Emerging Issues in Forensic Fingerprint Examination

John P. Black, CLPE, CFWE, CSCSA

Black & White Forensics, LLC

National Clearinghouse for Science, Technology and the Law
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Content

- Background
- Examination framework
- Documentation issues
- Stating conclusions
  - Moving toward five-bin scale
- Case studies

- *Throughout the presentation I'll be providing questions for you to ask your fingerprint expert. Your expert must be cognizant of the current state of affairs.*

Background

- Initial *Daubert* challenge to fingerprints – *U.S. v. Byron Mitchell* (1999)
- Scores of similar challenges since
- *Mayfield* case
- 2009 NAS Report
- 2012 NIST Human Factors Report
- 2016 PCAST Report
- 2017 AAAS Latent Fingerprint Report

NAS Report (2009)

- Claims of 'zero error rate' not plausible
- Better documentation needed (transparency)
- Uniqueness and persistence of friction ridge skin don't imply anyone can reliably discern whether two impressions were made by the same person.
- ACE-V doesn't guard against bias.
- Simply following ACE-V doesn't guarantee an examiner will reach a proper conclusion.

  - National Research Council. (2009). *Strengthening Forensic Science in the United States: A Path Forward*. US Department of Justice, Committee on Identifying the Needs of the Forensic Sciences Community.

PCAST Report (2016)

- Acknowledged that latent print discipline has responded to NAS report concerns
- Addressed 'foundational validity' and 'validity as applied'
- Raised issues about confirmation bias in agencies where only identifications are verified
- Cited the FBI/Noblis 'black box' study as significant and recommended additional studies of this type

– President's Council of Advisors on Science and Technology (PCAST) (2016). *Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods*. Executive Office of the President, September 2016.

AAAS Latent Fingerprint Report (2017)

- Extensive literature review to identify gaps
  - 212 references
- Detailed analysis of scientific foundations for latent print examination
- Looked at strengths and weaknesses
- Provided conclusions and recommendations
- Made suggestions for further research
  - (2009 NRC/NAS Report did not)

  - AAAS, *Forensic Science Assessments: A Quality and Gap Analysis- Latent Fingerprint Examination*, (Report prepared by William Thompson, John Black, Anil Jain, and Joseph Kadane), September 2017. DOI: 10.1126/srhrl.aag2874

Latent Print Examination Framework

Decision Making: ACE-V framework

Analysis – Information gathering/data collection

Comparison – Testing the data

Evaluation – Decision making (conclusion)

Verification – Quality assurance

<u>A</u>nalysis

- Observe information in a latent impression.
- Seek to understand the appearance, clarity and distortion of friction ridge information.
- Analysis should be documented prior to viewing the known (exemplar) impressions
  - Helps to mitigate potential bias
- Determine suitability for comparison.

Evaluation

- Sufficient agreement of information (data) results in a Source Identification decision.

- Sufficient disagreement of information results in a Source Exclusion decision.

- Lack of support for either of these conclusions leads to a type of inconclusive decision.
  - Support for same source
  - Inconclusive
  - Support for different source

  - We will look at this later in the presentation.

<u>V</u>erification

- Proactive quality control measure similar to peer review in hypothesis testing
- Attempt to falsify the conclusion of the examiner of record, or perhaps how it was drawn
- Ensure scientific procedures and principles were used
- Blind or non-blind

OSAC Verification BPR

- "Best Practice Recommendations for the Verification Component in Friction Ridge Examination"

- "At a minimum, verification shall apply to Source Identification, Support for Same Source and Source Exclusion conclusions."

- https://www.nist.gov/topics/organization-scientific-area-committees-forensic-science/friction-ridge-subcommittee

- Click on "Standards" below the photograph

Verification Study (2012)

Extent of Verification	# of Agencies (n=56)	% of Agencies
100 % of identifications	54	96
100% of exclusions	31	55
100% of inconclusives	29	52
100 % of 'no value'	20	36
100% of all conclusions	20	36

Black, J.P. Is There a Need for 100% Verification (Review) of Latent Print Examination Conclusions? *J. For. Ident.* 2012, 62 (1), 80 – 100.

Verification Issues

- Most agencies aren't verifying all conclusions, so they aren't consistently applying ACE-V.

- Some examiners view verification as confirming or rubber-stamping a colleague's conclusions.

- Post-NAS research and longtime casework experience show that error rates are much higher for exclusion decisions versus identification decisions.

- Check to see if all conclusions have been verified.

- If not, the agency should be able to articulate their reasoning.

Documentation Issues

Scene & Evidence Photography

- Are the crime scene photographs legible?
- Are any photographs missing?
- Are evidentiary items and their locations clear?
- Are impression evidence photographs (e.g. fingerprints) taken from the proper perspective?
- Were latent prints photographed prior to lifting?
- Was the lift card information completed?

Examination Documentation

- Is documentation present in the case file to support the reported conclusions?
- Can another competent examiner determine what was done and why?
- More complex prints require more documentation.
- Are standard documentation forms being used within an agency?
- Are those forms being used consistently by all personnel?
- Is GYRO being used?
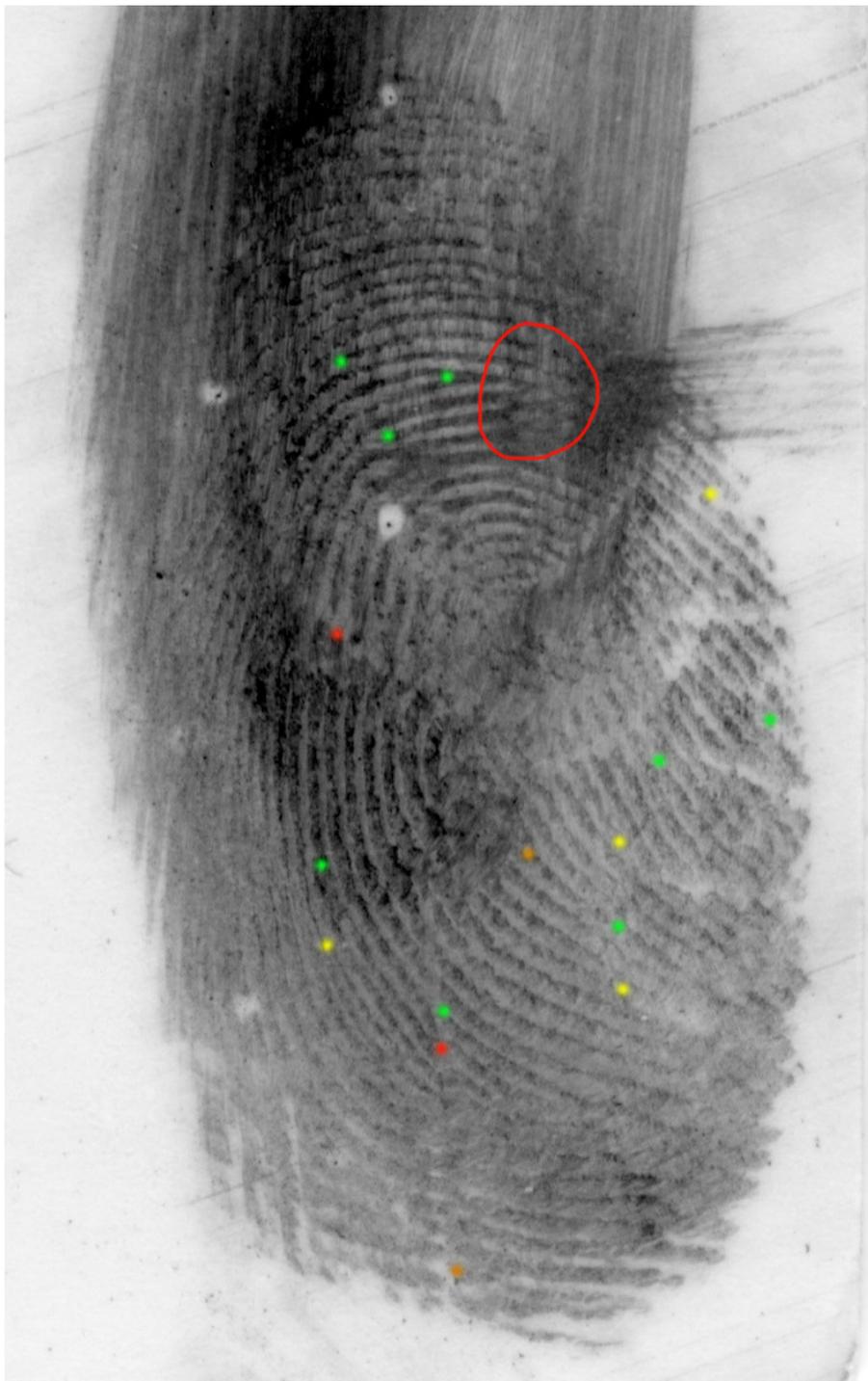
G – green
Y – yellow
R – red
O – orange

Langenburg, G., and C. Champod. 2011. "The GYRO System--A Recommended Approach to More Transparent Documentation." Journal of Forensic Identification, 61(4):373-384.

Quality	
High	Level 1 is distinct; Level 2 details are distinct; There are abundant distinct Level 3 details.
Medium High	Level 1 is distinct; Most of the Level 2 details are distinct; There are minimal distinct Level 3 details.
Medium Low	Level 1 is distinct; Few of the Level 2 details are distinct; There are minimal distinct Level 3 details.
Low	Level 1 may not be distinct; Most of the Level 2 details are indistinct; There are no distinct Level 3 details.

Table 1: Categories of quality defined as a function of levels of details observed.
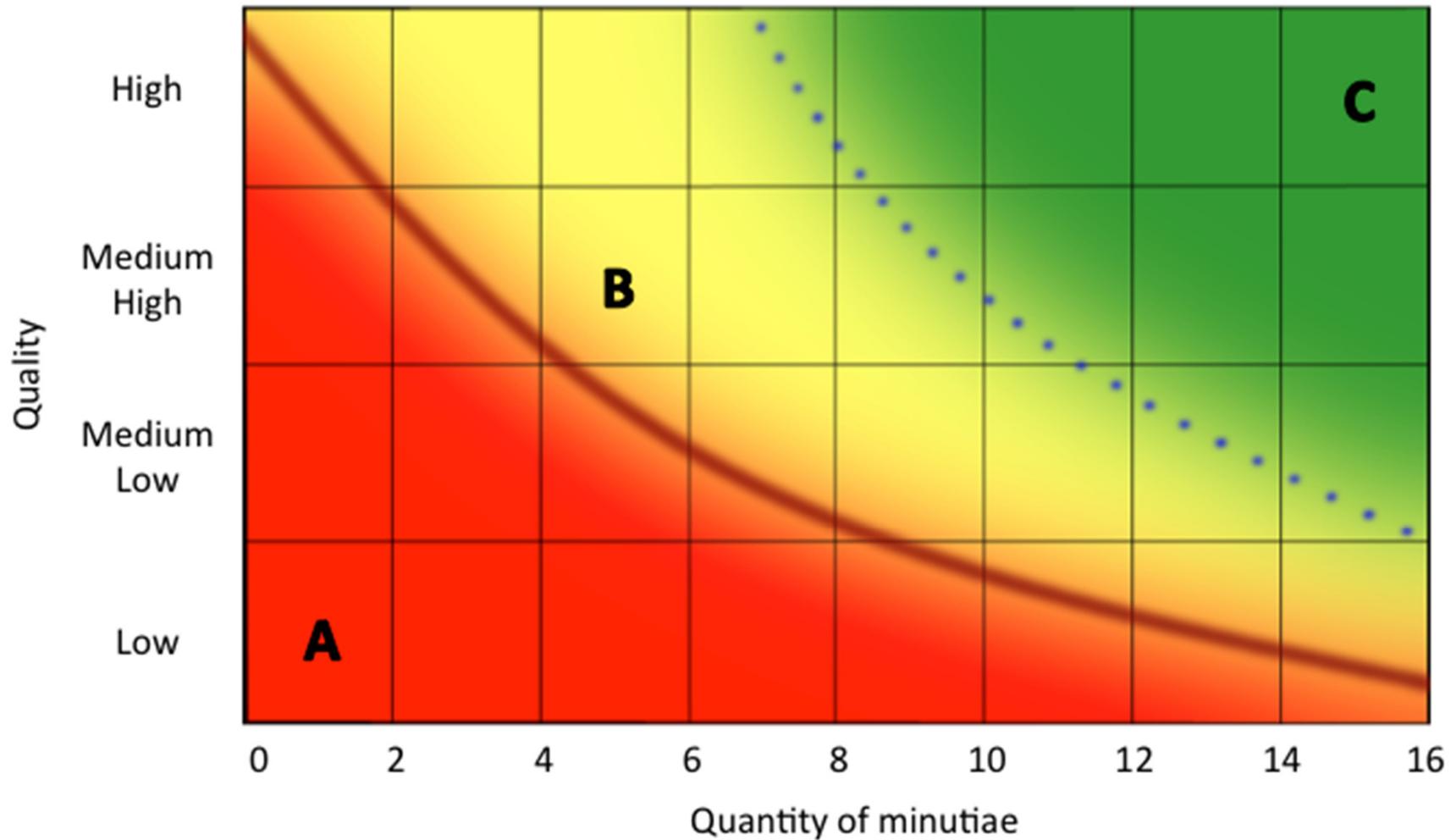
Sufficiency Graph

Figure 1: Sufficiency Graph. This graph does not suggest or endorse the use of minutiae counts as the sole criteria for a decision threshold.

- from SWGFAST Document #10

Friction Ridge Examination Conclusions

Traditional 3-bin Scale

- Identification
- Exclusion ('not identified'; 'no identification effected')
- Inconclusive
  - Primarily due to issues with known prints

FBI/Noblis 'black box' study

- 169 LPEs each compared approx. 100 pairs of latent and exemplar fingerprints from a pool of 744 pairs
- Overall false positive rate of 0.1%
- Overall false negative rate of 7.5%
- 34% of participants indicated making erroneous exclusions after training period
- 85% of participants made an erroneous exclusion during the study.

  – Ulery B.T., Hicklin R.A., Buscaglia J. and Roberts M.A. (2011). Accuracy and Reliability of Forensic Latent Fingerprint Decisions. *Proceedings of the National Academy of Sciences*, USA, Vol. 108, No. 19, pp. 7733-7738.

"To the exclusion of all others"

- Historical way to report and testify to a fingerprint or footwear identification

- However, "all others" were never considered.

- "Identification" implies absolute source attribution and results in a *de facto* exclusion of other sources.

- Exclusions are conscious decisions that certain people are not the source of a given impression.

"My results were verified…"

- It is reasonable for the government's expert to discuss verification as part of the process.
- However, if the expert offers that the verifying examiner concurred with his/her original conclusion(s), an objection may be warranted.
- Has been deemed as bolstering as well as hearsay
- *The State of New Hampshire v. David S. Connor* (2007)

Defense Forensic Science Center
(Information Paper - November 2015)

- Modified reporting language to express "identification"

- *"The latent print on Exhibit ## and the record finger/palm prints bearing the name XXXX have corresponding ridge detail. The likelihood of observing this amount of correspondence when two impressions are made by different sources is considered extremely low."*

Defense Forensic Science Center
(Information Paper - March 2017)

- *"The latent print on Exhibit ## and the standards bearing the name XXXX have corresponding ridge detail. The probability of observing this amount of correspondence is approximately ## times greater when impressions are made by the same source rather than by different sources.*

- Higher values provide stronger support for same source

AAAS Latent Fingerprint Report (2017)

- "The latent print on Exhibit ## and the record fingerprint bearing the name XXXX have a great deal of corresponding ridge detail with no differences that would indicate they were made by different fingers. There is no way to determine how many other people might have a finger with a corresponding set of ridge features, but it is my opinion that this set of features would be unusual."

Personal articulation language

- There is sufficient correspondence of quality, quantity and rarity of features for me to be confident that no other conclusion can be supported by the physical evidence.
    - Source association (identification)

- In other words, I believe I am making an accurate decision which will withstand scrutiny going forward.
    - Remember, there is no ground truth in casework.

OSAC 5-bin Scale

- Source Exclusion
- Support for Different Sources
- Inconclusive / Lacking Support
- Support for Same Source
- Source Identification

- Standard for Friction Ridge Examination Conclusions; OSAC Proposed Standard, Friction Ridge Subcommittee; Version: 1.0, June 2018.

Case Studies

Illinois v. Christopher Robertson

- Motion to exclude claim of a fingerprint "identification" and to find officer not qualified as an expert
- State's examiner sought to testify to absolute source attribution, claiming the print from the crime scene can be 'identified' as having come from defendant with 100% certainty
- Cited 2012 NIST Human Factors Working Group report that stated claims of absolute identification are "*not appropriate*".
- "…*latent print examiners should not report or testify, directly or by implication, to a source attribution to the exclusion of all others in the world.*"

  – Expert Working Group on Human Factors in Latent Print Analysis. (2012). *Latent Print Examination and Human Factors: Improving the Practice through a Systems Approach*. U.S. Department of Commerce, National Institute of Standards and Technology.

Illinois v. Christopher Robertson

- Cited the DFSC language

- Also stated that FBI examiners are no longer permitted to testify to 100% certainty

- [FBI] "*examiners testify that they are confident in the conclusion, would not expect to see the same amount of information repeated if the fingerprints originated from different people, and find no physical evidence causing them to doubt that the fingerprints are from the same source.*" (note: see DOJ ULTR for latent print discipline)

North Carolina v. McPhaul

- Appellate panel found error in admitting expert fingerprint testimony (lack of reliable conclusions)
- Did not reverse conviction, finding error to be harmless (based on other case evidence)
- Expert couldn't state what features were compared or what process was used
- Essentially testified by *ipse dixit*
- Defendant did not challenge general reliability of fingerprint evidence

– Garrett, B.L. The Reliable Application of Fingerprint Evidence. **66 UCLA L. Rev. 64 (2018)**

People v. Cline (Illinois)

- "I agree with the decision to reverse defendant's conviction because the fingerprint analysis was not verified by another examiner. However, I must write separately because the fingerprint itself was insufficient evidence to sustain a conviction beyond a reasonable doubt in this case. The only evidence linking defendant to the crime is a single, partial fingerprint on a portable item. There was no evidence that defendant left his partial fingerprint "under such circumstances as they could only have been made at the time the crime occurred."

  – Justice Walker, concurring with opinion

D.A. case refusal in Texas

- "After reviewing the case, it appears the only evidence we have connecting the defendant to the car is his fingerprint from the inside of the driver's door. While this evidence connects the defendant to the car, we also have to show that the fingerprint was made at the time the offense was committed – at the time of operation. That evidence is lacking. Based on my review of Texas case law, I do not believe we could get past a directed verdict of 'not guilty'. Therefore, I am going to refuse the case. Please feel free to give me a call if you would like further explanation or would like to discuss the case. Thank you."

Additional Fingerprint Expert Questions for Consideration

The Defense Challenge to Fingerprints
(Lisa J. Steele, Criminal Law Bulletin, Vol. 40, No. 3, 2004)

- The recovered evidence
  - Chain of custody, documentation
- The witness
  - Training, experience, certifications, proficiency results
- The science of fingerprint identification
  - Subjective evaluation, confirmation bias
- Methodology used in case on trial
  - Methods and procedures, exposure to suggestive info
- The expert's opinion
  - Defense expert may be necessary
- Legitimate access
  - No scientific way to age a fingerprint

Witness Qualifications

- Have you been tested for competency?
- Do you participate in regular proficiency testing?
- Are you certified as a latent print examiner?
- Are all your conclusions verified?
- Have you ever been made aware of making an erroneous identification?
- What about an erroneous exclusion?

Error Rate

- Are you aware of the error rate for the science of fingerprints? (*Daubert*)
- Can you cite any error rate studies since the 2009 NAS report?
- In those studies, did the researchers find errors when examiners made identification decisions?
- So is it fair to say the science of fingerprints isn't immune to error?
- How do you know you made an accurate decision regarding the evidence in this case?

Fingerprint Examination

- Are you aware of the OSAC/SWGFAST standards regarding fingerprint examination and documentation?

- Do you have documentation in your case file to support your conclusions?

- Did you view any task-irrelevant information prior to your evidence examination? (PCAST; AAAS)

- Do you have a threshold for making identification decisions?

- If so, what is that threshold and can you cite the basis for it?

Thank you for your time today!

John P. Black

john@bwforensics.com

601.604.6766

https://www.bwforensics.com