

The logo graphic consists of several concentric, overlapping arcs in shades of purple, blue, green, and yellow, partially overlapping the letters of the acronym.

# OSAC

**Organization of Scientific Area  
Committees for Forensic Science**

Chemistry and Instrumental Analysis  
Scientific Area Committee

Jose Almirall, Chair

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# Chemistry SAC Leadership

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**Jose Almirall**, Chair, Department of Chemistry and Biochemistry,  
Florida International University

**Chris Taylor**, Vice Chair, Defense Forensic Science Center, U.S. Army  
Criminal Investigation Laboratory

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**Andrew Bowen**, Chair, **Geological Materials**, U.S. Postal Inspection  
Service

**Brenda Christy**, Chair, **Fire Debris and Explosives Analysis**, Virginia  
Department of Forensic Science

**Melissa Kennedy**, Chair, **Forensic Toxicology**, ANSI-ASQ National  
Accreditation Board

**Agnes Winokur**, Chair, **Seized Drugs**, U.S. Drug Enforcement  
Administration

**Thomas White**, Chair, **Gunshot Residue**, Texas Department of Public  
Safety Crime Laboratory

**Diana Wright**, Chair, **Materials (Trace)**, FBI Laboratory

# Other SAC Members and Liaisons

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**Cedric Neumann, Ph.D.**, South Dakota State University (Statistics Task Group Representative)

**Hal Arkes**, Emeritus Professor of Psychology, Ohio State University (Human Factors Representative)

**Lynn Garcia**, Texas Forensic Science Commission (Legal Resource Representative)

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**Adam Negrusz, Ph.D.**, United States Drug Testing Laboratories, Inc.

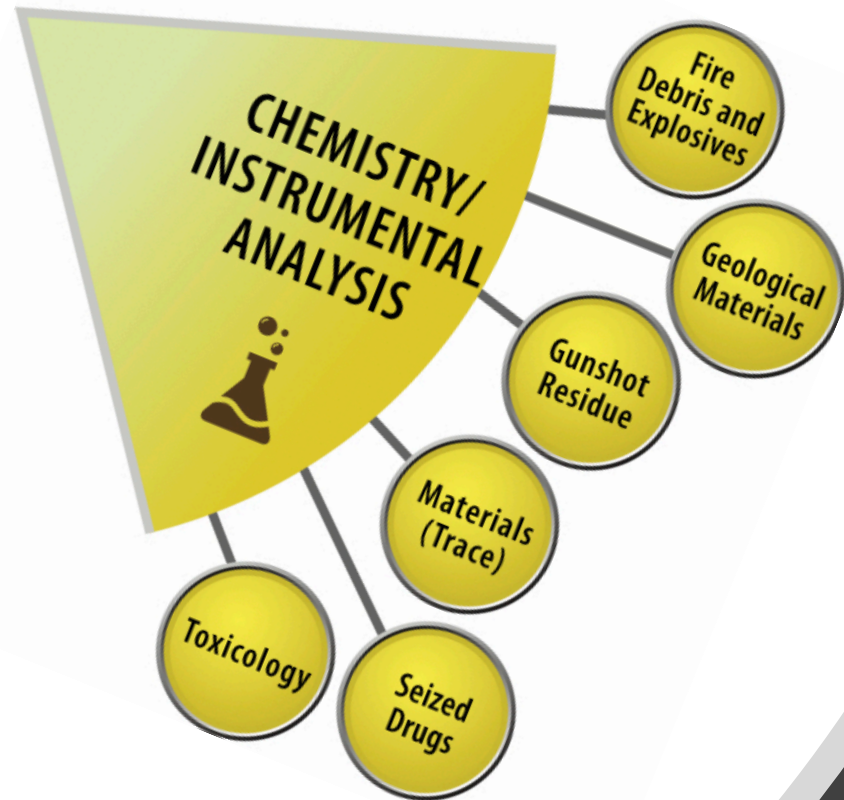
**Patrick Buzzini**, Sam Houston State University

**Scott Oulton**, U.S. Drug Enforcement Administration

**Reta Newman**, Pinellas County Forensic Laboratory

**Marcela Najarro**, National Institute of Standards and Technology

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Members of the Chemistry/Instrumental Analysis SAC at the July 2019 OSAC Meeting in Orlando, Florida.

Source: <https://www.nist.gov/topics/organization-scientific-area-committees-forensic-science/chemistryinstrumental-analysis>

“OSAC 2.0”  
Reorganization of the  
Chemistry SAC  
effective Oct. 1, 2020

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**Chemistry (Seized Drugs and Toxicology),**

Marc LeBeau, Chair and Reta Newman, Vice-Chair

**Seized Drugs SC,** Agnes Winokur, Chair, DEA Laboratory

**Forensic Toxicology SC,** Robert Johnson, Chair

Tarrant County Medical Examiner's Office

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**Chemistry (Trace Evidence and Ignitable Liquids),**

Chris Taylor, Chair and Chantelle Taylor, Vice-Chair

**Trace Materials SC,** Diana Wright, Chair, FBI Laboratory

**Ignitable Liquids, Explosives and GSR SC,** Brenda Christy,  
Chair, Virginia Department of Forensic Science



# Workforce / Casework Metrics in Forensic Science



U.S. Department of Justice  
Office of Justice Programs  
*Bureau of Justice Statistics*

November 2016, NCJ 250151

## Publicly Funded Forensic Crime Laboratories: Resources and Services, 2014

Matthew R. Durose and Andrea M. Burch, *BJS Statisticians*  
Kelly Walsh and Emily Tiry, *Urban Institute*

In 2014, the nation's 409 crime labs received an estimated 3.8 million requests for forensic services, down from the 4 million requests received in 2009 (figure 1). The analysis of controlled

**FIGURE 1**  
Number of requests for services received by publicly funded forensic crime labs, by type of request, 2009 and 2014

Bulletin

Total FTEs  
2002: 11,000  
2005: 12,200  
2009: 13,100  
2014: 14,300

2019: 15,610 ?

Bureau of Labor Statistics  
17% increase from 2016-  
2026 (or 2600 new jobs)

3.8 M requests in 2014  
33% Drugs  
24% Biological samples  
15% Toxicology

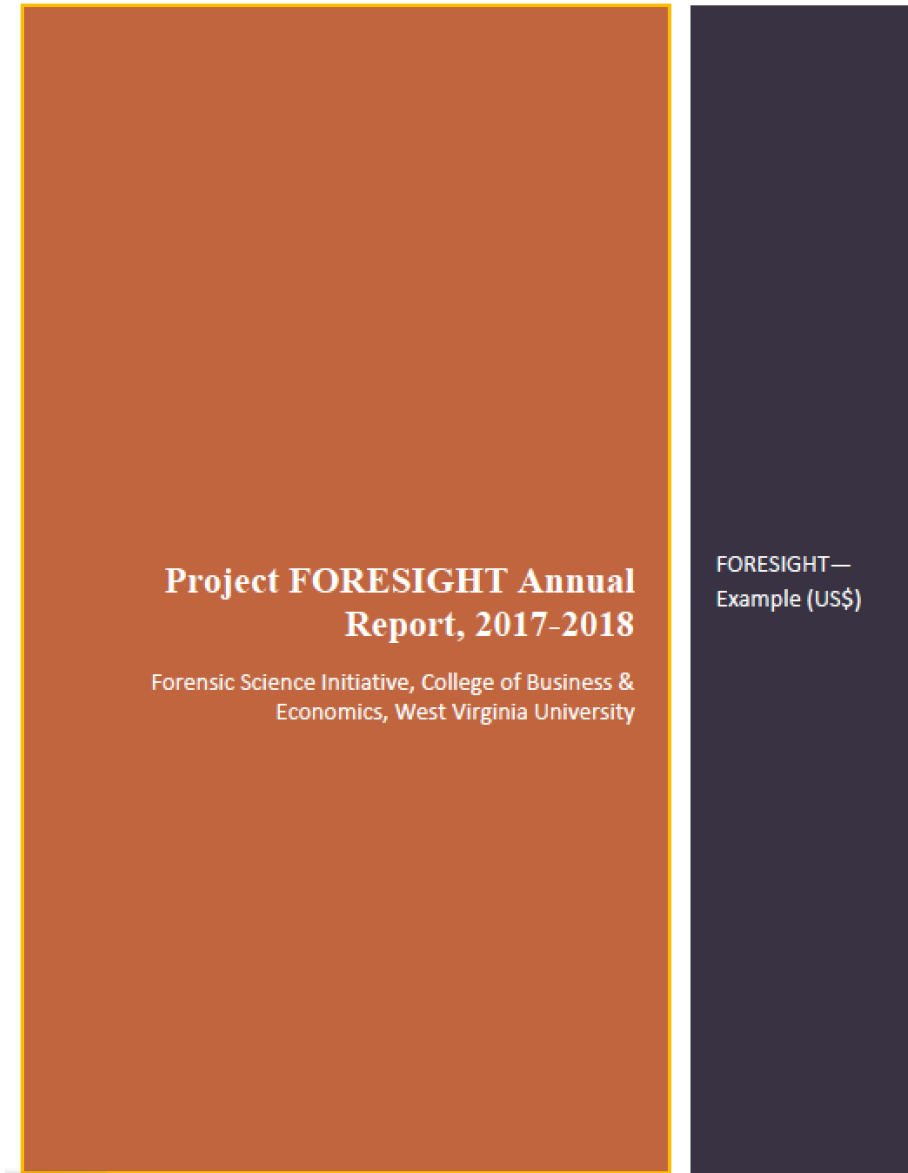


Source: Bureau of Justice Statistics, Census of Publicly Funded Forensic Crime Laboratories, 2009 and 2014.

# Workforce / Casework Metrics in Forensic Chemistry



# Casework Analysis – Source: Paul Speaker





# Casework/Caseload Analysis for US Population

	<b><u>For US population of 325 M (2017-2018)</u></b>			
	<b>Cases</b>	<b>Items</b>	<b>Tests</b>	<b>Reports</b>
<b>Blood Alcohol</b>	237,250	253,500	523,250	247,000
<b>Seized Drugs</b>	864,500	2,044,250	4,160,000	884,000
<b>Explosives Analysis</b>	845	585	10,075	260
<b>Fire Debris Analysis</b>	11,083	28,600	80,275	10,660
<b>Gunshot Residue</b>	15,535	17,550	21,028	9,490
<b>Tox (Ante Mortem)</b>	182,000	208,000	754,000	151,125
<b>Tox (Post Mortem)</b>	162,500	221,000	669,500	164,125
<b>Materials (Trace)</b>	8,515	22,750	114,985	6,988



# “Impact” of Forensic Chemistry Standards

**Number of Practitioners in the discipline that are affected by the standards:**

- 1. Seized Drugs – 2M+ drug identifications/year<sup>1,2</sup> (> 50% of forensic chemistry practitioners are drug chemists, ~ 300 at DEA + ~ 3000 ??? nationwide)**
- 2. Toxicology – 682,000 items examined<sup>2,4</sup> (??? examiners nationwide)**
- 3. Fire Debris, Explosives and GSR - ~ 260,000 fire debris analyses<sup>3</sup>, ~1,500 explosives analysis (500-800 fire debris examiners, 100-200 explosives examiners and ~ 100 GSR examiners)**
- 4. Materials (Trace) including Geological materials – ~ 22,750<sup>2</sup> items/year and 115,000<sup>2</sup> tests**

**Other measures of “impact” that are affected by the standards:**

**Human Health and Welfare impact**

**Impact on Law Enforcement**

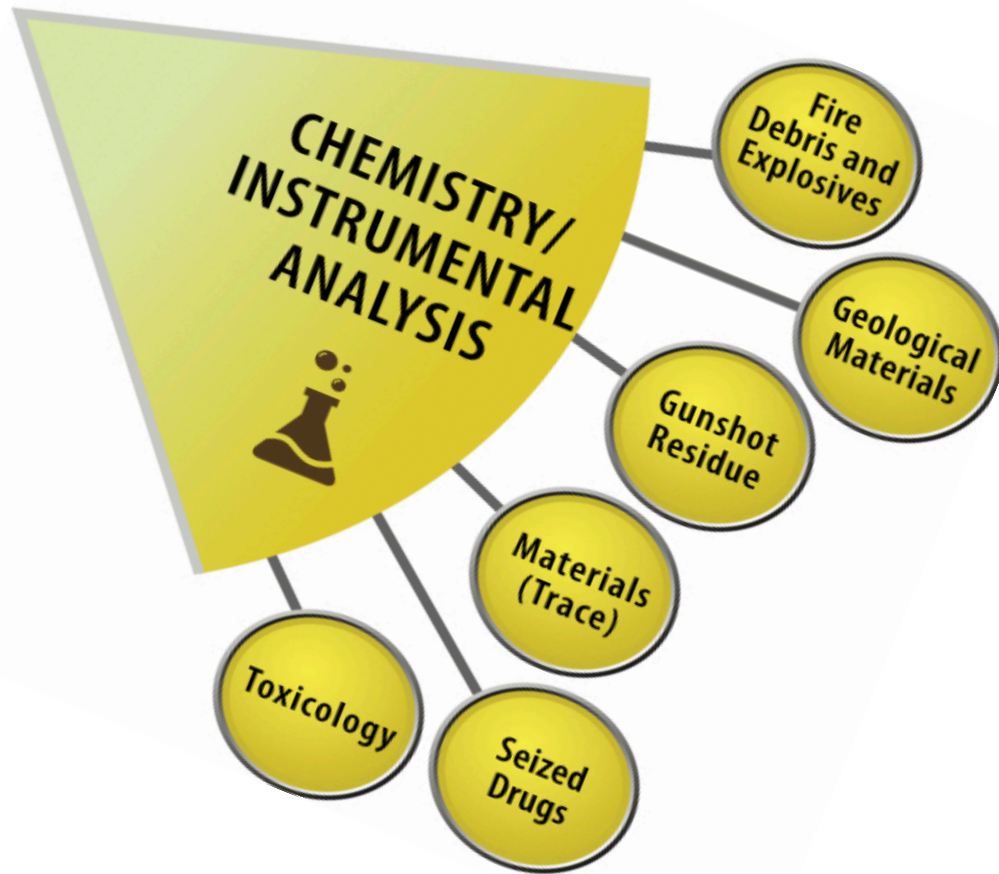
**Impact on the Justice System**

**Economic Impact on the US**

1. NFLIS (2018)
2. Project Foresight Annual Report (2017-2018), Paul Speaker
3. <https://www.usfa.fema.gov/data/statistics/#causesR>
4. Public Labs BJS (2014)
5. Needs Assessment of Forensic Laboratories and Medical Examiner/Coroner Offices (2020)



# Chemistry SAC Activities 2019-2020



## Chemistry SAC 'Mission':

1. Review and approve existing standards and develop new standards
2. Provide guidance and direction to SCs
3. Coordinate overlapping activities
4. Raise awareness and promote the implementation of OSAC standards
5. Publish research needs

# Chemistry SAC Activities 2019-2020



## 12 Standards on the OSAC Registry\*

### Materials (Trace)

[ASTM E1967 Standard Test Method for the Automated Determination of Refractive Index of Glass Samples Using the Oil Immersion Method and a Phase Contrast Microscope](#) (effective July 7, 2020).

[ASTM E2330 Standard Test Method for Determination of Concentrations of Elements in Glass Samples Using Inductively Coupled Plasma Mass Spectrometry \(ICP-MS\) for Forensic Comparisons](#) (effective July 7, 2020).

[ASTM E3085-17 Standard Guide for Fourier Transform Infrared Spectroscopy in Forensic Tape Examinations](#) (effective September 11, 2018).

[ASTM E1610-18 Standard Guide for Forensic Paint Analysis and Comparison](#) (effective June 26, 2018).

[ASTM E2937-18 Standard Guide for Using Infrared Spectroscopy in Forensic Paint Examinations](#) (effective June 26, 2018).

[ASTM E2927-16e1 Standard Test Method for Determination of Trace Elements in Soda-Lime Glass Samples Using Laser Ablation Inductively Coupled Plasma Mass Spectrometry for Forensic Comparisons](#) (effective June 5, 2018).

[ASTM E2926-17 Standard Test Method for Forensic Comparison of Glass Using Micro X-ray Fluorescence \( \$\mu\$ -XRF\) Spectrometry](#) (effective July 31, 2017).

**Coming Soon:** ASTM E3233-20 *Standard Practice for Forensic Tape Analysis Training Program*

ASTM E3234-20 *Standard Practice for Forensic Paint Analysis Training Program*



\* <https://www.nist.gov/topics/organization-scientific-area-committees-forensic-science/osac-registry-approved-standards>

# Chemistry SAC Activities 2019-2020



## 12 Standards on the OSAC Registry\*

### Forensic Toxicology

[ANSI/ASB Standard 036, Standard Practices for Method Validation in Forensic Toxicology, First Edition, 2019 \(effective July 7, 2020\).](#)

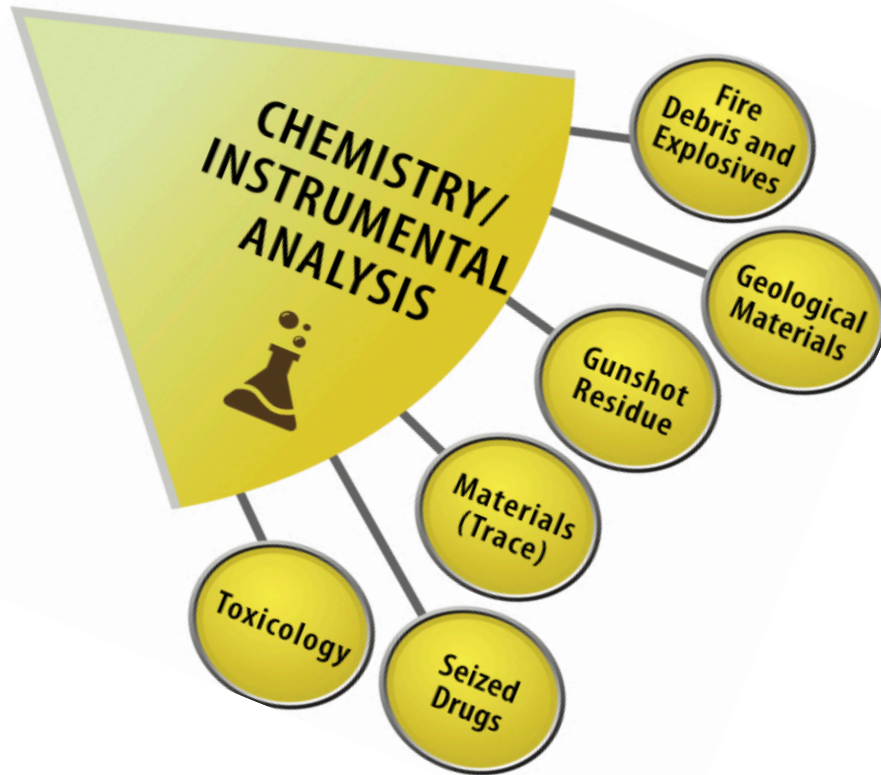
[ANSI/ASB Best Practice Recommendation 037, Guidelines for Opinions and Testimony in Forensic Toxicology, First Edition, 2019 \(effective November 5, 2019\).](#)

[ANSI/ASB Standard 017, Standard Practices for Measurement Traceability in Forensic Toxicology, First Edition, 2018 \(effective June 18, 2019\).](#)

### Seized Drugs

[ASTM E2329-17 Standard Practice for Identification of Seized Drugs \(effective August 7, 2018\).](#)

[ASTM E2548-11e1 Standard Guide for Sampling Seized Drugs for Qualitative and Quantitative Analysis \(effective April 3, 2017\).](#)



\* <https://www.nist.gov/topics/organization-scientific-area-committees-forensic-science/osac-registry-approved-standards>



# Chemistry SAC Activities 2019-2020

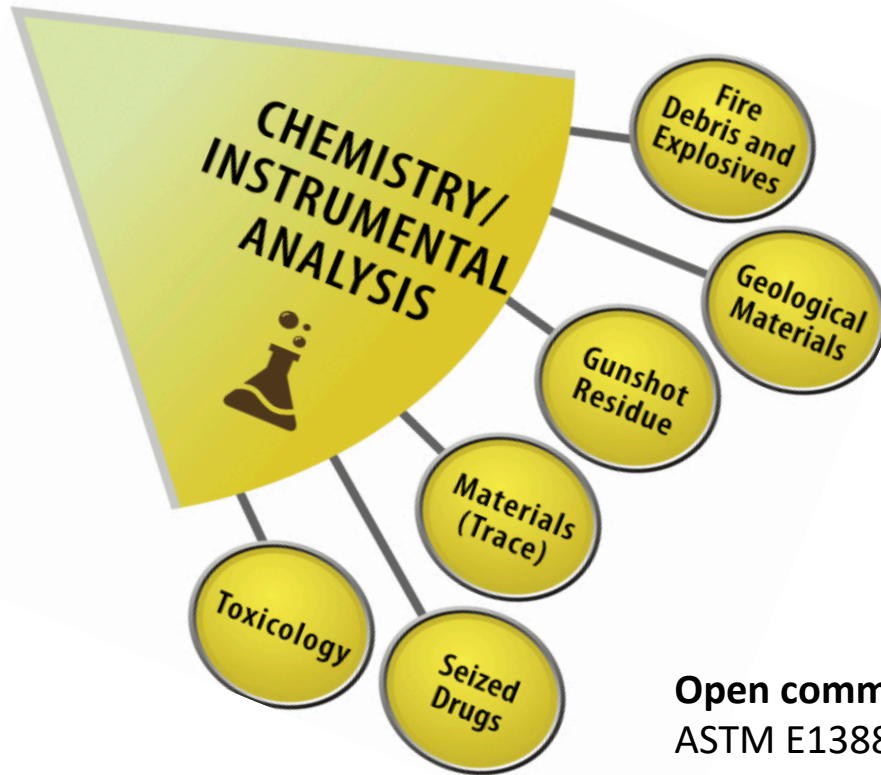
**35 standards published by an SDO (completed the SDO consensus process)**

**Fire Debris and Explosives Analysis: 12 standards**

**Materials (Trace): 12 standards**

**Seized Drugs: 8 standards**

**Forensic Toxicology: 3 standards**



**Open comment period closed on Sept. 4, 2020:**

- ASTM E1388-17 Standard Practice for Static Headspace Sampling of Vapors from Fire Debris Samples.*
- ASTM E1412-19 Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Passive Headspace Concentration with Activated Charcoal.*
- ASTM E1413-19 Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Dynamic Headspace Concentration onto an Adsorbent Tube.*
- ASTM E3189-19 Standard Practice for Separation of Ignitable Liquid Residues from Fire Debris Samples by Static Headspace Concentration onto an Adsorbent Tube.*



# Chemistry SAC Activities 2019-2020

**35 additional standards approved by the SAC and sent to an SDO (drafted with input from resource TGs)**

**Forensic Toxicology: 10 standards**

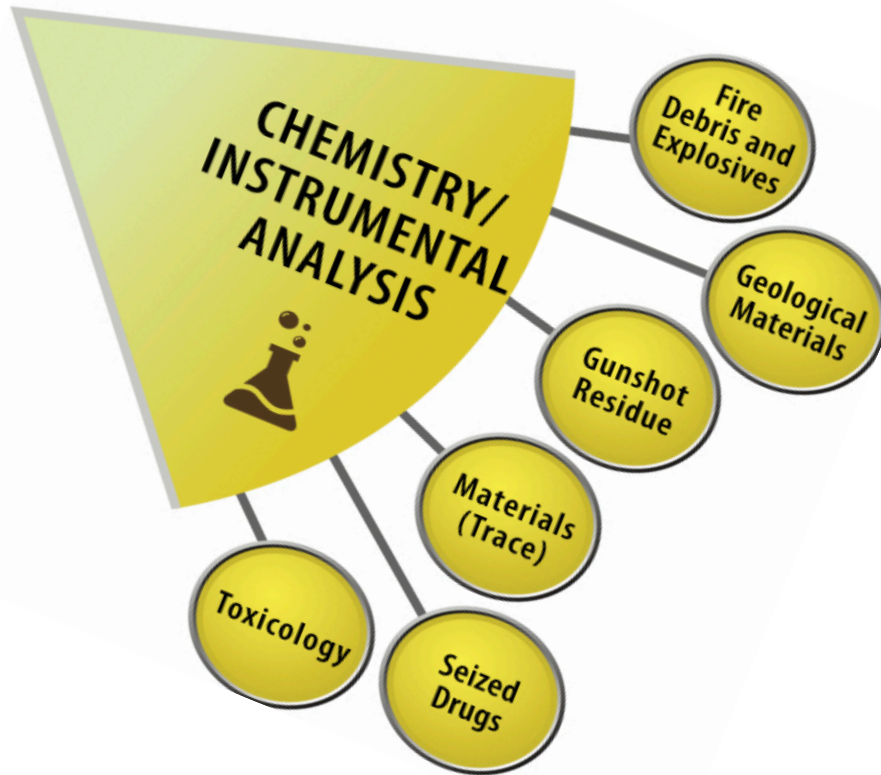
**Materials (Trace): 7 standards**

**Fire Debris and Explosives Analysis: 5 standards**

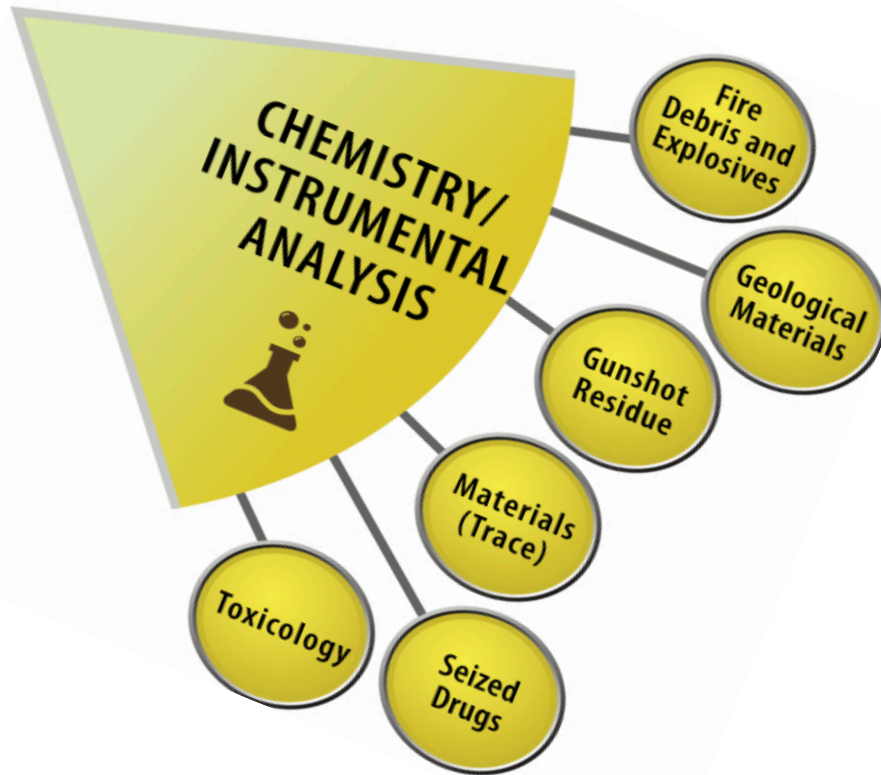
**Seized Drugs: 5 standards**

**Gunshot residue: 5 standards**

**Geological Materials: 3 standards**



# Chemistry SAC Activities 2019-2020



**38 standards under development (drafted) within the OSAC but not yet publicly available.**

**Fire Debris and Explosives Analysis: 14 standards**

**Materials (Trace): 11 standards**

**Forensic Toxicology: 4 standards**

**Seized Drugs: 4 standards**

**Gunshot Residue: 3 standards**

**Geological Materials: 2 standards**

**36 additional standards have been proposed but not yet drafted:**

Geological materials: 11 proposed

Fire Debris and Explosives Analysis: 8 proposed

Materials (Trace): 6 proposed

Forensic Toxicology: 6 proposed

Seized Drugs: 4 proposed

GSR: 1 proposed

**OSAC Registry: 12**

**Currently in Registry Approval: 6**

**Published by SDO: 35**

**Sent to SDO (Approved by SAC): 35**

**Drafted and under development: 38**

**Proposed (not yet drafted): 36**

**Total: 162**

# Subcommittee Organizational Priorities / Accomplishments

## Seized Drugs:

### Accomplishments:

1. Published three ASTM Revision Standards at SDO level, which included their conversion from Standard Guides to Practices:

*E1968-19 Standard Practice for Microcrystal Testing in Forensic Analysis for Cocaine*

*E1969-19 Standard Practice for Microcrystal Testing in Forensic Analysis for Methamphetamine and Amphetamine*

*E2125-19 Standard Practice for Microcrystal Testing in Forensic Analysis for Phencyclidine and Its Analogues*

2. The handling of five standards at the ASTM SDO level during this period.

*Standard Guide for The Development of EI-Mass Spectral Libraries for the Analysis of Seized Drugs*

*Standard Guide for Intra-laboratory Blind Quality Control Programs for Seized Drug Analysis*

*Annex to E2917 – Practice for Forensic Science Practitioner Training, Continuing Education, and Professional Development Programs*

Continuing the ASTM Ballot Process for two standards:

*WK65067 New Standard Guide for Assessment of Gas Chromatography and Electron Ionization Mass Spectrometry Data During the Qualitative Analysis of Seized Drugs*

*Revision of E2764-11 Standard Practice for Uncertainty Assessment in the Context of Seized-Drug Analysis*

3. The Seized Drugs Subcommittee partnered with Collaborative Testing Services (CTS) to conduct inter-laboratory studies, starting with a series of surveys to gather information on current practices from forensic service providers that will assist in our task of establishing minimum standards and guidelines. Four surveys have been created dealing with microcrystalline testing and GC-EI-MS assessments. The first survey addressing the assessment of GC and EI-MS data in qualitative seized drug analysis went live on August 2020 with the respective CTS drug analysis test.

# Subcommittee Organizational Priorities / Accomplishments

## Seized Drugs:

### Priorities:

#### **1. Test method - Analytical Scheme for the Differentiation of Marijuana and Hemp in Seized Drug Analysis**

With the revision of the Farm Bill in 2018, forensic science providers have had to develop and validate methods to distinguish Marijuana from Hemp and determine if the THC content is above 0.3%.

Task group members met with other partners to evaluate options for collaborations, such as the NIST CannaQAP project that was just starting and other researchers working on interlaboratory studies, such as the one in Texas. The task group decided to formulate a survey to collect information (e.g. are tests being conducted using decision points, are forensic science providers reporting a numerical value with an associated uncertainty). The task group has met eight times and communicated numerous times via emails over the last four months. A survey has been drafted and will be distributed to the forensic community.

#### **2. Standard Guide for Assessment of Fourier Transform Infrared (FTIR) Spectroscopy Data During the Qualitative Analysis of Seized Drugs**

The subcommittee has prioritized the completion of this new document and worked on this during the all-hands meeting in March of 2020. The document, in its final draft was balloted in August at the Subcommittee level and it passed to move to the SAC for a vote to go to ASTM.

#### **3. Revision of E2549 Practice for Validation of Seized Drug Analytical Methods**

The Seized Drugs Subcommittee collaborated with the Fire Debris and Explosives Subcommittee to form an interdisciplinary task group to revise this standard and create a multi-discipline overarching standard.

# Subcommittee Organizational Priorities / Accomplishments

## Forensic Toxicology:

### Accomplishments:

1. 2 Documents on the OSAC Registry
2. 3 Documents completed Public Comment Period at ASB
3. 1 Document closes public comment period at ASB
4. Three OSAC drafted standards are in the public comment adjudication phase at the ASB

Standard 055: *Standard for Breath Alcohol Measuring Instrument Calibration*

Standard 098: *Standard for Mass Spectral Data Acceptance in Forensic Toxicology*

Standard 113: *Standard for Identification Criteria in Forensic Toxicology*

5. Four OSAC drafted standards have successfully passed the Subcommittee ballot and are awaiting the OSAC 2.0 process (next step = STRP)

Guidelines for Performing Alcohol Calculations in Forensic Toxicology

Standard for the Minimum Content of Forensic Toxicology Procedures

Standard Practices for Proficiency Testing for Forensic Toxicology Laboratories

Guidelines for Specimen Collection and Preservation for Forensic Toxicology

# Subcommittee Organizational Priorities / Accomplishments

## Forensic Toxicology:

### Priorities:

1. Standard for Estimation of Measurement Uncertainty in Forensic Toxicology Laboratories - (Final) Draft document sent to Subcommittee for review
2. Standard for Breath Alcohol Instrument Specifications - (4th) Draft document sent to Subcommittee for review - Task Group to adjudicate comments
3. Standard for Education, Training, and Competency of Forensic Toxicology Personnel - Task Group formed in March 2020
4. Standard Method for Blood Ethanol Identification and Quantitation in Forensic Toxicology Laboratories - Task Group formed in March 2020
5. Anticipated action over the next year - adjudicate STRP comments, then public comments  
Guidelines for Performing Alcohol Calculations in Forensic Toxicology  
One of the 4 documents selected for the STRP pilot program
6. Future documents on the Toxicology Roadmap  
Quality Assurance Management Systems in Forensic Toxicology Laboratories  
Standard Method for Breath Alcohol Subject Testing



# Subcommittee Organizational Priorities / Accomplishments

## Fire Debris and Explosives Analysis:

### Accomplishments:

1. Four ASTM Standards completed OSAC Open Comment Period

2. Two new standards created by the FD&E subcommittee recently became ASTM standards –

*E3245-20 Standard Guide for the Systematic Approach to the Extraction, Analysis, and Classification of Ignitable Liquids and Ignitable Liquid Residues in Fire Debris Samples – drafting documents to submit for registry approval*

*E3197-20 Standard Terminology Relating to Examination of Fire Debris*

3. Documents currently in ballot at ASTM

*Revision to E2451-13 Preserving Ignitable Liquids and Ignitable Liquid Residue Extracts from Fire Debris Samples*

*WK67862 Standard Practice for the Forensic Examination and Identification of Intact Explosives*

*WK73117 Standard Practice for a Forensic Explosives Analysis Training Program*

*WK56998 Standard Terminology Relating to the Examination of Explosives*

*WK73482 Standard Practice for Reporting Results and Opinions of Ignitable Liquids Analysis*

*WK73484 Standard Practice for Reporting Results and Opinions of Explosives Analysis*

*WK73923 Standard Guide for the Forensic Examination and Identification of Explosive Residues*

4. Four (4) additional documents in process within the FD&E subcommittee

# Subcommittee Organizational Priorities / Accomplishments

## Fire Debris and Explosives Analysis:

### Priorities:

#### **1. Fire Debris - Interpretation and Classification of Gas Chromatography - Electron Ionization Mass Spectrometry Data for the Identification of Ignitable Liquids**

Restructuring and revising ASTM E1618 is our highest priority. Currently E1618 lists very cursory information regarding the identification of ignitable liquids. There is little to no information regarding interpreting fire debris data that includes complex matrices. Additionally, some of the information in E1618 is outdated or not validated.

#### **2. Explosives - Standard Guide for the Forensic Examination and Identification of Explosive Residues**

This document was drafted, approved by the subcommittee and approved by the SAC and has been submitted to ASTM as WK73923.

#### **3. Fire Debris - Standard Practice for Validation of Methods for Analysis of Ignitable Liquids(s)/Residues**

A joint task group was formed with the Seized Drugs Subcommittee to edit ASTM 2549, Validation of Seized-Drug Analytical Methods, into Standard Practice for Validation and Verification of Analytical Methods for Forensic Science Service Providers Performing Forensic Chemistry Analysis. This will serve as an over-arching validation document. This revised document is drafted and is in the FDE subcommittee for comment prior to drafting the Ignitable Liquid Annex.

#### **4. Explosives - Standard Practice for Validation of Methods for Analysis of Explosives**

A joint task group was formed with the Seized Drugs Subcommittee to edit ASTM 2549, Validation of Seized-Drug Analytical Methods, into Standard Practice for Validation and Verification of Analytical Methods for Forensic Science Service Providers Performing Forensic Chemistry Analysis. This will serve as an over-arching validation document. This revised document is drafted and is in the FDE subcommittee for comment prior to drafting the Explosives Annex.

# Subcommittee Organizational Priorities / Accomplishments

## Materials (Trace):

1. Interlab study to test the Interpretation guide: virtual training session held, 90 participants completed exercise. Next steps are data analysis, study design and preliminary results presented at ASTM virtual meeting in October, publishing results in a peer-reviewed journal, and submitting the informed, resulting guide to an SDO.
2. Interdisciplinary Crime Scene guide content completed, approved, and posted to website. Funding has been secured to turn the content into a mobile-device app for use by crime scene personnel to recognize and properly collect trace evidence. A pilot version of the app is expected by June, 2021.
3. A Physical Fit TG was formally established with multi-SAC/SC participation and as a result of a public survey of forensic science practitioners, TG priorities have been established. The first priority is the drafting of an overarching guide to physical fit examinations.
4. An Interlaboratory study on microscopical hair comparisons was accepted for publication in JFS.
6. The SC continues to oversee balloting of 11 standards @ ASTM: 1 Glass (Overarch Guide), 2 Hair (Training and Examination), 4 Fiber (IR, Microscopy, TLC, and Fabrics/Cordage), 4 Polymer (Overarch Tape Guide, SEM of Polymers, XRF of Polymers, MSP of Polymers)
7. Drafts are ongoing for the remaining overarching guides, training guides, and continued methodology guides for all TGs where these are not yet drafted (e.g., Glass training guide, Fiber overarching and training guides, Physical Match training guide)
8. The Glass TG conducted an interlaboratory study on intensity ratios for use in XRF of glass comparisons with the potential to update ASTM E2926 and has submitted the results of an interlaboratory study on interpretation of glass analysis via XRF analysis to a peer-reviewed journal.

# Subcommittee Organizational Priorities / Accomplishments

## Gunshot Residue:

### Accomplishments:

1. ASTM E1588 (Standard Practice for Gunshot Residue Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry) has passed ASTM ballot.
2. The Subcommittee is adjudicating negative votes from ASTM on the following documents:  
WK69622 Standard Practice for Reporting of Primer Gunshot Residue (pGSR) by SEM/EDS  
WK72526 Standard Practice for Expert Opinions on the Interpretation of pGSR Analysis  
WK58547 Standard Practice for Training in the Forensic Examination of GSR using SEM/EDS
3. The Subcommittee is drafting three documents for analysis of organic gunshot residue (O-GSR): collection and preservation of O-GSR, analysis of O-GSR by GC/MS, and analysis of O-GSR by LC/MS.
4. The Subcommittee has begun working with EDS vendors and NIST analysts on utilizing the capabilities of current EDS's to identify/eliminate particles as pGSR. We are evaluating the viability of programming the instrumentation to utilize the EDS k-ratios to classify particles as pGSR. This will reduce human factors bias, and also increase efficiency of pGSR analysis.

### Priorities:

1. Once published, advance ASTM pGSR documents onto the OSAC Registry.
2. Begin updating ASTM E1588 from a Standard Practice to a Standard Test Method.
3. Begin inter-laboratory study on analysis of O-GSR components using drafted standards
4. Perform a domestic study on the prevalence of pGSR particles on the hands of individuals not associated to a shooting event.
5. Develop a robust automated analysis classification scheme for identifying pGSR particles.

# Subcommittee Organizational Priorities / Accomplishments

## Geological Materials:

### Accomplishments:

1. Standard Guide for Determination and Comparison of Color by Visual Observation in Forensic Soil Examination (ASTM Work Item Number: WK70035) passed out of the E30.01 subcommittee and E30 votes currently being adjudicated.
2. Standard Guide for Analysis of Forensic Geological Materials by Powder X-Ray Diffraction (ASTM Work Item Number: WK72827) was submitted to ASTM and balloted in the E30.01 subcommittee. Votes being adjudicated
3. Standard Guide for Collection of Soils and Other Geological Evidence for Criminal Forensic Applications (ASTM Work Item Number: WK70187) was balloted in the E30.11 subcommittee. Votes are being adjudicated and we hope to re-ballot soon.

### Priorities:

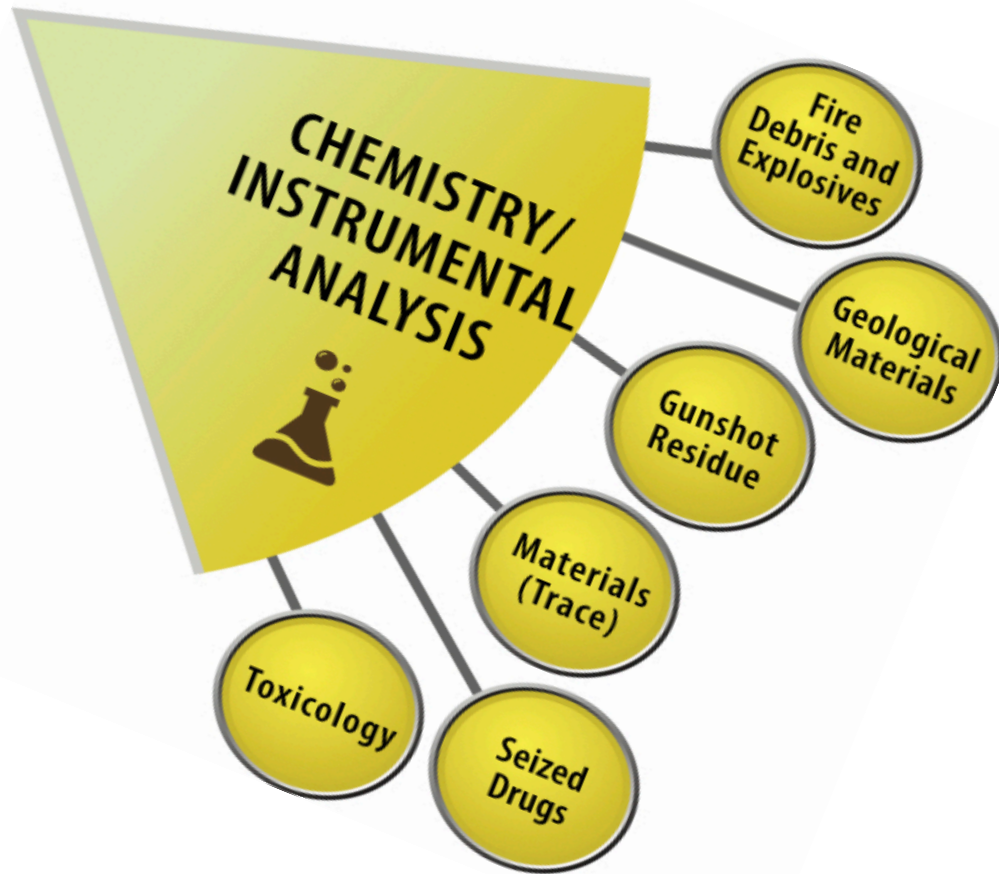
1. Get the three ASTM work products (see above) through the ASTM process.
2. Draft an overarching guide to forensic soil examination (Standard Guide for the Forensic Analysis of Soils and Geological Materials); significant portions of this document have been drafted but a considerable amount of work remains.
3. Draft new documents for specific steps/instruments that are part of the forensic soil examination process. Several of these are already drafted but in their early stages (e.g., Standard Guide for Polarized Light Microscopy of Soils and Geological Materials for Forensic Applications and Standard Guide for SEM/EDS Analysis of Soils and Geological Materials for Forensic Applications).

# Other Work Products / Promote Implementation

1. The GEO Subcommittee produced a video demonstrating how to collect soil evidence at crime scenes. This video is intended to supplement the guide that is currently in the ASTM process. Creation of the video involved collaboration between OSAC, the University of Kentucky, the FBI, and the International Union of Geological Sciences (IUGS) Initiative on Forensic Geology (IFG). Several OSAC members dedicated a week of their time to the project. The resulting video is currently hosted on the UK YouTube channel. The IUGS IFG has offered funding to add foreign language subtitles to the video to help distribute it to an international audience.
2. A collaboration between the Materials (Trace) SC and the Crime Scene Investigation SC resulted in a Technical Publication published on the SC website ([Trace Materials Crime Scene Investigation Guide](#)) and is planned to be converted to an app for distribution to crime scene investigation personnel.
3. Numerous interlaboratory exercises ongoing within several SCs.



# Research and Development Needs Identified



**Seized Drugs - 2 projects identified**

**Fire Debris and Explosives Analysis - 7 projects identified**

**Geological Materials - 6 project identified**

**Materials (Trace) - 7 projects identified**

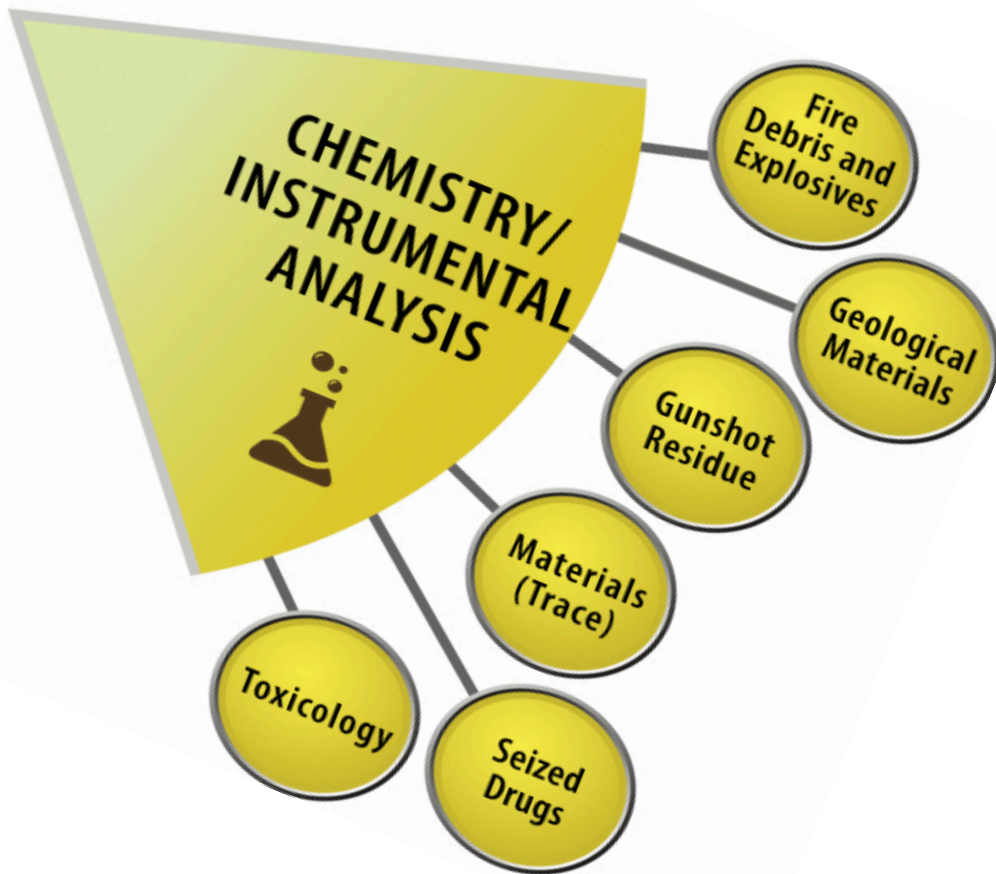
**Gunshot Residue - 6 projects identified**

**Toxicology - 9 projects identified**

**Total – 37 specific research projects identified by the  
Chemistry and Instrumental Analysis SAC**

<https://www.nist.gov/topics/forensic-science/osac-research-development-needs>

# Research and Development Needs Identified



## Seized Drugs

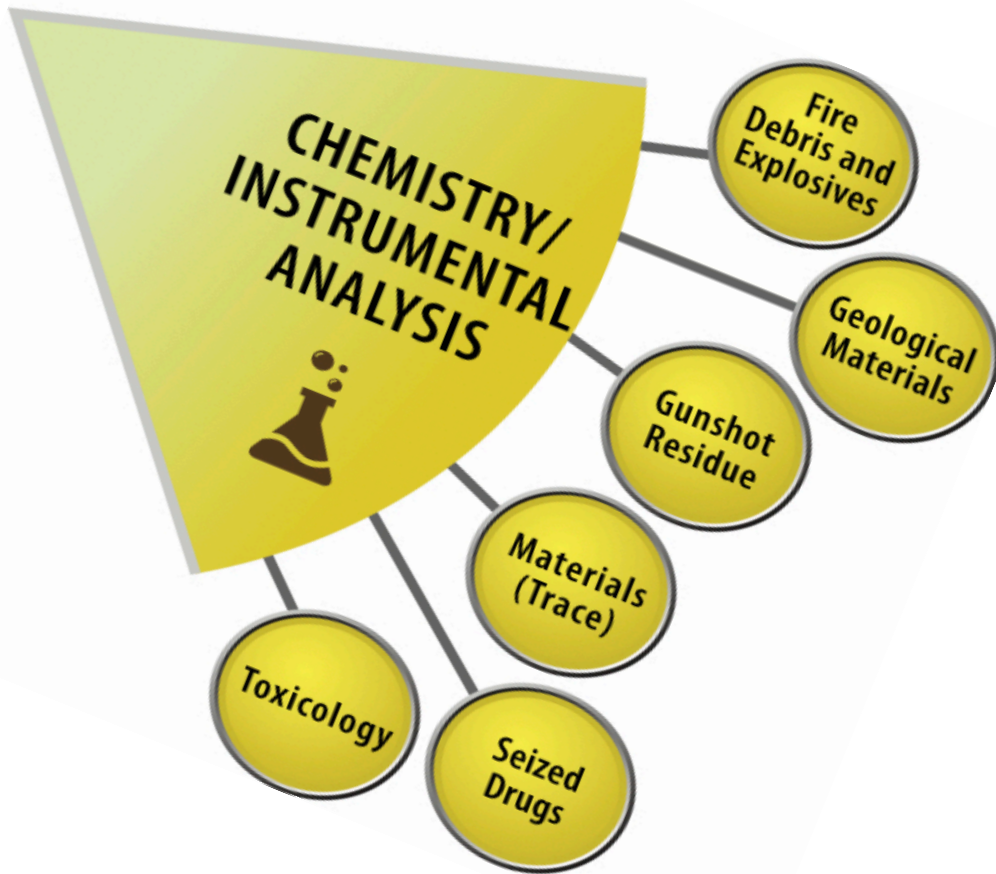
- [1. Acceptance Criteria for Instrumental Data Related to Qualitative Seized Drug Analysis](#)
- [2. Error Rates in Qualitative Methods of Analysis](#)

## Toxicology

- [1. Alternative Matrices](#)
- [2. Cannabinoids](#)
- [3. Data Analytics in Forensic Toxicology](#)
- [4. Emerging Drugs of Abuse and Therapeutic Agents](#)
- [5. Herbal and Dietary Supplements and Plant-Based Toxins](#)
- [6. Human Factors Toxicology](#)
- [7. Laboratory Automation](#)
- [8. Postmortem Distribution and Redistribution](#)
- [9. The Role and Impact of Pharmacogenetics and Pharmacogenomics in Forensic Toxicology](#)

<https://www.nist.gov/topics/forensic-science/osac-research-development-needs>

# Research and Development Needs Identified

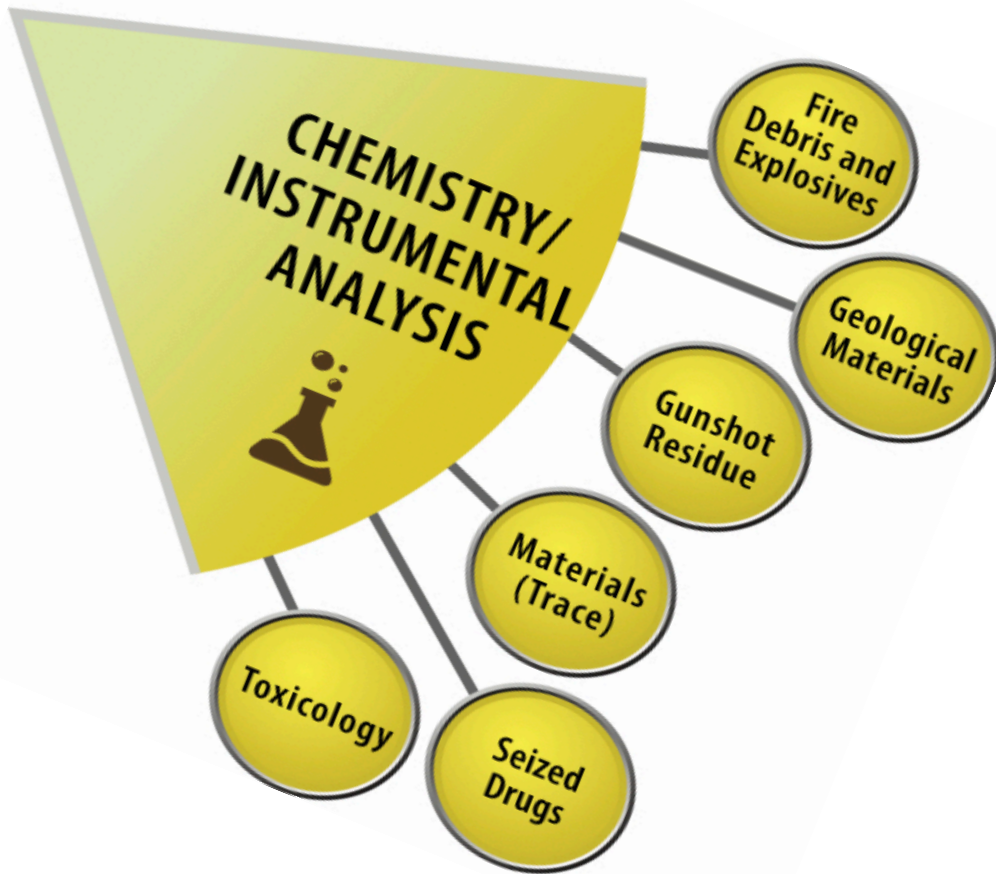


## Fire Debris & Explosives Analysis

- [1. Concentration of Extracts Containing Volatile/Unstable Explosives](#)  
[Determining the Threshold of Identification for Ignitable Liquids](#)
- [2. Evaluation and Comparison of Different Adsorption/Elution Methodology](#)
- [3. Identifying Post-blast Residue of Liquid Explosives](#)
- [4. Potential Transformation of Chlorate to Perchlorate and Visa-Versa During Explosion](#)
- [5. Research and Evaluation of Storage Conditions for Archiving Extracts from Fire Debris Samples](#)
- [6. Source Attribution for Ignitable Liquids from Fire Debris](#)
- [7. Source Attribution for Post-Blast Residues](#)

<https://www.nist.gov/topics/forensic-science/osac-research-development-needs>

# Research and Development Needs Identified



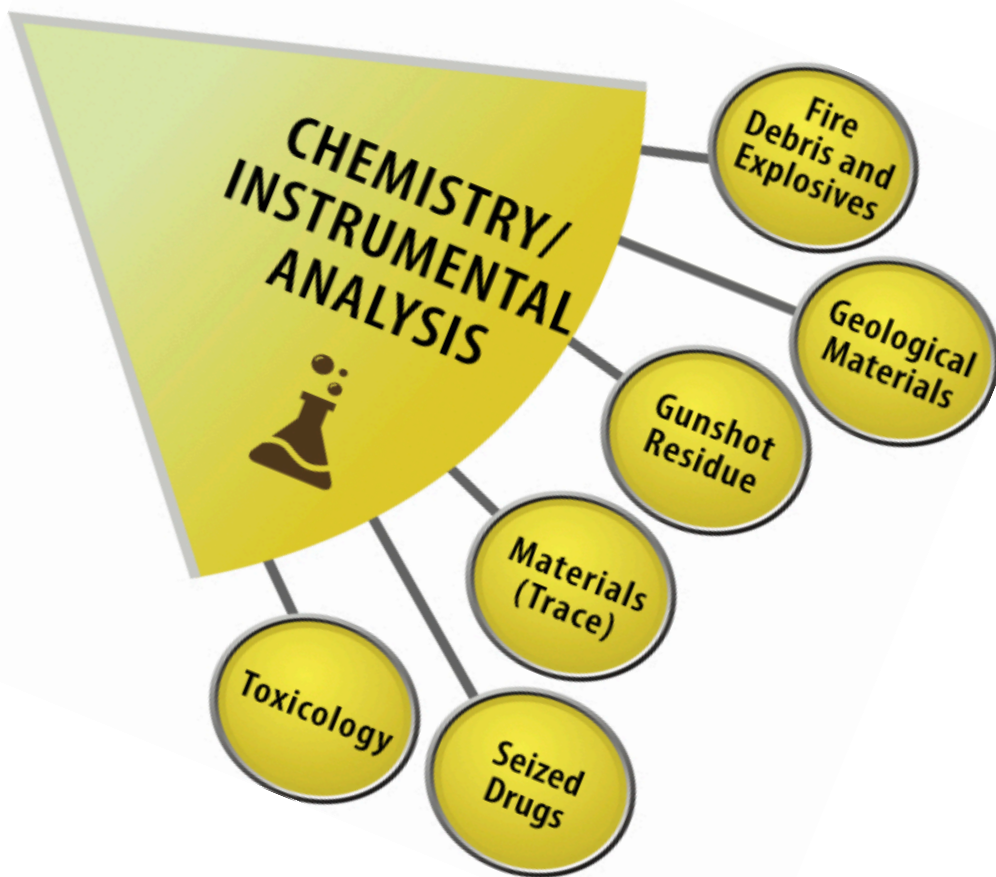
## Geological Materials

- [1. Assessing Heterogeneity of Soils](#)
- [2. Assessing the Suitability of Existing Resources from the Geology and Soil Science Communities to Supplement Forensic Geology Interpretations of Soil Mineralogy \(XRD and/or PLM\)](#)
- [3. Sample Size Limit for Visual Soil Color Determination](#)
- [4. Suitability of Color Contract Classes for Forensic Soil Comparisons](#)
- [5. Surficial Distribution of Airborne Particles from Point Sources](#)
- [6. Transfer and Persistence of Soils](#)

<https://www.nist.gov/topics/forensic-science/osac-research-development-needs>



# Research and Development Needs Identified



## Materials (Trace)

1. Assessment of Criteria for Meaningful Differences in Trace Materials Comparative Data

2. Assessment of the value of activity level factors during investigative processes and interpretation of glass evidence

3. Cross-validation of current and new micro-XRF technology for the forensic analysis of modern glass

4. Development of an Integrated and Multidisciplinary Approach for the Advancement of Data Collection, Data Management and Data Analysis to Aid Interpretation of Trace Evidence

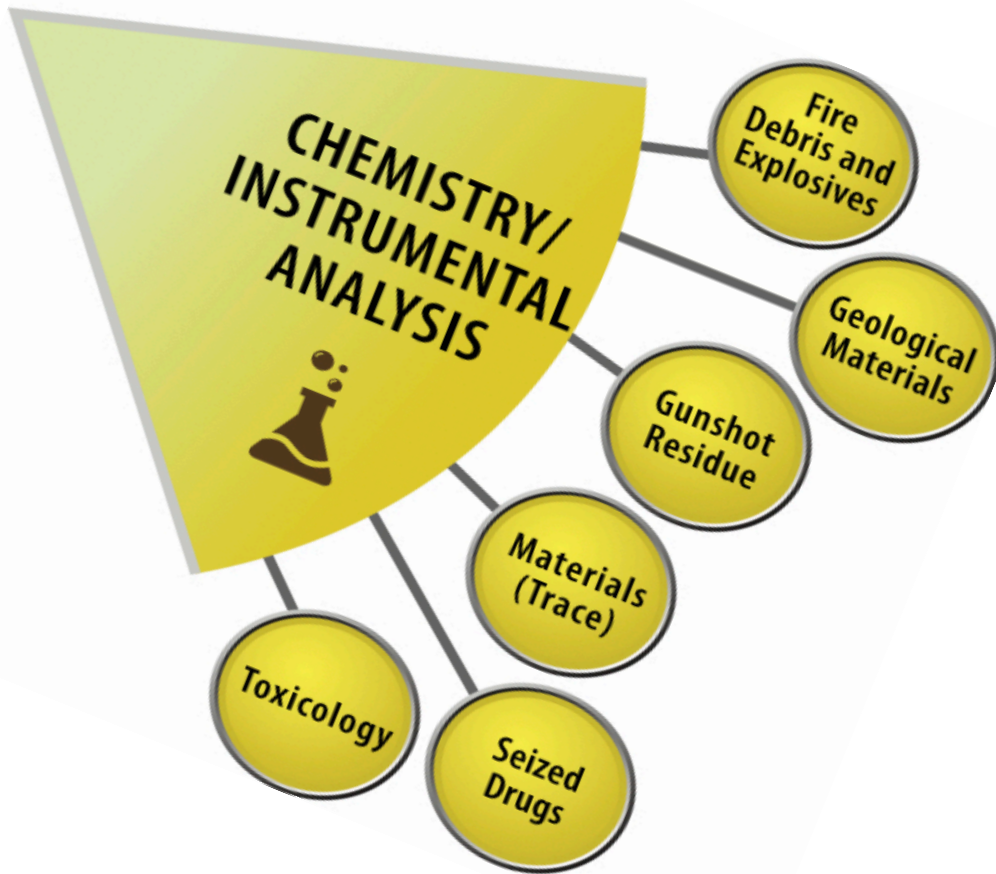
5. Development of Quantitative Assessment and Evaluation of Error Rates in Physical Fit Determinations of Trace Materials

6. Evidence of Combined Information Value of Microscopic Comparisons and Mitochondrial DNA Analysis for Hair Examinations

7. Validation of the Suitability of Standard Practice for Interpretation and Report Writing in Forensic Comparisons of Trace Materials

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# Research and Development Needs Identified



## Gunshot Residue

1. Prevalence of Characteristics and Consistent Particles
2. Comprehensive Feasibility of Organic Gunshot Residue Analysis
3. Comprehensive GSR Persistence Study
4. Development of Characterized Reference Stubs
5. Fundamental Research into Mechanism of Particle Formation
6. Specific Identification of Shooters

<https://www.nist.gov/topics/forensic-science/osac-research-development-needs>





# OSAC

Organization of Scientific Area  
Committees for Forensic Science

Thank you – [almirall@fiu.edu](mailto:almirall@fiu.edu)

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