



FBI BIOMETRIC CENTER OF EXCELLENCE

Innovating Biometrics

NIST International Biometric Performance Conference

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Criminal Justice Information Services Division
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Biometric Center of Excellence



FBI Biometric Initiatives



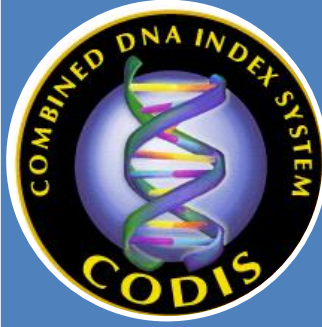
Integrated
Automated
Fingerprint
Identification
System

System



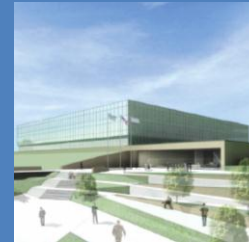
Next Generation
Identification

System



Combined DNA
Index System

System



Biometric
Technology
Center

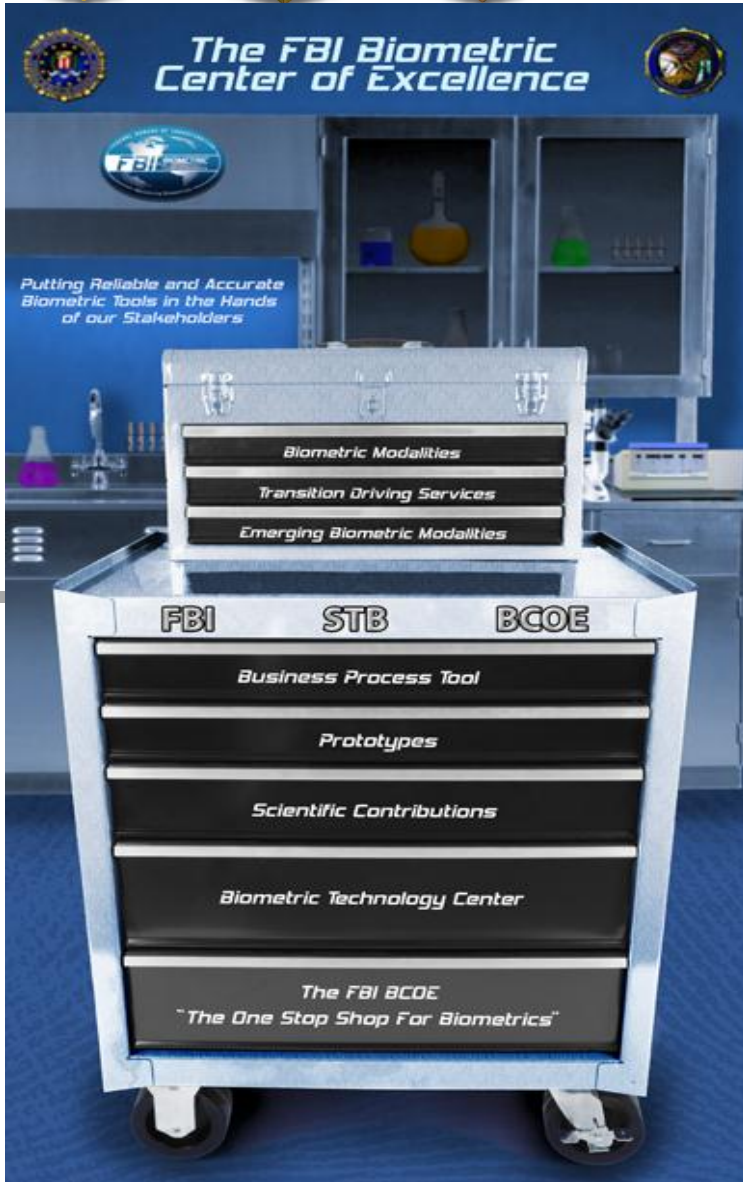
Building



Biometric Center
of Excellence

Program

FBI Biometric Initiatives



- **The Biometric Center of Excellence (BCOE)** is the FBI's program to explore new and enhanced biometric technologies for integration into operations.
- **BCOE Mission**
 - Foster Collaboration
 - Improve Information Sharing
 - Advance Adoption of Biometric and Identity Management Solutions



What Does the BCOE Do?

- Promote standards / Sponsor Standards Development
- Test and Evaluate Technologies
- Sponsor Research
- Develop Prototypes / Sponsor Pilots
- Develop Training
- Address Privacy/Policy



Collaboration is Key



BCOE Sponsored Projects

- Face
- Rapid DNA
- Tattoos
- Friction Ridge
- Voice Biometrics



Biometric Standards

- National Institute of Standards and Technology
 - Standards Development
 - Test and Evaluation
 - Biometric Web Services Interface Standards Support
 - Multiple Biometric Challenge Problems and Evaluation Support
- Scientific Working Groups
 - FISWG (face)
 - SWGFAST (friction ridge)
 - SWGDAM (DNA)



Automated Face Detection and Recognition (AFDAR) Prototype Software

- **Tool for forensic analysts to analyze video (and other media) and still images**
- **Return on Investment:**
 - Cost savings, crimes solved
- **Collaborating with other agencies regarding related projects and evaluation of AFDAR**





U.S. Government Facial Recognition (FR) Legal Series

- **Tool for USG agencies to discuss current and future uses of FR technology, legal and policy challenges to its use, and strategies for mission-effective, legally permissible use**
 - First forum in series held 8/31/2011 – Information Gathering
 - Second forum held 11/2/2011- Interoperability
 - Third forum will be held 3/14/2012 – Privacy
- **Collaboration and Sharing Lessons Learned**





Facial Comparison & Identification Training Development

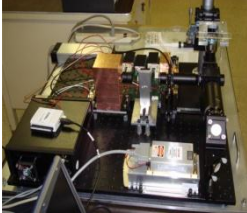


- **A tool for investigators and face examiners**
- **Proposed Course Options**
 - Introduction to Face Biometrics (4 hours)
 - Facial Identification Methods Overview (4 hours)
 - FBI Investigative Use of Face as a Biometric (8 hours)
 - Facial Comparison and Identification (2 days)
 - Advanced Facial Comparison (1 week)
- **Collaboration – Training being offered to and/or evaluated by other government agencies**



Rapid DNA Prototype

- **Tool for Law Enforcement – To use DNA at point of encounter for identification and to link to forensic profiles**



(Under Development R-DNA Systems)

- **Return on Investment**

- Cost Savings, Crimes Solved, Crimes Prevented
 - Next 6-18 months – Prototype Development, Testing, and Integration Planning
 - 2-3 years – Second Generation Prototype
 - 3-4 years – Pilot Testing in Crime Lab
 - 4 + years – Mature System Production
 - 4-7 years – Local Booking Station

- **Collaboration with DoD and DHS**



Tattoo | Graffiti ID Prototype

- **Tool for investigators and analysts to analyze symbols used in tattoos and graffiti for investigative purposes**
- **Return on Investment:**
 - Crimes solved (investigative leads)
- **Collaboration with academia and the National Gang Intelligence Center**



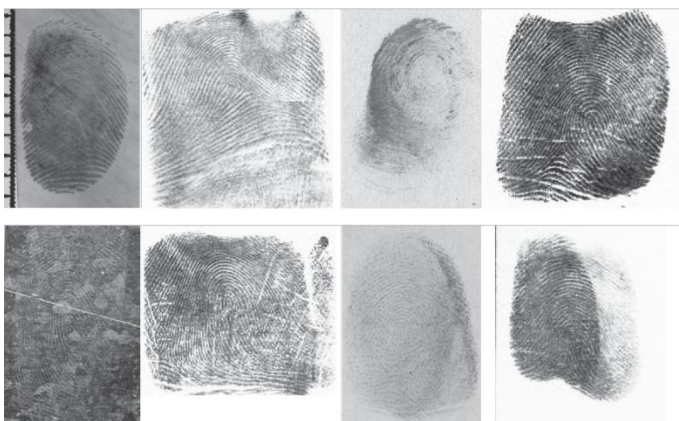


Friction Ridge

■ Tool for Latent Print Examiners to Support Courtroom Testimony

- Study of Accuracy of Latent Print Examiners – The Black Box Study
- Report available at

<http://www.pnas.org/content/108/19/7733>



The screenshot shows a web browser window with the URL <http://www.pnas.org/content/108/19/7733>. The page title is "Accuracy and reliability of forensic latent fingerprint decisions". The authors listed are Bradford T. Loney, R. Austin Hobbs, Jordan Buraglin, and Maria Antonia Roberts. The article is published in PNAS, Volume 108, Issue 19, August 23, 2011, pages 7733-7738. The abstract states: "The interpretation of forensic fingerprint evidence relies on the expertise of latent print examiners. The National Research Council of the National Academies and the legal and forensic sciences communities have called for research to measure the accuracy and reliability of latent print examiner decisions, a challenging and complex problem in need of systematic analysis. Our research focused on the development of empirical approaches to studying this problem. Here, we report on the first large-scale study of the accuracy and reliability of latent print examiner decisions in which 163 latent print examiners each compared approximately 100 pairs of latent and exemplar fingerprints from a pool of 346 pairs. The fingerprints were selected to include a range of attributes and quality encountered in forensic casework, and to be comparable to searches of an automated fingerprint identification system containing more than 58 million subjects. This study evaluated examiners on key decision points in the fingerprint examination process: procedures used operationally include additional safeguards designed to minimize errors. Five examiners made false positive errors for an overall false positive rate of 0.1%. Eighty-five percent of examiners made at least one false negative error for an overall false negative rate of 7.5%. Independent examination of the same comparisons by different participants (analogs to blind verification) was found to detect all false positive errors and the..."



Voice Biometrics

- Continuing to Enhance Voice Biometrics Technology Accuracy
 - Algorithm Enhancement by MIT Lincoln Lab
 - Software/Hardware Integration by Air Force Research Lab
- Progressing toward a Forensic Voice Data Format Standard
- Launched a new research project to establish a “Scientific Foundation” for voice biometrics by a team of scientists at MIT, Univ of Southern Calif, and Haskins Laboratories: 2014



Collaboration | With Academia

Applied Research

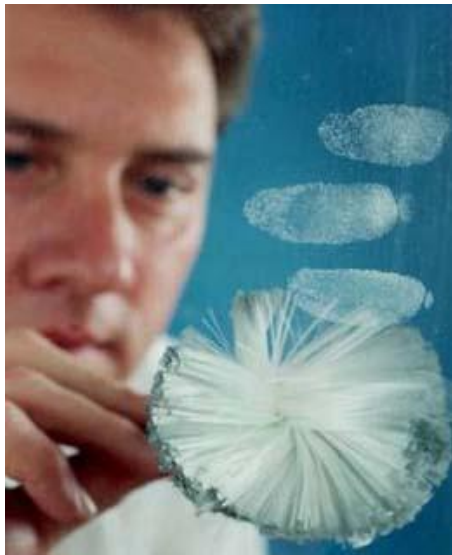


■ Automatic Detection of Altered Fingerprints Project

- Return on Investment: Solve crimes

■ Latent Fingerprint Enhancement Project

- Return on Investment: Expedite latent casework/reduce back logs – Solve crimes, cost savings



■ Friction Ridge Support Services Project

- Return on Investment: Training tool software prototype, friction ridge software prototype



Collaboration | With Academia

Applied Research

■ Biometric Collection Project

- **Return on Investment:** In-house “pristine” datasets for use in testing

■ Epithelial Cell Presence in Human Scent Evidence Project

- **Return on Investment:** Admissibility of DNA identifications in court

■ Handwriting Collection Project

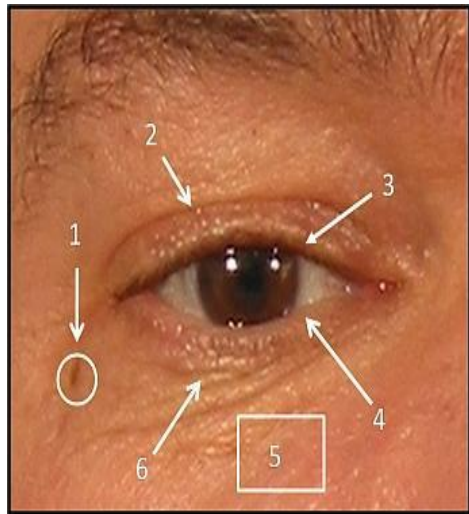
- **Return on Investment:** Validation of forensic case work, court admissibility, solve/prevent crimes, identify terrorist networks





Collaboration With Academia

Applied Research



■ Periocular Features Project

- **Return on Investment:** Solve crimes and provide additional investigative tool

■ Face and Component Face Analysis Project

- **Return on Investment:** Statistical models for forensic based ID and automatic biometrics



Collaboration With Academia

Applied Research

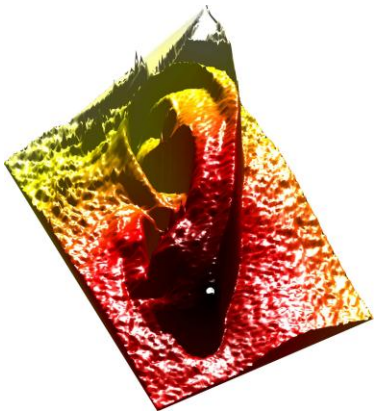


■ 2012 Twins Day Festival Collection Effort Project

- **Return on Investment:** In-house “pristine” datasets for use in testing

■ 2D and 3D Ear Patterns Project

- **Return on Investment:** Solve crimes and provide additional investigative tool





Privacy

- The FBI is committed to ensuring compliance with privacy laws, policies, and procedures
- Biometrics protect privacy by
 - Positively identifying subjects
 - Clearing those wrongly accused
- Protection of individual privacy rights and civil liberties is a top priority for the FBI



Looking Forward

Keeping an eye on....

- Ear
- Hand Images
- Scent
- Cardiac Signature





Online Resource: www.BiometricCoE.gov

- Visit our Web site
- or
- E-mail us at BiometricCoE@LEO.gov





Questions / Answers

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