



Latent Print Section

Program of Instruction (POI)

Comparative & Analytical Division



1. Scope

- 1.1. This document defines the training program for Latent Print Examiner (LPE) **Trainee's**, assigned to the Latent Print Section of the Houston Forensic Science Center (HFSC).
- 1.2. Upon successful completion of this training program, the LPE Trainee will be **competent** in the **examination and processing of physical evidence for the detection of friction ridge impressions as well as the** analysis, comparison, evaluation, and verification of friction ridge impressions. In addition, they will be **competent** in case documentation, including LIMS, chain of custody (COC) transfers, Mideo, AFIS entries, and report writing. The LPE will testify as an expert witness in courts of law, as required, to their findings and procedures.
- 1.3. The full Program of Instruction (POI) for an LPE is **4,160** hours. The total hours may be modified depending on the ability, skills, initiative of the Trainee, and extenuating circumstances.
 - 1.3.1. When the training program is modified, the **Training Coordinator**, Technical Lead, Section Manager, or designee must approve the modification.
 - 1.3.2. **When significant modifications are made to the training program the quality division must also approve the changes.**
 - 1.3.3. The training program is maintained by the **Training Coordinator**, Technical Lead, Section Manager, or designee and may not be altered without permission.

2. Responsibilities

2.1. Trainee Responsibilities

- 2.1.1. The trainee will be assigned to an authorized LPE who will act as their primary trainer. Authorized staff members in the Latent Print Section may also provide training in various areas if needed.
 - 2.1.1.1. Trainee will maintain all training records in a format that will allow the primary trainer, Technical Lead, **Training Coordinator**, Quality and designee's access. One Drive is the preferred method.
 - 2.1.1.2. The trainee will provide the primary trainer with weekly Training Logs.
 - 2.1.1.3. The trainee must pass each written exam with a score of 80% or higher. The trainee must pass the practical exam by obtaining 90% of expected conclusions.
 - 2.1.1.4. The trainee should accompany examiners to court to gain exposure to expert testimony on latent prints when/if possible.
 - 2.1.1.5. Any latent print training classes available during the training phase should be attended by the trainee when/if possible.

2.2. Primary Trainer Responsibilities

- 2.2.1. Monthly Training Reports (MTR) **will be provided** to the **Training Coordinator**, Section Manager, Technical Lead, and the Trainee's Supervisor. These reports are due within ten working days of the last day of each month.
- 2.2.2. MTR's will be submitted in the form of a memorandum and should include, at a minimum, the following information:
 - 2.2.2.1. The Trainee's name and POI title.



- 2.2.2.2. The chapters covered during the month and if the chapters were completed successfully
- 2.2.2.3. The chapters scheduled to be completed for the next month.
- 2.2.2.4. The trainee's progress through the POI and scheduled completion date (i.e. ahead or behind schedule, account for adjustments).
- 2.2.2.5. Significant accomplishments during the month.
- 2.2.3. **Assessments in the form of written exams, verbal exams and/or practical exams will be given during and/or after each module to evaluate the knowledge of the trainee, the ability of the trainee to articulate concepts and the ability of the trainee to demonstrate skills.** After each exam or practical exam, the primary trainer and/or designated module trainer will meet with the trainee to discuss the trainee's performance.
- 2.2.4. If a trainee fails a written **or verbal** exam, the trainer will review with the trainee areas that were unsatisfactory. The trainer may retest by either written or oral examination. If the trainee can successfully articulate the answer, written or orally, credit will be given. If the trainee cannot successfully articulate the answer, remedial review sessions are required, and a new exam will be administered. If the trainee makes one or more erroneous identifications and/or scores less than 90% on the practical examination, remedial training is required- **and** a new practical examination will be administered.
- 2.2.5. If the trainee does not perform to an acceptable level on the retraining and retesting, a memorandum will be issued **by the primary trainer or training coordinator** to the Trainee's Supervisor and Section Manager, Technical Lead, or designee listing the deficiencies and remediation steps taken. The Supervisor, Section Manager, Technical Lead, or designee will determine the course of action based on the primary trainer **or Training Coordinator** recommendations.
- 2.2.6. Monthly update meetings will be scheduled by the **Training Coordinator** to discuss the trainee's progress. When necessary, the primary trainer and/or module trainer will organize a meeting with the trainee's Supervisor, **Training Coordinator**, Technical Lead, and primary trainer to discuss any challenges or complications.

3. Overview of Program of Instruction

- 3.1. This **module** listing does not preclude the **addition of** other pertinent topics, **readings, exercises, etc.** as applicable and/or related to the science of fingerprints, forensic science, and the criminal justice system. The Section Manager, Technical Lead, **Training Coordinator**, or designee must approve additional **modules** or topics prior to instruction or incorporation into the program.
- 3.2. Blocks of instruction may be segmented as necessary for optimal trainee understanding of the subjects and concepts presented. All courses will be supplemented by required readings, group discussion, independent and directed study, exercises, and/or research



(or any combination thereof).

- 3.3. If a trainee has previous training and/or experience, they may be able to take a comprehensive assessment to be waived out of **modules** or portions of **modules**.



Latent Print Section
Latent Print Program of Instruction (POI)
Comparative & Analytical Division

Module	Course of Instruction	Training (Hours)	Trainer	Date
1	Introduction to Forensic Science	120		
2	Evidence Handling and Safety	80		
3	History of Fingerprint Identification	80		
4	Biological Aspects of Friction Ridge Skin	120		
5	Friction Ridge Pattern Recognition	40		
6	Obtaining Inked Finger, Palm, and Foot Prints	120		
7	Analysis, Comparison, Evaluation, Verification	1040		
8	Automated Fingerprint Identification Systems (AFIS)	80		
9	Digital Imaging of Latent Prints	80		
10	Cognitive Factors in Comparative Analysis	80		
	Processing			
11	Latent Print Development Techniques	320		
12	Latent Print Photography	80		
13	Competency Test (Processing & Comparison)	40		



Latent Print Section
Latent Print Program of Instruction (POI)
Comparative & Analytical Division

14	<u>Supervised Casework (Processing & Comparison)</u>	320/1040		
15	<u>Court Testimony and Ethics (Processing & Comparison)</u>	240		

Module 1: Introduction to Forensic Science

1. Training Objectives:

- 1.1. Familiarization with HFSC, the Quality Division, and the Latent Print Section.
- 1.2. Introduction to the HFSC Quality Manual as well as section specific Standard Operating Procedures.
- 1.3. Understanding of quality assurance/quality control guidelines at HFSC.
- 1.4. Understanding of ISO 17025:2017 and accreditation as it is applied to HFSC and the Latent Print Section.
- 1.5. Understanding of the way evidence flows through the laboratory **and how the work processes of different disciplines impact one another.**
- 1.6. Understanding of best evidence handling practices to ensure the integrity of the evidence for all disciplines.
- 1.7. Understanding of how Multiple Disciplinary Requests (MDRs) are handled at HFSC.
- 1.8. Working knowledge of latent print development techniques that may interfere with laboratory analysis by other forensic disciplines.

Required Readings:	Trainee	Completion Date
HFSC administrative policies and procedures		
Quality Manual, Houston Forensic Science Center		
Security Manual, Houston Forensic Science Center		
Standard Operating Policies, Latent Print Section		
ISO 17025:2017 and supplemental documents		
Fingerprint Sourcebook, NIJ, Chapters 7, 8, and 12		
NIST Expert Working Group on Human Factors, Latent Print Examination and Human Factors, NIJ, 2012, Chapter 5		
Criminalistics, 12th edition, Saferstein, Chapters 1-4		

Training Exercises: None		
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Training Standards:	Trainee/Trainer	Completion Date
Self-study for required reading		
The Trainee must pass a written test on required reading		
Shadow other HFSC forensic disciplines, including Latent Print Processing		
Shadow Support Specialist and/or designee handling of MDRs		



Module 2: Evidence Handling and Safety

2. Training Objectives:

- 2.1. Obtain the knowledge and practical skills to properly handle, mark, package, and transport physical evidence, thereby preserving its integrity and evidentiary value.
- 2.2. Learn about the equipment used by the Latent Print Section.
- 2.3. Understanding of basic health and safety issues such as potential biological hazards, personal safety hazards posed by bloodborne pathogens, procedures for handling sharps, and the use of personal protective equipment (PPE).
- 2.4. Understanding of the importance of proper chain of custody.
- 2.5. Understanding of proper safety procedures when in Latent Print Processing.

Required Readings:	Trainee	Completion Date
Quality Manual, Section 7.4 Handling of Evidence		
Criminalistics, Saferstein, pgs. 47 and 48		
Health and Safety Manual, Houston Forensic Science Center		
Fingerprint Sourcebook, NIJ, Chapter 11		
Safety for the Forensic Identification Specialist, Masters Chapters 4-6, 8, 13, 14, 16-18, and 20		
Handling of Evidence & Documentation Procedures, HFSC SOP		

Training Exercises: None		
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Training Standards:	Trainee/Trainer	Completion Date
Self-study for required reading		
The Trainee must pass a written test on required reading		
Tour of Latent Print Processing with an understanding of safety issues		
Successfully pass Firearms Safety Training		



Module 3: History of Fingerprint Identification

3. Training Objectives

- 3.1. Gain knowledge on the background and history of the science of fingerprints.
- 3.2. Learn about historical people, events, and early methods of identification.
- 3.3. Learn the earliest recorded awareness of fingerprints.
- 3.4. Understanding of the scientific observations leading to modern fingerprint identification.
- 3.5. Learn the chronology of fingerprints throughout the world and in the United States.

Required Readings:	Trainee	Completion Date
Fingerprint Source Book, NIJ, Chapter 1, Appendix B		
Quantitative-Qualitative Friction Ridge Analysis, Ashbaugh, Chapters 1-2		
Bradford, R. Mary E. Holland. America’s First Finger Print Instructor, The Print, 1998, 14(5):1-2		
Champod, C. et al, Alphonse Bertillon and Dactyloscopy, JFI, 1993, 43(6):604-625		
Sodhi, G.S. et al, The Forgotten Indian Pioneers of Fingerprint Science, Current Science, Vol 88 (1), January 2005		
IAI 1973 Resolution, August 1973 Pgs. 13 - 14		
The report of the International Association for Identification, Standardization Committee, March 2011		
OSAC: https://www.nist.gov/osac		
IAI: https://www.theiai.org/iai_history.php		

Training Exercises:		
Write a short synopsis of the contributions of each of the following figures: Hershel, Faulds, Galton, Vucetich & Henry		
Create a timeline of important historical events as they pertain to friction ridge skin		

Training Standards:	Trainee/Trainer	Completion Date
Self-study for required reading		
The trainee must pass a written test on required reading		



Module 4: Biological Aspects of Friction Ridge Skin

4. Training Objectives:

- 4.1. Gain knowledge on the biology/physiology of friction ridge skin.
- 4.2. Understanding of the formation of friction ridges during fetal development prior to birth.
- 4.3. Understanding that the friction ridge skin arrangement is unique and persistent through the life of the individual, barring scars, some diseases and decomposition after death.
- 4.4. Understanding of the biological significance of friction skin ridge patterns, the basic anatomy, and terminology of the hands and feet.
- 4.5. **Ability to articulate concepts of embryology and physiology.**

Required Readings:	Trainee	Completion Date
Fingerprint Source Book, NIJ, Chapters 2 & 3		
Criminalistics, 12th edition, Richard Saferstein, pages 131-134		
Quantitative-Qualitative Friction Ridge Analysis, Ashbaugh, Chapter 3		
Fingerprints and Other Ridge Skin Impressions, Champod, CRC, Chapter 1		
Scott's Fingerprint Mechanics, Olsen, Chapter 1, Pages 5-14 and 24-30		
The Critical Stage of Friction Ridge and Pattern Formation, Wertheim and Maceo, JFI, 52 (1), 2002, pps.35-85		
Embryologic Development of Epidermal Ridges and Their Configurations, Birth Defects, Babler, Original Article Series March of Dimes Defects Foundation (1991) 27(2):95-112		
Defined Pattern, Overall Pattern, and Unique Pattern, Ashbaugh, D., JFI, 42(6):503-512		
Congenital Malformations of Human Dermatoglyphs, David, T.J., Download from adc.bmj.com, January 2009		
Scars in Friction-Ridge Skin, Maceo, A., Evidence Technology Magazine, July-August 2005, pp. 26-28		

Training Exercises:		
Find and read two articles published within the past 7 years on the biology and physiology of friction ridge skin		
Give a presentation on these papers to the Latent Print Section		
Q&A discussion on the concepts of biology of friction ridge skin		

Training Standards:	Trainee/Trainer	Completion Date
Self-study for required reading		
The Trainee must pass a written test on required reading		



Module 5: Friction Ridge Pattern Recognition

5. Training Objectives:

- 5.1. Understanding of common terminology and definitions associated with friction ridge pattern recognition.
- 5.2. Understanding of basic classification systems (Henry, NCIC).
- 5.3. Basic understanding of friction ridge formations as they relate to recognition, orientation, interpretation, and identification.

Required Readings:	Trainee	Completion Date
The Self-Made Tapestry: Pattern Formation in Nature, Ball, Chapter 1		
Fingerprint Source Book, NIJ, Chapter 5		
The Science of Fingerprints, FBI, Chapters 2-8		
Friction Ridge Skin, Cowger, Chapter 3		
Scott's Fingerprint Mechanics, Olsen, Chapter 1, pp 15-23		
Ashbaugh, D. Palmar Flexion Crease Identification, JFI, 1991, 41(4):255- 273		
Discriminability of Fingerprints of Twins, Srihari, S. et al, JFI, 2008, 58(1):109-127		
Hand Determination of Whorl Patterns Using Axis Slant, Brazelle, JFI 68(1)		

Training Exercises:		
Classify five fingerprint cards including ridge counts and reference patterns		

Training Standards:	Trainee/Trainer	Completion Date
Self-study for required reading		
The Trainee must pass a written test on required reading		



Module 6: Obtaining Inked Finger, Palm, and Foot Prints

6. Training Objectives:

- 6.1. Understanding of the materials, procedures, methods, and techniques for recording finger, palm and sole prints.
- 6.2. Demonstrate an acceptable proficiency level in recording friction ridge skin and the importance of recording all friction ridge detail (major case prints).
- 6.3. Understanding the various methods for recording known friction ridges for criminal history or personal identification; including ink, inkless systems, Handiprint, and electronic capture systems.
- 6.4. Understanding the proper method of completing fingerprint and palm print card information, sequence for recording fingers, and method and purpose of printing plain impressions.
- 6.5. Understanding of procedures and equipment used in fingerprinting deceased persons.

Required Readings:	Trainee	Completion Date
The Fingerprint Source Book, NIJ, Chapter 4		
The Science of Fingerprints, FBI, Chapters 9-11, and 19		
Scott’s Fingerprint Mechanics, Olsen, Chapter 2		
Friction Ridge Skin, Cowger, Chapter 2		
Wertheim, P. Inked Major Case Prints, JFI, 1999, 49(5):468-177		
“Using Fingerprint Powder to Record Friction Ridge Details from a Cadaver”, JFI, Vol. 59, No. 3, 2009		
“Artifacts Caused by Livescan Affect a latent Print Comparison: An Action Case”, JFI, Vol. 69, No. 1, 2019		

Training Exercises:		
Take a complete set of fingerprints from five different subjects		
Take a complete set of palm prints from five different subjects		
Take a complete set of foot prints from two different subjects		
Take a complete set of major case prints from two different subjects using ink		
Take a set of major case prints from two different subjects using HandiPrint		



Latent Print Section
Latent Print Program of Instruction (POI)
Comparative & Analytical Division

Training Standards:	Trainee/Trainer	Completion Date
Self-study for required reading		
The Trainee must pass a written test on required reading		



Module 7: Analysis, Comparison, Evaluation, Verification (ACE-V)

7. Training Objectives:

- 7.1. Understanding of the ACE-V methodology and its application to friction ridge examination and the ability to analyze partial friction ridge impressions to determine their value.
- 7.2. Understanding of the use/criteria of NAQ, AQ, NV, NRD, PSL, and VEO for analysis determinations.
- 7.3. Understanding of friction ridge characteristics, terminology, and the varying definitions/interpretations assigned to combinations of ridge characteristics and their use in comparisons.
- 7.4. Understanding of the relationship between quality and quantity throughout the ACE-V process.
- 7.5. Understanding the value of incipient ridge characteristics in an impression.
- 7.6. Ability to recognize and utilize ridge flow configurations, scars, creases, and other friction ridge characteristics to support latent print examination.
- 7.7. Ability to recognize/determine anatomical source and orientation from which a latent print originated.
- 7.8. Understanding of the effects of distortion and how to properly analyze distortion.
- 7.9. Understanding the nature of tonal reversals and the ability to properly analyze these occurrences when they are encountered in latent print impressions.
- 7.10. Ability to recognize simultaneous impressions and understanding their value for comparison.
- 7.11. Understanding of the history of a point standard internationally and nationally and why there is currently no minimum “number” of points needed for an identification.
- 7.12. Demonstrate the ability to properly conduct a comparison.
- 7.13. Understanding of the criteria needed for an identification, exclusion, or inconclusive determination.
- 7.14. Awareness of the impact of an erroneous conclusion.
- 7.15. Basic awareness of research into statistical models and the potential for their integration into current friction ridge comparison procedures in the future.
- 7.16. Understanding of the importance of verification.
- 7.17. Demonstrate the ability to effectively articulate each phase of ACE-V.**

Required Readings:	Trainee	Completion Date
Quantitative-Qualitative Friction Ridge Analysis, Ashbaugh, Chapters 4-8		
Fingerprint Source Book, NIJ, Chapters 9, 10, and 14		
Friction Ridge Skin, Cowger, pages 129-206		
Advances in FP Technology, 2nd Edition, Lee and Gaensslen, Chapter 2		
Advances in FP Technology, 3rd Edition, Lee and Gaensslen, Chapter 15		
Fingerprints and Other Ridge Skin Impressions, C. Champod, Chapter 2		



Latent Print Section
Latent Print Program of Instruction (POI)
 Comparative & Analytical Division

NIST Expert Working Group on Human factors, Latent Print Examination and Human Factors, NIJ, 2012 - Chapters 1-4		
"Coins in the Pocket: A Simple Explanation of Quantitative-Qualitative Friction Ridge Analysis", JFI, Vol. 55, No. 3, 2005		
"Distortion versus Dissimilarity in Friction Skin Identification", JFI, Vol. 48, No. 2, 1998, William Leo		
"ACE-V and the Scientific Method", JFI, Vol. 60, No. 1, 2010		
"Detection of Forged and Fabricated Latent Prints", Wertheim, JFI, 1994, 44(6):652-679		
"A Performance Study of the ACE-V Process: A Pilot Study to Measure Accuracy, Precision, Reproducibility, Repeatability, and Biasability of Conclusions", JFI, Vol. 59, No. 2, 2009		
"Incipient Ridges and the Clarity Spectrum", Ashbaugh, D., JFI, 1992, 42(2):106-114		
"Level 3 Details and Their Role in Fingerprint Identification: A Survey among Practitioners", JFI, Vol. 58, No. 5, 2008		
"The Etiology of ACE-V and Its Proper Use: An exploration of the Relationship Between ACE-V And the Scientific Method of Hypothesis Testing", JFI, Vol. 56, No. 3, 2006		
"Friction Ridge Examination: ACE-V Documentation", Maceo, A., Holy Grail, Aug 2014		
"Qualitative Assessment of Skin Deformation: A Pilot Study", Maceo, A., JFI, 2008, 59(4):390-440		
"Sufficiency and Standards for Exclusion Decisions", Ray, E. et al, JFI, 2013, 63(6):675-697		
United States Department of Justice. (2006) Unclassified Executive Summary of the Office of the Inspector General: A Review of the FBI's Handling of the Brandon Mayfield Case		
"Investigation of the Reproducibility of Third-Level Characteristics", Anthonioz, A. et al, JFI, 61(2):171-192		
"Clues in Friction Ridge Comparisons: Tonal Reversals", Castellon, S., JFI, 2004, 64(3):223- 237		
FBI, Latent Prints: A Perspective on the State of the Science, (2009) www.fbi.gov/about-us/lab/forensic-science		
"Documenting and Reporting Inconclusive Results", Maceo, A., JFI, 201, 61(3):226-231		
"Blind Verification: Does it Compromise the Confidence of ACE-V Methodology to the Scientific Method", Mankevich, A., Chesakpeake Examiner, Fall 2007, 45(2):22-29		
Analysis, Comparison, Evaluation, and Verification Methodology, HFSC SOP		



Training Exercises:		
Analyze 100 latent prints to determine value		
Analyze 100 latent prints and mark the following		
<ul style="list-style-type: none"> • Determine anatomical origin • Mark orientation per SOP • Demonstrate knowledge of ridge flow and/or pattern type • Demonstrate knowledge of second level detail • Demonstrate knowledge of third level detail • Demonstrate knowledge of “Red Flag” areas (ie. distortion, pressure, tonal reversal, etc.) • Demonstrate ability to trace ridges accurately 		
Complete exercises in varying complexities in fingerprint examinations		
Complete exercises in varying complexities in palm print examinations		
Complete exercises in varying complexities in impression examinations		
Q&A discussion on the concepts of ACE-V		

Training Standards:	Trainee/Trainer	Completion Date
Self-study for required reading		
The Trainee must pass a written test on required reading		
Successfully complete a fingerprint practical.		
Successfully complete a palm print practical.		
Successfully complete an impression practical.		



Module 8: Automated Fingerprint Identification Systems (AFIS)

8. Training Objectives

- 8.1. Understanding of the history, capabilities and limitations of AFIS and the types of searches.
- 8.2. Understanding of how all local, state, and federal AFIS systems function.
- 8.3. Learn the HFSC Latent Print Section AFIS workflows.
- 8.4. Understanding of why a latent search in AFIS may be negative.
- 8.5. Understanding of close non-matches and AFIS interoperability.

Required Readings:	Trainee	Completion Date
The Fingerprint Source Book, NIJ - Chapter 6		
Advances in Fingerprint Technology, Lee and Gaensslen, 2nd Edition, Chapter 8		
“Utilizing AFIS searching Tools to Reduce Errors in Fingerprinting Casework”, Langenburg, G. et al, Forensic Science International, 257(2015):123-133		
“Utilizing AFIS searching Tools to Reduce Errors in Fingerprinting Casework”, Langenburg, G. et al, Forensic Science International, 257(2015):123-133		
“Why Identifications Are More Likely to Score in Rank One in AFIS”, Moore, R., JFI, 1991, 41(2):107-111		
“Why Identifications Are More Likely to Score in Rank One in AFIS”, Moore, R., JFI, 1991, 41(2):107-111		
Automated Fingerprint Identification System (AFIS) Operations, HFSC SOP		
Glossary and Abbreviations, HFSC SOP		
Fundamentals of Fingerprint Analysis, Chapter 7		

Training Exercises:		
Observe searches conducted by Latent Print Examiners in all systems		

Training Standards:	Trainee/Trainer	Completion Date
Self-study for required reading		
The Trainee must pass a written test on required reading		



Module 9: Digital Imaging of Latent Prints

9. Understanding of digital enhancement techniques using Adobe Photoshop or other similar programs to improve the quality of latent print images.

- 9.1. Tonal reversal
- 9.2. Position reversal
- 9.3. Use of layers
- 9.4. Image contrast
- 9.5. Image calibration/resolution
- 9.6. Use of digital filters

Required Readings:	Trainee	Completion Date
Criminalistics, 12th edition, Saferstein, pages 146-148		
“Techniques for Digital Enhancement of Latent Prints Obscured by Disruptive Backgrounds”, JFI, Vol. 54, No.2, 2004		
“Image Enhancement and Adobe Photoshop: Using Calculations to Extract Image Detail”, JFI, Vol. 59, No.4, 2007		
“Digital Enhancement of Latent Prints using Adobe Photoshop Black & White Adjustments”, JFI, Vol. 57, No. 4, 2007		
“Standard for Friction Ridge Digital Imaging”, swgfast.org		

Training Exercises:		
Trainer-led instruction to Adobe Photoshop: ____ Image 1:1 calibration/Resolution ____ Digital imaging/processing of latent prints ____ Quality/contrast enhancement ____ Black/White; use of grayscale ____ Tonal Reversal/Spatial Reversal ____ Use of Layers ____ Annotation/Documentation of Images		
The Trainee will independently capture, calibrate, enhance, and document latent prints (to be determined by the primary trainer)		

Training Standards:	Trainee/Trainer	Completion Date
Self-study for required reading		
The Trainee must pass a written test on required reading		



Module 10: Cognitive Factors in Comparative Analysis

10. Training Objectives:

- 10.1. Understanding how outside factors or extraneous information can influence decision making during friction ridge examinations.
- 10.2. Develop an awareness of various factors, physical and psychological, that can influence the decision-making process when making comparisons.
- 10.3. Understanding bias and how it can affect the interpretation of friction ridge skin features and the resulting conclusions:
 - 10.3.1. Confirmation bias
 - 10.3.2. Contextual bias
- 10.4. Articulate concepts of bias and how to mitigate confirmation and contextual bias.

Required Readings:	Trainee	Completion Date
"Why Experts Make Errors", Dror, I. et al, JFI, 2006, 56(4):600-616		
Fingerprint Source Book, NIJ, Chapter 15		
Byrd, J. S. (2006). Confirmation Bias, Ethics, and Mistakes in Forensics. JFI, 56 (4), 511-525		
Dror, I.E., Charlton, D., & Peron, A.E. (2006). Contextual Information Renders Experts		
Vulnerable to Making Erroneous Identifications. Forensic Science International, 156 (1). 74-78		
Busey, T. et al. The impact of fatigue on latent print examinations as Revealed by behavioral and eye gaze testing. Forensic Science International. 2014		
A Perspective on Errors, Bias, and Interpretation in the Forensic Sciences and Direction for Continuing Advancement*, JFS, July 2009, Vol. 54, No. 4, Qualtrax, TFSC Reading		
Cognitive and Human Factors in Expert Decision Making: Six Fallacies and the Eight Sources of Bias, Dror, Analytical Chemistry 2020, pp. 7998		
Practical Solutions to Cognitive and Human Factor Challenges in Forensic Science, Dror, Forensic Science Policy & Management, 2013, Qualtrax, TFSC Reading		

Training Exercises:	Trainee	Completion Date
Find and read two articles published within the past 5 years on human factors influencing the decision-making process during latent print comparisons		
Trainee will give a presentation of these papers to the Latent Print Section		
Q&A discussion on the concepts of bias		



Latent Print Section
Latent Print Program of Instruction (POI)
Comparative & Analytical Division

Training Standards:	Trainee/Trainer	Completion Date
Self-study for required reading		
The Trainee must pass a written test on required reading		



Module 11 Latent Print Development Techniques

11. Sequential Processing for Latent Prints

11.1. Training Objectives:

- 11.1.1. Understanding of safety hazards associated with each of the chemicals used for development of latent prints by HFSC; knowledge shall include proper disposal, spill procedures/equipment, and the use of personal protective equipment.
- 11.1.2. Understanding which latent print residue component is targeted by different chemical development procedures.
- 11.1.3. Understanding the effects of various solvents on different evidence surfaces (inks, plastics, varnishes, etc.).
- 11.1.4. Understanding of surface and environmental factors effecting selection and sequencing of chemical development procedures.
- 11.1.5. Understanding of various ways to do sequential processing and best practices for utilizing reagents in the correct sequence.
- 11.1.6. Understanding of the personal safety hazards associated with Alternate Light Sources (ALS) and TracER Laser.
- 11.1.7. Understanding of fluorescent chemical procedures used in conjunction with an ALS/Laser.
- 11.1.8. Understanding of equipment maintenance relative to the ALS/Laser.
- 11.1.9. Knowledge of luminescence, fluorescence, inherent luminescence, light wavelengths, band-pass filters, lasers, and light delivery systems as they relate to ALS/laser detection of latent prints.
- 11.1.10. Understanding of the basic types of brushes and their composition, as well as the proper usage for each type.
- 11.1.11. Understanding of surfaces and environmental factors when determining brush type, powder type, and color selection.
- 11.1.12. Understanding of proper usage of different lift materials.
- 11.1.13. Understanding of safety procedures related to all physical/chemical reagents.
- 11.1.14. Understanding of storage, application, and development procedures for physical/chemical reagents

11.2. Part I: **Non-Porous**

- 11.2.1. Alternate Light Source (ALS)
- 11.2.2. TracER
- 11.2.3. Cyanoacrylate Ester (CA)
- 11.2.4. Rhodamine 6G (R6G)
- 11.2.5. Basic Yellow 40 (BY40)
- 11.2.6. Powders

11.3. Part II: Porous

- 11.3.1. 1,2-Indandione (IND)
- 11.3.2. 1,8-Diazafloren-9-one (DFO)
- 11.3.3. Thermanin
- 11.3.4. Ninhydrin (NIN)
- 11.3.5. Physical Developer
- 11.3.6. Oil Red-O
- 11.3.7. Zinc Chloride



- 11.4. Part III: **Blood Reagents**
 - 11.4.1. Acid Yellow 7
 - 11.4.2. Amido Black
 - 11.4.3. Leucocrystal Violet (LCV)
- 11.5. Part IV: **Other (Adhesive, Grease, Wet, etc)**
 - 11.5.1. Gentian Violet
 - 11.5.2. Stick Side Powder-Wetwop
 - 11.5.3. Small Particle Reagent (SPR)
 - 11.5.4. Gun Blue
 - 11.5.5. Sudan Black

Required Readings Part I:	Trainee	Completion Date
Advances in FP Technology, 3rd Edition, Lee and Gaensslen, Chapters 3, 4, 5, 7, 10, & 13		
All Latent Print Section Sequential Procedures, HFSC		
Sequencing of Reagents for the Improved Visualization of Latent Prints, JFI 38(5) pp. 197-210, September/October 1998		
Fingerprint Sourcebook, NIJ, Sections 7.10, 11.3.3		
Latent Print Section Visual Examination Procedure, HFSC		
Latent Print Section TracER LASER Operating Procedure, HFSC		
Latent Print Section CrimeScope CA-16-500 Operating Procedure, HFSC		
TracER Laser Operating Manual		
Crimescope Operating Manual		
Fingerprint Detection with Lasers, Menzel, Sections 1.4-1.6, 3.7, 4.2-4.3, Ch 7, 8.2, 8.5, 8.6, 8.9, Ch 9		
Fingerprint Detection by Fluorescence Examination, Police Scientific Development Branch		
Fingerprint Sourcebook, NIJ, Sections 7.3, 11.2.2, and 11.2.3		
The Science of Fingerprints, FBI, Chapter 14, pages 173-174		



Advances in FP Technology, 3rd Edition, Lee and Gaensslen, Chapters 1 & 8		
Latent Print Section Fingerprint Powder Procedure, HFSC		
Fingerprint Sourcebook, NIJ, Sections 7.9		
Advances in FP Technology, 3rd Edition, Lee and Gaensslen, Chapter 11		
“Pretreatment Strategies for the Improves Cyanoacrylate Development of Dry Latent Fingerprints on Nonporous Surfaces”, JFI, Vol. 62, No. 5, 2012		
Cyanoacrylate Fuming Precautions, JFI 44(5). Pp 409-411, July/August 1996		
Ridge Detail through Latex Gloves, Hall JFI 41(6), 1991 pp. 415-416		
Tonally Reversed Friction Ridge Prints on Plastic, JFI, 39(1) pp. 11-22, January/February 1989		
Factors Affecting the Recovery of Latent Prints on Firearms. JFI, 1997, 47(2)		
Latent Print Cyanoacrylate Ester (Superglue) Fuming Procedure, HFSC		
MSDS for Cyanoacrylate		
http://www.cbdi.ai.org/Reagents/cyano.html		
Fingerprint Sourcebook, NIJ, Sections 7.10		
Fingerprints and Other Ridge Skin Impressions, Champod, Lenard, Margot, and Stoilovic, Pages 142-145		
Latent Print Section Basic Yellow 40 Procedure, HFSC		
MSDS for Basic Yellow 40		
http://www.cbdi.ai.org/Reagents/by40.html		
“Dye Staining of Duct Tape: An Overlooked Procedure”, JFI, Vol. 65, No. 3, 2015		



Latent Print Rhodamine 6G Procedure, HFSC		
MSDS for Rhodamine 6G		
http://www.cbdi.ai.org/Reagents/rhod.htm		

Training Exercises Part I:	Trainer	Completion Date
Trainer led demonstration of ALS and Laser examination		
Latent Print Section Visual Examination Procedure, HFSC		
Trainer-led orientation of powder processing/lifting		
Trainee practice lifting from multiple surfaces with various powders/lifting techniques		
Prepare reagents, if possible/applicable		
Process various items utilizing all non-porous reagents		

Training Standard Part I:	Trainer	Completion Date
The trainee must pass a written test on required reading		

Required Readings Part II:	Trainee	Completion Date
Fingerprint Sourcebook, NIJ, Sections 7.6		
Advances in FP Technology, 3rd Edition, Lee and Gaensslen, Chapter 2		
“Variability in Visualization of Latent Fingermarks Developed with 1,2 Indanedione-Zinc Chloride”, JFI, Vol. 63, No. 6, 2013		
“Use of an Optimized 1, 2-Indanedione Process for the Development of Latent Prints”, Bicknell DE, Ramotowski RS, Journal of Forensic Science, 2008; 53(5):1108-1116.		
Latent Print Section 1,2-Indanedione (IND) Procedure, HFSC		



Latent Print Section Processing Thermal Paper using 1,2-Indanedione (IND) Procedure, HFSC		
MSDS for 1,2-Indanedione		
http://www.cbdi.ai.org/Reagents/indane.html		
Fingerprint Sourcebook, NIJ, Sections 7.5		
"The effectiveness of 1,2-Indanedione- Zinc Formulations and Comparison with HFE-Based 1,8-Diazafluoren-9-one for Fingerprint Development", JFI Vol. 59, No. 6, 2009		
"Spectral Variations for Reaction Products Formed Between Different Amino Acids and Latent Finger Mark Detection Reagents on a Range of Cellulose-Based Substrates.", JFI, Vol. 59, No. 3, 2009		
Latent Print Section 1,8-Diazafluoren-9-one (DFO) Procedure, HFSC		
MSDS for 1,8-Diazafluoren-9-one		
http://www.cbdi.ai.org/Reagents/dfo.html		
"The Development of Latent Fingerprints on Thermal Paper Using a Novel, Solvent-Free Method." JFI 2005, 55:202-13.		
Latent Print Thermanin Procedure, HFSC		
MSDS for Thermanin		
Fingerprint Sourcebook, NIJ, Sections 7.4		
Advances in FP Technology, 3rd Edition, Lee and Gaensslen, Chapter 12		
The Science of Fingerprints, FBI, "Ninhydrin Method", Pages 177-179		
Latent Print Ninhydrin Procedure, HFSC		
MSDS for Ninhydrin		
http://www.cbdi.ai.org/Reagents/nin.html		



Training Exercises Part II:	Trainer	Completion Date
Prepare reagents, if possible/applicable		
Process various items utilizing all porous reagents		

Training Standard Part II:	Trainer	Completion Date
The trainee must pass a written test on required reading		

Required Readings Part III:	Trainee	Completion Date
Fingerprint Sourcebook, NIJ, Sections 7.12.5		
“Enhancement of Fingerprints in Blood”, JFI, Vol. 55, No. 6, 2005		
“The Use of Various Chemical Blood Reagents to Develop Blood Fingerprint or Footwear Impressions”, JFI, Vol. 64, No. 1, 2014		
Latent Print Acid Yellow 7 Procedure, HFSC		
MSDS for Acid Yellow 7		
Fingerprint Sourcebook, NIJ, Sections 7.12		
Advances in FP Technology, 3rd Edition, Lee and Gaensslen, Chapters 6 and 9		
“The Effect of Common Fingerprint Detection Techniques on the DNA Typing of Fingerprints Deposited on Different Surfaces”, JFI, Vol. 54, No.1, 2004		
“Developing Fingerprints in Blood: A Comparison of Several Techniques”, JFI, Vol. 57, No. 1, 2007		
Latent Print Section Amido Black Procedure, HFSC		
MSDS for Amido Black		
http://www.cbdi.ai.org/Reagents/amidom.html		
“Deposition of Bloody Friction Ridge Impression”, JFI, Vol. 58, No. 3, 2007, Glenn Langenburg		



Latent Print Leucocrystal Violet Procedure, HFSC		
MSDS for Leucocrystal Violet		
http://www.cbdi.ai.org/Reagents/lcv.html		

Training Exercises Part III:	Trainer	Completion Date
Prepare reagents, if possible/applicable		
Process various items utilizing all blood reagents		

Training Standard Part III:	Trainer	Completion Date
The trainee must pass a written test on required reading		

Required Readings Part IV:	Trainee	Completion Date
Fingerprints and Other Ridge Skin Impressions, Champod, Lennard, Margot, and Stoilovic, Page 160		
MSDS for Gentian Violet		
http://www.cbdi.ai.org/Reagents/gent.html		
Latent Print Gentian Violet Procedure, HFSC		
"The Use of Un-du to Separate Adhesive Materials", JFI, Vol. 57, No. 5, 2007		
"Does CA Fuming Interfere with powder Suspension Processing?", JFI, Vol. 59, No. 2, 2009		
Fingerprints and Other Ridge Skin Impressions, Champod, Lennard, Margot, and Stoilovic, Pages 161-162		
MSDS for Sticky Side Powder and Wetwop		
http://www.cbdi.ai.org/Reagents/sticky.html		



"The Use of Un-du to Separate Adhesive Materials", JFI, Vol. 57, No. 5, 2007		
Latent Print Sticky Side Powder-Wetwop SOP, HFSC		
Advances in FP Technology, 3rd Edition, Lee and Gaensslen, pages 5-7, 10-11		
"Development of Latent Prints Using Titanium Dioxide (TiO2) in SPR (White) on Adhesives", JFI, Vol. 55, No. 3, 2005		
Latent Print Small Particle Reagent Procedure, HFSC		
MSDS for Small Particle Reagent		
http://www.cbdi.ai.org/Reagents/spr.html		
Fingerprint Sourcebook, NIJ, Sections 7.13.4		
Latent Print Gun Bluing Solution Procedure, HFSC		
MSDS for Gun Blue		
http://www.cbdi.ai.org/Reagents/bluing.html		
Advances in FP Technology, 3rd Edition, Lee and Gaensslen, Section 4.1		
Latent Print Sudan Black Procedure, HFSC		
MSDS for Sudan Black		
http://www.cbdi.ai.org/Reagents/sudan.html		

Training Exercises Part IV:	Trainer	Completion Date
Prepare reagents, if possible/applicable		
Process various items utilizing all other reagents		

Training Standard Part IV:	Trainer	Completion Date
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Latent Print Section
Latent Print Program of Instruction (POI)
Comparative & Analytical Division

The trainee must pass a written test on required reading		
Module Training Exercises:	Trainer	Completion Date
Write an essay on why latent prints may not be developed on surfaces		



Module 12: Latent Print Photography

12. Training Objectives:

- 12.1. An understanding of latent print photography to include:
 - 12.1.1. Cameras and their operation
 - 12.1.2. Lenses and their uses and operation
 - 12.1.3. Lens Filters
- 12.2. An understanding of photographic procedures to include:
 - 12.2.1. Adjusting for exposure settings including aperture and shutter speed for optimal depth of field
 - 12.2.2. Use of scales in images
 - 12.2.3. Photography of powdered and chemically developed latent prints of various colors with various backgrounds.
 - 12.2.4. Photography of patent and plastic prints.
 - 12.2.5. Techniques for photographing fluorescent images.
 - 12.2.6. Understanding of the proper procedures for camera capture and digital scanning of latent images.
- 12.3. Ability to articulate latent print processes and the necessary photography to capture possible suitable latents.

Required Readings:	Trainee	Completion Date
Fingerprint Sourcebook, NIJ, Chapters 8, 10		
Friction Ridge Skin, Cowger, Chapter 5		
Fundamentals of Forensic Photography, Mancini, Ch 1-4, Ch 6, Ch 8		
Identification Photography, by Robert E. May (Booklet)		
Fingerprints and Other Ridge Skin Impressions, Champod, Chapters 3 & 4, Appendix 3		
The Science of Fingerprints, FBI, Chapters 13 – 15		
“Focus Stacking in Photoshop – Depth of Field Optimization In Macrophotography”, JFI, Vol. 64, No.1, 2014		

Training Exercises:	Trainer	Completion Date
Photograph latent prints developed from various porous substrates.		



Latent Print Section
Latent Print Program of Instruction (POI)
 Comparative & Analytical Division

Photograph latent prints developed from various non-porous substrates.		
Photograph latent prints developed on curved surfaces		
Photograph latent prints from various colored backgrounds		
Photograph latent prints from reflective surfaces		

Training Standards:	Trainer	Completion Date
Self-study for required readings.		
The trainee must pass a written examination on the required readings.		



Module 13: Competency Test

13. The trainee must successfully complete all designated modules in the training manual as well as the competency test before acquiring authorization to perform supervised dependent casework.

Training Exercises: None	Trainer	Completion Date
Training Standards:	Trainer	Completion Date
Processing competency test will consist of mock evidence. Following policies, evidence will be processed and any possible suitable latents that are developed will be preserved.		
Examination competency test will consist of mock evidence. All evidence will be examined following policies and standard methods. All conclusions shall be documented.		
The trainee has completed all modules through a comprehensive assessment and/or written examinations. This is used to fulfill the final written exam as required by the quality manual.		



Module 14: Supervised Casework

14. Training Objectives

- 14.1. Gain an understanding of the JusticeTrax system to properly document case notes.
- 14.2. Gain an understanding of utilizing Mideo to properly maintain and/or edit images.
- 14.3. Successfully complete DPS training to gain access to ULW and CBM archive.
- 14.4. Successfully complete Idemia training.
- 14.5. Trainee will work cases from start to finish. The trainee’s work will be reviewed by the primary trainer or designee to ensure all applicable policies and workflows are being followed. Cases worked under an authorized latent print examiner will be assigned to that examiner in LIMS. The primary trainer will regularly update the Training Coordinator, Technical Lead, Latent Print Supervisor, Latent Print Manager, and designee with either a recommendation to be released from dependent supervised casework or if further training is required.
- 14.6. A selection of five cases per discipline will be administered to the trainee. This is to demonstrate their competency of effectively working a case with minimal errors. If additional cases are needed, they may be added to the final five.
- 14.7. The trainee will keep a spreadsheet of cases processed to include case numbers, results, and any other notes deemed necessary.

Training Exercises:	Trainer	Completion Date
Trainee will process a variety of cases, of varying complexity, following the SOP’s and workflow.		
Trainee will examine a variety of cases, of varying complexity, following the SOP’s and workflow. Cases should include AFIS and comparison processes.		

Training Standards:	Trainer	Completion Date
Final five processing cases, worked with minimal supervision and with minimal corrections		
Final five comparison cases, worked with minimal supervision and with minimal corrections. (One case must be a comparison case)		



Module 15: Court Testimony and Ethics

15. Training Objectives:

- 15.1. Understanding of the role of expert witness testimony.
- 15.2. Knowledge of factors regarding the admissibility of evidence.
- 15.3. Understanding of courtroom operational procedures.
- 15.4. Knowledge of major court decisions and their significance.
- 15.5. Understanding of professional ethics.
- 15.6. Demonstrate competency in friction ridge processing and examination through mock trials. Biology of friction skin, current studies in the field including error rates, NAS, PCAST etc. are to be included

Required Readings:	Trainee	Completion Date
Fingerprint Sourcebook, NIJ, Chapters 12-15		
Advances in FP Technology, 2nd Edition, Lee and Gaensslen, Chapter 10		
Friction Ridge Skin, Cowger, Chapter 9		
NIST Expert Working Group on Human factors, Latent Print Examination and Human Factors, NIJ, 2012, Chapter 6		
Effective Expert Witnessing, Chapters 2-6 and 10 (pages 149-155)		
Ethics in Forensic Science, Chapters 3, 4, 10, 12, and 13		
NAS Report Strengthening Forensic Science, 2009 Report (as pertaining to latent prints)		
P-CAST Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods, 2016 Report (as pertaining to latent prints)		
Landmark Decisions Involving Evidence of Friction Skin Impression, Andre Moenssens, Finger Print and Identification Magazine, December 1966		
Qualifying as an Expert Fingerprint Witness: Designing a Set of Questions to Assist in Court Testimony. Wertheim JFI, 1990, 40 (2). pp. 60-68, 1990		
Confirmation Bias, Ethics, and Mistakes in Forensics, Jon Byrd, Journal of Forensic Identification, 51\523 56 (4), 2006		
Defending Against the Critics Curse, Glenn Langenburg, The Chesapeake Examiner, Spring 2003 Vol. 41 No. 1		
Ethics in Forensic Science: A Review of the Literature on Expert Testimony, Kathleen Saviers, Journal of Forensic Identification, 44\462 5 (4), 2002		
“Accuracy and reliability of forensic latent fingerprint decisions.”, PNAS. May 10, 2011. Vol. 108. No. 19. 7733-7738. Ulery et. al.		



“Miami-Dade Research Study for the Reliability of the ACE-V Process: Accuracy & Precision in Latent Fingerprint Examinations”, Pacheco, et al.		
Office of the Inspector General, A Review of the FBI’s Handling of the Brandon Mayfield Case, U.S. Department of Justice, 2009		
“Subjective – The Misused Word”, JFI, Vol .58, No. 1, 2008, William Leo		
Buffey rape case sets precedent: Prosecutors must disclose evidence, 11/10/15, Gazette Mail, Qualtrax TFSC Reading Material		
Judge reverses murder conviction, saying crucial DNA information not disclosed, 10/24/17, San Diego Union Tribune, Qualtrax TFSC Reading Material		
“Why Experts Make Errors”, JFI, Vol. 56, No. 4, 2006		
Cognitive and Human Factors in Expert Decision Making: Six Fallacies and the Eight Sources of Bias, Dror, Analytical Chem 2020, pp. 7998		
TFSC Licensing exam reading materials: Domain II		

Training Exercises:

Prepare Statement of Qualifications (SOQ) and Curriculum Vitae (CV)		
Write a 3-5 page paper on the history of courtroom cases to include but not limited to People V. Jennings, Frye v. US, Daubert v. Merrell Dow Pharmaceuticals, US v. Byron Mitchell, US v. Llera Plaza, Mayfield, US v. Brian Rose, and New Hampshire v. Langill		
Write a short synopsis of recent court developments as they relate to fingerprints		
Prepare list of court qualifying questions		
When possible attend/observe testimony of other analysts		

Training Standards:

	Trainee/Trainer	Completion Date
Self-study for required reading		
The Trainee must pass a written test on required reading		
Successfully participate in a qualifying questions mini moot court		
Successfully participate in the admission of evidence mini moot court		
Successfully participate in the admission of demonstrative aide mini moot court		
Successfully participate in a final moot court		
Testimony evaluation form has been completed by at the least one member of the prosecution or defense. Forms may also be submitted by other participants in the moot court such as the individuals serving as the judge and jury		