Dear Colleagues,

We are blessed in the field of forensic science to have a noble mission. Providing objective forensic interpretation helps solve and prevent crime. It promotes justice. Most importantly, it makes life safer for families. Advances in technology and use of databases permit forensics to provide leads for investigations where none exist. Forensic evidence provides a voice for those who all too frequently have none, victims of crime, wrongfully accused, and their families. Forensic science is objective. It takes no side but the truth.

As stewards of the practice of forensic science, much responsibility falls to us. We must protect the integrity of the evidence to ensure our findings are true and correct. We must ensure use of sound and current technology. We must ensure the appropriate weight and understanding of our findings. We must continue to improve. Please take a moment to share your thoughts on our mission with your staff. A sense of being a part of something greater than oneself puts our work into perspective.

Ray

2017-2018 National Priorities and Agenda

Please make a note of the new mailing address:
ASCLD Office
5 Glen Road Suite 123
Garner, NC 27529
Thank you for your prompt attention.
NIJ Forensic Science R&D Reports for ASCLD Crime Lab Minute Vol 10

These research reports have been submitted by the National Institute of Justice (NIJ) especially for their relevance to crime laboratory activities. ASCLD has not reviewed nor does it necessarily endorse the findings of this research.

Report: NIJ’s DNA Analysis, Capacity Enhancement and other Forensic Activities

This report summarizes NIJ’s approach to improving forensic science includes long term strategic advances and necessary immediate relief to address the challenges of satisfying increasing demand for DNA analysis. From 2008 to 2014, the turnaround time for analysis has remained nearly constant, while testing capacity increased by over 60 percent. Average cost per case has decreased from $1,279 in 2007 to $607 in 2014. And since 2009, uploads of DNA profiles to the Combined DNA Index System (CODIS) have increased 143 percent. The need for this assistance has never been greater, through capacity building, technical assistance, research, development, evaluation and dissemination, NIJ is working to address the challenges experienced by forensic laboratories.

Tune in to the FTCpE Just Science Podcast!

NIJ’s Forensic Technology Center of Excellence has launched Just Science, a podcast for forensic science professional and others interested in learning how crime laboratories are working to produce more accurate results, become more efficient and solve more crimes. The podcast covers every forensic science discipline. Recent episodes discussed lab management, human factors, 3D optical tomography, subjective probability, DNA mixture interpretations and economics and crime labs.

The Evidence for Very Small Particles

NIJ recently published an article in Forensics discussing the work of Stoney Forensic in developing an investigatory technique called “very small particle analysis.” This approach involves the careful examination of dust on an object to trace it back to its original location, or the comparison of two or more objects to determine if they have, at some point, been in the same place. The researchers have successfully used this analysis to support U.S. government agencies and local and international law enforcement investigations, for example to trace the origins of illegal shipments of elephant tusks.

Developing Reliable Methods for Microbial Fingerprinting of Soils

Soil evidence has the potential of being a valuable tool for linking a suspect, victim, or item to a crime scene. Currently, however, only class characteristics of soil are considered in traditional analysis. This NIJ-supported research project examined the utility of soil bacterial profiling via next-generation sequencing of the 16S RNA gene to identify a soil’s origin. The researchers successfully differentiated soil samples from diverse and similar habitats back to their location of origin 100 percent of time in multidimensional space and 87.5 percent of time through supervised classification. Time and space within a habitat did not affect bacterial profiles enough to hinder location-of-origin assignment. Soil collected from evidentiary items remained clustered nearest its location of origin with 100 percent accuracy, even after a full year or long-term storage. The success in tracing soils back to a location of origin demonstrates the potential of next-generation sequencing of bacteria, in conjunction with a combination of robust statistical techniques, for the individualization of forensic soil samples.

Quantitative Algorithm for the Digital Comparison of Torn Duct Tape

Researchers from University of California, Davis
sought to minimize human contextual bias in decisions about whether torn duct tape found at a crime scene matches a duct-tape roll found in a suspect’s possession by combining digital image analysis and an objective, quantitative algorithm in assessing the likelihood of a match. These NIJ-supported researchers performed edge detection and morphological smoothing operations on high-resolution images of torn duct tape edges to extract the torn-edge coordinates. In 97 percent of examined tears, the true match had the lowest observed sum of square residuals, with false positive rates ranging from 0.5 percent for some types of hand-torn duct tape to 62 percent for scissors-cut duct tape. This work provides a starting point for quantitative assessment of the likelihood of physical end matching of duct tape without human contextual bias.

Non-Medical Use of Prescription Drugs: Policy, Law Enforcement, and Diversion Tactics

The goal of this University of Central Florida study was to determine whether Florida law HB 7095 and related legislation reduced the number of pain clinics abusively dispensing opioid prescriptions in the State, as well as to assess the logistics of administering the law. The findings presented in this NIJ-supported report indicate that the Florida effort against rampant “pill mills” was largely successful, which is consistent with research that has documented reductions in opioid-related deaths in Florida. Further, the findings show the key role of interagency cooperation in the success of the legislation, which in conjunction with Florida’s legislation, should be considered a model for future efforts in reducing easy access to prescription opioids.

Differential Sampling of Footwear to Separate Evidentiary Particles from Background Noise

This NIJ-supported project by Stoney Forensic tested the ability to separate particle signals on the footwear soles using differential analysis of loosely held, moderately held, and strongly held particle fractions. Prior research has used a generalized sampling of particles on footwear soles from both contact and recessed areas shows the retention of particles from earlier contacts. The current study determined that although particles on the contact surfaces of footwear were removed and replaced, particles on the more recessed areas of the sole were not. Three environmental exposure sites were chosen to have different characteristic particle types (soil minerals) and shoes of two types (work boots and tennis shoes) were tested. Some shoes were exposed to only one environment, and others were exposed to all three in one of six sequences. Sampling methods were developed to separate particles from the contact surface of the shoe based on how tightly they were held to the sole.

Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) and Laser Induced Breakdown Spectroscopy (LIBS) Analyses of Paper, Inks, and Soils

Florida International University researchers sought to demonstrate the utility of an analytical chemistry tool that is relatively new to forensic laboratories, Laser Induced Breakdown Spectroscopy (LIBS), in conducting elemental analysis of ink, paper, and soil evidence quickly and with little or no sample preparation. The commercial LIBS instrumental results were compared to previously optimized in-house LIBS systems and also to the alternative forensic tools, which offer good analytical performance but suffer from either very high costs and significant complexity (in the case of LS-ICP-MS) or analytical limitations in the form of sample requirement and relatively high detection limits (in the case of mXRF and SEM-EDS). Although less mature than LA-ICP-MS, LIBS also shares the benefits associated with laser ablation methods, with the added advantage of improved speed, versatility, ease of operation, affordability, and portability. This NIJ-supported project shows that both LA-ICP-MS and LIBS are useful analytical tools for the analysis of paper, inks, soil, and cotton.

Method Validation for a Statistically Based Comparison of Tool Marks using GelSight-Based Testing in Crime Scene Investigation to Agencies across the Globe. After the Fact has been used as the competency standard since 2011 and is a cost-effective training tool. Assessments are $250 and available at www.csi-skills.com.

michelle.chernicoff@nfstc.org
https://www.nfstc.org/
Three Dimensional Imaging and Novel Comparison Algorithms for Firearm Forensics

TopMatch technology for structural 3D imaging and comparison of cartridge casings shows excellent and continually improving match accuracy; however, in order to fully establish the base credibility of the platform, it was necessary to establish best-scanning practices and to demonstrate that the method meets the quality-control criteria of other forensic instruments. This NIJ-supported project by Cadre Research Labs aimed to enhance TopMatch by establishing best practices and conducting a set of methodology studies. The project complements the previous studies on accuracy and evidence stability by addressing the remaining issues of precision, repeatability, reproducibility, contamination risk, and performance checks. In addition, researchers studied the effects of cleaning protocols, focus variation, and ambient lighting variation.

Measuring the Frequency Occurrence of Handwriting and Hand-Printing Characteristics

One of the basic axioms of handwriting comparison is that no two writers use the exact same set of handwriting characteristics. The database created by NIJ-supported researchers and the resulting frequency occurrence proportions provide the forensic and judicial communities with some empirical data with which to assess this axiom. The specific approach in collecting samples that match the U.S. demographics provides unique insight and substantive data on the quantitative relationship between the presence/absence of readily identifiable features and key demographic factors as noted by Huber and Headrick (age, gender, ethnicity, education, location of second/third grade schooling, and handedness) while controlling for other factors, such as temporal state and geographic locations. The original set of specimens collected from a wide spectrum of participants provided an initial large collection that was eventually pared down to achieve what is considered a representative sample from the entire target population.

Gunshot Residue in a Non-Firearm Detainee Population

Studies have shown varying amounts of gunshot residue (GSR) in the police environment, with most being on surfaces within facilities occupied and operated by law enforcement. This NIJ-supported study by researchers at the Harris County Institute of Forensic Sciences examined whether GSR contamination could be found on the hands of detainees at the Harris County Jail (Texas) who were not charged with any offenses related to the discharge of a weapon. Of the 175 samples obtained and tested, not one characteristic GSR particle was found. Coupling the results of this study with one in which no GSR particles were on 100 persons answering bench warrants in Bexar County (Texas) gives an average of less than one GSR particle in 275 hand samples. Considering that a different study of untested sexual assault kits.

Comparison of Microspectrophotometry and Fluorescence Excitation-Emission Matrix (EEM) Spectroscopy for Non-Destructive Fiber Examination

When spectral information is used in the study of fiber evidence, variations within a fiber source lead to the recommendation that multiple spectra be collected from each fiber to properly characterize the sample. Although this methodology is sufficient for comparison of profiles with obvious differences, the chemometric methods used in this NIJ-supported study from researchers at the University of Central Florida show higher accuracies than the visual method commonly used in forensic laboratories. Current practices in forensic labs that involve fluorescence microscopy do not take advantage of the information content that exists in the spectral signature of textile fibers.

Featured Article:

His name was Wilmer Souder. A physicist at the National Bureau of Standards, now known as the National Institute of Standards and Technology (NIST), Souder played an important role in the early days of forensic science. He helped send countless murderers, bootleggers, gangsters and thieves to prison, and he kept such a low profile partly out of concern for his and his family’s safety. Perhaps as a result, he was not long remembered for his forensic work, and his influence on the developing field of forensic science was not as great as it might have been.

NIST Library just finished scanning Souder’s nine notebooks and has made them available for anyone to view via the NIST Digital Archives:

http://nistsdigitalarchives.contentdm.oclc.org/cdm/landingpage/collection/p16009coll67

Bringing together experts from the forensic, research, legal, and law enforcement communities to strengthen forensic science and create a safer, more just society.

https://www.nist.gov/topics/forensic-science

Upcoming Events

International Forensic Science Error Management Symposium

July 24-28, 2017

Technical Colloquium: Quantifying the Weight of Forensic Evidence, June 27-29, 2017

Bode Cellmark Forensics provides advanced forensic solutions offering crime labs ways to reduce their workloads and budgets.

Bode’s newest offerings include: Sexual Assault Kit Backlog Reduction Program streamlines processes to eliminate backlogs of untested sexual assault kits.

Bode Buccal 2™ is uniquely designed to improve DNA databanking collecting and automate processing. The Bode Buccal 2 is a DIRECT COLLECTION SYSTEM that requires minimal training. There is NO Transfer Step Required.

Independent Validation Services are customized to meet your laboratory’s needs. Validation services provide completely unbiased analysis on your equipment, chemistries, or process.
coupling of a microscope to a spectrofluorimeter allows for the acquisition of a complete training set of EEMs for fiber dye identification from an individual fiber. Accounting for the variance of the EEM spectra at different regions along the length of the fiber provides a useful training set that can be used as the basis for principal component cluster analysis.

Development of a Mobile, Automated Tool Mark Characterization/Comparison System

This NIJ-supported project developed a portable prototype instrument that provides forensic examiners with the ability to characterize a tool-marked surface, compare the data from that surface to data files obtained from any other surface, and assess the likelihood that the marks on the two surfaces were made by the same tool. To date, the system has been successfully tested on data sets consisting of fully striated marks created from 50 sequentially manufactured screwdrivers, quasi-striated markings produced by 50 sequentially manufactured shear-cut pliers, and impression marks produced by 50 sequentially manufactured cold chisels.

The Interpretation of Patterned Injuries in Medicolegal Death Investigation

In this report, NIJ-supported researchers describe the results of their survey evaluating the effect of image processing and image quality on the ability of forensic pathologists to accurately interpret images of patterned injury of the skin. The study consisted of three surveys: the first, a collection of “classic” images that most pathologists would diagnose with high consensus (baseline survey); the second, degraded images with lesser resolution poorer composition to determine how degradation affected diagnostic consensus; and the third, images treated with various enhancement techniques to determine whether any benefit was gained. Surprisingly, the first survey produced a median of only 74 percent consensus. An analysis of the second and third surveys demonstrated the importance of context and history in forensic pathologic diagnosis. When provided with history, consensus rose to approximately 98 percent per question (median value) for the matching subset of the first survey.

Prediction of Drug Interactions with Methadone, Buprenorphine and Oxycodone

The impact of drug interactions spreads beyond the field of forensic toxicology to encompass general medicine, pharmacy and other areas involved in drug use and dispensing. These can all directly and indirectly impact the criminal justice systems, as many of these professions are called upon as consultants and expert witnesses for cases. Information on potential drug interactions with methadone, buprenorphine, and oxycodone can benefit these fields. A NIJ-supported project by researchers at the University of Utah hypothesized that the inhibition of the metabolism of opioids may contribute to their toxic effects and set out to measure the in vitro inhibition of metabolism of three opioids: methadone, buprenorphine, and oxycodone. This report outlines the progress made optimizing incubation conditions, establishing positive controls and screening inhibitory potential of the three drug classes.

Evaluation of a Novel Fluorescent Dye to Detect Anogenital Injury in Women of Color

NIJ-supported researchers at the University of Virginia tested fluorescent dyes to detect sexual assault injuries on different skin colors and tones. Trials were conducted to identify non-toxic suitable dyes that can be easily visualized using equipment already in common use among forensic examiners and will not interfere with subsequent forensic DNA testing. Findings suggest that fluorescein is both safe and feasible to use in detecting genital injury across all skin tones. However, additional research on alternative dyes across all skin tones is recommended.

Development of an Analytical System for Comparison and Identification of Fiber Dyes

In order to overcome challenges to generalized fiber dye characterizations, this NIJ-supported research...
explored a significant range of dyestuffs that span numerous major dye application classes, chemistries, chromophores, and fiber types, using techniques and methodologies currently available in most forensic laboratories. Numerous aspects of dye analysis, from extraction through micro analytical characterization, classification, and identification were examined for a set of 300 commercially prevalent dyestuffs. The results show that dye identification can be conducted using techniques available in many labs. It is anticipated that this research will provide a basis from which laboratories can expand their approach from a generalized comparison of color between questioned and known materials to a specific identification of the colorants present in a sample. This has the potential to increase the significance of results in the prosecution or defense of a case and improve the value of investigative leads in cases for which a comparison sample does not exist by constraining or identifying specific dyes.

Trace Metal Analysis by Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry and X-Ray K-Edge Densitometry

This NIJ-supported dissertation by an Iowa State University researcher describes studies on determining trace elements in samples with forensic importance, including trace analysis in lipstick, copper wire, fly larva and porcine skin tissue for gunshot residue and bullet residue in bones, as well as, soil from decomposed pig carcasses.

Pre-Feedback Eyewitness Statements: Proposed Safeguard against Feedback Effects on Evaluations of Eyewitness Testimony

This NIJ-supported study from an Iowa State University researcher tested pre-feedback statements as a safeguard for protecting against, and correcting for, the effects of confirming feedback on evaluations of eyewitness testimony. Results suggest that confirming feedback did not appear to have any influence on witnesses in the no pre-feedback statements condition. Additionally, confirming feedback did not impair evaluators’ abilities to discriminate between accurate and mistaken eyewitnesses in the conditions in which witnesses provided pre-feedback statements. Witnesses’ pre-feedback statements to evaluators did not improve evaluators’ abilities to discriminate between accurate and mistaken eyewitnesses who received feedback. Finally, evaluators tended to judge witnesses who gave no pre-feedback statements more favorably than they judged witnesses who gave pre-feedback statements.

Coming soon...... The Forensic Research Committee

An opportunity to work at JusticeTrax doesn't come around very often. We have a Software Tester position open! This one is going to go fast!

Please read about the opening at https://justicetrax.com/employment/

The Software Tester basic function is to validate the quality of JusticeTrax products. The Software Tester finds weaknesses in the products in an efficient and timely manner so that Software Developers can resolve them before customers experience a problem. The position reports to the Quality Manager.

Experience with JusticeTrax applications, especially LIMS-plus, may be substituted for experience as a software tester.
Following a number of requests from recipients for a direct link to the digest, I am in the process of creating a web-page on the ChemCentre web-site (www.chemcentre.wa.gov.au) for you to directly link to. I am hopeful that this will be active when the next issue of the digest is published and I will notify you accordingly. Please also continue providing me with feedback that enhances the value of this publication.

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NEWS STORIES

Editorial: Crime victims show why DNA testing of prisoners matters
Omaha World-Herald
Victims of unsolved crimes have a better shot at justice today because Nebraska's prison system has begun more vigorously enforcing a state DNA ...

How are rape kits processed?
kpw.com
Forensic scientists first pick up kits from a secure evidence locker after ... DNA evidence from a sample sexual assault forensic evidence kit awaits ...

London inferno may have destroyed DNA needed to ID 70 missing victims
Chicago Tribune
London inferno may have destroyed DNA needed to ID 70 missing ... said Denise Syndercombe Court, a forensic science expert at King's ...

Cuomo's familial DNA panel only had two members voting down the technique brought into ...
New York Daily News
Cuomo's familial DNA panel only had two members voting down the ... Cuomo voted against approving the use of familial DNA to solve violent crimes. ... on the State Commission on Forensic Science who opposed the technique ...

Chris Soules' attorneys: Toxicology tests were negative for alcohol and drugs
The Gazette: Eastern Iowa Breaking News and Headlines
Soules' attorneys argue in the motion that toxicology testing by the Iowa Division of Criminal Investigation Criminalistics Laboratory on two separate ...

Opioid epidemic driving up NC crime lab costs
WNCN
There's been a huge increase in a drug called fentanyl that's not only drastically impacting the work at the state crime lab, it's also dangerous for ...

Stopping gun crime
The American Society of Crime Laboratory Directors (ASCLD) has received funding from the Laura and John Arnold Foundation to develop software that will transfer data from forensic Laboratory Information Management Systems (LIMS) to FORESIGHT, a business quantitative process tailored to forensic laboratories.

The goal of the project, called FORESIGHT 20/20, will be to allow laboratories to easily upload business-relevant information from their individual LIMS to the FORESIGHT project, hosted at West Virginia University.

Software development and installations for JusticeTrax Alpha labs is progressing. The software provides a dashboard of the labs' own stats and FORESIGHT stats, among other information. The information, formatting, and interface may vary somewhat by vendor.