OSAC

Organization of Scientific Area Committees for Forensic Science

Chemistry/Instrumental Analysis Scientific Area Committee

Jose Almirall, Chair

Chemistry/ Instrumental Analysis SAC Leadership

Jose Almirall, **Ph.D.** Chair

Professor, Chemistry and Biochemistry and Director, Center for Advanced Research in Forensic Science - Florida International University

Vacant, Vice Chair

Chris Taylor, Executive Secretary, Defense Forensic Science Center, U.S. Army Criminal Investigation Laboratory

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

Susan Seebode Hetzel, Chair, ***Fire Debris and Explosives Analysis***, S-E-A, Ltd

Marc LeBeau, **Ph.D.,** Chair, ***Toxicology***, U.S. Federal Bureau of Investigation

Sandra Rodriguez-Cruz, **Ph.D.,** Chair, ***Seized Drugs***, U.S. Drug Enforcement Administration

Rodney Simmons, Chair, ***Gunshot Residue***, Wyoming State Crime Laboratory,

Diana Wright, **Ph.D.,** Chair, ***Materials (Trace)***, FBI Laboratory

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Chemistry/ Instrumental Analysis SAC Members and Liaisons

Patrick Buzzini, Ph.D., Sam Houston State University

Carl Chasteen, State of Florida, Division of State Fire Marshall

Stephen Morgan, Ph.D., University of South Carolina

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

Cedric Neumann, Ph.D., South Dakota State University

Scott Oulton, U.S. Drug Enforcement Administration

Ex-Officio Members - **Hal Arkes, Ph.D.**, Emeritus Professor of Psychology, Ohio State University (HFC)

Vacant, (LRC)

Bruce Houlihan, Director, Orange County Crime Laboratory/Orange County Sheriff-Coroner, Representative to Chemistry/Instrumental Analysis SAC (QIC)

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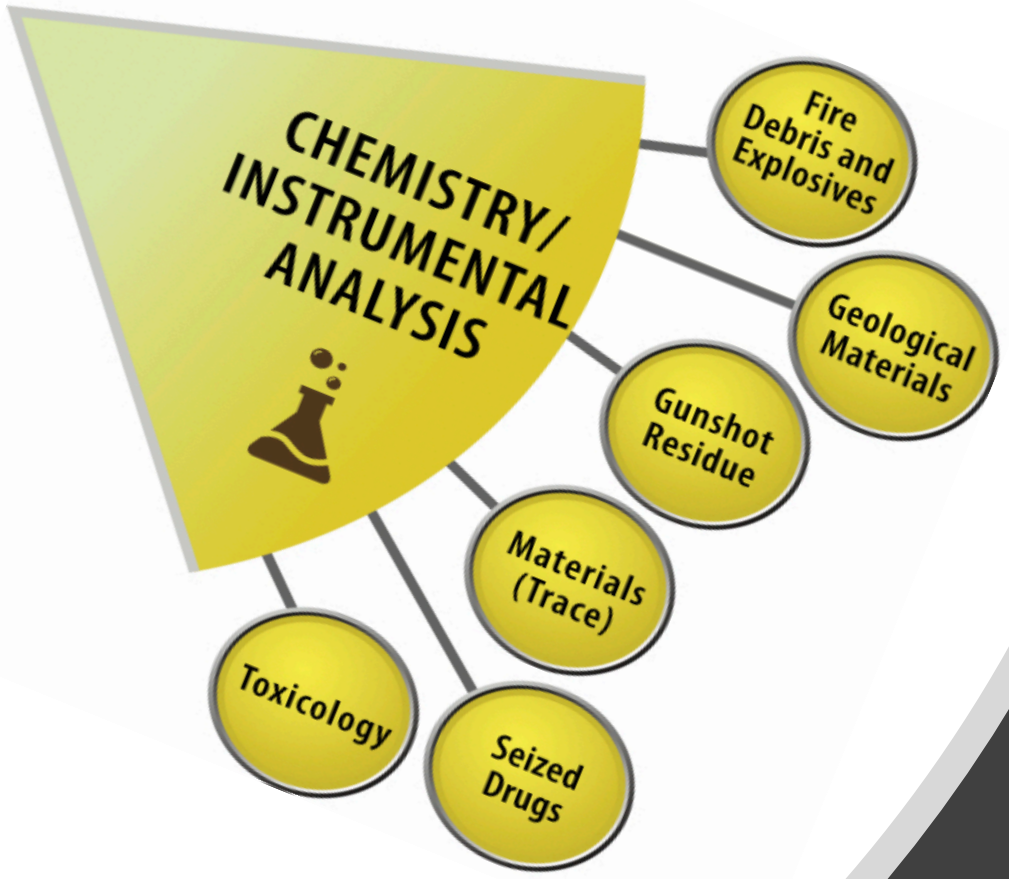

SAC 'Mission'

Review and Approve

Provide Guidance and Direction

Coordinate overlapping activities

Raise Awareness / Implementation

SAC Mission and Responsibilities

Review and approve standards, technical reports, and research needs

- Process already exists
- Provide feedback to OSAC to improve the process
- Use the structure of OSAC to interact and communicate*

Provide guidance and direction to subcommittees (e.g., whether a standard should be a guide, practice or test method)

- Provide high-level goals to the subcommittees
- Provide technical advice to assist with SC activities
- Be able to ask the hard questions at any stage during the entire process
- Advising on fit-for-purpose nature of a technique (e.g., setting minimum detection limits for methods)

Provide coordination for overlapping disciplines (i.e., champion development of overarching documents)

- Facilitating development of cross-disciplinary standards
- Minimum performance for instruments
- Quality (e.g., PT TG)
- Education & Training
- Research (e.g. Technical Issues TG)
- Use of statistics and interpretation
- Reporting language

Raise Awareness and Foster implementation of Standards

- Outreach through formal communications and information dissemination (conferences, publications, etc.)
- Identify opportunities for implementation
- Champion implementation pathways

* D. Kaye, Hypothesis Testing in Law and Forensic Science: A Memorandum**, 130,** *Harvard Law Review,* F. 127.

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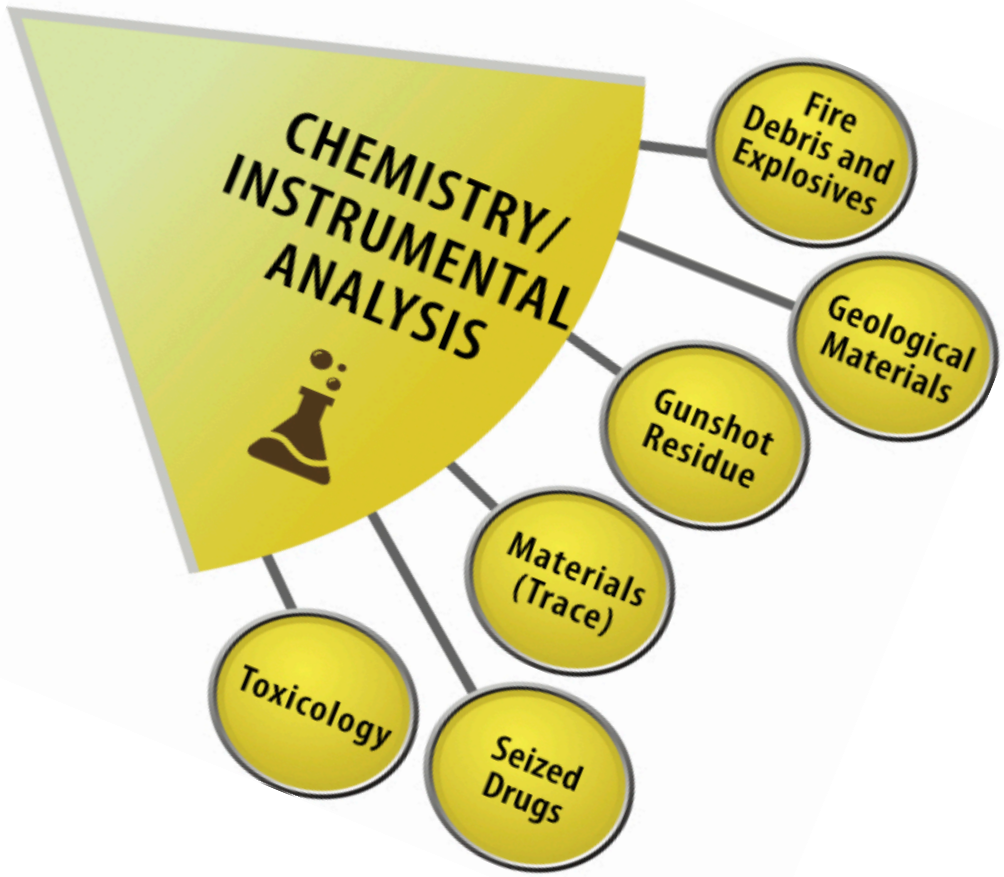
Chemistry SAC Activities 2018-2019



Recognize existing (SDO) standards and develop new standards within the forensic chemistry disciplines:

- Seized Drugs - 10 existing ASTM and 7 new standards
- Fire Debris and Explosives - 10 existing ASTM and 10 new
- Geological Materials – working on 8 new standards
- Materials (Trace) - 13 existing ASTM and 9 new
- Gunshot Residue - 1 existing ASTM and 3 new
- Toxicology - 15 ASB standards (from 0 in 2016)

Total – 49 existing SDO standards (35 in 2017)

37 (26 in 2017) new standards in SDOs

80+ forensic chemistry standards in SDOs

~ 40 Additional standards in development within the Chemistry and Instrumental Analysis subcommittees.

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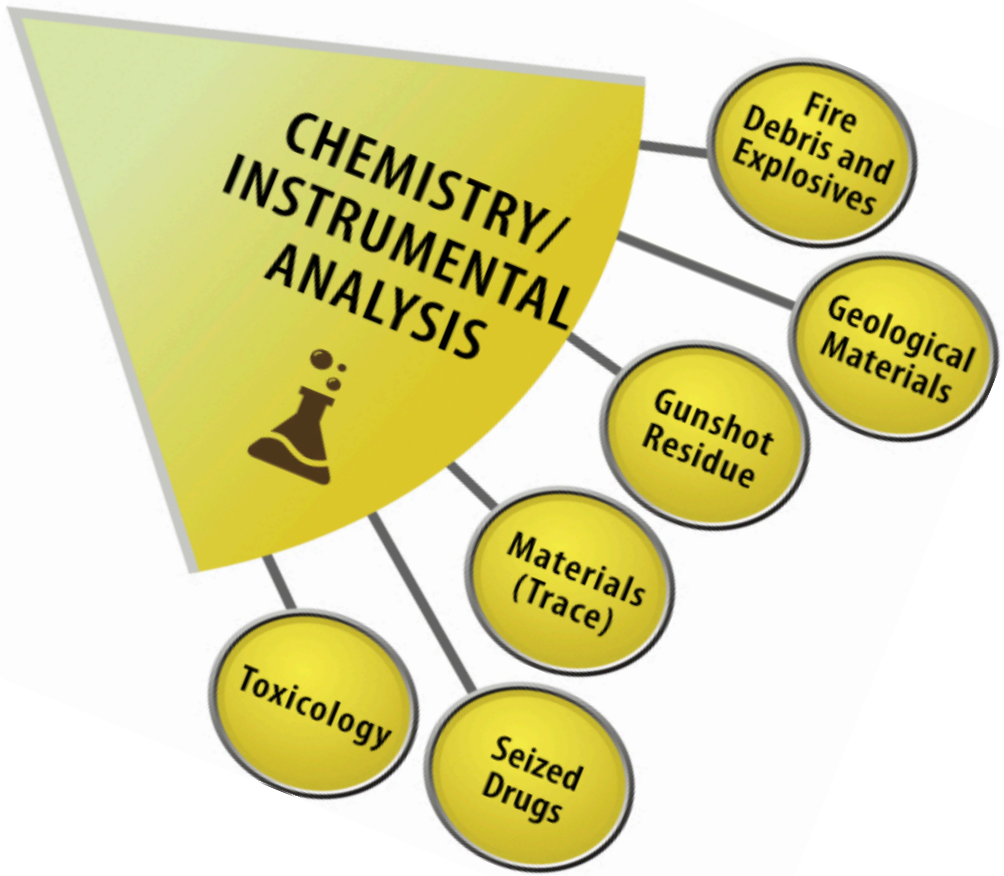
Research and Development Needs Identified



Seized Drugs - 2 projects identified
Fire Debris and Explosives Analysis - 8 projects identified
Geological Materials - 1 project identified
Materials (Trace) - 6 projects identified
Gunshot Residue - 5 projects identified
Toxicology - 6 projects identified

Total – 28 specific research projects identified by the Chemistry and Instrumental Analysis SAC

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

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Standards on the Registry

ASTM E1610-18: Standard Guide for Forensic Paint Analysis and Comparison (Materials Trace Subcommittee, June 26, 2018)

ASTM E2926-17: Standard Test Method for Forensic Comparison of Glass Using Micro X-ray Fluorescence (μ-XRF) Spectrometry (Materials Trace Subcommittee, July 31, 2017)

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 (Materials Trace Subcommittee, June 5, 2018)

ASTM E2937-18: Standard Guide for Using Infrared Spectroscopy in Forensic Paint Examinations (Materials Trace Subcommittee, June 26, 2018)

ASTM E3085-17: Standard Guide for Fourier Transform Infrared Spectroscopy in Forensic Tape Examinations (Materials Trace Subcommittee, September 11, 2018)

ASTM E2329-17: Standard Practice for Identification of Seized Drugs (Seized Drugs Subcommittee, August 7, 2018)

ASTM E2548-11e1: Standard Guide for Sampling Seized Drugs for Qualitative and Quantitative Analysis (Seized Drugs Subcommittee, April 3, 2017)

Coming Soon!

- ANSI/ASB STD 017: Standard Practices for Measurement Traceability in Forensic Toxicology (Toxicology Subcommittee, Published 6/2018)

- ANSI/ASB BPR 037: Guidelines for Opinions and Testimony in Forensic Toxicology (Toxicology Subcommittee, Published 1/2019)

Standards in Process – at SDO

Toxicology:

- ANSI/ASB STD 036: Standard Practices for Method Validation in Forensic Toxicology
- ANSI/ASB STD 053: Standard for Report Content in Forensic Toxicology
- ANSI/ASB STD 054: Standard Practices for a Quality Control Program in Forensic Toxicology Laboratories
- ANSI/ASB STD 055: Standard for Breath Alcohol Measuring Instrument Calibration
- ANSI/ASB STD 098: Standard for Mass Spectral Data Acceptance in Forensic Toxicology

Standards in Process – at SDO

Toxicology:

- ANSI/ASB STD 113: Standard for Identification Criteria in Forensic Toxicology
- ANSI/ASB STD 119: Standard for the Analytical Scope and Sensitivity of Forensic Toxicological Testing in Medicolegal Death Investigations
- ANSI/ASB STD 120: Standard for the Analytical Scope and Sensitivity of Forensic Toxicological Testing in Impaired Driving Investigations
- ANSI/ASB STD 121: Standard for the Analytical Scope and Sensitivity of Forensic Toxicology Urine Testing in Drug-Facilitated Crimes Investigations

Standards in Process – Under Development

Toxicology:

- Quality Assurance Management Systems in Forensic Toxicology Laboratories
- ASB/ANSI STD 056: Standard Practices for Measurement Uncertainty in Forensic Toxicology
- Standard Practices for Proficiency Testing of Forensic Toxicology Laboratories
- Guidelines for Specimen Collection and Preservation in Forensic Toxicology
- ANSI/ASB STD 118: Standard for Breath Alcohol Instrumentation Specifications
- Standard Practice for the Content of Forensic Toxicology Standard Operating Procedures

Standards in Process – Under Development

Toxicology:

- Standard Practice for the Content of Forensic Toxicology Standard Operating Procedures
- ANSI/ASB BPR 122: Guidelines for Ethanol Calculations in Forensic Toxicology
- Taxonomy Guidelines in Forensic Toxicology

Foundational Documents

Toxicology:

- Scientific Working Group for Forensic Toxicology (SWGTOX) Standard for Laboratory Personnel
- Scientific Working Group for Forensic Toxicology (SWGTOX) Standard for Breath Alcohol Personnel

Research Needs

Toxicology:

- Data Analytics in Forensic Toxicology
- Emerging Drugs of Abuse and Therapeutic Agents
- Herbal and Dietary Supplements and Plant-Based Toxins
- Human Factors Toxicology
- Postmortem Distribution and Redistribution
- The Role and Impact of Pharmacogenetics and Pharmacogenomics in Forensic Toxicology

Outreach Efforts

Toxicology:

- Society of Forensic Toxicologists
- American Academy of Forensic Sciences
- California Association of Toxicologists
- Midwest Association of Forensic Science
- Northeast Association of Forensic Science
- The International Association of Forensic Toxicologists (China, Argentina, Brazil, Greece)
- Forensic and Clinical Toxicology Association (Australia)
- Health Sciences Authority (Singapore)

Quality

- ANSI/ASB STD 017: Standard Practices for Measurement Traceability in Forensic Toxicology (Published 2018)
- ANSI/ASB STD 036: Standard Practices for Method Validation in Forensic Toxicology
- ANSI/ASB STD 054: Standard Practices for a Quality Control Program in Forensic Toxicology Laboratories
- ANSI/ASB STD 055: Standard for Breath Alcohol Measuring Instrument Calibration
- ANSI/ASB STD XXX: Quality Assurance Management Systems in Forensic Toxicology Laboratories
- ANSI/ASB STD 056: Standard Practices for Measurement Uncertainty in Forensic Toxicology

Personnel

- ANSI/ASB XXX: Standard Practices for Proficiency Testing of Forensic Toxicology Laboratories
- ANSI/ASB XXX: Standard for Education and Training of Forensic Toxicology Personnel
- ANSI/ASB XXX: Standard for Education and Training of Breath Alcohol Personnel

Stakeholders

- ANSI/ASB XXX: Guidelines for Specimen Collection and Preservation in Forensic Toxicology
- ANSI/ASB 118: Standard for Breath Alcohol Instrumentation Specifications
- ANSI/ASB XXX: Forensic Toxicology Guidelines for Accrediting and Certification Bodies

Approved for OSAC Registry
Being considered for OSAC Registry
With ASB for Circulation to Public
Under draft by OSAC Toxicology Subcommittee
Not started

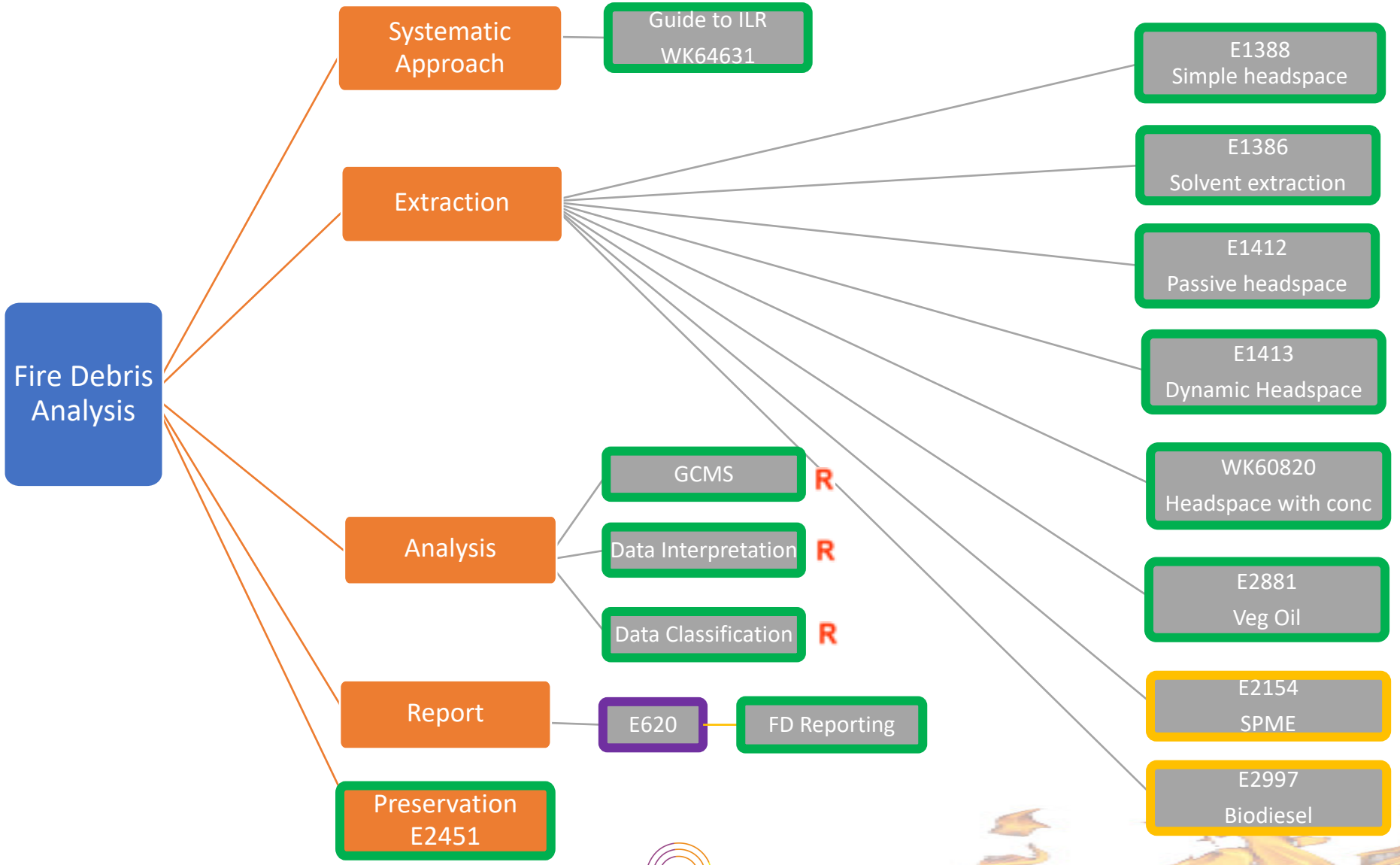
Applications

- ANSI/ASB STD 098: Standard for Mass Spectral Data Acceptance in Forensic Toxicology
- ANSI/ASB STD 120: Standard for the Analytical Scope and Sensitivity of Forensic Toxicology Testing in Impaired Driving Investigations
- ANSI/ASB STD 121: Standard for the Analytical Scope and Sensitivity of Forensic Toxicology Urine Testing in Drug-Facilitated Crimes Investigations
- ANSI/ASB STD 119: Standard for the Analytical Scope and Sensitivity of Forensic Toxicological Testing in Medicolegal Death Investigations
- ANSI/ASB STD 113: Standard for Identification Criteria in Forensic Toxicology
- ANSI/ASB XXX: Standard Practice for the Content of Forensic Toxicology Standard Operating Procedures
- ANSI/ASB STD 058: Standard Method for Blood Ethanol Quantitations
- ANSI/ASB XXX: Standard Method for Breath Alcohol Subject Testing

Report and Testimony

- ANSI/ASB BPR 037: Guidelines for Opinions and Testimony in Forensic Toxicology (Published 2019)
- ANSI/ASB STD 053: Standard for Report Content in Forensic Toxicology
- ANSI/ASB XXX: Taxonomy Guidelines in Forensic Toxicology
- ANSI/ASB BPR 122: Guidelines for Ethanol Calculations in Forensic Toxicology

Fire Debris Analysis



Some work completed

Doc out of our "control"

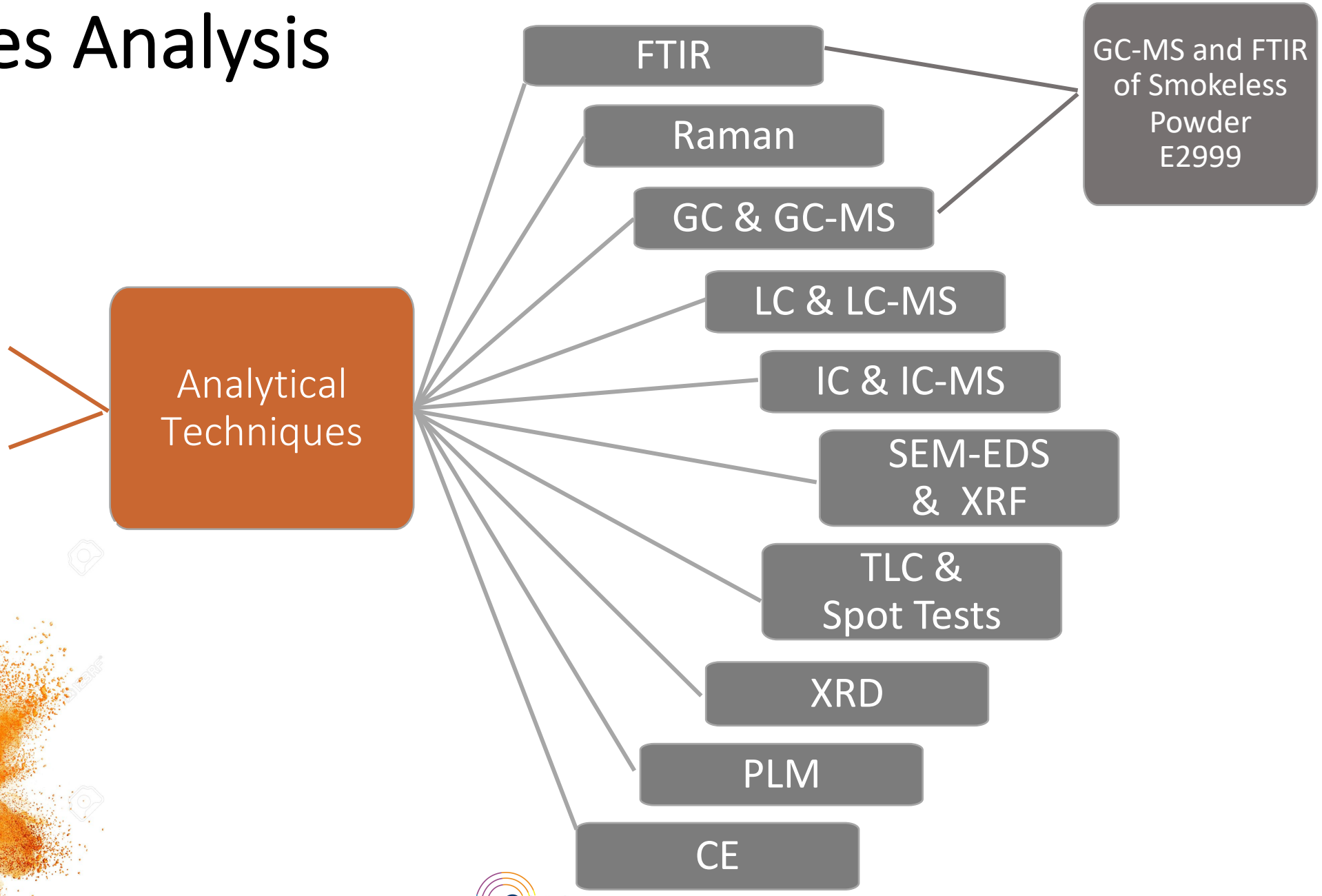
To be determined

R = Needs Further Research

Explosives Analysis

Detail

Explosives Analysis Detail



Explosives Analysis
Detail

Identification Requirements

- Smokeless Powder E2998
- Black Powder, Substitutes, & Fuel Oxidizer Mixtures
- RDX, HMX, TNT, PETN, etc. (Plastic Bonded Explosives)
- Dynamite
- Primary Initiating Explosives (Including Peroxides)
- Blasting Agents (Emulsions, Water Gels, ANFO, Slurries, etc.)

Existing SDO [ASTM] Standards

- E1386 – Sample Prep – Solvent Extraction
- E1388 – Sample Prep – Simple Headspace
- E1412 – Sample Prep – Passive Headspace
- E1413 – Sample Prep – Dynamic Headspace
- E2154 – Sample Prep – SPME

- E1618 – Sample Analysis – Fire Debris by GCMS
- E2997 – Sample Analysis – Biodiesel

- E2451 – Sample Preservation

Fire Debris Related

Many of these have been/are being revised by the FD&E Subcommittee

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Existing SDO [ASTM] Standards

- ASTM E2998 – Characterization – Smokeless Powder
- ASTM E2999 – Sample Analysis – Smokeless Powder by GCMS and FTIR

Explosives Related

Standards in Process – at SDO [ASTM]

- WK56043 – Terminology
- WK60820 – Sample Prep – Headspace onto an Adsorbent Tube
- WK64631 – Guide to Analysis and ID of Ignitable Liquids

Fire Debris Related

Standards in Process – at SDO [ASTM]

- WK56998 – Terminology
- WK67862 – Exam and ID of Intact Explosives

Explosives Related

Standards in Process – Under Development

Fire Debris Related

- Reorganization of E1618;
  - Guide to GC-[EI]MS
  - Classification of Ignitable Liquids
  - Interpretation of Ignitable Liquids by GC-MS
  - Reporting Results and Opinions
- Training Program
- QA/QC for Fire Debris Laboratories

Standards in Process – Under Development

Explosives Related

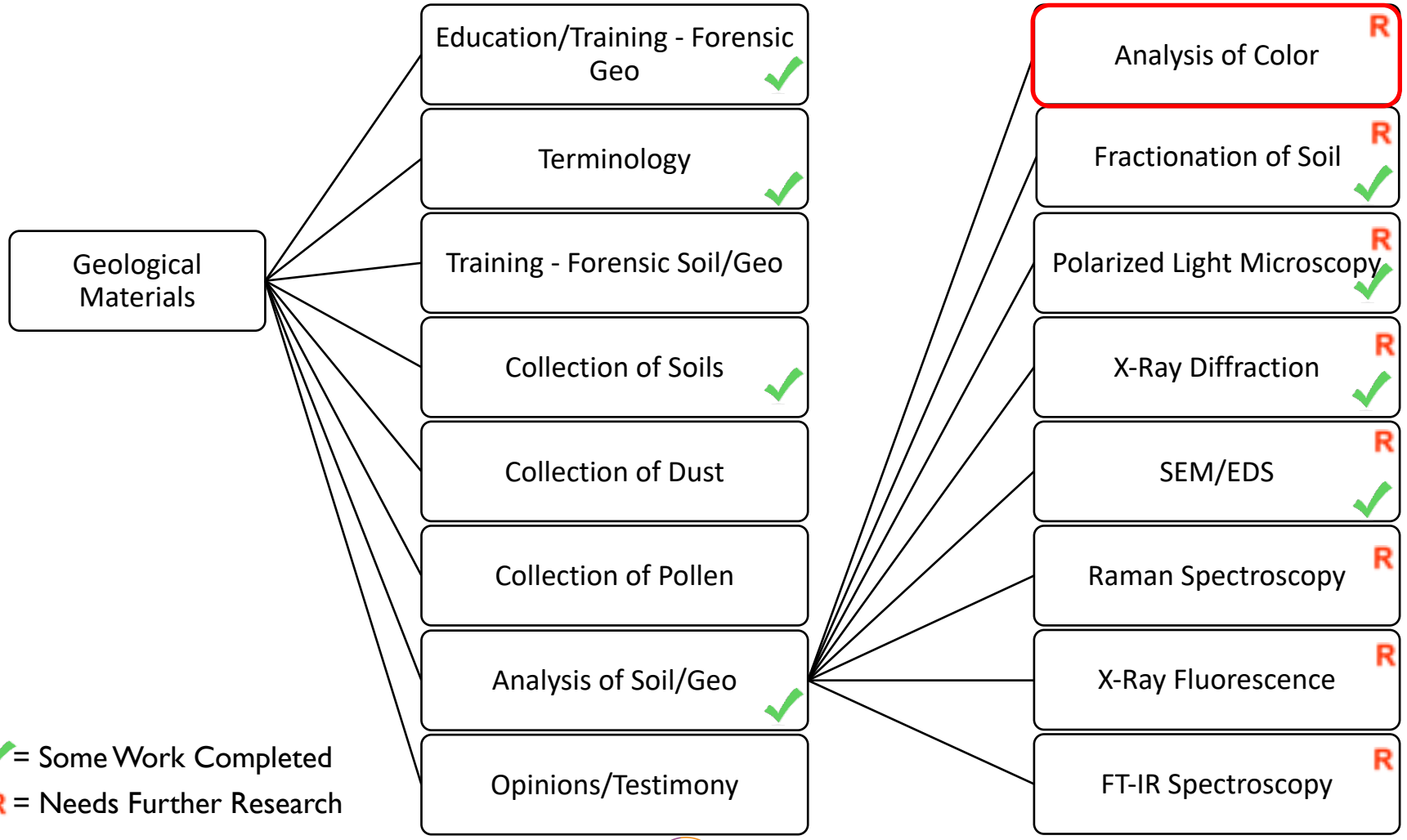
- Exam and ID of Post-Blast Explosives
- Training Program
- Reporting Results and Opinions
- Instrumental Methods of Analysis

Research Needs

Fire Debris & Explosives:

- Concentration of Extracts Containing Volatile/Unstable Explosives
- Determining the Threshold of Identification for Ignitable Liquids
- Evaluation and Comparison of Different Adsorption/Elution Methodology
- Identifying Post-blast Residue of Liquid Explosives
- Potential Transformation of Chlorate to Perchlorate and Visa-Versa During Explosion
- Research and Evaluation of Storage Conditions for Archiving Extracts from Fire Debris Samples
- Source Attribution for Ignitable Liquids from Fire Debris
- Source Attribution for Post-Blast Residues

(CHEMISTRY / INSTRUMENTAL ANALYSIS)
ROADMAP FOR GEOLOGICAL MATERIALS



✓ = Some Work Completed

R = Needs Further Research

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Standards in Process – Under Development

- Standard Guide for the Collection of Soils and Other Geological Evidence for Forensic Applications
- Determination and Comparison of Color by Visual Observation in Forensic Soil Examination

Drafts of these standards have been pitched to the SAC and Resource Committees, and are being edited based on comments.

Standards in Process – Under Development

- Standard Guide for the Analysis of Soils and Other Geological Evidence for Criminal Forensic Applications
- Standard Guide for Using Scanning Electron Microscopy for Morphology and Energy Dispersive Spectroscopy in Forensic Soil and Geological Materials Analysis
- Standard Guide for the Use of Polarized Light Microscopy in the Forensic Examination and Comparison of Geological Sediments

Drafts of these standards are in progress.

Standards in Process – Under Development

- Standard Guide for the Analysis of Forensic Geologic Materials by powder X-Ray Diffraction
- Standard Guide for Fractionation of Soil in Forensic Soil Examinations
- Standard Terminology for Forensic Analysis of Soils and Other Geological Materials

Standards in Process – Under Development (planned in the future)

- Standard Practice for Education and Training in Forensic Geology
- Standard Practice for a Forensic Soil / Geology Training Program
- Standard Guide for Opinions and Testimony in Forensic Geology
- Standard Guide for the Collection and Analysis of Pollen for Forensic Application

Additional Activities

Geological Materials:

- Production of an educational video and other training materials related to collection of soil evidence at crime scenes is planned for September 2019 at the University of Kentucky

Research Needs

- Transfer and Persistence of Soil Components
- Geographic Variability of Soils in Areas with Different Land Use / Different Geologic Settings

Roadmaps

- Materials/Trace roadmaps:
  - Overview
  - Expansion 1: Paint and Tape related documents
  - Expansion 2: Glass and Fiber related documents
  - Expansion 3: Hair and Physical Match related documents

Materials (Trace) Subcommittee Road Map

Training

- *Standard Practice for a Forensic Hair Analysis Training Program* — Currently being revised
- *Standard Practice for a Forensic Fiber Analysis Training Program (SWGMAT)* — Currently being revised
- *Standard Practice for a Forensic Paint Analysis Training Program* — Currently being revised
- *Standard Practice for a Forensic Tape Analysis Training Program* — Currently being revised
- *Standard Practice for a Forensic Glass Analysis Training Program* — Currently being developed
- *Standard Practice for Physical Fit Training for Forensic Comparisons of Trace Materials*

Research

- Gap Analysis — Submitted to OSAC
- Research Needs — Continually updating
- Paint Examination Interpretation Validation Study — In process
- Review Article on Subcommittee Trace Disciplines — In process

Quality Assurance

- *Trace Evidence Quality Assurance Document (SWGMAT)* — Needs revision

Outreach

- Crime Scene Guide — Currently being revised
- Customer Surveys
  - Trace Practitioners — Complete
  - Laboratory Management — Complete
  - Legal Community — In Process

Analysis

Collection & Preservation

- *Trace Evidence Recovery Guidelines (SWGMAT)* — Needs revision

Examination

- Paint Examination — See Expansion 1
- Tape Examination — See Expansion 1
- Fiber Examination — See Expansion 2
- Glass Examination — See Expansion 2
- Hair Examination — See Expansion 3
- Physical Fit Examination — See Expansion 3

Interpretation & Report Writing

- *Standard Practice for Interpretation and Report Writing in Forensic Comparisons of Trace Materials* — Currently being revised

Key:

- New standard to develop
- Future revision of an existing standard
- SDO Process
- RA Process
- On OSAC Registry
- Other Projects

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Materials Road Map, Expansion 1

Paint Examination

General Paint Guideline
E1610 - Standard Guide for Forensic Paint Analysis and Comparison

Microscopy of Paint

FTIR
E2937 - Standard Guide for Using Infrared Spectroscopy in Forensic Paint Examinations

MSP
E2808 - Standard Guide for Microspectrophotometry in Forensic Paint Analysis
Currently being revised

PGC-MS
Standard Guide for Using PGC-MS in Forensic Polymer Examinations (SWGMAT)
Currently being revised

SEM/EDS
E2809 - Standard Guide for Using Scanning Electron Microscopy / X-ray Spectrometry in Forensic Polymer Examinations
Currently being revised

X-Ray Diffraction (XRD)

X-Ray Fluorescence (XRF)

Raman

Tape Examination

General Tape Guideline
Standard Guide for Forensic Tape Analysis and Comparison
Currently being developed

Physical Characteristics
Standard Guide for Assessing Physical Characteristics in Forensic Tape Examinations (SWGMAT)
Needs revision

Light Microscopy
Standard Guide for Using Light Microscopy in Forensic Tape Examinations (SWGMAT)
Needs revision

FTIR
E3805 - Standard Guide for Using FTIR in Forensic Tape Examinations

PGC-MS
Standard Guide for Using PGC-MS in Forensic Polymer Examinations (SWGMAT)
Currently being revised

SEM/EDS
E2809 - Standard Guide for Using Scanning Electron Microscopy/X-ray Spectrometry in Forensic Polymer Examinations
Currently being revised

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Key:
- New standard to develop
- Future revision of an existing standard
- SDO Process
- RA Process
- On OSAC Registry
- Other Projects

Materials Road Map, Expansion 2

Glass Examination

General Glass Guideline

Standard Guide for Forensic Glass Analysis and Comparison

Currently being revised

Refractive Index

E1967 - Standard Test Method for the Automated Determination of RI of Glass Samples using Oil Immersion Method and Phase Contrast Microscope

Currently being revised

ICP-MS

E2330 - Standard Test Method for Determination of Concentrations of Elements in Glass Samples using ICP-MS for Forensic Comparisons

Currently being revised

LA-ICP-MS

E2927 - Standard Test Method for Determination of Trace Elements in Soda-Lime Glass using LA-ICP-MS for Forensic Comparisons

XRF

E2926 - Standard Test Method for Forensic Comparison of Glass Using Micro X-ray Fluorescence (μ-XRF) Spectrometry

Fiber Examination

Fabrics & Cordage

E2225 - Standard Guide for Forensic Examination of Fabrics and Cordage

Currently being revised

General Fiber Guideline

Standard Guide for Forensic Fiber Analysis and Comparison (SWGMAT)

Currently being revised

Microscopy

E2228 - Standard Guide for Microscopic Examination of Textile Fibers

Currently being revised

FTIR

E2224 - Standard Guide for Forensic Analysis of Fibers by IR

Currently being revised

TLC

E2227 - Standard Guide for Forensic Examination of Non-reactive Dyes in Textile Fibers by TLC

Currently being revised

MSP

Standard Guide for Forensic Analysis of Fibers by MSP (SWGMAT)

Currently being revised

PGC-MS

Standard Guide for Using PGC-MS in Forensic Polymer Examinations (SWGMAT)

Currently being revised

Key:

- New standard to develop
- Future revision of an existing standard
- SDO Process
- RA Process
- On OSAC Registry
- Other Projects

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Materials Road Map, Expansion 3

Hair Examination

Standard Guide for Forensic Human Hair Analysis and Comparison (SWGMAT)

Currently being revised

Physical Fit Examination

Standard Guide for Forensic Examinations of Physical Fit of Trace Materials

Key:

- New standard to develop
- Future revision of an existing standard
- SDO Process
- RA Process
- On OSAC Registry
- Other Projects

Standards in Process – at SDO

Materials/Trace Training Guides with ASTM for approval

Standard Practice for a Forensic Hair Examination Training Program

Standard Practice for a Forensic Tape Analysis Training Program

Standard Practice for a Forensic Paint Analysis Training Program

Standards in Process – at SDO

Materials/Trace Guides with ASTM pending approval of E30 KSA statement

E1967 - Standard Test Method for the Automated Determination of Refractive Index of Glass Samples Using the Oil Immersion Method and Phase Contrast Microscope

E2330 - Standard Test Method for Determination of Concentrations of Elements in Glass Samples Using Inductively Coupled Plasma Mass Spectrometry (ICP-MS) for Forensic Comparisons

Standards in Process – at SDO

Materials/Trace Guides with ASTM for 5 year review/revision

E2808- Standard Guide for Microspectrophotometry and Color Measurement in Forensic Paint Analysis

E2224 - Standard Guide for Forensic Analysis of Fibers by Infrared Spectroscopy

E2225 - Standard Guide for Forensic Examination of Fabrics and Cordage

E2228 - Standard Guide for Microscopic Examination of Textile Fibers

Existing Standards being revised for SDO

Materials/Trace Guides being revised

E2227 - Standard Guide for the Forensic Examination of Non-Reactive Dyes in Textile Fibers by Thin-Layer Chromatography

E2809 - Standard Guide for Using Scanning Electron Microscopy/X-Ray Spectrometry in Forensic Paint Examinations

Standards in Process – Under Development

Standard Guide for Using Pyrolysis Gas Chromatography and Pyrolysis Gas Chromatography-Mass Spectrometry in Forensic Polymer Examinations

Standard Guide for Forensic Tape Analysis and Comparison

Standard Practice for Interpretation and Report Writing in Forensic Comparisons of Trace Materials

Trace Evidence Field Guide – for crime scene personnel for collection of trace evidence

Standards in Process – Under Development

Standard Guide for Forensic Fiber Analysis and Comparison

Standard Practice for a Forensic Fiber Analysis Training Program

Standard Practice for a Forensic Glass Analysis Training Program

Standard Guide for Forensic Glass Analysis and Comparison

Standard Guide for The Microscopical Examination of Human Hair

Work in Progress – Under Development

Trace Evidence Field Guide – smart phone app for field use

Further development of the road maps scheme for the Physical Match Task Group

Completion of a review paper for use with the Interpretation Guide

Validation Study of use of the Interpretation Guide for Paint evidence

Research Needs

Materials (Trace):

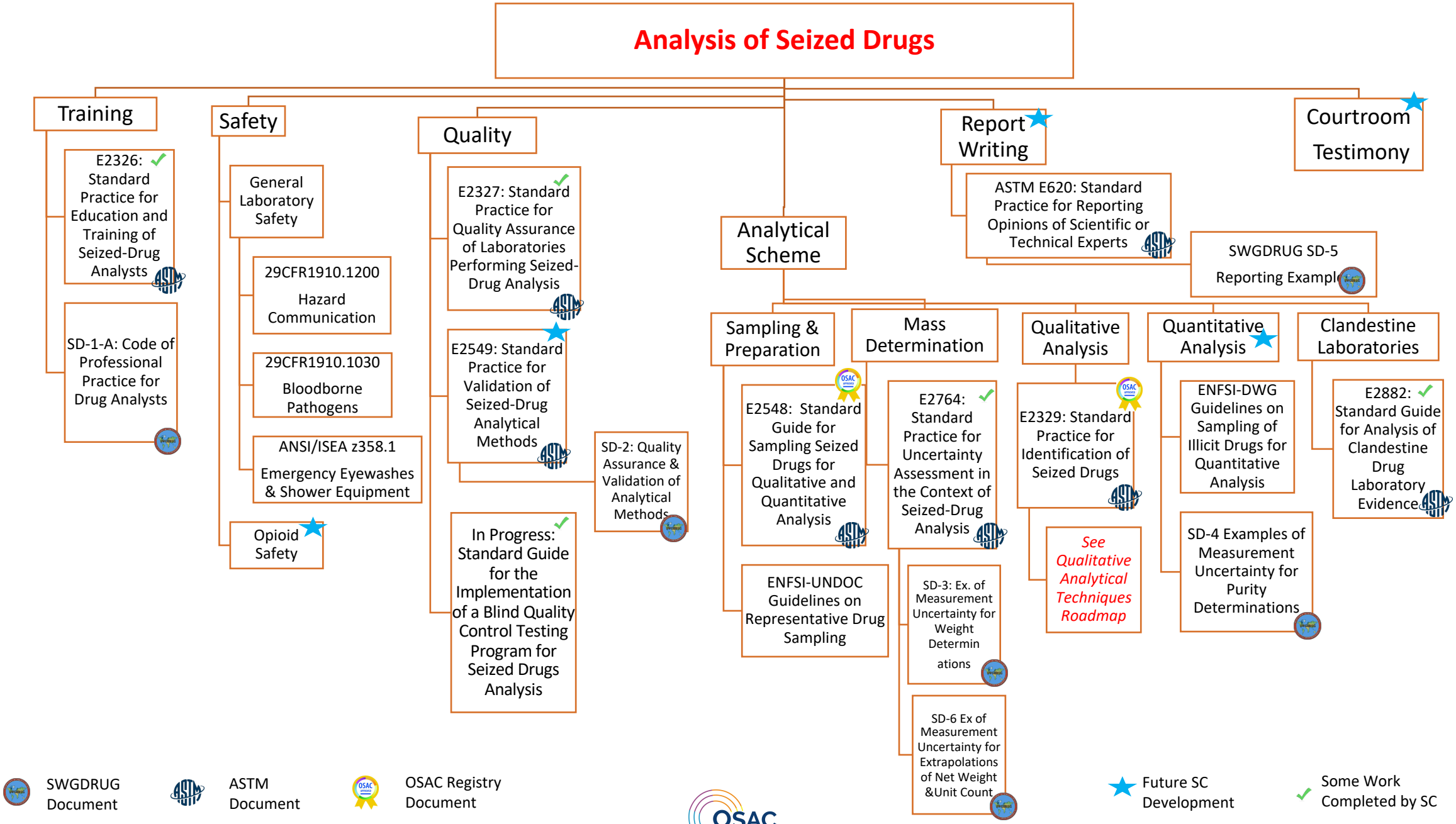
- Assessment of Criteria for Meaningful Differences in Trace Materials Comparative Data
- Assessment of the value of activity level factors during investigative processes and interpretation of glass evidence
- Cross-validation of current and new micro-XRF technology for the the forensic analysis of modern glass
- Development of an Integrated and Multidisciplinary Approach for the Advancement of Data Collection, Data Management and Data Analysis to Aid Interpretation of Trace Evidence

Research Needs

Materials (Trace):

- Development of Quantitative Assessment and Evaluation of Error Rates in Physical Fit Determinations of Trace Materials
- Evidence of Combined Information Value of Microscopic Comparisons and Mitochondrial DNA Analysis for Hair Examinations
- Validation of the Suitability of Standard Practice for Interpretation and Report Writing in Forensic Comparisons of Trace Materials

Analysis of Seized Drugs



SWGDRUG Document

ASTM Document

OSAC Registry Document

Future SC Development

Some Work Completed by SC

Qualitative Analytical Techniques

Instrumental

- Mass Spectrometry
  - In Progress: Standard Practice for Assessment of Gas Chromatography & Electron Ionization Mass Spectrometry Data During the Qualitative Analysis of Seized Drugs ✓
  - In Progress: Guidelines for Mass Spectral Libraries ✓
- Infrared Spectroscopy
  - In Progress: Standard Practice for Assessment of Infrared Spectroscopy Data During the Qualitative Analysis of Seized Drugs ✓
- Nuclear Magnetic Resonance Spectroscopy
- Raman Spectroscopy
- Gas Chromatography
  - In Progress: Standard Practice for Assessment of Gas Chromatography & Electron Ionization Mass Spectrometry Data During the Qualitative Analysis of Seized Drugs ✓
- X-Ray Diffraction
- Liquid Chromatography
- Capillary Electrophoresis
- Ion Mobility Spectrometry
- Supercritical Fluid Chromatography
- Ultraviolet Spectroscopy
- Fluorescence Spectroscopy

Non-Instrumental

- Examination of Plant Material
  - Macroscopic Identification
  - Microscopic Identification
- Thin Layer Chromatography
- Color Tests
- Microcrystalline Tests
  - E1968: Standard Guide for Microcrystal Testing in the Forensic Analysis of Cocaine
  - E1969: Standard Guide for Microcrystal Testing in the Forensic Analysis of Methamphetamine and Amphetamine
  - E2125: Standard Guide for Microcrystal Testing in the Forensic Analysis of Phencyclidine and Its Analogues
- Pharmaceutical Identifiers
- Immunoassay
- Melting point

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✓ Some Work Completed by SC

ASTM Document

Existing SDO **Seized Drugs** Standards

- **E2326** – Standard Practice for Education and Training of Seized-Drug Analysts
- **E2327** – Standard Practice for Quality Assurance of Laboratories Performing Seized-Drug Analysis
- **E2549** – Standard Practice for Validation of Seized-Drugs Analytical Methods
- **E2764** – Standard Practice for Uncertainty Assessment in the Context of Seized Drug Analysis
- **E2882** – Standard Guide for Analysis of Clandestine Laboratory Evidence

Standards in Process – at SDO

- **E2764** – Standard Practice for Uncertainty Assessment in the Context of Seized Drug Analysis *(under revision)*
- **E2882** – Standard Guide for Analysis of Clandestine Laboratory Evidence *(under revision)*
- ***WK65067*** *– Practice for Assessment of Gas Chromatography and Electron Ionization Mass Spectrometry Data During the Qualitative Analysis of Seized Drugs*

Standards in Process – Under Development

- Standard Guide for Intra-laboratory Blind Quality Control Program for Seized Drugs Analysis
- Standard Guide for the Development and Suitability Assessment of Electron Ionization - Mass Spectral (EI-MS) Libraries and Databases for Forensic Identification
- Standard Guide for Assessment of Infrared Spectroscopy Data During the Qualitative Analysis of Seized Drugs

Research Needs

Seized Drugs:

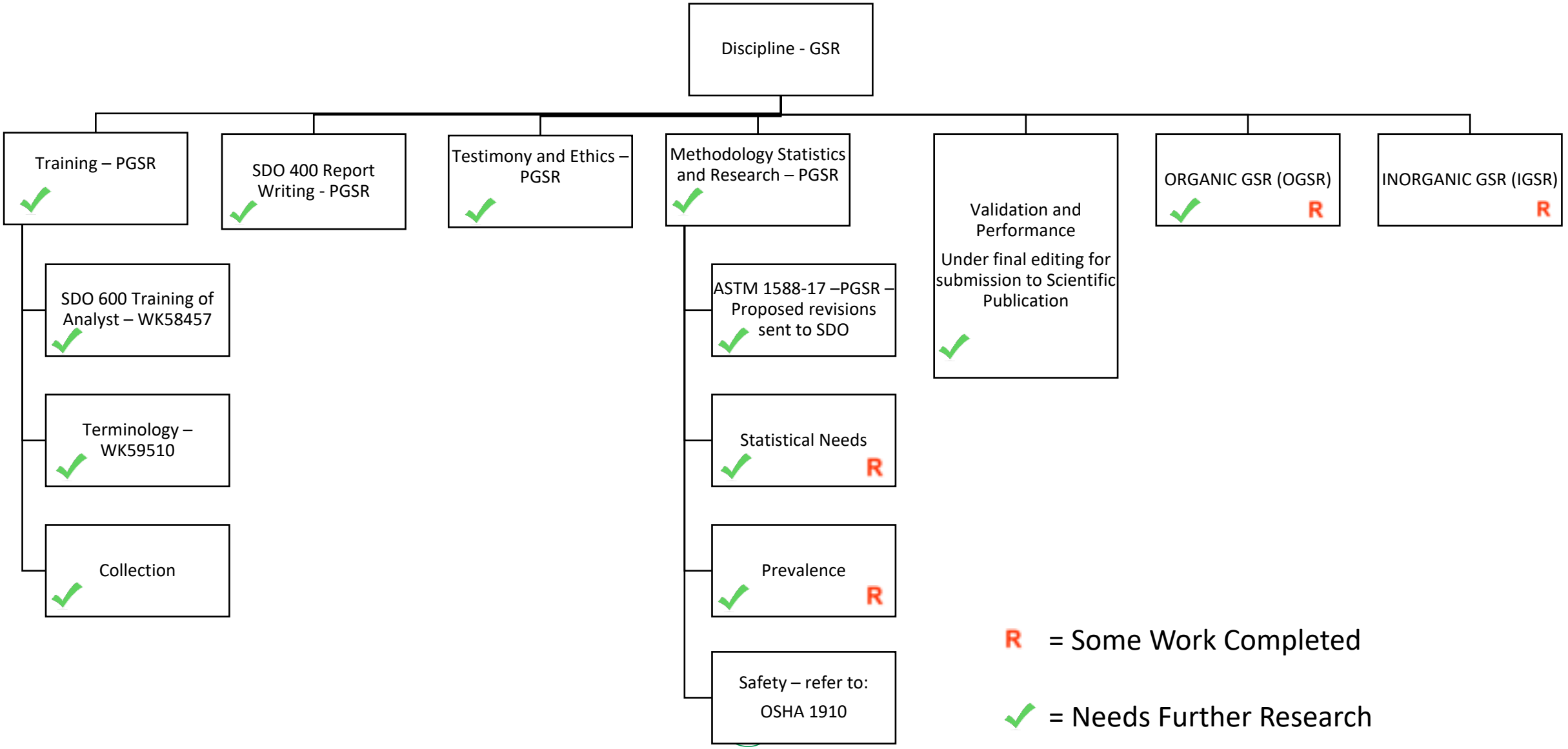
- Acceptance Criteria for Instrumental Data Related to Qualitative Seized Drug Analysis
- Error Rates in Qualitative Methods of Analysis

*** White-box study currently under development by Forensic Science Technology Center of Excellence (FTCoE) at RTI in partnership with the Kentucky State Police ***

Other **Seized Drugs** Resources Under Development

- **Compilation of:**
  - ✓ *Cannabis (hemp/marijuana) analysis resources*
  - ✓ *Pharmacophore information resources*
  - ✓ *GC-MS analysis limitations*

Gunshot Residue – Subcommittee Roadmap



Standards in Process – at SDO

ASTM E1588-17: Standard Guide for Gunshot Residue Analysis by Scanning Electron Microscopy/Energy Dispersive X-ray Spectrometry

WK58457 Training in the Forensic Examination of GSR using Scanning Electron Microscopy/Energy Dispersive X-ray Spectrometry

Standards in Process – Under Development

Report Writing

The Report Writing Document was pitched at the Houston in-person meeting; all comments have been considered and addressed, and the document is being finalized for submission to the ASTM.

Organic GSR:

This Task Group has made substantial progress on their document: The Collection Storage and Analysis of Organic Gunshot Residues. The Subcommittee will be voting on the proposal to Pitch this document at the upcoming in-person meeting in July 2019.

Testimony:

The Testimony and Ethics Task Group has completed their document: Standard Practice for Expert Witness Opinions on the Interpretation of Primer Gunshot Residue (pGSR) Analysis by Scanning Electron Microscopy/Energy Dispersive X-Ray Spectrometry. The Subcommittee will be voting on the proposal to Pitch this document at the upcoming in-person meeting in July 2019.

Validation and Quality Assurance:

This Task Group has completed a detailed document to verify performance of SEM and EDS. They are currently editing the document and working to have the document published in Forensic Chemistry.

Inorganic Gunshot Residue:

This Task Group was recently added to the GSR-SC and has been meeting regularly to work on a database that will be used as a future resource.

Research Needs

Gunshot Residue:

- Comprehensive Feasibility of Organic Gunshot Residue Analysis
- Comprehensive GSR Persistence Study
- Development of Characterized Reference Stubs
- Fundamental Research into Mechanism of Particle Formation
- Specific Identification of Shooters

OSAC

Organization of Scientific Area Committees for Forensic Science

Thank you

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