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Forensic Science Research and Development at the National Institute of Justice: Opportunities in Applied Physics GREGORY DUTTON, National Institute of Justice — Forensic science is a collection of applied disciplines that draws from all branches of science. A key question in forensic analysis is: to what degree do a piece of evidence and a known reference sample share characteristics? Quantification of similarity, estimation of uncertainty, and determination of relevant population statistics are of current concern. A 2016 PCAST report questioned the foundational validity and the validity in practice of several forensic disciplines, including latent fingerprints, firearms comparisons and DNA mixture interpretation. One recommendation was the advancement of objective, automated comparison methods based on image analysis and machine learning. These concerns parallel the National Institute of Justice's ongoing R&D investments in applied chemistry, biology and physics. NIJ maintains a funding program spanning fundamental research with potential for forensic application to the validation of novel instruments and methods. Since 2009, NIJ has funded over $179M in external research to support the advancement of accuracy, validity and efficiency in the forensic sciences. An overview of NIJ's programs will be presented, with examples of relevant projects from fluid dynamics, 3D imaging, acoustics, and materials science.

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