

Topics and Techniques for Forensic DNA Analysis
Houston DNA Training Workshop
April 3-4, 2007

Instructor: John M. Butler (NIST)

April 3, 2007 (Tuesday)

8:00 – 9:00 a.m. **TOUR Houston Police Department DNA Laboratory**

9:00 – 9:30 a.m. **Introductions** by instructor and participants

9:30 – 10:30 a.m. **ABI 310/3100/3130 Capillary Electrophoresis Fundamentals**

Advantages of capillary electrophoresis and historical perspectives
ABI Genetic Analyzer instrument overview: differences between ABI 310/3100/3130xl
Sample preparation, injection, separation, and detection

10:30 – 10:45 a.m. **BREAK**

10:45 a.m. – 12:15 p.m. **Capillary Electrophoresis Fundamentals (cont.)**

Sample preparation, injection, separation, and detection (cont.)
Capillary array microchip CE systems: similarities and differences

12:15 p.m. – 1:15 p.m. **LUNCH**

1:15 – 2:45 p.m. **STR Typing and Molecular Biology Artifacts**

PCR, avoiding contamination
STR markers and nomenclature
Stutter (N-4, N+4), non-template addition, variant alleles, tri-allelic patterns, null alleles
Mutations, mixtures
Dye blobs and spikes, pull-up

2:45 – 3:00 p.m. **BREAK**

3:00 – 4:00 p.m. **CE Troubleshooting**

Deciphering artifacts from true alleles: dye blobs, spikes, pull-up
External factors impacting genotyping: temperature shifts and impact on sizing precision
Instrument problems: capillary clogging, syringe leaks
Troubleshooting benchmarks/QC monitoring (current and syringe travel)

4:00 – 5:00 p.m. **MEET WITH HPD STAFF ALONE**

Outline for Houston DNA Training Workshop (April 3-4, 2007)

April 4, 2007 (Wednesday)

9:00 – 10:30 a.m. **Mixture Interpretation**

Sample interpretation overview
NIST MIX05 interlab study results
Strategies, statistics, and software to aid mixture interpretation
Discussion

10:30 – 10:45 a.m. **BREAK**

10:45 – 12:15 a.m. **Mixture Interpretation (cont.)**

Discuss Clayton *et al.* (1998) steps to mixture deconvolution
Review ISFG DNA Commission recommendations

12:15 – 1:30 p.m. **LUNCH**

1:30 – 2:45 p.m. **qPCR and Low-Copy Number DNA Testing**

Real-time PCR and DNA quantitation
Issues and challenges with low-copy number DNA testing

2:45 – 3:00 p.m. **BREAK**

3:00 – 4:00 p.m. **miniSTRs**

miniSTRs – tools for improving recovery from degraded DNA
MiniFiler kit and concordance studies
Characterization of 26 new miniSTR loci at NIST
New European core STR loci – D2S441, D10S1248, D22S1045

Q&A as needed throughout the various presentations