Information Technology Laboratory Newsletter

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ITL Focuses on Creating Usable Electronic Health Records

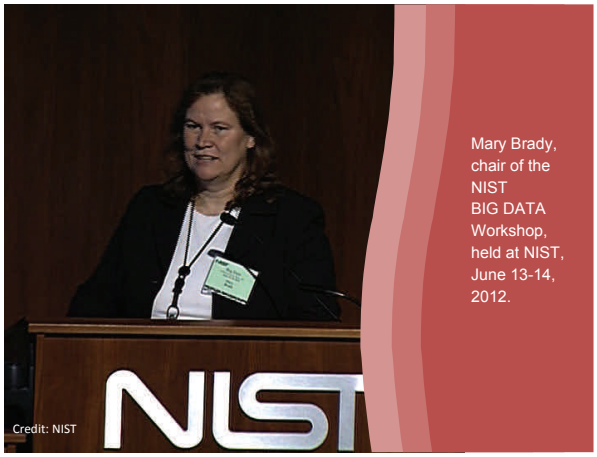
To facilitate the use of electronic health records (EHRs) by healthcare professionals, ITL and the Office of the National Coordinator for Health IT recently cosponsored a workshop on “Creating Usable Electronic Health Records (EHRs): A User-Centered Design Best Practices Workshop.” EHRs have the potential of improving the quality, safety, and efficiency of patient care, yet insufficient attention to usability in systems design has been identified as a significant barrier to their successful adoption and widespread use.

Dr. Farzad Mostashari, the National Coordinator for Health IT, and Dr. Jacob Reider, Acting Chief Medical Officer in the Office of the National Coordinator for Health IT, gave keynote talks. Speakers included medical doctors, usability experts, and others who have identified safety issues and usability challenges unique to EHRs and have worked with ITL to develop technical guidance to improve them.

At the workshop, developers, designers, product managers, and human factors professionals at EHR vendor organizations attended sessions designed to enhance the usability of their systems by experiencing and examining innovative design processes. These processes were pulled from actual use cases focused on patient-centered tasks, which result in innovative, usable, and safe products. The workshop offered a series of engaging, collaborative and thought-provoking sessions to help educate EHR design teams. Also provided was a discussion on ITL's ongoing research and development efforts in heath IT usability. Workshop presentations are available here.

BIG DATA Workshop Focuses on Measurements and Standards

Another recent workshop hosted by ITL focused on BIG DATA. The workshop was in response to the March 2012 unveiling of the White House BIG DATA Initiative, which promises to transform our ability to use BIG DATA for scientific discovery, environmental and biomedical research, education, and national security.



Mary Brady, chair of the NIST BIG DATA Workshop, held at NIST, June 13-14, 2012.

In recent years, BIG DATA has been mined to identify consumer trends, detect fraud, and as a tool for predictive analytics or surveillance. An increasing trend, however, supports the use of BIG DATA for new scientific discoveries and critical decision making. In these scenarios, the accuracy of the results and the methods by which we achieve them must be clearly understood.

Workshop presentations covered a variety of key national priority topics including examples from science, health, disaster management, security, and finance. Also discussed were topics in emerging technology areas, including machine learning algorithms, social media, analytics, BIG DATA platforms, and network topologies. A government panel provided multiagency perspectives. The workshop was held in collaboration with the National Science Foundation Center for Hybrid Multicore Productivity Research. The presentations are available here.

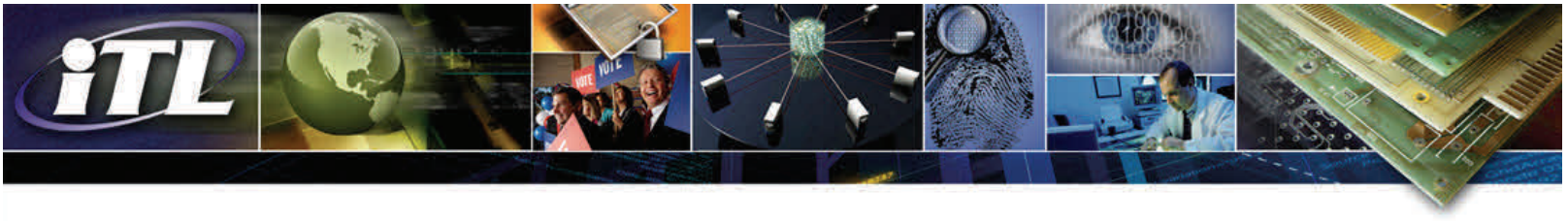
ITL Issues Cloud Computing Recommendations

Cloud computing allows computer users to conveniently rent access to fully featured applications, to software development and deployment environments, and to computing infrastructure assets such as network-accessible data storage and processing. NIST Special Publication 800-146, *Cloud Computing Synopsis and Recommendations*, reviews the NIST-established definition of cloud computing, describes cloud computing benefits and open issues, presents an overview of major classes of cloud technology, and provides guidelines and recommendations on how organizations should consider the relative opportunities and risks of cloud computing. Lee Badger, Tim Grance, Robert Pat-Corner, and Jeff Voas coauthored the publication, available here.

ITL Hosts Visit of Mathematics Undergraduates

A group of 14 undergraduate students representing six minority-serving colleges and universities visited NIST on June 27, 2012, to learn how mathematics is used in science and engineering research. During their half-day visit, the students received an overview of NIST and its mathematics research programs. They heard talks and participated in demonstrations on quantum information, immersive scientific visualization, network science, games theory, and the measurement of polymeric scaffolds. The visit to NIST was sponsored by the ITL Diversity Committee in association with ITL's Applied and Computational Mathematics Division and Statistical Engineering Division.

The students were participants in the Math SPIRAL (Summer Program In Research And Learning) program of the University of Maryland's College of Computer, Mathematical and Physical Sciences. SPIRAL is a multiyear program funded by the National Science Foundation and the National Security Agency to bring gifted college undergraduates from underrepresented groups to the College Park Campus. During the six-week summer session, students participate in intensive classroom work built around applications and opportunities in the mathematical sciences. They work with research teams on campus and see a wide range of career opportunities through tours and special lectures.



Selected New Publications

Recommendation for Key Management—Part 1: General (Revision 3)
By Elaine Barker, William Barker, William Burr, William Polk, and Miles Smid
NIST Special Publication 800-57
July 2012

This document contains basic key management guidance. It is intended to advise developers and system administrators on the "best practices" associated with key management.

Guide to Bluetooth Security
By John Padgette, Karen Scarfone, and Lily Chen
NIST Special Publication 800-121, Revision 1
June 2012

Bluetooth is an open standard for short-range radio frequency communication. This publication provides information on the security capabilities of Bluetooth technologies and gives recommendations to organizations employing Bluetooth technologies on securing them effectively.

Comparison of the WSQ and JPEG 2000 Image Compression Algorithms on 500ppi Fingerprint Imagery
John M. Libert, Shahram Orandi, and John G. Grantham
NISTIR 7781
April 2012

This paper presents the findings of a study conducted to compare the effects of WSQ and JPEG 2000 compression on 500 ppi fingerprint imagery at a typical operational compression rate of 0.55 bpp (bits per pixel), corresponding to an effective compression ratio of approximately 15:1. Compression effects are measured using peak signal to noise ratio (PSNR), proportion of pixels changed via compression regardless of magnitude, and a frequency analytic method the Spectral Image Validation/Verification (SIVV) metric.

IREX III Supplement 1: Failure Analysis
By George W. Quinn and Patrick Grother
NISTIR 7853
April 2012

Iris recognition has the potential to be extremely accurate, but it is highly dependent on the quality of the input data. The purpose of this failure analysis is to identify the causes of poor sample quality in the dataset and to provide best practice recommendations for how to improve the quality of captured samples.

Sensitivity Analysis for Biometric Systems: A Methodology Based on Orthogonal Experiment Designs
By Yooyoung Lee, James J. Filliben, Ross J. Michaels, and P. Jonathon Phillips
NISTIR 7855
May 2012

This paper introduces an effective and structured methodology for carrying out a biometric system sensitivity analysis. The goal of sensitivity analysis is to provide the researcher/developer with the insight and understanding of the key factors that affect the matching performance of the biometric system under study.

Guideline for the Implementation of Coexistence for Broadband Power Line Communication Standards
By David H. Su and Stefano Galli
NISTIR 7862
June 2012

Power Line Communication (PLC) systems provide a bidirectional communication platform capable of delivering data for a variety of Smart Grid applications such as home energy management and intelligent meter reading and control. This publication introduces the coexistence mechanism for the IEEE and ITU-T BB-PLC standards, and provides implementation guidelines for PLC devices to be used for smart grid applications.

A Human Factors Guide to Enhance EHR Usability of Critical User Interactions when Supporting Pediatric Patient Care
By Svetlana Z. Lowry, Matthew T. Quinn, Mala Ramaiah, David Brick, Emily S. Patterson, Jiajie Zhang, Patricia Abbott, and Michael C. Gibbons
NISTIR 7865
June 2012

This report details recommendations to enhance EHR usability when supporting pediatric patient care and identifies promising areas for EHR innovation. It also illustrates unique pediatric considerations in the context of representative clinical scenarios.

Usability of PIV Smartcards for Logical Access

By Emile Morse, Mary Theofanos, Yee-Yin Choong, Celeste Paul, Aiping Zhang, and Hannah Wald
NISTIR 7867
June 2012

This paper presents the findings of a NIST PIV usability pilot study. It presents recommendations to improve the usability of PIV smartcard implementations, particularly within the federal government, where Homeland Security Presidential Directive-12 mandates smartcard use.

Upcoming Technical Conferences

Cryptographic Key Management Workshop 2012

Dates: September 10-11, 2012
Place: NIST, Gaithersburg, Maryland

This workshop will address the technical and administrative aspects of Cryptographic Key Management Systems (CKMSs) that currently exist and may be required for U.S. federal use in the future. The first day will review and solicit comments on draft NIST Special Publication (SP) 800-130, *A Framework for Designing CKMS*, and draft NIST SP 800-152, *A Profile for U.S. Federal CKMS*. The second day will focus on CKMS capabilities in future security products and services in new U.S. federal Information systems. ITL seeks input on the utility and feasibility of these capabilities as well as suggestions for other technical capabilities required in future CKMSs.

NIST contact: Elaine Barker, 301/975-2911, kmwquestions@nist.gov

Third Annual InfoSec Summit Hosted by NIST

Date: September 13, 2012
Place: NIST, Gaithersburg, Maryland
Sponsor: Baltimore Information Systems Security Association Chapter
Cost: $150

The InfoSec Summit will present four tracks: Privacy & Legal Issues, Forensics, Security Management, and Cloud Computing Security. Event speakers include representatives from the Naval Criminal Investigative Service (NCIS), NIST, the American Civil Liberties Union (ACLU), the SANS Institute, the Social Security Administration (SSA), the National Security Agency (NSA), and private industry organizations.

NIST contact: Evelyn Brown, 301/975-5661, evelyn.brown@nist.gov

2012 Biometric Consortium Conference and Biometric Technology Expo

Dates: September 18-20, 2012
Place: Tampa Convention Center, Tampa, Florida

Supported by the National Institute of Standards and Technology (NIST) and the National Security Agency (NSA), the Biometrics Consortium Conference (BC2012) will focus on biometric technologies for defense, homeland security, identity management, border crossing, and electronic commerce.

NIST contact: Fernando Podio, 301/975-2947, fernando.podio@nist.gov

3rd Annual Shaping the Future of Cybersecurity Education Workshop

Dates: October 30-November 1, 2012
Place: NIST, Gaithersburg, Maryland

Sponsored by the National Initiative for Cybersecurity Education (NICE), the workshop will address the theme "Connecting the Dots in Cyberspace." Presentations will reflect current collaborations in cybersecurity education projects, trends, and initiatives that will provide pathways to future solutions. In addition to theme-based presentations, other aspects of cybersecurity awareness, education, training, and workforce will be addressed.

NIST contact: Magdalena Benitez, 301/975-6182, magdalena.benitez@nist.gov

The NIST campus at Gaithersburg, Maryland.

Credit: NIST

The Information Technology Laboratory (ITL) is a major research component of the National Institute of Standards and Technology (NIST) of the U.S. Department of Commerce. We develop tests and measurement methods, reference data, proof-of-concept implementations, and technical analyses that help to advance the development and use of new information technology. We seek to overcome barriers to the efficient use of new information technology, and to make systems more interoperable, easily usable, scalable, and secure than they are today. Our website is http://www.itl.nist.gov.

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