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# Biology/DNA Scientific Area Committee 2020 Update

Robyn Ragsdale, Ph.D., Chair

# Biology/DNA SAC Leadership

**Robyn Ragsdale, Ph.D.**, Chair; Florida Department of Law Enforcement

**Carl Sobieralski**, Vice Chair; Indiana State Police Laboratory

**Kimberly Frazier**, Chair; Wildlife Forensic Biology Subcommittee ; Wyoming Game and Fish Department Wildlife Forensic and Fish Health Laboratory

**Beth Ordeman**, Chair; Human Forensic Biology Subcommittee; Pinellas County Forensic Laboratory

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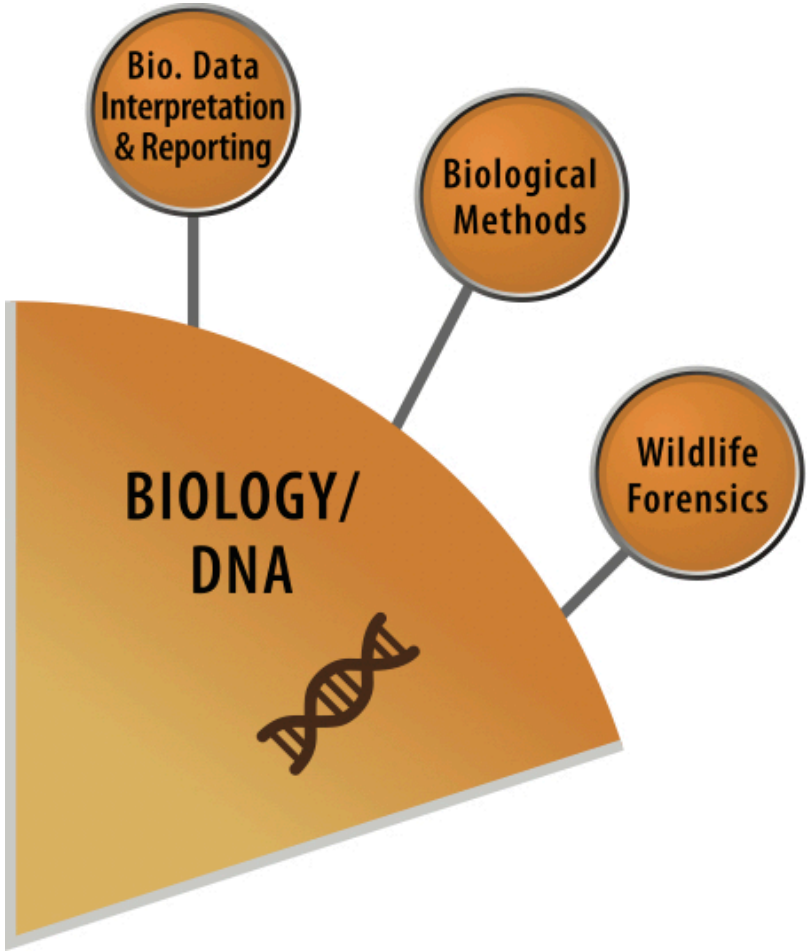



The Biology Scientific Area Committee provides strategic direction within the Biology Discipline, serves as a platform to integrate similar standards activities across multiple forensic science disciplines, and manages the activities of the following subcommittees:

Human Forensic Biology

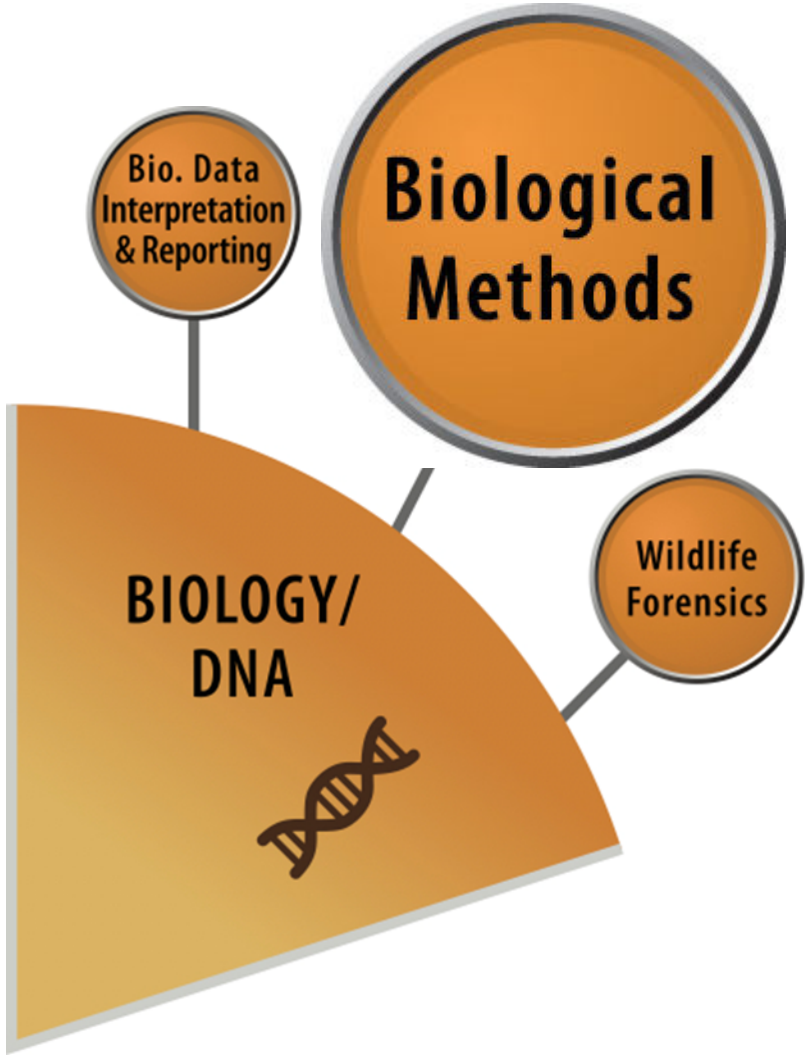
Wildlife Forensic Biology

# SAC Activities

**Biology SAC members work closely with the SC and TGs in identifying needed standards, development of new standards, as well as identifying research needs for the forensic biology community. Additionally, they are available to help with implementation of OSAC Registry Standards in your laboratory.**

**The Biology SAC works closely with SWGDAM to ensure our efforts are complemented.**

**Kristine Kadash, Subcommittee Chair, Jefferson County Regional Crime Lab**
**Susan Greenspoon, Subcommittee Vice Chair, Virginia Department of Forensic Services**
**Kristin Schelling, Subcommittee Executive Secretary, Michigan State Police**



# ASB Published Standards OSAC Registry

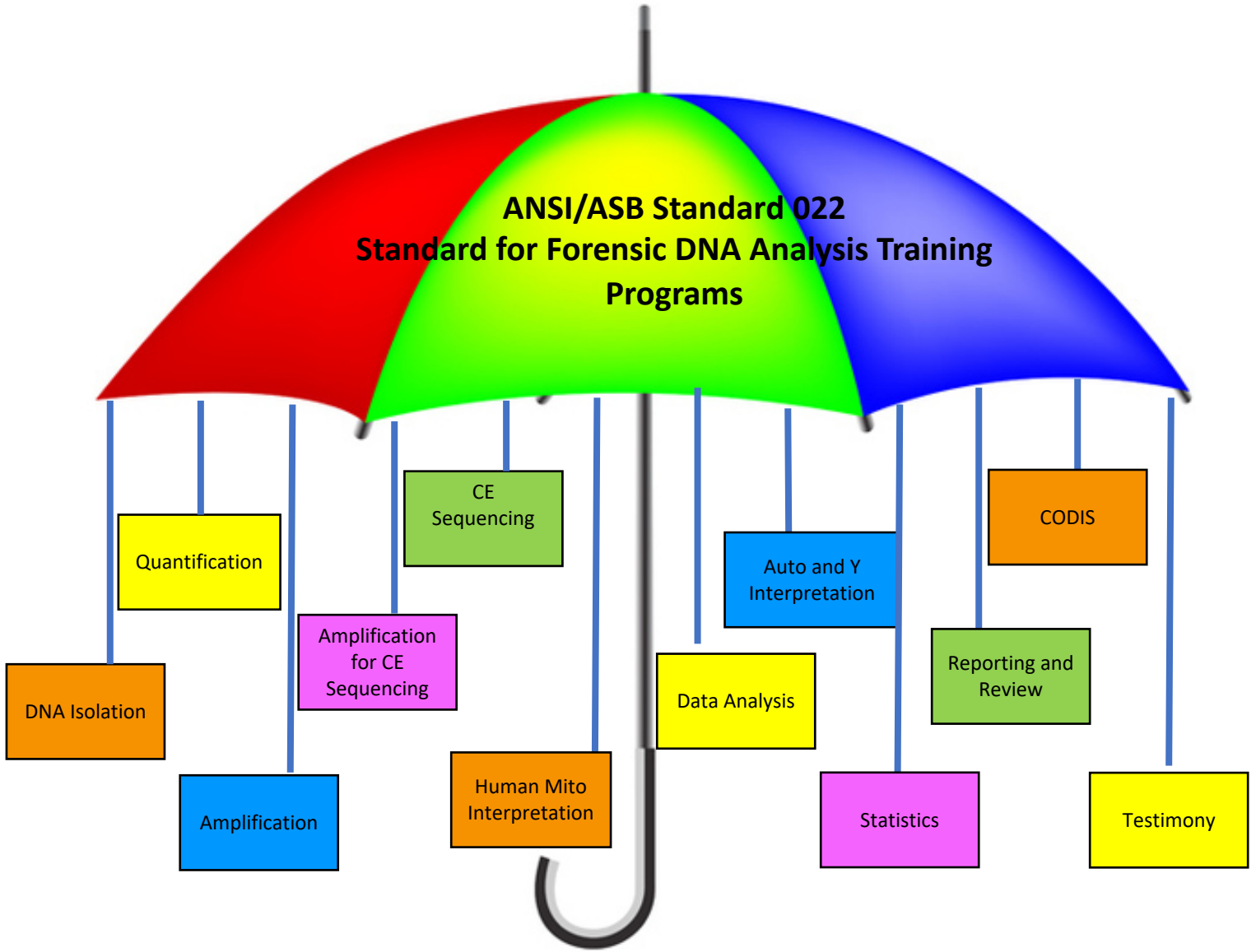
## ANSI/ASB Standard 022 Standard for Forensic DNA Analysis Training Programs, First Edition, 2019

**This standard provides the general requirements for a forensic DNA laboratory's training program in DNA analysis including data interpretation.**

http://www.asbstandardsboard.org/published-documents/dna-published-documents/ (All Human Forensic Biology documents at ASB)

https://www.nist.gov/topics/organization-scientific-area-committees-forensic-science/osac-registry-approved-standards (All Human Forensic Biology and Wildlife Forensic Biology Documents on the OSAC Registry)

# Training Standards

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# ASB Published Standards Going through the OSAC Approval Process Registry

**ANSI/ASB Standard 023, Standard for Training in Forensic DNA Isolation and Purification Methods, First Edition, 2020**

**This document provides requirements to ensure proper training in the methods of DNA isolation and purification used within the trainee's forensic DNA laboratory.**

# ASB Published Standards Going through the OSAC Approval Process Registry

[ANSI/ASB Standard 115, Standard for Training in Forensic Short Tandem Repeat Typing Methods using Amplification, DNA Separation, and Allele Detection, First Edition, 2020]

**This standard provides the requirements of a forensic DNA laboratory's training program in forensic Short Tandem Repeat typing methods using amplification, DNA separation and allele detection.**

# ASB Published Standards Going through the OSAC Approval Process Registry

**ANSI/ASB Standard 116, Standard for Training in Forensic DNA Quantification Methods, First Edition, 2020**

**This standard provides the requirements for a forensic DNA laboratory's training program in DNA quantification.**

# ASB Published Standards Going through the OSAC Approval Process Registry

**ANSI/ASB Standard 038, Standard for Internal Validation of Forensic DNA Analysis Methods, First Edition, 2020**

**This document details the general requirements for performing an internal validation of all forensic DNA analysis methods within a forensic DNA laboratory.**

# ASB Published Standards Going through the OSAC Approval Process Registry

## ANSI/ASB Standard 110 Standard for Training in Forensic Serological Methods, First Edition, 2020

**This standard provides the general requirements for a forensic serology training program to evaluate body fluids, stains, or residues related to forensic investigations. This standard does not address training in forensic DNA analysis procedures.**

# Biological Methods Subcommittee

DNA Training Task Group

Validation Task Group

Serology and Y-STR Task Group

Massively Parallel Sequencing/Next Generation Sequencing Task Group

Familial Searching Task Group

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# Biological Methods Subcommittee

## DNA Training Task Group

**Standard for Forensic DNA Analysis Training Programs, ANSI/ASB Std 022**

- Standards for Training of Forensic DNA Isolation and Purification Methods, ANSI/ASB Std 023
- Standards for Training of Forensic DNA Quantification Methods , ANSI/ASB Std 116
- Standards for Training of Forensic STR Typing Methods using PCR Amplification, DNA Separation, and Allele Detection, ANSI/ASB Std 115
- Standard for Training in Forensic DNA Amplification Methods for Capillary Electrophoresis Sequencing *
- Standard for Training in Forensic DNA Sequencing using Capillary Electrophoresis *
- Standard for Training in Forensic Human Mitochondrial DNA Interpretation*

## Validation Task Group

**Standard for Internal Validation of Forensic DNA Analysis Methods, ANSI/ASB Std 038**

| | |
|---|---|
| Standard for Internal Validation of Human STR Profiling on CE Platforms | → Best Practice Recommendations for Internal Validation of Human Short Tandem Repeat Profiling on Capillary Electrophoresis Platforms |
| Standards for the Internal Validation of Human DNA Quantification | → Best Practice Recommendations for Internal Validation of Human DNA Quantitation |
| Standards for Internal Validation of DNA Extraction Methods | → Best Practice Recommendations for Internal Validation of DNA Extraction Methods |
| Standards for Internal Validation of Automated Platforms | → Best Practice Recommendations for Internal Validation of Automated Platforms |

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# Biological Methods Subcommittee

## Serology and Y-STR Task Group

- Standards for the Developmental and Internal Validation of Forensic Serological Methods
- Standards for the Analytical Procedures and Report Writing of Serological Methods
- Standard for Training in Serological Methods, ANSI/ASB Std 110
- *Standards for Validation of Male DNA Screening* and related reporting document *(Proposed)*
- *Best Practice Recommendations for Reporting Results of Serological Examinations (proposed)*
- Best Practice Workflows for Efficient Sampling and Direct to DNA of Sex Assault Kits

## Contamination Task Group

- Forensic Laboratory Standards for Prevention, Monitoring, and Mitigation of DNA Contamination

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# Biological Methods Subcommittee

**Sequencing: Massively Parallel Sequencing/Next Generation Sequencing Task Group**

**Familial Searching Task Group**

**Standard for Training in Forensic Sequencing Methods: Massively Parallel Sequencing/Next Generation Sequencing**

**Standards for Validation and Implementation of Familiar Searching for Forensic Purposes**

**Standard for Internal Validation of Genetic Analysis on Massively Parallel Sequencing/Next Generation Sequencing Platforms**

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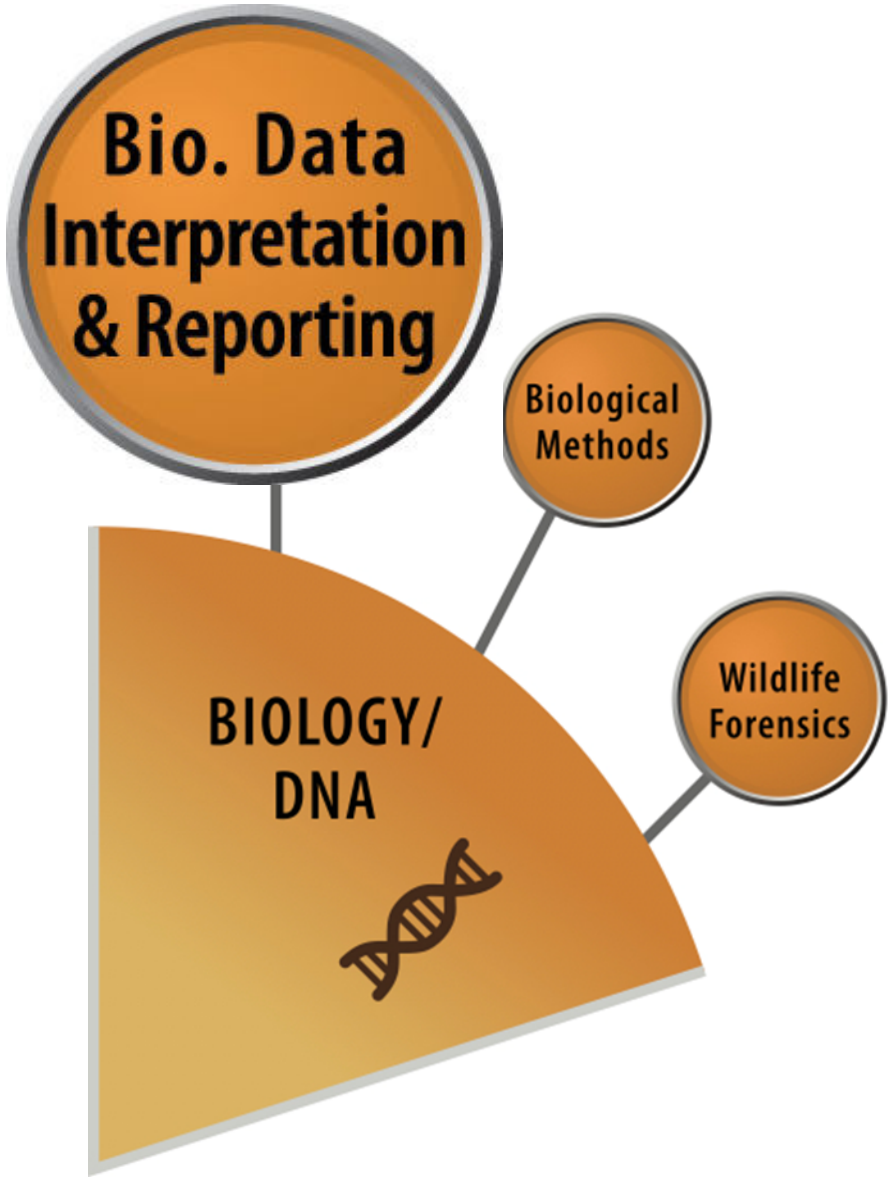
**Beth Ordeman, Subcommittee Chair, Pinellas County Sheriffs Office**
**Brian Higgins, Subcommittee Vice Chair, DFSC-USACIL**
**Lisa Brewer, Subcommittee Executive Secretary, Retired**



# ASB Published Standards OSAC Registry

**ANSI/ASB Standard 020, *Standard for Validation Studies of DNA Mixtures, and Development and Verification of a Laboratory's Mixture Interpretation Protocol*, First Edition, 2018**

**This standard sets forth the requirements for the design and evaluation of internal validation studies for mixed DNA samples and the development of appropriate interpretation protocols for mixtures based on the validation studies performed. This standard includes a requirement that the laboratory verify and document that the mixture interpretation protocols developed from the completed validation studies generate reliable and consistent interpretations and conclusions for the types of mixed DNA samples typically encountered by the laboratory. This standard applies to any type of DNA testing technology and methodology used, including but not limited to, STR testing, DNA sequencing, SNP testing, haplotype testing, traditional and rapid protocols, etc., where mixtures of DNA may be encountered, analyzed and interpreted.**

# ASB Published Standard on OSAC Registry

**ANSI/ASB Standard 040, *Standard for Forensic DNA Interpretation and Comparison Protocols*, First Edition, 2019**

**This document provides requirements for a laboratory's DNA interpretation and comparison protocol. A protocol is needed for any DNA testing methodology that includes data interpretation and/or comparison. The protocol should encompass all variables permitted in the technical protocols that may have an impact on the data generated and the variety and range of test data anticipated in casework based on the types of samples routinely accepted and tested in the laboratory.**

**https://www.nist.gov/system/files/documents/2020/09/02/OSAC%20Intent-Clarification%20on%20ANSI-ASB%20Std%2040%20Requirement%204.3.pdf**

# Promega Webinars

**Development and Publication of New Standards and Best Practices - The Process**

https://www.promega.com/Resources/Webinars/Worldwide/Archive/2020/Development%20and%20Publication%20of%20New%20Standards%20and%20Best%20Practices%20The%20Process/

**Mixture Interpretation Validation, and Protocol Development and Verification (ANSI/ASB STDs 020 and 040)**

https://www.promega.com/Resources/Webinars/Worldwide/Archive/2020/Mixture%20Interpretation%20Validation%20and%20Protocol%20Development%20and%20Verification/

**Training Standards Overview (ANSI/ASB STD 022)**

https://www.promega.com/Resources/Webinars/Worldwide/Archive/2020/training-standards-overview/

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# ASB Published Standard on OSAC Registry

**ANSI/ASB Standard 018, *Standard for Validation of Probabilistic Genotyping Systems*, First Edition, 2020**

**This standard sets forth the requirements to be used by laboratories for the validation of probabilistic genotyping systems related to interpreting autosomal STR results. Amelogenin is not covered by this standard. Laboratories are advised to review their validation for compliance with this standard, supplement validation where necessary, and modify existing protocols accordingly.**

# Biological Data Interpretation and Reporting

- Data Analysis
- Interpretation
- Statistical Analysis
- Report Writing/Review
- CODIS
- Testimony

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# Biological Data Interpretation and Reporting

## Data Analysis

Standard for Setting Analytical and Stochastic Thresholds

Validation Standards for Probabilistic Genotyping, ANSI/ASB 018

Best Practice Recommendations for Validation of Forensic DNA Software

Standard for Training on Analysis of Forensic STR Data

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# Biological Data Interpretation and Reporting

## Interpretation

Standard for Training of Forensic Autosomal and Y-STR Data Interpretation

Standards for Forensic DNA Interpretation and Comparison Protocols, ANSI/ASB Std 040

Standards for Internal Self-Evaluation of Mixture Protocols

Standards for Validation Studies of DNA Mixtures, and Development and Verification of a Laboratory's Mixture Interpretation Protocol, ANSI/ASB 020

Best Practice Recommendations for the Management and Use of Elimination Databases

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# Biological Data Interpretation and Reporting

## Statistical Analysis

Standard for Training in the use of Statistics in Interpretation of Forensic DNA Evidence

Standard for Statistical Interpretation of Autosomal STRs

Standard for Assigning Propositions for Likelihood Ratios

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# Biological Data Interpretation and Reporting

## Report Writing / Review

Standard for Training of Forensic DNA Reporting and Review

Standard for Reporting DNA Conclusions

Standard for Interpreting and Reporting DNA Test Results Associated with Contamination and Failed Controls

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# Biological Data Interpretation and Reporting

## CODIS

**Standard for Training of CODIS**

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# Biological Data Interpretation and Reporting

## Testimony

Standard for Training on Testimony for Forensic Biology

Best Practices for Forensic Biology Testimony

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# Training Standard Suite

| Methods | Status | Data Interpretation and Reporting | Status |
|---|---|---|---|
| DNA Isolation and Purification Methods * | Published by ASB 7/3/2020 | STR Data Analysis | Assigned to ASB Working Group |
| Quantification Methods * | Published by ASB 9/4/2020 | Autosomal and YSTR Interpretation | Assigned to ASB Working Group |
| STR Typing Methods | Published by ASB 9/4/2020 | Use of Statistics in Interpretation | Assigned to ASB Working Group |
| Amplification Methods for CE Sequencing * | ASB Second round of public Comment | Reporting and Review | Assigned to ASB Working Group |
| CE Sequencing * | ASB Second round of public Comment | CODIS | Assigned to ASB Working Group |
| Human Mitochondrial Interpretation | ASB first round of public comment | Testimony | Pending ANSI approval of title/scope |

* Applicable to human and non-human DNA

| Other training standards – apart from suite | Status |
|---|---|
| Serological Methods | Published by ASB 9/4/2020 |
| Forensic Sequencing Methods | OSAC comment adjudication |
| Familial Searching (training is one element) | Pending OSAC comment |

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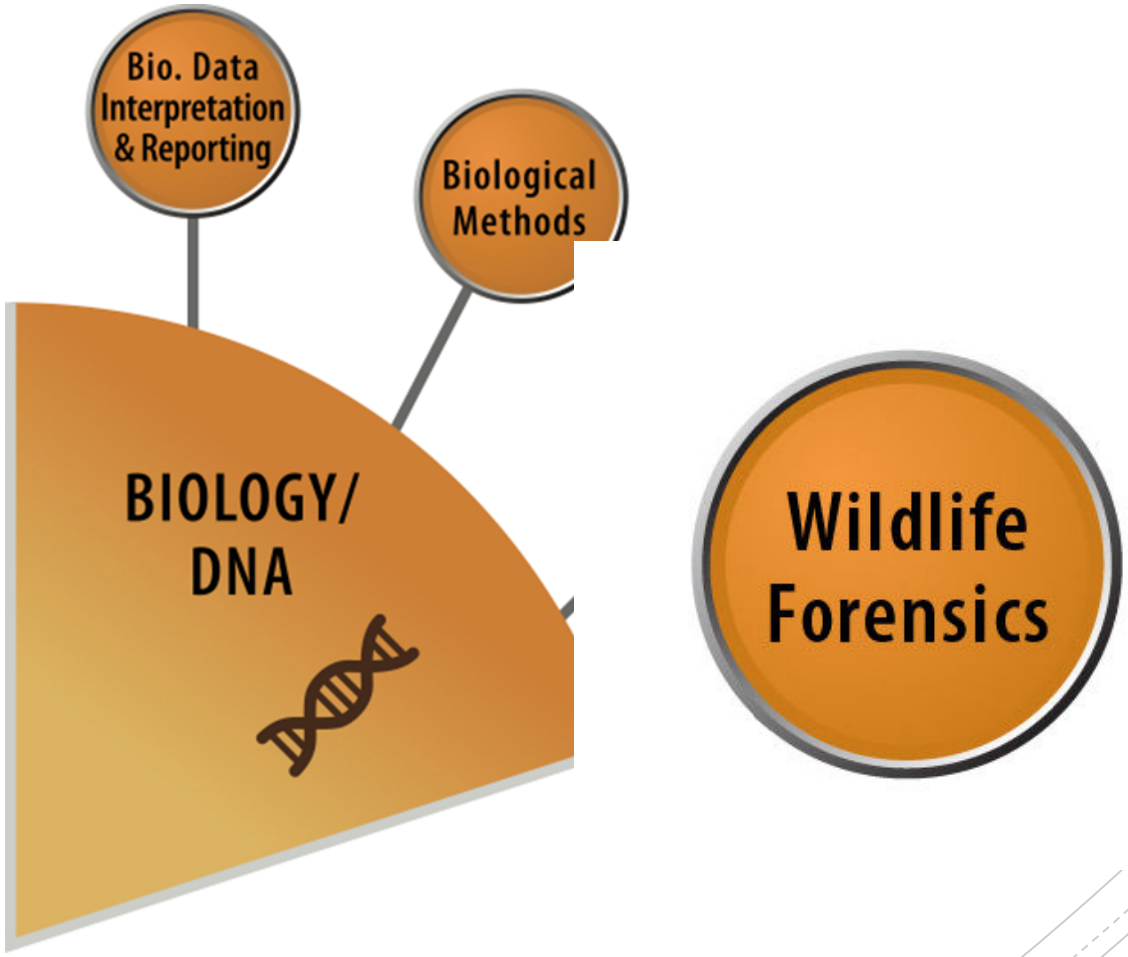
ASB AAFS Standards Board

**Kimberly Frazier**, Subcommittee Chair, Wyoming Game and Fish Department Wildlife Forensic and Fish Health Laboratory

**R. Christopher O'Brien, Ph.D.**, Subcommittee Vice Chair, University of New Haven

**Ashley Spicer**, Subcommittee Executive Secretary, CA Dept. of Fish and Wildlife, Law Enforcement Division



# OSAC Registry Approved Standards

## ANSI/ASB Standard 028, *Wildlife Forensics Morphology Standards*, First Edition, 2019

**This document provides minimum standards for wildlife forensic analysts in the subdiscipline of morphology.**

http://www.asbstandardsboard.org/published-documents/wildlife-forensics-published-documents/ (All Wildlife Forensic Biology documents at ASB)

https://www.nist.gov/topics/organization-scientific-area-committees-forensic-science/osac-registry-approved-standards (All Human Forensic Biology and Wildlife Forensic Biology Documents on the OSAC Registry)

# OSAC Registry Approved Standards

**ANSI/ASB Standard 047, *Wildlife Forensics Validation Standard—Validating New Primers for Sequencing*, First Edition, 2019**

**This document provides minimum requirements and recommendations for validating new primers for mitochondrial haplotyping and/or taxonomic identification via sequencing in wildlife forensic DNA laboratories where the sequencing (Sanger) method has already been validated.**

# ASB Published Standards Going Through the OSAC Registry Process

## ANSI/ASB Standard 019, *Wildlife Forensics General Standards*, First Edition, 2019

**This document provides minimum standards and recommendations for practicing wildlife forensic analysts. This document covers good laboratory practices, evidence handling, and training as well as considerations of taxonomy and reference collections that are specific to wildlife forensic science.**

# ASB Published Standards Going Through the OSAC Registry Process

**ANSI/ASB Standard 029, *Report Writing in Wildlife Forensics: Morphology and Genetics*, First Edition, 2019**

**This document describes the information to be provided in formal written reports of wildlife forensic examinations for use in legal proceedings. Requirements for both genetic and morphological examination reports are covered. Forensic reports serve a variety of audiences, and must provide a clear and concise summary of methods, results, and limitations.**

# ASB Published Standards Going Through the OSAC Registry Process

**ANSI/ASB Standard 046, *Wildlife Forensics Validation Standards—STR Analysis*, First Edition, 2019**

**This document provides minimum standards and recommendations for validating new nuclear STR (short tandem repeat) markers for use in wildlife forensic DNA laboratories where the STR genotyping method has already been validated.**

# ASB Published Standards Going Through the OSAC Registry Process

**ANSI/ASB Standard 048, *Wildlife Forensic DNA Standard Procedures*, First Edition, 2019**

**This document provides minimum requirements for forensic DNA analysis of wildlife evidence including general laboratory practice, DNA extraction and amplification, analysis and interpretation, statistical support, sequencing, mitochondrial DNA haplotyping, taxonomic identification, STRs and data analysis.**

# ASB Published Standards Going Through the OSAC Registry Process

**ASB Standard 106, *Wildlife Forensics—Protein Serology Method for Taxonomic Identification*, First Edition, 2020**

**This document addresses the protocols required for general protein serology methods for taxonomic identification routinely used in the laboratory. These protocols include: Serology methods routinely used in the laboratory, the validation process, and statistical analysis and interpretation of serology results generated in the laboratory. This document also covers the use of quality controls (positive, negative and comparison samples) and the analysis of results if controls fail. The document explains how differences in expressed proteins can be used to identify animals at family and/or species level using a suite of serology methods.**

# ASB Published Standards Going Through the OSAC Registry Process

**ANSI/ASB Standard 111, *Standard for Training in Mitochondrial DNA (mtDNA) Analysis for Taxonomic Identification*, First Edition, 2020**

**This standard provides requirements to ensure proper training in animal taxonomic identification based on mitochondrial DNA (mtDNA) sequencing, data analysis, and reporting within the trainee's forensic DNA laboratory.**

# Wildlife Forensics - Genetics and Morphology

- Training
- General Standards
- Validation
- Report Writing
- Methods – Taxonomic Identification
- Maintenance of Reference Collections
- DNA
- Methods

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# Wildlife Forensic Genetics

## Training

- Forensic DNA Analysis Training Programs ANSI/ASB Std 022
- Standard for Training in mtDNA Analysis for Taxonomic Identification ANSI/ASB Std 111
- Standard for Training in Forensic DNA Sequencing using Capillary Electrophoresis *
- Standards for Training of Forensic DNA Isolation and Purification Methods, ANSI/ASB Std 023
- Standards for Training of Forensic DNA Quantification Methods , ANSI/ASB Std 116

**Wildlife Forensic General Standards ANSI/ASB 046**

## Validation

- Wildlife Forensics Validation Standards _ STRS ANSI/ASB 046
- Wildlife Forensic Validation Standard – Validating New Primers for Sequencing ANSI/ASB 047
- Standard for Use of Public Databases for Wildlife Forensic Protocols

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# Wildlife Forensic Genetics

**Methods – Taxonomic Identification – Serology or DNA**

- Wildlife Forensic DNA Standard Procedures ANSI/ASB Std 048
- Wildlife Forensic - Protein Serology Method for Taxonomic Identification ANSI/ASB Std 106
- Wildlife Forensic Reference Collection Standards
- Standard for the Development and Use of in-house Sequence Databases for Taxonomic Assignment of Wildlife
- Best Practices for Building New STR Panels in Wildlife Forensics
- Genetic Methods to Determine an Individual of Potential Hybrid Origin
- Methods for Geographic Assignment of Individual Animals
- Standard for the Use of GenBank for Taxonomic Assignment of Wildlife
- Standard for Development and Use of Allele Frequency and Population Genetics Databases
- Wildlife Forensic Methods – Sampling of Reference Samples from Live Mammals
- Report Writing in Wildlife Forensics: Morphology and Genetics ANSI/ASB Std 029

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# Wildlife Forensics Morphology

**Wildlife Forensic Morphology Standard ANSI/ASB 028**

| Training | Validation | Methods |
| --- | --- | --- |
| Training in Taxonomic Identification using Morphology | Morphology Validation | Morphology Methods |

**Maintenance of Reference Collections**

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# OSAC

## Organization of Scientific Area Committees for Forensic Science

**Beth Ordeman,** Biological Data Interpretation and Reporting Subcommittee Chair, Pinellas County Forensic Laboratory bordeman@co.pinellas.fl.us

**Kimberly Frazier**, Wildlife Subcommittee Chair, Wyoming Game and Fish Department kim.frazier@wyo.gov

**Robyn Ragsdale, Ph.D.**, Biology Chair; Florida Department of Law Enforcement robynragsdale@fdle.state.fl.us

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

# OSAC

## Organization of Scientific Area Committees for Forensic Science

To review and comment on documents in development at OSAC:
https://www.nist.gov/topics/organization-scientific-area-committees-forensic-science/standards-open-comment
To review and comment on documents at ASB:
http://www.asbstandardsboard.org/notice-of-standard-development-and-coordination/

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