

An Introduction to Statistical Thinking for Forensic Practitioners

8:30am – 3:30pm, March 3, 2016
Palm Beach County Sheriff's Office
Palm Beach, FL

PART I: Hal Stern, Alicia Carriquiry, Colin Lewis-Beck, CSAFE

Why Probability and Statistics?

- A forensics problem to motivate the discussion
- Where statistics meets forensics: match criteria, probative value
- A preview of coming attractions

Probability and Statistics Preliminaries

- Probability – the mathematical language of uncertainty
 - Basic rules
 - Conditional probability
- Bayes' rule (a key to later discussion of Bayesian statistical inference)
- Bayes' rule and the likelihood ratio
- Probability distributions
 - How probability can be used to model data values
 - Some examples
- Statistical Inference
 - Population / Sample
 - Role of probability distributions
 - Importance of data collection
 - Overview of inference procedures

Probability and Statistics for Forensic Science

- The forensic science problem in statistical terms
 - Evidence types (DNA, latent prints, firearms, ...)
 - A range of different types of variables
 - Critical issues in design of data collection and availability of population databases
- Use of basic statistical tools
 - Probability models for evidence measurements
 - Estimation, confidence intervals and testing in some settings
- Likelihood ratio approach

- The concept in simple cases (e.g. blood type or other discrete characters)
- Continuous data (e.g., trace evidence)
- Bayes vs frequentist inference
- What happens with more complex data (most pattern evidence?)

PART II: Kevin McElfresh (FIU), Henry Swofford (DFSC)

Communicating results of forensic analyses to jurors and law professionals

- 30 years of statistics in court, banding, binning, and calculating to a lay audience. What's next? -- McElfresh
- Integrating Statistical Thinking and Methods into Practice - Latent Print Examination – Swofford

Open discussion, questions and feedback.

