

Oakland Police Department Criminalistics Laboratory
DNA Instrumentation and Analysis Software
Biometric Technology Use Policy
September 2020

1. Purpose

The Oakland Police Department (OPD) Criminalistics Laboratory's (Crime Lab) Forensic Biology/DNA unit utilizes specialized DNA collection and analysis instrumentation and software to perform forensic DNA testing. During this lengthy and complicated process, one step removes and purifies DNA from cells (digestion/extraction), another quantitates how much DNA is present and lastly, by amplifying and analyzing Short Tandem Repeats (STR) in the DNA using Polymerase Chain Reaction (PCR) and separated by Capillary Electrophoresis (CE), forensic DNA profiles are generated. Software is involved in the following processes: (i) collection and processing of STR DNA fragment data; (ii) interpretation of DNA data into DNA profiles used for comparison purposes. At the end of all processes, a determination can be made as to whether a DNA sample collected from a crime scene can be associated with a known individual through a comparison of evidentiary (crime scene) and known reference DNA profiles. Statistical weight is provided for all inclusion comparisons.

The technology within the scope of this Biometric Technology Use Policy includes:

Digestion / Extraction

- **Aurora Biomed:** Versa 1100 liquid handler instrument and VERSAware software for automated cell digestion and microscope slide preparation.
- **Qiagen:** EZ1 Advanced XL instrument and EZ1 Advanced XL Investigator Protocol Card (Software) for extraction and purification of DNA.

DNA Quantitation

- **Qiagen:** QIAgility Liquid Handler Robots and computers for rapid, high-precision automated PCR setup (also used for Normalization/Amplification and DNA Typing).
- **Applied Biosystems:** 7500 Real Time PCR systems and 7500 System Detection Software for determination of quantity and quality (degradation level) for a DNA sample.

DNA Normalization / Amplification – STR (autosomal and Y)

- **ThermoFisher Scientific:** SpeedVac DNA Concentrator for concentrating low quantity DNA samples.
- **ThermoFisher Scientific:** 9700 and ProFlex Thermalcyclers for PCR amplification of STR DNA fragments.

DNA Typing – STR (autosomal and Y)

- **ThermoFisher Scientific:** Applied Biosystems 3130 (current technology in use) and 3500 (similar technology undergoing validation to replace 3130) Series Genetic Analyzer and Data Collection Software is designed for data collection in human identification (HID) applications. The Crime Laboratory uses/intends to use this software to collect STR DNA data from amplified samples. This software normalizes genetic data and creates “hid” files to be used by data processing (GMIDX or FaSTR) and interpretation (ArmedXpert, STRmix) software.

DNA Interpretation – STR (autosomal and Y)

- **Applied Biosystems:** GeneMapper ID-X Software is used for review and evaluation of sizing and genotyping data generated from the genetic analyzers. This analysis software can be configured to set analysis parameters, edit raw data, and aids to prepare data for further interpretation into DNA profiles.
- **NicheVision:** FaSTR software is used for review and evaluation of sizing and genotyping data generated from the genetic analyzers. This analysis software can be configured to set analysis parameters, edit raw data, and aids to prepare data for further interpretation into DNA profiles.
- **NicheVision:** ArmedXpert Analysis Software is used for streamlined DNA typing interpretation resulting in reduced time spent on DNA mixture interpretation. It also uses published and validated population DNA allele frequencies to calculate DNA profile frequency estimates to aid in providing the weight of any inclusion comparison drawn between an evidence sample and a known reference.
- **NicheVision:** STRmix™ software combines established and validated biological modelling and complex mathematical processes to use a continuous model to interpret a wide range of complex DNA profiles. It can compare these DNA profiles to a reference profile and calculate the weight of the comparison using well established Likelihood Ratio statistics.

DNA Databasing

- **HP:** Server for the Combined DNA Index System (CODIS) and peripheral computers used to enter and search evidence DNA profiles against legally obtained reference samples (Convicted Offenders, Arrestees, Missing Persons) and other evidence profiles.

The forensic evidence analyzed by the Forensic Biology Unit develops biometric data, however, the Department does not use it in a surveillance capacity (prospectively), it uses it to solve crimes that have already occurred (retrospectively).

2. Authorized Use

The DNA instrumentation and analysis software described above shall be used primarily on evidence or reference samples submitted by law enforcement and collected pursuant to a search warrant, other legal means, or by documented consent. The DNA instrumentation and analysis software shall be used solely for aiding in criminal or civil investigations; for validating new methods and for special projects designed to evaluate improvements to the forensic DNA collection and analysis process, collecting data for statistical studies or lecture presentations; and for quality assurance purposes. To the latter, reference samples from Crime Laboratory staff members, interns, and law enforcement personnel who have access to evidence or the operational areas of the Forensic Biology/DNA unit may be processed using the DNA instrumentation and analysis software as a part of the chain of processes used to

develop DNA profiles to measure or detect a contamination event in the unit, should it occur. All other uses are prohibited. The DNA instrumentation and analysis software shall not be used for personal, non-law-enforcement-related purposes; and shall not be used to surveil, harass, intimidate, or discriminate against any individual or group.

3. Data Collection

The data collected attests to the purity or amount of the DNA and usually also contains genetic information, specifically STR DNA marker alleles (types) that collectively constitute a forensic DNA profile that has the potential to characterize or identify a single individual. (Note: identical twins typically have identical forensic DNA profiles, since they are derived from a single fertilized egg, or zygote).

4. Data Access

Criminalists and Forensic Technicians with duties in the Forensic Biology/DNA unit shall be the only Crime Laboratory personnel authorized to use the DNA instrumentation and analysis software in casework, and only after completing a comprehensive training program and qualifying test, at which time, with the Supervisor's recommendation, the Crime Laboratory Manager issues a written authorization. No one else shall have the authority to grant access to use the DNA purification instrument or software in casework. Criminalists and Forensic Technicians are granted access to one another's cases only for the purpose of discovery or CPRA requests, documenting quality checks, verifications or peer review. Interns also are authorized to use the DNA instrumentation and analysis software for special projects, not casework, and only after receiving necessary training and under the supervision of a qualified Criminalist.

5. Data Protection

All data generated using the DNA instrumentation and analysis software shall be securely maintained at all times in a limited access location, or on a secure server. To evaluate and interpret the DNA analytical data, authorized personnel shall only use computers on secure network drives.

6. Data Retention

Data are retained indefinitely on secure server or network drives. Hard copies of case files containing the laboratory report, notes, and instrument printouts are similarly retained indefinitely in the casefile held in under Crime Lab control with secure, limited-access areas, or at a Departmentally approved Records Retention facility. Retained data may be used if questions pertaining to the case in question arise, or if an investigation into a quality issue arises and is documented in Incident Response.

7. Public Access

Members of the public shall have no direct access to the DNA instrument data generated. If requested under the California Public Records Act (CPRA), the Crime Lab shall deny the request on the ground that such data is exempt from disclosure under the investigative exemption (Government Code section 6254(f), (k) and 6255), Evidence Code Section 1040 and perhaps other exemptions, unless and until they are made publicly available in criminal proceedings. If such a CPRA request is made or if a subpoena or court order is issued for such DNA instrumentation and analysis data, the data shall be made public or deemed exempt from public disclosure pursuant to state or federal law, after consultation with the Oakland City Attorney's Office as needed.

8. Third-Party Data-Sharing

Following the completion and review of a specific case, the case file and data are disseminated only to the law enforcement customer and/or City Attorney and/or prosecuting attorney and assisting staff and shall be subject to discovery in criminal or civil proceedings. The case file and data (including copies) shall not be shared with anyone else without a court order. In addition, crime scene samples that qualify for search in the California State DNA Index System (SDIS) and National DNA Index System (NDIS) (components of the Combined Index System or CODIS database), are uploaded to SDIS according to the NDIS Operational Procedures Manual (<https://www.fbi.gov/file-repository/ndis-operational-procedures-manual.pdf/view>). Suspect DNA profiles that qualify for search are uploaded to SDIS pursuant to California Penal Code 297.

9. Training

Forensic Technicians and Criminalists in the Forensic Biology/DNA unit shall complete a comprehensive training program and shall not embark on any casework with the DNA instrumentation and analysis software until they have successfully taken a relevant qualifying test. Once qualified, they shall take proficiency tests bi-annually. Interns shall be authorized to use the DNA instrumentation and analysis software for special projects, and not casework, only after receiving necessary training and under the supervision of a qualified Criminalist. Criminalists, Forensic Technicians, and interns in the Forensic Biology/DNA unit shall be provided with a copy of the DNA instrumentation and analysis software Biometric Technology Use Policy. The Crime Laboratory Manager and Criminalist IIIs are responsible for providing oversight of the training program, ensuring comprehension of policies and documenting adherence.

10. Auditing and Oversight

The Forensic Biology/DNA unit is overseen by two supervisors and by Crime Laboratory upper management (Crime Laboratory Manager and Quality Supervisor), all of whom shall oversee compliance with this Biometric Technology Use Policy and Standard Operating

Procedures via Administrative and Quality Reviews of casework, policy updates and annual Internal Audits. Additionally, the Crime Lab is accredited by the American National Standards Institute (ANSI) National Accreditation Board (ANAB), which provides oversight to the operation of the Forensic Biology Unit. The Crime Lab is assessed by ANAB on an annual basis. Moreover, the Forensic Biology/DNA unit complies with the Federal Bureau of Investigation (FBI)'s Quality Assurance Standards (QAS) for Forensic DNA Testing Laboratories. The Forensic Biology unit is audited to the FBI's QAS annually, alternating internal and external audits.

11. Maintenance

The mechanism to ensure the security and integrity of the tools, instrumentation and data are insured by oversight provided by the Forensic Biology/DNA unit Supervisors and upper management as defined in the "Auditing and Oversight" section above.