NIST Update and Agenda Review

VCAT Meeting: February 3, 2016, Gaithersburg, MD

Willie E. May

NIST Director and Under Secretary of Commerce for Standards and Technology

Welcome to New VCAT Member

Waguih S. Ishak

- *Division Vice President & Director, Corning West Technology Center (CWTC), Corning*

- Joined Corning in 2007 to establish CWTC which is:
  - a Corning Innovation Hub responsible for business development, collaborations with industry, academia, VCs and startups on the West Coast
  - staffed with scientists and engineers working on high-speed interconnects, novel displays, solid-state illumination, and imbedded sensors

- Prior experience includes positions at Avago Technologies, Agilent Labs, and Hewlett-Packard Labs

- Is a Life Fellow of the IEEE

- Serves on the Technical Advisory Boards of USC, UC San Diego, Santa Clara University, and NRC of Canada

- Was Awarded the University of California Exemplary Service Award in 2015

Welcome to New VCAT Member

Allen Adler

- *Vice President, Enterprise Technology Strategy, The Boeing Company*

- *Leads Boeing's strategic planning for technology.*
  - setting research priorities based on future business opportunities
  - identifies critical technologies for Boeing's investment of its research and development funds
  - fosters enterprise-wide collaboration and replication of key technologies across the company's multiple global businesses.

- *Is executive sponsor of the Boeing Technical Fellowship who promote technical excellence and innovation and represent Boeing's top research, development and manufacturing capabilities.*

- *Served as director of the Tactical Technology Office at the Defense Advanced Research Projects Agency prior to joining Boeing*

Welcome to our Visitors from the National Physical Laboratory (NPL) - the UK's National Measurement Institute

Dr. Peter Thompson, NPL Director & CEO

Dr. Kamal Hossain, Director for International Affairs

4

Topics: NIST Update

- Safety and Site Security Update
- Update on Director's Priorities
- NIST Budget Status
- Selected Staff Awards/Achievements
- Strategic Research and Programmatic Updates
- Agenda Review

Safety Update

Recordable case (RC)

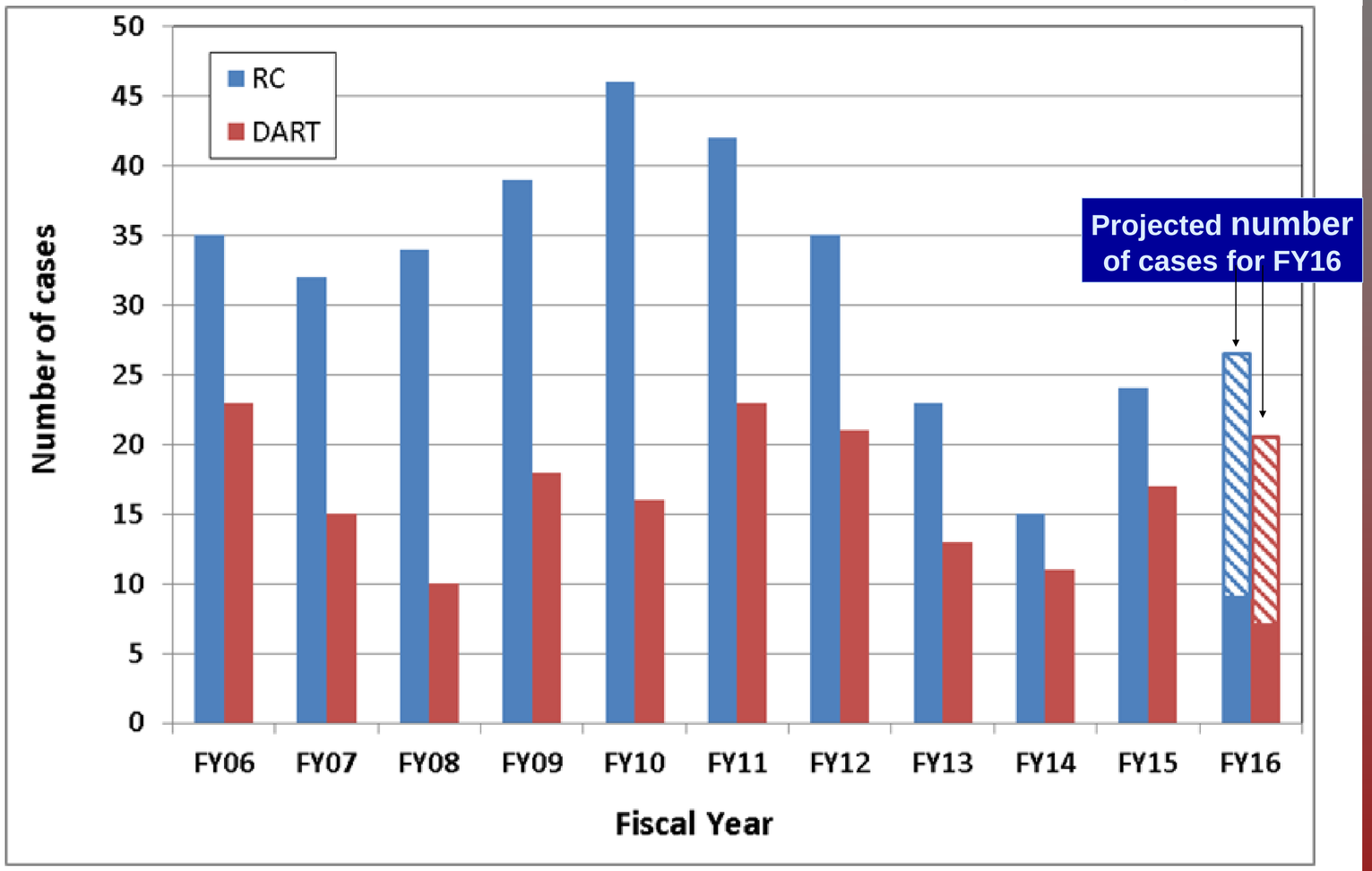
- To a first approximation, a work-related injury or illness that results in any of the following: death, days away from work, restricted duty, transfer to another job, medical treatment beyond first aid, loss of consciousness.

DART case

- A work-related injury or illness that results in any of the following: **D**ays **A**way from work, **R**estricted duty, **T**ransfer to another job.

NIST Safety Incident Metrics

Data shown is to January 31, 2016



Goal = Zero

NISTSafety

Nine FY16 OSHA Recordable Cases Reported into IRIS as of 31 Jan 2016

IRIS case number	DART case?	Injury or Illness?	Brief description of event	Brief description of injury/illness	OU	Date of occurrence	Date reported to mgmt	Date entered into IRIS
16-IG-0009	Y	Injury	Employee was sliding a box across the floor and fell when the box unexpectedly stopped	Employee dislocated finger	OFPM	20-Oct	20-Oct	21-Oct
16-IG-0011	Y	Injury	Employee was pushing open a heavy gate	Employee experienced pain in lower back	OFPM	26-Oct	27-Oct	2-Nov
16-IG-0014	Y	Illness	A plastic duct was not properly sealed releasing a strong odor in the vicinity of the employee's workspace	Employee experienced asthmatic symptoms	OFRM	26-Oct	27-Oct	28-Oct
16-IG-0022	N	Injury	Employee slipped after turning ankle while walking	Employee experienced pain in one knee	OFRM	23-Nov	23-Nov	9-Dec
16-IB-0011	Y	Injury	Employee was removing a tarp that was covering outdoor equipment	Employee exerienced pain in a muscle of the left leg	OFPM	5-Jan	7-Jan	7-Jan
16-IB-0012	Y	Injury	Employee was moving equipment and boxes	Employee experienced pain and numbness in the wrist and hand	PML	5-Jan	6-Jan	6-Jan
16-IG-0029	Y	Injury	Employee was climbing a ladder when a foot slipped off a rung	Employee experienced pain in left knee	OFPM	11-Jan	11-Jan	12-Jan
16-IG-0030	Y	Injury	Employee was rushing to vehicle and slipped and fell on a sloped section of a sidewalk	Employee sustained a separated shoulder and wrist pain	LP	13-Jan	14-Jan	14-Jan
16-IO-0002	N	Injury	Employee was moving equipment from an upper shelf to a lab bench when another piece of equipment located on the shelf fell	Employee experienced pain in fingers	MML	15-Jan	15-Jan	15-Jan

4 were from slips, trips, and falls;
3 were from overexertion (pushing/pulling/turning);
1 was a chemical exposure;
1 was from “contact with”.

3 occurred in the Labs; 6 in MR

5 occurred in the first half of January

Building 236 Incident

~7:00 pm Saturday, July 18, an explosion occurred in a laboratory room in Bldg. 236.

- A member of the NIST security force assigned to the Gaithersburg campus suffered non-life threatening injuries,
- The NIST Police and Fire Departments responded and due to the presence of what appeared to be meth manufacturing evidence requested the assistance of the Montgomery County Police and Fire Departments.
- The officer resigned from Federal Service, effective July 19.
- Former Officer pleaded guilty on Aug. 21, 2015 to attempting to manufacture amphetamine in a NIST laboratory

- **Former Officer Christopher Bartley was sentenced on January 8, 2016 in Federal Court to 41 months of prison time**

United States Attorney Rod J. Rosenstein commended the FBI, DEA and Montgomery County Police Department for their work in the investigation, and praised NIST for their assistance in the investigation.

Building 236 Incident: NIST Actions in Response

- Immediately following the incident, open NIST Staff access to Building 236 was restricted until further notice and we began reviewing NIST security patrol procedures

- Extended invitations to 3 external security experts with specific experience in protecting a research campus to conduct independent reviews of NIST's current security posture (both campuses).

Update on NIST independent reviews of our Security Posture

- **Committee of Experts (CoE) was convened Sept 2015 and conducted site visits in November, 2015**
  - David S. Komendat, Boeing Senior VP and Chief Security Officer
  - William C. Cullen, NIH Associate Director for Security & Emergency Response
  - Nicholas M. Schnare, Department of Commerce Assistant Director for Security and Emergency Management

- **Each external security expert, provided an independent assessment and evaluation to determine whether current**
  - security/law enforcement measures and protocols
  - physical security systems and safeguards
  - risk management principles
  - security, law enforcement and contract security staffing, and
  - the security/law enforcement management structure

  at NIST are consistent with government or industry best practices, and appropriate to ensure the continued security and safety of NIST personnel, program activities and resources.

- **Status:**
  - **Six high level themes were identified**
  - **Recommendations are under consideration, in collaboration with DoC Office of Security**

High Level Summary - Security Improvement Themes

Authorities

- **There was no firm evidence found that clearly articulated NIST senior management's authority and responsibility** to assure the security of NIST facilities, people, property and assets

Culture

- **The NIST corporate culture is not amenable to strengthening security measures** at either location (Gaithersburg or Boulder) in any way that would further reduce the collegial atmosphere conducive to science. Security policies are seen as a hindrance to NIST's need to be open to industry and academia.

Risk

- **There is no designated official who is responsible for accepting risk on behalf of NIST in the security area.** The decision to accept risk is one that should not be taken lightly and subsequently is generally reserved for those officials with overall responsibility for an organization. NIST does not have a robust program for identifying and mitigating security risks

Organization

- **NIST's current organizational structure limits the effectiveness of the security program.** The security organization is bifurcated and located too low in the organizational structure for security leaders to carry out their mission effectively. The daily operational environment at NIST does not appear to warrant both a security and a law enforcement cadre.

Resources

- **Security resources at NIST (staffing, services, equipment and systems) are undersized for the breadth of responsibility of the program.** In many instances functional areas of security are only one deep, creating single points of failure.

Strategic Planning

- **There is no long term security management strategy/sustainment plan in place for NIST.** A comprehensive plan should identify key threats/risks and those capital investments necessary to sustain and improve the NIST security infrastructure.

NIST was already planning critical step to enhance security at its facilities.

- **Physical Security Improvements include**:
  - providing expanded coverage of the site via CCTV cameras
  - installation of cypher locks for individual labs within Lab Buildings
  - improvements to both visitor registration and associate systems;
  - improving visitor control points at key access points located in the Building 101 complex

- **IT Improvements include:**
  - critical IT network security equipment upgrades;
  - expanding staff and equipment resources for privileged access management at the system-to-system level;
  - inclusion of federal, contract, associate, and international associate indicators within the display name of all NIST email accounts (ex. john.doe (intlassoc)@nist.gov);

Artist drawing of Security Turnstiles for access control to lab buildings adjacent to bldg. 101

Additionally, NIST and the DoC Office of Security (OSY) have been working with DoC Office of the Inspector General to review NIST Foreign Guest Researcher program..

Topics: NIST Update

- Safety and Site Security Update
- Update on Director's Priorities
- NIST Budget Status
- Selected Staff Awards/Achievements
- Strategic Research and Programmatic Updates
- Agenda Review

Priorities Shared with VCAT in June 2014

- **Fill key senior leadership vacancies** (Directors of: PML, EL, MEP, SCO, AMNPO, and my replacement as ADLP)

- **Work with the Senior Leadership Team in:**
  - Continuing to strengthen the NIST Safety Culture
  - Completing the successful implementation of new NIST Technical programs initiated in response to pressing national needs
  - Enhancing current and developing new capabilities needed to enhance mission delivery
  - Addressing long-term sustainability of the Baldrige Program
  - Strengthening the MEP Program
  - Supporting the Secretary by leading the Innovation Goal Activities within the Department's Strategic Plan
  - Improving the efficiency and effectiveness of our internal operations
    - becoming an organization known and looked up to for our "Operational Excellence"
  - Increasing staff engagement in the direction and implementation of NIST programs and priorities

NIST Organizational Structure

Director
Under Secretary of Commerce for Standards and Technology
Willie E. May

Chief of Staff
Kevin Kimball
Executive Officer for Administration
Management and Organization
Program Coordination
Public Affairs Office
Congressional and Legislative Affairs
International and Academic Affairs

Associate Director for Laboratory Programs/Principal Deputy
Kent Rochford
Staff Offices
Standards Coordination
Gordon Gillerman
Special Programs
Richard Cavanaugh

Material Measurement Laboratory
Laurie Locascio
Communications Technology Laboratory
Dereck Orr, Acting
Physical Measurement Laboratory
James Olthoff
Engineering Laboratory
Howard Harary
Information Technology Laboratory
Charles Romine
Center for Nanoscale Science and Technology
Robert Celotta
NIST Center for Neutron Research
Robert Dimeo

Associate Director for Innovation and Industry Services
Phillip Singerman
Staff Offices
Economic Analysis
Technology Innovation
Technology Partnerships

Baldrige Performance Excellence Program
Robert Fangmeyer
Hollings Manufacturing Extension Partnership
Carroll Thomas
Advanced Manufacturing Program Office
Michael Molnar

Associate Director for Management Resources
Mary Saunders
Staff Offices
Civil Rights and Diversity
Research Support Services

Office of Acquisition and Agreements Management
Cecelia Royster
Office of Safety, Health and Environment
Richard Kayser
Office of Financial Resource Management
George Jenkins
Office of Human Resources Management
Susanne Porch
Office of Information Systems Management
Delwin Brockett
Office of Facilities and Property Management
Steve Salber

In filling the position of Associate Director for Laboratory Programs, the search focused on someone who ideally:

- truly understands NIST and its Mission
- is open-minded and outcome oriented
- has demonstrated a willingness to lead strategically
- is an excellent communicator
- is an advocate for continued improvement of support functions
- has well-recognized technical chops
- has experience with or exposure to “crisis management”

Following a nation-wide search that garnered more than 85 applicants

- 6 were interviewed
- **Dr. Kent Rochford was selected**

He has served as:

- Founding Director of NIST’s Communication Technology Laboratory.
- R&D Director at Sharp Laboratories of America
- NIST Boulder Laboratory Operations Director.
- Acting Director of the NIST Electronics and Electrical Engineering Laboratory,
- Chief of NIST’s Quantum Electronics and Photonics Division
- Manager Systems and Architecture Division for Yafo (Start –up)
- Project Leader within NIST EEEL.

Priorities Continued

- **Work with the Senior Leadership Team in:**
  - **Continuing to strengthen the NIST Safety *and Security Culture***
  - **Completing the successful implementation of new NIST Technical programs initiated in response to pressing national needs**
  - Enhancing current and developing new capabilities needed to enhance mission delivery
  - Addressing long-term sustainability of the Baldrige Program
  - Strengthening the MEP Program
  - Supporting the Secretary by leading the Innovation Goal Activities within the Department's Strategic Plan
  - Improving the efficiency and effectiveness of our internal operations
    - o becoming an organization known and looked up to for our "Operational Excellence"
  - Increasing staff engagement in the direction and implementation of NIST programs and priorities

Since our inception as the **National Bureau of Standards in 1901**, in addition to maintaining the more traditional National Physical Measurement Standards, **we have also focused a significant portion of our research and measurement services activities on addressing contemporary societal needs**

NIST has become:

- a key player on the Administration's Innovation Team
- the nation's go-to agency for measurements, standards, and technology

Priorities Continued

- **Work with the Senior Leadership Team in:**
  - Continuing to strengthen the NIST Safety *and Security Culture*
  - Completing the successful implementation of new NIST Technical programs initiated in response to pressing national needs
  - **Enhancing current and developing new capabilities needed to enhance mission delivery**
  - Addressing long-term sustainability of the Baldrige Program
  - Strengthening the MEP Program
  - Supporting the Secretary by leading the Innovation Goal Activities within the Department's Strategic Plan
  - Improving the efficiency and effectiveness of our internal operations
    - o becoming an organization known and looked up to for our "Operational Excellence"
  - Increasing staff engagement in the direction and implementation of NIST programs and priorities

Enhancing current and developing new capabilities needed to enhance mission delivery

- Innovations in Measurement Science (IMS) Program
- Joint Institutes and Centers of Excellence Program
- Post Doctoral and Guest Researcher Programs
- Challenge Prizes

Priorities Continued

- **Work with the Senior Leadership Team in:**
  - Continuing to strengthen the NIST Safety *and Security Culture*
  - Completing the successful implementation of new NIST Technical programs initiated in response to pressing national needs
  - Enhancing current and developing new capabilities needed to enhance mission delivery
  - **Addressing long-term sustainability of the Baldrige Program and Strengthening the MEP Program**
  - Improving the efficiency and effectiveness of our internal operations
    - o becoming an organization known and looked up to for our “Operational Excellence”
  - Increasing staff engagement in the direction and implementation of NIST programs and priorities

Priorities Continued

- **Work with the Senior Leadership Team in:**
  - Continuing to strengthen the NIST Safety *and Security Culture*
  - Completing the successful implementation of new NIST Technical programs initiated in response to pressing national needs
  - Enhancing current and developing new capabilities needed to enhance mission delivery
  - Addressing long-term sustainability of the Baldrige Program and Strengthening the MEP Program
  - **Improving the efficiency and effectiveness of our internal operations**
    - **becoming an organization known and looked up to for our "Operational Excellence"**
  - Increasing staff engagement in the direction and implementation of NIST programs and priorities

Operational Excellence: Update

NIST Internal Operations Task Groups

- reports completed early last year
- action plans developed to address priority recommendations identified by the NIST Director

Progress to date of Task Groups

- **human resources**
  - onboarding program concept developed and approved; currently staffing an onboarding office
  - local approving authority in place for key actions
  - pay band restrictions in the Administrative career path addressed

- **reimbursable agreements**
  - RACO responsibilities expanded
  - legal reviews moving more efficiently
  - umbrella agreements in place with key NIST customers
  - review/approval times have decreased dramatically (currently 30 days or less)

- **acquisitions**
  - restructuring and expanding teams to enhance service quality and efficiency
  - expanding customer advocacy resources
  - obtained waiver from DOC for local sign off on requirements less than $150K

- **All Task Groups**
  - Service Now’” pilots established for HR, reimbursable agreements and acquisitions to address customer needs for improved tracking, transparency and timeliness of actions

Priorities Continued

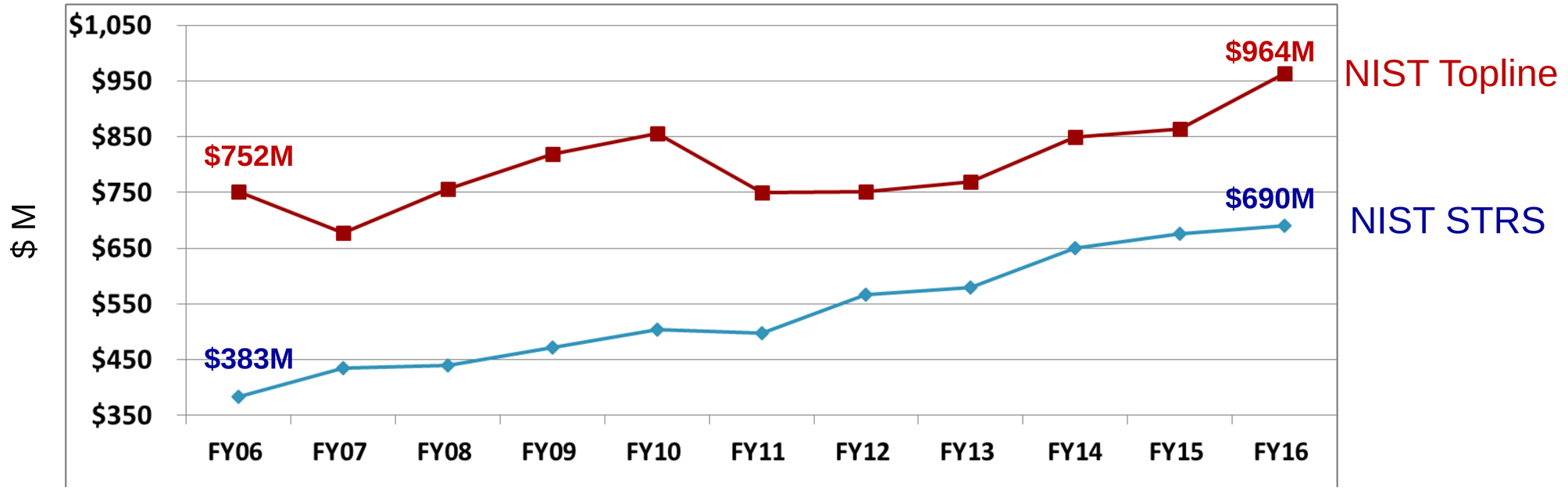
- **Work with the Senior Leadership Team in:**
  - Continuing to strengthen the NIST Safety *and Security Culture*
  - Completing the successful implementation of new NIST Technical programs initiated in response to pressing national needs
  - Enhancing current and developing new capabilities needed to enhance mission delivery
  - Addressing long-term sustainability of the Baldrige Program and Strengthening the MEP Program
  - Improving the efficiency and effectiveness of our internal operations
    - o becoming an organization known and looked up to for our “Operational Excellence”
  - **Increasing staff engagement in the direction and implementation of NIST programs and priorities**

Topics: NIST Update

- Safety and Site Security Update
- Update on Director's Priorities
- NIST Budget Status and Hill Update
- Selected Staff Awards/Achievements
- Strategic Research and Programmatic Updates
- Agenda Review

Budget Update (from FY2016 Omnibus Appropriations Bill, $M)

	FY 2015 Enacted	FY 2016 President's Request	FY2016 Enacted
STRS / Laboratory Programs	$675.5	$754.7	$690.0
ITS	$138.1	$306.0	$155.0
CRF	$50.3	$59.0	$119.0
Total, NIST Discretionary	863.9	1,119.7	964.0



FY2016 STRS funding:

Provides **$690M** for Scientific and Technical Research and Services (STRS)

Issue:

During our recent budget growth spurt, most years our STRS increase has exceeded the funding required for new Congressional priorities. However, that was not the case this year.

- **STRS increase over FY15 is $14.5M**
- **Congressional priorities and required ATBs amount to ~$41M.**

- **FY2016 STRS funds for mandated increases for Congressional priorities** $25.0
  Funded by:
  - STRS Increase over FY2015 $14.5
  - FY15 Base Reductions to Fund New Initiatives ($25 - $14.5) $10.5

  } $25 M

- FY2016 STRS funds for Adjustments-to-Base (Inflation Increases) $16.8
  Funded by:
  - Additional Base Reductions to Fund Inflation Increases $16.8

NIST Proposed Program Increases to Address Congressional Priorities

	FY2016 Increase $M as per Omnibus	NIST Proposed STRS Increase FY2016 $M	Proposed Program Total $M
• **Disaster Resilient Buildings and Infrastructure,**	$10.0	+$10.0	$20.4
• **Strengthening NIST Cryptographic and Privacy Capabilities**	$ 7.0	+ $7.0	$13.2
• **Quantum-Based Sensors and measurements,**	$ 5.0	+ $5.0	$26.6
• **Urban Dome Program**	$ 2.0	+ $2.0	$9.45
• **Metals-Based Additive Manufacturing**	$ 0.5	+$ 0.0	
• **Advanced Materials/Materials Genome Initiative (MGI)**	$10.0	+ $1.0	~$33.4

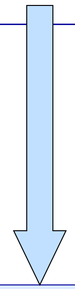
NIST FY2016 Industrial Technology Services (ITS), $M

	FY2015	President's Request, FY2016	FY2016
ITS	**$138.1**	**$306.0**	**$155.0**
Advanced Mfg Tech Consortia	8.1	15.0	--
Hollings Mfg Ext Partnership	130.0	141.0	130.0
Nat'l Network for Mfg Innovation	0.0	150.0	25.0

$20 M for up to 2 DoC NNMI Institutes
$5 M to support AMNPO
(to provide shared services and support to all NNMI Institutes)

NIST Construction of Research Facilities (CRF), $M

	FY2015	President's Request, FY2016	FY2016
CRF	**$50.3**	**$59.0**	**$119.0**
Initial work to modernize Bldg 245			60.0
Safety, Capacity, Maintenance and Major Repair			59.0



$ 3 M Complete Bldg 3 renovation
$12 M Continue Bldg 1 (Wing 5) renovation
$44 M Apply to deferred maintenance and repair backlog

Topics: NIST Update

- Safety and Site Security Update
- Update on Director's Priorities
- NIST Budget Status
- Selected Staff Awards/Achievements
- Strategic Research and Programmatic Updates
- Agenda Review

Presidential Rank Awards

- **Chosen by President Obama and the U.S. Office of Personnel Management from ~6,800 senior Federal staff**

Distinguished Rank Recipients
are recognized for sustained extraordinary accomplishment, and receive a cash award of **35% of their base salary**. **Only 1% of career SES or SL/ST may receive this rank.**

Meritorious Rank Recipients
are recognized for sustained accomplishment, and receive a cash award of **20% of their base salary**. **No more than 5% of career SES or SL/ST members may receive this award.**

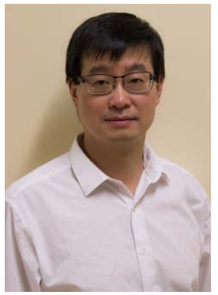
NIST Recipients in 2015

Distinguished Senior Professional: John Butler

- NIST Fellow and special assistant to the Director for forensic science, recognized for his world leading work in forensic DNA analysis. He currently serves as the Co-Vice Chair of the U.S. National Commission on Forensic Science.

Distinguished Executive: Jun Ye

- Recognized for “advancing the frontier of light-matter interactions and focusing on precision measurement, quantum physics and ultracold matter, optical frequency metrology, and ultrafast science."



Meritorious Senior Professional: Joseph Stroscio

- NIST Fellow recognized for leading a world-class research program in the measurement of the electronic properties of grapheme, the subject of the 2010 Nobel Prize in Physics.

Ron Ross, NIST Fellow

Samuel J. Heyman "Service to America Award" in Homeland Security and Law Enforcement,

- **awarded October 7, 2015** "for instituting a state-of-the-art risk assessment system that has protected federal computer networks from cyberattacks and helped secure information critical to our national and economic security."

He also received:

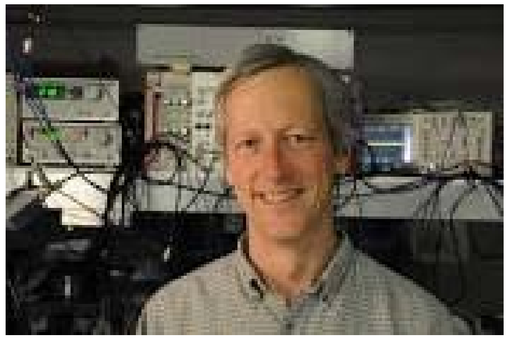
- **2015 Government Computer News Executive of the Year**
- **Class of 2015 National Cyber Security Hall of Fame**
- **Top 10 Influencers in Government InfoSec**

Adam Sedgewick, Information Technology Laboratory

Named as one of the **Top 10 Influencers in Government InfoSec in 2015**

"for his efforts in the development of the NIST Cybersecurity Framework for Critical Infrastructure"

New NIST Fellow



Nathan Newbury

Leader of the Fiber Sources and Applications Group
Applied Physics Division
Physical Measurement Laboratory

NIST Fellows are senior researchers who:

- operate at the highest level of achievement and impact in contributing to the NIST mission;
- are visionary scientific/technical leaders;
- provide high-quality programmatic input/advice to NIST management; and mentor, motivate, and
- inspire other NIST technical staff.

NIST Fellows are primarily involved in research and technology development and deployment; not administration.

Frank Gayle – Deputy Director, Advanced Manufacturing National Program Office

Elected as "ASM International Fellow", October 6, 2015

"for outstanding technical contributions and research management in materials measurement, applications, and manufacturing with significant contributions to light alloy metallurgy, quasicrystals, high temperature superconductivity, solder science and structural integrity."

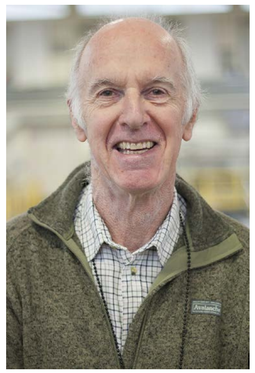
This honor recognizes Gayle for his distinguished contributions in the field of materials science and engineering, and provides a forum for technical and professional leaders to serve as advisors to the Society.

Laurie Locascio - Director, Material Measurement Laboratory

Elected as American Institute for Medical and Biological Engineering (AIMBE) Fellow

"for outstanding contributions to the fields of microfluidics and biosensors for applications in biomedical sciences and engineering".

The College of Fellows is comprised of the top two percent of medical and biological engineers in the country.

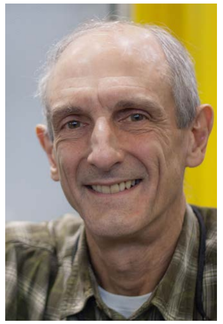


John Copley -

Elected as Fellow of the Neutron Scattering Society of America

"for his outstanding research on the physics of liquids and fullerenes and his major contributions to neutron instrument development and data analysis."

Through the NSSA Fellowship Program, the NSSA recognizes members who have made significant contributions to the neutron scattering community in North America.



Dr. Charles Majkrzak - NIST, APS, NSSA Fellow

The Clifford G. Shull Prize in Neutron Science by the Neutron Scattering Society of America

- *"For leadership in the development, application, and establishment of neutron reflectivity as an essential measurement tool for nanoscale materials."*
- To recognize outstanding research in neutron science and leadership promoting the North American neutron scattering community in honor of Clifford G. Shull, who received the Nobel Prize in 1994 with Bert Brockhouse for seminal developments in the field of neutron science.

Dr. Yun Liu - a long-time guest researcher & NIST Associate in the NIST Center for Neutron Research

The Science Prize of the Neutron Scattering Society of America

- "*For the discovery of dynamic cluster ordering in complex colloidal and protein systems using neutron scattering.*"
- Given to recognize a major scientific accomplishment or important scientific contribution within the last 5 years using neutron scattering techniques. Nominees must be within 12 years of receiving their PhD degree. Preference shall be given to applicants whose work was carried out predominantly in North America.

Dr. Sam Benz - Electromagnetics Division, Physical Measurement Laboratory
2016 IEEE Joseph F. Keithley Award
•"for creating and disseminating quantum-based superconducting voltage standards that form the basis for worldwide precision voltage measurements"

Drs. Stephen Russek, Michael Boss, Katy Keenan and Karl Stupic - Quantum Electronics and Photonics Division, Physical Measurement Laboratory
2015 Colorado Governor's Award

- "for High-Impact Research in Public Health and Life Sciences for developing a broad suite of calibration "phantoms" to enable quantitative magnetic resonance imaging (MRI)"

Stephen Russek

Michael Boss

Katy Keenan

Karl Stupic

NIST Director & Staff Win 2016 Federal Laboratory Consortium (FLC) Awards

FEDERAL LABORATORY DIRECTOR OF THE YEAR

Dr. Willie E. May – National Institute of Standards and Technology

for:

- Outstanding support of technology transfer activities by NIST laboratories;
- Efforts to develop the NIST Science and Technology Entrepreneurship Program to promote the utilization of NIST-owned inventions;
- Championing of NIST's biomanufacturing initiative; and
- Effective leadership of NIST that fosters entrepreneurial activities and collaborative partnerships, including a 5-year CRADA partnership with Medimmune.

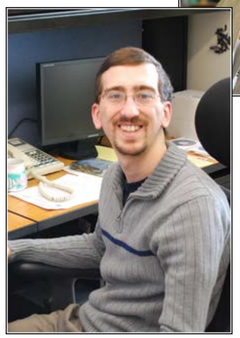
EXCELLENCE IN TECHNOLOGY TRANSFER

Awarded to the following from the Energy and Environment Division, Engineering Laboratory

- **W. Stuart Dols**
- **Steven Emmerich**
- **Brian Polidoro**

for:

"Building Airflow and Containment Computer Model for Sustainability and Health"



Precision Measurement Laboratory building renamed in honor of legendary Laboratory Director

Distinguished Career

- Began career as a postdoc in Boulder at JILA
- **Led NIST research leading to 4 Nobel Prizes and 2 MacArthur Fellowships**
- Her honors include Service to America Career Achievement Award, the Women in Science and Engineering Lifetime Achievement Award
- Leadership role in creation of NIST's Summer Undergraduate Research Program (SURF) and Joint Quantum Institute (JQI)
- Advocate of women and minorities in science

Dr. Katharine Gebbie

During her amazing 47 year tenure at NIST, Dr. Gebbie has helped foster a world leading research environment that has yielded 4 Nobel prizes and countless other awards. for women in science.

Cutting-Edge Laboratory

- Building first dedicated in 2012
- Tightly controlled environment for next-generation atomic clocks, nanoscale imaging, and biomedical standards
- In-house nano- and micro- fabrication facility accelerates R&D for electrical standards, homeland security, and quantum computing

Topics: NIST Update

- Safety and Site Security Update
- Update on Director's Priorities
- NIST Budget Status
- Selected Staff Awards/Achievements
- Strategic Research and Programmatic Updates
- Agenda Review

NIST Internet Time Services

- **NIST provides a range of time dissemination services, including NIST Internet Time Service (ITS)**

- **The most popular NIST ITS is provided through the Network Time Protocol**
  - NTP is provided in standard and authenticated form and is directly traceable to NIST UTC
  - NIST NTP timing accuracy is fundamentally limited to about 1 millisecond per day (a stability and accuracy of 10^{-8} at one day)
  - NIST NTP servers receive approximately 12 billion hits/day

- **Over the past several years NIST has explored privatizing its NTP servers**

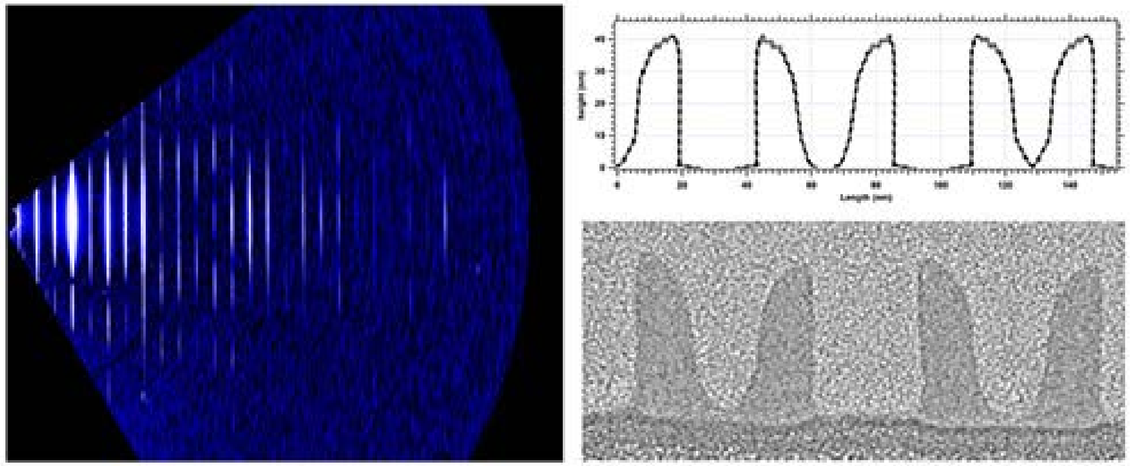
- **NIST has decided:**
  - Not to privatize due primarily to security concerns
  - To centralize our NTP servers at 3 sites at or near the Boulder and Gaithersburg campuses
  - To upgrade the servers and harden them
  - To add sufficient bandwidth to internally handle the >60 billion hits expected in the next decade

NIST and Intel Get Critical (Dimensions) with X-rays

Researchers from NIST MML and Intel have successfully used an X-ray scattering technique (CDSAXS) to accurately measure features on a silicon chip to within fractions of a nanometer, or about the width of a single silicon atom.

- With the complexity and the size of lines, trenches, holes and other features on silicon slices shrinking to single-digit nanometers, measurement tools long used to monitor chip production are approaching their limits.

- The experimental technology used, CDSAXS (critical-dimension small angle X-ray scattering), could be developed as a new in-line process control tool for measuring vanishingly small features on next-generation computer chips.



An example CDSAXS scattering pattern (left) shows the interference patterns created by the shape of the nanostructure, which ultimately yield a “best fit” shape model (top, right). The corresponding cross-sectional image (bottom), obtained with a transmission electron microscope, shows the nanostructure measured by NIST and Intel researchers.

Update: Advanced Communications

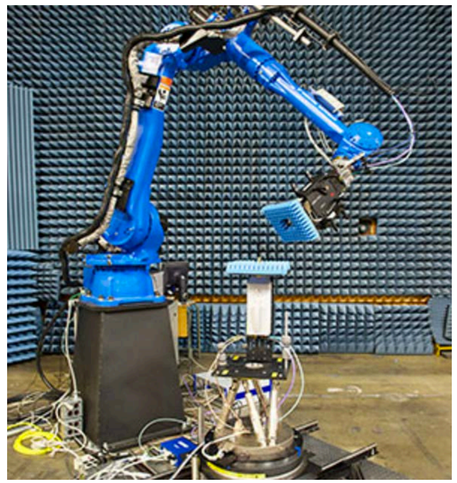
Research and tools to enable emerging communication technologies

- Strong progress in public safety communications interoperability and work to be further accelerated by receipt of $300 M from the AWS-3 spectrum auction
- National Advanced Spectrum and Communication Test Network launched spectrum sharing project – focus on 3.5 GHz Citizen Band Radio Service spectrum sharing – strengthening partnerships between NIST, NTIA, DOD and private sector
- Infrastructure and expertise build up through significant new staff hires to scale up research, measurement and standards activities

NIST
National Institute of Standards and Technology
U.S. Department of Commerce

5G Millimeter-Wave Channel Model Alliance

PSCR



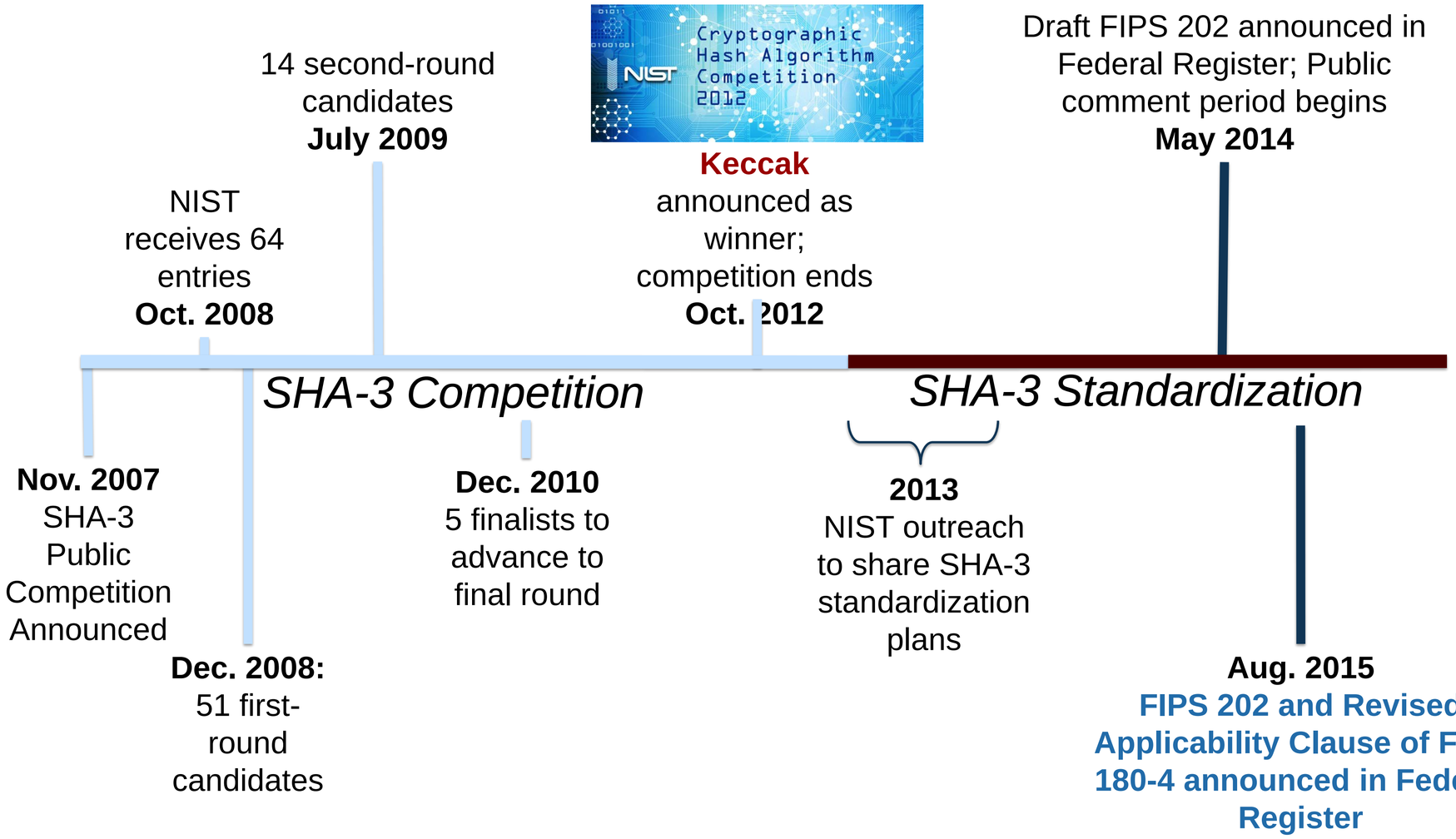
Progress made on VCAT Recommendations to NIST regarding NIST Cryptographic Standards Program

- Improve NIST's open and transparent process when producing its standards and best practices.
- Increase NIST cryptographic capacity.
- Increase the involvement of the cryptographic community, including academia and industry, in the standards development process.
- Review and clarify NIST's relationship with NSA

44

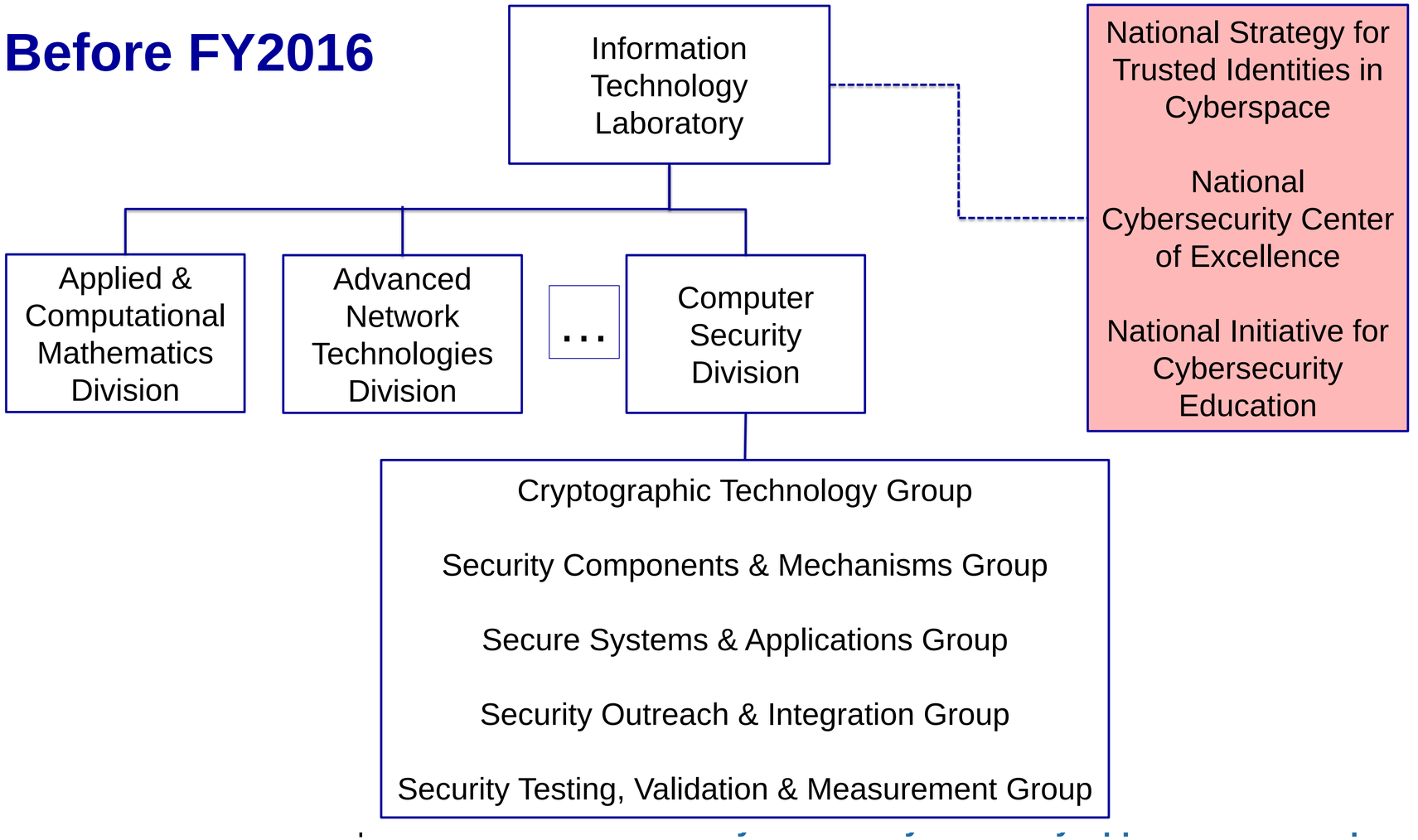
Secure Hash Algorithm (SHA)-3

The first cryptographic hash algorithm NIST developed using a public competition and vetting process



Realignment of the Cybersecurity Portfolio

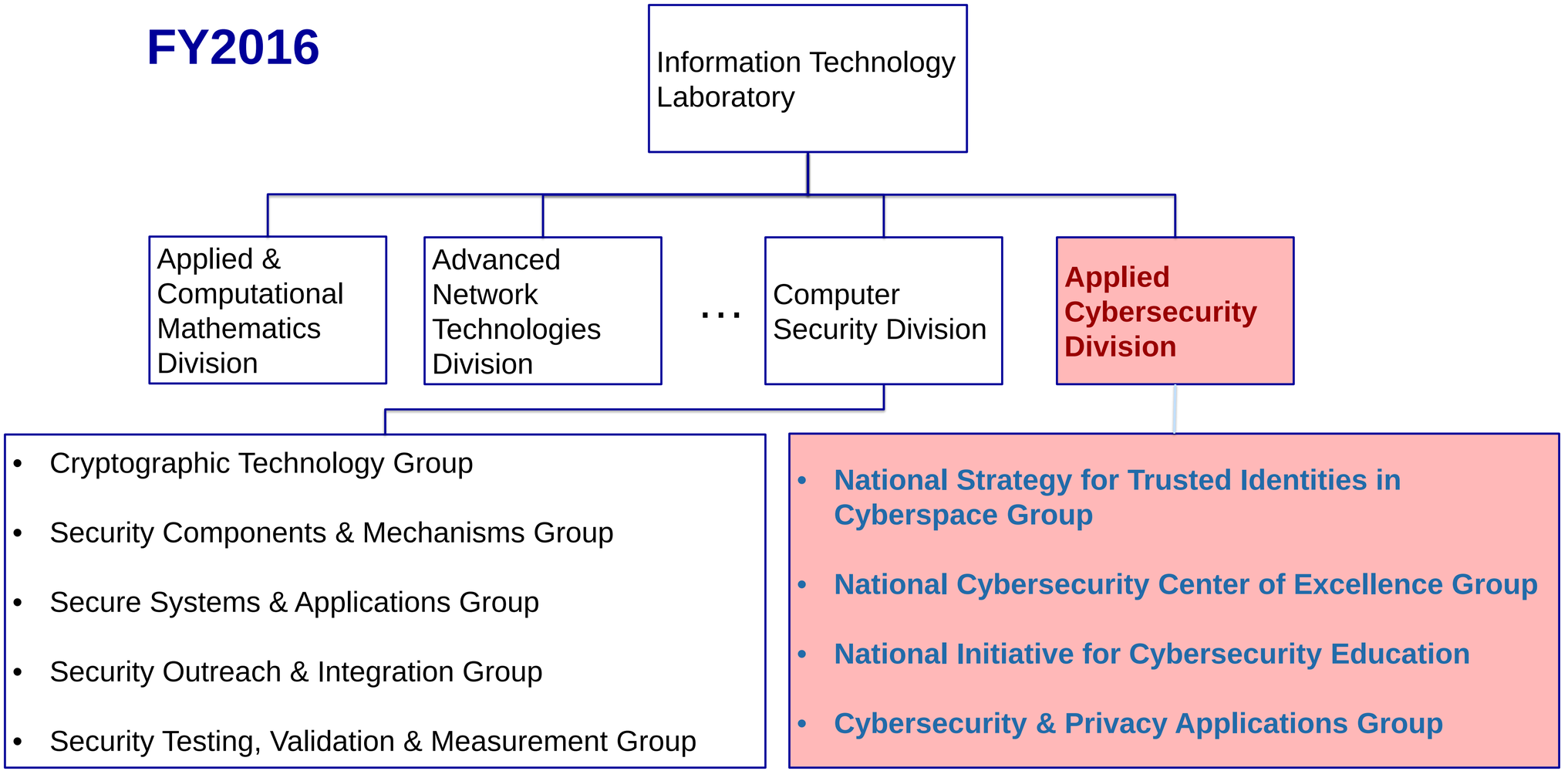
Information Technology Laboratory realignment to addressing growth in cybersecurity



Realignment of the Cybersecurity Portfolio

Information Technology Laboratory realignment to addressing growth in cybersecurity

FY2016



National Cybersecurity Center of Excellence

Accelerating the deployment and use of secure, standards-based technologies

History/Background

- Established in Feb. 2012 in partnership with the State of Maryland and Montgomery County
- 23 industry partners
- First Federally Funded R&D Center for Commerce and First Dedicated to Cybersecurity; Sept. 2014
- New NIST Special Publication Series Launched for Cybersecurity Practice Guides in 2015

New Facility Opened – December 2015

- Located ~3 miles from NIST Gaithersburg Campus
- The additional 60,000 square feet expands the center's workspace from 4 to 22 separate, flexible laboratories with space to house NIST and MITRE experts, other agency detailees and visiting industry and academic specialists.
- Ribbon-cutting ceremony to be hosted by Senator Mikulski, Secretary Pritzker, and Director May on February 8, 2016

New NCCoE Facility
9700 Great Seneca Hwy
Rockville, MD

Current areas of research and development:

- **Health Care** – Security platforms for the wireless medical infusion pumps
- **Energy** – Identity and access management central management for IT and operational resources
- **Transportation** – Cybersecurity profile for bulk liquid transport
- **Financial Services** – IT asset management to support making software changes and network breaches more easily identifiable
- **Attribute Based Access Controls** – Capability to support controlled access by an individual's attributes rather than their role.
- **Trusted Email** – Security platform that provides trustworthy email exchanges across organizational boundaries

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

Adoption Rates for NIST Cybersecurity Framework

First released in 2014 the NIST Framework for Improving Critical Infrastructure Cybersecurity, has been rapidly adopted:

Gartner:

> **"Recent estimates are that by 2020, more than 50% of private and public organizations in the US will leverage the NIST cybersecurity framework, up from the current 30% in 2015."**

On its website, Absolute reports that:

- **82% of federal agencies are either fully or partially adopting the framework**
- **53% of organizations outside the federal government have adopted NIST standards.**

http://blogs.absolute.com/blog/adoption-rate-soars-for-nist-cybersecurity-framework/

National Network for Manufacturing Innovation

Providing a manufacturing research infrastructure to solve industry challenges

Today, I'm asking Congress to build on the bipartisan support for this idea . . . creating a network of these hubs and guaranteeing that the next revolution in manufacturing is "Made in America." --July 30, 2013

Current Institutes:

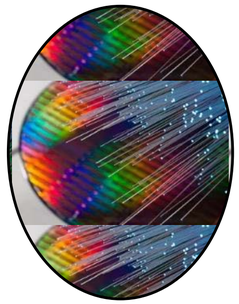
America Makes
Additive Manufacturing
DOD–Youngstown OH

DMDII
Digital Mfg & Design Innovation
DOD – Chicago IL

LIFT
Lightweight & Modern Metals
DOD – Detroit MI

PowerAmerica
Power Electronics Manufacturing
DOE – Raleigh NC

IACMI
Adv. Composites Manufacturing
DOE – Knoxville TN



Integrated Photonics
DOD
Rochester NY

Flexible Hybrid Electronics
DOD
San Jose, CA

Smart Manufacturing
DOE Solicitation

Revolutionary Fibers & Textiles
DOD
Solicitation

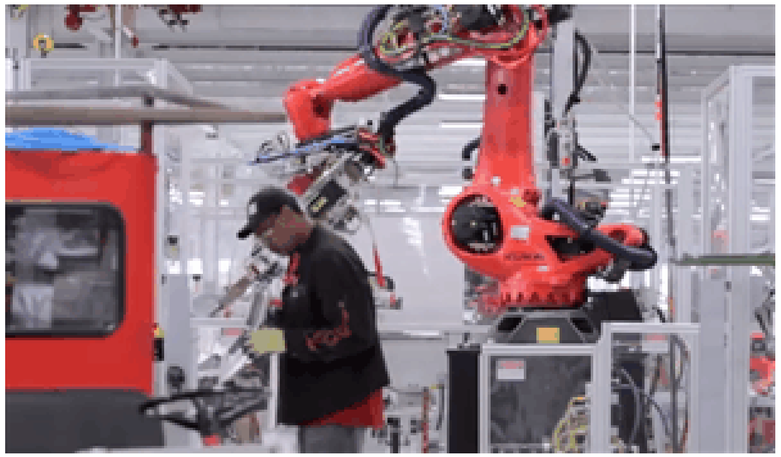
Institutes for FY 2016:

DOC – 2, open topic
DOD – 2, topic TBD
DOE – 2, topic TBD

National Network for Manufacturing Innovation – NIST Role

NIST Advanced Manufacturing Office (AMO)

- Administers NIST NNMI Institutes
- Operates the interagency Advanced Manufacturing National Program Office, (AMNPO) which:
    - convenes the whole-of-government NNMI program
    - Provides annual reporting to Congress
    - Shares best practices and provides shared services for Institutes
    - Establishes new Institutes that address private sector needs
- Awards AMTech funds to establish technology roadmaps addressing long-term U.S. industrial research needs.



NIST Labs support other-agency NNMI Institutes

- Contributing to FOA / vision / review
- Serving in advisory roles
- Developing active collaborations

New in 2016: Up to two new centers on open topics

NIST Laser Welding Program: Progress towards a calibrated laser weld

Currently, laser welding is…

- A viable but underutilized solution to many industrial welding problems
- A complex, multi-physics process (light-matter interaction at the extreme)
- A process that is difficult to characterize due to current measurement limitations
- Limited by measurement capability (currently more art than science)

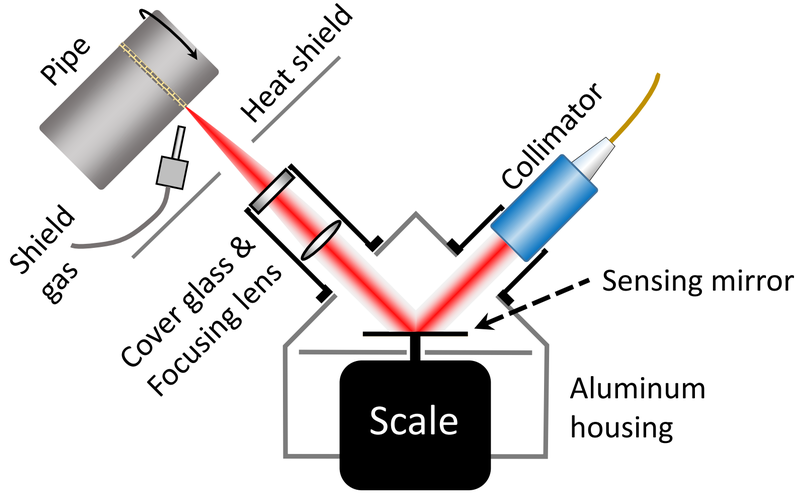
NIST laser welding program goals…

- Improved manufacturing efficiency

Improved yield, real-time quality control, process portability

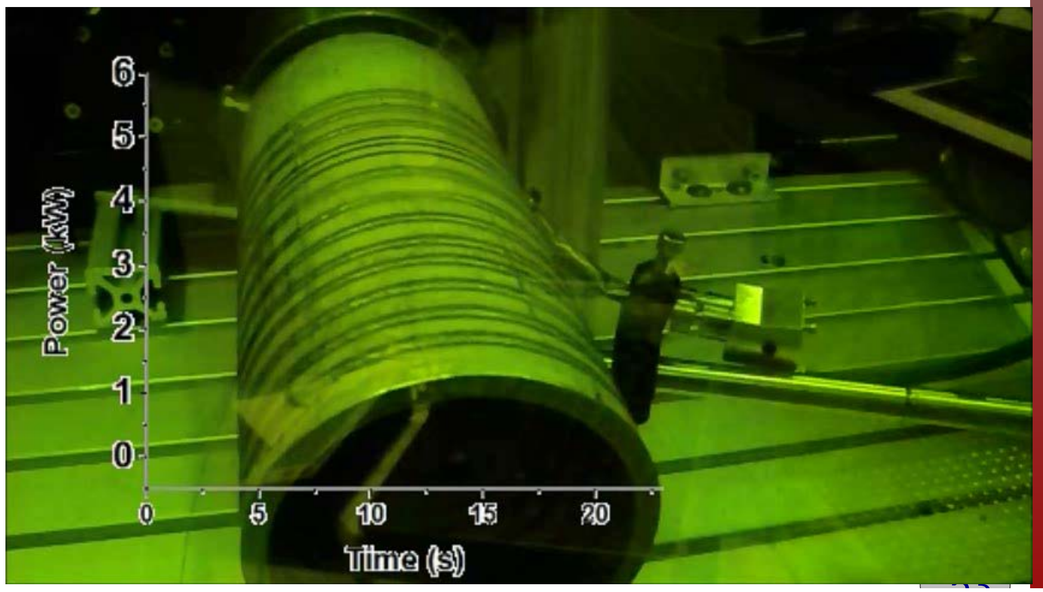
- New manufacturing capabilities

Enabling laser welding of hard-to-weld/"un-weldable" materials



First in the world: Real-time, calibrated laser power measurement during a laser weld

- Conventional methods cannot accurately measure laser power during a laser weld because the laser light must be absorbed to be measured.
- New radiation pressure technique measures the very small force of light as it reflects from a mirror. This force is proportional to the laser power.
- Radiation pressure allows laser light to be measured AND used to weld simultaneously.
- Radiation pressure uses a commercial scale to measure laser power, traceable to the kilogram.



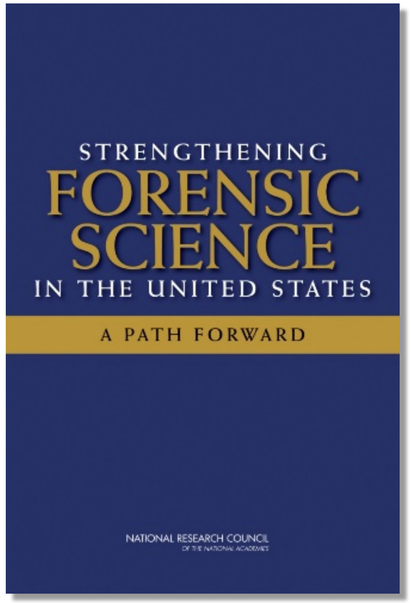
PML PHYSICAL MEASUREMENT LABORATORY

MATERIAL MEASUREMENT LABORATORY

NIST Center for Neutron Research

B. Simonds, P. Williams, J. Sowards, J. Hadler

2009 NAS Report



- *"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." (p.7)*

- *"The efforts of these (21 Scientific Working Groups) are laudable. However, . . . it is not clear how [they] interact or the extent to which they share requirements, standards, or policies. Thus, there is a need for more consistent and harmonized requirements." (p.16)*

- The 2009 NAS Report criticized the 21 Scientific Working Groups advising the forensics jurisprudence community as being "too highly fragmented with very different structures and outputs" …. the resulting standards were not enforceable or developed in an open and transparent manner.
    - DOJ and NIST responded with MOU in February 2013 with creation of a new entity: **- the Organization of Scientific Area Committees (OSAC)**

Forensic Science Efforts at NIST

NIST Internal Research and Measurement Service Programs

~+$7.5M/year invested

NIST Forensic Science Center of Excellence

CoE: ~$4M/year invested for 5 years (2015-2020)

International Symposium on Forensic Science Error

432 participants (11 countries) in 2015

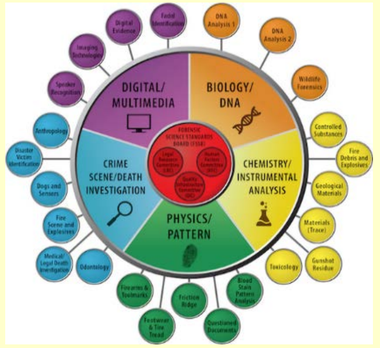
Partnership with Department of Justice

National Commission on Forensic Science (NCFS)

Department of Justice FACA

- 32 voting and 8 ex-officio members
- Develops policy recommendations for U.S. Attorney General

Organization of Scientific Area Committees (OSAC)



NIST-administered

>540 members from the community

establishing documentary standards and best practices

Who, What, WHEN: Determining the Age of Fingerprints

NIST chemists have tested if you can determine the age of a fingerprint by the degree to which the biomolecules, such as fatty acids, in the fingerprint's ridges have migrated down into the valleys.

- proof-of-concept paper published in Analytical Chemistry
- a potential advantage is that this approach doesn't depend on chemical changes in the fingerprint, which are highly dependent on circumstances, but depends primarily on molecular weight and fairly well-understood models of molecular diffusion.

Even the approximate age of a fingerprint can have a critical bearing on forensic results.

- can rule out some prints as being too old to be relevant
- help fix the time of the crime
- differentiate the multitude of fingerprints found on improvised bombs to winnow out prints of individuals who may simply have handled the components in a shop from those of the actual bombmakers.

Credit: Muramoto/NIST

Chemical imaging of a fingerprint shows the relative distribution of palmitic acid (green) and the more immobile waxy residue (red) when freshly deposited (left) and after 72 hours (right), showing the migration of the palmitic acid.

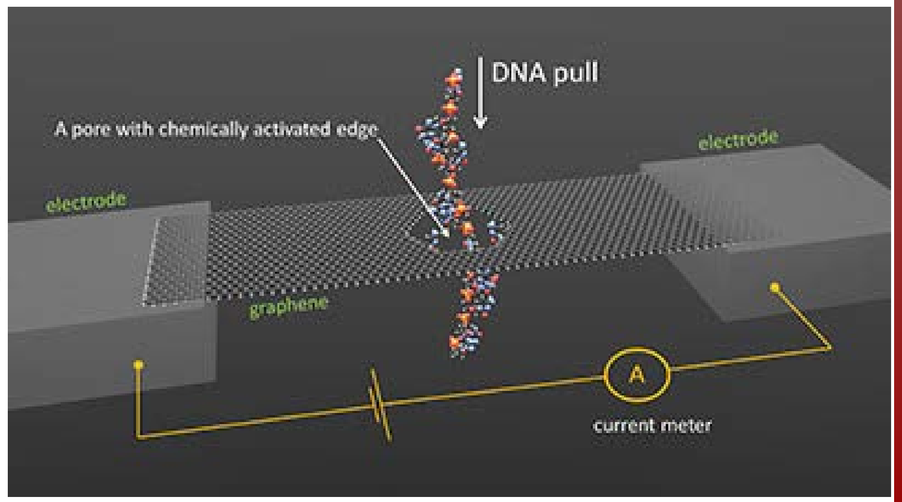
S. Muramoto and E. Sisco. Strategies for potential age dating of fingerprints through the diffusion of sebum molecules on a nonporous surface analyzed using time-of-flight secondary ion mass spectrometry. Anal. Chem., Articles ASAP Publication Date (Web): July 17, 2015 DOI: 10.1021/acs.analchem.5b02018.

NIST Simulates Fast, Accurate DNA Sequencing Through Graphene Nanopore

- **NIST researchers have simulated a new concept for rapid, accurate gene sequencing by pulling a DNA molecule through a tiny, chemically activated hole in graphene—an ultrathin sheet of carbon atoms—and detecting changes in electrical current.**
  - Concept: to create temporary chemical bonds and rely on graphene's capability to convert the mechanical strains from breaking those bonds into measurable blips in electrical current
  - To detect all four DNA bases, four graphene nanoribbons, each with a different base inserted in the pore, can be stacked to create an integrated DNA sensor

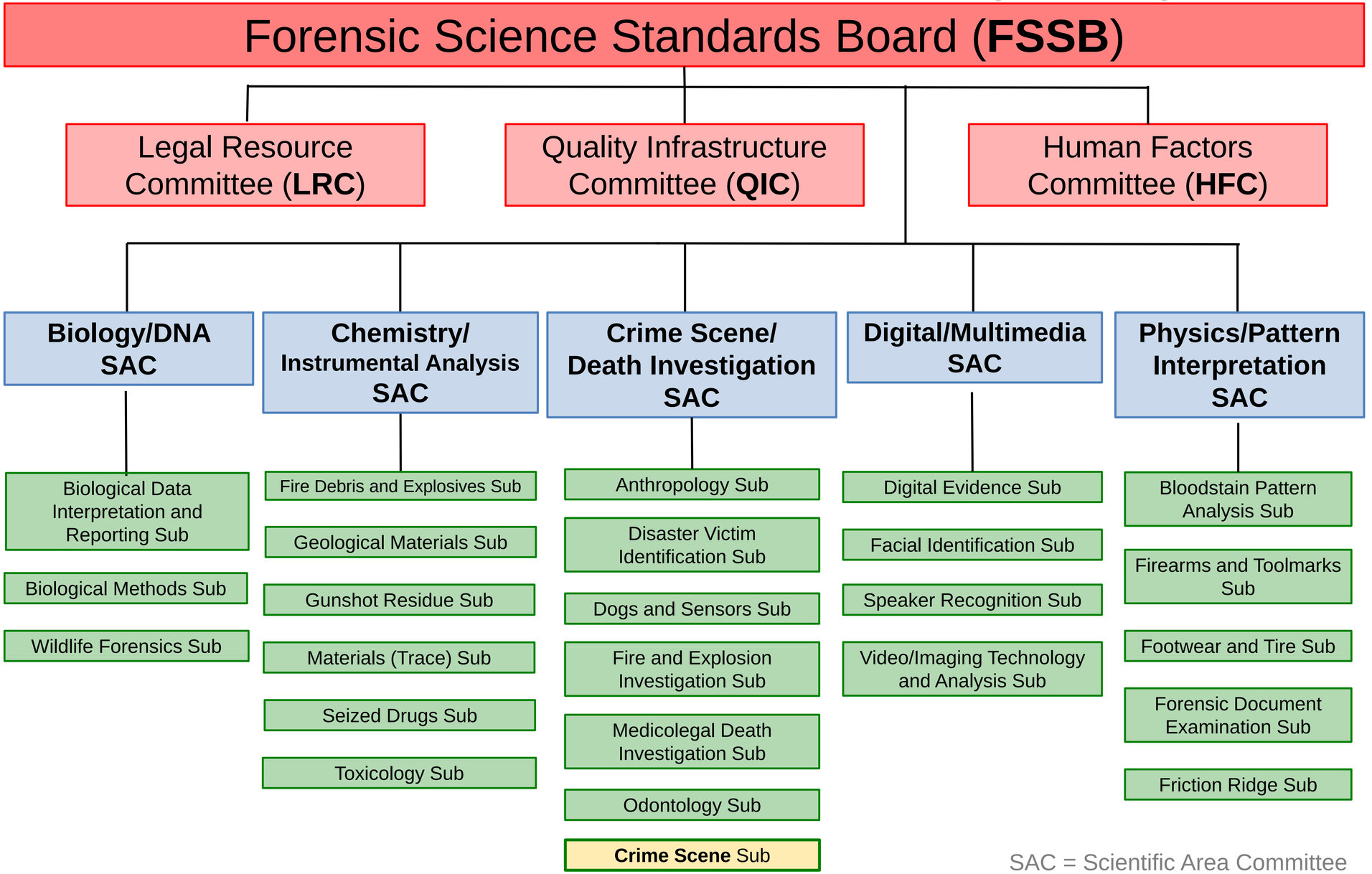
- **The NIST study suggests the method could identify about 66 million bases—the smallest units of genetic information—per second with 90 percent accuracy and no false positives.**
  - If demonstrated experimentally, the NIST method might ultimately be faster and cheaper than conventional DNA sequencing, meeting a critical need for applications such as forensics.

"This is essentially a tiny strain sensor," says NIST theorist Alex Smolyanitsky, who came up with the idea and led the project. "We did not invent a complete technology. We outlined a new physical principle that can potentially be far superior to anything else out there."



Credit: Smolyanitsky/NIST

Organization of Scientific Area Committees (OSAC)



SAC = Scientific Area Committee
Sub = Subcommittee

Forensics

About Us | Resources | OSAC | National Commission on Forensic Science | Contact Us

NIST Home > Forensics > OSAC > osac approved standards

Forensic Science

- OSAC Home
- Forensic Science Standards Board
- Resource Committees
- Scientific Area Committees
- OSAC Subcommittees
- OSAC Registries
- OSAC Research Needs Assessments
- OSAC Catalog of External Standards and Guidelines
- OSAC Application Form
- OSAC News
- OSAC Roles and Responsibilities
- Forensic Science Home

Organization of OSAC Scientific Area Committees for FORENSIC SCIENCE

Registry of Approved Standards

- ASTM E2329-14: Standard Practice for Identification of Seized Drugs

http://www.nist.gov/forensics/osac/osac-registries.cfm

Cyber-Physical Systems (CPS) Program

Enabling scalable design and reproducible performance measurement of advanced CPS

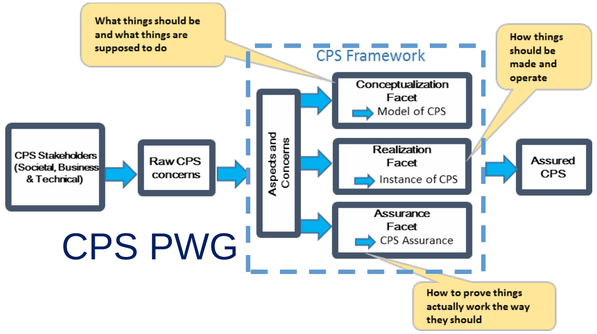
Global Cities Team Challenge

- Smart Cities are key platforms for demonstrating replicable, scalable and reproducible deployment of CPS/Internet of Things (IoT) solutions
- June 2015 Expo featured 63 teams and 200+ participating companies, cities, and universities
- **GCTC2016 kickoff held Nov 12-13, 2015; 16 teams formed so far**…

GLOBAL CITY TEAMS CHALLENGE

CPS Public Working Group

- NIST Leadership with industry, academia, and government participation
- CPS Framework drafted (now in public review) by experts in 5 working groups



CPS TestBed

- CPS Testbed workshop held in Feb 2015 resulted in conceptual design

CPS Testbed

CPS Standards and Research

- Cybersecurity, industrial control systems, manufacturing, health care, smart grid…

Community Resilience

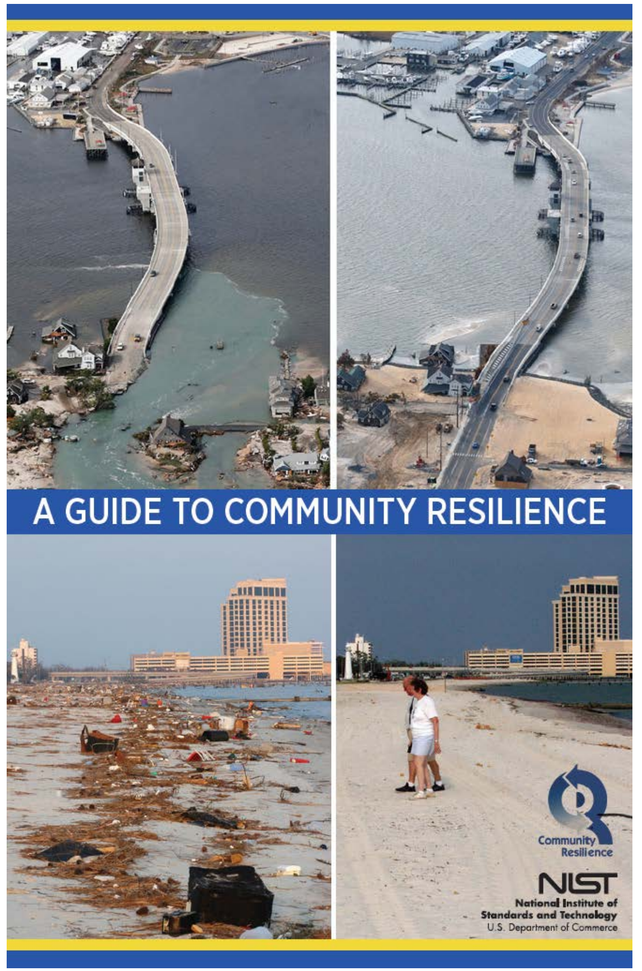
Developing science-based tools to assess resilience, support resilience investment decisions, and provide guidance for planning and implementation of resilience measures

Planning Guide

- Community Resilience Planning Guide for Buildings and Infrastructure Systems (Vol 1 & 2) released in October 2015
  - Included in The President's Climate Action Plan, 2013
  - Press releases by NIST and the Department of Commerce
- Community Resilience Economic Decision Guide for Buildings and Infrastructure Systems published in December 2015

Community Resilience Panel

- **Community Resilience Panel for Buildings and Infrastructure Systems launched November 9, 2015**
  - Approximately 300 stakeholders representing government agencies, community and emergency planners, utility managers, insurance industry, etc.
  - Priorities, plans, and research needs to improve standards, guidelines and best practices to strengthen resilience
  - The Panel's efforts will inform updates to the Planning Guide



White House Earthquake Resilience Summit

On Tuesday, February 2, the White House hosted an Earthquake Resilience Summit to promote adoption of an earthquake-early warning system in the United States.

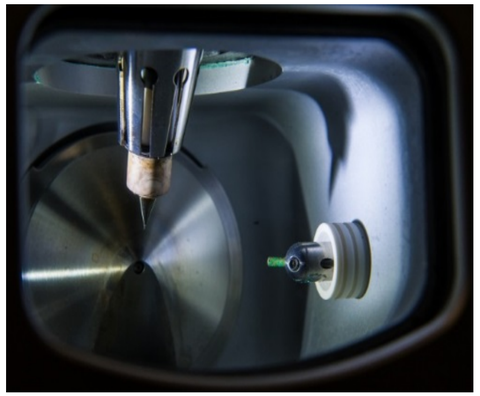
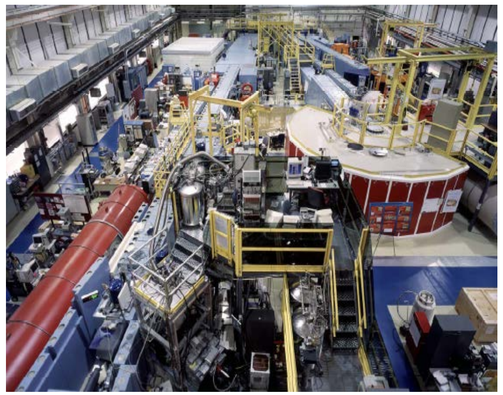
NIST Role:

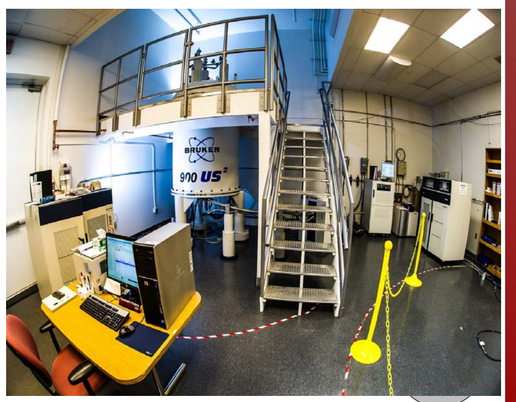
- NIST is the Lead Agency of the National Earthquake Hazards Reduction Program (NEHRP) and, as such, is directed to work through the Interagency Committee on Seismic Safety in Construction (ICSSC) to create and maintain guidelines that help agencies implement this requirement.

- Specifically, the Director of NIST is to:
  - issue implementing guidelines to assist agency compliance
  - provide assistance in interpreting these guidelines to Federal departments and agencies

7 Funded + 3 Projects Under NIST-MedImmune CRADA

- Develop a fluorescence-based optical method to select the optimal formulation for keeping protein medicines stable and safe.
- Develop a new form of Raman Spectroscopy to determine rapidly that protein medicines are properly folded.
- Develop a mass spectral library to help detect and identify contaminant proteins from the host cells used to manufacture protein medicines.
- Develop a mass spectral library of cell surface proteins that are important in the biological pathways of disease and potential targets of therapeutics.
- Determine the genetic stability of cell lines used to manufacture protein therapeutics.
- Develop high resolution NMR and isotopic labeling methods to produce atomic resolution, 3-D structural maps of monoclonal antibodies, the largest class of protein therapeutics.
- Use neutron scattering methods to understand at a molecular level why protein therapeutics can unfold and form particles during manufacturing and during administration to patients.

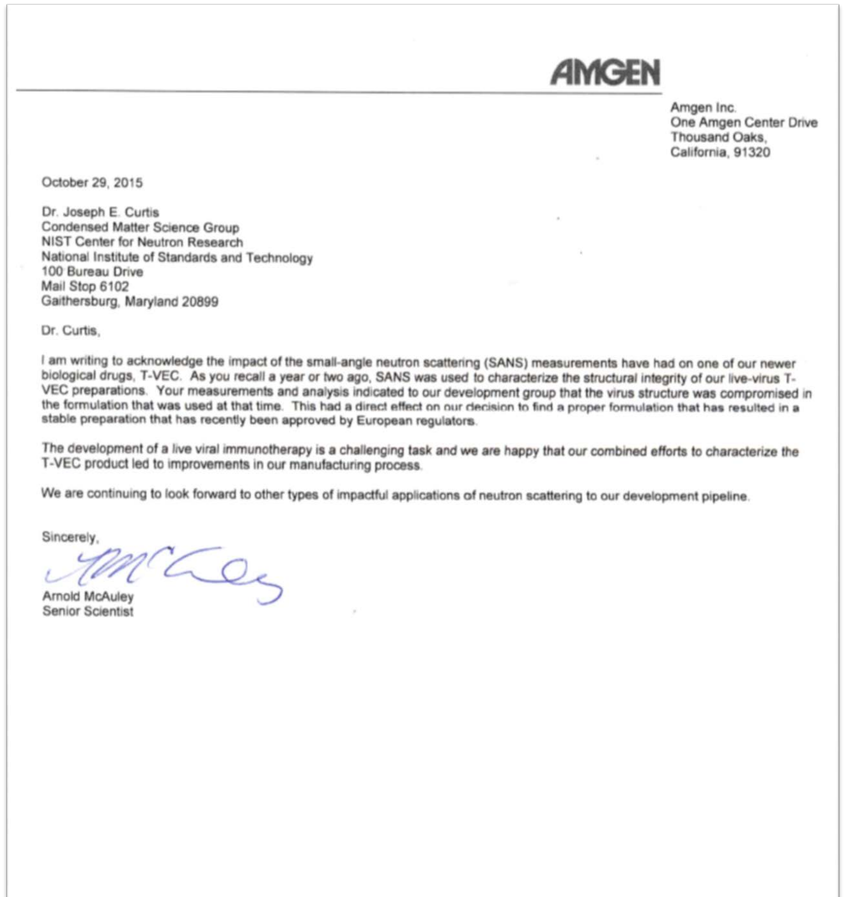



Neutrons Help Amgen with Formulation of Anti-cancer Drug: T-VEC

NIST Measurements Assisting Industry

IMLYGIC

Injectable formulation of T-VEC for treatment of melanoma



AMGEN

Amgen Inc.
One Amgen Center Drive
Thousand Oaks,
California, 91320

October 29, 2015

Dr. Joseph E. Curtis
Condensed Matter Science Group
NIST Center for Neutron Research
National Institute of Standards and Technology
100 Bureau Drive
Mail Stop 6102
Gaithersburg, Maryland 20899

Dr. Curtis,

I am writing to acknowledge the impact of the small-angle neutron scattering (SANS) measurements have had on one of our newer biological drugs, T-VEC. As you recall a year or two ago, SANS was used to characterize the structural integrity of our live-virus T-VEC preparations. Your measurements and analysis indicated to our development group that the virus structure was compromised in the formulation that was used at that time. This had a direct effect on our decision to find a proper formulation that has resulted in a stable preparation that has recently been approved by European regulators.

The development of a live viral immunotherapy is a challenging task and we are happy that our combined efforts to characterize the T-VEC product led to improvements in our manufacturing process.

We are continuing to look forward to other types of impactful applications of neutron scattering to our development pipeline.

Sincerely,

Arnold McAuley
Senior Scientist

“Your (SANS) measurements and analysis indicated to our development group that the virus structure was compromised in the formulation that was used at that time. This had a direct effect on our decision to find a proper formulation that has resulted in a stable preparation that has recently been approved by European regulators.”

Arnold McAuley
Amgen Senior Scientist

Approved by FDA in October 2015

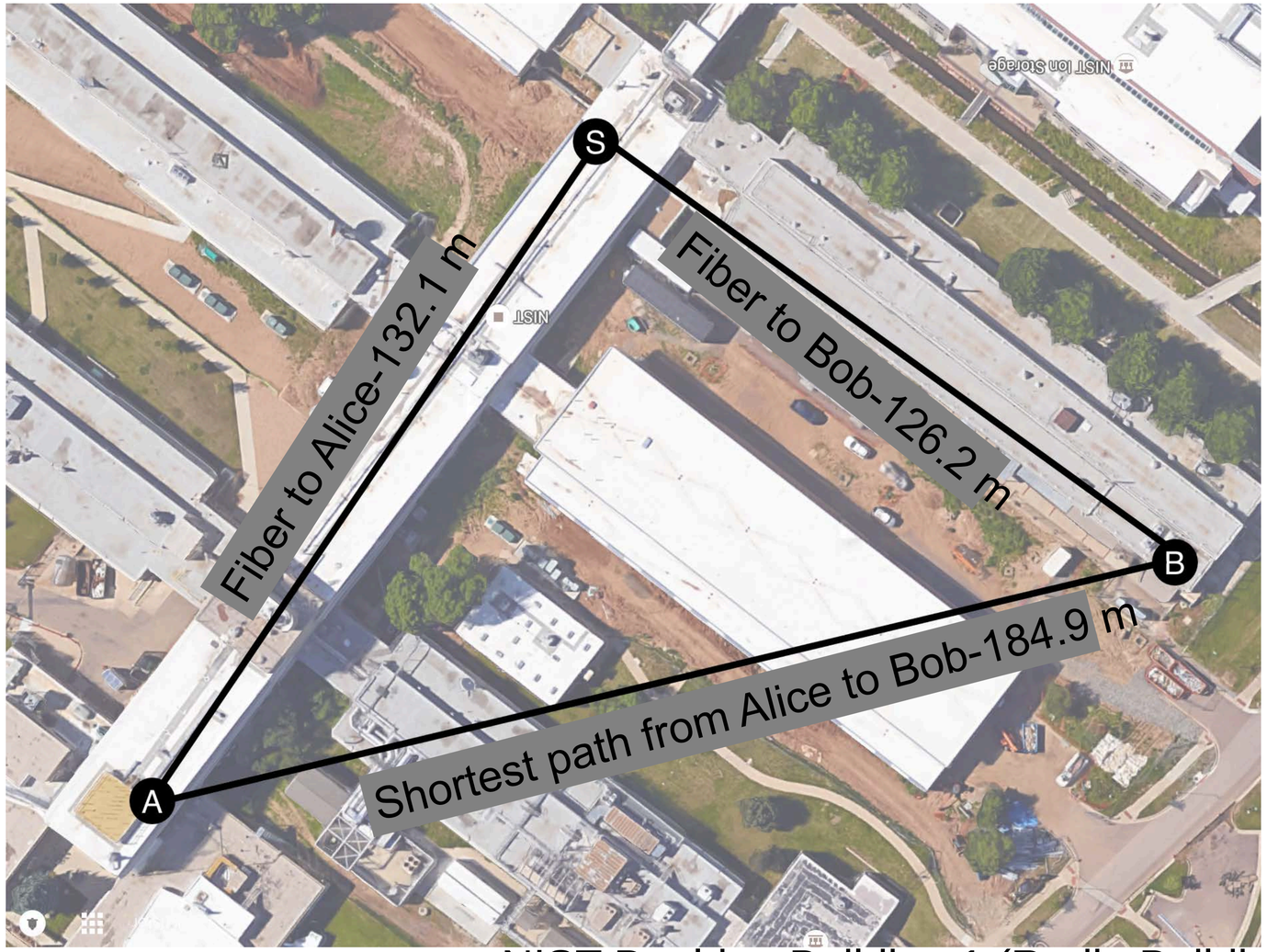
Quantum Science

Einstein was Wrong about Quantum Mechanics!

- Bell Inequality (1964) gives a method to experimentally determine if there are “hidden local variables” (Einstein) or if the quantum mechanical description of nature is complete (Bohr)
  - Implicates issues of: **localism** (no instantaneous cause-and-effect occurring over large distances), **realism** (truth not depending on observation), **determinism** (presence or absence of free will), possible existence of influences we inherently cannot detect (“hidden variables”)
- Many experiments since 1972 have violated Bell’s inequality but there are always experimental limitations (“loopholes”)
- NIST demonstrated a new, “loophole free” experiment: “Strong Loophole-Free Test of Local Realism” Phys. Rev. Lett. **115**, 250402 (2015), Lyden K. Shalm et al.
- NIST’s high efficiency single-photon detectors were key missing component in enabling this experiment, as well as a similar experiment performed in Vienna
- Top Science in 2015: American Physical Society, Science News, Gizmodo
- Will fuel further debate about the nature of nature

PRL cover of 18 Dec 2015 shows a picture of John Stewart Bell with a mosaic of other images of key contributors to Bell inequality experiments, including NIST research team

Einstein was Wrong about Quantum Mechanics!



NIST Boulder, Building 1 (Radio Building)

What We Did

- *Entangled photon pairs (EPPs)* created in the Source Lab (S)
- Efficiently coupled to optical fiber and transmitted to the Alice Lab (A) and the Bob Lab (B)
- *Fast random number generators* select a measurement basis while EPPs are en route

Loopholes?

- ✓ *Locality Loophole:* labs are sufficiently far apart, and the single-photon detectors fast enough
- ✓ *Fair Sampling Loophole:* NIST-only **high efficiency** single-photon detectors key elements

Data Analysis

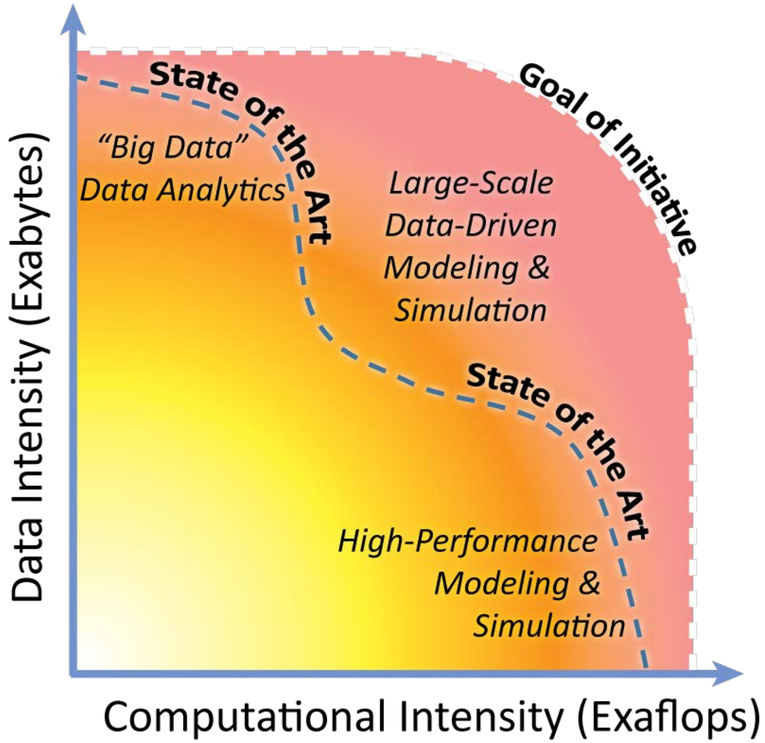
- **Hypothesis testing** concludes there's a really, really, really small chance that *Local Realism* can explain our data!

National Strategic Computing Initiative (NSCI)

A whole-of-government effort to maximize the benefits of high-performance computing

Vital Statistics

- Executive Order announced July 29, 2015
- Tasks NIST with **foundational research and development**
  "NIST will focus on measurement science to support future computing technologies"
- Prominent in FY 2017 budget discussions at interagency level
- **NIST Technical Lead: Carl Williams (Deputy Director, PML)**



Possible program elements

Software

- Architectures
- Algorithms
- Applications

Hardware

- Superconducting Computing
- Neuromorphic (Brain-like) Computing
- Quantum Computing

Both

- Software / Hardware Co-Design

Update on Challenge Prizes

Update: Head Health Challenge III - Advanced Materials for Impact Mitigation

- A Public-Private Challenge Prize to stimulate the development of advanced materials that exhibit excellent energy absorbing /dissipating properties
- Employs NIST expertise in materials testing and assessment
- Inspired by the National Materials Genome Initiative (MGI)

NIST is leveraging Challenge III to expand MGI-related activities in advanced protection materials

- **January 29, 2015:** NFL SuperBowl Press Conference
- **February 2, 2015:** Challenge III Opens
- **March 2015:** 125 Abstracts Received
- **April 2015:** 75 Winning Abstracts invited to submit full proposal and a material sample
  - Summer 2015: NIST tested the submitted samples; met with judges and selected 5 semifinalists
- **October 2015:** the 5 First Round Awardees receive $250,000 each; begin work to refine materials
- **September 2016:** **Grand Prize Winner awarded $500,000**

MML engineers prepare to drop a red instrumented weight onto a sample of material being proposed for use as a component of helmets. The platform that the sample sits on is also instrumented to measure the distribution of forces transmitted through the material.

First-Round Awardees: Head Health Challenge III - Advanced Materials for Impact Mitigation

- **Alba Technic, LLC** (Winthrop, Maine)
  - patented, shock-absorbent honeycomb material with an outer layer that diverts the energy from a fall or hit.
  - upon impact, the outer layer changes into a hard shell to spread the energy and protect the user from injury.

- **Charles Owen Inc.** (Lincolnton, Ga.)
  - material with a stacked, origami-like design can fold efficiently to optimize energy absorption.
  - material based on originally developed for applications such as solar array packing for space industry.

- **Corsair Innovations** (Plymouth, Mass.)
  - a textile that uses tiny, spring-like fibers to repel rotational and linear impacts,
  - is washable, breathable, wicks sweat and can be easily engineered to meet impact performance requirements.

- **Dynamic Research Inc.** (Torrance, Calif.) and **6D Helmets LLC**
  - 6D's single-impact suspension technology is being evolved for use in repeated impact conditions.
  - 6D's multi-layer, suspended internal liner system allows the outer layer to move independently of the inner layer in order to reduce the effect of both angular and linear impact forces.

- **University of Michigan** (Ann Arbor, Mich
  - a lightweight, multi-layered composite that includes a viscoelastic material.
  - material can be uniquely utilized to help limit the force of multiple and repeated impact events.

Reference Data Challenge

- The NIST Standard Reference Data collection contains some of the world's most accurate and comprehensive datasets of physical, materials science, chemical, and biological data.

- **But is there a better way to share NIST SRD with the researchers who need it?**

We asked people to build an App using at least one of these NIST Datasets:

1. CODATA Fundamental Physical Constants (SRD 121)
2. Ground Levels and Ionization Energies for the Neutral Atoms (SRD 111)
3. Atomic Weights and Isotopic Compositions (SRD 144)
4. Computational Chemistry Comparison and Benchmark Database (SRD 101)
5. NIST-JANAF Thermochemical Tables (SRD 13)
6. ITS-90 Thermocouple Database (SRD 60)

About the Challenge

$45,000
In Prizes

130+
Participants

26
Apps Submitted

Nov. 16th
Winners to be Announced

Winners of the Reference Data Challenge

First place:

- **Meru Lab Reference App**, **$30,000** to Kris Reyes from Meru Apps in Princeton, N.J.
  - **allows users to quickly access NIST chemical species data with the tap of a near-field communication (NFC) tag**, smart chips store digital information and share it with a smartphone.
  - Use of NFC tags enables access to relevant NIST data in a way that minimally interrupts users workflow and allows multiple users in a laboratory to share and store information. The app provides multiple functionalities for search and display of NIST SRD.

Second place:

- **LabPal app,** $10,000 to Zachary Ratliff (Waco, Texas) and Daniel Graham (Danville, Ky.)
  - **A quick reference tool** that **incorporates search features, a calculator, an infrared spectrum viewer and lab notes functionality that can easily be shared in one app.**

Third place:

- **ChemBook app,** $5,000 to a team from MetroStar Systems, Reston, Va.
  - **Users can search for elements and compounds based on name, formula and even common terms such as moth balls or water.**
  - **Combines NIST SRD with other open source data** and incorporates informative YouTube videos and other media.

N-STEP - NIST Science and Technology Entrepreneurship Program

- **New entrepreneurship program to help accelerate the transition of NIST developed technologies to the marketplace.**
  - Officially launched November 18, 2015
- **Program will provide up to 10 grants a year to former NIST employees, post-docs, and guest researchers, to turn promising NIST technologies into entrepreneurial careers and high-tech businesses.**
- **NIST is partnering with Maryland Technology Development Corporation (TEDCO)**
  - TEDCO will administer the program, award funds, assist awardees, and monitor progress
  - The program will fund activities nationwide.
- **Enterprise taps into the unique talent pool of NIST's post-docs providing them with additional resources and training to take their work to the next level.**

Topics: NIST Update

- Safety and Site Security Update
- Update on Director's Priorities
- NIST Budget Status
- Selected Staff Awards/Achievements
- Strategic Research and Programmatic Updates
- Agenda Review

VCAT Meeting Agenda: February 3-4, 2016

WEDNESDAY Morning, FEBRUARY 3, 2016

Overview and Safety

8:30 am	Call to Order	**Roberto Padovani**, VCAT Chair
8:40 am	NIST Update and Agenda Review	**Willie E. May**, Under Secretary of Commerce for Standards and Technology & NIST Director
9:40 am	Discussion	
9:50 am	Safety Update	**Richard Kayser**, Chief Safety Officer
10:00 am	Discussion	
10:10 am	*Break*	

VCAT Meeting Agenda: February 3-4, 2016

WEDNESDAY Morning - continued

NIST Workforce: Employee Survey results, actions and HR practices and policies

10:20 am Context Setting — **Willie May**, Under Secretary of Commerce for Standards and Technology and NIST Director

10:30 am: Improving Employee Engagement at the local level

Joannie Chin, Acting Deputy Director, Engineering Laboratory (EL)

Carroll Thomas, Director, Manufacturing Extension Partnership (MEP)

Laurie Locascio, Director, Material Measurement Laboratory (MML

11:30 am HR Recruitment and Engagement Activities

Susanne Porch, Director, Office of Human Resource Management

11:50 am Ensuring a word-class scientific and technical NIST workforce: Thoughts from two NIST Fellows

Michael Moldover, NIST Fellow

Jun Ye, NIST Fellow

12:20 pm Discussion

12:35 pm Lunch

VCAT Meeting Agenda: February 3-4, 2016

WEDNESDAY Afternoon

1:30 pm Deliberations and Presentation on Observations, Findings, and Recommendations of 2015 Annual Report, Part 1

2:45 pm Break

NIST Laboratory Tours

3:15 pm Various NIST Lab tours

5:15 pm Meeting Adjourn

6:00 pm VCAT Reception at Gaithersburg Hilton