



F9 Recent National Institute of Standards and Technology (NIST) Activities in Forensic Science: Examining Scientific Foundations and Innovation-to-Implementation Issues

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Learning Overview: The goal of this presentation is to discuss recent efforts at NIST to strengthen forensic science through examining scientific foundations of methods and through studying challenges with implementing new research innovations.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by discussing the importance of having documented research and validation studies to support measurement and interpretation claims in forensic science. This presentation will also review a recent innovation-to-implementation meeting held at NIST.

Involvement of the NIST in forensic science spans almost a century. Wilmer Souder, a physicist at the then National Bureau of Standards (1911–1913, 1917–1954), performed handwriting, typewriting, and ballistics analysis on more than 800 cases for dozens of Federal agencies beginning in the 1920s.¹ After the 2009 National Research Council Report, *Strengthening Forensic Science in the United States: A Path Forward*, NIST increased its involvement in the field. A partnership initiated in 2013 with the Department of Justice (DOJ) launched the Organization of Scientific Area Committees for Forensic Science (OSAC) and established the National Commission on Forensic Science (NCFS) as a federal advisory committee to DOJ.^{2,3} While NCFS closed after its second two-year term in April 2017, OSAC continues with Congressional-funding and participation of more than 500 members of the forensic community.^{4,5}

Today, NIST conducts collaborative research, partners with the community to strengthen policies and practices, convenes meetings to examine issues, and explores scientific foundations of forensic disciplines.⁶ NIST maintains active research programs in fingerprints and other pattern evidence, including firearms and tool marks, forensic DNA, digital evidence, forensic statistics, drug analysis, and trace evidence. NIST creates forensic-specific reference materials and data sets to enable traceable measurements. NIST also funds the Center for Statistics and Applications in Forensic Evidence (CSAFE) to improve statistical support for pattern and digital evidence.

At the request of Congress, NIST has begun scientific foundation reviews of various forensic disciplines.⁷ The first review covers DNA mixture interpretation and explores issues of relevance and reliability when testing complex mixtures involving small amounts of DNA. Additional reviews are planned to cover bitmark analysis, digital evidence, and firearms and tool marks. These reviews should increase trust in forensic methods that have a strong scientific foundation and provide strategic direction for future research in areas that need further strengthening.

In June 2019, NIST convened a Forensic Science Research Innovation-to-Implementation (RI2I) Symposium to examine challenges with moving research ideas and projects into routine use in forensic laboratories.⁸ Presentations and discussions came from a broad range of stakeholder perspectives: academic researchers, practitioners, public and private laboratory directors, lawyers, judges, and business product managers. The United Kingdom Forensic Science Regulator and a senior project officer from the Australian National Institute of Forensic Science provided important overseas experience and perspectives. Two RI2I breakout sessions gathered additional insights from each perspective and explored implementation challenges for introducing a new technique into a toxicology laboratory.

This presentation will provide a summary of these recent activities at NIST.

Reference(s):

1. Copies of Souder's notebooks are available in the NIST Digital Archive: <https://nistdigitalarchives.contentdm.oclc.org/digital/collection/p16009coll67/search>.
2. Butler, J.M. (2015) U.S. initiatives to strengthen forensic science & international standards in forensic DNA. *Forensic Science International: Genetics* 18: 4-20. [open access].
3. Butler, J.M. (2017) Recent activities in the United States involving the National Commission on Forensic Science and the Organization of Scientific Area Committees for Forensic Science. *Australian Journal of Forensic Sciences* 49(5): 526-540. [open access]. <https://www.justice.gov/archives/ncfs>.
4. <https://www.nist.gov/topics/organization-scientific-area-committees-forensic-science>.
5. <https://www.nist.gov/topics/forensic-science>.
6. <https://www.nist.gov/news-events/news/2018/09/nist-details-plans-reviewing-scientific-foundations-forensic-methods>.
7. <https://www.nist.gov/news-events/events/2019/06/forensic-science-research-innovation-implementation-symposium-ri2i>.

Scientific Foundations, NIST, Implementing Research