VISITING COMMITTEE ON ADVANCED TECHNOLOGY (VCAT or Committee)
MINUTES OF THE TUESDAY, OCTOBER 25, 2022
WEBINAR MEETING

ATTENDANCE:

Visiting Committee Members Attending
Cerf, Vinton
Fischer, George
Jackson, Keoki
Johnson, Anthony M.
Kaler, Eric
Khan, Mehmood
Ku, Katharine
Matusow, Jason
Parker, Michelle
Vasko, David (Dave)
Wasserman, Gail

Designated Federal Officer
Shaw, Stephanie

NIST Leadership Board
Bahar, Mojdeh
Boehm, Jason
Brockett, Del
Brown, Essex
Chin, Joannie
Dimeo, Robert (Rob)
Dowell, Marla
Evans, Heather
Fangmeyer, Robert
Hooker, Stephanie
Jenkins, George E.
Kushmerick, James
Locascio, Laurie
Mackey, Elizabeth (Liz)
Molnar, Mike
Olthoff, James K.
Pritchett, Jeanita
Raghavan, Pravina
Romine, Charles (Chuck)
Sastry, Chandan
Wixon, Henry

NIST Staff
Adams, James
Babakhanova, Greta
Balachandra, Anita
Banovic, Stephen
Beers, Kathryn
Bittman, John
Bobb, Beverly
Boeckl, Kaitlin (Katie)
Boggs-Russell, Ashley
Boisvert, Ron
Brunner, Zahraha (Zara)
Carnahan, Lisa
Dohne, Kirk
Fasolka, Mike
Fato, Hope
Fetsko, Melissa
Folk, Alex
Forster, Amanda
Fraser, Jerry
Gayle, Frank
Gendron, Cheryl
Gloster, Gerald (Jerry)
Greer, Chris
Griffith, David
Gundlach, David
Hahn, Carina
Hardis, Jonathan
Hickernell, Robert (Bob)
Hildebrand, Jacqueline
Hoehler, Matthew
Hudson, Monica
Huergo, Jennifer
Ivy, Nahla
Jones, Christina
Jones, John Paul
Kauffman, Leah
Keys, Mirta-Marie
Kirby, Brian
Kramar, John
Lavik, Erin
Lin, Eric
Madhavan, Rajmohan
Mayton, Heather
McIntyre, Kevin
Meritis, Dimitrios
Midzor, Melissa
Morrow, Jayne
Nadal, Maria
Neumann, Dan
Newton, Thomas
Ng, Lisa
Orji, Ndubuisi (George)
Porch, Susanne
Press, Rich
Ramotowski, Robert
Reidy, Kari
Rudnitsky, Robert
Sberegaeva, Anna
Schmidt, Michael
Schufreider, Jim
Seiler, David (Dave)
Sharpless, Kathy
Shyam-Sunder, Sivaraj
Singerman, Phillip
St. Pierre, James (Jim)
Stine, Kevin
Sullivan, Suzanne
Szuchyt, April
Teske, Michael
Varadi, Laslo
Wasil, Charles
Wavering, Al
Whetstone, James
Wilkinson, Richard

Others
Baize, Rosemary – NASA Fellow, Subcommittee on Space and Science Senate Commerce, Science, and Transportation Committee, Democratic Staff
Brickell, Missye – Intel Corporation
Brinkman, Mary - US House Committee on Science, Space, and Technology
Callahan, Rebecca - Professional Staff - Research and Technology Subcommittee Committee on Science, Space, and Technology
Cohen, Rachel - GuidePost Strategies, LLC
Eller, Jeff - Eller Group
Klose, Christopher - The Meagher Group
Luckett, Mia - Lewis-Burke Associates LLC
Meagher, Mary - The Meagher Group
Merzbacher,Celia – Quantum Economic Development Consortium, SRI International
Pellish, Jonny – US House Committee on Science, Space, and Technology
Nicholas, Kathleen – Holland & Knight LLP
Rutledge, Elisabeth - Eller Group

Thomas, William - Science Policy News American Institute of Physics
Viggiani, Nick – Global Foundries
Webber, Naomi - Lewis-Burke Associates LLC

Tuesday, October 25, 2022

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

Dr. Khan called the meeting to order at 10:00 a.m., reviewed the meeting logistics, and took roll call. Dr. Khan welcomed a new member to the VCAT, Mr. Jason Matusow, and thanked Dr. Gail Folena-Wasserman and Mr. David Vasko for their contributions to NIST. Dr. Khan expressed condolences to Dr. Locascio and the NIST community on the recent safety incident tragedy and then turned the meeting over to Dr. Locascio.

SESSION I: SPECIAL SESSION

NIST Update on Safety Incident – *Dr. Laurie Locascio, Under Secretary of Commerce for Standards and Technology and NIST Director*

Dr. Locascio gave an update on a workplace incident that happened September 26, 2022 on the Gaithersburg campus. The accident resulted in the death of a NIST employee.

Out of respect for the family, the name is being withheld at this time, but they were a federal employee working at NIST for 10 years. The employee fell from an elevated height when part of that structure collapsed underneath him/her. NIST is providing support to the family to ensure they receive all benefits to which they are entitled.

Dr. Locascio immediately established an incident response team led by NIST Associate Director for Laboratory Programs, Dr. Olthoff. The accident is being investigated by OSHA (Occupational Safety and Health Administration) and the NIST Office of Safety, Health, and Environmental (OSHE) is conducting a root-cause analysis to determine the cause of the accident as well as recommend corrective actions. In the aftermath of the tragedy, Dr. Locascio has called for a safety standdown and instructed laboratory, shops, maintenance and office workers to closely examining their environments for potential hazards. Dr. Locascio announced her intent to establish a new Federal Advisory Committee, the NIST Safety Commission, to assess the state of NIST safety culture.

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

Discussion. The group discussed NIST's plans in response to the tragedy, including:

- Safety practices are being examined at the NIST campuses,
- Ways for NIST staff to support the family of deceased NIST employee,
- Anonymous reporting mechanisms for employees to report safety concerns,
- Town halls with OUs (operational units) to promote communication about industrial safety best practices, and
- Near-miss reporting is currently kept track of and examined for any root causes.

SESSION II: PROGRAMMATIC AND OPERATIONAL UPDATES

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

Dr. Locascio welcomed the newest VCAT member, Mr. Jason Matusow, and she acknowledged and thanked outgoing VCAT members, Dr. Gail Folena-Wasserman and Mr. David Vasko, for their contributions, time, and experience. She continued with a brief overview of some future events at NIST and program highlights.

With respect to leadership changes, Dr. Locascio stated Dr. Heather Evans is serving as acting Director of the Program Coordination Office and Dr. Jason Boehm is the NIST Chief of Staff. Dr. Eric Lin is now serving as

Interim CHIPS Research and Development Program Director, stepping away from his position of Director of the Material Measurement Laboratory (MML). In his absence, Dr. Stephanie Hooker is serving as acting Director of MML.

She then shared recent updates from her five priority areas for NIST:

1. *Manufacturing Leadership*
2. *Critical and Emerging Technologies Leadership*
3. *Standards Leadership*
4. *Mission Delivery Enhancement*
5. *NIST Community*

1. *Manufacturing Leadership*. Signed into law on August 9, 2022, the CHIPS and Science Act of 2022 provides $50 billion over 5 years to DOC (Department of Commerce) and NIST to implement programs, which includes $39 billion aimed at increasing domestic semiconductor capacity and $11 billion in research and development. The Semiconductor Industry Association predicts 280,000 new jobs as a result of this investment, and NIST will be managing the programs with direct engagement with Secretary Raimondo. The NIST for the Future Act is a piece of this legislation.

The Manufacturing Extension Partnership (MEP) National Network is developing a strategic plan and under a new organizational structure is seeking nominations for the MEP Advisory Board. The Administration's Executive Order (EO) 14005 directs Federal agencies to work with the MEP National Network, and the new strategy will emphasize solving issues associated with supply chain, workforce development, and technology adoption. MEP will build greater partnerships with OEMs (Original Equipment Manufacturers) to enhance the supplier ecosystem for U.S. manufacturers.

The NIIMBL (National Institute for Innovation in Manufacturing Biopharmaceuticals) annual report was released in July, and as a NIST-led Manufacturing USA Institute, NIIMBL continues to be an exemplar. The Biomanufacturing Readiness Levels Framework developed by NIIMBL lays the groundwork for a universal assessment of technology maturing and readiness levels for commercial biomanufacturing technology adoption. The NIST Office of Advanced Manufacturing hosted a Manufacturing USA exhibit at the International Manufacturing Technology Show, including representatives from nine of the Manufacturing Innovation Institutes.

2. *Critical and Emerging Technologies Leadership*. NIST priorities in this category include biotechnology, artificial intelligence (AI), cybersecurity and privacy, energy technologies, advanced communications, and quantum information science and technology.

- Artificial Intelligence: NIST is in the process of developing a voluntary AI Risk Management Framework which will protect individual rights and guide AI development and use. NIST is on track to release the AI Risk Management Framework in January 2023.

- Biotechnology: President Biden issued an EO on September 12, 2022, on Advancing Biotechnology and Biomanufacturing Innovation for a Sustainable, Safe, and Secure American Economy. The EO directs NIST in partnership with stakeholders to create and make publicly available lexicon to assist in the development of measurements to support the bioeconomy, as well as take steps to improve the nation's cybersecurity for biological data. In other news, NIST released a Research Grade Test material for monkeypox within 30 days in response to a public need, a record for NIST.

- Cybersecurity and privacy: The NIST Cybersecurity Framework (CSF) is now translated into 10 languages. Revision of the CSF, coined “CSF 2.0,” is underway. The first workshop for the revision attracted almost 4,000 participants from a hundred countries, and NIST anticipates the release of the draft revision in spring of next year. On October 18, NIST participated in the White House Summit on Internet of Things (IoT) Cybersecurity Labeling event, which discussed approaches to labeling IoT consumer products. NIST is celebrating 50 years of cybersecurity work.

- Advanced communications: NIST released an interagency report on Advanced Communications Technology Standards that was prepared with other members of a working group within the Interagency Committee on Standards Policy, a group chaired by NIST. The report catalogs the

standards-related activities of participating Federal agencies and identifies areas for strategic coordination. The NIST Communications Technology Laboratory (CTL) commissioned NIST's first Open Radio Access Network (O-RAN) for 5G spectrum sharing test bed and the Public Safety Communications Research (PSCR) division just awarded more than $10 million to eight recipients in the last round of major grant funding for the Public Safety Innovation Accelerator Program.

- Climate: climate remains an important White House and Department of Commerce priority. NIST is building a community across the organization in support of climate. A new Climate Working Group recently developed a white paper outlining NIST's programs. Recent highlights of NIST contributions include announcing awards of $500,000 to each of five universities under the "Training for Improving Plastics Circularity Grant Program"; and publication of a new interoperability profile to enable communications between devices and systems to unlock functions in our grid systems. The NIST work is being incorporated by Standards Developing Organizations and into technical documentation used by industry. NIST also has been recognized externally for our work related to climate. A team of physicists at NIST were finalists for the Samuel J. Heyman's Service to America Medal (Sammies), in recognition of their system using frequency combs to detect methane gas leaks. This year's class of the Sustainability, Energy, and Environmental Ambassadors Program recognized the NIST Office of Facilities and Properties Management, CTL, and Engineering Laboratory, and NIST won the Department's Energy and Environmental Stewardship Awards for energy and water conservation, contracting and environmental stewardship projects at both Gaithersburg and Boulder campuses.

- Quantum: Dr. Locascio stated NIST continues to make excellent progress in quantum information science and technology, including a new multi-agency partnership, *The Washington Metropolitan Quantum Network Research Consortium*, (DC-QNet), which includes a total of eight organizations (six government agencies) to implement a functional quantum network as a regional testbed. Just last week, a group led by JILA (Joint Institute for Laboratory Astrophysics) and NIST Fellow Dr. James Thompson's have for the first time successfully combined two features of quantum mechanics to make a better quantum sensor, announcing a new "matter wave interferometer." Dr. Locascio acknowledged two prestigious physics awards for research staff: NIST JILA Fellow Dr. Jun Ye won the 2022 Breakthrough Prize in Fundamental Physics, with a $3 million prize, for his pioneering research on atomic clocks, and NIST physicist Dr. Adam Kaufman was awarded the 2023 Early Career Breakthrough New Horizons Physics Prize, for his work in advancing the control of atoms and molecules to improve atomic clocks and quantum information processing. The Quantum Economic Development Consortium continues to make progress on enabling and growing a robust commercial quantum-based industry and associated supply chain in the U.S. And finally, the post-quantum cryptography effort at NIST is developing cryptographic systems that are secure against both quantum and classical computers. NIST announced four encryption algorithms that will be part of a post-quantum cryptographic (PQC) standard, which should be finalized in 2 years. A conference is slated for November 29th through December 1st, 2022 to discuss the PQC standardization effort.

3. *Standards Leadership*. Dr. Jayne Morrow has come on board to serve as Senior Advisor on Standards Policy and brings extensive experience to her work with the White House, private sector, and the NIST Standards Coordination Office.

The National Security Strategy was released on October 12, 2022, and NIST is working closely with the National Security Council on developing a more strategic approach to U.S. Government involvement in international standards, in support of the National Security Strategy. The Biden administration and Congress have made U.S. participation in standards a national priority. NIST is working closely with the National Security Council on development and implementation of a strategic approach to international standards engagement for the U.S. Government and is currently preparing for launching roundtables and discussions.

Collaboration with like-minded partners on international standards remains an important element of our strategy, which includes the U.S.-EU Trade and Technology Council (TTC), the Quad, the International Telecommunication Union, and the International Organization for Standardization (ISO). Recent accomplishments include an effort, led by NIST, to implement standards information sharing mechanisms with allies and likeminded partners to increase situational awareness.

4. *Mission Delivery Enhancement*. Dr. Locascio is focused on increasing awareness of NIST's impact by engaging with stakeholders in industry, academic, and government, including through recent high-level engagements centering around semiconductors, biomanufacturing, standards, cybersecurity, IoT, and AI.

Dr. Locascio also commented on some recent activities garnering considerable external attention:

- Regarding NIST's investigation of the Champlain Towers South Condominium in Surfside, Florida, NIST completed non-destructive testing in July and is working with local authorities to establish safe testing conditions for the evidence. On October 19th, the National Construction Safety Team Advisory Committee held a public meeting to update the status of the Surfside investigation and Hurricane Maria's impact on Puerto Rico.

- The NIST National Windstorm Impact Reduction Program deployed staff on-site to monitor the effects of Hurricane Ian to identify the role NIST might play in a follow-on study or investigation, if required. In response to Hurricane Ian, in response to an urgent ask by hospitals in southwest Florida for medical supplies, within 24 hours the Florida MEP center mobilized and worked with other centers across the national network to secure nearly $2 million in equipment.

- Dr. Locascio provided an update on the NIST Center for Neutron Research (NCNR). A confirmatory order from the Nuclear Regulatory Commission (NRC) on August 1, 2022, cited no violations or civil penalties. The Nuclear Regulatory Commission is in the process of completing a technical evaluation report to inform their decision to restart the reactor.

- And finally, NIST recently launched a new modernized website for iEdison, the online reporting system for recipients of federal funds to report inventions. The system was transitioned to NIST from the National Institutes of Health (NIH) and includes new functionality and security features making it easier to comply with the reporting requirements of the Bayh-Dole Act. More than 8,500 inventions and 21,000 patents were added to iEdison in 2021.

5. *NIST Community*. Three objectives for this priority area are DEIA (diversity, equity, inclusion, and accessibility); safety; and return to a post-COVID campus community. On October 11, the NIST DEI Office hosted an internal virtual launch event featuring an invited speaker, sharing updates on the NIST DEIA strategic plan implementation, and announcing the launch of a new iLEAD series offering learning opportunities for NIST staff. Dr. Locascio noted that there are positive signs that the virtual work environment is transitioning into a hybrid one, with more people coming on to campus, but she also noted still challenges. NIST leadership are collecting information about return-to-work policies at the local organizational level to inform ongoing discussions and decisions.

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

Discussion. The group asked Dr. Locascio questions about her remarks, including the following themes:

- How NIST can establish a sufficient workforce development strategy with the projected 280,000 new jobs in semiconductor industry,
- Whether the NIST standards sharing alert service could be shared with US industry, and how best to inform US industry about new standards being developed and adopted abroad, for example in the EU,
- Discussion of media reports that one of the top post-quantum cryptography algorithms was cracked within two weeks (NIST noted that this was not one of the four finalist algorithms they selected),
- A National Academy report entitled "Protecting Critical Technologies for National Security in an Era of Openness and Competition" on the use of platforms as foundational development technology,
- How NIST could ensure more people learn about their significant work, for example the recent Breakthrough Award to NIST Scientist Dr. Ye,
- Public-private sector investment in R&D relating to CHIPS Act,
- How to address the lack of U.S. participation in standards development for critical and emerging technologies,
- The need for a planned and purposeful approach for NIST to assist in R&D for biomanufacturing, and

- How to solidify and define NIST's role as a member of a larger connected community within U.S. Government.

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

Dr. Mackey described the recent safety tragedy in which an individual was demolishing a test structure and fell approximately 12 feet, sustaining fatal injuries. Safety staff secured the site within minutes so investigation could be conducted safely. OHSA was contacted within an hour, and Dr. Mackey is the point of contact for the OSHA investigation. OSHA procedure takes 6 months to complete their investigation. The Deputy Chief Safety Officer, Mr. Stephen Banovic, will lead the NIST safety investigation and root-cause analysis work.

After the initial fact-finding phase, NIST conducted a thorough review of safety-related documents, files, communications, standard operating procedures, hazard reviews, and training. NIST is now in the process of performing interviews with relevant staff. NIST has contracted with a third party to do finite element modeling and failure analysis of pertinent structural components of the test facility. A corrective action plan will be developed with NIST executives to ensure proper depth, breadth, and sustainability of any changes made.

Dr. Mackey described the importance of near-miss reporting is effort identify and to implement corrective actions before accidents can occur. Dr. Mackey reviewed the safety related statistics to date, including injuries and illnesses. There were 109 cases of incidents and near misses in FY22. The reduced number reflects reduced on-campus staffing due to telework. There were 46 recordable illnesses, which includes 42 work-related COVID cases (OSHA requires workplace transmission of COVID to be recorded when other standard recording criteria are met).

NIST's return-to-work procedures have been updated to align with CDC guidance, e.g., following close contacts, staff and visitors may enter the campuses, but must wear a better performing mask (3-ply surgical, KN95, or N95), practice social distancing, and self-monitor for symptoms for 10 days. There are no occupancy restrictions. NIST Gaithersburg campus, since there is a health unit located there, offers COVID booster and flu shots to federal employees, and NIST rolled out a new COVID reporting application for staff to obtain campus access requirements.

Dr. Mackey noted they are increasing the number of inspections (office and non-office) from pandemic lows, and she summarized the findings from inspections in FY22 (see presentation for details).

Dr. Mackey described ways in which her organization is providing support to the NCNR. For example, she and NCNR Director Rob Dimeo co-chair the NIST NCNR Enforcement Action Support Team that is responsible for ensuring that NCNR meets all requirements of the NRC confirmatory order.

Dr. Mackey provided an update on the NIST safety management system that is based on ISO 45001, the new standard, and is implemented via issuing directives. There are 46 programs effective and deployed in the directives management system. There are 11 programs under development, and Dr. Mackey expects 10 of the 11 programs to be out in FY23. She noted her team is planning to deploy a more formal approach to safety culture activities in the coming months. Dr, Mackey shared information about her office's focus on education and training for workplace safety, including a popular Workplace Inspector Series. Incident-related communications issued by Mackey's office include safety minutes and videos focused on incident prevention. Managers and subscribers are notified of posted incidents, and new in FY22 they are providing weekly incident summaries to NIST leadership, color-coded for risk levels.

FY23 focus areas for safety include the safety culture program implementation, compliant with ISO 450001, and a re-evaluation of job hazard reviews. Emphasis will be on completing the remaining directives of the safety management system; reevaluating job hazard reviews and analysis; and improving the safety management system.

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

Discussion. The group discussed the following topics:

- Since accessibility and safety can often align, safety and accessibility inspections would benefit from mutual interaction,
- Hunting for safety problems and offering rewards for finding them,
- How is virtual reality evolving as a tool to help ensure employee safety,
- Benchmarking safety issues and trends with other laboratories (outside of NIST), and
- Potential to develop a cross-laboratory working group to explore what others are doing related to safety.

Budget Overview - Dr. Heather Evans, Director (acting), NIST Program Coordination Office

Dr. Evans provided a synopsis of the current and future budget years: FY23, FY24, and FY25. NIST is currently under a Continuing Resolution at the FY 2022 funding level until mid-December. The CHIPS and Science Act has provided some authorization levels for FY23 that are close to the President's Budget Request. NIST is currently in the planning stages for FY24 budget and will begin to plan in the coming months for FY25.

The President's Budget Request for FY23 includes increases to grow NIST programs and is a significant increase over FY22 levels. The congressional marks are generally favorable for FY23, with the House and Senate are both supporting the majority of initiatives, but not always at the requested levels.

Dr. Evans briefly overviewed the NIST for the Future Act (included in the CHIPS and Science Act signed into law), which authorizes funding levels for and codifies NIST's role in bioscience, cybersecurity, greenhouse gas, advanced communication, international standards, and more. The Act provides additional NIST flexibilities for hiring and operations. More broadly. The CHIPS and Science Act calls on NIST to work with the National Science Foundation, Department of Energy, and other departments and agencies in an all-of-government approach. The CHIPS and Science Act provides five years of funding authorization for NIST. In FY23 the proposed levels are similar to the President's FY23 request, with a gradual increase over 5 years to $2.28 billion that nearly doubles the NIST total budget from FY22 to FY27, but this growth is uneven across budget lines (see chart).

For more information, see Dr. Evans' presentation.

Discussion. The group discussed the following topics:

- Cost of overhead to manage money for congressionally directed funding awards, and
- Management of network funding line for Manufacturing USA.

SESSION III: CHIPS SESSION

NIST's CHIPS Overview—*Dr. Jason Boehm, NIST Chief of Staff; Dr. Eric Lin, Interim CHIPS R&D Program Director; and Mr. Michael Schmidt, CHIPS Program Office Director*

Dr. Boehm provided a high-level overview of the programs authorized by the CHIPS Act to stimulate revitalization of the U.S. semiconductor manufacturing and innovation ecosystem. He directed VCAT to a strategy issued by the Department of Commerce that lays out the approach to implementation of the CHIPS Act, which can be found on CHIPS.gov.

The CHIPS for America Vision has three key areas of focus:

- Build more resilient supply chains for important components providing economic security.
- Bring the most sophisticated technologies back to the U.S., ensuring national security.
- Ensure long-term U.S. leadership in the sector and keep the U.S. in the forefront for future innovation.

DOC is tasked with managing and implementing $50 billion allocated into two programs. One program allocates $39 billion for manufacturing incentives, which includes efforts to attract large-scale investments in advanced technologies and to incentivize expansion of manufacturing capacity for mature and other types of

semiconductors. The second program is an $11 billion fund focused on R&D, which includes four programs authorized under the CHIPS Act. These programs will be coordinated together with CHIPS initiatives from other agencies, including DoD, U.S. Department of State, NSF, and the Department of Treasury. Across all of these efforts, there will be a huge focus on workforce development. Manufacturing incentives will spur large-scale investments in leading-edge logic and memory manufacturing clusters. The $50 billion is a major addition to the DOC and NIST to implement these programs, and new organizational structures have been created to execute them—the CHIPS Program Office, led by Mr. Michael Schmidt, and the CHIPS R&D Office, currently led by Dr. Eric Lin.

Mr. Schmidt shared the goals of the newly formed CHIPS Program Office, which is focused on the $39 billion incentives portion of the legislation that will focus on the onshoring of domestic manufacturing of semiconductors in associated supply chains. Schmidt outlined his priority to obtain as much private capital as possible and protect taxpayer dollars while achieving the significant CHIPS policy objectives. The Secretary of Commerce is committed to have a notice of funding opportunity (NOFO) by February 2023 and that is when the CHIPS Program Office will be open for applications and prepared to engage with applicants.

Dr. Lin described the $11 billion CHIPS R&D funding goals to spur a national focus on transformative innovations in the semiconductor technology. A second part of the funding is to create an integrated infrastructure for research and prototyping innovations.

Workforce development and training crosses all of the programs with a goal to nurture the next generation of companies that will keep the U.S. in the lead on innovation.

The newly appointed Industrial Advisory Committee held an administrative nonpublic planning meeting recently and will hold their inaugural public meeting soon. A Manufacturing USA Request for Information was issued to help inform what institutes should look like and how to align.

Dr. Locascio wrapped up the session by asking VCAT for their advice about managing NIST organizational health in the context of this unprecedented, expansive, five-year investment in CHIPS. She reminded VCAT that NIST was called upon to do this work because of its reputation for rigor, integrity, and excellence, working from basic research to applied research, promoting commercialization, and leading standards development.

For more information, see Dr. Boehm, Dr. Lin, and Mr. Schmidt's presentation.

Discussion. The group discussed the following topics:

- Potential for the CHIPS Act to increase tension with Mainland China, resulting in a hazard to supply chain,
- Concerns about overall geopolitical stability in producing chips while U.S. builds capacity,
- Challenges of managing the entire NIST organization while keeping focus on CHIPS,
- Potential for two divergent cultures evolving within NIST that produces disparate opportunity,
- Need to use engagement surveys or instruments to evaluate the staff and measure engagement,
- Importance of senior NIST leadership communication about CHIPS to staff,
- Creating a welcoming environment and engaging staff to present ideas,
- Taking advantage of other agencies' knowledge going forward – NSF, DOE, DOD, etc. – and make adjustments where efforts are duplicative or not effective,
- Government engagement needed to facilitate a collaborative perspective with industry and allies with regards to chip manufacturing capability, and
- Careful consideration of supporting chip manufacturing in non-U.S. companies.

SESSION IV: SUBCOMMITTEES SESSION

Subcommittees on Visibility Efforts - *Dr. Vinton G. Cerf, Subcommittee Chair*

Dr. Cerf reiterated the subcommittee's goal to develop clear messaging to effectively communicate NIST's value across stakeholder groups, identify mechanisms for the strategic delivery of NIST's messaging, and develop approaches for increasing the exposure of key stakeholders to NIST's critical work driving American innovation. Dr. Cerf discussed that NIST is very well known in some sectors, and less well known in others.

The subcommittee is exploring how to increase NIST visibility among this variety of different stakeholders, including the general public. They are focused on identifying targets for increased visibility and awareness of NIST and for what purpose.

Thus far the subcommittee has met a few times and has identified potential outside experts to engage, including Mr. Alan Alda. Dr. Cerf noted the need to assess the current level of visibility that NIST has with different groups and discussed whether NIST might engage a professional firm to help with this effort. Dr. Cerf noted that NIST already uses many mechanisms including YouTube and LinkedIn to share information about the organization and ongoing activities, but he noted the Subcommittee wants to further explore ways to increase engagement in those channels. He also noted the importance of ensuring that Congress is well informed about NIST, and the subcommittee's interest in outreach with academic and industry partners that are not already aware of NIST programs. Other topics raised included the potential for a Friends of NIST organization and leveraging NIST alumni. Dr. Cerf noted the group is continuing to identify potential recommendations for the VCAT to approve.

Discussion. The group discussed the following topics:

- Opportunities for NIST to promote to the public of why standards are important,
- Exploring mechanisms such as an independent foundation,
- How to leverage public-private partnership opportunities,
- The need to tailor messages to specific audiences, and
- Opportunities for NIST to collect testimonials from the stakeholders who use and benefitted from NIST work.

Subcommittee on Workforce Efforts—*Dr. Gail Folena-Wasserman, Subcommittee Chair*

Dr. Wasserman described the three specific areas the subcommittee is focusing on: programs for students in pipeline development and nurturing the Science, technology, engineering, and mathematics (STEM) workforce; expansion of Manufacturing USA Institute training efforts; and pilot programs to help women return to the workforce after a prolonged absence.

The subcommittee enlisted two subject matter experts to date: Ms. Margaret Latimore, former head of the STEM program on the Montgomery College campus in Germantown, Maryland, and Dr. Jacqui Hall, head of early talent development programs at AstraZeneca.

The subcommittee is drafting a plan of action to develop recommendations, and Dr. Wasserman noted that NIST already has many programs in place to cultivate a scientific workforce. The subcommittee would like feedback from NIST on where to focus relating to manufacturing. Dr. Wasserman shared that the subcommittee has met with the NIST Manufacturing USA institute (NIIMBL) Director, who shared many ideas in the area of workforce and noted that funding and coordination across institutes are ongoing challenges.

Discussion. The group discussed workforce topics, including:

- Challenges to define what the minimal employable skill is to get someone in the door,
- How to find industry and other spokespeople to promote STEM careers by talking with students in high school and postsecondary levels,
- Possibility of apprenticeships as a pathway to workforce development (e.g., compared to a traditional four-year college degree),
- Long-lasting effects of COVID on student STEM knowledge and abilities, and
- Challenges of expanding cross-institute workforce development efforts in Manufacturing USA within existing budget and programmatic authorities.

Subcommittee on Alignment of Manufacturing Efforts—*Mr. David Vasko, Subcommittee Chair*

Mr. Vasko outlined the work to date of the subcommittee on alignment of manufacturing efforts. The subcommittee is charged with envisioning ways and providing recommendations for NIST's manufacturing

programs, to better integrate and align them to effectively span the innovation continuum. The subcommittee has engaged several subject matter experts with manufacturing and policy expertise to inform their deliberations.

The subcommittee is examining the alignment of NIST laboratory outputs, MEP, and Manufacturing USA, and will also be exploring how the new CHIPS program factors into the suite of NIST programs. The subcommittee is also benchmarking NIST programs against other manufacturing programs (e.g., Fraunhofer institutes) to identify any best practices for NIST to incorporate.

Discussion. The group discussed the following topics:

- How, if at all, concerns about environmental pollution, ease of maintenance, longevity of product, support and maintenance, are addressed by NIST manufacturing programs,
- Potential for the NIIMBL framework for technology readiness for biomanufacturing to be leveraged by other programs (e.g., MEP), and
- The need to coordinate the efforts of both the Workforce Development and Manufacturing Alignment Subcommittees.

For more information, see Dr. Cerf, Dr. Wasserman, and Mr. Vasko's presentation.

Group Discussion

The VCAT agreed that the primary objective of the subcommittees is to provide their recommendations to the full VCAT at their next meeting in February. Dr. Locascio confirmed that she is interested in any ideas that the VCAT and encouraged them to be bold.

Plan Forward – *Dr. Mehmood Khan, Chair, VCAT*

Dr. Khan again thanked Mr. Vasko and Dr. Wasserman for their service to VCAT. He congratulated Dr. Locascio on the recognition and awards for NIST staff, notably the award of the Breakthrough Prize in Physics to Dr. Jun Ye. He mentioned that this is an unprecedented time coming out of the pandemic and trying to deal with the hybrid work environment. Dr. Khan expressed hopes for the NIST Center for Neutron Research to return to full operation.

Dr. Khan again shared VCAT condolences regarding the tragic safety event, noting that while it will be challenging for the institute it will ultimately result in changes and improvements that strengthen the NIST community. Finally, he also noted the tremendous significance of the CHIPS Act.

Meeting Wrap-Up

Dr. Locascio thanked VCAT for sharing important insights in a transformative time for the agency. With historic investments in new technology areas, it is important that NIST does not get lost underneath the weight of it, as there are some big challenges up ahead.

Adjournment

The meeting was adjourned at 4:29 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
Dr. Mehmood Khan, Chair, NIST Visiting Committee on Advanced Technology