# OSAC RESEARCH NEEDS ASSESSMENT FORM

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| **Title of research need:** | Characterization, development, and validation of methods in artificial intelligence/machine learning (AI/ML) for wildlife forensics applications |
| **Keywords:** | artificial intelligence, machine learning, confidence metrics |

| **R&D Need Rank:** Low, Medium, High | High | **SAC Approved Date:** | 3/1/2026 |
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**Submitting subcommittee(s):** Wildlife Forensic Biology

## Research Need Summary:

The purpose of these research needs is to build a stronger scientific foundation for forensic science standards. The information provided herein will help to evaluate and strengthen existing standards, and/or fill any standards related gaps. In the space below, please provide a brief narrative of the need to be addressed. This should include:

- The identity of any specific standards that would be affected/improved/evaluated
- A discussion on gaps that exist within the standards or standards related gaps that need to be filled
- How this work would fill those gaps
- An overview of any current or past research efforts that may be relevant to this effort
- A discussion regarding how this research might improve current laboratory capabilities and/or forensic services within the criminal justice system
- Any relevant references

Artificial intelligence/machine learning (AI/ML) research has experienced rapid growth resulting in valuable technological innovations that have permeated and influenced every field of science. As a result of this rapid development, AI/ML technologies require characterization, development, and validation to be successfully applied to the diverse disciplines within wildlife forensic science. AI/ML technology has become highly accessible and easier to use due to the availability of robust datasets, affordable computing solutions, and the rise of open-source AI/ML tools. The primary benefits of AI/ML are the ability to automate tasks, analyze vast amounts of complete data quickly, and provide insights to improve discovery, decision-making, and efficiency. AI/ML has the potential to enhance evidence analysis, accelerate investigations, and improve the accuracy of macroscopic, microscopic, chemical, and molecular analysis while providing transparent confidence metrics. There is a preference for Explainable AI (as opposed to Unexplainable AI, or 'black box' systems) to ensure that any AI/ML models and methods utilized, along with subsequent results and related documentation, are understandable and accessible to forensic practitioners, the courts, and the general public. While the application of AI/ML to these types of analyses is still in the developing stages, with proper investment in research and development, the benefits of AI/ML can be used to improve the field of wildlife forensic science.

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