NIST FORENSIC SCIENCES

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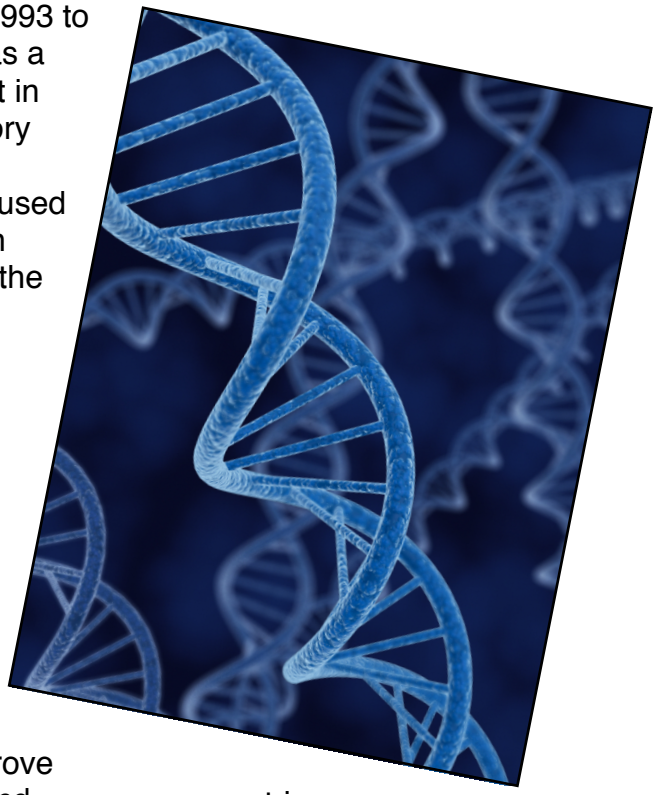
Forensic Science Just Became Personal

by **John M. Butler**, NIST Fellow and Special Assistant to the Director for Forensic Science

Over the past two decades, I have dedicated my career to improving the field of forensic science. My level of commitment changed on the morning of June 2, 2013, when I awoke to discover that while my family and I had been sleeping, a thief had broken into our home removing property, but more importantly violating our sense of security. Since that moment, forensic science has become more than my professional passion; now it is personal.

For the past 30 years I have had an interest in forensic science and have worked hard to advance the field of forensic DNA analysis. From 1993 to 1995, I worked as a graduate student in the FBI Laboratory pioneering DNA techniques now used worldwide. As an NRC postdoc in the then NIST Biotechnology Division, I developed the STRBase website (now NIST Standard Reference Database 130) and began preparing training materials to improve understanding and implementation of forensic DNA methods. The research efforts that I have been involved with over the years have led to more than 140 publications and invitations to teach in more than 20 countries.



In 2011, I was named by ScienceWatch as the #1 most impactful author worldwide (in terms of citations per publication) in forensic science and legal medicine for the decade of 2001 to 2011. My four forensic DNA textbooks are widely used and cited, such as in the June 3, 2013,

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Supreme Court decision of Maryland v. King that opens the doors to arrestee DNA testing.

My career at NIST over the past 15 years has involved building the Applied Genetics Group and advancing measurement science for forensic DNA through significant funding from the National Institute of Justice and the FBI. In early April 2013, I moved to the Office of Special Programs to help forensic science efforts across NIST as a "Special Assistant to the Director for Forensic Science." Little did I know that my interest in forensic evidence and its capability to solve crimes would soon become directly important to me personally.

In the early morning hours of Sunday, June 2, under the cover of darkness, a thief entered our home in Old Town Gaithersburg. While our family (six children, my wife, and I) slept, the perpetrator broke in, roamed our house armed with one of our kitchen knives, and left with our TV, a work bag containing my NIST badge and official passport, my oldest daughter's jewelry, another daughter's piggy bank containing $4, and some electronics including our home computer. Fortunately, no one awoke to stumble upon or confront the brazen culprit – an act that could have proved fatal. Being a victim of crime provides a whole new perspective on the importance of solving crime.

After I discovered the computer theft on Sunday morning, my wife called the Gaithersburg Police who arrived to take pictures and collect a few items of evidence for fingerprint processing. We later heard that a number of other homes in our neighborhood were also

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Please send updates and suggestions for articles to John Butler.

Coming soon:

www.nist.gov/forensics

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burglarized on Saturday night. Thinking of our home as a crime scene was a new experience for me.

On Monday morning, I called the Montgomery County Police to see whether they could do some DNA testing on the knife handle and the tips of remaining computer cables that would have been touched. I wanted to see any potential evidence put to good use. Crime scene investigators and a detective came to comb our home for clues. They swabbed and dusted and photographed my personal belongings for fingerprints and DNA that might be used to identify the perpetrator. (Of course, if gloves were used during the commission of the thefts, then biological evidence and fingerprints may not be available.) Years of study on the topic of forensic evidence factored into helping the police investigators with their crime scene reconstruction and processing. In addition, my sharp-eyed wife located some discarded surgical gloves that may be connected to the crime in a street gutter near our home.

Crime lab analytical results are not yet complete, but hopefully they will yield results that can be compared to local, state, and national DNA databases to try to put a name to the culprit that violated our home. Never in my life have I had a greater desire to see evidence appropriately collected and measurements properly performed! Perhaps the theft of the very computer used to write my last two forensic DNA books can be solved with the techniques described within these volumes.

NIST must continue its quest to improve forensic science so more crimes can be solved. Victims are depending on reliable measurements, interpretation, and reporting. I understand this need now more than ever.

Forensic science just became personal! **§**

NIST Office of Special Programs Launches *NIST Forensic Sciences News*

Seeking to improve communication across NIST on forensic science

I began working on forensic science issues across NIST at the beginning of April after having been part of the forensic DNA efforts in the Material Measurement Laboratory (and previously the Chemical Science and Technology Laboratory) for the past 15 years. In my new role, I would like to see communication improved across NIST in this important program area. We would like to share updates to the NIST community and beyond on a regular basis. One way will be through this new quarterly newsletter — *NIST Forensic Sciences News*. Suggestions for improvements or content for the newsletter are always appreciated. Please contact me at john.butler@nist.gov or 301-975-4049. **§**

John M. Butler, NIST Fellow and Special Assistant to the Director for Forensic Science

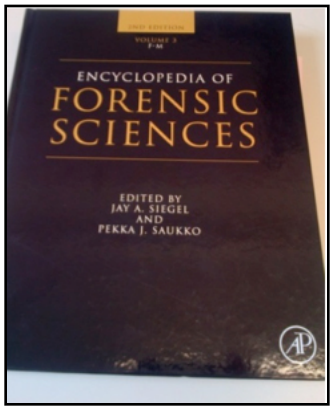
100 Years of NIST History in Forensics

A century of service to forensic science

This year marks 100 years since NIST (then the Bureau of Standards) became involved in forensic science. According to the 1966 volume *Measures for Progress: A History of the National Bureau of Standards* by R.C. Cochrane (p. 302), Albert Osborn, an early pioneer in questioned documents, sent some micrometers to the Bureau of Standards for calibration in 1913. Dr. Wilmer Souder of the Weights and Measures Division tested these micrometers and began his interest and involvement in a number of forensic science disciplines. For the next two decades, Dr. Souder's laboratory served as the federal government's principal crime research center until the FBI Laboratory began its operations in 1932. Dr. Souder specialized in identification of bullets, cartridge casings, firearms, and questioned documents. By the early 1930s, he was participating in 50 to 75 Federal investigations each year including an important role as the only government witness regarding analysis of the ransom note from Bruno Hauptmann in the kidnapping and murder of Charles Lindbergh's son. Dr. Souder retired from NIST in 1954 and served for a number of years as a consultant to the director.

The Memorandum of Understanding between NIST and the Department of Justice announced on Feb. 15, 2013, thus begins a second century of involvement in forensic science. As we improve our NIST websites regarding forensic science efforts, we would like to include more historical information from each forensic discipline where NIST has played a role. Please contact Robert M. Thompson (robert.m.thompson@nist.gov) if you have historical information to contribute. **§**

New *Encyclopedia of Forensic Science*



In early 2013, Elsevier Academic Press published a second edition of the *Encyclopedia of Forensic Sciences*, which includes full color figures and a significant expansion in coverage (now four volumes instead of three) compared to the first edition that was published in 2000. NIST's John Butler served as section editor for the forensic biology articles. John has a copy of the four-volume set and access to all of the articles electronically. Please contact him if you are interested in reading an article. A table of contents for the EFS2e can be accessed at http://www.sciencedirect.com/science/referenceworks/9780123821669. **§**

Largest DNA Workshop Ever Conducted

DNA Mixture webcast reaches >1000 practitioners

On April 12, NIST broadcast eight hours of continuing education material from the Portrait Room on the topic of DNA mixture interpretation. Over the following two weeks, certificates of participation were issued to 1039 DNA analysts based on verification of participation by their DNA technical leaders. We reached practitioners in 49 states (all but South Dakota) and at least 10 countries ranging from Bahrain and Brazil to Switzerland and Spain. The event was organized by John Paul Jones from the NIST Law Enforcement Standards Office, and presenters included John Butler (NIST Office of Special Programs), Mike Coble (NIST Applied Genetics Group), Robin Cotton (Boston University), Bruce Heidebrecht (Maryland State Police), and Charlotte Word (consultant). SurveyMonkey electronic poll questions were also used to collect feedback in real-time from participants and numerous questions received via email and Twitter were addressed during the webcast. An enormous amount of positive feedback was received suggesting that this avenue of sharing information may be an important way that NIST can connect with the forensic science community. Videos from the webcast are archived and available at http://www.nist.gov/oles/forensics/dna-analyst-training-on-mixture-interpretation.cfm. §

Left to right:
Gladys Arrisueno (NIST, Twitter feed monitor & poll questions), **John Paul Jones** (NIST, webcast organizer), **Mike Coble** (NIST, presenter), **John Butler** (NIST, presenter & organizer), **Charlotte Word** (Consultant, presenter), **Robin Cotton** (Boston University, presenter), **Bruce Heidebrecht** (Maryland State Police Lab, presenter)

Listing of Forensic Databases Compiled

Melissa Taylor of the NIST Law Enforcement Standards Office has organized a survey of state and federal law enforcement agencies to develop a comprehensive list of databases, reference materials, and standard reference collections use by forensic scientists in laboratories at the state and local levels. The listing she developed of 228 state, federal, and commercially run databases is available at http://www.nist.gov/oles/forensics/forensic-database.cfm. §

Biological Evidence Preservation Handbook Published

Over the past two decades, the Innocence Project (http://www.innocenceproject.org) has been an advocate for using post-conviction DNA testing to help exonerate wrongfully convicted individuals. As of early June 2013, more than 300 DNA exonerations have been achieved. In order for post-conviction DNA testing to be possible, biological evidence must exist and be properly preserved. For the past several years, NIST has coordinated an effort with the National Institute of Justice to develop a biological evidence preservation handbook. As a result of multiple committee meetings, a 73-page handbook was produced that makes recommendations for evidence retention, safe handling, packaging and storage, chain-of-custody and tracking, and appropriate disposal once evidence retention is no longer required by law. This handbook is available for download as a free pdf file from http://nvlpubs.nist.gov/nistpubs/ir/2013/NIST.IR.7928.pdf. §

New Collaborations and Opportunities with the DEA

Synthetic Drug Webcast Leads to New Collaborations

On April 30 and May 1, NIST hosted a webcast and workshop on Emerging Trends in Synthetic Drugs in collaboration with the Drug Enforcement Administration (DEA). John Paul Jones of the NIST Law Enforcement Standards Office organized the workshop, and Bill MacCrehan of the Material Measurement Lab's Chemical Sciences Division (MML/CSD) spoke on NIST reference materials and capabilities. On May 31, Bill and John Paul visited the DEA Special Testing and Research Laboratory in Northern Virginia along with Karl Irikura and Katrice Lippa from MML/CSD. As a result of this visit to DEA, NIST will be doing collaborative calculations to predict IR spectra (Karl Irikura), molecular similarity (Carlos Gonzales), and the use and uncertainty of measurements for quantitative NMR (Katrice Lippa). Videos from the webcast are achived and available at http://www.nist.gov/oles/synthetic_drugs.cfm. §

NIST-wide Forensic Science Efforts for April-May 2013

The following list summarizes NIST-wide forensic science efforts during April and May to aid the forensic science community. Thanks to NIST forensic science champions for providing feedback about these activities. In some of the topic areas below, information has been subdivided by forensic discipline.

Publications

Peer-Review Articles/Book Chapters/Trade Journals/NIST Special Reports

NIST Special Reports

The Biological Evidence Preservation Handbook: Best Practices for Evidence Handlers. NIST Interagency/Internal Report (NISTIR) 7928. NIST co-authors: Susan M. Ballou, Margaret C. Kline, Mark D. Stolorow, Melissa K. Taylor. Published: April 23, 2013.

Writing Guidelines for Requests for Proposals for Automated Fingerprint Identification Systems. NIST Special Publication (NISTSP) 1155. NIST co-authors: Melissa Taylor, Susan Ballou, Mike Garris. Published: April 25, 2013.

Writing Guidelines to Develop a Memorandum of Understanding for Interoperable Automated Fingerprint Identification Systems. NIST Special Publication (NISTSP) 1156. NIST co-authors: Melissa Taylor, Susan Ballou, Mike Garris. Published: May 14, 2013.

Ballistics

Song, J. (2013) Proposed “NIST Ballistics Identification System (NBIS)” based on 3D topographic measurements on correlation cells. *AFTE Journal* 45(2): 184-194.

Computer Forensics

The National Institute of Justice published *Test Results for Digital Data Acquisition Tool: FTK Imager CLI 2.9.0_Debian NCJ 242138*, in May 2013. This 128-page document is available at https://ncjrs.gov/pdffiles1/nij/242138.pdf

DNA

Coble, M.D., Hill, C.R., Butler J.M. (2013) Haplotype data for 23 Y-chromosome markers in four U.S. population groups. *Forensic Sci. Int. Genet.* 7: e66-e68.

Hill, C.R., Duewer, D.L., Kline, M.C., Coble, M.D., Butler, J.M. (2013) U.S. population data for 29 autosomal STR loci. *Forensic Sci. Int. Genet.* 7: e82-e83.

McLaren, R.S., Patel, J., Ewing, M.M., Storts, D.R., Noel, F., Dognaux, S., Hill, C.R., Kline, M.C., Butler, J.M. (2013) Developmental validation of the PowerPlex ESI 17 Pro System. *Forensic Sci. Int. Genet.* 7: e69-e73.

Butler, J.M. and Hill, C.R. (2013) Biology and genetics of new autosomal STR loci useful for forensic DNA analysis. Chapter 9 in Shewale, J. (ed.), *Forensic DNA Analysis: Current Practices and Emerging Technologies*. Taylor & Francis/CRC Press: Boca Raton. pp. 181-198.

Coble, M.D. (2013) miniSTRs. Chapter in Siegel, J.A. & Saukko, P.J. (editors) *Encyclopedia of Forensic Sciences, Second Edition.* Elsevier Academic Press: San Diego. pp. 239-242.

Butler, J.M. (2013) Forensic DNA advisory groups: DAB, SWGDAM, ENFSI, and BSAG. Chapter in Siegel, J.A. & Saukko, P.J. (editors) *Encyclopedia of Forensic Sciences, Second Edition.* Elsevier Academic Press: San Diego. pp. 339-343.

Drug Analysis

Demoranville, L.T., & Verkouteren, J.R. (2013) Measurement of drug facilitated sexual assault agents in simulated sweat by ion mobility spectrometry. *Talanta* 106: 375-380.

McCall, H., Moran, J., Yeager, B., Bell, S. (2013) Ion mobility spectrometry as a tool for evaluation the efficacy of cleaning protocol for clandestine methamphetamine laboratory remediation. *Journal of Occupational and Environmental Hygiene* 10: 26-35.

Explosives Analysis

Bruno, T.J., Nichols, J. (2013) Method and apparatus for pyrolysis-PLOT-cryoadsorption headspace sampling and analysis. *J. Chromatogr. A* 1286: 192-199.

Fingerprint Analysis

Staymates, J.L., Staymates, M.E., Gillen, G. (2013) Evaluation of a drop-on-demand micro-dispensing system for development of artificial fingerprints. *Anal. Methods* 5: 180-186.

Nuclear Forensics

Inn, K.G.W., Johnson, C.M., Oldham, W., Jerome, S., Tandon, L., Schaaff, T., Jones, R., Mackney, D., MacKill, P., Palmer, B., Smith, D., LaMont, S., Griggs, J. (2013) The urgent requirements for new radioanalytical certified reference materials for nuclear safeguards, forensics, and consequence management. *J. Radioanal. Nucl. Chem.* 296: 5-22.

Trace Analysis

Verkouteren, J.R., Ritchie, N.W.M., Gillen, G. (2013) Use of force-sensing array films to improve surface wipe sampling. *Environmental Science Processes & Impacts* 15: 373-380.

Clemons, K., Dake, J., Sisco, E., Verbeck IV, G.F. (2013) Trace analysis of energetic materials via direct analyte-probed nanoextraction coupled to direct analysis in real time mass spectrometry. *Forensic Science International* 231: 98-101.

Staymates, M., Bottiger, J., Schepers, D., Staymates, J. (2013). A streamlined, high-volume particle impactor for trace chemical analysis. *Aerosol Science and Technology* DOI: 10.1080/02786826.2013.804620, Available online May 16, (2013).

Presentations

Talks/Seminars/Posters

1. **John Butler** invited presentation at Northeastern University (Boston, MA), April 4, 2013, Saferstein Memorial Lecture: "Beyond CSI: Exciting Application of Forensic DNA"
2. **John Butler** invited presentation at Northeastern University (Boston, MA), April 5, 2013, Saferstein Memorial Lecture: "The Future of Forensic DNA Testing"
3. **Bill MacCrehan** poster at 5th Annual Workshop on Trace Explosives Detection meeting (Philadelphia, PA), April 9, 2013, “Standard Reference Materials (SRMs) that simulate trace explosives residues of C-4, Semtex, TNT, and TATP”
4. **Greg Gillen** presentation at 5th Annual Workshop on Trace Explosives Detection meeting (Philadelphia, PA), April 10, 2013, “Fabrication of Trace Explosive Particle Test Materials Using Inkjet Printing onto Hydrophobic and Oleophobic Surfaces”
5. **Jennifer Verkouteren** presentation at 5th Annual Workshop on Trace Explosives Detection meeting (Philadelphia, PA), April 10, 2013, “Performance Metrics for IMS-based Trace Explosives Detectors using Inkjet Printed Materials”
6. **Bill MacCrehan** presentation at 5th Annual Workshop on Trace Explosives Detection meeting (Philadelphia, PA), April 11, 2013, “Reproducible dynamic vapor-time profiles of explosives and materials with uniform release rates for detection testing”
7. **Jacqueline Mann** presentation at NIST (Gaithersburg, MD), April 11, 2013, “The Urgent Requirement for New Radioanalytical CRMs for Measurement Traceability in Nuclear Safeguards, Nuclear Forensics, and Consequence Management”
8. **Mike Verkouteren** presentation at 5th Annual Workshop on Trace Explosives Detection meeting (Philadelphia, PA), April 12, 2013, “Interlaboratory Study to Support Proposed ASTM Standard Method for Determination of Limit of Detection in Explosive Trace Detectors”
9. **John Paul Jones** gave opening remarks as part of the NIST DNA Mixture Interpretation Webcast (Gaithersburg, MD), April 12, 2013 - video available at http://www.nist.gov/oles/forensics/dna-analyst-training-on-mixture-interpretation.cfm.
10. **John Butler** and **Mike Coble** presentations as part of the NIST DNA Mixture Webcast (Gaithersburg, MD), April 12, 2013 - slides and video available at http://www.nist.gov/oles/forensics/dna-analyst-training-on-mixture-interpretation.cfm.
11. **John Butler** invited presentation at 4th Annual Post-Conviction Conference (Charlotte, NC), April 18, 2013, "DNA Mixture Interpretation" [.pdf]
12. **Robert M. Thompson** invited presentation at the University of Rhode Island Graduate Forensic Science Seminar Series (Kingston, RI), April 19, 2013, “Firearm Examination in the Forensic Science Laboratory”

13. **Susan Ballou** presentation at the International Association of Identification--Chesapeake Bay Division meeting (Dover, DE), April 22, 2013, “Are You Responsible for the Misidentifications?”
14. **John Paul Jones** gave opening remarks as part of the NIST/DEA Emerging Trends in Synthetic Drugs Workshop & Webcast (Gaithersburg, MD), April 30 – May 1, 2013 – video available at: http://www.nist.gov/oles/synthetic_drugs.cfm
15. **Bill MacCrehan** presentation at the NIST/DEA Emerging Trends in Synthetic Drugs Workshop & Webcast (Gaithersburg, MD), May 1, “Capabilities for Measurements, Materials, Data, Modeling, and Information Processing in the Chemical Sciences Division”
16. **Becky Hill** presentation at the Mid-Atlantic Association of Forensic Science Annual Meeting’s Y-STR workshop (Roanoke, VA), May 7, 2013, "Variability of Y-STR Marker Sets in the NIST 1036 U.S. Population Samples”
17. **John Butler** invited presentation at the Fourth Congress of the Brazilian Society of Forensic Genetics (São Paulo, Brazil), May 8, 2013, "State-of-the-Art Forensic DNA"
18. **Becky Hill** presentation at the Mid-Atlantic Association of Forensic Science Annual Meeting (Roanoke, VA), May 8, 2013, "The Impact and Benefit of Expanding the U.S. Core Autosomal STR Markers”
19. **Kevin Kiesler** presentation at the Mid-Atlantic Association of Forensic Science Annual Meeting (Roanoke, VA), May 8, 2013, "Capabilities of Next-Generation Sequencing Instrumentation for Mitochondrial DNA Whole Genome Analysis”
20. **Mike Coble** presentation at the American Society of Crime Lab Directors Annual Meeting (Durham, NC), May 9, 2013, "Why are Mixtures Difficult and Lessons Learned from DNA Mixture Workshops"
21. **Melissa Taylor** and **Shannan Williams** poster at the American Society of Crime Lab Directors Annual Meeting (Durham, NC), May 9, 2013, "Biological Evidence Storage Conditions”
22. **Greg Gillen** presentation at the 25th Annual Workshop on Secondary Ion Mass Spectrometry, (Annapolis, MD), May 14, 2013, “SIMS Imaging of Thermal Aerosols from Illicit Narcotics and Explosives”
23. **Ed Sisco** presentation at the 25th Annual Workshop on Secondary Ion Mass Spectrometry, (Annapolis, MD), May 14, 2013, “Analysis of fingerprints using C_{60} SIMS”
24. **Tim Brewer** presentation at the 25th Annual Workshop on Secondary Ion Mass Spectrometry, (Annapolis, MD), May 14, 2013, “Forensic applications of ambient MS – illicit narcotics and explosives”
25. **Eric Windsor** poster presentation at the 25th Annual Workshop on Secondary Ion Mass Spectrometry, (Annapolis, MD), May 14, 2013, “Laser Diode Thermal Desorption Mass Spectrometry for Forensic Analysis”
26. **Jacqueline Mann** invited presentation at the Countering Nuclear and Radiological Threats Symposium (Fairfax, VA) May 16, 2013, “The Urgent Requirement for New Radioanalytical CRMs for Measurement Traceability in Nuclear Safeguards, Nuclear Forensics, and Consequence Management”
27. **Barbara Guttman** gave an invited presentation on the NSRL at Preserving.exe: Toward a National Strategy for Preserving Software, a conference hosted by the Library of Congress (Washington, DC), May 20-21
28. **John Paul Jones** presentation at the California Association of Criminalists (CAC) Spring Seminar (Pasadena, CA), May 22, 2013, “NIST Research, Guidelines, and Tools that Support Forensics Scientists”

29. **Robert Thompson** presentation at the California Association of Criminalists Spring Seminar (Pasadena, CA), May 23, 2013, "2D/3D Topography Comparisons of Toolmarks Generated by Consecutively Manufactured Chisels and Punches"
30. **Robert Thompson** presentation at the California Association of Criminalists Spring Seminar (Pasadena, CA), May 23, 2013, "Initial Tests using CMC Method for Optical Image Correlations of Cartridge Cases Fired from Consecutively Manufactured Pistol Slides"
31. **John Song** presentation at the California Association of Criminalists Spring Seminar (Pasadena, CA), May 23, 2013, "Validation Tests for the CMC Method using Cartridge Cases Fired with Consecutively Manufactured Pistol Slides"

Conferences/Workshops/Session Organized

- **John Paul Jones** organized a DNA Mixture Interpretation webcast on April 12: http://www.nist.gov/oles/forensics/dna-analyst-training-on-mixture-interpretation.cfm
- **John Paul Jones** organized a webcast and workshop on Emerging Trends in Synthetic Drugs conducted in collaboration with the Drug Enforcement Administration that was held at NIST April 30 and May 1: http://www.nist.gov/oles/synthetic_drugs.cfm
- **Greg Gillen** helped organize the 5th Annual Workshop on Trace Explosives Detection, Philadelphia, PA, April 8-12, 2013
- **Greg Gillen** helped organize the 25th Annual Workshop on Secondary Ion Mass Spectrometry, Annapolis, MD May 13-17, 2013
- **Barbara Guttman and Jim Lyle** represented NIST at a Department of Homeland Security Science & Technology Cyber Forensics Working Group on April 16.
- NIST hosted the NSRL/CFTT Steering Committee in May 16. **Doug White, Jim Lyle, Rick Ayers, and Ben Livelsberger** presented. The Steering Committee meets every other month to provide federal input to the NSRL and CFTT. Current members are from the Federal Bureau of Investigation, the Department of Defense Cyber Crime Center, Department of Homeland Security/Science & Technology, US Secret Service, Customs & Border Protection, Securities & Exchange Commission, US Postal Service, the National White Collar Crime Center, the Drug Enforcement Agency, the National Institute of Justice, Commodities Future Trading Commission, the Naval Postgraduate School and others.
- **Michael Ogata** participated in an AT&T Mobile App Hackathon in May to support his research into mobile phone forensics.

Visits to Forensic Laboratories

- **John Butler** visited the Boston Police Department Forensic Laboratory on April 5, 2013, while in Boston giving presentations at Northeastern University. Lab director Don Hayes provided a tour of the forensic biology and chemistry sections and discussions were held with the DNA Technical Leader Julie James.
- Members of the Computer Forensics Tool Testing team (**Jim Lyle, Rick Ayers, and Barbara Guttman**) visited a Defense Intelligence Agency forensics lab on April 9 to discuss file carving. NIST is developing a specification and test material for file carving. NIST has received funding from DIA in FY 2010 and 2011 and they have submitted a funding request for FY 2013.

- **Robert M. Thompson** visited the Rhode Island State Forensic Laboratory on April 19, 2013, on the URI campus. He visited their laboratory spaces and gave a presentation of the most recent work that NIST's Forensic Science ballistic research team had accomplished. The firearm's laboratory was reviewed and he described and demonstrated to one of the examiners what would be necessary for finding an objective "match position" area for a pair of bullets for identification.
- Members of the CFTT (**Jim Lyle, Rick Ayers, and Barbara Guttman**) visited the e-discovery forensic lab at TransPerfect on May 23. (Andrew Neal, Region Director, TransPerfect Digital Forensics, said "Our forensics team enjoyed the conversation, and it definitely gave us a better understanding of your projects and the resources they provide. Hopefully you had a chance to see how we deploy your work product on a daily basis, and see or hear some of the unique aspects of digital forensics and e-discovery in our environment. I think your visit held significant value for us. We are committed to participating in the professional community, including standards development and testing, so please keep us in mind if you encounter any opportunities for us to contribute.")
- Members of the NIST Applied Genetics Group including **Pete Vallone, Mike Coble, Becky Hill, and Kevin Kiesler** visited the FBI Laboratory on May 23 and provided five hours of lectures to the FBI's Federal DNA Database Unit. These presentations were part of continuing education for the FBI scientists and provided an opportunity to showcase the latest forensic DNA research efforts at NIST. In FY13, the Applied Genetics Group received almost $700k from the FBI Biometrics Center of Excellence through an interagency agreement with the NIST Information Access Division.
- **Mike Coble** gave a presentation and demonstration of the STRmix DNA mixture interpretation program to the FBI's DNA Unit I on May 31.
- Members of the NIST Office of Special Programs and Chemical Sciences Division including **John Paul Jones, Bill MacCrehan, Karl Irikura and Katrice Lippa** visited the Drug Enforcement Administration's Special Testing and Research Laboratory in Dulles, VA on May 31 to discuss future collaborations in the subject areas of Purity – qNMR, NIST Traceable RMs, Interlaboratory Comparisons, Computational Chemistry, Drug stability studies/storage conditions, and Uncertainty/statistics. This discussion is a follow-up to the Emerging Trends in Synthetic Drugs workshop held at NIST.

CRADAs or Other Partnerships with Industry or Academia

- EL's Fire Division is partnering with the **International Association of Arson Investigators (IAAI)** to develop a training module titled, Temperature, Heat Flux and their Measurement for the Fire Investigator, for their CFITrainer.net web based learning system. The IAAI project is supported by the DHS Assistance to Firefighters Grant Program. The module will be completed by September 2013.
- **Marshall University** submitted a report for their computer forensics work on federated testing for the academic year. Marshall is beta testing our federated testing material. They discovered several places we needed to improve the usability of the material by non-NIST scientists. Federated testing is designed to make NIST-developed test methods and materials usable by the general computer forensics community.

Patents

Bruno, T.J., Method and apparatus for pyrolysis PLOT-Cryoadsorption headspace sampling and analysis; U.S. patent application.

Guest Researchers or Students

- Alex Nelson, a PhD student from UC Santa Cruz started on a year-long contract at NIST where he will develop data for his dissertation.
- Simone Gittelson from the University of Lausanne in Lausanne, Switzerland was awarded an Early Postdoctoral Mobility fellowship by the Swiss National Science Foundation on May 24 and will join the NIST Applied Genetics Group in October to conduct 9 months of research in probabilistic reasoning for forensic evidence evaluation and interpretation.
- Dr. Mark Tyra, DHS sponsored term hire, to help in the nuclear forensics program within the Radiation and Biomolecular Physics Division.
- Devin McBain, SURF student from Cal State Chico, working on trace vapor analysis by PLOT-Cryoadsorption.
- The Surface and Microanalysis Science Division (Group 643-05) has several student/guest researcher fellowships: U.S. Army Crime Lab “SMART” Fellowship, 4 Department of Homeland Security DHS Fellows, and a SURF student.
- The Law Enforcement Standards Office has a Forensic Science Master’s Student from George Mason University for the summer.

Reference Data Activities

- The **National Software Reference Library (NSRL)** now has over 16,000 software applications. We added 4 million new file signatures bringing our total to over 165 million. Of these 400,000 were unique bringing our unique count to 33 million.
- The NSRL added its first set of data from the Stephen M. Cabrinety History of Microcomputing Collection. The Cabrinety Collection has 15,000 software packages collected from 1975 to 1995 by Stephen M. Cabrinety and donated to Stanford after his death. See http://www.nist.gov/itl/ssd/software-030513.cfm, http://news.stanford.edu/thedish/?p=25483 and http://blogs.loc.gov/digitalpreservation/2013/02/video-game-preservation-at-scale-an-interview-with-henry-lowood/ for background on the NIST-Stanford collaboration. The NSRL Cabrinety data contains 1200 products and 12,000 file signatures.
- The NSRL published the first set of Diskprint data. The Diskprint project goes beyond file-based metadata and looks at the entire lifecycle of a piece of software from install to uninstall. Key pieces of data that will be captured include changes to the registry, to memory, and network traffic. The diskprint initial data shows that there are over several thousand registry changes made by a piece of software and most all of them are unique. That means that registry entries will be a useful way of identifying software that is or has been on a system.
- The NSRL made RDS 2.40 available for free download. The RDS is published quarterly (on months divisible by 3) and sold through the SRD Office as Special Database 28. After one month, it is put online for free distribution.

- **Melissa Taylor** from the Law Enforcement Standards Office has led an effort to survey state and federal law enforcement agencies to develop a comprehensive list of databases, reference materials, and standard reference collected used by scientists in forensic laboratories. This list of 228 forensic databases, which is available at http://www.nist.gov/oles/forensics/forensic-database.cfm, is intended to inform future SRM and SRD development.

Committee Assignments

- **Mike Coble** participated in the North Carolina Forensic Science Advisory Board meeting in Raleigh, NC on April 9. He was appointed to a four-year term in 2012 by North Carolina Attorney General Roy Cooper.
- **John Butler** participated in the Virginia Department of Forensic Sciences Scientific Advisory Committee meeting in Richmond, VA on May 13. He was appointed to a four-year term in 2009 by Virginia Governor Timothy Kaine.
- **Bill MacCrehan** is a member of ASTM International Committee E30.01 Forensic Sciences: Criminalistics.
- **Susan Ballou** is on the American Academy of Forensic Sciences Forensic Science Foundation Board of Trustees and is currently secretary for the ASTM E30.12 committee. She also participates in the Scientific Working Group for Digital Evidence (SWGDE), the Technical Working Group for Fire and Explosion (TWGFEX), the High Technology Crime Investigation Association (HTCIA) Mid-Atlantic Chapter, the International Association for Identification (IAI) as the NIST-Forensic Sciences Liaison, and the International Association of Chiefs of Police (IACP) Computer Crime and Digital Evidence Committee.

Editorships and Editorial Board Service

- **John Butler** is the Associate Editor of *Forensic Science International: Genetics*. He is also on the editorial board of the *Journal of Forensic Sciences*.
- **Dan Madrzykowski** is on the editorial review board of the *Fire and Arson Investigator Journal*, published by the International Association of Arson Investigators (IAAI).

Visitors or Tours at NIST related to Forensic Science

- Professor April Hill, Metropolitan State University of Denver gave an Applied Chemicals and Materials Division Seminar on April 5 entitled “Using colorimetric solid-phase extraction (CSPE) to improve presumptive drug testing”
- **Jenise Reyes-Rodriguez** gave a computer forensics lab tour for several student groups as part of the ITL-CIO Student Shadow Day on April 29. **Barbara Guttman** also served as a mentor.
- Danny Hall from Illumina Inc visited **Pete Vallone** (Applied Genetics Group) on May 8 to discuss next-generation sequencing technologies and potential uses for human identification.

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