

**UNITED STATES DEPARTMENT OF JUSTICE  
STATEMENT ON THE PCAST REPORT  
ABSTRACT**

In September 2016, the President’s Council of Advisors on Science and Technology (“PCAST”) released a report (“Report”) titled, *Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature Comparison Methods*. The Report contained several fundamentally erroneous claims. Among them were that “feature comparison” methods belong to the scientific discipline of metrology (measurement science); that feature comparison methods can *only* be deemed “foundationally valid” by adhering to PCAST’s mandatory and non-severable set of experimental design criteria; and that error rates for feature comparison methods can *only* be established using these “appropriately designed” black box studies.

Citing the PCAST Report, several courts have recently limited the scope of opinion testimony by firearms and toolmarks examiners regarding the source of a bullet or shell casing. These courts relied on certain claims made in the Report to support their decisions. The Department offers this response to PCAST’s claims regarding what it described as “feature comparison methods” and referred to by the Department as forensic pattern examination.

First, traditional forensic pattern examination methods—as currently practiced—do *not* belong to the scientific discipline of metrology. Forensic examiners visually *compare* the individual features observed in two examined samples, they do not *measure* them. The result of this comparison is a conclusion that is stated in words (nominal terms), not magnitudes (measurements).

Second, PCAST’s claim that forensic pattern examination methods can *only* be validated using its non-severable set of nine experimental design criteria is inconsistent with its own examples, international laboratory standards, and authorities in experimental design. There is no *single* scientifically recognized means by which to validate a scientific method. Various experimental designs create different conditions under which examiner performance can be tested and measured. Different designs add to a diverse body of knowledge from which the validity of a forensic method can be determined. Results derived from the collective body of relevant literature as a whole—rather than from a single type of experimental design—is the appropriate basis from which to determine whether a method is fit for purpose and thus valid for casework applications.

Third, casework error rates cannot be established through the exclusive and non-severable application of PCAST’s experimental design criteria. No single error rate is applicable to all labs, examiners, or cases. Researchers necessarily operate within a finite framework of experimental assumptions, choices, conditions, and limitations that will invariably differ from those encountered during actual casework. It follows that error rate “outputs” of a given study are inextricably connected to their unique experimental “inputs.” Moreover, experimental studies fail to account for critical laboratory quality assurance measures, such as verification by a second examiner and technical review. As a result, it is not scientifically valid to generalize the error rate derived from a small subset of studies that utilized a single type of experimental design to *all*

laboratories, examiners, and casework scenarios as PCAST advocated. However, when one considers the compendium of *all* relevant studies in the firearms/toolmarks discipline (provided in Appendices “A” and “B”) their false positive error rates are remarkably similar—around 1% or less in most cases. This is a good measure of what the United States Supreme Court described in the *Daubert* decision as the “potential rate of error.”

Error rates derived from scientific studies of various size, scope, and experimental design all provide important information about the practices and abilities of examiner-participants. However, the most relevant question in any case is not the *rate* of error, but the *risk* of error. The best insurance against false incrimination is the opportunity to retest the evidence. In most cases, the typically non-consumptive nature of forensic pattern examination easily facilitates this final safeguard.