OSAC Facial Identification Subcommittee & FISWG Update

LORA S SIMS

AUGUST 13, 2019

RENO, NV

INTERNATIONAL ASSOCIATION FOR IDENTIFICATION (IAI) CONFERENCE

NIST National Institute of Standards and Technology U.S. Department of Commerce

OSAC Subcommittee Leadership

Position	Name	Organization	Term
Chair	Lora Sims	Ideal Innovations, Inc.	2021
Vice Chair	Angie Yankowski	Michigan State Police	2021
Executive Secretary	Dr. Jane Wankmiller	University of Northern Michigan	2021

OSAC Subcommittee Members

Name	Organization	Term
Walt Bruehs	FBI	2019
Mark Dolfi	LA Co Sheriff Dept	2021
Neal Gieselman	AWARE, Inc	2019
Leslie Kelly	Department of Defense	2021
Dr. Steven Lee	San Jose State University	2021
Ping Ma	University of Georgia	2020
Allison Miller	Biometrics Operations Division	2020
Paul Moody	Palm Beach County Sheriff's Office	2021
Emily Mullins	USG	2020
Todd Putorti	New York State Department of Motor Vehicles	2019
Dr. Kirt Simmons	AR Children's Hospital	2021
Debra Tennant	Federal Bureau of Investigation	2020
Antonio Trindade	US Border Patrol	2020
Steve Wilkins	Pierce Co Sheriff's Dept	2019

U.S. Affiliates

Justin Cook	Federal Bureau of Investigation
Edward German	Macon County Sheriff's Office
Jodie Linger	Federal Bureau of Investigation
Michael Streed	Baltimore County Police Department

Foreign Affiliates

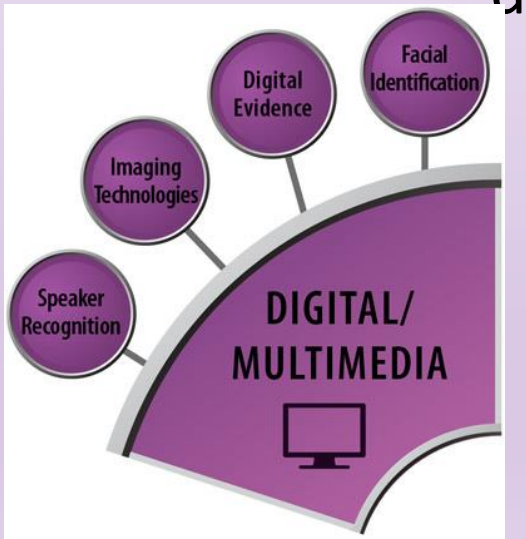
OSAC
Organization of Scientific Area Committees for Forensic Science

Carolyn Dutot	Canada Border Services Agency
Dr. Netta Lev Tov Chattah	Israel National Police
Michael Matheson	Department of Foreign Affairs
Campbell McGhee	INTERPOL
Reuben Moreton	Qumodo
Johanna Morley	Metropolitan Police Service
Patricia Moss	Australian Passport Office
Ruth Phillips	Metropolitan Police Service
Jason Prince	Australian Federal Police
Dr. Arnout Ruifrok	Netherlands Forensic Institute
Geoff Whitaker	UK Home Office
Dr. Caroline Wilkinson	Liverpool School of Art and Design

July 23-26, 2019
Orlando, FL

Discipline Description

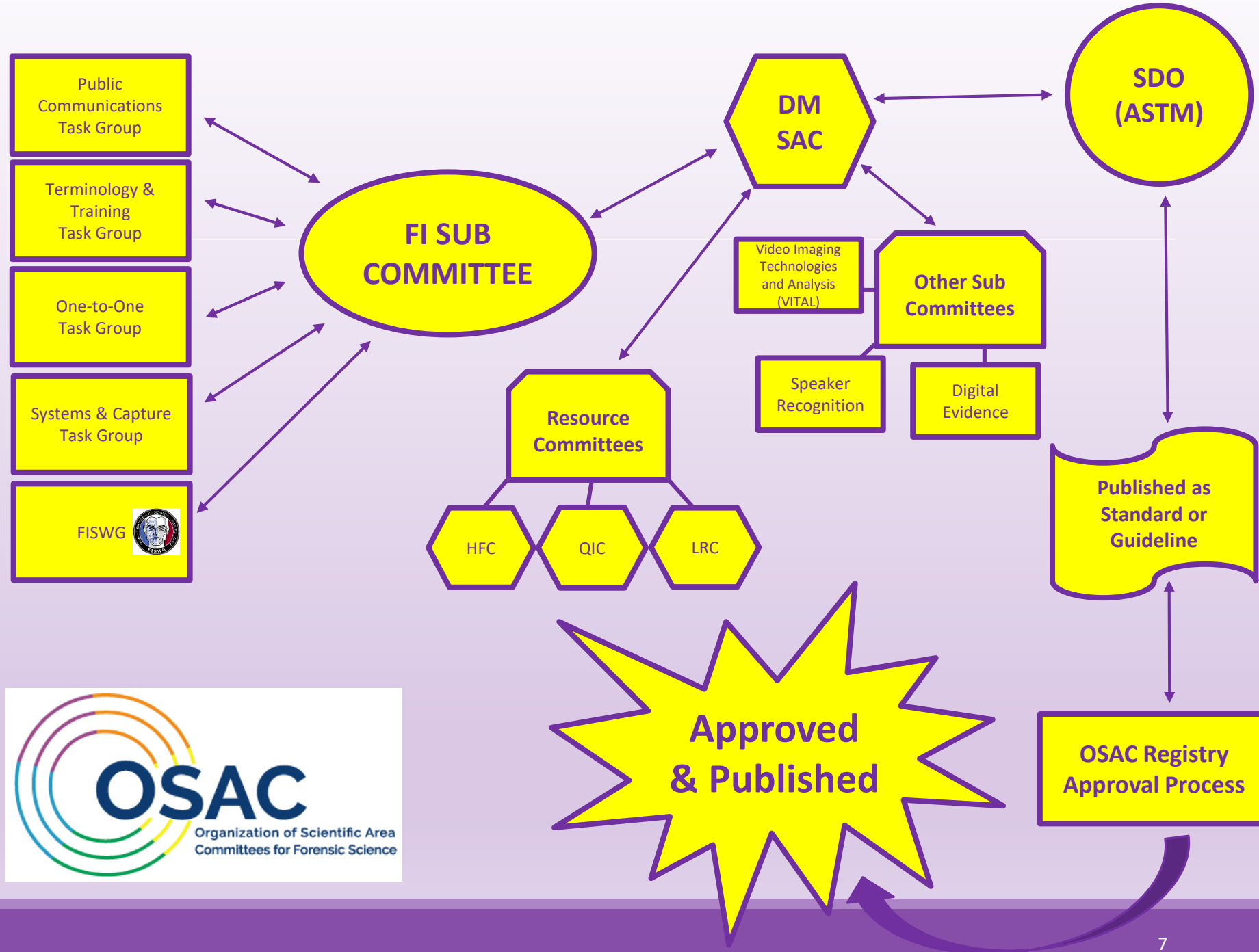
The Mission of the OSAC Facial Identification Subcommittee is to develop consensus standards and guidelines for the image-based comparisons of human facial features and to provide recommendations for the research and development necessary to advance the state of the science.



Similar mission of FISWG

OSAC
Organization of Scientific Area Committees for Forensic Science

FACIAL • IDENTIFICATION • SCIENTIFIC • WORKING • GROUP
FISWG

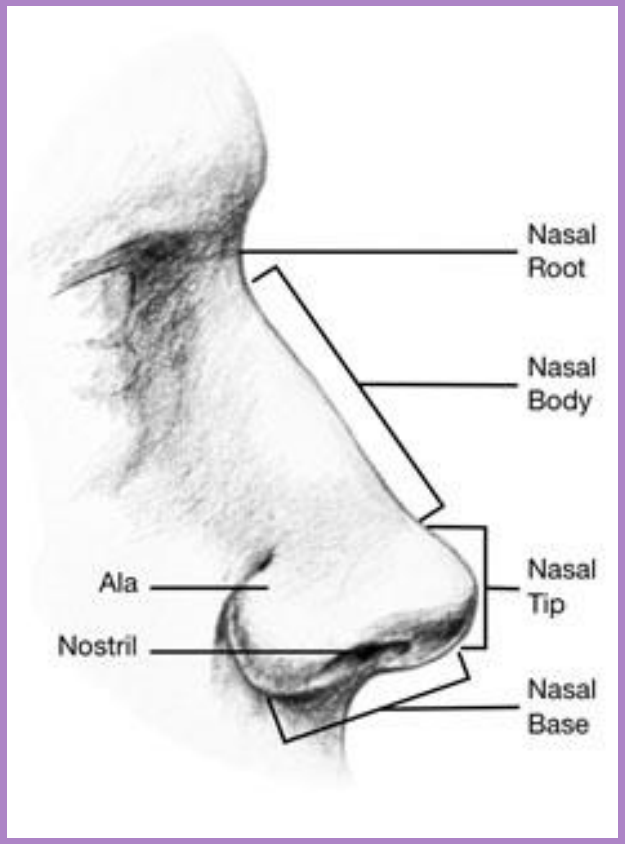

Public Communications Task Group
Terminology & Training Task Group
One-to-One Task Group
Systems & Capture Task Group
FISWG
FI SUB COMMITTEE
DM SAC
SDO (ASTM)
Video Imaging Technologies and Analysis (VITAL)
Other Sub Committees
Speaker Recognition
Digital Evidence
Resource Committees
HFC
QIC
LRC
Published as Standard or Guideline
Approved & Published
OSAC Registry Approval Process
OSAC
Organization of Scientific Area Committees for Forensic Science

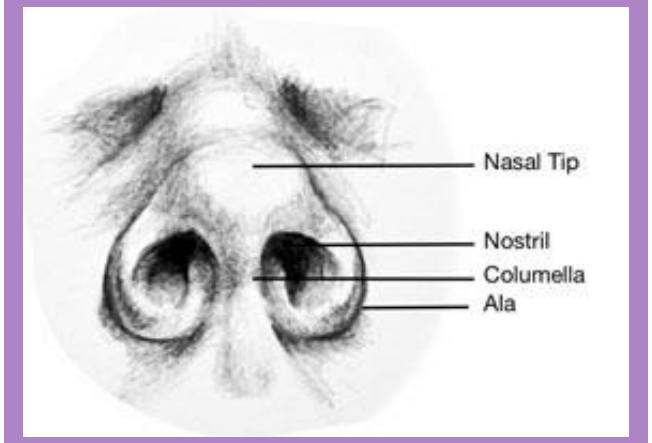
ASTM E3149-18 Standard Guide for Facial Image Comparison Feature List for Morphological Analysis

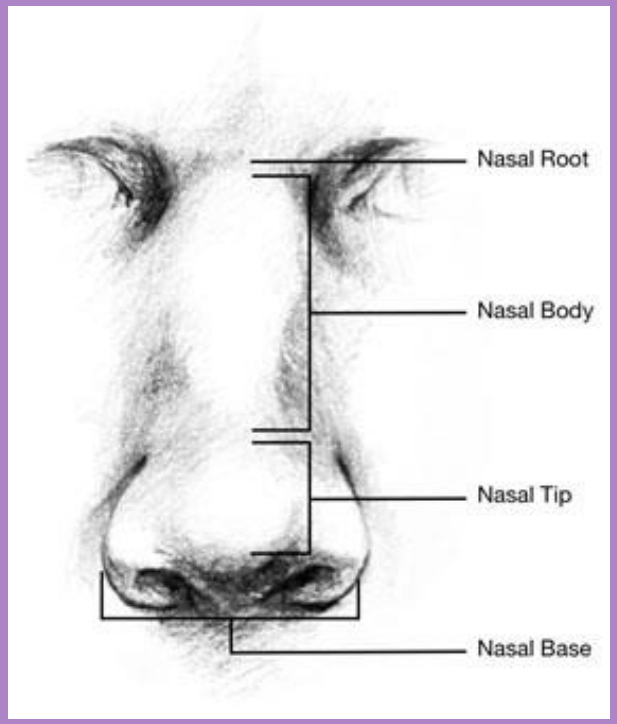
February 14, 2019

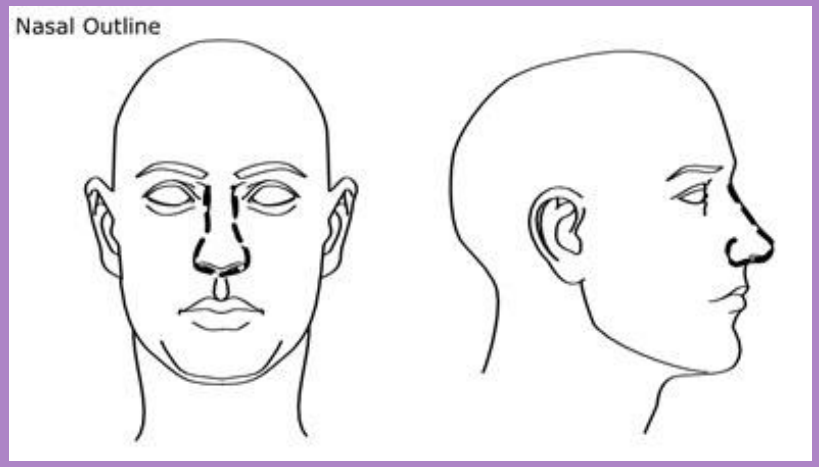
- Scope: To provide a standardized list to be considered when conducting morphological analysis
- Objective: Aids in providing a systematic way of comparing features of the face/head
- Key Components of Standard:
  - List of Facial Components (gross features considered in virtually all comparisons, e.g., Nose)
  - List of Component Characteristics (e.g., Root, Bridge, Tip, Nostrils, Columella, Alae)
  - List of Characteristic Descriptors (e.g., overall shape, relative length/width, prominence, size)

ID	Facial Components
1	Skin
2	Face/Head Outline
3	Face/Head Composition
4	Hairline/Baldness Pattern
5	Forehead
6	Eyebrows
7	Eyes
8	Cheeks
9	Nose
10	Ears
11	Mouth
12	Chin/Jawline
13	Neck
14	Facial Hair
15	Facial Lines
16	Scars
17	Facial Marks
18	Alterations
19	Other

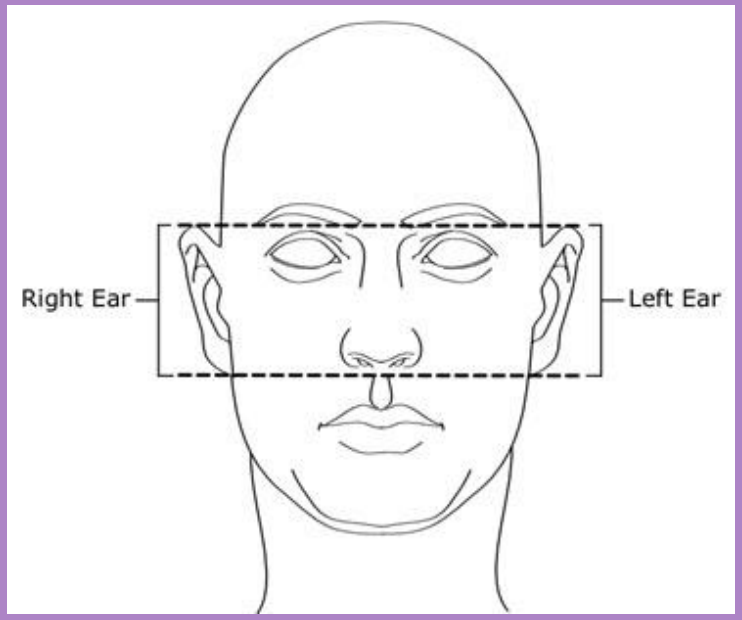


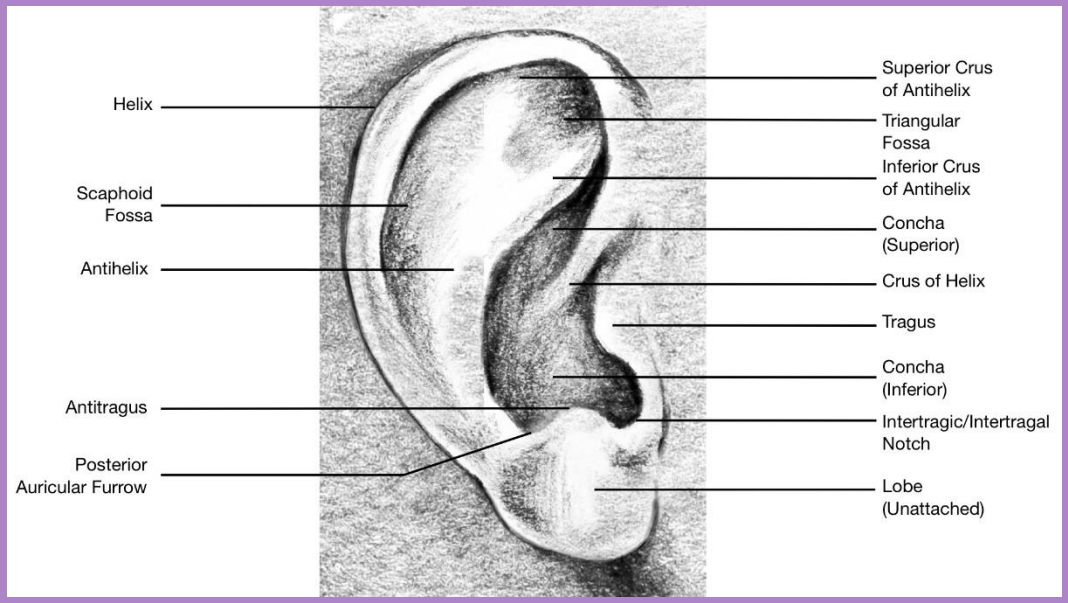


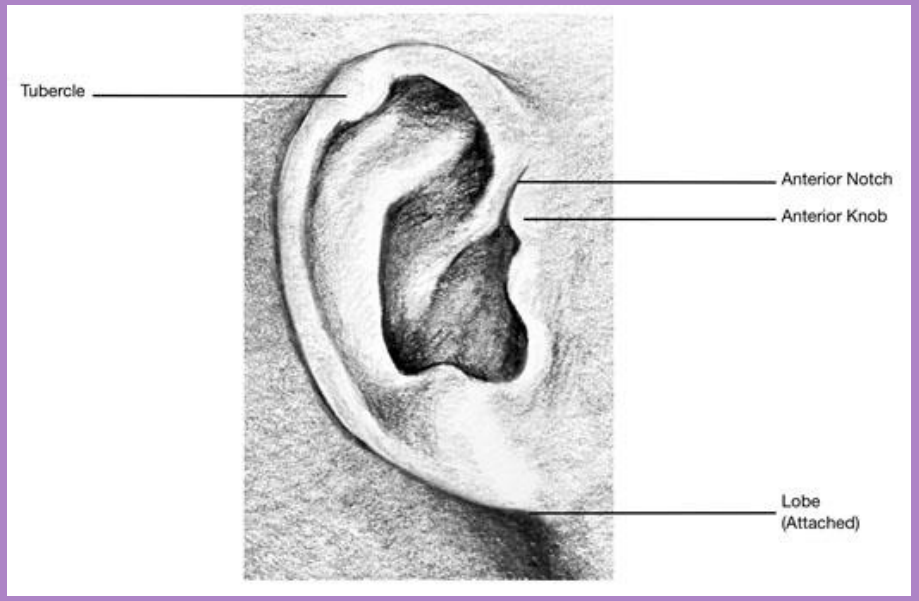


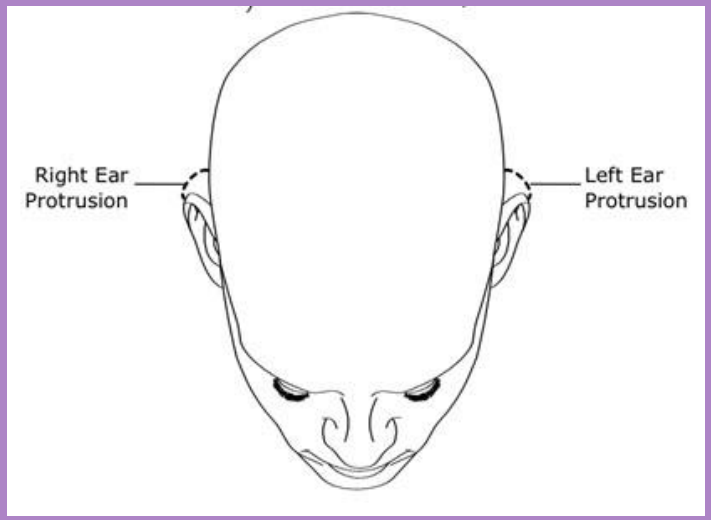


Drawings by J. Wankmiller









Drawings by J. Wankmiller

ASTM E3148-18 Guidelines for Postmortem Facial Image Capture

Standards in Process – Registry Approval Pending Public Comment Period until 9/5/2019

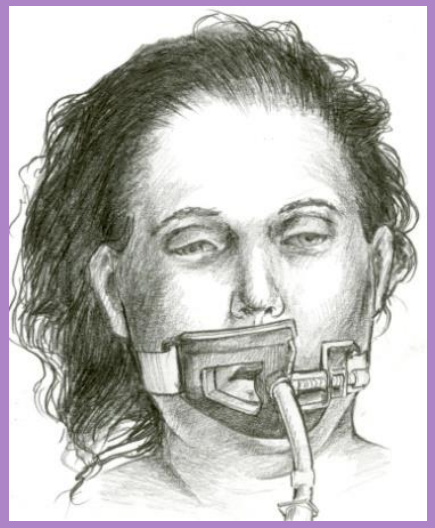
- Scope: To provide guidelines for capturing postmortem facial images of unidentified human remains in a controlled (morgue) and semi-controlled (field) settings to facilitate Facial Recognition (FR) searches or facial comparison that may contribute to determining the identity of the unidentified person.
- Objective: Provides an overview of the optimal processes and techniques for the capture of postmortem facial images of human remains in order to maximize their utility in FR searches and facial image comparisons.
- Key Components of Standard:
  - Image capture environment (lighting, camera position, and background)
  - Preparation of the subject body (head position, head coverings and accessories, shoulder position)
  - Preparation of the subject face (obscuring matter, hair, wounds or fragments, mouth, eyes, eyeglasses, prosthetics)
  - Use of video
  - Documenting scars, marks, tattoos (SMT)

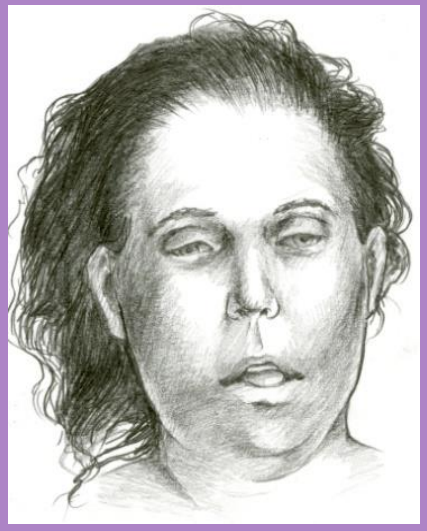
Other items to consider in this standard

- Decedent position
- Lighting
- Camera position
- Background
- Decedent Body preparation
  - Supine
  - Seated
  - Head covering

Photographic Environment in ME Office

Placement of the Body Block to Adjust Head Position for Capturing Frontal Image from Above





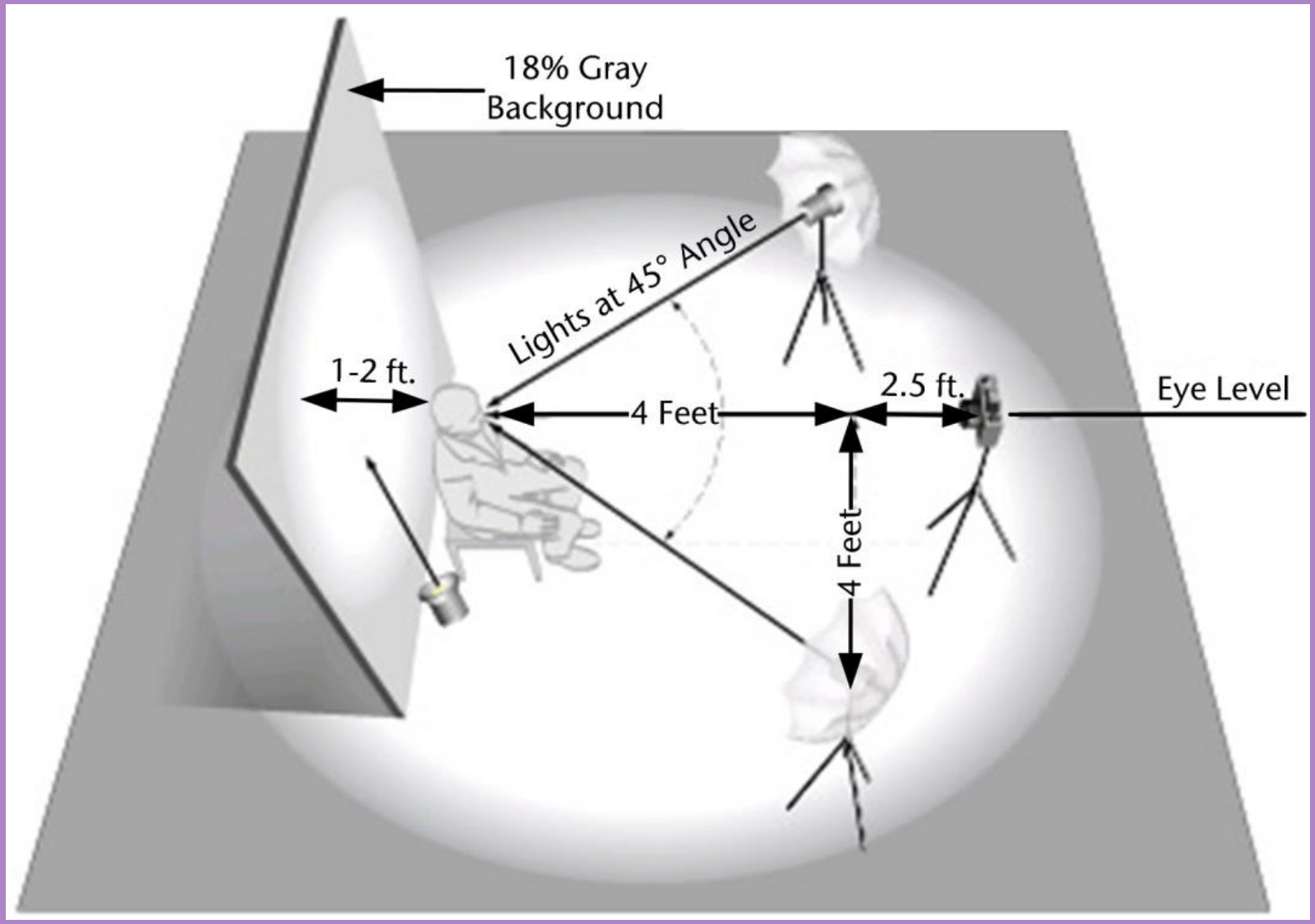
Evidence of Resuscitation Efforts or Other Medical Intervention, as Shown in this Figure, May Also Obstruct Portions of the Face

Drawings by J. Wankmiller

ASTM E3115-18 Capture And Equipment Assessment For Face Recognition Systems

Standards in Process – Registry Approval Pending Public Comment Period until 9/5/2019

- Scope: To provide best practices for collection to ensure the images captured are suitable for Face Recognition (FR) system use
- Objective: Provides an overview of the considerations a practitioner should take when making decisions for the capture of facial images.
- Key Components of Standard:
  - Image capture process as it relates to the following:
    - Controlled acquisition (when all imaging parameters can be adjusted as needed to optimize the resulting image, e.g. passport offices)
    - Semi-controlled acquisition (when some aspects of the environment or subject can be controlled, but not all aspects of both)
    - Ad-hoc acquisition (when neither the environment nor the subject can be controlled, e.g. surveillance, cell phones, and third party imagery).



Example of a Controlled Acquisition Environment

GUIDE FOR ROLE BASED TRAINING IN FACIAL COMPARISON

Standards in Process – Sent to SDO (ASTM)

- Scope: To provide recommendations for a role based training to achieve competency in facial comparison tasks
- Objective: Providing guidelines for training programs specific subject matter, relevant to facial reviewers and facial examiners required to conduct comparisons from the basic to the advanced level
- Key Components of Standard:
  - Overview of different roles and what training should be achieved at each role (e.g. manager should have an awareness of all things, facial examiner should be proficient in the majority of subjects)
  - Categories of Training (e.g. overview, skills & techniques, knowledge of processes, court preparation & presentation)

	Aptitude Testing	Introductory Overview	Skills and Techniques	Knowledge of Processes	Court Presentation	Instruction
Manager	N/A	AW	AW	AW	AW	N/A
Supervisor	N/A	CP	AW	AW	AW	AW
Collector	N/A	AW	CP	CP	CP	N/A
Facial assessor	AP	AW	AW	AW	N/A	N/A
Facial reviewer	AP	CP	CP	CP	AW	N/A
Facial examiner	AP	CP	CP	CP	CP	N/A
Technical reviewer	AP	CP	CP	CP	CP	N/A
System administrator	N/A	AW	AW	AW	N/A	N/A
Trainer	N/A	CP	CP	CP	CP	CP

AW – Awareness
AP - Aptitude
CP - Competency and ongoing Proficiency
N/A - Not Applicable

Matrix of minimum training recommendations

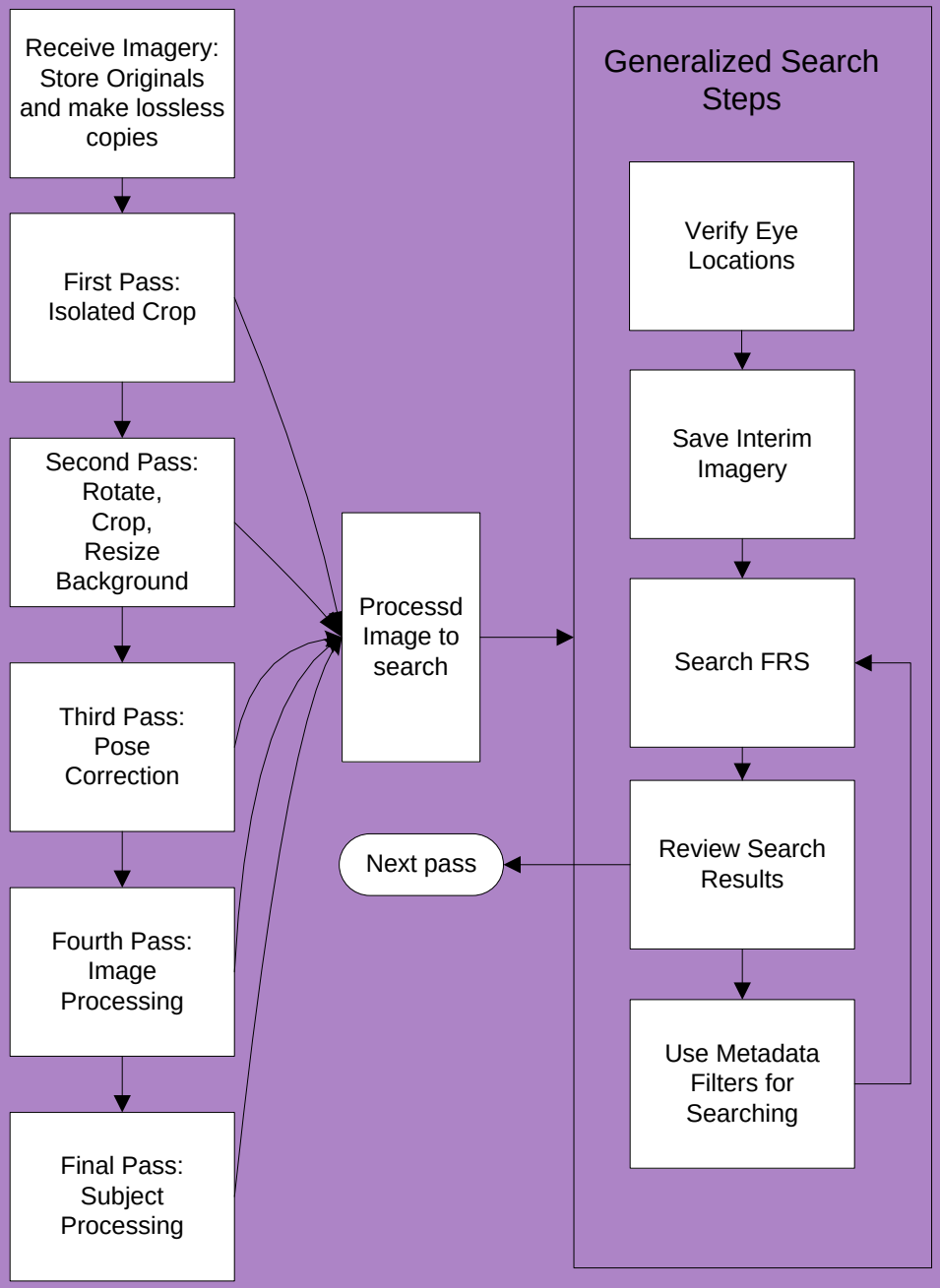
Image Processing to Improve Automated Facial Recognition Search Performance

Standards in Process – Starting the SDO process

- Scope: To provide facial examiner guidelines for processing a probe image in order to maximize the potential that an investigative lead will be included among the candidates returned following a facial recognition system (FRS) search.
- Objective: Images that meet agreed upon international standards (such as ISO/IEC 19794-5: Face Image Data) can normally be submitted to an FRS for searching with little or no operator intervention. Many FRS also include intrinsic mechanisms for correcting minor deviations in subject pose, image size or vendor specific adjustments to the image. Manual processing by a trained facial examiner may be beneficial for sub-optimal images (e.g. low resolution, heavily compressed or where the subject's pose, illumination, and/or expression are non-neutral).
- Key Components of Standard:
  - Generalized and sequential search process.
  - Adherence to standard workflows

Other items to consider in this standard

- Verify eyes can be found.
- Save interim image sets
- Search and review results
  - FRS results should be compared against the original probe image(s).
- Consider using metadata binning



Photographic Environment in ME Office

Physical Stability of Facial Features of Adults

Standards in Process – Starting the SDO process

- **Scope:** To be used in conjunction with ASTM E3149-18 for Morphological Analysis
- **Objective:** To describe the relative physical stability of facial features of adults when assessing the observed component characteristics within a single living subject as an aid to the facial comparison examiner.
- **Key Components of Standard:**
  - Addresses five factors that affect the stability of facial features in adults
  - All features are ranked as “Low”, “Moderate”, and “High stability”

Factors to consider in stability of Facial Features

- Expression
- Aging (short & long term)
  - Short term – 5 years or less
  - Long term – excess of 5 years
- Significant weight change
- Change in health
  - Not including trauma, inflammation, and tumors
- Intentional alteration

Face/Head Outline

The shape of the cranial vault does not change significantly in adulthood under normal conditions, but weight fluctuation or subdermal implants may give the appearance of change.

Changes in weight or expression affect the shape of the face with the latter dominated by movement of the lower jaw. The stability of the face shape over long periods of time may also be dependent upon tooth and related bone loss. Changes in health and intentional alterations (e.g. disease, maxillofacial surgery, orthodontic procedures, and cosmetic implants) may cause greater variation in the overall shape of the face.

Component Characteristic	Expression	Time-related Changes (Short Term)	Time-related Changes (Long Term)	Significant Weight Change	Changes in Health	Intentional Alterations
Shape of Cranial Vault	H	H	H	M	H	M
Overall Shape of Face	L	H	M	L	L	L

Forensic Face Note Taking and Reporting Requirements

Standards in Process – Starting the SDO process

- Scope: To provide minimum guidelines on note taking and reporting procedures for forensic facial comparisons
- Objective: To assist forensic examiners in documentation and report writing
- Key Components of Standard:
  - Gives general guidelines but still allows for agency specific requirements to be included into the note taking and reports

Research Gaps Identified

Validation of Physical Stability

- Literature review of relevant studies [scientific, medical, academic, and professional] regarding the physical stability of the facial features of adults detailed within the current Physical Stability of Facial Features of Adults document.
- In addition to the literature review, the conclusions reached based on relevant research should be presented to the subcommittee in layman's terms for incorporation into the document.

- Post Capture Imaging Processing
  - Best practices and scientifically validated techniques to improve facial image quality for biometrics and forensics

- Human Factors in Facial Image Comparison
  - Research to determine effective strategies for training in facial comparison and to develop testing material.
  - Research to validate the methods used by trained examiners to compare faces and establish effective case management and bias mitigation strategies.

- Assessment of the accuracy of getting Facial Images from DNA
  - Research to perform an objective evaluation of the performance of claimed techniques by vendor(s) who are selling technology that purports to create an accurate adolescent facial image from DNA.

- Evaluation into the Validity of Facial Comparison Training Methods *new*
  - conduct empirical validation of current facial comparison training courses for operational personnel to determine what aspects of training are required to improve facial comparison ability

Additional Items of Interest

- Current multi-subcommittee standards/guidelines
  - Virtual Subcommittee #1: ISO 17020/17025
  - Virtual Subcommittee #2: ANSI/NIST-ITL 1-2011
  - Virtual Subcommittee #3: ACE Process Map
  - Virtual Subcommittee #4: Training, Continuing Education & Professional Development
  - Virtual Subcommittee #5: Source Conclusions
- Future possible multi-subcommittee standards/guidelines
  - Presenting Evidence in Court (e.g. how to use visual aids)
  - Reporting findings
- Leverage those already on the affiliate list and encourage others within the community to join OSAC to assist with document development, research, etc.
  - Complete the OSAC membership application form found at: https://www.nist.gov/forensics/osac-application.cfm
  - Please be sure to specify your interest in the Facial Identification Subcommittee

OSAC documents in progress

- Additional standards/guidelines currently being worked on by FI Subcommittee (all in draft format)
  - Conclusion Scale
  - Guide/standard on Live FR use
  - Guide for Proficiency Testing in Role Based Facial Comparison
  - Guide for Aptitude Testing in Role Based Facial Comparison
  - Guide/standard/best practices for managing head coverings, accessories, and make-up (HCAM) for booking photographs

Application to OSAC

- For more information about OSAC or becoming a member:
  - https://www.nist.gov/forensics/organization-scientific-area-committees-forensic-science
  - https://www.nist.gov/osac-application-form

****Be sure to specify your interest in the Facial Identification Subcommittee**

FISWG/OSAC relationship

- FISWG & OSAC work together on development of additional standards & guidelines
- FISWG website has many other standards, guidelines, best practices, and use cases
- FISWG website contains FAQs regarding the FI discipline
- Meets separately from OSAC
  - Next FISWG meeting scheduled for October 21-25, 2019 at FBI CJIS campus in Clarksburg, WV.
  - Currently accepting membership applications to FISWG
    - Application information can be found at www.FISWG.org
- Questions regarding FISWG can be sent to: chair@fiswg.org

FISWG documents finalized

- Standards/guidelines finalized
  - Guide for Mentorship of Facial Comparison Trainees in Role Based Facial Comparison
  - Investigative Lead Note Taking and Reporting Requirements
  - Forensic Face Note Taking and Reporting Requirements
  - Physical Stability of Facial Features of Adults
  - Standard Guide for Capturing Facial Images for Use with Facial Recognition Systems

FISWG documents in progress

- Additional standards/guidelines currently listed on website as draft for comment
  - Facial Comparison Overview and Methodology Guidelines
  - Effects of Printing Methods on Facial Images used for Comparisons
  - Standard Guide for Scanning Facial Images
  - Minimum Training Criteria for Usage of Facial Recognition Systems
  - Image Factors to Consider in Facial Image Comparison

Application to FISWG

- For more information about becoming a member/participant of FISWG:
  - https://fiswg.org/members.html

Questions

Lora Sims
Lora.sims@idealinnovations.com