VISITING COMMITTEE ON ADVANCED TECHNOLOGY (VCAT or Committee)
MINUTES OF THE WEDNESDAY, FEBRUARY 14, 2024
WEBINAR MEETING

ATTENDANCE:

Visiting Committee Members Attending
Cerf, Vinton
Fischer, George
Ghosh, Monisha
Jackson, Keoki (Dana)
Johnson, Anthony M.
Ku, Katharine
Matusow, Jason
Pierpoint, Mark

Designated Federal Officer
Shaw, Stephanie

NIST Leadership Board
Adams, James
Bahar, Mojdeh
Boehm, Jason
Brockett, Del
Brown, Essex
Chin, Joannie
Fangmeyer, Robert (Bob)
Folk, Alex
Jenkins, George E.
Johnson, Janelle
Kushmerick, James
Locascio, Laurie
Mackey, Elizabeth (Liz)
Midzor, Melissa
Molnar, Michael (Mike)
Olthoff, James (Jim)
Romine, Charles (Chuck)
Sastry, Chandan
Stine, Kevin
Szakal, Christopher
Vaughn, Robert (Skip)
Wixon, Henry

NIST Staff
Allocca, Clare
Andrews, Anne
Arissian, Ladan
Ausherman, Nicole
Averill, Jason
Ayala, Melissa
Barbosa, Nicholas
Berilla, Michael
Bobb, Beverly
Boeckl, Kaitlin (Katie)
Boggs-Russell, Ashley
Brown, Hannah
Bruce, Sally
Brunner, Zahraha (Zara)
Buchanan, Kerrianne
Carnahan, Lisa
Chang, Walter
Chukran, Melinda
Conrad, Brad
Coolbroth, Dana
Corwin, Kristan
Cubert, Amy
David, Lindra
DiBernardo, Mary Jo
Dickson, Jessica
Dohne, Kirk
Donley, Elizabeth
Dowell, Marla
Fasolka, Michael
Francomacaro, Sal
Fraser, Gerald (Jerry)
Gillerman, Gordon
Ginty, Nathan
Glenn, Rachel
Goldstein, Barbara
Hardis, Jonathan
Hauk, Kandy
Hildebrand, Jacqueline
Hogan, MaryAnn G.
Hooker, Stephanie
Huergo, Jennifer
Ivy, Nahla
Jahanmir, Said
Jones, Christina
Kagan Guthrie, Benjamin
Kauffman, Leah
Kim, Yekyung
Knake, Maria
Kramar, John
Lane, Anne
LaSalle, Connie
Lawson, Jeremy
Leaman, Dana
Lin, Eric
Loftin, Bethany
Madhavan, Rajmohan
Mahn, Amy
Malhotra, Jyoti
Martin, Natalia
Meritis, Dimitrios
Morrow, Jayne
Moylan, Shawn
Nadal, Maria
Newton, Thomas
Phelps, Amy
Phillips, Brandyi
Pollack, Charles
Pollard, Shelly
Polyakov, Sergey
Porch, Susanne
Press, Rich
Rao, G. Nagesh
Reczek, Karen
Reidy, Kari
Rigosi, Albert
Roberts, Kamie
Rogers, Kelley
Rosa, Jennifer
Ryan, Christopher
Saar, Ramona J.
Schlatter, Katie M.
Schmidt, Mark
Schufreider, James (Jim)
Sedgewick, Adam
Seiler, David (Dave)
Sharpless, Kathy
Shepard, Scott
Shyam-Sunder, Sivaraj
Snowden, Hope
Sofka, Holly
St. Pierre, James (Jim)
Stambaugh, Corey
Sullivan, Suzanne
Szuchyt, April
Tabassi, Elham
Taylor, Jacob
Thompson, Alan Keith
Tran, Kimmai
Vanek, Anita
Wasil, Charles
Whiteside, Teresa
Wilkinson, Richard
Yao, Jue
Yashar, David

Others

Cassady, Amber – Lewis-Burke Associates LLC
Finn, Nathan – Lewis-Burke Associates LLC
Grisat, Michelle – National Nurses United
Harder, Josh – Lewis-Burke Associates LLC
Hernandez, Arielle – National Nurses United
Luckett, Mia - Lewis-Burke Associates LLC
McCabe, Karen – IEEE Standards Association
Mulberry, Karen – IEEE Standards Association
O'Neal, Brynne – National Nurses United
Saunders, Mary – American National Standards Institute
Webber, Naomi – Lewis-Burke Associates LLC

Wednesday, February 14, 2024

Call to Order – *Dr. Mehmood Khan, VCAT Chair*

Dr. Jackson, VCAT Vice Chair, called the meeting to order at 10:00 a.m. He began by acknowledging that this would be the last meeting for VCAT members Katharine Ku, George Fischer, and himself and thanked them for their dedicated service to the Committee. He then reviewed the meeting logistics and took roll call before turning the meeting over to Mr. Prager for the annual ethics briefing.

Annual Ethics Briefing - *Mr. Zachary Prager – Attorney in the Ethics Law and Programs Division, Office of the General Counsel, Department of Commerce (DOC)*

Mr. Prager provided the VCAT Members with their annual ethics briefing for the calendar year 2024, during which he reviewed changes in the interpretation of Federal Advisory Committee Act (FACA) regulations, conflict of interest rules, financial disclosure requirements, and restrictions regarding lobbying, political activities, gifts, and other issues.

For more information, see Mr. Prager's presentation.

Discussion. VCAT members discussed the following topics:

- Keeping track of days worked on VCAT and understanding representational limits as per the Hatch Act,
- Representation of a company to NIST or Department of Commerce (DOC) with intent to influence government action is prohibited, and
- Gifts between special government employees (SGEs) may have different restrictions than gifts from non-SGEs.

Election Results for VCAT Chair and Vice Chair – *Stephanie Shaw, Senior Project Manager, Program Coordination Office, and Designated Federal Officer, VCAT*

Ms. Shaw said nominations were received and confirmed the ballots were sent to all the current VCAT members and returned to Ms. Shaw. Ms. Shaw tallied the ballots and announced that beginning March 1, 2024, the new VCAT Chair will be Mr. Jason Matusow and the VCAT Vice Chair will be Dr. Mark Pierpoint for a term of two years.

SESSION I: NIST PROGRAMMATIC UPDATES

Agenda Review and NIST Updates – *Dr. Laurie Locascio, Under Secretary of Commerce for Standards and Technology and NIST Director*

After providing the agenda for the day, Dr. Locascio announced NIST leadership changes:

- Mr. Kevin Stine, Director of the Information Technology Laboratory (pending DOC approval),
- Ms. Bethany Loftin, Director of the Technology Partnerships Office (pending DOC approval), and
- Dr. Melissa Midzor, Acting Director of the Communication Technology Laboratory.

An executive team has been assembled to build the U.S. Artificial Intelligence Safety Institute (USAISI). Ms. Elizabeth Kelly will serve as the Executive Director and Ms. Elham Tabassi will serve as the Institute's Chief Technology Officer.

Dr. Locascio thanked Ms. Katharine Ku, Dr. Keoki Jackson, and Mr. George Fischer for their time, service, and participation with the VCAT, commenting on the invaluable expertise and recommendations they provided over the past six years.

Dr. Locascio explained that for the coming year, the three VCAT meetings will be split into two single-day virtual meetings and one two-day in-person meeting. All members are expected and strongly encouraged to attend all

three meetings, with all meeting dates through 2026 posted on the public VCAT website. Dr. Locascio encourages feedback on the new meeting format.

The format of the presentation covered three key areas of NIST programmatic updates:

1. Artificial Intelligence (AI)
2. CHIPS Preliminary Memorandum of Terms (PMT) Announcements
3. Selected NIST Highlights

1. Artificial Intelligence. A key AI challenge is the lack of adequate scientific underpinning and practical tools, technical standards, and test methods necessary to evaluate AI systems for safety, security, and bias. The President's Executive Order (E.O.) on Safe, Secure, and Trustworthy AI directs NIST to create guidance, develop evaluation and testing environments and tools, and engage with stakeholders and develop standards. NIST will engage with industry and relevant stakeholders to refine and develop guidance documents, including for use by synthetic nucleic acid sequence providers and further develop guidelines, tools, and practices to support agencies' implementation of minimum risk management practices. AI will be a top area of focus for NIST to ensure a stronger U.S. engagement in international standards.

As of this meeting, NIST is about a third of the way through the 270-day period for when the E.O. actions must be complete. In December 2023, NIST announced a Request for Information (RFI) seeking to gather input from the public related to E.O. work in critical areas, including the labeling of synthetic content. The comment period closed February 2, 2024, and NIST received feedback from over 200 organizations and private individuals. Dr. Locascio emphasized this RFI step is critical because the guidance, tools, and resources NIST develops are all voluntary. Also in December 2023, NIST released a draft of guidelines for evaluating differential privacy for public comment. The feedback received will be incorporated in a final report and be published in late 2024. NIST also hosted a secure software development framework workshop in January 2024. This workshop had 600 participants in attendance from across industry, academia, and government, with discussions being critical for the creation of a secure software development framework companion resource. Finally, the pre-release testing of NIST's Dioptra, an experimentation testbed, infrastructure for security evaluations of machine learning algorithms is almost complete.

Vice President Harris announced the creation of the NIST-led United States Artificial Intelligence Safety Institute (USAISI) in Fall 2023, with a mission centered on building the science, the policy, and the practice behind safe development and use of trustworthy AI. The institute will drive the fundamental research to provide the technical building blocks and improve the science of AI safety and guide the implementation of scientific findings. The institute will work with partners and allies, both domestically and abroad, through partnerships and scientific collaborations. Along with Ms. Tabassi and Ms. Kelly, Dr. Locascio acknowledged two long-term NIST staff members involved in this effort, Dr. Jake Taylor, who led the development of the AI Safety Institute Consortium (AISIC), and Ms. Kamie Roberts, who's been keeping NIST on task for E.O. deliverables.

An important part of the USAISI is the Consortium. Shortly after the institute was announced in November 2023, NIST put out a Federal Register Notice (FRN) asking for letters of interest in joining the AISIC, and over 600 were received from different organizations around the globe. DOC Secretary Gina M. Raimondo officially announced the launch of the consortium in February 2024, with an inaugural cohort of more than 200 member companies. Five working groups have been formed, including on generative AI, frontier AI red-teaming, capabilities evaluation, safety and security, and synthetic content authentication.

In January, NIST released the Adversarial Machine Learning Taxonomy and Terminology Report, which is an important step for establishing a common language for understanding threats and mitigation methods in the field of adversarial machine learning. The National AI Advisory Committee (NAIAC) hosted four public meetings since the last VCAT meeting in October 2023 and has published several reports, recommendations, and non-decisional documents to address AI literacy, existential risk, and implementation of the USAISI.

Dr. Locascio stated this will be an important year for the NIST AI program with the USAISI and consortium. NIST is focused on completing the E.O. deliverables on time, which will include a report on synthetic content, guidelines for red-teaming, generative AI companion resource, and an upcoming pilot program for test evaluations. NIST will work closely with partners of the AISIC to develop work plans for the groups' efforts. Member organizations will host workshops across the country in support of the five working groups' activities.

2. CHIPS Preliminary Memorandum of Terms (PMTs) Announcements. December 2023 marked timing of the first announcements of the PMTs, an initial agreement of terms between the Department of Commerce (DOC), NIST, and U.S. companies. The first PMT is with BAE Systems Electronic Systems, which will provide approximately $35 million in federal incentives for a project in Nashua, New Hampshire, with a goal to replace aging tools and quadruple production of CHIPS needed for F-35 fighter jet program and other critical defense programs.

In January 2024, Dr. Locascio announced a nonbinding PMT with Microchip Technology Inc. to provide $162 million in federal incentives to onshore their semiconductor supply chain. These funds will be used to modernize and expand facilities in Colorado Springs, Colorado, and Gresham, Oregon, will create over 700 direct construction and manufacturing jobs, and nearly triple the output of semiconductors produced at these sites, which are critical to America's automotive, commercial, industrial, defense, and aerospace industries. More PMT announcements will be forthcoming.

3. Selected NIST Highlights.

Creating Trust in Digital Technologies. This year is going to be eventful for NIST's work in digital technologies with several major releases and updates planned for NIST cybersecurity and cryptography work. In February 2024, NIST will release the Cybersecurity Framework 2.0, which completes the first major update to the Cybersecurity Framework since it was released in 2014. NIST also anticipates the first set of final versions of the federal information processing standards for post-quantum cryptography to be released in Summer 2024. The goal of the standards is to resist future attacks by quantum computers that will threaten the security of the current standards. A memorandum of understanding between NIST Manufacturing Extension Partnership (MEP) and Manufacturing USA's Manufacturing X Digital Institute kicked off and will be a five-year collaboration to assist small- and medium-sized manufacturers with technology adoption in sensor technologies, cybersecurity, supply chain optimization, and workforce development. In December 2023, NIST held a forum to discuss progress on the development of cybersecurity requirements for consumer-grade routers, which was tasked by the White House in July 2023. The forum was attended by more than 25 organizations, and stakeholders discussed a preliminary draft of Internet of Things (IoT) cybersecurity profile for consumer-grade routers and product component requirements with NIST.

Advanced Communications. The Biden administration issued an E.O. in November 2023 to implement the National Spectrum Strategy. The NIST Communications Technology Laboratory is collaborating with the National Telecommunications and Information Agency (NTIA), to identify areas of collaboration to execute the actions identified in the strategy. In Fall 2023, NIST released the NextG wireless gaps analysis which identified crucial technology and research opportunities in wireless communications. NIST will build on the 2023 Wireless Gaps report and complete five strategic roadmaps to guide future advanced communication research, standards development, and technology efforts. NIST has also laid the groundwork for future ultra-precise timing links to geosynchronous satellites. Finally, NIST researchers published two *Nature* articles, one on a groundbreaking approach that combined the accuracy of frequency combs with quantum-limited sensitivity, and another on a demonstration of optical time transfer of 10,000 times higher performance than traditional microwave techniques. These new techniques will pave the way for space-based global clock networks.

Biotechnology. Four NIST employees—Dr. Greg Cooksey, Dr. Mathew DiSalvo, Dr. Anthony Kearsley, and Dr. Paul Patrone—received the DOC Ron Brown Excellence in Innovation Award for their invention of serial cytometry. This team's efforts have enabled potential significant improvements in detecting rare circulating tumor cells and, for the first time, provided real-time measurements of cellular functions. Additionally, NIST and the FDA led a joint workshop on regenerative medicine, focused on gene delivery systems, genome editing, and flow cytometry, in November 2023.

Climate. NIST's multidisciplinary research continues to address climate measurements in impactful ways. In a project led by the Engineering Laboratory (EL), NIST published the first-ever engineering-derived tornado wind speed maps for the contiguous United States, implementing a recommendation of the National Construction Safety Team (NCST) investigation of the 2011 Joplin, Missouri, tornado devastation. Provisions for tornado-resistant design have also been incorporated into the 2024

International Building Code, providing the first-ever protections for conventional buildings against tornadic winds. NIST also moved the frequency comb technology from controlled laboratory conditions to the harsh conditions of the real world and used a fieldable robust frequency comb to measure methane emissions from agriculture, resulting in enhanced gas emission data that informs policy decisions.

Contaminants of Concern. NIST sent a report to Congress on Per- and Polyfluorinated Substances (PFAS) in firefighter gear exposed to wear and tear. The study showed that stressing the gear through abrasion, weathering, and heat caused measured PFAS concentrations to increase in the outer shell materials, providing previously unavailable data that toxicologists, epidemiologists, and other health experts can use to assess the risk to firefighter health. Last month, NIST co-authored the National Emerging Contaminants Research Initiative (NECRI) Implementation Plan to provide Congress a step-by-step strategy for maintaining clean and safe drinking water for the American public.

NCNR Update. Dr. Locascio gave an update on the NIST Center for Neutron Research (NCNR) which was unexpectedly shut down in February 2021, and despite extensive cleanup efforts, some fissionable material remains near the reactor core. A plan has been developed to clean the reactor internals further by conducting underwater power washing during the summer and fall of 2024, followed by conducting reactor operations post-cleaning. Care is being taken to ensure operations not only resume in a timely manner, but also resume safely. Additionally, three neutron guides are planned to be replaced in 2024 which will improve performance of nine instruments from 1.5 to 10 times current levels. Additionally, a workshop was held in October 2023 entitled "Neutrons for the Future," in which over 200 scientists from across the country participated, with a final report currently in preparation.

*Select Public Engagements***.** NIST has awarded nearly $3 million to 15 small businesses in nine states under the Small Business Innovation Research (SBIR) program, which will fund research and development as well as commercialization projects to support a variety of technology-based programs such as advancement in semiconductors, drug development, and flexible electronics manufacturing. NIST has also made eight awards totaling $1.1 million to support standards education in undergraduate and graduate curricula. Since this began in 2012, NIST received over 255 applications to support standards curricula, and 54 awards have been made totaling $4.3 million. Finally, the Baldrige Performance Excellence program is transforming the award process to recognize national role models of resilience and long-term success. Baldrige Reimagined will be starting in 2024.

NIST Community. In the interest of preserving teleworking flexibilities and maximizing in-person interactions, last month NIST began implementation of updated telework guidance to clarify telework and remote work guidance across the Institute. Key to this guidance is the establishment of "Community Days" on Tuesdays and Thursdays. All employees are encouraged to work with their supervisors and managers to increase meaningful in-person work on these days by scheduling meetings, events, and activities. NIST has also clarified employee eligibility for two or four days of telework per week based on position duties with provided guidance for supervisors and employees to consider when they are determining their telework agreements. Fully remote work applicability has also been addressed and is recognized as a strategic management tool to recruit and retain a highly qualified and diverse workforce.

For more information, see Dr. Locascio's presentation.

Discussion. The group discussed the following topics:

- Utilizing the Risk Management Frameworks to address dependency and risks of software,
- Consideration of RAND to partner with NIST on AI technical matters,
- Consideration to have NIST connect with Lloyd's Register Foundation and Gallup to gather info about public view of AI safety,
- Federal-wide, Department of Commerce, and individual institution guidelines for telework,
- Executive Order taskings placing demands on staff, especially those dealing with allocations,
- Plans for NIST to be part of the National Spectrum Strategy Implementation Plan that NTIA is working on,
- Difference between near-term AI milestones and E.O. milestones,
- Long-term reach of the USAISI Consortium,
- Role NIST will play in its outreach to other countries' AI safety institutes,

- Capacity to be at the forefront of AI incident response as things happen,
- Communicating initiative updates to the public on how VCAT supports public-private partnerships,
- Ability of NIST to execute requirements during a Continuing Resolution (CR),
- Having hiring authorities is critical, especially for CETs,
- Bringing people together to answer problems on the pre-competitive research space strengthens NIST's position in the international standards arena,
- Effort to have small companies, entrepreneurs, and universities of all sizes to be more engaged within CHIPS R&D, and
- Lessons learned from the cybersecurity E.O. that can be applied to the AI E.O.

Safety Update - *Dr. Elizabeth Mackey, Chief Safety Officer and Director of Office of Safety, Health, and Environment (OSHE)*

Dr. Mackey gave an overview of five key safety areas: management review and 2024 goals, incident and near-miss data, leading indicator safety metrics, status of action plans, and status of safety management system (SMS).

Three Executive Safety Committee (ESC) meetings were held last quarter looking at safety metrics. In October 2023, ESC Part 1 covered a review of action plans, incident investigation, external assessment, safety culture survey, and developing a safety culture improvement plan. In November 2023, ESC Part 2 covered the safety management system status, directives that codified the safety management system, training data, incidents, and corrective action data. In December 2023, ESC Part 3 examined inspection deficiencies, communications data, and the draft goals and actions, which were finalized during the meeting.

Four 2024 goals have been posted on the ESC website and will be communicated in the quarterly Safety Standards newsletter:

1. Have a complete and fully functional SMS,
2. Improve NIST safety culture,
3. Strengthen OSHE roles and responsibilities, and
4. Performance metric goals, access to those data, and complete build of safety dashboard for managers.

In the first quarter (Q1), there have been 37 reported cases spread among injuries, illnesses, near-misses, property damage, spill release, and exposure. NIST is on track, in terms of number of events, to pre-COVID levels, which typically total 150 to 175 events per year. More near-miss reports have come in since the Q1 data were compiled, but overall, the numbers are low and there will be a campaign to ensure people are comfortable and do report all near misses, allowing NIST to be proactive. A key focus moving forward will be an analysis of potentially serious incidents and looking at common root causes. There were three OSHA recordable cases which were slips, trips, and falls, ten illness cases that were nearly all related to COVID, and four hearing loss cases in Q1.

NIST is typically below industry averages for recordable cases. In 2022, NIST's recordable cases were heavily influenced by COVID cases. In 2022, the most recent set of data, the total recordable cases (TRC) and days away, restrict, or transferred (DART) numbers were higher than the industry sector, however much of this was heavily influenced by reported COVID cases, in which NIST is very diligent about reporting.

The leading indicators from the January 2024 data covered four areas: training completion, hazard reviews, inspections performed, and incident-related corrective action status. New leaders are required to take NIST leadership safety training, and in FY 2024, a new Safety Rules of Behavior now goes out to all staff, employees, and associates, requiring attestation of its review. In hazard reviews, the MML database, which is used by the Laboratories at NIST, has 2,901 activities approved in the system along with their risk distribution, with more than half falling within the moderate risk category. Additionally, there were 922 inspections performed in Q1. A little over 1,000 deficiencies found were abated in the first quarter and there are 231 still outstanding. Finally, there were 22 incident-related corrective actions taken in Q1 and 15 of those were closed. Of the over 3,000 corrective actions, 65 are still not abated. On a percentage basis, NIST is doing quite well. About 50 of the 65 still open are facility fixes, which take a longer time to implement.

The key items associated with the safety commission are in five key areas: leadership commitment, strengthening

OSHE roles and authorities, SMS improvements, safety culture, and achieving and sustaining excellence. In leadership commitment, resources have been allocated to complete fall hazards, ensuring NIST's safety management system is externally audited, and an ongoing drumbeat of communication from leaders to help change the safety culture. OSHE will also take a stronger role in hazard abatement, leading incident inspections, and reviewing and participating in hazard reviews. To accomplish this, a new employee was embedded at the NCNR and three new inspectors were hired. An offer has also been made for an employee to be embedded at the Physical Measurement Laboratory (PML) JILA lab at the Boulder campus, with more to come. In safety culture, external consultants for safety leadership held impactful sessions with all NIST supervisors on safety leadership. In achieving and sustaining excellence, external contractors are developing an ISO 45001 precertification audit.

The National Safety Council Safety Barometer Survey was held about a year ago to gather data for the safety culture improvement plan. The overall score for NIST was in the 70th percentile in comparison to peers, however there were some low-scoring items on the survey results, necessitating action. One low-scoring item was medical resources being sufficient for treating people, in which actions were already taken to correct.

Regarding the status of NIST's SMS, six programs have yet to be rolled out and fifty-three are completed. Three of those remaining six programs will be developed by safety consultants, including the build out of an audit and assessment program, a contractor safety program, and a construction safety program, and the other three programs are in various draft stages.

Dr. Mackey said OSHE continues to work hard to improve the culture, with great leadership engagement. There is a strong focus on integration of safety into how NIST does business, and there is continuous improvement being made with workplace inspections, bringing in external consultants, and benchmarking data.

For more information, see Dr. Mackey's presentation.

Discussion. The group discussed the following topics:

- Working with European Union (EU) and global industry on health and human safety programs,
- Safety risks as a direct consequence of lack of maintenance and renovation funding,
- VCAT report should mention NIST is delinquent regarding maintenance and facilities,
- Need to develop communications, campaigns, and events to instill trust and confidence in staff,
- Present budget needs to prioritize safety to ensure OSHE is supported by top leadership and has resources necessary to make safety changes,
- Have periodic refreshers and a required annual certification included for training classes,
- Dissemination of a newsletter with progress made, published metrics, and best practices,
- Potentially having staff volunteers for medical or chemical emergencies to respond before first responders can arrive,
- Access cards to permit access to potentially hazardous equipment only to staff that has completed proper training,
- Digital badges for employees to display to show what training they have completed, and
- Clarifying between facilities challenges and safety issues in VCAT annual report.

SESSION II: NIST PROGRAMMATIC AND OPERATIONAL UPDATES

DEIA Update – *Ms. Janelle Johnson, NIST Diversity Equity and Inclusivity Office (DEIO) Director*

Ms. Johnson stated three key areas for culture improvement:

1. Enhancing the organizational culture to reflect the central tenets of diversity, equity, inclusion, and accessibility (DEIA),
2. Implementing enterprise-wide DEIA principles to define organizational and individual behaviors required to successfully lead and sustain DEIA, and
3. Ensuring consistent communication about DEIO actions across the enterprise.

A DEIA strategic plan was developed prior to Ms. Johnson's arrival at NIST and to date 53 percent of the actions

are now complete. Ms. Johnson restructured the DEIO infrastructure and other partnering groups by reducing the implementation teams from four teams to one team, renaming the DEIA Council as the "DEIA Community of Practice, and preparing to launch the DEIA Executive Council in the third quarter of FY 2024. Ms. Johnson also visited labs, participated in organizational unit (OU) office discussions, conducted listening sessions, and conducted site visits at the Boulder and Charleston campuses to assess DEIA organizational maturity. The Office of Personnel Management (OPM), per White House guidance, released a federal-wide DEIA maturity model for agencies to measure their efforts against. The model consists of three levels: level 1 - foundational capacity, level 2 – advancing outcomes, and level 3 – leading and sustaining. NIST is currently at the beginning of level 2 – advancing outcomes.

Ms. Johnson is continuing to have discussions across the agency on how to integrate DEIA into workplace practices and policies to ensure sustainability. Building on the discussions, Ms. Johnson partnered closely with the strategic recruitment program manager to ensure diverse methods are being employed to enhance talent acquisition. Increased visibility of voluntary employment organizations (VEOs)/employee resource groups (ERGs) to NIST leadership is another area of focus, which is critical to fostering employee engagement.

The DEIO also hosted a Fireside Chat in January with Ms. Willie Pearl Mackey King, Dr. Martin Luther King Jr.'s personal secretary to foster further DEIA reflections. Ms. King transcribed Dr. King's famous Birmingham letter from scraps of paper while he was jailed. This event gave attendees the opportunity to reflect both on history and our trajectory forward and why it is vitally important to keep Dr. King's dream alive to have a fully diverse and inclusive workforce in the Nation, including at NIST.

Ms. Johnson also will be conducting enterprise-wide facilitated discussions with a spotlight on DEIA topics such as multi-generational diversity, microaggressions/unconscious biases and the impacts on the organization, and psychological safety versus trust. The DEIO will continue to host cultural observance events in partnership with VEOs/ERGs. A federal-wide DEIA Principles, DEIA Competency Model, and the DEIA Strategic Plan will be implemented by the fourth quarter of FY 2024. Ms. Johnson said with these efforts going forward and staff working together, NIST could have the greatest workplace culture across the federal landscape.

For more information, see Ms. Johnson's presentation.

Discussion. The group discussed the following topics:

- Analysis on software NIST employees rely on for day-to-day operation and accessibility,
- Reducing/streamlining implementation teams from four to one for efficient decision-making capabilities,
- External pressures and efforts to eliminate DEIA efforts and impact on NIST DEIA efforts,
- Expanding focus of the definition of diversity,
- Defining key metrics being tracked for first phase of the strategic plan,
- Suggestions on how VCAT members can help in DEIA activities,
- Inclusion of the international community of scientists at NIST in DEIA efforts, and
- Improving and communicating the national impact the DEIA work NIST is doing across programs like Manufacturing Extension Partnership (MEP), Manufacturing USA, and implementation of the CHIPS and Science Act.

CHIPS R&D Updates - *Dr. Eric Lin, Deputy Director, CHIPS R&D Office*

Dr. Lin stated that the CHIPS R&D Office takes DEI principles quite seriously across CHIPS for America, and the work is supported by Ms. Kylie Patterson, the Director of Opportunity and Inclusion within CHIPS. There are resources on the chips.gov website that show DEI-related approaches for CHIPS for America.

CHIPS for America has two major programs, $39 billion for incentives and $11 billion for R&D, with additional incentives from other agencies including the Department of Defense (DoD), State Department, National Science Foundation (NSF), Department of Treasury, and the Department of Energy (DOE). All of this is underpinned with workforce initiatives to create jobs and invest into people to move foundational technology into the future.

The top three goals for the R&D program are U.S. technology leadership, accelerating ideas to market, and a robust semiconductor workforce.

There are four major CHIPS R&D programs: Metrology, the National Semiconductor Technology Center (NSTC), the National Advanced Packaging Manufacturing Program (NAPMP), and the Manufacturing USA Institute. Each of these programs are underpinned with workforce initiatives that work across the different programs. The NSTC has been stood up and both the NAPMP and Manufacturing USA Institutes have named specific topics to get started. The Metrology Program has made significant investments, nearly $100 million, into a range of different programs around Grand Challenges. Each of the projects has an industry partner that will coalesce into communities of practice. There are follow-on activities from the standards summit that have been identified by stakeholder groups, such as standards for digital twins and a chiplet ecosystem. The NSTC Consortium Agreement was signed by the Natcast CEO, Dierdre Hanford, along with the Secretaries of Commerce, Energy, Defense, and the NSF Director. Natcast is the public-private partner designed to run the NSTC.

The Historically Black College and Universities (HBCU) CHIPS network kicked off at the Department of Commerce, with keynotes from Department of Commerce Secretary Gina M. Raimondo, Director of the Domestic Policy Council (DPC) Ms. Neera Tanden, Director of the Office of Science and Technology Policy (OSTP) Dr. Arati Prabhakar, and NIST Director Dr. Laurie Locascio. A webinar was held in mid-January about specific projects in CHIPS metrology. In November 2023, there was a vision for the NAPMP as well as a comprehensive semiconductor workforce vision that covered all of CHIPS for America. In February 2024, there was an Industry Day for the Manufacturing USA Institute on the topic of digital twins.

The NAPMP will drive U.S. leadership in advanced packaging and provide the technology needed for packaging manufacturing in the United States. The program will develop critical and relevant innovations for advanced packaging technologies and accelerate their scaled transition to the U.S. manufacturing entities. This will establish a vibrant onshore packaging industry where advanced node chips are manufactured and packaged in the United States. Integrated solutions will provide the ability to be commercialized here in the United States, and $3 billion will be invested in this enterprise. The first Notice of Funding Opportunity (NOFO) on materials and substrates will come later in Spring 2024 around the $300 million range.

Legislation authorized up to three Manufacturing USA Institutes on semiconductors to be added to the larger Manufacturing USA network. A decision was made to establish one institute with the potential for a significant impact on the main semiconductor manufacturing, and the selected topic was digital twins, which will align well with the other three programs. It is expected to have a minimum commitment of $200 million over five years. The vision of the Digital Twin Institute is to enable seamless integration of digital twin models into the U.S. semiconductor manufacturing, advanced packaging, and assembly industries. The mission of the institute is to foster a collaborative environment with the domestic semiconductor industry, enabled by the world's first shared semiconductor digital twin process validation facility, industry-relevant research projects, and digital twin-supported workforce training.

The Digital Twin Institute objectives are to:

- Reduce the time and cost for chip development and manufacturing,
- Accelerate the adoption of semiconductor manufacturing innovations,
- Increase access to semiconductor manufacturing training through adoption of tools, and
- Expand access to digital twin tools, solutions, and framework.

The Digital Twin Institute will provide a physical facility and a digital framework that is integrated with industry-led research programs, which could create a significant advantage for where the industry can go in the future.

For more information, see Dr. Lin's presentation.

Discussion. The group discussed the following topics:

- Biggest risks or obstacles in achieving the goals set out for the programs,
- Interagency coordination and what is needed from other parts of the federal government,
- Navigating within a complex IP landscape in semiconductors and packaging,
- Efforts in hiring experienced staff to come on board and meet the technical needs,
- Establishing a process to ensure national interests are preserved and managing conflicts of interest,
- Keeping the leadership chain vibrant going forward,

- Using AI-supporting tools for optimization in the design space, and

- Funding pace and expectations for the CHIPS R&D and CHIPS Manufacturing Incentives Program.

SESSION III: SUBCOMMITTEE RECOMMENDATIONS TO VCAT

Subcommittee on U.S. International Standards Development Activity – *Mr. Jason Matusow, Subcommittee Chair, and Dr. Jayne Morrow, NIST Senior Advisor for Standards Policy*

Mr. Matusow said in April 2023 he was asked to chair a subcommittee on U.S. International Standards Development Activity, and, in May 2023, the White House announced the United States Government National Standards Strategy for Critical and Emerging Technologies (USG NSSCET), with NIST being tasked with its implementation. In September 2023, NIST released an RFI, which closed December 22, 2023. Dr. Locascio charged the Subcommittee with three specific objectives:

1. Barriers to U.S. participation in standards development activities,
2. Opportunities to increase professional CET sectors engaged in standards development activity, and
3. Opportunities for NIST to work effectively with private-sector stakeholders to foster greater U.S. investment in pre-standardization research for standards development activity.

The Subcommittee held eight to ten listening sessions with visiting experts over a six-month period. The experts each wrote independent submissions based on their experience and what was heard in the listening sessions, and then Mr. Matusow created a draft report for VCAT's consideration. The Subcommittee and visiting experts represented standards development organizations (SDOs), industry, academic institutions, and think tanks.

One note of concern woven throughout the feedback was that the U.S. has an industry-led, voluntary, rules-based system, and the industry-led point was a key element that was highlighted. The American National Standards Institute (ANSI)-published standards strategy still exists, and the USG NSSCET needs to coexist with it. The relationship to consortia has not been identified in the USG NSSCET, and more engagement is needed from consortium communities related to NIST. Another area of concern is that there is no mention of open-source software in the standardization approach, which should be included in the implementation process.

Three challenges to broader U.S. standards organization engagement are the barriers for small- and medium-sized enterprises to participate due to costs, travel logistics and visa challenges to get experts from other countries to participate at the meetings hosted in the United States, and the need for long-term engagement and education of the executives who are responsible for supporting standardization.

There is an entire class of pre-standardization work that can be emphasized and highlighted. An example is the collection of collaborative efforts of the USAISI and the AISIC that will be formulated. This is one forum for collaboration with NIST to produce materials that can be moved to standardization bodies.

Measurement science is NIST's core capability and is looked at by industry, academia, civil society, and the community. In workforce development, there are varying levels of participants in the standardization context, from executives to the experts who are going to the meetings. There is a need for the recognition and support of those doing the standardization work, highlighting that work as value by all participants in the system.

The final report focuses on four areas, coordination, engagement, capacity, and innovation, and was reviewed, discussed, and approved by the full group of VCAT members prior to this presentation. The report contains 37 total recommendations, which represent the information the Subcommittee deduced from discussions for NIST to consider and to determine next steps.

Dr. Morrow then provided an update on the USG NSSCET implementation. NIST hosted 10 listening sessions around the United State. There were also 100 stakeholder engagements which were opportunities to share the Strategy as well as bolster awareness and support. A survey of the Interagency Committee on Standards Policy (ICSP) was helpful in shaping the unique challenges to implementing the Strategy.

NIST received over 105 submissions from the RFI, with 70 submissions that were highly relevant, resulting in 785 specific themes and topics that NIST is now tracking. Dr. Morrow said the U.S. government should continue to be an active stakeholder in the standards process, and NIST has unique contributions that can be better

utilized and supportive to standards development activities, which will require additional coordination. It is important to hear from a broad swath of civil society and better support them to understand how to remove barriers to their participation and in emerging technology fields that will have an enormous impact on society. A better understanding on how research and development dollars can be utilized to support standards efforts and increase engagements is also needed.

Dr. Morrow said access to standards development activities, standards development tables, and standards have encountered barriers for engaging and utilizing standards in day-to-day activities. Additionally, NIST is learning ways to engage with academic research organizations in a way that is most beneficial for them and standards development activities.

Dr. Morrow said next steps are for NIST staff and leadership to take the Subcommittee's recommendations under advisement, map efforts forward with the interagency, share an update with the VCAT on a response to the recommendations, draft an implementation plan for public feedback, and then launch the implementation plan.

For more information, see Mr. Matusow and Dr. Morrow's presentation.

Discussion. The group discussed the following topics:

- Greatest areas of concern out of the 37 total recommendations,
- Barriers to participation are logistical and cost challenges,
- Possibility of convergence of various critical and emerging technologies,
- Different technologies possibly being at different levels of readiness for standardization and uniqueness of technologies may require customization depending on need,
- Concern about other nations taking advantage of the existing landscape,
- National security concerns reflected in the report,
- The role of the State Department as it represents the United States in the International Telecommunications Union and has a role regarding visas for the participation of standards experts in hundreds of other standards organizations, and
- Areas where NIST can investigate whether federal or industry avenues need to be strengthened.

SESSION IV: WORKING SESSION

Review and Discuss Recommendations for VCAT Annual Report – *Dr. Keoki Jackson, Vice Chair, VCAT*

Ms. Shaw provided the logistics of the annual report. The report needs to go to Congress 30 days after the FY 2025 President's Budget Release, which is tentatively set for March 11. After the discussion of the report, any final edits or changes can be done through email. Some topics were broken into a few key areas: deeper exploration of NIST's role in critical and emerging technologies, U.S. leadership in international standards, strengthening U.S. manufacturing leadership, expanding and strengthening NIST safety culture, cultivating workforce culture of belonging through DEIA, and NIST budget.

Discussion. The group discussed the following topics:

- Use of boldface font in the report to emphasize the need of funds for repair, maintenance, and upgrade of NIST facilities,
- Changing format of the report to include heavy-hitting comments in first paragraph for impact,
- Simplifying technical language of the report for the public and Congress,
- Emphasizing that Congressional action is need for funding NIST's core mission,
- Avoiding misrepresentation that previous funding was not sufficient as there were some successes made in the past year,
- First sentence of the report should be an attention-getter and call to action,
- Investment in facilities as a critical issue and needed to maintain, retain, and grow U.S. ability to compete,
- Conveying the message that business-as-usual is no longer sufficient,
- For CHIPS and Science Act to move faster, NIST needs more people coming on board quicker,
- Report is strictly from VCAT to Congress through the Secretary of Commerce,

- Highlighting the need for enhanced and increased staffing authorities in addition to resources,
- Including in tone of the report who is going to take credit and benefit from amazing work NIST is doing,
- Being sensitive in making sure to recognize the exceptional work NIST does despite constraints,
- Objective of the report being to get the resources and support NIST needs,
- Emphasizing value and importance of an immediate response and the long-term value on the taskings under the Executive Orders,
- Diversity and inclusion message needing to be highlighted more in the report, including work within the CHIPS and Science Act implementation,
- Emphasis of the importance and value of core mission elements,
- Distinguishing between White House Executive orders and Congressional legislation early in the report,
- Changing language to highlight quality of opportunity of attracting and retaining the best workforce at NIST to achieve success for the nation as a whole,
- Mentioning essentiality of NIST for U.S. economy, for government services, and high-profile issues,
- Use of the phrase "the VCAT believes" throughout report because it clarifies it is VCAT speaking to issues and not NIST, and
- Forming a small VCAT drafting sub-team to work online collaboratively to make final report edits.

Working Session Wrap-up and Annual Report Next Steps

There were no public comments. In closing for the day, Mr. Matusow stated that the annual report will be finalized via email. Dr. Jackson, Mr. Matusow, and Dr. Locascio thanked all the participants, invited guest speakers, and NIST staff. A special thanks was given to Dr. Jackson, Ms. Ku, and Mr. Fischer for their dedicated service, expertise, and participation in the VCAT over the last six years.

Adjournment

The meeting was adjourned at 4:44 PM.

I hereby certify that to the best of my knowledge; the forgoing minutes are accurate and complete.

Ms. Stephanie Shaw, Designated Federal Officer, NIST Visiting Committee on Advanced Technology
Mr. Jason Matusow, Chair, NIST Visiting Committee on Advanced Technology