

OSAC RESEARCH NEEDS ASSESSMENT FORM



Title of research need: Best practices to minimize potential biases in the generation and interpretation of DNA profiles

Describe the need: Identifying human factors that may contribute to potentially biased testing strategies, subjective interpretations or the misrepresentation of the relevance of DNA evidence in court is the first step towards designing measures to minimize adverse effects. This and resulting research aimed at best practices will enable laboratories to implement appropriate changes and be in a better position to consistently deliver objective testing, reports and unbiased testimony.

Keyword(s): Human factors, DNA interpretation

Submitting subcommittee(s): Human Biology **Date Approved:** 05/04/2021

(If SAC review identifies additional subcommittees, add them to the box above.)

Background Information:

1. Does this research need address a gap(s) in a current or planned standard? (ex.: Field identification system for on scene opioid detection and confirmation)

Yes, as bias is certainly addressed in many standards, strategies exist to combat bias but research is still needed

2. Are you aware of any ongoing research that may address this research need that has not yet been published (e.g., research presented in conference proceedings, studies that you or a colleague have participated in but have yet to be published)?

No

3. Key bibliographic references relating to this research need:

- 1) Champod C. (2014) Research focused mainly on bias will paralyse forensic science. Science and Justice 54:107-109.
- 2) Dror I (2013) Practical Solutions to Cognitive and Human Factor Challenges in Forensic Science. Forensic Science Policy & Management 4:105-113.
- 3) Edmond G, Tangen JM, Searston RA, Dror I (2015) Contextual bias and cross-contamination in the forensic sciences: The corrosive implications for investigations, plea bargains, trials and appeals. Law, Probability and Risk 14:1-25.
- 4) Dror I, Hampikian G (2011) Subjectivity and bias in forensic DNA mixture interpretation. Science and Justice 51:204-208.
- 5) Kasin S, Dror I, Kukucka J (2013) The forensic confirmation bias: Problems, perspectives, and proposed solutions. Journal of Applied Research in Memory and Cognition 2:42-52.
- 6) Nickerson RS (1998) Confirmation bias: a ubiquitous phenomenon in many guises. Review of General Psychology 2:175-220.

4. Review the annual operational/research needs published by the National Institute of Justice (NIJ) at <https://nij.ojp.gov/topics/articles/forensic-science-research-and-development-technology-working-group-operational#latest>? Is your research need identified by NIJ?

No

5. In what ways would the research results improve current laboratory capabilities?

Cognitive factors like selective perception, adjustments to regular occurrences, and confirmation bias affect the interpretation of information in everyday life and the workplace in many ways. In forensic science the body of research addressing human factors is still limited and what would benefit the field is process design and best practices proven to minimize any adverse effects on objective decision making. For the area of forensic DNA analysis many of the results are unambiguous and yield stable and reproducible interpretations, but there is a category of results, specifically complex mixtures where the interpretation is influenced by human factors. Here expert systems or probabilistic genotyping may remove some of the analyst to analyst variability for mixture deconvolution and comparisons, but there still will be differences on which mixtures are deemed suitable for comparison and how different analysts perceive the limitations of the software used. Cognitive biases can also affect overall testing strategies and sample selection, and reporting or court testimony.

6. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

Most of the current research on human factors and cognitive bias in forensic practitioners is focused on forensic pattern evidence interpretation. It would be helpful to get a more in depth analysis of risk factors in a forensic DNA laboratory and during DNA based court testimony. Any resulting suggestions on how to minimize adverse effects of known psychological and neurological influences will serve as the basis of appropriate standards and/or best practices for DNA laboratories.

7. In what ways would the research results improve services to the criminal justice system?

Criminal justice system stakeholders rely on forensic laboratories to provide biology/DNA results on physical evidence in an unbiased fashion with reports designed to express the significance and the limitations of the data, so that all parties clearly understand the conclusions. A systematic study and a strategy for minimizing the effects of factors like selective perception, base rate regularities and confirmation bias on forensic DNA testing will support this goal.

8. Status assessment (I, II, III, or IV):

III

	Major gap in current knowledge	Minor gap in current knowledge
No or limited current research is being conducted	I	III
Existing current research is being conducted	II	IV

This research need has been identified by one or more subcommittees of OSAC and is being provided as an informational resource to the community.