U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY
Full Committee Hearing

"Examining NIST's Priorities for 2025 and Beyond"

Questions Submitted by Chairman Frank Lucas for Dr. Locascio

1. **DR. LOCASCIO:** NIST operates the National Vulnerability Database (NVD), which is the U.S. government repository of standards-based vulnerability management data represented using the Security Content Automation Protocol (SCAP). This data enables automation of vulnerability management, security measurement, and compliance. Industry heavily relies on the NVD to keep their systems and products updated and protected from cyber vulnerabilities. Recently, Congress was alerted that the NVD has been steadily falling behind on its mission and in February the backlogs were crippling the repository. Committee Staff have since received updates and have been assured that they have reallocated resources and are working to process incoming vulnerability data.
    a. Can you update us on the status of the NVD backlogs and how NIST is planning to reallocate resources to the NVD?

NIST Response:
NIST already reallocated funding and has awarded a contract for additional processing support for incoming Common Vulnerabilities and Exposures (CVEs) for inclusion in the National Vulnerability Database. NIST is confident that this additional support will allow NIST to return to pre-February 2024 processing rates. As of this response, the staffing has been restored and NIST is actively working to input and generate the data related to the backlog vulnerabilities while servicing new vulnerabilities as they are identified.

    b. How much does the FY25 Budget Request provide to address this backlog?

NIST Response:
After FY 2024 appropriations were enacted, NIST reallocated funding to increase the ability to respond to the NVD demand, making available up to $8.5 million of investment per year. These funding levels continue in the FY 2025 Budget Request, and NIST will continue to monitor the level of demand.

2. **DR. LOCASCIO:** Last year, the National Academies of Sciences, Engineering, and Medicine released a report revealing numerous major utility infrastructure systems are currently in critical condition and failing to fulfill NIST's mission, creating risks of catastrophic failure of entire laboratory buildings. The report estimates NIST must spend anywhere between $5 to $6.6 billion over the next 12 years to address its maintenance backlog and critical modernization needs. Per year, the report estimates NIST must spend $300 to $400 million to address existing issues with an additional $120 to $150 million to stop and stabilize the effects of deterioration.
    a. What is NIST's plan to make these critical investments and implement recommendations from the National Academies report to ensure NIST facilities can conduct advanced measurement science and research?

NIST Response:

NIST is proactive in identifying and prioritizing its maintenance and critical modernization needs, as aligned with the assessment by the National Academies of Sciences, Engineering, and Medicine (NASEM). In addition to NIST-adopted master plans for its Boulder and Gaithersburg campuses, respectively, to identify the needed renovations and new facilities, in support of present and anticipated mission-related goals, NIST is responding to the NASEM report recommendations by aligning the recommended infrastructure plan informed by laboratory needs with the adopted master plans and the coordinated recovery plan. Combined, the plans aim to support the existing, and provision for new, infrastructure over the next twenty years, offering gradual changes with a set of right-sized projects, complete at each step. This approach allows for maximal flexibility to support the evolving mission-specific goals consistent with available funds. In addition to facility renovation and new construction needs outlined in the master plans, projects related to improving safety and major repairs of the physical plant have been identified and pursued, as funding permits. NIST has identified in its coordinated recovery plan a list of "shovel ready" projects that could be initiated over the next several years, should funding become available. The list of projects totals roughly $2.5 billion. This NIST assessment aligns with the recent NASEM report that calls for addressing safety concerns due to infrastructural issues.

In FY 2025, NIST is ready to start the last phase of radiation physics building modernization, contingent on congressional appropriation. This $178 million top-priority project will enable NIST to resume calibration services discontinued due to facility degradation. These calibration services ensure the safety and security of 4 million radiation workers in the United States, as well as the public. In addition, in FY 2025, NIST has requested $133.2 million for SCMMR projects, including installing rooftop safety rails to address the top safety risk for fall hazards, starting Phase 1 of the multi-phase Renovation and Expansion of the Gaithersburg Central Utility Plant (CUP), starting Phase 1 of the complete replacement of the Gaithersburg underground utility infrastructure system, and pursuing other projects to address NIST's over $1.1 billion FY 2023 deferred maintenance backlog.

3. **DR. LOCASCIO:** The CHIPS Act authorizes the creation of a new Manufacturing USA Institutes to support the domestic microelectronics manufacturing industry. Overseen by NIST, the new Institute is scoped in focus to "Digital Twins for Semiconductors" with the goal of standardizing digital twins for each part of the manufacturing process and creating a marketplace for all manufacturers to have access to digital twins. My understanding is the goal is for digital twins to allow for manufacturing and supply chain transparency as well as accelerated manufacturing across the ecosystem. The Notice of Funding Opportunity was release for the new Manufacturing USA Institute with concept papers due in June and final applications due in September.
    a. Can you share the process undertaken to arrive on Digital Twins for Semiconductor as the focus of the new Institute and elaborate on the significance Digital Twins will have from your perspective on the future of the domestic semiconductor industry?

NIST Response:
Digital twin technology can significantly reduce U.S. chip development and manufacturing costs, such as by improving capacity planning, production optimization, facility upgrades, and real-time process adjustments. The technology offers a critical tool for the United States to achieve technology leadership and accelerate ideas to market across the semiconductor sector. Currently, no country has invested at the scale needed or successfully unified the industry to unlock the enormous potential of digital twin

technology for breakthrough discoveries.

On May 6, the Commerce Department released a Notice of Funding Opportunity (NOFO) seeking proposals from eligible applicants for activities to establish and operate a CHIPS Manufacturing USA institute focused on digital twins for the semiconductor industry. The CHIPS for America program anticipates up to approximately $285 million for a first-of-its-kind institute focused on the development, validation, and use of digital twins for semiconductor manufacturing, advanced packaging, assembly, and test processes.

After receiving extensive public input, the CHIPS R&D office determined that a single institute with both regionally focused programs and meaningful cross-region participation will best meet the CHIPS for America goals of strengthening U.S. technology leadership, accelerating ideas to market, and realizing a robust semiconductor workforce. In establishing a single institute with national reach, CHIPS for America seeks to enable the seamless integration of digital twin models into U.S. semiconductor manufacturing, assembly, and advanced packaging, enabling rapid adoption of innovations and enhancing domestic competitiveness for decades to come.

4. **DR. LOCASCIO:** On November 1, 2023, the Administration announced the establishment of the United States Artificial Intelligence Safety Institute (USAISI). To date, the Safety Institute and its consortium have been stood up and are operating. Can you elaborate on the need for a $50 million price tag for the USAISI?

NIST Response:
As foreign governments and private companies invest billions of dollars into building continuously more advanced AI models, it's critical that the U.S. government is able to recruit high-quality AI expertise and build the tools, datasets, and testbeds to maintain leadership in the face of increased international competition and make informed decisions about the risks and benefits of AI. NIST's Fiscal Year 2025 Budget Submission to Congress proposes, $50 million, an increase of $41.7 million for NIST's AI-related work to realize the goals of the AI Safety Institute (AISI) and to continue to build the ecosystem for AI innovation. The majority of the funding ($40.1 million) would support the AISI and the remainder of the funds ($9.9 million) would support expansion of the work in NIST's Laboratory Programs. AISI will pilot pre-deployment testing of frontier models for capabilities and risks. An increased investment will allow AISI to build this pilot into a reliable apparatus to test the most advanced AI models before they are released to the public to tackle critical emerging AI risks. NIST, through AISI, will develop voluntary guidelines on governing the most advanced AI models, and novel methods to test capabilities, risks, and safeguards, across a range of domains and issue areas, such as cyber operations, synthetic content, tool use, harm to individuals and communities, and chemical, biological, nuclear, and radiological development. This funding will also support critical engagement with key international, industry, civil society, and academic stakeholders. The funds that would support expansion of the work in NIST's Laboratory Programs would allow NIST to continue to build the foundational science needed for understanding and testing AI so that we can safely realize its benefits.

5. **DR. LOCASCIO**: On May 21, 2024, the United States Artificial Intelligence Safety Institute (USAISI) released its Vision document. This document came several months after the establishment of the USAISI and its Consortium. Can you explain why the Vision document was not released sooner?

NIST Response:
The U.S. AI Safety Institute (AISI) vision paper came out approximately three months after the appointment of the Director of the AISI on February 7, 2024. The timeframe between the Director's appointment and the release of AISI's vision paper was necessary to allow AISI to build out its team, properly consult a diverse array of stakeholders, and iterate on renditions of its future vision. The vision paper is an overview of AISI's philosophy, mission, and strategic goals.

6. **DR. LOCASCIO**: In December 2023, the Government Accountability Office (GAO) released a report on strengthening disclosure requirements to improve research security. GAO recommended that NIST collect and review disclosures from domestic associates—including information on positions and appointments, current and pending research support, and participation in foreign talent recruitment programs—and appropriately require updates to these disclosures. GAO identified that NIST plans to expand its review process to include the information collection template used for foreign national associates and plans to complete corresponding modifications to the information system used to collect and store this information. Has NIST begun the process of implementing the template and storage of this information?

NIST Response:
NIST takes research security very seriously and has developed, published, and implemented NIST IR 8484, "Safeguarding International Science Research Security Framework," a risk-balanced program that fosters the safeguarding of international science while mitigating risks to the integrity of the open collaborative environment. NIST agrees with the GAO recommendation on strengthening research security by expanding disclosure requirements of collecting and reviewing information disclosures on positions, appointments, and research support to U.S. associates. To date:

- NIST has submitted to OMB for approval a request to extend to U.S. Associates the use of the template currently approved and used for Foreign National Associates

- NIST has defined a review process to ensure appropriate documentation and compliance with existing requirements for subsequent integration into the NIST management system for Associates

- The NIST Research Security Team is currently using existing OMB-approved information collected for U.S. Associates to review CHIPS U.S. Associates. This step meets the immediate need identified in the CHIPS and Science Act. NIST will start using the new U.S. (domestic) template upon OMB approval for all U.S. Associates.

7. **DR. LOCASCIO**: In December 2023, the Government Accountability Office (GAO) released a report on strengthening disclosure requirements to improve research security. GAO recommended that NIST, in coordination with the Secretary of Commerce, evaluate the effectiveness of research security training courses for NIST staff. GAO identified that NIST plans to act on this recommendation and will administer a survey to collect employee feedback to evaluate the effectiveness of their research security training efforts. Has NIST started this survey and when do you expect the survey to conclude?

NIST Response:
NIST agrees with the GAO recommendation on evaluating the effectiveness of research security training courses for NIST staff and has taken the following actions:

- The NIST Research Security Office and the DOC OSY Field Servicing Security Office (FSSO) developed tailored survey questions to collect training feedback from NIST employees to fulfill the GAO recommendation.

- The survey will accompany the counterintelligence training at NIST once the updated counterintelligence course is deployed, with the expected deployment by the end of the 2024 calendar year.

- NIST will use the feedback to update future counterintelligence courses once the survey concludes, which is expected by the end of the 2025 calendar year.

- In FY 2024 NIST has submitted the detailed action plan for implementing the survey to GAO.

Questions Submitted by Ranking Member Lofgren for Dr. Locascio

1. In February, NIST scaled back how it enriches vulnerability data that goes into the National Vulnerability Database or NVD. Organizations all over the world rely on this database to ensure they are removing vulnerabilities discovered in their computers. NIST made this decision because of budget challenges resulting from Congress passing multiple continuing resolutions. I am sure these issues have been exacerbated by the 10 percent cut to NIST programs in the fiscal year 2024 budget. As a result, there is a backlog of thousands of vulnerabilities.
    a. Can you describe the activities that NIST is doing to address this backlog? What is the timeline for NIST to address this backlog?

NIST Response:
NIST already reallocated funding and has awarded a contract for additional processing support for incoming Common Vulnerabilities and Exposures (CVEs) for inclusion in the National Vulnerability Database. NIST is confident that this additional support will allow NIST to return to pre-February 2024 processing rates. As of this response, the staffing has been restored and NIST is actively working to input and generate the data related to the backlog vulnerabilities while servicing new vulnerabilities as they are identified. The reallocated funding did come from NIST's reduced FY 2024 research budget, and NIST is assessing the impacts this reallocation will have on ongoing cybersecurity research and development programs. NIST will continually re-evaluate the estimated timeline, which will be affected by inputs and updates to data provided and maintained by outside sources, including Authorized Data Providers (ADPs), for insight about which data gaps still remain.

2. It is my understanding that NIST is having to scale back its other cybersecurity and privacy activities to scrounge together enough funding to address the NVD backlog. How has this issue affected NIST's cybersecurity program beyond the NVD?

NIST Response:
To ensure the continued support of the NVD, NIST has scaled back in areas of standards, specifications, and testing of the U.S. Government identity credentials, specifically the Common Access Card (CAC) and Personal Identity Verification (PIV) cards; NIST has limited outgoing grants to U.S. universities, scaled back on travel to, and participation in, some in-person Standards Development Organization meetings.

3. The United States has failed to invest in the development of domestic recycling markets, and as of 2021, the nation only recycles 5 percent of its plastic waste, a fraction of the hundreds of millions of pounds of plastic produced globally. The Federal Government can play an important role in supporting research and development and facilitating standards, tools, and technologies needed across the different stages of the plastics production and recycling lifecycle to minimize plastic waste. NIST is currently doing some of this important work in collaboration with university and industry partners. Please elaborate on the status of the plastics recycling research at your agency and how NIST can continue to collaborate with academia and industry on this environmental and human health crisis.

NIST Response:
NIST is designing new reference materials, data sets, tools, and workforce development to

improve and harmonize measurements useful to all stages of recycling and develop sustainable plastics with great interest and involvement from private and public research and manufacturing. The NIST Circular Economy program is investing in methods to improve identification and sorting of plastic in materials recovery facilities and at recycling companies to produce cleaner, and thus more valuable, recycled materials.

As part of this effort, NIST is producing and compiling critical validated data sets and standard reference data to improve the detection and quantification of additives in plastic products, and of plastics in the environment, while also assessing industrial processing conditions and modeling recycled polymer compositions to increase tolerance to impurities and decrease the need for additives. NIST supported a grant program in each of FY 2022 and FY 2023 to fund related curricula development in U.S. universities. This has resulted in new research facilities, new courses, new degree programs, and expanded access to the cutting edge of polymer science, fostering collaborations between polymer chemists and engineers with diverse expertise, creating innovative approaches to polymer and product design, and addressing the problems presented by current practices.

4. NIST runs a vital program in forensic sciences to strengthen forensic practice through research and improved standards. A transformative 2009 report by the National Academy of Sciences revealed that many forensic techniques used commonly in the courtroom had never been rigorously and empirically tested. Creating science-backed standards for forensics is critical to ensure that forensic analysis can be applied objectively, fairly, and with due confidence across our justice system. Due to the severe cuts in FY24 Appropriations, NIST had to make the difficult decision to terminate funding for its Forensic Science Center of Excellence, a consortium led by Iowa State University. In addition to funding the important work at Iowa State, NIST does research internally and manages the OSAC –which develops draft standards for forensic evidence.

    a. Fifteen years after the 2009 report, how far have we come in strengthening forensic science and standards and what significant gaps remain? Is it time for another comprehensive review of the state of forensic science and strategic plan for R&D going forward? If yes, why? If not, why not?

NIST Response:
The goal of the NIST Forensic Science Program is to strengthen the scientific basis of forensic disciplines, to put the "science" into "forensic science," so that evidence may be appropriately collected, accurately analyzed, and effectively communicated. In response to the 2009 National Academies report, NIST has significantly expanded both its research and development and standards tools for forensic science disciplines. Accordingly, NIST intensified its collaborative work with stakeholders to develop, disseminate, and facilitate the adoption of these tools. The NIST efforts are bringing the best possible forensic science methods and practices to the criminal justice system, with the goal of eliminating bias in measurements, analysis, and interpretation of evidence. In recent years, the criminal justice system has increasingly turned to forensic science evidence to assist in law enforcement investigations and criminal prosecutions. Both prosecutors and defendants are increasingly using forensic science evidence to support their arguments. Therefore, the NIST involvement is timely and needed.

Considerable progress has been achieved in the 15 years since the National Academies report. The NIST Forensic Science Program has reached multiple milestones that include measurement protocols, calibration systems, Standard Reference Materials and Data, process maps for forensic scientists and examiners, a series of scientific foundation reviews that examine the reliability of forensic science

methods and practices, guidance for evidence management and preservation, human factors influence analysis, and a portfolio of 182 forensic science standards. The impacts of the NIST Forensic Science Program are being realized through major advances in research, science-based standards development, scientific foundation reviews, workshops, meetings, and conferences, and extramural grants.

At the same time, a sustained and significant research and standards effort is needed to maintain and improve existing methods and practices in view of evolving science as well as to expand to new research focus areas, consistent with the evolution of crime. NIST believes that periodic comprehensive review of the state of forensic science is required. Over the past year, NIST has initiated a comprehensive effort to assess the strategic challenges and opportunities to advance forensic science in the United States over the coming decade. This assessment has resulted in publication of an environmental scan based on a review of the literature[1] and a report from a roundtable discussion with forensic science thought leaders convened by NIST.[2] NIST is currently in the process of synthesizing the perspectives and insights gained from these reports, together with inputs from NIST subject matter experts, to publish a comprehensive report on "Strategic Opportunities to Advance Forensic Science in the United States: A Path Forward Through Research and Standards." This report is intended to inform and guide future strategic priorities for forensic research and development at NIST and the broader forensic science community.

5. How, if at all, is NIST working with Iowa State and its CSAFE partners to support continuity in their work, even absent direct funding from NIST?

NIST Response:
NIST will continue to work collaboratively with Iowa State University and CSAFE to support continuity in their work, even absent continued direct funding from NIST. Subject matter experts (SMEs) from NIST will continue to provide technical expertise to the Center of Excellence by actively participating in monthly meetings of advisory boards for all eight CSAFE research focus areas. NIST SMEs also serve on the Strategic and Research and Technology Transfer Advisory Boards. In addition, NIST is available to collaborate with forensic science stakeholders, who can help with the testing and implementation of the CSAFE tools. Once all previously disseminated CSAFE funding from NIST that remains is ultimately expended, NIST plans to continue collaboration with CSAFE in areas of mutual interest in forensic science research and standards.

6. Please provide any other notable updates to NIST's efforts, including engagement in activities with other agencies, such as the National Institute of Justice, to advance forensic science and standards in fiscal years 2024 and 2025.

NIST Response:
NIST has a long history of engaging in critical partnerships with many federal and state law enforcement agencies, including the Federal Bureau of Investigation (FBI), Drug Enforcement Agency (DEA), Bureau of Alcohol, Tobacco, Firearms, and Explosives (BATFE), U.S. Army Criminal Investigation Laboratory (USACIL), Defense Cyber Crime Center (DC3), and numerous state and local law enforcement agencies (e.g., Maryland State Police, Texas Department of Public Safety, Florida

[1] Forensic Science Environmental Scan 2023: https://nvlpubs.nist.gov/nistpubs/ir/2024/NIST.IR.8515.pdf
[2] Long-Term Vision and Strategic Priorities for Forensic Science in the United States: Summary Report of a Roundtable Discussion with Thought Leaders: (https://www.nist.gov/publications/long-term-vision-and-strategic-priorities-forensic-science-united-states-summary-report).

Department of Law Enforcement). In addition, the NIST-administered Organization of Scientific Area Committees (OSAC) for Forensic Science Program involves engaging with practitioners from several hundred federal, state, local, and private forensic science service providers.

NIST has a strategic partnership with the National Institute of Justice (NIJ), Office of Investigative and Forensic Sciences (OIFS). This partnership has resulted in the development of several important deliverables that have been or will be published in FY 2024. In May 2024, a comprehensive report was published, "Forensic DNA Interpretation and Human Factors: Improving Practice Through a Systems Approach." This report made a total of 44 recommendations to improve practice in the interpretation of DNA evidence and reduce the likelihood and consequence of potential errors. In 2016, the U.S. Congress passed the *Justice for All Reauthorization Act*, which called upon the Director of the National Institute of Justice (NIJ) to establish "best practices for evidence retention" in "consultation with federal, state, and local law enforcement agencies and federal laboratories." Based on a past NIJ/NIST collaboration, the Technical Working Group on Biological Evidence Preservation, NIJ reached out to NIST to establish a steering committee to address this new challenge. This collaboration will soon result in the publication of two reports, "Evidence Management Steering Committee Report: Key Takeaways and Opportunities to Strengthen Evidence Management Processes" and "Managing Physical Evidence: A Report on the Results of a Nationwide Survey of Evidence Handlers." These reports will be important resources that can be used to assist OSAC in its mission to support the development of standards across all disciplines of forensic science.

Questions Submitted by Ms. Foushee for Dr. Locascio

1. What is the justification of a recent reduction in already-allocated funding to the Center for Statistics and Applications in Forensic Evidence (CSAFE), which serves as the Forensic Science Center of Excellence under NIST?

NIST Response:
The FY 2024 NIST appropriations enacted by Congress resulted in a reduction of $33 million for NIST's Scientific and Technical Research and Services (STRS) account when adjusting for congressionally-directed external projects, significantly affecting programs across the entire organization. To manage the lower funding levels, NIST implemented reductions in funding for grants, financial assistance awards, contracts, and internal programs. NIST previously provided nine years of financial assistance award funding for CSAFE, but the current reduced funding environment will not allow for the final tenth year of planned funding ($3.8M in FY 2024) for CSAFE. NIST did not take this decision lightly and recognizes the difficulties this might cause. This decision is solely due to budgetary reductions and is not reflective in any way of CSAFE activities, performance, and track record under the current financial assistance award.

2. What additional previously awarded grants were cut following the passage of FY24 appropriations and how much did NIST reduce the planned awards by? Please provide specific names of projects and related dollar amounts.

NIST Response:
The proposed reductions in grants and other similar financial assistance awards total $12.3 million of the $33 million funding reduced from the NIST research budget resulting from FY 2024 enacted appropriations. However, the other reduced grants and financial assistance awards in FY 2024 are proposed primarily in areas where all funding to previous awardees was fully obligated prior to the enacted FY 2024 appropriations bill, meaning further reductions are primarily from funds allocated for grants and financial assistance awards that have yet to be awarded.

3. How did NIST make the decision to balance cuts between existing and new grant awards?

NIST Response:
With the enactment of the FY 2024 appropriations bill so late in the fiscal year, reductions had to be realized in non-labor funding categories, such as grants, financial assistance awards, contracts, and travel for funding that had not yet been obligated. In identifying areas of funding yet to be obligated while protecting funding in programmatic areas prioritized in the FY 2023 and FY 2024 Joint Explanatory Statements (JES), including critical and emerging technologies, there were only a limited number of program/project accounts that could be identified for potential mid-year funding reductions.

4. After nine years of federal investment in forensic science research, CSAFE is preparing the deployment of technologies to forensic experts in the field. How does NIST plan to ensure CSAFE is supported to carry out the goals initially intended and as achieved

through research, educational tools, and trainings for those in the field of forensic science?

NIST Response:
NIST plans to continue collaboration with CSAFE to disseminate and promote their research, computational algorithmic tools, and forensic science statistics training initiatives. CSAFE has participated in the biennial FORENSICS@NIST program review since 2022 and is expected to participate in the next symposium on November 18-20, 2024. This platform provides a unique exposure to a very large domestic and international audience (1744 registered participants from all 50 states and 69 countries in 2022). CSAFE statisticians continue to be actively engaged with the NIST-administered OSAC Standards Program through participation in the Statistics Resource Task Group as well as several discipline-specific subcommittees. Their participation facilitates the dissemination of CSAFE research and statistical knowledge to forensic science practice through standards development. NIST also is available to collaborate with forensic science stakeholders, who can help with the testing and implementation of CSAFE-developed tools. To this end, multiple CSAFE representatives participated and provided valuable input during a recent NIST workshop on Communicating Forensic Findings (Communicating Forensic Findings: Current Practices and Future Directions | NIST) held from June 25-26, 2024.

Questions Submitted by Mr. Amo for Dr. Locascio

1. A recent NIST fact sheet on Principles for Engagement With CHIPS Applicants During Due- Diligence Phase to Ensure a Skilled and Diverse Workforce notes that "Applicants will adhere to federal law that requires that employees have the right to join a union, to bargain collectively through representatives of their own choosing, to engage in other concerted activities for the purpose of collective bargaining." Given the importance of preserving the right to organize, what are the consequences if companies receiving CHIPS Act funds break federal labor law?

NIST Response:
As part of the process of applying to receive CHIPS funds, applicants must address their approach to meeting the Good Jobs Principles for both the facilities and construction workforce, jointly developed by the Departments of Labor and Commerce; one of these principles is worker empowerment and representation. Further, all applicants must comply with all applicable Federal labor and employment laws, including but not limited to Title VII of the Civil Rights Act of 1964, the Fair Labor Standards Act, the Occupational Safety and Health Act, and the National Labor Relations Act, the last of which protects employees' right to bargain collectively and engage in concerted activities for the purpose of workers' mutual aid or protection.

During the due diligence phase, DOC's CHIPS Program Office (CPO) works with applicants to confirm and further refine their workforce commitments and standards and receives technical assistance from DOL and other federal agencies regarding applicable labor standards..

All CHIPS awardees will be required to adhere to federal law in order to receive funding, including aforementioned federal labor laws that address employees' rights to join a union and bargain collectively through representatives of their own choosing. Noncompliance with federal labor laws may affect distribution of milestone payments.

Throughout all of these stages, CPO is actively engaging with applicants to ensure their awareness of their legal obligations under federal labor laws. Additionally, the Department of Commerce is committed to working with the Department of Labor and other agencies across the federal government if labor violations occur.

2. Please explain if the administration will include clawback provisions in contracts with companies receiving federal CHIPS Act if the recipient is found to have engaged in illegal union-busting activity.

NIST Response:
All CHIPS awardees will be required to adhere to federal law in order to receive funding, including aforementioned federal labor laws that address employees' rights to join a union and bargain collectively through representatives of their own choosing. Noncompliance with federal labor laws may affect distribution of milestone payments.

Throughout all of these stages, the CHIPS Program Office is actively engaging with applicants to ensure their awareness of their legal obligations under federal labor laws. Additionally, the Department of Commerce is committed to working with the Department of Labor and other agencies across the federal government if labor violations occur.

3. Consistent with the NIST fact sheet on CHIPS workforce development plans, will workforce commitments be codified in the terms of the award and include metrics and processes to measure, track, and report publicly on those goals and commitments?

NIST Response:
Yes, terms of the award will include workforce commitments. For example, CHIPS awardees receiving workforce development funds for sectoral programs will have robust data collection and reporting requirements. Awards will stipulate the conditions under which workforce funding will be released to awardees, and those conditions mandate that funded plans include metric-based goals and require processes to measure, track and report on those goals and commitments.

Questions Submitted by Ms. Lee for Dr. Locascio

1. The American innovation we strive for in the committee is not limited to technology. A recent NIST factsheet on Principles for Engagement With CHIPS Applicants During Due-Diligence Phase to Ensure a Skilled and Diverse Workforce notes that "Applicants will adhere to federal law that requires that employees have the right to join a union, to bargain collectively through representatives of their own choosing, to engage in other concerted activities for the purpose of collective bargaining."

   a. Given the well-documented history of union-busting in the industry, what are the consequences if and when companies receiving CHIPS Act funds break federal law?

   b. How is NIST exploring options to support its overall mission by supporting its workers through prioritizing grant funding to companies that utilize union labor and expanded access to childcare?

   c. Will there be any claw-back provisions included in the contracts with companies receiving CHIPS funding if they engage in illegal union-busting activity?

NIST Response:
In workforce development plan submissions, applicants are required to describe their approach to meeting the Good Jobs Principles, one of which is worker empowerment and representation. Applicants are further asked to describe engagement with strategic partners, including labor unions; these responses are factored into merit review evaluations. Further, all applicants must comply with all applicable Federal labor and employment laws, including but not limited to Title VII of the Civil Rights Act of 1964, the Fair Labor Standards Act, the Occupational Safety and Health Act, and the National Labor Relations Act, the last of which protects employees' right to bargain collectively and engage in concerted activities for the purpose of workers' mutual aid or protection.

For the construction workforce, Project Labor Agreements are strongly encouraged, and applicants may describe approaches to union engagement, including through Registered Apprenticeship programs and allowing union representatives to accompany OSHA inspectors during any inspections of the site.

During the due diligence phase, DOC's CHIPS Program Office (CPO) works with applicants to confirm and further refine their workforce commitments and standards. Our team engages in these commitments directly in the due diligence process and receives technical assistance from DOL and other federal agencies regarding applicable labor standards.

All CHIPS awardees will be required to adhere to federal law in order to receive funding, including aforementioned federal labor laws that address employees' rights to join a union and bargain collectively through representatives of their own choosing. Noncompliance with federal labor laws may affect distribution of milestone payments.

Throughout all of these stages, CPO is actively engaging with applicants to ensure their awareness of their legal obligations under federal labor laws. Additionally, the Department of Commerce is committed to working with the Department of Labor and other agencies across the federal government if labor violations occur.

2. How will NIST use funding for Advanced Communication Research and Standards to build next generation communication technologies that are not just better and faster, but that are built with intentionality in improving access to opportunities for rural and underserved

populations?

NIST Response:
NIST's Advanced Communication Research and Standards development is crucial for meeting the global demand for broadband technologies and improving access for rural and underserved populations. NIST conducts fundamental research utilized by partner agencies within the Commerce Department, such as the National Telecommunications and Information Administration (NTIA), to expand broadband access to rural areas.

NIST fosters economic growth in communities by providing innovators with standards and tools to evaluate technology and data and enhancing access to system development. These efforts reduce barriers to entry for small businesses, promote vendor diversity and encourage market competition. NIST aims to lower the barrier to entry and achieve vendor diversity by developing measurement methods to quantify the ability of different vendors to interoperate with each other and develop tools for multi-vendor optimization and performance.

NIST's research contributes to a broader All-of-Commerce initiative on technology transfer, where NIST plays a key role in developing and implementing standards and tools for broadband technologies. Because NIST's work also covers privacy and security considerations of target technologies, NIST offers those insights and protections as part of the technical awareness and capabilities it shares with the communities it serves.

Examples of NIST research areas that improve access to opportunities that benefit rural and underserved communities:

- **Ensuring opportunities in Open Radio Access Networks (O-RAN).** O-RAN opens the cellular network hardware market to new vendors, including small businesses, by developing a common, open interface between network components. It could significantly reduce infrastructure costs, allowing carriers to deploy more base stations at a lower cost and expand service into previously deemed commercially unviable areas. NIST's research is creating tools and standards to ensure interoperability between components from different vendors and optimize carrier networks. NISTs development of an open source-based testbed supports low-cost component development and testing of 5G Security and RAN Intelligent Controller (RIC) prototypes for small businesses and academia. These efforts are vital for small businesses and academia to compete.
- **Improving the capabilities of the nation's first responders**. NIST has a long-term research and development collaboration with the FirstNet Authority, which provides broadband service to first responders nationwide. To ensure effective response in rural and underserved populations, NIST is:
    - Carrying out the next-generation broadband research required to ensure Mission Critical Voice (MVC) device capabilities are built to be fully functional in rural areas with sporadic cell coverage.
    - Hosting business accelerator programs targeting small businesses and innovators nationwide to drive economic growth and commercialization efforts. Each program reaches out to rural and underserved communities to ensure equal opportunities for entrepreneurs.
- **Low-cost coverage of large rural areas:** The essential technologies for providing low-cost coverage in large rural areas include low-cost high-speed long haul wireless networks, integration of terrestrial networks with satellite networks, and low-cost radio access network technologies using unlicensed frequency bands. While the FCC has recently made more spectrum available for use by unlicensed devices, it must be shared with an incumbent user

which needs to be protected. NIST's wireless coexistence research portfolio develops new methods, analysis tools and techniques for sharing the unlicensed radio spectrum while preserving incumbent systems, and expanding wireless coverage options for large rural areas.

Questions Submitted by Mr. Casten for Dr. Locascio

1. For Dr. Locascio: Can you speak briefly to what NIST is doing in detecting, monitoring, and quantifying methane emissions, and how NIST interacts with industry on that front?

NIST Response:
NIST collaborates closely with industry by engaging in partnerships, sharing expertise, and providing guidance on best practices. Through these collaborations, NIST helps industry implement accurate measurement techniques for quantifying methane emissions and ensuring compliance with regulations. In January 2024, NIST initiated multi-agency and private sector discussions aimed toward achieving measurement consistency in remote sensing of methane super-emitters, specifically, the procedures necessary for reliable detection and quantification of methane emissions, and standardization of remote sensing terminology and methodologies.

In addition, NIST develops primary gas standards and provides measurement services that enable industry to perform accurate and consistent methane measurements. NIST's ongoing research in Nobel Prize-winning technology called a frequency comb, allows for continuously and cost-effectively monitoring of methane leaks in oil and gas production facilities, landfills, wastewater treatment plants, coal mines, and natural seeps.

2. For Dr. Locascio: I've seen two contradictory pieces of information recently. We know we have to cut methane because of its massive greenhouse gas potential. A lot of research shows that it's difficult to get enough granularity on methane tracking to identify the specific source, where we can assign some culpability. NASA's Administrator Nelson has said that the satellite monitoring we have is actually good enough that we can get to that level of granularity. Do you feel at this point that we have enough granularity or do we need to do more research to get that granularity so that we can actually identify where these sources are and shut them down?

NIST Response:
Satellite-based detection of methane can be effective for detecting large leaks as well as for monitoring emission activity with a spatial resolution of approximately 60 meters. In cases where emitters are sufficiently separated, wind strength is low to moderate, source strength sufficiently large, and ownership of the supply chain is documented, effective geolocation of leaks is possible. Challenges arise with continuous monitoring, detecting smaller leaks, quantitative measurements of leaks, and resolving multiple sources located closely together.

Accordingly, there are several research projects aimed at enhancing the existing technology. First, accelerated research into the performance and calibration of localized emission measurements is essential to understanding our detection capabilities. Second, by improving sensitivity, satellites will detect smaller leaks (i.e., not super emitters) that may account for over half to two thirds of the total methane emissions. Third, ground-based and aircraft-based detection technologies can offer significantly better granularity to geolocate sources and more consistent, time-of-day- and weather-independent monitoring. Combined, these multi-tiered technologies could become particularly valuable for industrial use for routine self-monitoring, and locating of faulty equipment.

3. For Dr. Locascio: From a climate perspective, whether the United States should export

liquified natural gas (LNG) depends a lot on what we know about leakage rates in other countries. Who tracks the international releases of methane, and can they answer what are the leak rates around the world?

NIST Response:
Tracking international methane releases involves collaboration among various agencies, including international organizations, national governments, and research institutions. Efforts to track methane releases on a global scale require cooperation and coordination among these various stakeholders to ensure accurate and comprehensive data collection and analysis. NIST works closely with the U.S. agencies (such as NOAA, EPA, and NASA), international bodies (National Metrology Institutes, World Meteorological Organization, UN organizations, the UN Environment Programme's International Methane Emissions Observatory), and private organizations to advance capabilities to track methane releases on a global scale. These initial efforts aim to improve cooperation and coordination among these various stakeholders to ensure accurate and comprehensive data collection and analysis.

4. For Dr. Locascio: What is your ability to track the larger global methane balances? Do we have a good handle on the global methane balance?

NIST Response:
The global methane budget is fairly well understood from analysis of remote sensing and ground-based measurements. The Global Carbon Project asserts that "over the past two decades, emissions from natural sources haven't changed while emissions from human activities have increased significantly" https://www.globalcarbonproject.org/methanebudget/20/hl-compact.htm.

NIST works with NOAA, NASA, and other agencies to advance remote sensing standards and measurement technologies. Advances in the measurement and calibration technologies that underpin consistently accurate monitoring can advance U.S. and global capabilities to get a better handle on methane emissions. More intensive and sustained monitoring of methane is needed to better attribute methane emission sources.

Questions Submitted by Mr. Kean for Dr. Locascio

1. DR. LOCASCIO – One of the more significant funding increases NIST is requesting is in the area of artificial intelligence (AI) given your agency's mandate to develop measurements and data that address the performance and reliability of AI systems, as well as manage the risks and maximize the benefits of those systems. Given NIST's expertise in AI, I'd like to ask for your thoughts about what considerations a state might want to keep in mind as it creates an AI Innovation Hub.

NIST Response:
NIST would be happy to follow up with Representative Kean to have a more direct conversation on potential considerations.

At a high level, an approach that brings together a broad spectrum of AI researchers, industry leaders, start-up companies, and other partners, emphasizing collaborations across the board – has the potential to make great contributions to advancing innovation in AI technologies.

It is important that any effort considers both the positive and negative impacts that AI technologies may bring. Maximizing benefits and minimizing risks of AI depends on more than technical expertise. Developing and using AI responsibly can involve knowledge and skills within numerous fields including organizational governance, stakeholder engagement, risk analysis, psychology, data science, AI safety, privacy, cybersecurity, civil rights and civil liberties, and more. Ideally, AI teams will represent a diversity of experience, expertise, and backgrounds. It will be important that those considerations be taken into account right from the start of any collaborative AI undertaking.

Further, an approach that provides support to advance research and development, and provides access to dedicated accelerator space, and opportunities to pilot the use of ethical AI for positive societal impact, would be advantageous. Building on the NIST AI Risk Management Framework (AI RMF), and its associated resources, could also be a good starting point for any hub and NIST would be pleased to engage with leaders and participants in the hub if they decide to operationalize this framework.

2. Just last month, my home States of New Jersey held its first ever AI Summit, jointly hosted by the New Jersey Economic Development Authority and Princeton University, that focused on the creation of an AI Hub that will advance New Jersey's leadership in the field and spur innovation in the development of new AI technologies. Millions of dollars, and man hours, will be dedicated to this endeavor, and there is an active RFI open seeking input to guide and identify future partnerships, resource needs, and contributions that will be needed to make this hub a success.

    a. With that in mind, and having the expertise that you do, what advice would you give to the state of New Jersey in the establishment of this Hub that you believe would deliver the most jobs, the greatest return on investment, and largest benefit to society as a whole?

NIST Response:
Again, NIST would be happy to have NIST subject matter experts follow up directly to provide more robust input. Some things to consider could include:

Reviewing the recommendations from the National AI Research Resource, or NAIRR, Task Force, of which NIST was a member. That group developed a roadmap for standing up a national research

infrastructure that would broaden access to the AI resources essential to research and development. New Jersey may find related initiatives to be especially relevant and of interest as it moves forward with its AI Innovation Hub. Many of the recommendations from the task force have been put into practice during an ongoing two-year multi-partner pilot of the NAIRR concept (see nairrpilot.org). To date, the NAIRR has awarded over 150 allocations of computing time for AI research, two of which have been awarded to researchers in New Jersey (Rutgers and the Stevens Institute of Technology).

Consider using the guidance being offered by NIST and other agencies carrying out the President's Executive Order on Safe, Secure, and Trustworthy Artificial Intelligence as a starting point. NIST's draft guidance, much of which will be finalized soon after incorporating public comments, is available online.

A variety of other NIST and Department of Commerce resources, including many that relate to measurements, standards, guidelines, and leading practices, are publicly available. The Department of Commerce workforce development strategy offers several key principles aimed at creating conditions for economic growth. For example, the AI Innovation Hub may consider building sustainable systems and partnerships, to includes partners like educational institutions, labor unions, and community-based and economic development organizations.

Questions Submitted by Ms. Stevens for Dr. Locascio

1. NIST plays a critical role in developing next-generation biotechnology and biomanufacturing, including through publishing a bioeconomy lexicon, convening stakeholders to inform biometrology, and understanding risks and mitigation associated with nucleic acid synthesis. With the global bioeconomy being estimated to be valued at $4 trillion with many countries vying for leadership in this space, including China, it is imperative that NIST continue to support U.S. leadership in this emerging field.

    a. Why are NIST activities on biometrology and other standardization activities key to the development of both scientific advancements and necessary regulatory frameworks by other federal agencies, especially with the growing convergence of AI and biotechnology?

NIST Response:
Standards provide the baseline against which all stakeholders can compare and collaborate, thereby ensuring the quality and precision of a product. NIST is focused on providing standards and measurement services that are key to advancing the entire sector. Additionally, biotechnology and biomanufacturing stakeholders recognize and trust that NIST provides unbiased measurement services and publicly available tools and standards that are needed to ensure companies are able to rapidly and accurately assess whether they are meeting regulatory guidelines. With the growing convergence of AI and biotechnology, of which NIST has unique expertise, products can be discovered and generated faster than ever before; but this also increases the risk of the development of hazardous bioproducts. The best practices, references, and data sets being developed by NIST, if sufficiently supported, can provide the guidance and tools to enable the safe development of new biotechnologies. Within one organization, NIST can bring together world-leading experts in biometrology, artificial intelligence, and cybersecurity, and data management so that the U.S. can realize the benefits of a growing bioeconomy and maintain leadership for economic and national security.

2. How will the budget cuts in Fiscal Year 2024, combined with NIST's focus on other emerging technologies, affect ongoing biometrology activities? Where would delay or foregone NIST activities in biometrology leave the United States leadership in this sector?

NIST Response:
With the Fiscal Year 2024 reductions to NIST's research budget, NIST was unable to increase investments in critical and emerging technology areas, including biotechnology and biomanufacturing. Foreign competitors such as China are annually investing multi-billions of dollars in biotechnology and biomanufacturing as they see the bioeconomy as being pivotal to economic and national security. While NIST is making progress in biotechnology efforts, a significant and sustained investment is needed to keep pace with the ever-increasing measurement and standards needs of this fast-growing industry, aligned with the President's landmark FY 2022 Biotechnology and Biomanufacturing Executive Order. Otherwise, U.S. leadership may be ceded to foreign competitors. Additionally, if NIST is not sufficiently funded to support American and international standards in biotechnology, then biotechnology products from the U.S. will have to meet the standards set by other countries or risk other countries refusing to import U.S. products.

Questions Submitted by Ms. Salinas for Dr. Locascio

1. In a letter my colleagues and I sent to Secretary Raimondo earlier this year, we asked the Secretary to ensure jobs created with funding from the CHIPS and Science Act are good, safe, community-sustaining jobs. We asked the Secretary to bring organized labor to the table and encourage the use of project labor agreements and community benefit agreements to ensure jobs created by the CHIPS and Science Act are truly high quality.

    a. What enforceable commitments has NIST secured to ensure semiconductor manufacturing workers enjoy a free and fair choice to join a union?

NIST Response:
As part of the process of applying to receive CHIPS funds, applicants must address their approach to meeting the Good Jobs Principles for both the facilities and construction workforce, jointly developed by the Departments of Labor and Commerce; one of these principles is worker empowerment and representation. Applicants are further asked to describe engagement with strategic partners, including labor unions; these responses are factored into merit review evaluations. Finally, all applicants must comply with all applicable Federal labor and employment laws, including but not limited to Title VII of the Civil Rights Act of 1964, the Fair Labor Standards Act, the Occupational Safety and Health Act, and the National Labor Relations Act, the last of which protects employees' right to bargain collectively and engage in concerted activities for the purpose of workers' mutual aid or protection.

During the due diligence phase, DOC's CHIPS Program Office (CPO) works with applicants to confirm and further refine their workforce commitments and standards. CPO is in the process of developing award terms with applicants. The due diligence process includes discussions with applicants on a variety of workforce development priorities previously outlined in CHIPS for America's "Principles for Engagement with CHIPS Applicants During Due Diligence Phase to Ensure a Skilled and Diverse Workforce" fact sheet, such as training, curriculum design, and education investments, accessible and affordable childcare, and adherence to employment and worker safety standards. Workforce commitments are subject to negotiation with applicants. Additionally, our team regularly works with relevant federal agencies to engage in these commitments directly and receives technical assistance from DOL and other federal agencies regarding applicable labor standards.

Throughout all of these stages, CPO is actively engaging with applicants to ensure their awareness of their legal obligations under federal labor laws. Additionally, the Department of Commerce is committed to working with the Department of Labor and other agencies across the federal government if labor violations occur.

2. Oregon is already leading the way in semiconductor research and development (R&D), including through a National Science Regional Innovation Engine and an Economic Development Administration Tech Hub: both focused on semiconductor innovation and both including strong community and industry partnerships. Industry in Oregon stands ready to deploy its resources to support additional CHIPS and Science R&D efforts. Of particular interest is the National Semiconductor Technology Center (NSTC), as Oregon's existing infrastructure uniquely positions the state to serve as a hub for domestic research and development.

    a. Will NIST release a roadmap for NSTC activities, and if so when can we expect

to see that?

NIST Response:
On May 24, 2024, CHIPS for America and Natcast, the operator of the National Semiconductor Technology Center (NSTC), released a roadmap outlining a vision for progress in 2024.

The roadmap highlights some of the top priorities of the NSTC including facilities, workforce, initial R&D funding opportunities, and membership.

The roadmap can be viewed on the CHIPS website at https://www.nist.gov/chips/research-development-programs/national-semiconductor-technology-center or at https://www.nist.gov/system/files/documents/2024/05/24/NSTC%20Roadmap_FINAL.pdf

3. I was pleased to see recent R&D funding opportunity announcements. When can we expect additional announcements, and what is the time horizon for awarding the $11 billion in total R&D funding?

NIST Response:
The CHIPS and Science Act appropriated $39 billion to the Department of Commerce in funding to onshore semiconductor manufacturing through an incentives program. The appropriation also separately included $11 billion to advance U.S. leadership in semiconductor R&D through four programs: the CHIPS National Semiconductor Technology Center (NSTC) Program, the CHIPS National Advanced Packaging Manufacturing Program (NAPMP), the CHIPS Manufacturing USA Program, and the CHIPS Metrology Program. The CHIPS R&D Office (CRDO) continues to make progress on advancing these historic R&D programs.

As previously announced, the Commerce Department expects to invest over $5 billion of CHIPS funds in the NSTC over the decade, and approximately $3 billion in additional funding for the National Advanced Packaging Manufacturing Program to drive U.S. leadership in advanced packaging.

On May 6, 2024, the Commerce Department released a Notice of Funding Opportunity (NOFO) seeking proposals from eligible applicants for activities to establish and operate a CHIPS Manufacturing USA institute focused on digital twins for the semiconductor industry. The CHIPS for America program anticipates up to approximately $285 million for a first-of-its kind institute focused on the development, validation, and use of digital twins for semiconductor manufacturing, advanced packaging, assembly, and test processes.

On July 1, 2024, Natcast released the first workforce funding opportunity for the NSTC – the NSTC Workforce Partner Alliance (WFPA) program. The program will invest in initiatives addressing critical U.S. job and skill gaps across semiconductor design, manufacturing, and production. This initial workforce program plans to make awards to 4-10 high-impact projects. Project proposals will be one to two years in duration with a total budget between $500,000 and $2 million per award. The WFPA is the first of several anticipated workforce program funding opportunities to be offered through the NSTC.

On October 18, 2024, the U.S. Department of Commerce issued a Notice of Funding Opportunity (NOFO) to enable the United States semiconductor industry to adopt innovative new advanced packaging flows for semiconductor technologies. CHIPS for America anticipates making available up to approximately $1.6 billion for funding multiple awards across five research and development (R&D) areas with the potential for follow-on funding for prototyping activities. Anticipated amounts will vary by R&D area and range from approximately $10 million to approximately $150 million in Federal funds

per award, with awards being made over a five-year period of performance. Additionally, CHIPS for America anticipates reserving up to $50 million to support awardees' future prototyping activities, to be conducted at the anticipated National Semiconductor Technology Center (NSTC) Prototyping and NAPMP Advanced Packaging Piloting Facility.

On May 22, 2024, the U.S. Department of Commerce announced that eight teams have been selected to submit full applications for the National Advanced Packaging Manufacturing Program (NAPMP) funding opportunity for materials and substrate materials. The funding opportunity, released in February 2024, requested applications for research and development (R&D) activities that will establish and accelerate domestic capacity for advanced packaging substrates and substrate materials, a key technology for manufacturing semiconductors. Final projects will play a vital role in helping to ensure that American innovation drives cutting-edge developments in semiconductor R&D and manufacturing. The CHIPS for America program anticipates awarding approximately $300 million in amounts up to approximately $100 million over up to 5 years per award. Program awards may be leveraged by voluntary co-investment. Within a decade, through R&D funded by CHIPS for America, we will create a domestic packaging industry where advanced node chips manufactured in the U.S. and abroad can be packaged within the United States and where innovative designs and architectures are enabled through leading-edge packaging capabilities.

On October 2, 2024, the U.S. Department of Commerce issued a Notice of Intent (NOI) to open competition for Artificial Intelligence-powered Autonomous Experimentation (AI/AE) for Sustainable Semiconductor Materials, meeting industry needs to accelerate innovation in materials and processes that incorporate sustainability metrics while continuing to advance the state of the art in performance, power, area, and cost metrics of semiconductors.

On June 28, 2024, Natcast released the first call for proposals for the NSTC's initial research and development (R&D) programs. This first NSTC R&D program will address the domestic RF IC (Radio Frequency Integrated Circuit) industry and is focused on the adaptation of Artificial Intelligence (AI) and Machine Learning (ML) technology for use in RF design. Natcast announced awards for up to $30 million across multiple projects.

On August 21, 2024. Natcast released a call for proposals for a Test Vehicle Innovation Pipeline (TVIP). The program will fund shared test vehicles comprised of common sets of standardized processes with reusable masks or partially fabricated wafers. Developing a comprehensive set of test vehicles will accelerate the "lab-to-fab" transition by reducing non-recurring engineering costs and accelerating cycles of learning. Total program award funding of up to $55M is anticipated with 4-12 awards.

Natcast has also announced its intent to launch a new Early R&D program on polyfluoroalkyl substance (PFAS) reduction and innovation in semiconductor manufacturing (PRISM), dedicating approximately $35M across 8-12 awards for analysis, sensing, abatement, and modeling efforts related to end-to-end PFAS mitigation capabilities.

The CHIPS Metrology Program is building partnerships between researchers and industry to address the microelectronics industry's grand challenges. In the first year, CHIPS for America has awarded over $100 million in funding across 30 projects that are helping to develop new instruments, methods, data analysis, and models and simulations. More funding opportunities will be announced in the coming months.

In July 2024, the Department of Commerce and the U.S. National Science Foundation (NSF) announced a new $30 million funding opportunity to establish the Network Coordination Hub that will manage the National Network for Microelectronics Education (NNME). As specified in the CHIPS and Science Act

of 2022, the NNME is envisioned as an up to $200 million investment in the next generation of talent, spanning the full range of jobs and levels, necessary for the long-term success of the U.S. semiconductor and microelectronics industry.

CHIPS for America is bridging the gap between industry and R&D. With strategic investments in R&D complementing targeted industry incentives, CHIPS for America will not only bring semiconductor manufacturing back to the U.S. – it will keep it here for good.

4. The agency announced Natcast, a new, purpose-built non-profit created to operate the National Semiconductor Technology Center (NSTC) consortium. Currently, Natcast is asking entities to join the "NSTC Community of Interest" to provide input as the NSTC progresses. Natcast specifically calls for "educational institutions of all sizes and focus) including community colleges" to join.

    a. How would you like to see the NSTC address semiconductor workforce training, and how are you ensuring that community and technical colleges are getting the proactive outreach they need to be full partners in these efforts?

NIST Response:
On September 30, 2024, Natcast, the purpose-built, non-profit entity designated to operate the National Semiconductor Technology Center (NSTC) by the U.S. Department of Commerce, announced the official launch of the NSTC Membership program. NSTC members can benefit from dynamic and cross-sector collaboration; access to leading-edge R&D facilities; development of member-driven research agendas; unique opportunities to research, prototype, and scale up semiconductor technologies; and workforce best practices and initiatives developed through the NSTC Workforce Center of Excellence. These resources, several of which are planned to become available throughout 2025, are aimed at reducing barriers for members to bring new technologies from lab-to-fab as well as supporting member efforts to build and sustain a strong U.S. semiconductor workforce development ecosystem.

The Department of Commerce expects to invest hundreds of millions in the NSTC's workforce efforts, including the creation of a Workforce Center of Excellence to support efforts across the country.

NSTC's Workforce Center of Excellence (WCoE) aims to ensure that individuals at all stages of life have access to education and training that prepares them for good jobs in the semiconductor industry. The WCoE will build a community of stakeholders and facilitate resource sharing among employers, educational institutions, and training providers, such as universities, community and technical colleges, labor unions, workforce development boards, and research organizations. The WCoE will identify and promote evidence-based, innovations and successful solutions, guide future WCoE investments, and inform the development of capacity-building initiatives. Additionally, the WCoE will pilot new efforts and scale effective and equitable education and workforce development programs, including those serving underserved communities.

On July 1, 2024, Natcast released the first workforce funding opportunity for the NSTC Workforce Partner Alliance (WFPA) program. This funding opportunity seeks to invest in training and educational support for American workers, who are essential to extending U.S. leadership in foundational technologies and strengthening the U.S. semiconductor ecosystem. Through this program, the NSTC intends to fund projects or scale existing programs that address critical workforce needs within the semiconductor industry in the U.S. This program will specifically focus on closing workforce and skills gaps in the United States for researchers, engineers, and technicians involved in semiconductor design, manufacturing, and production.

The NSTC WFPA program encourages a wide range of workforce solution providers to apply, including established programs with a track record of success seeking to scale, growing programs seeking to expand or realign, and new programs that meet a previously unaddressed need, opportunity, or theory of change. All entities that provide semiconductor-related education or training programs, products, or activities developed to prepare, encourage, motivate, or enable individuals to obtain the skills or credentials required for semiconductor jobs (or otherwise enhance access to semiconductor jobs) are encouraged to apply. The WFPA is the first of several anticipated workforce program funding opportunities to be offered through the NSTC.