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Analytical forensic metrology

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Metrology is an enabling infrastructural science that underscores science-based quality measurement systems in forensic chemical analysis and testing laboratories. It is an essential “rules” oriented requirement of laboratory accreditation, but if practiced from a “results” oriented perspective, even greater benefits can be derived. Chemical metrology can be the missing link in casework when trying to prove that quantitative forensic measurement data have the necessary scientific integrity and validity, and that chemical measurement results will be able to withstand intense scrutiny during courtroom testimony. A sound metrological cornerstone, and a clear understanding of metrological principles and concepts and their implementation, are essential for the successful operation of modern forensic science laboratories and their ability to earn and sustain public trust. This presentation will provide a basic introduction to metrology and its relevance to a select few of the many facets of the overall analytical measurement process. The key metrological concepts of calibration, traceability and measurement uncertainty will be described as they apply to chemical applications of quantitative forensic analysis. Examples will be presented to illustrate how knowledge and training in chemical metrology facilitates the recognition of scientific weaknesses in laboratory methods validation and instrument qualification as well as scientific deficiencies in commercial certificates for measurement standards, laboratory data and analysis reports.

Biography

Jerry D Messman earned a PhD in analytical chemistry from the University of Maryland (College Park, Maryland USA). His professional career in analytical chemistry and metrology began with the National Bureau of Standards (NBS), and continued with the National Institute of Standards and Technology (NIST), where he participated in the certification of diverse Standard Reference Material (SRM) chemical artifacts for trace metal concentrations and also optical SRM artifacts for the qualification of UV/VIS absorption spectrophotometers. As part of his current responsibilities for Stranaska Scientific LLC, Jerry also provides metrological consulting services to crime laboratories and the criminal defense legal community.

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