Forensic Science Assessments
A Quality and Gap Analysis

National Commission on Forensic Science
Washington, DC
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AAAS Project Staff
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Scientific Responsibility, Human Rights and Law Program
American Association for the Advancement of Science

The AAAS Project is supported by a grant from the Laura and John Arnold Foundation
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Project Forensic Science Fields

- Fire Investigation
- Latent Fingerprint Analysis
- Firearms and Tool Marks
- Bitemark Analysis
- Trace Evidence—Hair Analysis
- Bloodstain Pattern Analysis
- Footwear and Tire Tracks
- Digital Evidence
- Trace Evidence- Fibers
- Trace Evidence- Paint and other coatings
Project Lineage

- 2006 Congressional Appropriation
- The National Academies - National Research Council
- The White House Office of Science and Technology Policy (OSTP)
- National Science and Technology Council Committee on Science
- Subcommittee on Forensic Science (SoFS)
- Research, Development, Testing and Evaluation (RDT&E)
- American Association for the Advancement of Science (AAAS)
Project Overview

- Project will evaluate the scientific foundation the forensic community relies on to support their practices and, where the scientific underpinning of these practices falls short, recommend areas requiring further study

- This “gap analysis” will produce a research agenda to:
  - Serve as the basis for arriving at forensic methods that will inspire greater confidence in our criminal justice system
  - Encourage basic scientists outside the forensic community to pursue the research topics presented in the reports and funding agencies to support these scientists

- Audience: Scientists (both forensic and non-forensic), legislators, legal and law enforcement communities, and public
Planned Process for Preparing and Disseminating Reports

- Each working group will produce a report setting forth its findings and recommendations.
- AAAS has commissioned a writer to produce a “plain English,” jargon-free version of each report.
- The technical report and the more accessible version will be accompanied by a AAAS press release highlighting its findings and recommendations.
- Each report will be posted on the AAAS website along with a PowerPoint presentation that highlights key points.
- AAAS will host webinars associated with the release of each individual report, accessible to all stakeholders.
- AAAS will convene briefings for Members of Congress and their staff when project is completed.
### Phase 1 Working Groups

<table>
<thead>
<tr>
<th>Fire Investigation Working Group</th>
<th>Firearms and Tool Marks Working Group</th>
<th>Latent Fingerprint Analysis Working Group</th>
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<tbody>
<tr>
<td><strong>Jose Almirall, Ph.D</strong> (Chair)</td>
<td><strong>Tom Busey, Ph.D</strong> (Chair)</td>
<td><strong>John Black</strong> (Forensic Science)</td>
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<td>(Chemistry)</td>
<td>(Cognitive Psychology/Human Factors)</td>
<td>Black &amp; White Forensics, LLC.</td>
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<td>Florida International University</td>
<td>Indiana University</td>
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<td><strong>Hal Arkes, Ph.D</strong></td>
<td><strong>Bruce Craig, Ph.D</strong></td>
<td><strong>Anil Jain, Ph.D</strong> (Biometric Engineering)</td>
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<tr>
<td>(Cognitive Psychology/Human Factors)</td>
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<td>Purdue University</td>
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<td>Ohio State University</td>
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<td>Michigan State University</td>
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<td><strong>John Lentini, CFI, D-ABC</strong></td>
<td><strong>Chittaranj Sahay, Ph.D</strong></td>
<td><strong>Jay Kadane, Ph.D</strong> (Statistics)</td>
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<td>(Forensic Science)</td>
<td>(Manufacturing Engineering/Metrology)</td>
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<tr>
<td>Scientific Fire Analysis, LLC.</td>
<td>University of Hartford</td>
<td>Carnegie Mellon University</td>
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<td><strong>Frederick Mowrer, Ph.D</strong></td>
<td><strong>Christopher Schuh, Ph.D</strong></td>
<td><strong>William Thompson, J.D., Ph.D.</strong></td>
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<tr>
<td>(Fire Protection Engineering/Fire Science)</td>
<td>Materials Engineering)</td>
<td>(Chair)</td>
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<tr>
<td>California Polytechnic State University</td>
<td>MIT</td>
<td>(Human Factors)</td>
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<tr>
<td><strong>Janusz Pawliszyn, Ph.D</strong></td>
<td><strong>Robert Thompson</strong></td>
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<td>(Analytical Chemistry)</td>
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<td>University of Waterloo</td>
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Latent Fingerprint Analysis (Meeting: July 9, 2015)

Prior to the in-person meeting, the Working Group Chair suggested that the quality of the Working Group’s review of the literature might be enhanced if they were allowed to:

- Frame the relevant questions themselves
- Make a global assessment of how well those questions were addressed by the existing literature and what gaps exist

As a result, the original fifteen questions from the updated bibliography were combined to focus on six questions critical to evaluating the scientific basis of the field.
Fire Investigation (Meeting: July 20, 2015)

- Working Group members formulated their own set of questions covering both fire cause determination and fire debris analysis.
- The development of these questions was based partially on the original questions from the SoFS bibliography, but was also the product of what they as a group believed were the most critical issues in the field.
Working Group Meetings

**Firearms and Tool Marks (Meeting: August 20, 2015)**

- Working Group members divided the articles from the bibliography into four categories:
  - Differentiability
  - Validation
  - Human Factors
  - Quantitative Studies
- The fifth and final category, Research Needs and Agenda, would be written following completion of the analysis of those four categories
Project Milestones/Timeline & Challenges

- First priority was to select the first three fields and appropriate working group members
  - Forensic scientist selected first, with input from the Advisory Committee
  - Advisory Committee with Project staff compiled relevant scientific fields that should be represented on each WG and suggested potential members
  - Project staff researched various fields and came up with a list of potential nominees
- Managing 3 WG’s concurrently has been challenging (14 members total)
  - In-person meetings were scheduled only when all (or majority) of WG members could be present; as a result, meetings were held later than planned
  - Each WG had its own “personality” and work style
Peer Review of Reports: Technical and "Plain Language"

- Advisory Committee and Selected Forensic Scientists

Anticipated Schedule for Release of First 3 Reports

- Latent Fingerprint Analysis & Fire Investigation: Late January 2016
- Firearms and Tool Marks: Late February
Sample Table of Contents

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- Disclaimer
- Acknowledgements
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  - Methods at a Glance
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  - Conclusions and Recommendations
  - A. Fire Scene Investigation
  - B. Fire Debris Analysis
  - References
- Appendices
  - Working Group Roster
  - Working Group Bios
  - Methods in Detail
  - Bibliography
  - Working Group Questions that framed the Report
  - Project Advisory Committee and Staff