



FEDERAL BUREAU OF INVESTIGATION'S FACE PROGRAM

RICHARD W. VORDER BRUEGGE
SENIOR PHOTOGRAPHIC TECHNOLOGIST
OPERATIONAL TECHNOLOGY DIVISION

FACE: FORENSIC DISCIPLINE AND BIOMETRIC



Biometrics

- A measurable biological (anatomical and physiological) or behavioral characteristic used for identification

Face Recognition (FR) - the **automated** searching of a facial image in a computer database, typically resulting in a group of facial images ranked by computer-evaluated similarity



Event



Forensics

- Visible physical characteristics one can use for the purposes of measurements or comparisons that are collected after an event

Face Identification (FI) - the **manual** examination of the differences and similarities between two facial images for the purpose of determining if they represent different persons or the same person

WHY USE FACE RECOGNITION?

- Identification of unknown subjects
- Locating known subjects under different identities.
- Clustering subjects in unsorted data (seized/gathered media).
- Locating/linking associates through co-occurrence in photos.
- Matching subjects across multiple recordings/locations.
- Watch listing subjects to expedite/enhance tracking them.

CAN FACE RECOGNITION & FACIAL IDENTIFICATION BE USED IN COURT?

<i>Daubert Criteria</i>	<i>Meets Criteria</i>	<i>Means By Which Daubert Addresses Criteria</i>
1. Is the evidence based on a testable theory or technique?	✓	The National Institute of Technology (NIST) Multi- Biometric Evaluation (BME) 2010 and other challenges indicate the technique is testable.
2. Has the theory or technique been published and peer reviewed?	✓	FBI Forensic Audio, Video, and Image Analysis Unit (FAVIAU) utilizes published methodologies.
3. For a particular technique, does it have a known error rate?	✓*	NIST MBE 2010 and the Facial Recognition Vendor Tests (FRVT) 2006 establish error rate for many techniques.
4. For a particular technique, does it have standards governing its operational use?	✓*	Many U.S. and International standards including ISO/IEC 19794-5 and ANSI/NIST ITL 1-2011 Standards govern collection, analysis, and transmission.
5. Is the underlying science generally accepted within a relevant community?	✓*	Facial Identification Scientific Working Group establishes and maintains community consensus on underlying science.

*The criterion is currently addressed; however, improvements are desirable.

SCENARIOS TYPES

- One to Many (1:N) “Recognition/Identification”
- One to one (1:1) “Verification/Individualization”
- Many to Many (X:X) “Clustering”
- One to few (1:M) “Watch List”

SCIENCE AND TECHNOLOGY BRANCH



Science and Technology Branch



Criminal Justice
Information Services Division



Laboratory
Division



Operational
Technology
Division

BIOMETRIC CENTER OF EXCELLENCE (BCOE)

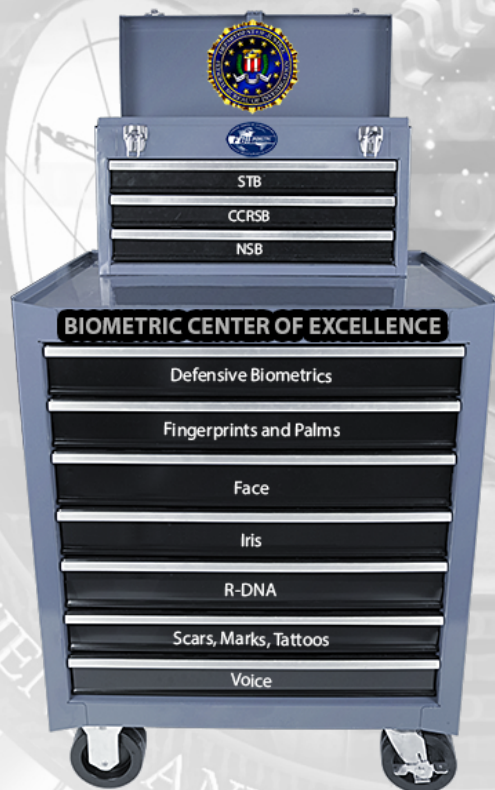


BCOE ACTIVITIES

- Promote /Sponsor Standards Development
- Sponsor Technology Test & Evaluation (T&E)
- Sponsor Applied Research
- Develop Prototypes/Sponsor Pilots
- Develop Training
- Address Privacy/Policy Issues
- Partner and Collaborate for Success



BCOE APPLIED RESEARCH PROJECTS



- Periocular Features
- Facial Analytics and Constituent Parts with Stills
- Forensic Use of Dermal Marks
- Unconstrained Face Recognition
- 2-D and 3-D Ear Patterns
- Face and Tattoo Recognition

FACIAL IDENTIFICATION SCIENTIFIC WORKING GROUP (FISWG) WEB SITE



- FBI's BCOE created the FISWG Web Site
- Mission – “Develop consensus standards, guidelines, and best practices for the discipline of image-based comparisons of human features.”
- www.fiswg.org
- Visit <http://www.nist.gov/forensics/osac.cfm> for information on evolving standards processes

NEXT GENERATION IDENTIFICATION (NGI)



NEXT GENERATION IDENTIFICATION
BIGGER — BETTER — FASTER

RAP BACK
RAPID MOBILE ID
IRIS
FACIAL
LATENTS
PALMS



5678901 (8100)1 23456(21)
1 11234
ACCESS APPROVED
112345678901 (8100)1 23456(21)1234567

NGI IMPLEMENTATION SCHEDULE

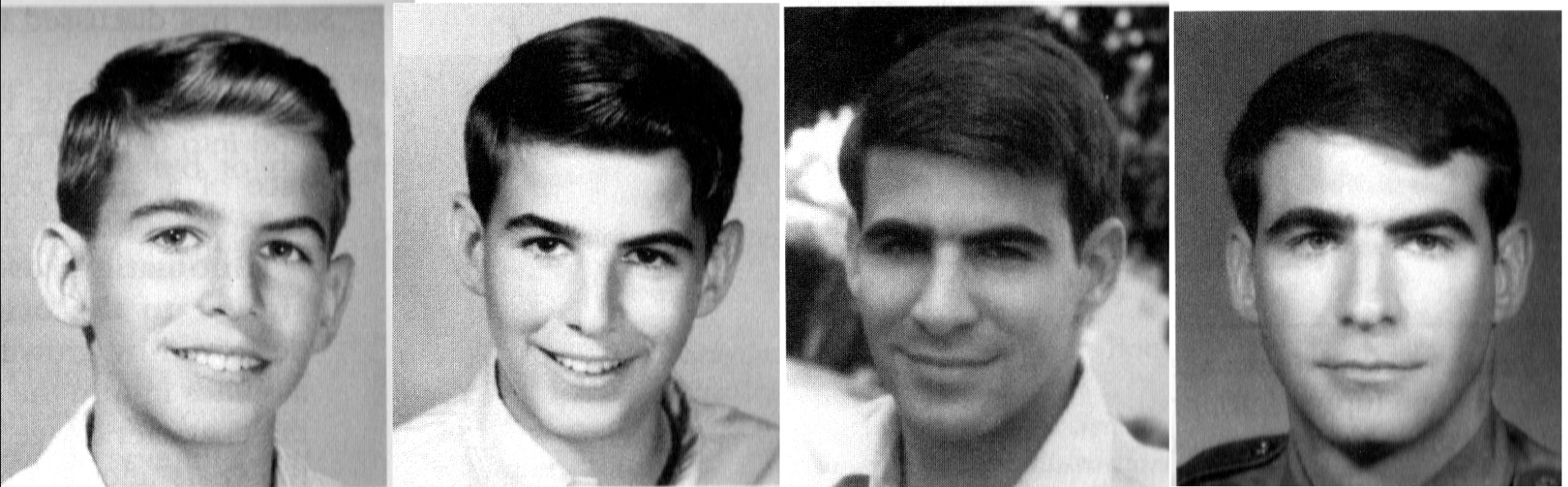




CHALLENGES FOR FACE RECOGNITION AND FACIAL IDENTIFICATION

AGE PROGRESSION

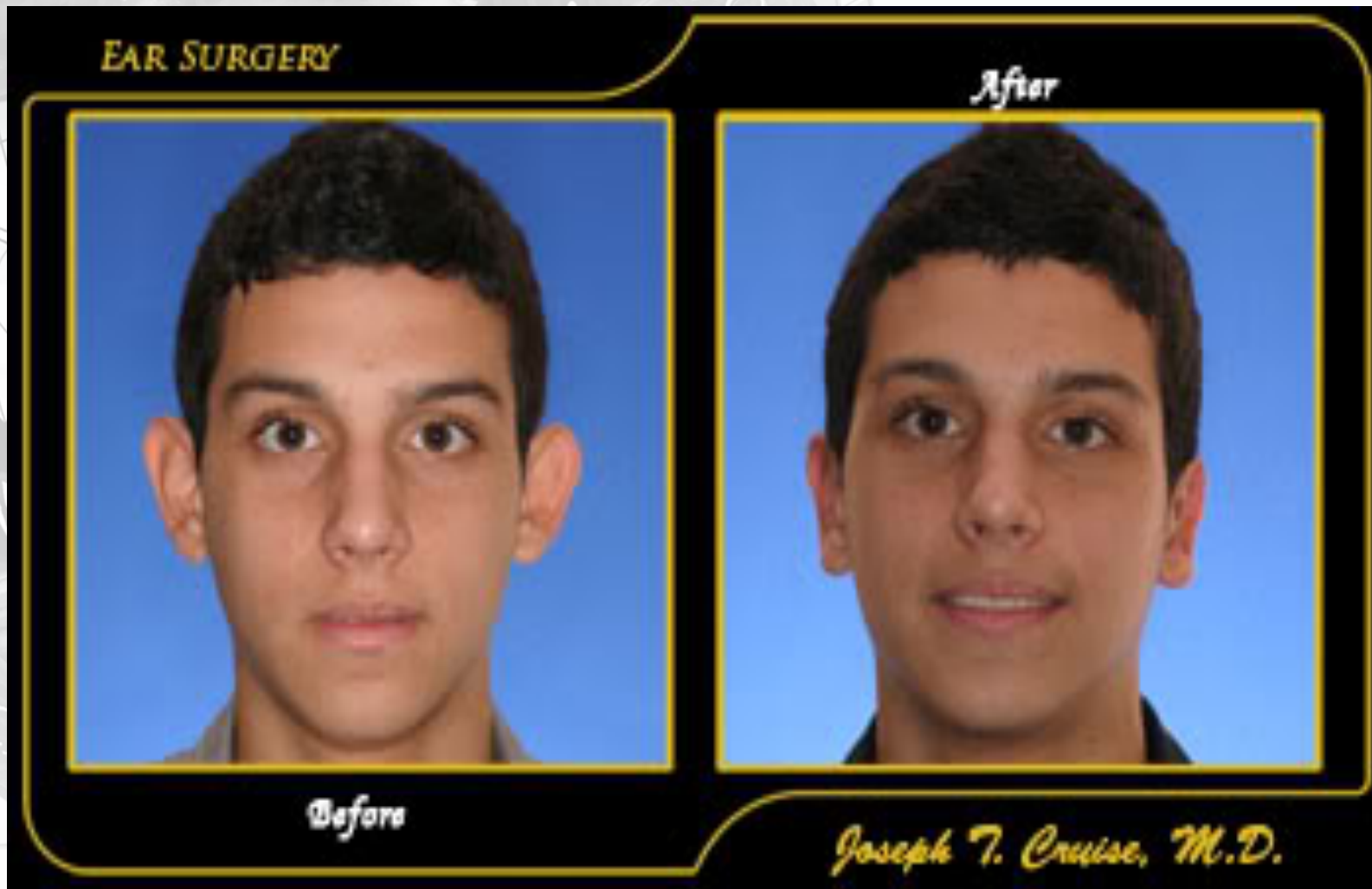
EXAMPLE



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PLASTIC SURGERY

EXAMPLE



PHYSICAL ALTERATIONS

EXAMPLE



before



after



BEFORE HAIR AND MAKEUP



AFTER HAIR AND MAKEUP



POSE CORRECTION

EXAMPLE



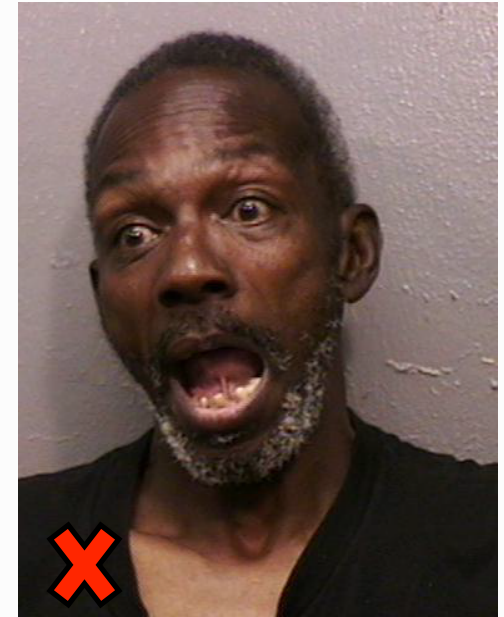
EVEN & NATURAL IMAGE ILLUMINATION

EXAMPLE



NATURAL EXPRESSION AND PROPER IMAGE COMPOSITION

EXAMPLE



SUBMISSION RECOMMENDATIONS

- Best Quality Image
- Prefer at least 480 X 640 resolution
- Prefer image received in digital format (scan image and submit in digital format)
- Obtain Original electronic version of photo whenever possible (direct copy from Government system, if possible)
- Ears Visible
- Head at level position
- Straight-on full frontal face shot
- Unobstructed Face
- Adequate light
- Neutral Expression
- Eyes open
- No glasses, sunglasses or headwear



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DISCOVER • DEVELOP • DELIVER

UNCLASSIFIED