



D15 Data Integrity in Forensic Science and Engineering

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The goal of this presentation is to increase awareness of the existence of data fabrication or falsification perpetrated by a small subset of scientists and engineers and to help the ethical forensic investigator develop robust analyses and conclusions that account for this unfortunate reality.

Scientists and engineers have historically been among the most trusted and respected professionals in society, but increasing reports of data fraud generate cause for alarm. This presentation will impact the forensic science community by raising awareness of this unethical behavior and will review the ways in which data is fabricated or falsified.

The Internal Revenue Service is an effective supervisory agency ensuring honest and accurate self-reporting of income upon which taxation is based. No such organization exists for the data self-reported by scientists or engineers. None has been needed because these professionals have historically told only the truth, and for this reason society holds scientists and engineers in high esteem and implicitly trusts the data they report.

Unfortunately, a small subset of scientists and engineers has deliberately invented or altered data for ill purposes. This behavior is particularly troublesome in matters concerning forensic investigations in which wrongful conviction (or failure to correctly convict) in a criminal case or an inappropriate settlement in a civil case may result. Regardless of the reason, any attempt to alter the reality of an experiment or observation is wrong and unethical. Such alterations take many forms and fall chiefly under the subheadings of fabrication and falsification.

Fabrication refers to ill-intentioned “invention” of data where none exists. This blatant act occurs by: (1) “dry-labbing” — reporting the results of calculations or experiments that never occurred; (2) adding “invented” data to actual experiments (so that mean values are altered) — this can also include physically or digitally adding objects to crime scene images (where no such objects existed in reality) or the opposite — removing or materially repositioning such objects; or, (3) reporting actual data, but from an inflated sample size (thereby misrepresenting the population estimated by a falsely reported sample size).

Falsification, while equally wrong and unethical, is subtler and has more manifestations. Falsification refers to taking actual experimental data and modifying it for ill purposes. This includes, for example: (1) undocumented measurement system “recalibration” to achieve a desired outcome; (2) biased (and undocumented) study subject selection; (3) unjustified data rejection; (4) exaggerated experimental measurement precision; (5) wrongfully identifying results as “typical” when, in fact, the results were the best ever observed; and, (6) confusing sample or subject identification numbers to obscure tracing.

It is important to add that discussions, including disagreements, regarding data interpretation are healthy and acceptable in ethical forensic science and engineering; however, the data itself should never be in question.

In summary, data fabrication and falsification are despicable acts diametrically opposed to the ethics of moral people and violate the trust society places in scientists and engineers. Such acts waste time and money, can endanger human life, and besmirch the vast majority of forensic scientists and engineers who behave according to high ethical standards. The panel discussion concluding this session will explore the means by which forensic scientists and engineers can be alert to acts of fabrication or falsification by others and thereby improve the credibility of their reports and the robustness of their conclusions.



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Data Fabrication, Data Falsification, Data Interpretation

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