NIST
National Institute of Standards and Technology
U.S. Department of Commerce

Trace Evidence Measurements & Standards

FORENSICS @ NIST

#NISTForensics

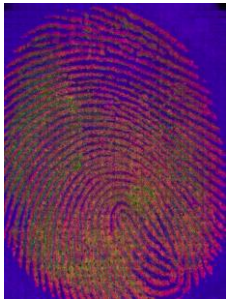
Material Measurement
in Forensic Science

Need:

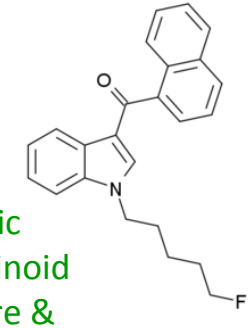
- To ensure the accuracy and reliability of forensic results and measurements
- To create improved methods in forensic analysis

Objectives:

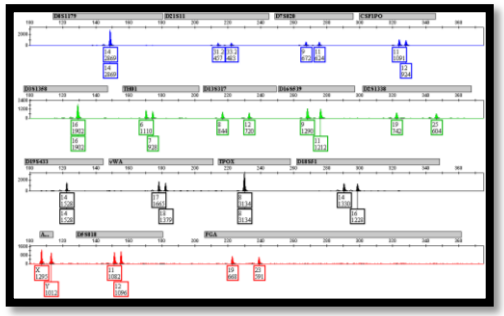
- Improving Analytical Capabilities in Three Forensic Science Program Areas
  - **Drugs and Toxins**
  - **Trace Evidence**
  - **Human Identity (DNA)**
- Develop measurement toolset
  - Methods, Reference Materials and Data for Forensics
- Enable quantifiable uncertainty of measurements
- Improved efficiency/cost effectiveness



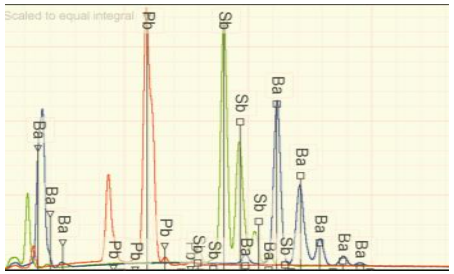
Combined Chemical and Biometric Analysis of Fingerprint Lifts



Synthetic Cannabinoid Structure & Analysis



DNA profile generated 4X faster



Reliable ID of gunshot residue

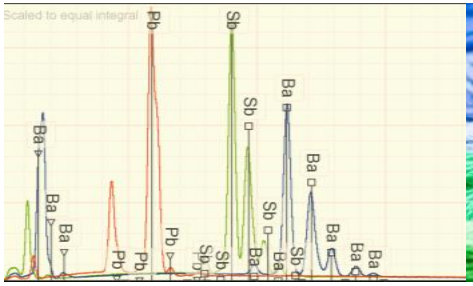
Customers and Partners

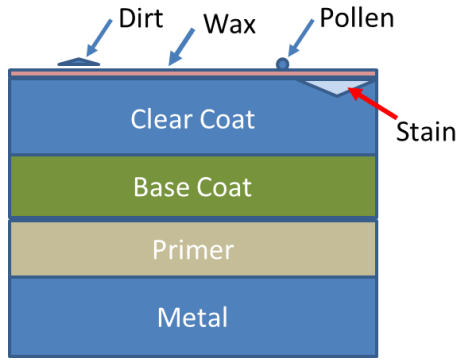
SWGDRUG FBI DEA

QIAGEN NIJ National Institute of Justice AFDIL Armed Forces DNA Identification Laboratory life technologies Promega ThermoFisher SCIENTIFIC

Trace Evidence

- ✓ Particles & Surfaces
  - Trace explosive & drug particle analysis
  - Gunshot Residue – improved elemental identification and sensitivity
  - Improved sampling methods
    - Fingerprint Developer Test Material & Method
  - Multivariate analysis
    - Morphology, elemental, molecular
- ✓ Fibers
  - Combined morphology and spectral data
  - Improved Micro-IR
  - Chemimetric Approaches
- ✓ Paint
  - Automotive and architectural paint characterization
- Fire/Arson
  - More reliable analysis of accelerant vapors
  - Thermodynamic reference data





Automotive Paint

Strategy for Trace Evidence

- Develop measurement toolset
  - Methods, Reference Materials and Data for Forensics
- Enable quantifiable uncertainty of measurements
- Improve the efficiency/cost effectiveness

- Inkjet reference materials
- Field tests
- More reliable elemental ID and higher sensitivity GSR analysis
- Multivariate analysis of spectroscopic & morphologic data
- For both qualitative and quantitative analysis
- Desktop & handheld technologies
- Sampling approaches for particles & fingerprints

Trace Evidence

- 11:00 am – 11:20 am Stephanie Watson
  - Assessment of a Portable Spectrophotometer for Measuring Color of Automotive
- 11:20 am – 11:40 am Julie Bitter
  - Evaluating Sources of Variability in Forensic Fiber Trace Evidence Examination
- 11:40 am – 12:05 pm Greg Gillen
  - Materials Deposition Inkjet Printing for Spatially Resolved Chemical Standards
- 12:05 pm – 12:15 pm Q&A SESSION