Information Technology Laboratory Newsletter

Credit: ASU Biodesign Institute

May—June 2016

Issue 141

ITL Workshops on Statistical Interpretation of DNA Mixtures Bring About Procedural Changes at Texas DNA Laboratories

In 2015, the Texas Forensic Science Commission raised concerns about how forensic evidence was being interpreted by forensic laboratories in Texas. These concerns included interpretation methods of DNA mixtures. The common practice had been to assign the probability that a random person in the population is included as a possible contributor to the mixture, using a protocol that was not adapted to the complex, low-template DNA mixtures recovered from crime scenes today.

In response to these concerns DNA laboratories in Texas are changing their approach from an inclusion probability to a much more powerful and adaptable likelihood ratio method. To facilitate this, staff from ITL's Statistical Engineering Division conducted the workshops in DNA mixture interpretation in Texas.

All of the DNA laboratories in Texas are now transitioning towards a continuous model for assigning likelihood ratios for the interpretation of DNA evidence. This is the most advanced approach that currently exists because it makes the most use of the information present in the electropherograms obtained from the DNA analyses. To help the laboratories with this transition, ITL guest researcher John Buckleton and statistician Simone Gittelson gave parts of a two-day workshop in November 2015 to all of the technical leaders of the forensic DNA laboratories in Texas. This workshop was held in Fort Worth and given in collaboration with Prof. Bruce Budowle, Director of the Institute of Applied Genetics at the University of North Texas Health Science Center. Simone Gittelson then followed up by travelling to Texas for two weeks in January 2016 to give three two-day workshops to three groups of DNA analysts of the Texas Department of Public Safety: the first took place in Austin, the second in Houston, and the third in Fort Worth. All of these workshops consisted of interactive presentations and practical exercises on mixture deconvolution, assigning the number of contributors, probability theory, match probabilities, and likelihood ratios. At each of the workshops, there were between 40 and 50 participants.

The first case using this approach starts April 18, 2016, with some high-profile death penalty cases in the pipeline. ITL will follow the results of their DNA workshop efforts with interest.

Cybersecurity Framework Update

On April 6-7, 2016, ITL hosted a Cybersecurity Framework Workshop at NIST. Since Version 1.0 of the Cybersecurity Framework (Framework) was released on February 12, 2014, ITL has been working to raise awareness of the Framework and encourage its use as a tool to help industry sectors and organizations manage cybersecurity risks. The workshop served as a progress touchpoint to highlight a variety of Framework uses and work products. Nearly 900 attendees helped ITL to better understand stakeholder awareness, current use of the Framework, the need for updates, sharing of best practices, and future governance. See the website for more information.

Pilot Funding for Accessing Online Health Information

ITL's National Strategy for Trusted Identities in Cyberspace (NSTIC) National Program Office (NPO) recently announced a second solicitation for pilot funding in 2016, which focuses on streamlining the way that patients and providers access health information from different organizations online. The NPO is looking for a project that will demonstrate how deployment of federated identity credentials improves access to online health information. Using the same credential across multiple healthcare providers can make life easier for users by simplifying and speeding up sign-in processes. For providers, making strides in the efficiency of medical record access means time and money saved better outcomes for security and privacy. The deadline to apply is **June 1, 2016**. See the NSTIC Notes blog for more information.

Consumer-Facing/Retail Sector Cybersecurity Workshop

ITL's National Cybersecurity Center of Excellence (NCCoE) recently hosted a public workshop to help consumer-facing businesses improve the security around their payment ecosystem and better protect consumer information. Held at the University of Alabama at Birmingham, the event featured keynote speaker Brian Engle, Executive Director of the Retail Cyber Intelligence Sharing Center (R-CISC), who highlighted current and emerging cybersecurity challenges for the retail and consumer-facing sector. An interactive panel discussion gave perspectives from across the consumer payment ecosystem, and breakout sessions looked into technical aspects and architectures, ensuring that any future NCCoE projects properly represent consumer-facing businesses and their challenges. See the website.

# Annual FISSEA Conference Focuses on the Power of Cybersecurity Training and Awareness

On March 15-16, 2016, ITL hosted the 29th Annual Federal Information Systems Security Educators' Association (FISSEA) Conference. The FISSEA audience included managers responsible for information systems security awareness, training, certifications, workforce identification, and compliance in federal agencies, contractors providing awareness and training support, and faculty members of accredited educational institutions who are involved in information security training and education. Over 280 cybersecurity training professionals attended the conference.

The theme for the conference was *"The Quest for the Unhackable Human: The Power of Cybersecurity Awareness and Training." Reuben Paul, the 10-year-old Founder/CEO of CyberShaolin and Prudent Games provided an inspiring keynote presentation on R U #Unhackable? Presenters represented federal agencies, private industry, and academia.*

The FISSEA conference continues to be a valuable forum for individuals from government, industry, and academia who are involved with information systems/cybersecurity awareness, training, education, certification, and professionalization to learn of ongoing and planned training and education programs and initiatives. It affords ITL the opportunity to provide assistance to federal agencies as they work to meet their Federal Information Security Management Act (FISMA) responsibilities. See the FISSEA website.

Staff Accomplishments

John Messina, Software and Systems Division, received a Technical Achievement Award from the InterNational Committee for Information Technology Standards (INCITS). The award recognizes his technical savvy, initiative, and international leadership in support of the INCITS/DAPS38 - Distributed Application Platforms & Services standards community.
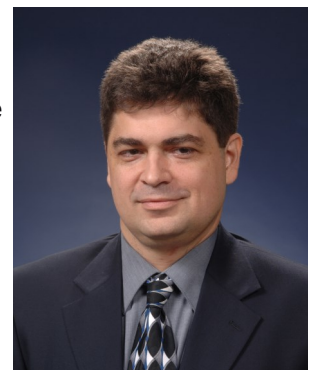
Selected New Publications

Secure Virtual Network Configuration for Virtual Machine (VM) Protection
By Ramaswamy Chandramouli
NIST Special Publication 800-125B
March 2016

Virtual Machines (VMs) are key resources to be protected since they are the compute engines hosting mission-critical applications. Since VMs are end-nodes of a virtual network, the configuration of the virtual network forms an important element in the security of VMs and their hosted applications. The virtual network configuration areas discussed in this documentation are network segmentation, network path redundancy, firewall deployment architecture, and VM traffic monitoring. Various configuration options under these areas are analyzed for their advantages and disadvantages and security recommendations are provided.

Security Content Automation Protocol (SCAP) Version 1.2 Validation Program Test Requirements
By Melanie Cook, Stephen Quinn, David Waltermire, and Dragos Prisaca
NISTIR 7511 Rev 4
January 2016

This report defines the requirements and associated test procedures necessary for products or modules to achieve one or more Security Content Automation Protocol (SCAP) validations. Validation is awarded based on a defined set of SCAP capabilities by independent laboratories that have been accredited for SCAP testing by the NIST National Voluntary Laboratory Accreditation Program (NVLAP).

NIST Cryptographic Standards and Guidelines Development Process
By Cryptographic Technology Group
NISTIR 7977
March 2016

This document describes the principles, processes, and procedures that drive cryptographic standards and guidelines development efforts at NIST. Reflecting public comments received on earlier versions, this document will serve as the basis to guide NIST's future cryptographic standards and guidelines development efforts.

NSTIC Pilots: Catalyzing the Identity Ecosystem [including updates as of 09-20-2015]
By Katerina Megas, Phil Lam, Ellen Nadeau, and Colin Soutar
NISTIR 8054
March 2016

Pilots are an integral part of the National Strategy for Trusted Identities in Cyberspace (NSTIC), issued by the White House in 2011 to encourage enhanced security, privacy, interoperability, and ease of use for online transactions. This document details summaries and outcomes of NSTIC pilots and explores common themes in the pilots' work developing and operating innovative identity solutions.

Derived Personal Identity Verification (PIV) Credentials (DPC) Proof of Concept Research
By Michael Bartock, Jeffrey Cichonski, Murugiah Souppaya, Paul Fox, Mike Miller, Ryan Holley, and Karen Scarfone
NISTIR 8055
January 2016

This report documents proof of concept research for Derived Personal Identity Verification (PIV) Credentials. Smart card-based PIV Cards cannot be readily used with most mobile devices, such as smartphones and tablets, but Derived PIV Credentials (DPCs) can be used instead to PIV-enable these devices and provide multifactor authentication for mobile device users. This report captures existing requirements related to DPCs, proposes an architecture that supports these requirements, and demonstrates how such an architecture could be implemented and operated.

A Rational Foundation for Software Metrology
By David Flater, Paul E. Black, Elizabeth Fong, Raghu Kacker, Vadim Okun, Stephen Wood, and D. Richard Kuhn
NISTIR 8108
January 2016

In this report, we revisit software metrology from two directions: first, top down, to establish a theory of software measurement; second, bottom up, to identify specific purposes for which software measurements are needed, quantifiable properties of software, relevant units, and objects of measurement. Although there are structural obstacles to realizing the vision of software metrology that works like physical metrology for all desired measurands, progress is possible if we start with a rational foundation.

Tattoo Recognition Technology – Best Practices (Tatt-BP): Guidelines for Tattoo Image Collection
By Mei Ngan, George W. Quinn, and Patrick Grother
NISTIR 8109
February 2016

This document provides best practice guidelines for the collection of good quality tattoo images. As an outcome of the Tatt-C 2015 activity, algorithm failure to correctly match a tattoo is often related to the consistency and quality of image capture. Notably, inconsistencies in image angle, orientation, size of the tattoo relative to the entire image, and poor collection characteristics such as poor illumination, low contrast, blur, and the existence of clothing and background clutter caused failures for tattoo detection and matching algorithms. While some problems can potentially be rectified via post-capture image processing, certain properties cannot be recovered after the photograph is taken. As such, certain guidelines should be followed to ensure that good quality images are collected.

Upcoming Technical Conferences

International Biometric Performance Testing Conference 2016
Dates: May 3-5, 2016
Place: NIST, Gaithersburg, Maryland
Sponsors: NIST, Department of Homeland Security, and Department of Justice, Federal Bureau of Investigation
Cost: $150 with catering; $61 without catering

A sequel to the IBPC 2010, 2012, and 2014 conferences, this international forum will cover advances in the field of biometric testing, and performance definition, specification, and assurance. The conference seeks to identify fundamental, relevant, effective, and new performance metrics and to present best practices for performance design, calibration, evaluation, and monitoring. The overarching goal is to refine the concept of biometric performance and to elevate adoption and effectiveness of biometric technologies.

NIST contact: Elham Tabassi, elham.tabassi@nist.gov

IBPC Technical Colloquium: Quantifying the Weight of Forensic Evidence
Dates: May 5-6, 2016
Place: NIST, Gaithersburg, Maryland
Cost: None

The purpose of this colloquium is to facilitate a technical discussion about theories and current approaches and practices for assigning the weight of evidence. The colloquium will address different mathematical and statistical methods for quantifying the weight of evidence and the development of guidelines for the forensic science community.

NIST contact: tc.forensicweightofevidence@nist.gov

NSCI: High-Performance Computing Security Workshop
Dates: May 19-20. 2016
Place: NIST, Gaithersburg, Maryland

The purpose of this workshop is to identify security priorities and principles that should be incorporated into the strategy of the National Strategic Computing Initiative (NSCI), to bring together stakeholders from industry, academia, and government, and to identify gaps that should be addressed.

NIST contact: Lee Badger, mark.badger@nist.gov

Workshop on Named Data Networking
Dates: May 31-June 1, 2016
Place: NIST, Gaithersburg, Maryland
Cost: None

NIST has ongoing efforts in Cyber-Physical Systems/Internet of Things and Big Data. This workshop will gather representatives from industry, government, and academia to discuss the role that Named Data Networking (NDN) future internet architecture can play in support of these two critical network environments, as well as future content delivery over mobile networks.

NIST contact: Lotfi Benmohamed, lotfi.benmohamed@nist.gov

Disclaimer: Any mention of commercial products or reference to commercial organizations is for information only; it does not imply recommendation or endorsement by the National Institute of Standards and Technology nor does it imply that the products mentioned are necessarily the best available for the purpose.

The NIST campus at Gaithersburg, MD.

Credit: Katherine Green

TO SUBSCRIBE TO THE ELECTRONIC EDITION OF THE ITL NEWSLETTER, GO TO ITL HOMEPAGE