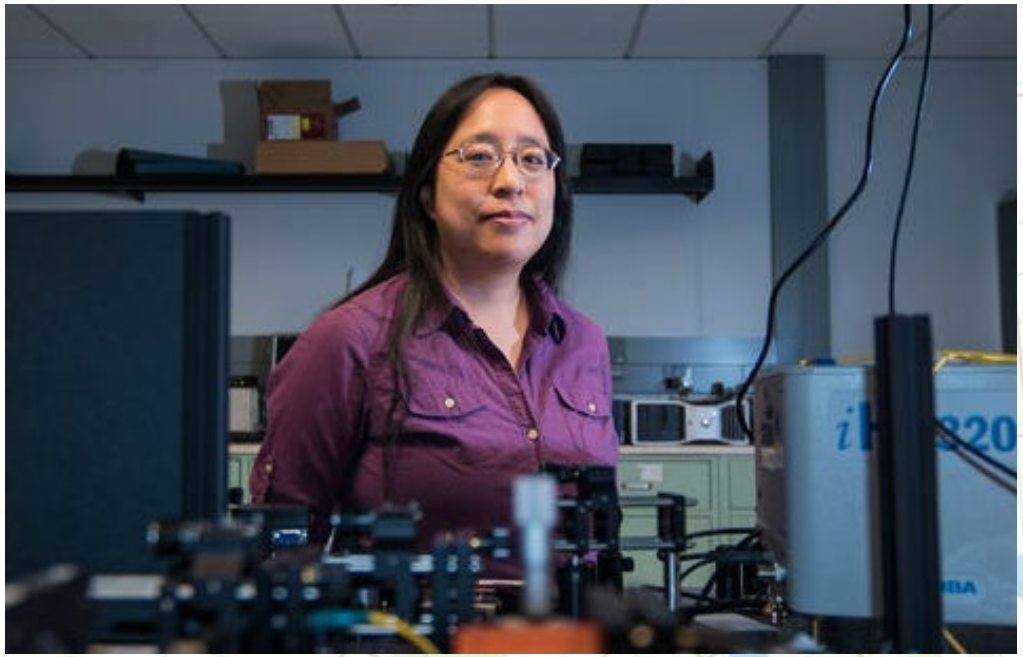
NIST ITL Lab Updates
Acting Director, ITL
Jim St.Pierre

October 25, 2023

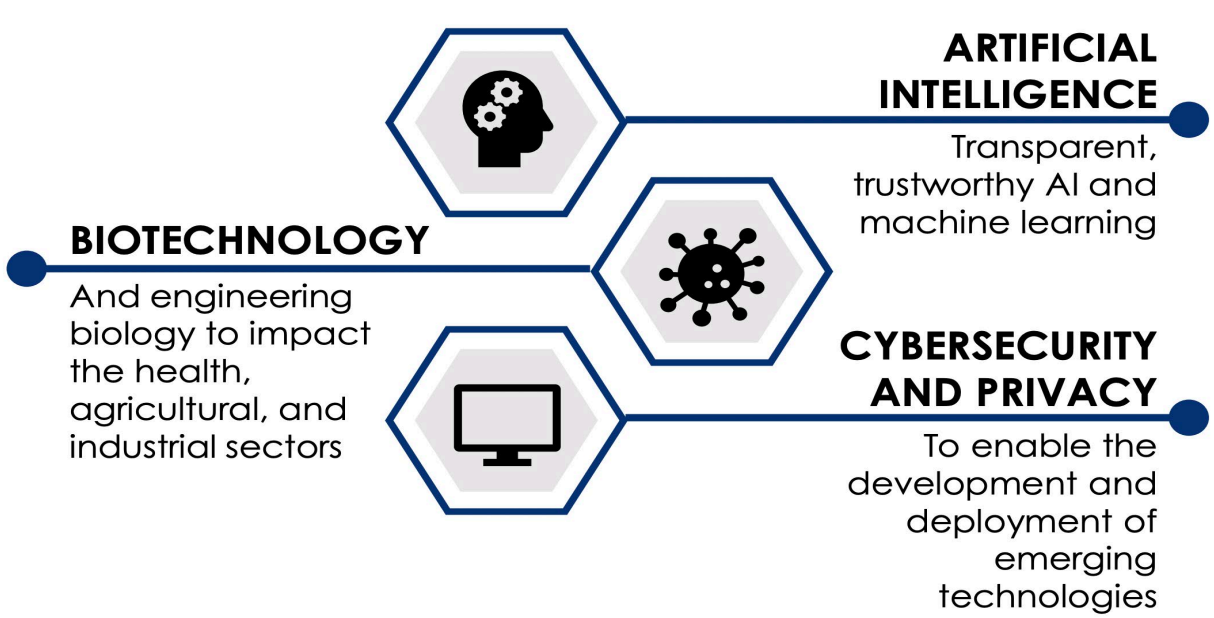
National Institute of Standards and Technology
U.S. Department of Commerce

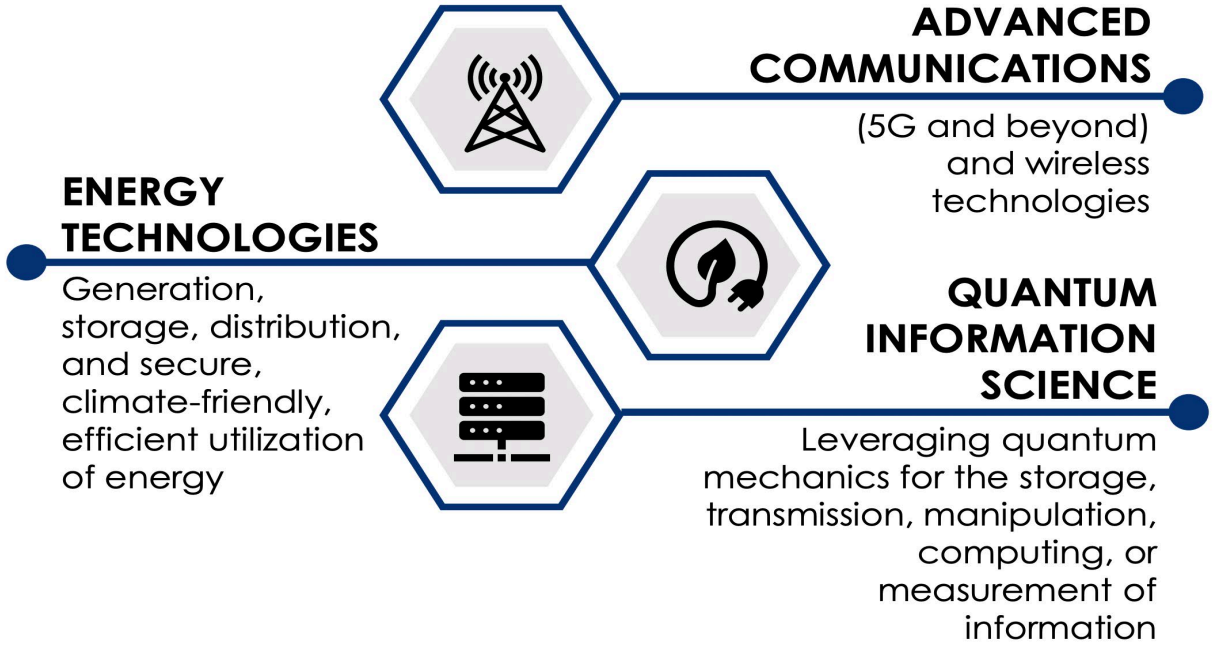
Cultivating Trust in IT and Metrology



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

NIST Wide Critical and Emerging Technologies



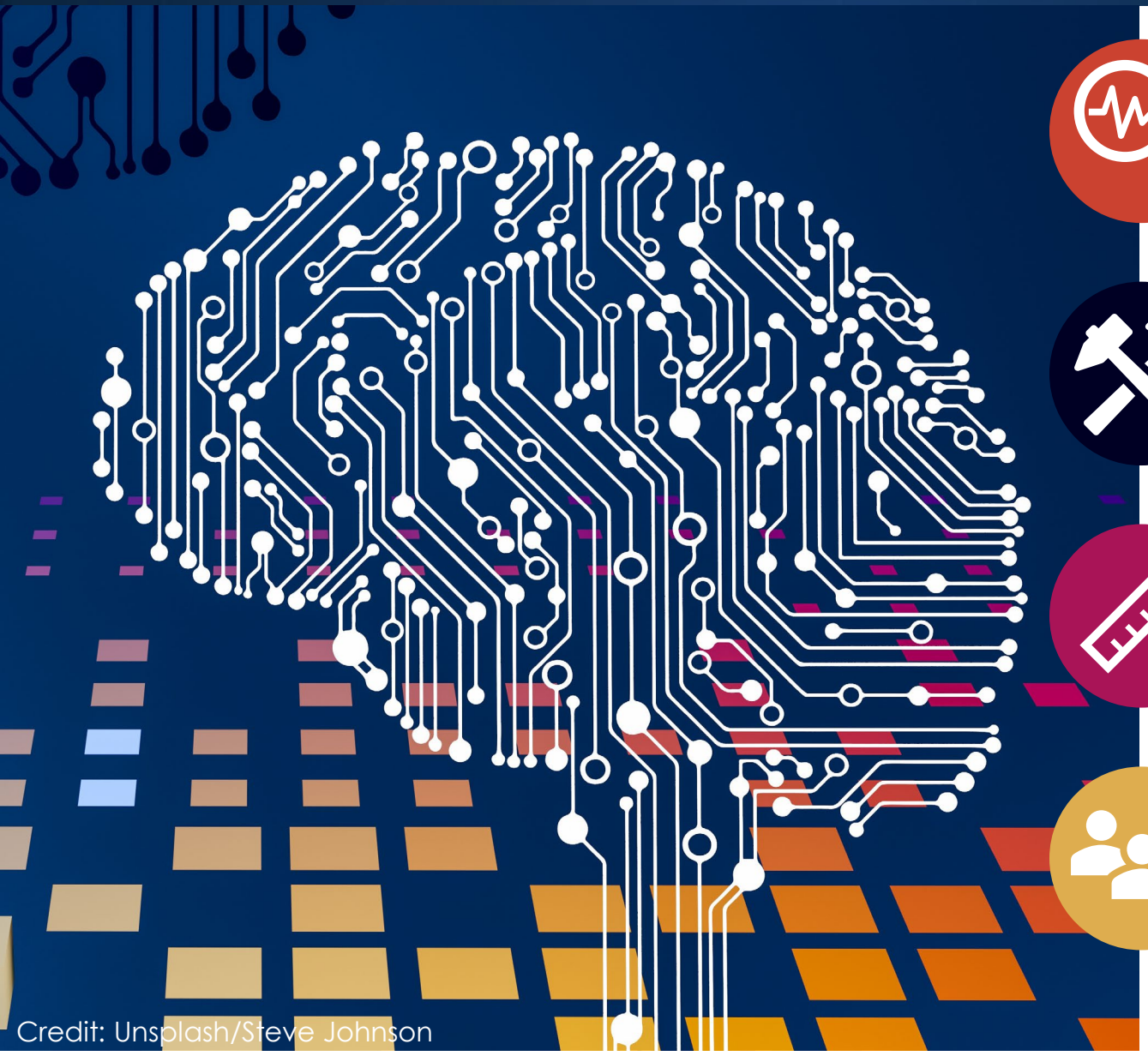


ITL Portfolio

Maximize the benefits of information technology (IT) to society through a balanced IT measurement science and standards portfolio of three major activities:

1) fundamental research in IT, computer science, mathematics, statistics;
2) applied IT research and development; and
3) standards development and technology transfer.

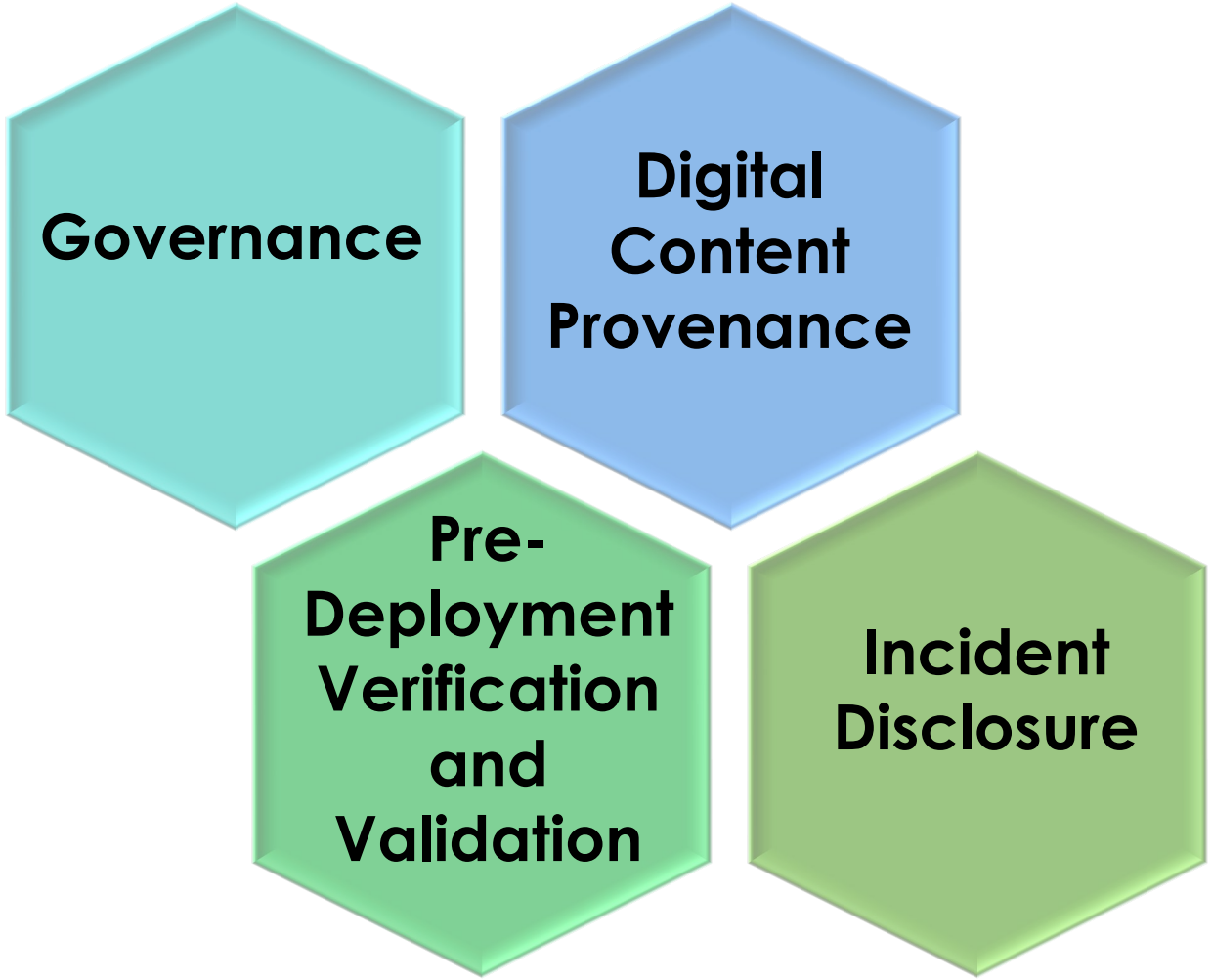
Artificial Intelligence



Credit: Unsplash/Steve Johnson

- Fundamental and Applied AI Research
- Guidance, Tools, and Frameworks
- Measurement, Evaluation, and Standards
- Lead and Convene Domestically and Internationally

Generative AI Public Working Group



- **Announced in July 2023 by Secretary Raimondo and led by NIST.**
- Nearly 1,000 public and private sector volunteers have joined the group to:
  - Create a cross-sectoral AI RMF profile focusing on four program areas
  - Support NIST's testing, evaluation, and measurement efforts
  - Explore opportunities to use AI for good
- Drafts of four sets of guidelines are anticipated for release for public comment later this year

National AI Advisory Committee

- AI Futures: Sustaining Innovation in Next Gen AI
- AI in Work and the Workforce
- AI Regulation and Executive Action
- Engagement, Education and Inclusion
- Generative and NextGen AI: Safety and Assurance
- Rights-Respecting AI
- AI and the Economy
- Procurement of AI Systems
- International Arena: Collaboration on AI Policy and AI-Enabled Solutions

New Focus Areas Working Groups

- Realigned focus areas to explore impacts of AI

Meetings

- Public meetings informing the Committee on their Year 2 work

Reports, Recommendations, and Non-Decisional Documents

- Recommendation for International Emerging Economies
- Three instructive explainer documents on topics including the NIST AI RMF, generative AI, and AI regulation

NIST Leadership in AI

Credit: Time Magazine

International Engagement

- October 12: Published a crosswalk between NIST AI RMF and Singapore AI Verify as part of Singapore CET Dialogue

Standards Development

- September 28: Hosted a Joint Workshop on Risk Management for AI Systems with ANSI

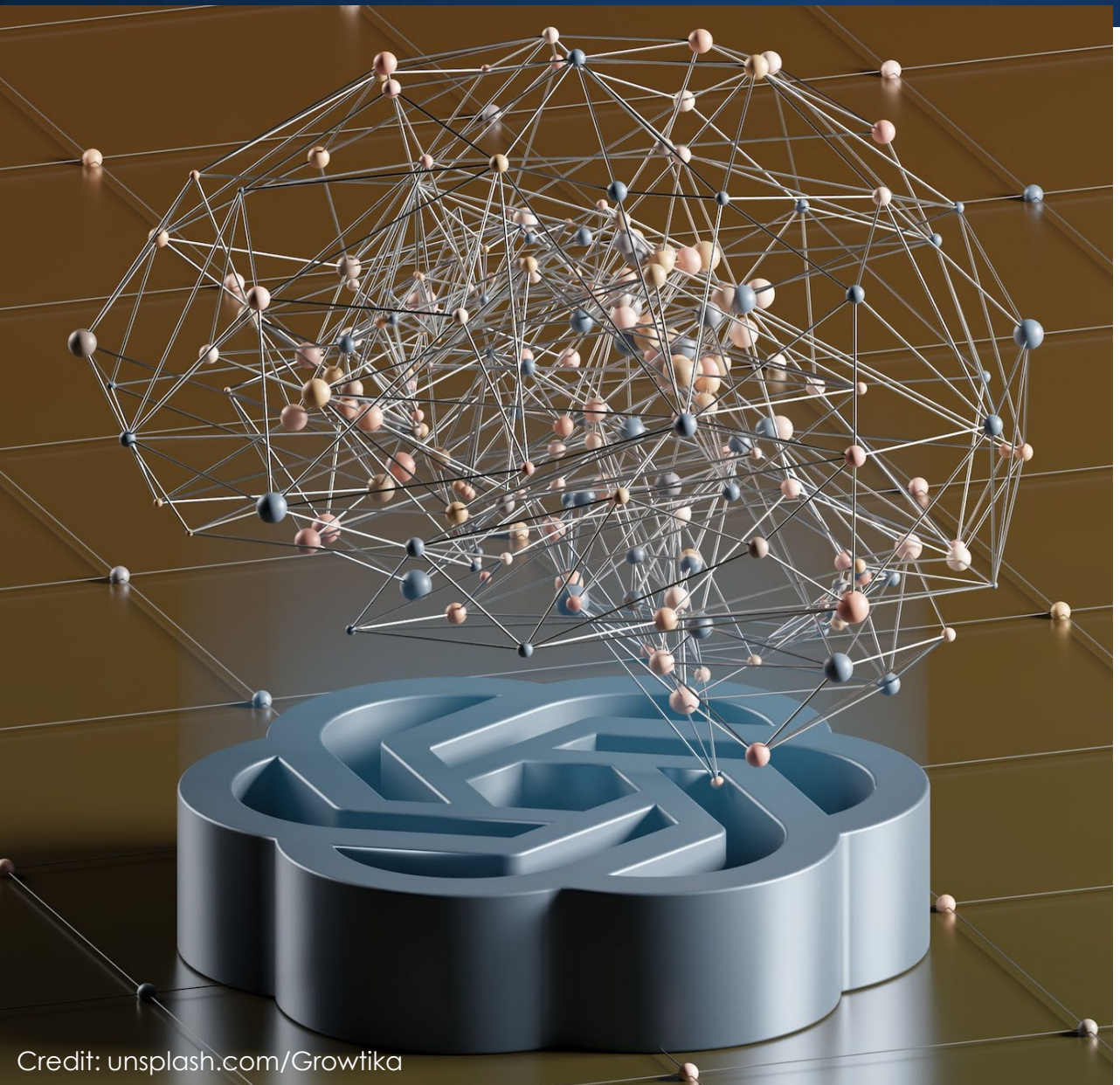
AI Governance Forum

- August 21: Participated at the Forum in Seattle, Washington, hosted by Senator Cantwell to discuss AI

Leadership in AI

- September 7: NIST's Elham Tabassi was included on Time Magazine's list of 100 most influential people in AI

What's Next for NIST


Credit: unsplash.com/Growtika

Further International Engagement

- Upcoming joint webinar on AI risk and safety with the United Kingdom collaborators
- Continue engagement in fora to further standards development

Advance AI R&D and Measurement

- Including expansion of testing and evaluation, standards, and guidelines
- Strengthen engagement and joint R&D with stakeholders and community

Lead Domestically

- Upcoming executive action on AI potentially coming in the fall

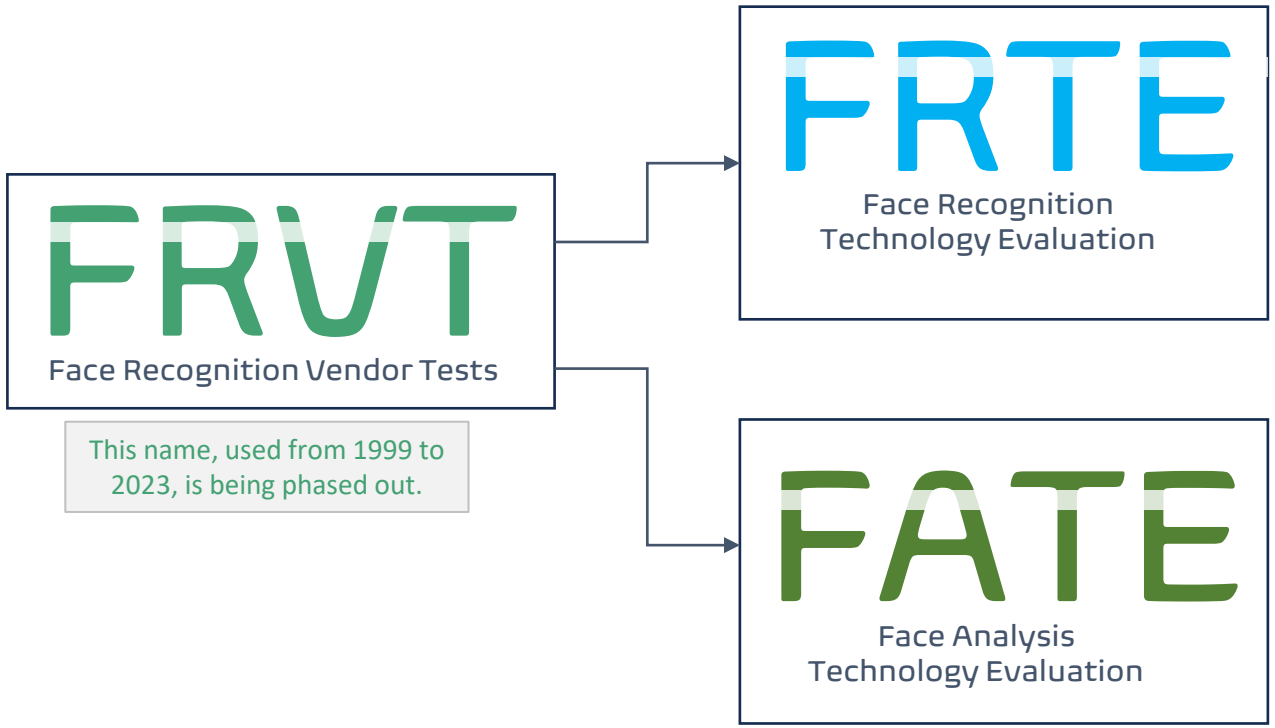
NIST – ITL and Biometrics

FINGERPIRNTS

- N2N Fingerprint Capture Challenge
- Fingerprint Vendor Technology Evaluation (FpVTE)
- Slap Fingerprint Segmentation Evaluations (SlapSeg)
- Proprietary Fingerprint Template Evaluations (PFT)
- Minutiae Interoperability Exchange (MINEX)
- Evaluation of Latent Fingerprint Technologies (ELFT)
- Biometric Quality

NIST – ITL and Face Recognition

FRVT Split :: Distinguishing recognition from analysis



- 1:1 Verification
- 1:N Search
- Twins Disambiguation
- 1:N Face + Iris

- Morph Detection
- Quality Summarization
- Quality Defect Detection
- Presentation Attack Detection
- Age Estimation

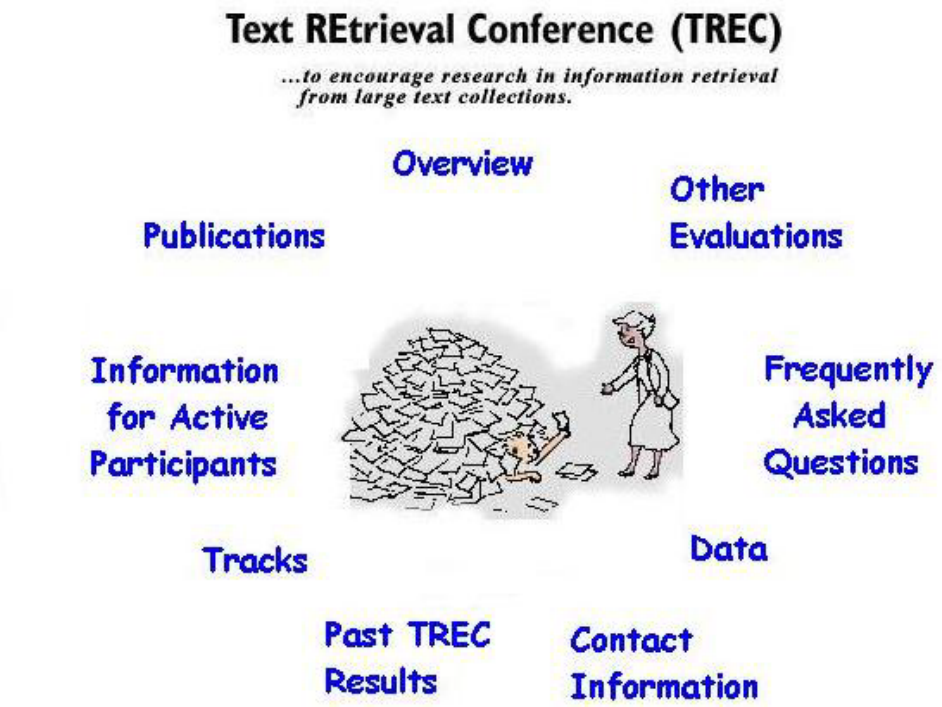
Benchmarks are: Independent + Free + Open globally + Regular + Repeatable + Fair + Black box IP-protecting + Large-scale + Statistically robust + Public + Transparent + Extensible

NIST – ITL and Information Retrieval

TREC workshop at NCOEE – Nov 14-17, 2023
TREC | NIST

TRECVID workshop – Nov 13-15, 2023
TRECVID | NIST

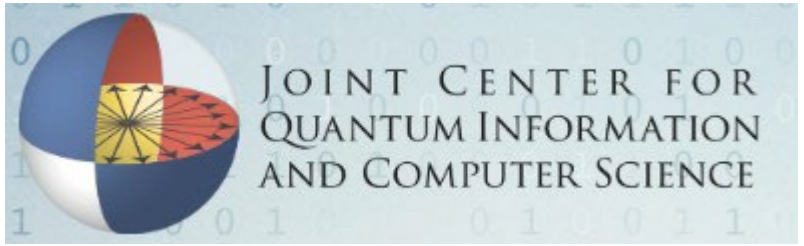
TAC workshop – Nov 13, 2023
TAC | NIST

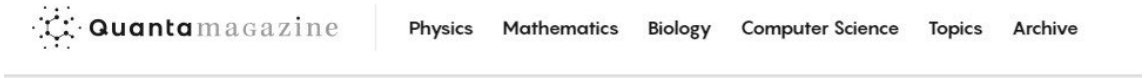


Quantum Information in ITL

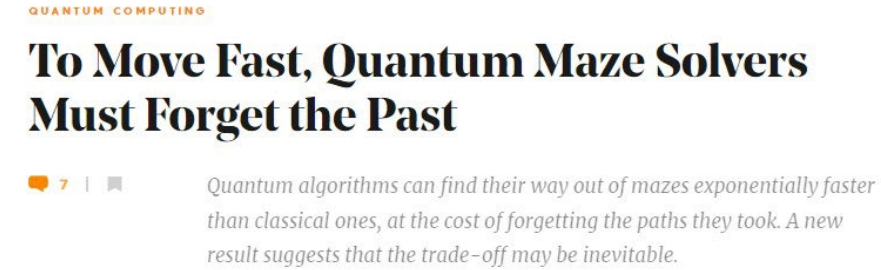
QuICS: Joint Center at UMD College Park

- 14 Fellows (8 NIST), 20 postdocs, 68 students
- Focus: quantum computer science
- 59 research papers issued in calendar 2023

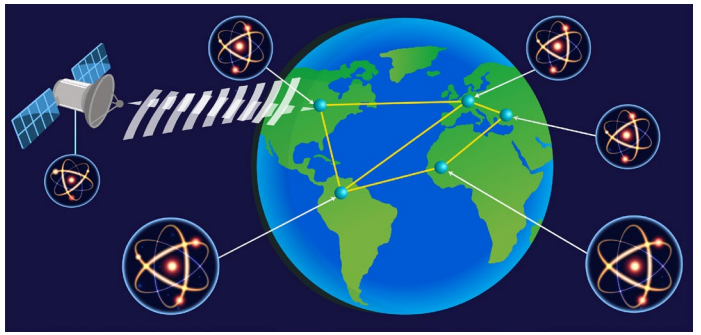




- "Quantum Algorithms and the Power of Forgetting"



- DC-QNet: Regional Quantum Network Testbed
  - Joint effort of NIST, NASA, NSA, ARL, NRL, USNO
  - Now operational
  - NIST focus: Quantum Network Metrology
  - Recent work: timing, synchronization, noise characterization



Encryption Updates: 3 New Draft FIPS

FIPS 203, *Module-Lattice-Based Key-Encapsulation Mechanism Standard*
(Crystals – Kyber)

FIPS 204, *Module-Lattice-Based Digital Signature Standard*
(Crystals – Dilithium)

FIPS 205, *Stateless Hash-Based Digital Signature Standard*
(Sphinx +)

NCCOE Activities

Center Partnerships with State and County Renewed

The Department of Commerce's National Institute of Standards and Technology (NIST), the state of Maryland and Montgomery County, Maryland, have renewed their partnership in support of the National Cybersecurity Center of Excellence (NCCoE), a collaborative hub where industry, government and academic experts work together to solve pressing cybersecurity challenges.

NIST – ITL And NCCOE Projects Underway

5G Cybersecurity

Creating practical solutions that strengthen the security of a system's architectural components, provide a secure cloud-based supporting infrastructure, and enable security features provided by 5G standards.

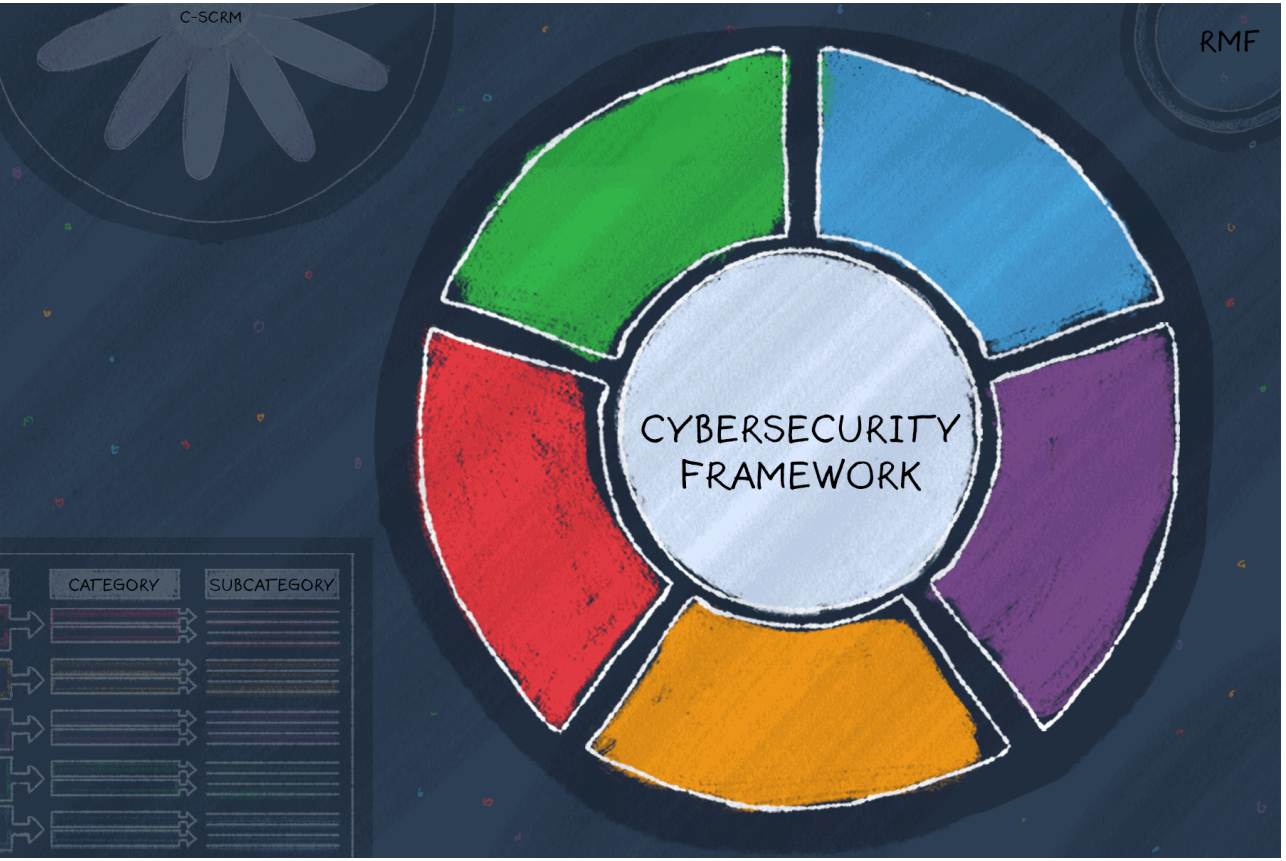
Cybersecurity Framework Profile for Electric Vehicle Extreme Fast Charging Infrastructure

The electric vehicle (EV) extreme fast charging (XFC) infrastructure ecosystem relies on multiple connected subsystems to include EV charging stations, data flow networks, and utility power distributers.

Cybersecurity of Genomic Data

The advent of low-cost genomic sequencing technologies has ushered in an era where it is now possible to sequence and analyze an entire genome quickly and affordably. The vast amounts of genomic data collected have helped fuel our nation's economic and health leadership posture; however, this information may not be protected with sufficient rigor.

Revision to Cybersecurity Framework



[Discussion Draft of the NIST CSF 2.0 Core] - feedback on this discussion draft may be submitted at any time.

Comments on CSF 2.0 due Nov. 4th 2023

NIST National Vulnerability Database (NVD)

- New APIs for Industry Integration and Use
- The NVD added information to its CVE detail pages to identify vulnerabilities appearing in CISA's Known Exploited Vulnerabilities (KEVS) Catalog.
- New Data linking to SWIDS and NSRL

CVSS V3 Score Distribution

Severity	Number of Vulns
CRITICAL	20030
HIGH	54235
MEDIUM	52315
LOW	2277

CVE Status Count

Total	219488
Awaiting Analysis	309
Undergoing Analysis	231
Modified	73387
Deferred	115
Rejected	12778

NVD Contains

CVE Vulnerabilities	219488
Checklists	614
US-CERT Alerts	249
US-CERT Vuln Notes	4486
OVAL Queries	10286
CPE Names	1105523

NIST – ITL And Workforce - NICE

Cybersecurity Career Ambassador Program. The program seeks to promote cybersecurity career awareness, exploration, and development by creating a network of volunteers to serve as champions for expanding and diversifying the cybersecurity workforce.

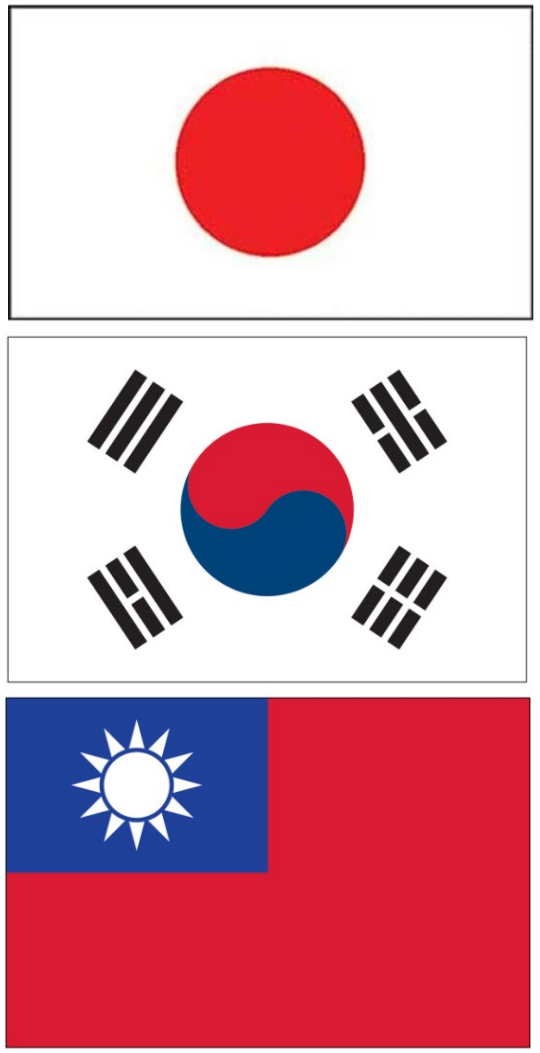
Call for Proposals for the 2024 NICE Conference and Expo is now open! This year's theme, "**Strengthening Ecosystems: Aligning Stakeholders to Bridge the Cybersecurity Workforce Gap**," highlights the collective effort to strengthen the cybersecurity landscape. By joining forces with key partners, we can foster a more robust cybersecurity ecosystem to bridge the workforce gap.

NOTICE OF FUNDING OPPORTUNITY (NOFO)
Regional Alliances and Multistakeholder Partnerships to Stimulate (RAMPS) Cybersecurity Education and Workforce Development
Closed on: Tuesday, September 5, 2023, by 11:59 p.m. Eastern Time

Cybersecurity Business Development Mission - Sept. 18-26, 2023

Participated in DoC International Trade Administration Executive-led Cybersecurity Business Development Mission to Taiwan, South Korea, and Japan - Purpose:

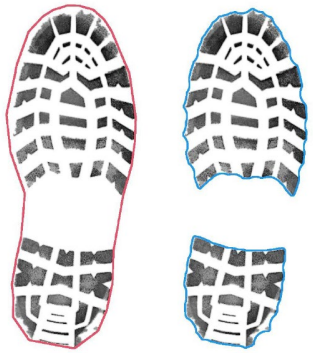
- Introduce U.S. firms to East Asia's information and communication technology (ICT) security and critical infrastructure protection markets, and to assist them in finding business partners.
- Promote the tenets and adoption of the U.S. National Institute of Standards and Technology (NIST) Cybersecurity Framework & related guidance and standards globally.
- Included representatives from U.S. companies and U.S. trade associations with members that provide cybersecurity and critical infrastructure protection products and services.

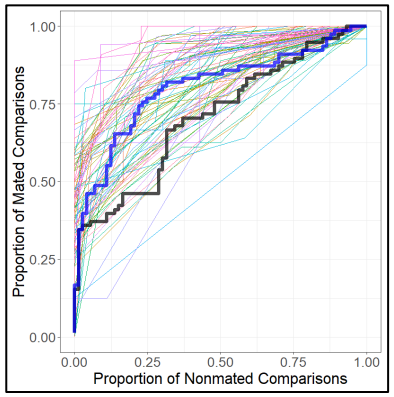


Statistical Engineering Division

Initial release of NIST Footwear Impression Comparison System

- More capable than many professional footwear examiners
- Focus for now is on second opinions





- Certification of SRM 3655 Glycans Solution
  - World's first SI-traceable standard for glycans
  - Needed for testing of monoclonal antibody therapeutics (mAbs)
  - Unexpected glycans can trigger life-threatening immune system responses

- Deep Generative Modeling for Comms Systems Testing and Data Sharing
  - Optimal transport data augmentation shown to aid population masking
  - Now testing performance of direct GAN training and GAN transfer learning

Staff Recognition

NIST and the Nobel Prize. NIST ITL Math Department cited in "for experimental methods that generate attosecond pulses of light for the study of electro dynamics in matter",

DOC Gold Medal for the Phish Scale
The NIST Phish Scale: Method for rating human phishing detection difficulty | NIST

2022 DoC Gold Medal for development of cell characterization standards to improve manufacturing and quality assurance of life saving therapies

2022 DoC Silver Medal for analyzing the effects of the alkali-silica reaction on structural integrity of reinforced concrete used in nuclear power plants

Image Group (Mei Ngan) – provisional patent for her methodology of detecting morph using 1-to-many face recognition was selected by NIH Federal Lab Education Accelerate (FLEX) Program as a topic of interest, now working with students of ASU to further the effort.


OCT. 9, 2023
THE 100 MOST INFLUENTIAL PEOPLE IN ARTIFICIAL INTELLIGENCE
TIME100/AI
ELON MUSK'S FIGHT FOR THE FUTURE OF AI
By WALTER ISAACSON
time.com

QUESTIONS?