

NIST Update and Agenda Review

Dr. Willie E. May

Acting NIST Director

Acting Under Secretary of Commerce for Standards and Technology

Welcome to New VCAT Members

Hemma Prafullchandra

*Chief Technology Officer and
Senior VP, Products at HyTrust, Inc.*

- Over 25 years of industry experience in the field of security
- Held senior management and technical positions at FuGen Solutions, VeriSign, Critical Path, Sun Microsystems, and The Wollongong Group
- Recognized as one of the 2014 Power Players in IT Security



Credit: NIST

Welcome to New VCAT Members

Mike Garvey

President and C.E.O. of M-7 Technologies

- M-7 Technologies is a founding and governing board member of America Makes, the NNMI established in 2012
- M-7 Technologies is also a founding member of ASTM International Standards Development Committee E-57 on 3D Imaging Systems
- Executive board member of the Youngstown Business Incubator, and a member of Youngstown State University College of STEM Advisory Committee
- Former examiner for the Malcolm Baldrige National Quality Award



Credit: Youngstown State University

Welcome to Our Invited Guest

David Wilson

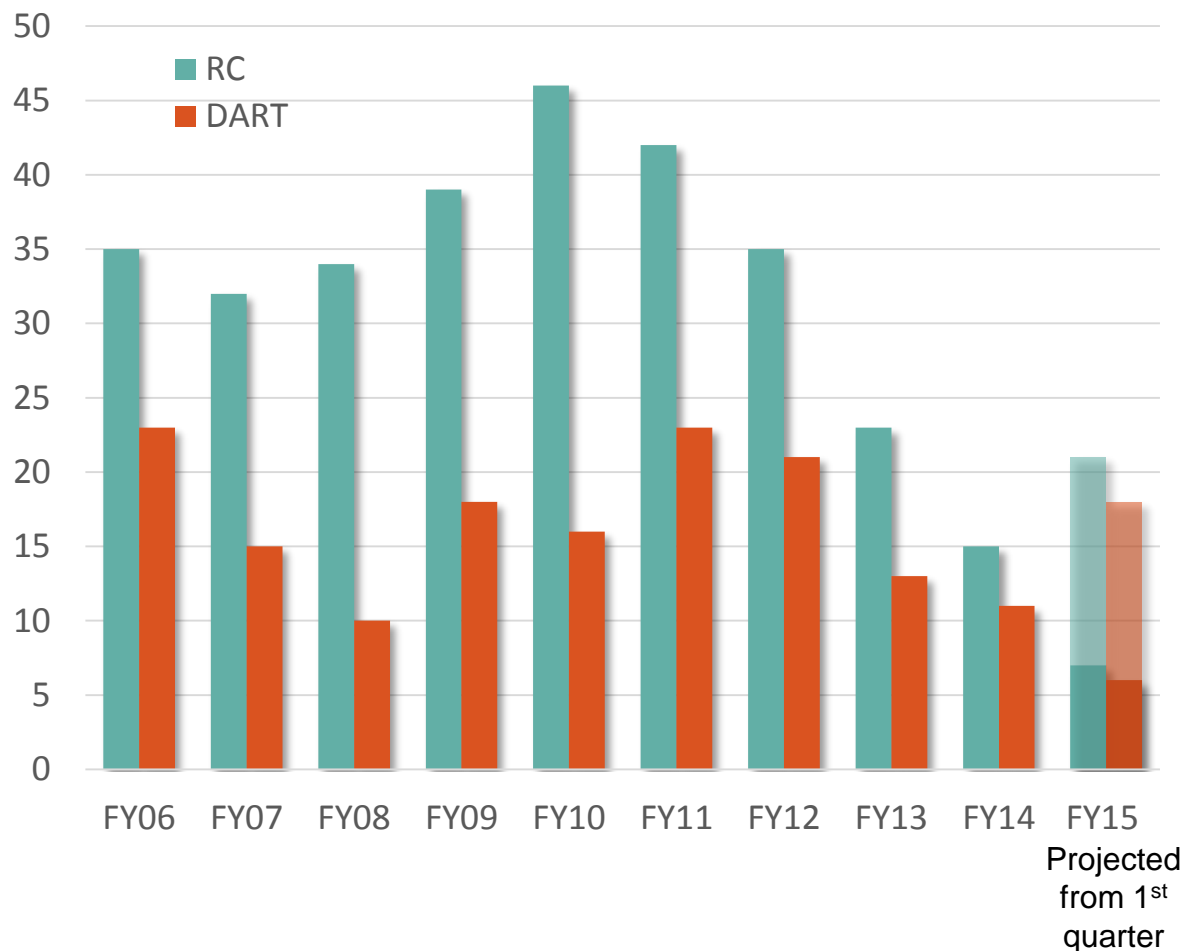
President of Morgan State University

- Former chancellor of both University of Wisconsin Colleges and the University of Wisconsin–Extension
- Has held numerous other administrative posts in academia, including: vice president for University Outreach and associate provost at Auburn University, and associate provost of Rutgers, the State University of New Jersey
- In February 2010, the President appointed him to the 11-member Board of Advisors on Historically Black Colleges and Universities



Credit: Morgan State University

Safety Update



Goal = Zero

Recordable case (RC)

To a first approximation, an injury that required medical treatment beyond first aid

DART case

An OSHA recordable that resulted in employee Days Away, Restricted duty, or job Transfer

Safety Incident

- During 100% chemical inventory, MML scientist discovered uranium-containing reference materials in violation of policy for control of such materials
- Incident response:
 - NRC notified
 - NIST Leadership informed
 - Search for additional radioactive material
 - MML had Safety Stand Down Day
 - Other OU Directors took actions
 - NIST Director sent email to all staff

Legacy Radioactive Material Discovery

- NRC regulation violations because materials were not:
- appropriately labeled
 - in approved facility
 - in inventory

Safety Incident Investigation

- Findings
 - 160 additional materials transferred to Radiation Safety
 - Some staff unaware of radiation safety program requirements
 - Changes in requirements not communicated to all staff
- Root Causes
 - Failure to manage changes in locations, personnel, material ownership, and regulatory requirements
 - Failure to conduct sufficiently thorough inventories
- Corrective Actions
 - New procedures for:
 - conduct of chemical inventories, radioactive materials inventories, and safety inspections
 - **Ensurance of cradle-to-grave material accountability** (database under development)
 - staff exit-from-duty process to ensure all types of hazardous materials are properly disposed
 - New Radiation Safety Program requirements for acquisition of uranium and thorium materials (under development)

Legacy Radioactive Material Discovery



NIST Update

- NIST Organizational Update
 - Confirmation of Director
 - Priorities
 - Budget
- Selected Staff and Programmatic Achievements
- External Reviews
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NIST Director Update:

Presidential Nomination and Senate Confirmation required



Presidential Nomination

- July 24, 2014: Dr. Willie E. May nominated to be NIST Director and Commerce Undersecretary for Standards and Technology



Senate Commerce, Science and Transportation Committee

- July 28, 2014: Referred to Committee
- December 9, 2014: Committee reported favorably during an Executive Session



Full Senate Vote

- December 16, 2014: The 113th U.S. Congress completed its work without a Full Senate vote on the nomination

My Priorities as Acting Director

- **Fill key leadership vacancies** (e.g., Directors of PML, EL, MEP, and the Standards Coordination Office)
- **Work with the Senior Leadership Team in:**
 - Continuing to strengthen the NIST Safety Culture
 - Completing the successful implementation of programs that NIST has initiated in response to pressing national needs
 - Enhancing current and developing new capabilities needed to enhance mission delivery
 - **Improving the efficiency and effectiveness of our internal operations**
 - becoming an organization known and looked up to for our “Operational Excellence”
 - Addressing long-term sustainability of the Baldrige Program
 - Strengthening the MEP Program
 - Supporting the Secretary in the execution of the Department’s Strategic Plan

Operational Excellence Task Forces

- Effective mission delivery requires operational excellence in key functions
 - Acquisitions
 - Agreements
 - Human Resources
 - Legal Services
- Established four task forces
 - Involve customers and process owners
 - Challenge status quo
 - Recommend process improvement solutions
 - Report back every 30 days, complete by first of 2015

Priority Update:
Improve
operational
efficiency and
effectiveness

Groups were asked to answer:

What does success look like?

What works well?

What hinders success?

How can we fix barriers?

Operational Excellence Task Forces - *continued*

- All task forces kicked off between mid-Sept and mid-Oct
- Three of four task groups have issued final reports
- Already aggressively acting on some recommendations
- **Commonly cited needs:**
 - robust processes
 - transparent tracking infrastructure and targets for timeliness
 - updated and clarified roles and responsibilities
 - training and guidance for all stakeholders

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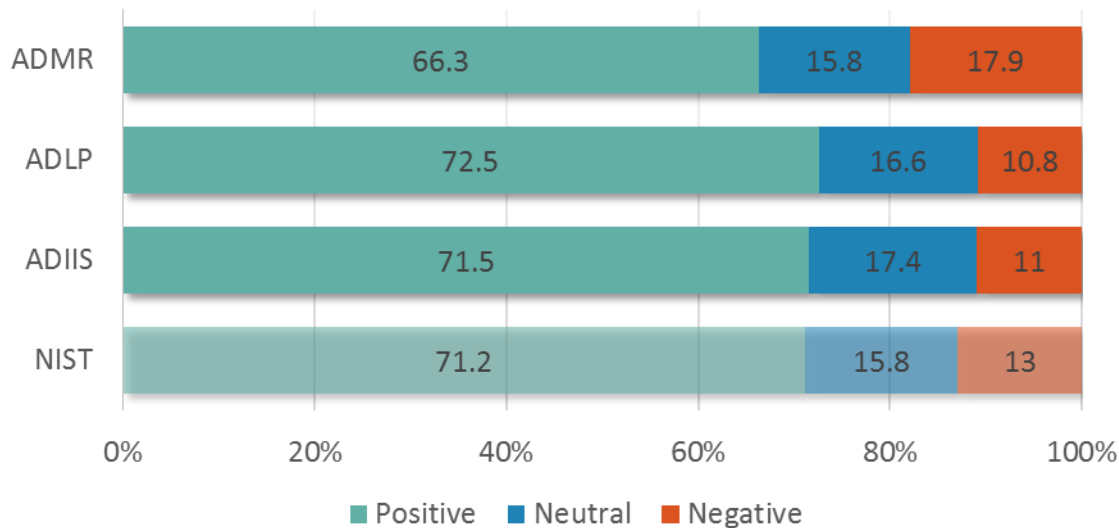
Employee Engagement and Satisfaction

- Selected data from 2014 OPM Employee Viewpoint Survey

Priority Update:
Improve operational efficiency and effectiveness

HR selected 11 questions from the survey related to employment engagement and job satisfaction.

Averages shown; positive = most satisfied



Director's Recognition for Excellence in Mission Support

- For commitment to and excellence in service that stands out to customers and contributed to NIST mission delivery
- Bi-monthly recognition to an individual or group of employees from the MR Directorate
 - Certificate
 - Luncheon with NIST Director and Associate Directors
 - CIYA
- Nominations by OU Directors within Lab and IIS Directorates
- Selection by Director based on recommendations from panel of Deputies of Lab and IIS Directorates

Priority Update:
Improve
operational
efficiency and
effectiveness

Considered factors:

Quality of activity and service
Initiative and creativity
Degree of difficulty overcome
Breadth and scope of impact
provided

NIST Update

- NIST Organizational Update
 - My Priorities
 - **Budget**
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FY 2015 Budget Update

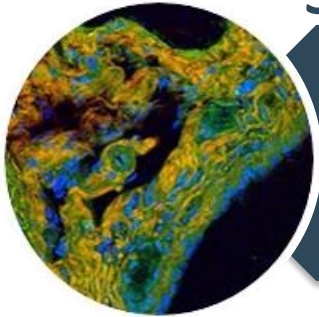
- The “CROmnibus” was enacted on December 9, 2014
- Total NIST Budget: \$863.9M (+\$14M over FY2014)
 - Scientific and Technical Research and Services: \$675.5M (+\$24.5M)
 - Industrial Technology Services: \$138.1M (-\$4.9M)
 - Construction of Research Facilities: \$50.3M (-\$5.7M)
- Also includes language authorizing the National Network for Manufacturing Innovation (NNMI)



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FY 2015 Budget Update

STRS



- \$6M for Cybersecurity R&D
- \$6M for Lab to Market
- \$2M for GHG Measurement
- \$3.5M for Forensic Science R&D
- \$2.5M for Cyber-Physical Systems
- \$2.5M for Synthetic Biology and Biomfg
- \$2M for NIST-on-a-Chip

ITS



- \$2M for Manufacturing Extension Partnership
- -\$6.9M for AMTech (compensated with FY14 carryover)

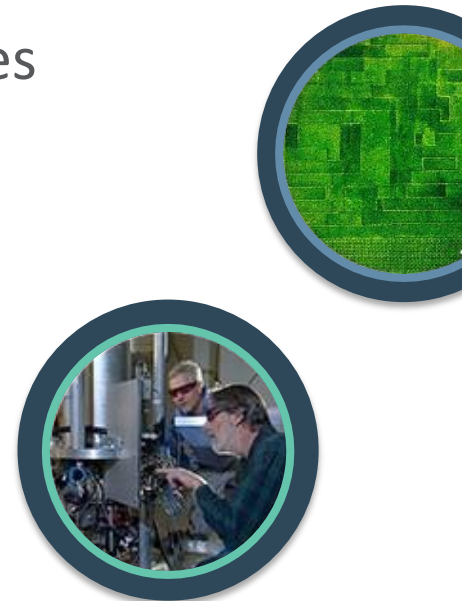
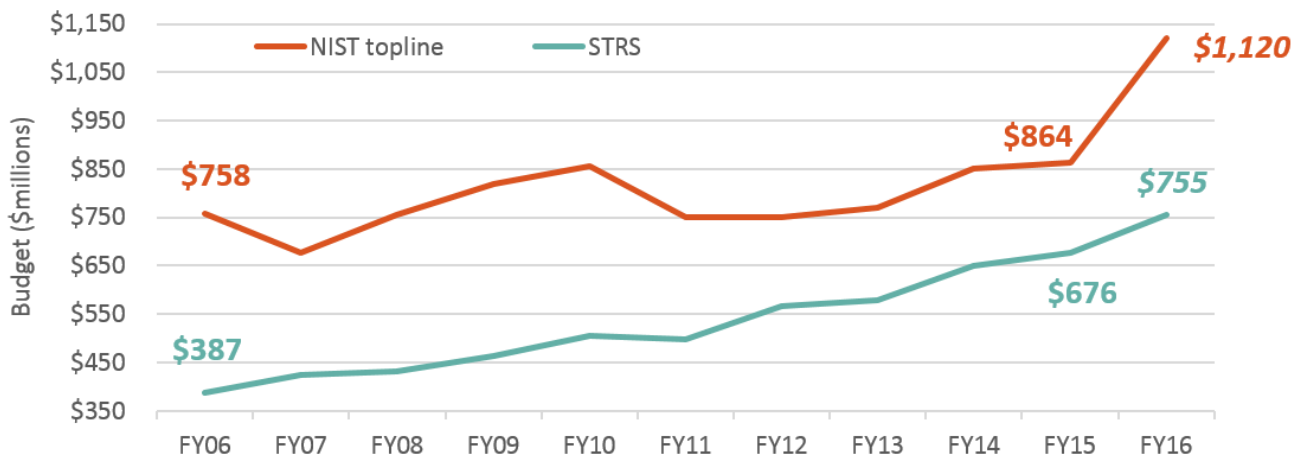
CRF



- Funds highest priority construction, maintenance, and repair projects
- Requests status reports on ongoing renovation projects

FY 2016 Budget Request

- President's request NIST Budget: \$1,119.7M (+\$255.8M over FY15)
 - Scientific and Technical Research and Services: \$754.7M (+\$79.2M)
 - Industrial Technology Services: \$306M (+\$167.9M)
 - Construction of Research Facilities: \$59M (+\$8.7M)
- Includes one-time funding for two NNMI institutes



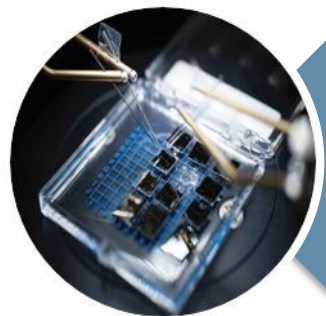
FY 2016 Budget Request

STRS



- \$11M for NCNR
- \$10M for Materials Genome Init.
- \$10M for Disaster Resilience
- \$9M for Advanced Comms
- \$7M for Cryptography
- \$5M for Advanced Sensing for Mfg
- \$5M for Cyber Physical Systems
- \$5M for Mfg Entrepreneurship
- \$5M for Quantum-based Sensors
- \$4M for Biomfg / Engineered Bio
- \$4M for Lab-to-Market

ITS



- \$150M for National Network for Manufacturing Innovation (NNMI)
- \$9.7M for Manufacturing Extension Partnership
- \$6.8M for Advanced Manufacturing Technology Consortia (AMTech)

CRF



- \$7.9M for Safety Capacity, Maintenance, and Major Repair

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Five NIST Scientists win APS awards



Gretchen Campbell – Maria Goeppert Mayer Award

For her pioneering contributions to the study of superfluidity in atomic-gas Bose-Einstein condensates, realizing atomic analogs to superconducting and superfluid liquid circuitry, including the use of weak links to create the first closed-circuit atomtronic devices.



Ian Spielman – I.I. Rabi Prize in Atomic Molecular, and Optical Physics

For the development of quantum simulations using ultra-cold atoms, creation of synthetic electromagnetic fields, demonstration of synthetic spin-orbit coupling, and applications to studying new physical systems.



Robert J. Celotta – Joseph F. Keithley Award

For the invention and development of electron spin sources and detectors, and their application to measurement science.



Daniel Pierce – Joseph F. Keithley Award

For the invention and development of electron spin sources and detectors, and their application to measurement science.



John Unguris – Joseph F. Keithley Award

For the invention and development of electron spin sources and detectors, and their application to measurement science.

Dean of Staff Recognition Resurrected

Naomi Crockett
NBS/NIST employee for
52 years

**Longest serving
NIST employee**



Next Dean of Staff:
Elizabeth Fong
NIST employee for 47 years

Extended Calibration Service for Laser Welding and More

- NIST has launched a new measurement service capability for high-power lasers
- Supports a broad range of general applications such as cutting and welding of metals and has more specialized uses such as defusing unexploded land mines.
- Use of these high-power lasers could result in significant savings for U.S. manufacturers. E.g., compared to traditional welding methods, laser welding is lower cost and has a smaller environmental footprint.

**Max. power calibration
extended from 1.5 kW
to 10 kW**



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External NIST Reviews

- NIST has three complementary methods for external review
 - **Visiting Committee on Advanced Technology (VCAT)**
 - What should NIST currently be doing in response to its Mission?
 - **National Research Council (NRC) Board on Assessment**
 - What is the quality of the research being carried out in each Laboratory Organization in support of the NIST Mission
 - **NIST Measurement Services Programmatic External Review**
NEW

National Research Council FY14 Review

- **Technical programs**
 - Comparative research quality
 - Adequacy for program goals
- **Portfolio of scientific expertise**
 - Is expertise world class?
 - Support technical programs?
- **Facilities, equipment, and human resources**
- **Output dissemination**
 - Are goals driven by stakeholder needs?
 - Tech transfer effectiveness
 - Output use and impact assessment

Quality of research supporting NIST mission

FY14 NRC Reviews:

Engineering Lab

Material Measurement Lab

FY15 NRC Reviews:

Physical Measurement Lab

Information Technology Lab

Communication Technology

Lab

National Research Council FY14 Review

Engineering Laboratory

“Measurement science remains one cornerstone of the research program (...). Computer simulation, effectively integrated with unique testing and physical measurements, is becoming a second cornerstone of the program, making possible the generalization of experimental results and facilitating the dissemination of technology to the user community.”

Material Measurement Laboratory

“The high-quality technical work at the MML (...), supported by an excellent equipment infrastructure, is enabling the MML to meet its technical goals. However, the MML is in high demand by external stakeholders, its relevant technologies are leading-edge and dynamically changing, and there is competition for individuals with the expertise required of its staff.”

NIST Measurement Services Programmatic External Review

- **Conducted:** *January 27-28, 2015*
- **Purpose:** *provide a high level review of the NIST measurement service programs (calibrations, SRMs, and SRD) to include evaluating the capabilities and performance of NIST compared to the general competencies of the world's national measurement institutes*
- **External Review:**
 - By a team of eight high-level, technical representatives from five of the world's Regional Metrology Organizations
- **Background:**
 - The Organic Act of 1901 and updated in 2008 requires that NIST conduct "Comparison of US national standards with those of other nations."
 - The CIPM Mutual Recognition Arrangement (MRA) established in 1999 requires:
 - Declaring and documenting calibration and measurement capabilities (CMCs)
 - Evidence of successful participation in formal, relevant international comparisons
 - Demonstration of system for assuring quality of each NMI's measurement services

NIST Measurement Services Programmatic External Review

- *continued*

Charge to Panel:

Each panelist to provide the NIST Director with his/her views of the:

- NIST Programs for delivering Calibrations, SRMs, and SRD services including:
 - capabilities NIST maintains to underpin the delivery of its measurement services to customers
 - level of participation and performance in CIPM MRA key comparisons, etc.
 - relevance of measurement services provided (from a global perspective)
 - the NIST Quality System

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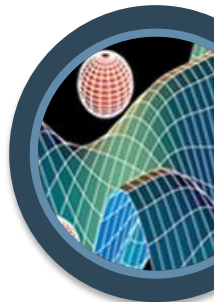
Quantum Information and Computer Science (QuICS)

- Research partnership between University of Maryland, NIST, and the NSA
- Center Objectives:
 - Develop scientific foundation for quantum information science
 - Maintain nation's leading role in quantum information science
 - Establish unique interdisciplinary center including computer scientists, physicists, and quantum information researchers
- Kickoff Workshop March 31 – April 1



JOINT CENTER FOR
QUANTUM INFORMATION
AND COMPUTER SCIENCE

NIST



NIST Partnering with NFL in Head Health Challenge: Seeking materials to advance safety and protection

In September 2014 , NIST signed a Memorandum of Understanding to cooperate with the National Football League, Under Armour, Inc., and General Electric Company to advance the state-of-the-art in advanced materials for impact mitigation.

- Sponsors seek to stimulate development of a range of materials that provide excellent energy absorbing and energy dissipating properties
- Partnership utilizes NIST expertise in materials testing and assessment
- Launched a prize challenge focusing on research and technologies to develop advanced energy absorbing materials



- **January 29, 2015: NFL Press Conference**
- **February 2, 2015: Challenge Website opens**
- March 2015 Abstract Submission Deadline
- April 2015 Winning Abstracts invited to submit full proposal and sample of material
- 6 Round 2 awardees up to \$250,000 each
- Grand Prize Winner \$500,000

Activity is highly aligned with the NIST efforts under the Administration's Materials Genome Initiative

FirstNet / Public Safety Communications Research

- Partly due to the lack of interoperability among radio equipment, first responders face significant communication problems
- The Middle Class Tax Relief and Job Creation Act of 2012
 - Created FirstNet to provide emergency responders nationwide, high-speed, broadband network dedicated to public safety.
 - NIST to receive \$100–300M from Wireless Spectrum Auction for R&D and testing support for FirstNet/Public Safety Communications Research

FirstNet / Public Safety Communications Research

- NIST has been involved with Public Safety Communications research for several years
- With this funding, the research plan has expanded to include activities involving:
 - Mission Critical Voice over LTE
 - LMR to LTE integration/migration
 - Expanded 700 MHz Demonstration Network
 - ID and incorporate public-safety requirements into broadband standards
- Plan will engage all stakeholders
 - Stakeholder-driven R&D roadmaps
 - Competitive industry collaboration program
 - Partnerships with Federal agencies

Proceeds from wireless auctions provide NIST \$300M through 2022 for Public Safety Communications



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Program Update: Disaster Resilience Framework

The Disaster Resilience Framework will identify typical performance goals; existing standards, codes, and practices to enhance resilience; and gaps that must be addressed to enhance community resilience.

- Holding fourth workshop Feb. 18-19, 2015 in San Diego
- Disaster Resilience Framework at 50% Draft
- Framework focuses include:
 - Social aspects of resilience
 - Interdependencies and Cascading Effects
 - Building Sector
 - Transportation Sector
 - Energy Sector
 - Communication and Information Sector
 - Water and Wastewater Sector



Workshops:

- Gaithersburg, MD – Apr. 7, '14
- Hoboken, NJ – July 30, '14
- Norman OK – Oct. 27-28, '14
- San Diego, CA – Feb. 18-19, '15
- Southeast/Gulf Coast – Apr. '15
- West Coast – July '15

Program Update: Cybersecurity Framework

- Exec. Order 13636 (Feb. 12, 2013) directed NIST to work with stakeholders to develop a voluntary framework for reducing cyber risks to critical infrastructure
- The Cybersecurity Framework is to:
 - Include existing standards, methodologies, and processes
 - Provide an approach to identify, assess, and manage cyber risk
 - Identify areas for improvement



“It is the policy of the United States to enhance the security and resilience of the Nation’s critical infrastructure and to maintain a cyber environment that encourages efficiency, innovation, and economic prosperity while promoting safety, security, business confidentiality, privacy, and civil liberties.”

Program Update: Cybersecurity Framework

What We've Been Doing

Development

- Developed through a strong and intensive private-public partnership
- Delivered in 1 year, on time

Raising Awareness

- Partnering on awareness campaigns
- Participating in stakeholder-organized events

Analyzing Use

- Getting feedback on Framework use
- Issuing guidance and reference tools

Where We're Headed

Amplifying

- Amplify awareness through strengthened relationships with sectors and agencies

Educating

- Produce guidance, tools, and resources; support others as they do the same
- Engaging more communities

Sustaining

- Improve the Framework if needed based on experience
- Ensure the Framework and its use endures

Program Update: Cryptography Review

- NIST Director asked VCAT to help review NIST's cryptographic standards development process
- VCAT asked Committee of Visitors – a distinguished panel of experts – to provide feedback
- VCAT recommendations
 - Openness and Transparency
 - Independent Strength and Capabilities
 - Clarification of Relationship with NSA
 - Technical and other issues



COV Members

Vint Cerf
Edward Felten
Steve Lipner
Bart Preneel
Ellen Richey
Ron Rivest
Fran Schrotter

Program Update: Cryptography Review

- Request in 2016 budget for increased cryptography capability
- Proposed withdrawal of several obsolete Standards (Jan. 16, 2015)
- Seeking comment on revised NIST Cryptographic Standards and Guidelines document (ends Mar. 27, 2015)



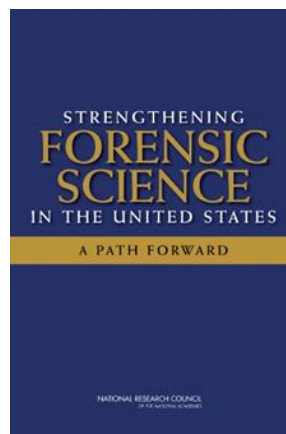
FY16 Budget Request:

Expanded cryptography team
Analysis of quantum-resistant security technologies
Development and dissemination of standards, guidelines, and tests

Program Update: Forensic Science

- With US DoJ, established the National Commission on Forensic Science
- Established **the Organization of Scientific Area Committees (OSAC)**, the practice-focused organization supporting the National Commission on Forensic Science
- Conducting laboratory-based research on forensic science methods

Strengthening the “Science” in Forensic Science



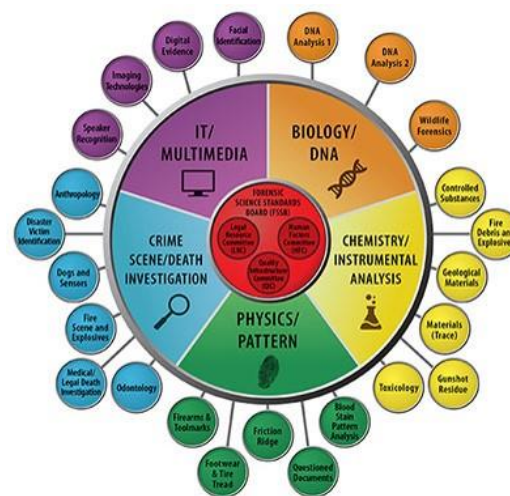
“With the exception of nuclear DNA analysis, no forensic method has been rigorously shown to have the capacity to consistently, and with a high degree of certainty, demonstrate a connection between evidence and a specific individual or source.”

*U.S. National Research Council,
NAS, Feb. 2009*

Program Update: Forensic Science and OSAC

- Membership of all subcommittees finalized – total of 422
- Forensic science standards inventory published
- Public OSAC Meetings to be held Feb. 16-17

Strengthening the “Science” in Forensic Science



Program Update: NIST Centers of Excellence

NIST has received appropriations to expand our Centers of Excellence program. We will establish new COEs in FY2015:

- **Community Resilience**

- Develop integrated, systems-based computational models to assess community infrastructure resilience and guide community-level resilience investment decisions
 - Competition closed Sept. 12, 2014; received strong response
 - Leading proposal has been selected
 - Announcement planned in mid-February 2015

- **Forensic Science**

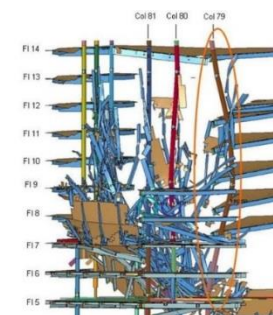
- Develop probabilistic methods to support the forensic science disciplines, focusing Pattern Evidence and Digital Evidence
- Proposals due by December 13, 2014; received strong response
- Expect to make award in Q3 FY15



Credit: NIST



Credit: FBI



Jace Anderson/FEMA

Meeting Agenda

- Overview
 - Safety
 - Congressional Update
 - NNMI Update
- Baldrige Performance Excellence Program
- Hollings Manufacturing Extension Partnership Program
- VCAT Annual Report
- NIST International Programs and Engagements



Questions?