initial stage of exploration. Due to the differences in social environment and judicial systems between China and other countries, it is important to establish an education system that fits China's national condition. In my presentation, I would like to introduce the course structure of forensic science in Chin, talk about the process of course construction of forensic science that we are going through. With my own experience of studying forensic science abroad, I would like to discuss the difference between course structure in Chinese universities and overseas universities, and the reasons why such differences would occur.

Biography

Yumeng ZHUO, MSc, studied Forensic Science in Kingston

University London, then graduated from Cranfield University with a degree of Master of Science in Forensic Archaeology af Anthropology. Currently working at Forensic Identification Centre of Shandong University of Political Science and Law, mainly engaging in forensic clinical identification.

Liangliang Li, Ph.D
Shandong University of Political Science and Law, China

Study on Estimating the PMI of Buried Bodies Based on Multiple Indicators

Abstract

The accurate estimation of postmortem interval (PMI) is of great significance to case detection. With rapid development in recent years, forensic entomology and forensic microbiology have become a hotspot of research among many methods. In this study, an experimental model of earth- buried carcasses was established using 30 rabbits. Three of the carcasses were randomly excavated on the 1st, 5th, 10th, 20th, 40th, 60th, 90th, 120th, 150th, and 180th day since the burial. The research content included insect taxa, succession patterns, microbial taxa (fungal and bacterial), and metabolites of brain tissues, etc. The results showed that 1) a total of 16 species of arthropods colonized the earth-buried carcasses. We have mapped succession matrix of important arthropods on the carcasses, and summarized the decay process of the carcasses, as well as the emergence and disappearance patterns of adults, larvae, pupae, and pupal shells. 2) A total of 4053 metabolites were annotated in the rabbit brain tissues at the three time points of 1st d, 5th d, and 10th d. Among them, a total of 1607 metabolites were annotated in the KEGG database, involving 202 metabolic pathways. An error rate of 0 was obtained when using the

Random Forest model to screen the first 10 metabolites to classify the three time points. 3) A total of 1312 bacterial and 575 fungal species were annotated in the soil samples, and a total of 992 bacterial and 515 fungal species were annotated in the skin samples. Alpha diversity and Beta diversity analyses were performed for the above taxa respectively, and the test of difference between groups ADONIS analysis showed that the effect of group on soil bacterial community was significant (R2=0.6328, F=3.8302, p=0.001). The random forest regression model constructed based on skin, soil bacteria as well as fungi had the highest degree of explanation of 88.80%, and the bacterial and fungal communities showed a more significant linear trend with PMI, and the constructed linear discriminant had a good predictive efficacy.

Biography:

Liangliang Li, Ph.D., Associate senior professional title, Deputy Director of Forensic Identification Center of Shandong University of Political Science and Law, is engaged in forensic evidence and forensic toxicology identification. He graduated from the Department of Forensic Medicine of Soochow University with a Ph.D. and is mainly engaged in forensic entomology research. He has published more than 20 academic papers, basically related to the use of forensic entomology for postmortem interval (PMI) estimation.

Guo Mengshuo
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Application of Gas Chromatography-Ion Mobility Spectrometry in Forensic Science

Abstract

The gas chromatography–ion mobility spectrometry (GC–IMS) technique, as an emerging analytical method, has demonstrated significant potential in the field of forensic science. Research conducted by our group focuses on the application of GC–IMS in forensic medicine, trace evidence analysis, food safety, and other branches of forensic science. In forensic medicine, GC–IMS has been employed to analyze animal and human samples, enabling the identification of species from on-site specimens and estimating postmortem intervals based on variations in VOCs in human muscle tissues over time. In trace evidence analysis, qualitative analysis of volatile compounds from different ballpoint pen inks and stamp inks, combined with principal component analysis (PCA) and hierarchical cluster analysis (HCA), has allowed for successful differentiation of ink types. In the realm of food safety, headspace GC–IMS (HS–GC–IMS) coupled with multivariate statistical analysis has been used to identify aroma compounds and isomeric components in floral and fruit teas, thereby providing a basis for the classification of

tea varieties. Furthermore, in other areas of forensic science, GC–IMS can be utilized for the detection of propofol concentrations in blood. Studies have shown that GC–IMS offers several advantages, including no need for enrichment or concentration, low detection limits, rapid analysis, and intuitive visual results. These features make it a powerful tool for addressing various analytical challenges in forensic science, providing robust technical support for related research and practice, and showing great promise for advancing and innovating forensic analytical techniques.

Biography

Guo Mengshuo, female, is a master's student in Forensic Science at Shandong University of Political Science and Law. Guo's research focuses on forensic toxicology and uses metabolomics detection technology to examine on-site physical evidence and obtain useful biological information.

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Tropicamide; A new Trend of Abuse

Abstract

The rapid rise of new psychoactive substances (NPS) poses serious health and enforcement challenges, with limited knowledge about their effects. Tropicamide, a muscarinic

antagonist used medically for eye dilation, has increasingly been misused, particularly via injection, in several countries. Since 2011, tropicamide bottles have been submitted to a Sharjah laboratory from airport seizures, mainly involving passengers from former Soviet Union, used it to avoid eye profiling upon arrival. In 2017, the lab first detected tropicamide abused with methamphetamine during a routine seizure analysis. By 2018, seizures increased significantly, prompting systematic monitoring of tropicamide in both drug seizures and urine samples.