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Editorial
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The Discipline of Forensic Sciences at the Crossroad

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Editorial

As a member of the American Association for the Advancement of Science (AAAS) and the American Academy of Forensic Sciences (AAFS), I am unhappy to learn that the AAAS has decided to cancel the massive reevaluation of the forensic sciences due to the lack of funding and time constraints. The reevaluation was recommended by the PCAST report two years ago as well as by the NRC report in 2009. The initial project was charged to conduct investigations of ten major forensic sub-disciplines or areas and to issue suggestions for improving the empirical foundations of each. While the initial project was considered to be potentially "transformational" to the American justice system, the undertaking has been discontinued just after two reports on the arson and fingerprints were produced this year. The PCAST report recommended that the ten areas of the forensic sciences need to be reevaluated in two stages. Stage one would focus on the three areas of ballistics and tool mark analysis, latent fingerprints, and arson investigations.

Later on, seven sub-disciplines would follow in Stage Two to include bloodstain pattern analysis, digital evidence, footwear and tire tracks, bite-mark analysis, fiber evidence, hair evidence, and trace evidence of paint and other coatings. Although the discontinuation of the project appears to be the funding and the time constraints, the actual cause is the level of complicity and depth as well as the scope and direction that the discipline of forensic sciences involves. Given the fact that the arson and fingerprint reports took two years to complete by the AAAS, the whole discipline simply cannot wait for another eight years to see the results. In other words, the current situation should encourage more inputs and suggestions from the people interested. Therefore, my inputs and suggestions are being offered here to improve and reform the discipline.

Due to the complexity and the depth of professional knowledge and principles that the discipline requires for a court testimony, especially in a cross-examination, the future scope and direction of forensic sciences should open its door to promote more field forensics and medical forensics, rather than just heavily relying on lab forensics. The rationale behind this is quite simple: without the other two pillars, the results of lab forensics would be more likely discredited, which has occurred in many well-known cases already due to the "garbage in-garbage out" effect. Currently, several cutting-edge technologies are available for preliminary examinations of certain types of evidence in the field to strengthen the field forensics. For example, Rapid DNA has been accepted recently for its field and lab applications, and it will start a new era of rapid identification in the field. Another example would be the laser detection devices (532 nm and 447 nm) on many types of latent biological evidence of saliva and semen, explosive residues, and fingerprints on some difficult surfaces [1,2]. At the present time, the author is conducting a project of detecting sweat residues in fingerprints on strangulation marks. It is believed that in the near future portable devices with the following features will be needed and in high demand: Non-destructive, non-invasive, non-contact, and DNA free with rapid and in situ position examinations using digital and quantitative measures.

While the technology is the backbone in forensic sciences, the direction and scope of the discipline is evolving. The discipline is collaborating with and accepting more knowledge, principles, and applications from other disciplines. One of the examples is the Bayesian statistics in age estimation from skeletal remains where phase-related age estimation is based on the highest posterior density region [3]. It is well known that statistics is one of the major disciplines in social science. From a quick survey of the major forensic journals, one can easily see that more and more articles are being published incorporating legal aspects of evidence admission and evaluation (the Exclusionary Rules), and modus operandi analyses from the behavioral disciplines such as criminology, criminal justice, and psychology, just to name a few new developments.

Conclusion

In conclusion, the current debate in forensic science on accreditation, quantification, standardization, and computerization will continue for some time. To be more accepted by the judicial system under scientific objectivity and efficiency, we must work together, e.g., police officers, investigators, forensic practitioners, forensic academies, prosecutors, judges, and defense attorneys, for a relatively fair process of collecting, analyzing, interpreting and reporting forensic evidence. First, a new mentality within the discipline is much needed to accept an extended role for forensic sciences that goes beyond the simple production of evidence for the court. Second, specific criteria-based modeling activities in each sub-discipline for the investigative and crime analysis process have to be carried out systematically. Finally, such efforts must cross the boundaries of different disciplines. In other words, the future of the forensic science discipline will become a more multi-disciplinary, inter-disciplinary, or cross-disciplinary approach or coined here as "The Whole Body Approach."

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