Physics and Pattern Evidence Scientific Area Committee

Chair: Austin Hicklin, Noblis

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NIST
National Institute of
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Pattern SAC Leadership

- Officers
  - Chair: R. Austin Hicklin, Noblis
  - Vice Chair: Lesley Hammer, Hammer Forensics
  - Executive Secretary: Thomas Busey, Indiana University, Bloomington

- Subcommittee Chairs:
  - Bloodstain Pattern Analysis: TobyWolson, Retired (Miami-Dade Police Department)
  - Firearms and Toolmarks: Andy Smith, San Francisco Police Department Crime Lab
  - Footwear and Tire: G. Matt Johnson, Orange County Crime Laboratory
  - Forensic Document Examination: Rigo Vargas, Mississippi Crime Laboratory
  - Friction Ridge: Melissa Gische, Federal Bureau of Investigation

Pattern SAC Members and Liaisons

- Members
  - David Baldwin, Special Technologies Laboratory, USDOE
  - Ted Burkes, Federal Bureau of Investigation
  - Paul Kish, Paul Erwin Kish Forensic Consultant & Associates
  - Nicholas Petraco, John Jay College of Criminal Justice
  - Hal Stern, University of California, Irvine
  - David Stoney, Stoney Forensic, Inc.
  - John Vanderkolk, Indiana State Police Laboratory Division
- Ex-Officio Members
  - Liaison to Human Factors Committee: Rick Lempert, University of Michigan
  - Liaison to Legal Resource Committee: David Kaye, Pennsylvania State School of Law
  - Liaison to Quality Infrastructure Committee: Erin Henry, Oklahoma State Bureau of Investigation

Pattern SAC: Role

- Provide direction and oversight for 5 subcommittees
  - Firearms & Toolmarks
  - Footwear and Tire
  - Friction Ridge
  - Questioned Documents
  - Bloodstain Pattern Analysis
- Interface with the resource committees
  - Human Factors
  - Legal Resource
  - Quality Infrastructure
  - (OSAC-wide Forensic Statistics Task Group)
- Communicate activities, progress, recommendations
- Review, facilitate public comment, and approve standards and guidelines
- Coordinate research priorities

Pattern SAC : Purpose

- To foster the development of rigorous standards and guidelines within and across the pattern disciplines
- To assist in the adoption of these standards and guidelines
- To encourage enforcement of these standards and guidelines through accreditation, certification, and training
- To encourage evaluations to test and validate procedures
- To encourage research to improve the disciplines
- To enhance the rigor of these disciplines through transparent, accurate, and reliable processes

Pattern SAC: Priorities

- Coordination across disciplines in these areas
  - Current:
    - Conclusions
    - Terminology
  - Future:
    - Reporting
    - Training/competency/certification/proficiency
    - Accreditation
    - Testimony
    - Imaging
    - Documentation
    - Collection/Crime scene investigation
    - Research/General discipline needs
    - Validation

Pattern SAC: Role of affiliates

- Standards and guidelines are developed by task groups (with oversight from the SACs and subcommittees)
- Task group participation is not limited to OSAC members: subcommittee chairs can name OSAC affiliates to task groups
- International participants can participate as affiliates
- Active participation as an affiliate is considered in new member selection

- If interested, contact the appropriate subcommittee chair

Goals for standards and guidelines

- Standards and guidelines need to be practical: to be as rigorous as practical given current capabilities
- BUT
- OSAC also needs to recommend research to continually improve the disciplines in these areas

- Terminology and conclusions: consistent across disciplines
- Procedures: as quantitative and objective as practical
- Documentation: complete and transparent
- Conclusions, Reporting and Testimony
  - include all data on which conclusions are based
  - distinguish data, conclusions, and opinions
  - clearly state the limitations and caveats of conclusions
  - clearly specify the bases of opinions

Building on the work of the SWGs

- We want to make sure that OSAC does not sacrifice any of the benefits and successes of the SWGs
- Areas where OSAC can improve on SWGs:
  - Formal standards
    - SWG standards were often informal (or were actually guidelines), not defined in a way that would meet the requirements of a standard from an SDO (Standards development organization)
  - More powerful voice in making recommendations
  - Better enforceability
    - SWGs had no means of enforcing standards, no real authority
    - OSAC's unified voice should have more authority in tying OSAC standards to training, accreditation, and certification
  - Coordination among disciplines
  - Broader basis for input and review
    - Membership is broader by design (e.g. including academic researchers)
    - OSAC includes statistical, quality, human factors, legal resources
    - Input (task groups)
    - Review (canvass process, SAC and FSSB approval)

Current Progress

- Pattern SAC documents at AAFS Academy Standards Board:
  - *Scope of Expertise in Forensic Document Examination*
  - *Guideline for the Articulation of the Decision-Making Process Leading to an Expert Opinion of Source Identification in Friction Ridge Examinations*
- Many draft documents in progress in subcommittees
- Firearms/Toolmarks and Friction Ridge subcommittees replied to the Dec 2016 PCAST RFI
- Multi-discipline *Standard for Source Conclusions* under development
- 24 research needs (see next slide)

Pattern SAC Research & Development Needs

Bloodstain Pattern Analysis:
- Behavior of Blood Outside the Body
- Bloodstain Pattern Classification
- Examiner Reliability Study: Black and White Box Studies on Bloodstain Pattern Analysts
- Interaction of Blood and Fabrics

Firearms & Toolmarks:
- Assessment of Examiners' Toolmark Categorization Accuracy
- Blind Verifications Needs Assessment
- Cognitive Bias: To What Extent Does It Affect Firearm and Toolmark Comparison Outcomes
- Effect of New Technology on Quantitative Consecutive Matching Striae ID Criteria
- Study to Assess the Accuracy and Reliability of Firearms and Toolmarks

Forensic Document Examination:
- Comparability and Complexity in Handwriting
- Hand Printing Complexity and Comparability
- National Database of Handwriting
- Validation of Conclusion Scale

Friction Ridge:
- ACE-V Bias
- Assessing the Sufficiency and Strength of Friction Ridge Features
- Close Non-Match Assessment
- Examiner Consistency During Friction Ridge Feature Mark-Up
- Friction Ridge Statistical Modeling
- Latent Fingerprint Image Quality Usage

Footwear and Tire:
- Examiner Reliability Study: Black/White Box Study on Footwear and Tire Examiners
- National Footwear Database/Reference Collection
- Population Frequency of Class Characteristics: Footwear in the United States
- Probability of Randomly Acquired Characteristics
- Testing & Validation of 3D Imaging Technologies for Footwear & Tire Impressions Evidence

Comments or questions?

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