

# **Conference Report**

2019 China Fingerprint Evidence Symposium

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2019 CDIAI fingerprint meeting

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On November 4, 2019, the Symposium on Fingerprint Evidence together with the first China Division of the International Association for Identification (CDIAI) meeting was successfully held at B211, Research Building, in the Xueyuan Lu Campus of China University of Political Science and Law (CUPL) in Beijing. Dr. Shiquan Liu, director of training, office of Evidence Law and Forensic Science Institute of CUPL, and also the secretary general of the CDIAI, hosted this conference. Around 70 people attended the meeting, some of whom are shown in the picture below.



Some of the attendees at the meeting were Prof. Zhang Baosheng, Honorary Dean of Institute of Evidence Law and Forensic Science, CUPL; Liu Huan, Director of Fingerprints Division, Institute of Forensic Science of China (IFSC); John Vanderkolk, Manager of the Indiana State Police Laboratory in Fort Wayne, Indiana, USA; Tom Busey, Professor of Cognitive Science, Indiana University Department of Psychological and Brain Sciences; Wang Jinxi, Professor of Institute of Evidence Law and Forensic Science, CUPL; Chen Yongsheng, Professor of Peking University Law School; Chai Naiwen, 2nd Prosecution Hall of the Supreme People's Procuratorate, PRC; Yang Ziliang, Deputy Director of Criminal Division, 2nd Intermediate People's Court of Beijing; Huang Taotao, Deputy Director of Beijing Daxing District People's Court; Liang Wanbin, Political Commissar of Criminal Police Unit, Henan Provincial Public Security Department; Liu Chiping, Former Deputy Chief of Changzhou Municipal Police Department, Jiangsu Province; Sun Zhong, Senior Engineer of Fingerprints Division of Criminal Police Unit, Beijing Public Security Department; as well as experts and investigators from Zhejiang Provincial Public Security Department, Liaoning Provincial Public Security Department, Hebei Provincial Public Security Department, Jiangxi Provincial Public Security Department, Gansu

Provincial Public Security Department, Beijing Haidian District People's Procuratorate, Zhejiang Police College, and People's Public Security University of China.



Prof. Zhang Baosheng welcomed the participants and shared his opinions of the admissibility rules of scientific evidence. He pointed out that scientific evidence can be a double-edged sword. Although the adaptation of scientific evidence has reduced innumerable misjudged criminal cases, it has also created wrongful convictions. It is ultimately presented in court and legally sets the criteria for the admissibility of scientific evidence. Litigant participants have communicated with different languages. Jurists considered the testimonies with their natural language, while scientists examined with data, or numbers and formulas. Namely, jurists pursue justice and fairness, while scientists pursue truth and knowledge. Prof. Zhang Baosheng made a specific introduction to the USA's *Federal Rules of Evidence 702*, pointing out that scientific evidence is a kind of opinion evidence and relevance is the fundamental attribute of evidence. Given this, judges need to determine the relevance of scientific evidence in a particular case.

The meeting was opened by Mr. Liu Huan, Director of Fingerprints Division, Institute of Forensic Science of China (IFSC). He extended a warm welcome to the participants and hoped that this seminar would explore fingerprint evidence from many perspectives with the aim of promoting it to be more mature and robust. He

started with a fingerprint case, emphasizing that public security organizations should do a good job in reducing risks in fingerprint identifications. He pointed out that cognitive factors such as background information of the case could interfere with fingerprint inspection and identification. This is a reason why it is necessary to set up effective procedures and evidence control measures to avoid identification errors. In the quality management system of fingerprint examination, we should pay attention to cognitive bias, training, and proficiency testing. He stressed that differences in expert



opinions can help to expose identification errors. Therefore, it is necessary to establish a transparent conflict resolution mechanism for expert opinions, as well as to adopt appropriate procedures and methods to effectively manage material evidence identification information simultaneously to reduce the undue influence of cognitive bias in evidence identification, such as name an identification supervisor to block out the irrelevant information for experts. Fingerprint identification is facing many challenges, and its foundations can be stronger. Strengthening the scientific research of fingerprint identification will help to reduce the risk of fingerprint identification errors. The probabilistic conclusion of fingerprint identification could become a trend. It is necessary to effectively reduce the errors and risks in order to demonstrate the science and reliability of fingerprint identification. There is still much work to be done in the field of fingerprint examination.

Prof. Chen Yongsheng conducted a study on the major criminal cases rectified in China in recent years. He pointed out that one of the important reasons for misjudged

cases are misconduct, such as torture, by officials in court, procuratorate, or a public security bureau. Another reason is error in forensic identification. Within our country, he combined the Nie Shubin, She Xianglin, Du Peiwu cases to introduce us to forensic identifications in China's misjudged criminal cases. He pointed out several reasons forensic identification led to criminal misjudged cases. The only identification was of a blood type identification, forgery of expert opinions, misuse of polygraph technology, error in sample extraction, disregard for the probative role of conclusions, and the expert opinions of public security organs are often questioned.



John Vanderkolk put forward his own thoughts on *Forensic Comparative Science: Generalizing Across Disciplines*. He pointed out the key components of measurements and judgments in forensics comparative science. He has been trying to produce one strategy for explaining the examination of morphological evidence, or shapes. Also, he discussed David Ashbaugh's three levels of details that describe the clarity and measurability of details in images recorded from features of fingerprint skin. First level details are measured as the general flow or general forms of the shapes. Second level details are measured as the specific paths, lengths, and positions of those paths. Third level details are the measured edges, textures, contours, and anomalies along the paths, or within the boundaries or dimensions of the details.

Using the ranges of measurements within and among three levels of details, a Quality and Quantity sufficiency threshold, and resulting conclusions from the examination, he built a common framework for the examination of shapes.



Tom Busey gave a speech on *Fatigue, Visual Working Memory, and Decision Making*. In his research, he studied casework qualified latent print examiners as they conducted an experiment that was as close to a latent print examination as possible. In the morning, when eyes were fresh, he recorded their eye gaze behavior by using eye-tracking technology. Eye-trackings were recorded again in mid-afternoon when the examiners were fatigued after having just completed an extremely demanding perceptual task. Results suggested that participants had difficulty placing multiple features into working memory when tired. They tended to terminate the search process earlier when fatigued, which caused a drop in conclusive decision making. Besides, Professor Busey pointed out that there is no perfect decision threshold that would eliminate all errors. However, there could be an optimal threshold placement that balances competing demands for safe communities and keeping innocent people out of jail. This is a so-called taboo tradeoff. How do we know what the thresholds should be? Who should determine what those thresholds should be? All of those questions were deliberated.





The subject of Professor Jinxi Wang's presentation was "the Evaluation and Definition of Corroboration and Morphological Evidence." Criminal corroboration, that is, the evidence has to be identical with each other, is the generally accepted evidence theory in judicial practice. Criminal corroboration is a method of evidence investigating, but is regarded as a standard of verification in practical cases, or even the premise of evidence admissibility, negating the process of "acceptance" and "conviction". "Acceptance" is the evaluation on the evidence itself, while "conviction" needs a comprehensive decision of the whole case. It should be noted that corroboration is only a method of evidence analyzing. Professor Wang emphasized that scientific evidence can be affected by cognitive bias, and it is necessary to have a correct understanding of experts' shortcomings. We, as humans, can be easily affected by the deviation and implication caused by information, procedures and systems. We should control the information of which we consciously come into contact.

Wenfeng Hu, senior analyst of the fingerprint department, Institute of Forensic Science of China (IFSC), pointed out that there are four basic conditions for the identification of fingerprints: identical pattern types; similar directions of the ridges; multiple matching minutiae in corresponding parts; minutiae with no fundamental difference. The last condition is particularly important among all of them. If the identification conclusion is to come out to be affirmative, there must not be any fundamental difference. In other words, a single difference in minutiae can lead to the conclusion of exclusion. In order to draw everyone's attention to this principle, analyst Hu defined and evaluated the importance of difference points in fingerprint identification according to his personal experience on such cases, in which the difference points found must be fundamental, as non-fundamental differences can be caused by problematic samples, deformation, application and displacement of force, and positional relations.

Xiaojun Li, deputy director of the fingerprint department, Institute of Forensic Science of China (IFSC), presented the latest developments of fingerprint discovery, acquisition, and appearing technology in China. He

introduced the components of the technology mentioned at crime scenes—on-site discovery technology, on-site acquisition technology, appearing technology and image processing technology. In recent years, the research products of optical inspection technology tend to be more portable, and miniaturized instruments have emerged, providing convenience for criminal investigation. The appearance of field atomizer devices also provides a new means for humidification technology. In the field of on-site acquisition technology, there appears fingerprint transfer on films, silica gel extraction and fixation, electric fingerprint brush, etc. Furthermore, vacuum coating, thermosensitive fluorescence, thermal paper, and EOS protein staining are also emerging. Immense potential for growth is seen with the application of PS, OCT technology, as well as the appearance of DCS series fingerprint image processing system and the online fingerprint image optimization system of the network of public security.



Mr. Chiping Liu

Well-known fingerprint expert Chiping Liu introduced the method of nine-grid topological fingerprint identification. The basic theoretical system of nine-grid topological fingerprint identification comes from four aspects: the genetic influences within fingerprints, *the Book of Luo*, *Topology*, and human visual cognitive rules. Dr. Liu explained the scientific principle behind the nine-grid topological fingerprint identification method from these four aspects and brought the theories into practice. He proposed the modeling of the nine-grid topology fingerprint identification method, and achieved the identification of fingerprints, palm prints and foot prints through the matching of the topological structures. Finally, Dr. Liu believed that with the continuous development of computer technology, image recognition technology is constantly optimized, thereby algorithms are persistently improved. Topological fingerprint identification method can be widely guided and applied to all tangible objects and areas of mark identification including fingerprints.





Mr. Zheyu Hong, on behalf of Moqi Technology, made his report on “the Research Progress of the Unstructured Data of Non-minutiae Comparison in Fingerprint Identification”, in which he compared the traditional minutiae comparison with the multi-dimensional minutiae comparison, and compared their fingerprint comparison procedures as well as introduce the company’s latest generation of fingerprint identification system.



Dr. Shiquan Liu discussed news from OSAC, the latest forensic science organization in the United States. According to a preliminary OSAC report, OSAC might endorse a range of five conclusions, possibly changing from the three current conclusions of exclusion, inconclusive, and identification analysts might make when comparing two fingerprints. Fingerprint analysts should consider the similarities and differences observed in the process of making conclusions, and evaluate the relative degrees of support for the resulting claim. Dr. Liu believes that an identification conclusion should not be expressed as a fact, but in the form of an expert’s opinion. It should be accepted that there are both objective and subjective factors in fingerprint examinations. Dr. Liu explained the terms matching, ridge details, minutiae, similarity, individualization, and others. He also emphasized that the confusion between matching and similarity should be avoided.

During the open discussion session of the conference, prosecutor Naiwen

Chai of the Supreme People's Procuratorate spoke highly of the seminar. Prosecutor Chai affirmed the importance of fingerprint evidence in practical cases, and that many long-standing cases had been solved through fingerprint identification. Prosecuting personnel should reserve more knowledge about scientific evidence, since the investigation of scientific evidence had become the greatest difficulty in the process of handling case. Mr. Zhong Sun pointed out that although the identification principle of the unity of quality and quantity is clear to many, it is still difficult to handle in practical cases and the accumulation of experience is needed. The current study had provided a good perspective as it had warned the practitioners from various aspects of cognitive science to avoid falling into the cognitive traps and to come to more accurate identification opinions.

The conference concluded with discussions which had revealed various new ideas and raised a good number of beneficial questions. Professor Jinxi Wang summed up the conference and emphasized we should constantly improve the reliability and accuracy of science and technology to reduce the occurrence of wrongful convictions as much as possible. This conference had been a friendly meeting among Chinese and foreign experts, an important exchange of theories and practices, and moreover, an exchange of traditional methods and innovative thinking.

Dr. Shiquan Liu gave the closing address that learning is a never-ending process. We all need to recognize our limitations as experts, since there is no such thing as absolutely objective evidence. We are looking forward to more exchanges and collaborations in the future and wish everyone to attend the International Forensic Science Innovation and Development Symposium 2020 & China Division of International Association for Identification (CDIAI) 2020 Annual Educational Conference, See <http://www.ifsids.com/> for conference information.

