



Firearms and Toolmarks

Physics and Pattern SAC

Todd Weller

AFTE 2018





Subcommittee Leadership

| Position | Name | Organization | Email |
|---------------------|--------------|--|--------------------------------|
| Chair | Todd Weller | Weller Forensics | toddweller@wellerforensics.com |
| Vice Chair | Andy Smith | San Francisco Police Dept Crime Lab | andy.smith@sfgov.org |
| Executive Secretary | Wendy Gibson | VA Dept of Forensic Science | Wendy.gibson@dfs.virginia.gov |

In October 2017, Andy Smith stepped down as Chair and Todd Weller was elected Chair



Subcommittee Voting Members



| # | Name | Organization |
|----|----------------------|---|
| 1 | Steve Scott | FBI |
| 2 | Mike Neel | BATF |
| 3 | Xiaoyu Alan Zheng | NIST |
| 4 | Ted Vorburger, PhD | NIST |
| 5 | Eric Collins | Contra Costa Co Sheriff Forensic Services |
| 6 | Doug Murphy | FBI |
| 7 | Max Morris, PhD | Iowa State University |
| 8 | Chris Monturo | Miami Valley Regional Crime Lab |
| 9 | Erich Smith | FBI |
| 10 | James Carroll | Los Angeles County Sheriff's Office |
| 11 | Cassey Allen | TX Department of Public Safety - Austin |
| 12 | Ryan Lilien, MD, PhD | Cadre Research Labs |
| 13 | Ron Nichols | Nichols Forensic Science Consulting |
| 14 | Bill Demuth | Illinois State Police |
| 15 | Melissa Oberg* | Indiana State Police Crime Lab |
| 16 | Erica Lawton* | Alabama Department of Forensic Science |
| 17 | Nicholas Petraco* | John Jay College |



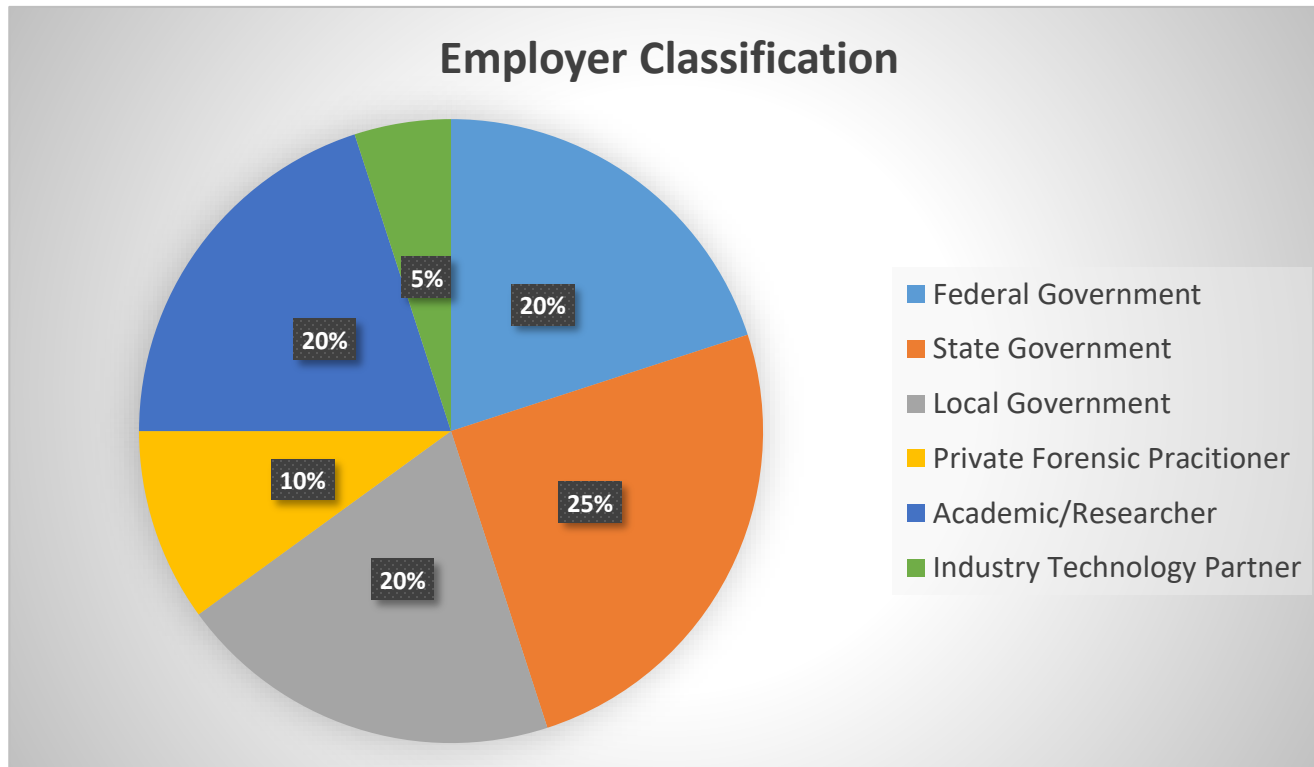


Subcommittee Affiliate Members

| # | Name | Organization |
|---|---------------------|--|
| 1 | Jodi Marsanopoli | BATF |
| 2 | John Murdock | Contra Costa County Crime Laboratory |
| 3 | Nancy McCombs | California Department of Justice, Fresno |
| 4 | John Marshall | RCMP Forensic Lab, Ottawa |
| 5 | Gerhard Wevers | Institute of Environmental Science and Research, New Zealand |
| 6 | Carey Alvarez Bacha | Aurora Police Department Crime Laboratory |



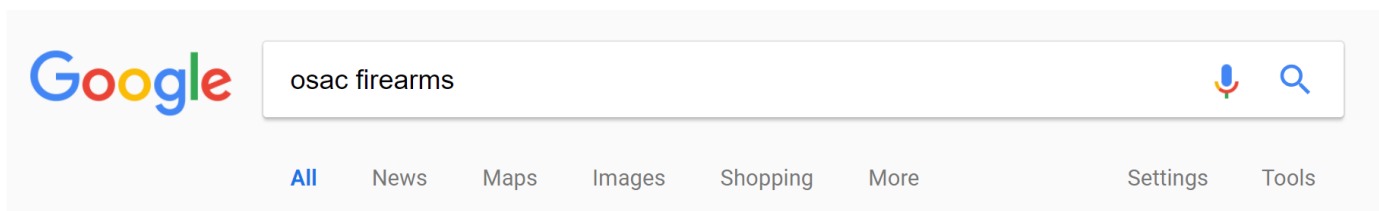
Employer Classification Mix of Voting Members



OSAC Firearms & Toolmarks Website

<https://www.nist.gov/topics/forensic-science/organization-scientific-area-committees-osac/firearms-and-toolmarks>

- SWGGUN legacy documents, research needs, draft standards, etc.
- Google “OSAC Firearms”
 - Top Hit



About 16,700 results (0.45 seconds)

Firearms and Toolmarks Subcommittee | NIST

<https://www.nist.gov/topics/forensic-science/firearms-and-toolmarks-subcommittee> ▼

Jun 27, 2014 - The Firearms and Toolmarks Subcommittee focuses on standards and ... **OSAC Firearms** and Toolmarks Subcommittee's Response to the ...

OSAC Subcommittees | NIST

<https://www.nist.gov/topics/forensic-science/osac-subcommittees> ▼

Jul 10, 2014 - Physics/Pattern Interpretation Scientific Area Committee · Bloodstain Pattern Analysis. physics pattern. **Firearms** and Toolmarks · Friction Ridge.

OSAC Firearms & Toolmarks Website

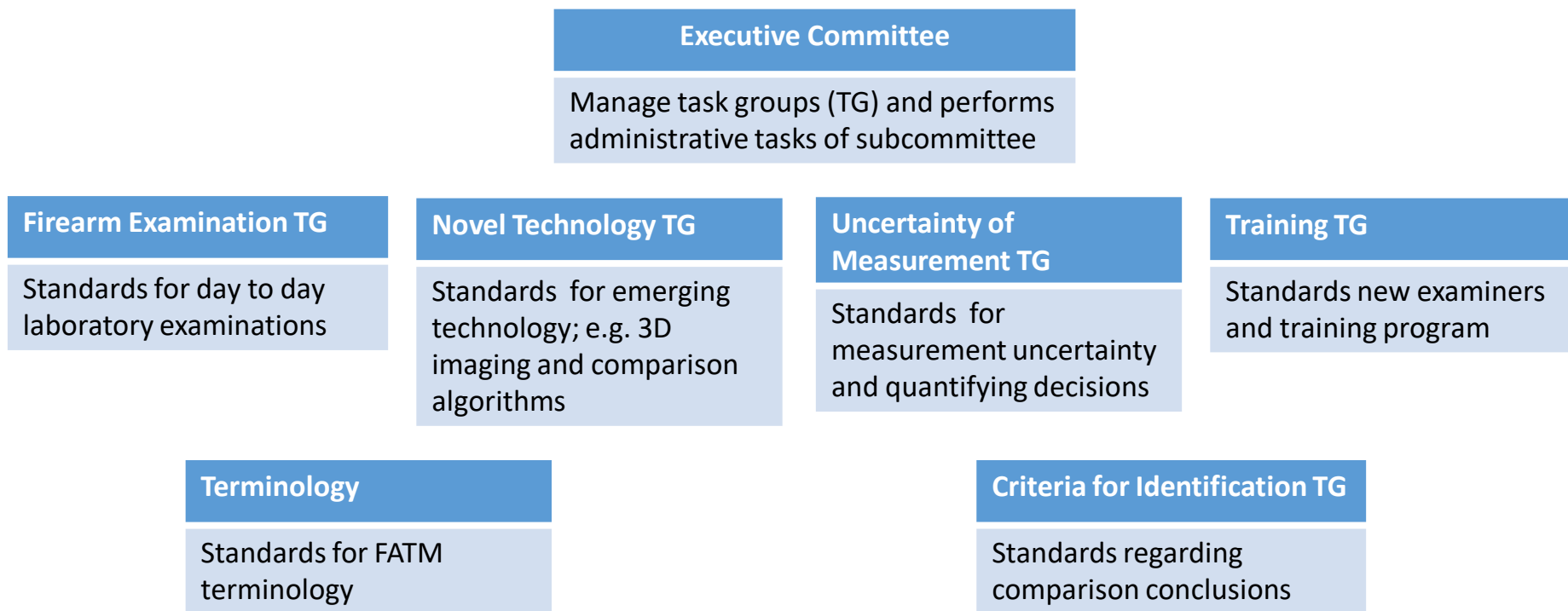
Firearms and Toolmarks Subcommittee



[Officers](#) | [Members](#) | [Research & Development Needs](#) | [Documents In Process](#)

The Firearms and Toolmarks Subcommittee focuses on standards and guidelines related to the examination of firearm and toolmark evidence. This includes the comparison of microscopic toolmarks on bullets, cartridge cases, and other ammunition components and may also include firearm function testing, serial number restoration, muzzle-to-object distance determination, tools, and toolmarks.

Overview & Roadmap of FATM Subcommittee



Winter 2015: FATM subcommittee formed six task groups to focus on the most pressing/important topic areas in the discipline. The same task groups still exist and continue to work on standards and guidelines in each topic area.



Task Group 1: Firearm and Toolmark Examination Standards

- Develop standard methods for the examination of firearm and toolmark evidence
 - E.g. Day-to-day examination protocols and test methods

Task Group Name: Firearm and Toolmark Examination Standards

Task Group Chair Name: Jim Carroll*

Members: Steve Scott, Cassey Allen, Erica Lawton

Task Group Chair Contact Information: JPCarrol@lasd.org

*Jim Carroll accepted leadership of this task group in late 2017



Firearm & Toolmark Examination Task Group Progress

| Document Title | Status |
|---|-------------------|
| Standard Guideline/Best Practice for the Safe Handling of Firearms and Ammunition | Sent to ASB |
| Standard Test Method for the Examination and Testing of Firearms | Draft in Progress |



Task Group 2: Novel Technology

- Provide standards for new measurement and comparison methods to enhance the process of toolmark examinations.
- Specify hardware quality assurance protocols and validation requirements for software and statistical conclusions.
- Specify processes for utilizing new technologies in forensic laboratories. This includes hit verification, virtual microscopy, inter-lab data exchange, dispute resolution, and training.

Task Group Name: Technology Development, Validation, and Implementation

Task Group Chair Name: Dr. Ryan Lilien

Members: Alan Zheng, Erich Smith, Dr. Nick Petraco

Affiliate Members: John Marshall

Task Group Chair Contact Information: ryan@cadresearch.com



Technology Development, Validation, and Implementation Task Group Progress

| Document Title | Document Status |
|---|---------------------------|
| Standard for Topography Comparison Software for Firearm and Toolmark Analysis | Sent to ASB |
| Standard for Implementation of 3D Technologies in Forensic Laboratories for Firearm and Toolmark Analysis | Sent to ASB |
| Standard for 3D Measurement Systems and Measurement Quality Control for Firearm and Toolmark Analysis | Sent to ASB |
| Virtual Microscopy | Initial Draft in Progress |



Task Group 3: Uncertainty of Measurement

- Standards and procedures to express the uncertainty for measurements of physical quantities that matter for firearm and toolmark analysis;
 - Includes: issues associated with quantifying uncertainty in decision making.

Task Group Name: Uncertainty of Measurement

Task Group Chair Name: Dr. Ted Vorburger

Members: Chris Monturo, Dr. Max Morris, Dr. Nick Petraco

Affiliate Members: Carey Alvarez Bacha

Task Group Chair Contact Information: tvtv@nist.gov

Uncertainty of Measurement Task Group Progress



| Document Title | Status |
|---|---------------------------|
| Standard for Barrel and Overall Length Measurements for Firearms, includes guidelines and example spreadsheet for calculating uncertainty | Sent to ASB |
| Uncertainty for Trigger Pull Measurement | Draft in progress |
| Statistical Standard/Guideline for Source Identification and Related Quantities | Initial draft in progress |



Task Group 4: Training Program

- Standards for Examiner Qualifications and Training:
- Minimum Requirements for an Examiner Training Program
 - Firearms & Toolmarks
 - Other Examinations: serial number restoration, distance determination
 - Competency Testing
 - Continuing Education
- Minimum Qualifications for Firearm/Toolmark Examiners
 - Trainees

Task Group Name: Training Program

Task Group Chair Name: Doug Murphy*

Members: Bill Demuth, Melissa Oberg,

Affiliate Members: Jodi Marsanopoli

Task Group Chair Contact Information: dpmurphy@fbi.gov

*Doug Murphy accepted leadership of this task group in late 2017



Training Task Group Progress

| Document Title | Status |
|---|--------------------------------|
| Minimum Qualifications of Firearm/Toolmark Examiners Trainees | Final Vote of SAC prior to ASB |
| Standard Firearms Examinations Training Program | Initial Draft in progress |



Task Group 5: Standard Criteria for Source Conclusions

- Development of minimum standards for:
 - The criteria used to draw conclusions regarding the comparison of a questioned toolmark to a known or unknown source tool
 - The supporting documentation for such examinations and conclusions
 - The reporting of source conclusions

Task Group Name: Standard Criteria for Source Conclusions

Task Group Chair Name: Eric Collins

Members: Mike Neel, Max Morris, Ron Nichols

Affiliates: John Murdock, Nancy McCombs, Gerhard Wevers

Task Group Chair Contact Information: ecoll@so.cccounty.us

Source Conclusions Task Group Progress



| Planned Actions | Status |
|---|--|
| Standard Range of Source Conclusions and Criteria for Firearm and Toolmark Examinations | Adjudicating comments from RCs and SAC |
| Standard for Supporting Documentation of Source Conclusions – INITIAL DRAFT | Draft in progress |
| Expression of Source Conclusions – INITIAL DRAFT | Draft in progress |
| Verification of Source Conclusions – INITIAL DRAFT | Draft in progress |



Topic 6: Terminology

- Reviewed existing glossaries to determine if terms and definitions are appropriate and sufficient for use and make adjustments or additions were necessary.
- Working with other disciplines in attempt to standardize terminology

Task Group Name: Terminology

Task Group Chair Name: Bill Demuth

Members: Cassey Allen, Doug Murphy

Task Group Chair Contact Information: Bill_Demuth@isp.state.il.us



Terminology Task Group Progress

| Planned Actions | Approx. Deadline |
|--|--|
| OSAC Subcommittee on Firearms and Toolmarks Glossary | Adjudicating Comments from RCs and SAC |



Research Needs

- In Jan 2016, FSSB asked that we highlight topics appropriate for additional research. Updated March 2018. Eight topics highlighted:
 - Blind Verifications Needs Assessment
 - Cognitive Bias: To What Extent Does It Affect Firearm and Toolmark Comparison Outcomes
 - Consistency of Examiner Evaluation of Distance Determination GSR Patterns
 - Effect of New Technology on Quantitative Consecutive Matching Striae ID Criteria
 - Evaluation of Examiner Conclusions Utilizing a Five-Point Scale
 - Resolution Requirements for 3D Virtual Comparison Microscopy
 - Assessment of Examiners' Toolmark Categorization Accuracy
 - Study to Assess the Accuracy and Reliability of Firearms and Toolmark Examinations
- More details available on website

Summary

- Progress starting to be tangible: five documents sent to external SDO (Academy Standards Board)
- Other task groups have documents far along in the OSAC internal review; expect more documents to be sent to SDO soon
- New standards being drafted (e.g. virtual microscopy, trigger pull uncertainty, training program)
- Future considerations: smoothing transitions
 - Onboarding new leadership (e.g. task group chairs, executive committee) and new members. Will be working to improve this process as term limits come up.

Term Limits

- Term limits: will be adding new members in coming years.





New members are needed

- Term limits: will be adding new members. If interested, please apply:
 - <https://www.nist.gov/osac-application-form>





Questions?

