

**LESS HYPE, MORE HELP: AI THAT IMPROVES  
SAFETY, PRODUCTIVITY, AND CARE**

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**HEARING**

BEFORE THE

SUBCOMMITTEE ON SCIENCE, MANUFACTURING,  
AND COMPETITIVENESS

OF THE

COMMITTEE ON COMMERCE,  
SCIENCE, AND TRANSPORTATION  
UNITED STATES SENATE

ONE HUNDRED NINETEENTH CONGRESS

SECOND SESSION

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MARCH 3, 2026

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SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED NINETEENTH CONGRESS

SECOND SESSION

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## **LESS HYPE, MORE HELP: AI THAT IMPROVES SAFETY, PRODUCTIVITY, AND CARE**

**TUESDAY, MARCH 3, 2026**

U.S. SENATE,  
SUBCOMMITTEE ON SCIENCE, MANUFACTURING, AND  
COMPETITIVENESS,  
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,  
*Washington, DC.*

The Subcommittee met, pursuant to notice, at 10:15 a.m., in room SR-253, Russell Senate Office Building, Hon. Ted Budd, Chairman of the Subcommittee, presiding.

Present: Senators Budd [presiding], Cruz, Blackburn, Young, Moreno, Baldwin, Cantwell, Hickenlooper, Blunt Rochester, and Rosen.

### **OPENING STATEMENT OF HON. TED BUDD, U.S. SENATOR FROM NORTH CAROLINA**

Senator BUDD. This hearing will come to order. Good morning, everyone. Thank you all for being here.

I recognize myself for opening remarks, and thank you, Ranking Member Baldwin and Chairman Cruz, Ranking Member Cantwell, and our witnesses for working to put this important hearing together.

Artificial intelligence will undoubtedly usher in significant improvements in quality of life for the American people. It will make many workplaces safer and more productive, helping to increase output, raise wages, and grow the economy.

It will enhance manufacturing capabilities, especially those of critical importance to our economic and national security such as semiconductors and those in the defense industrial base.

It will make it easier to reshore manufacturing through human-enhancing automation and digital twinning simulation.

Smart systems and devices have the potential to revolutionize health care, improving early detection of diseases such as cancer, and helping people with disabilities live better lives, not by replacing doctors but by augmenting their diagnostic and treatment capabilities.

AI-enabled research, aided by self-driving cloud labs, could massively reduce barriers to the discovery of new drugs. AI's potential in the health care industry presents unique opportunities to save and improve lives.

I have also noted that as I travel the state, some North Carolinians share concerns about the growth of AI in automated or autonomous technology.

There is a natural hesitancy toward technology that may disrupt incumbent industries or systems. It is normal to worry about the impacts of advancements on your job, your children, and your community.

But if we have learned anything from our history, it is that innovation is the lifeblood of the American economy. Our nation's story has been shaped by technological advancements that have time and time again expanded prosperity and improved outcomes.

I believe that AI, deployed in numerous ingenious ways, can help people be better versions of themselves in their daily lives.

For those of us in this room, it is our job to listen to those concerns and to work together in a bipartisan fashion to address potential harms so that our Nation can reap the tremendous benefits that AI has to offer.

As I have said before, winning the AI race against China is paramount for our national and economic security. The administration is leaning in and providing important leadership, ongoing work to first identify and then to aid in the export of the American AI stack.

From hardware to software, it will ensure that global AI diffusion and standards are anchored in American values. The Genesis Mission will build upon America's scientific dominance by networking together world-class labs, computing power, and datasets to turbo charge scientific discovery.

The diffusion of AI into the economy will be a critical dimension in this race. According to one report, AI is the most rapidly adopted general purpose technology in history with three in five U.S. adults surveyed having used AI less than 3 years after its release.

However, other studies have found that U.S. businesses can lag their Asian and even European peers in enterprise adoption of AI tools.

I am concerned that China, given its top-down command-and-control structure, deep and sophisticated manufacturing industry, and open-source heavy AI ecosystem is in a prime position to diffuse AI quickly and broadly.

Achieving a manufacturing renaissance in America is as bipartisan and deeply held a goal as any in Congress. Given demographic realities such as an aging, skilled workforce, and stalled population growth, we will need to diffuse and scale smart technologies and processes to make more critical goods domestically.

I am excited to discuss many of these technologies and systems today. Our witnesses are at the front lines and cutting edge of making our economy and our daily lives smarter.

I look forward to hearing from them about what excites them, what concerns them, and roadblocks we in Congress can address.

Ranking Member, do you have any comments?

Senator BALDWIN. Absolutely.

Senator BUDD. All right.

**STATEMENT OF HON. TAMMY BALDWIN,  
U.S. SENATOR FROM WISCONSIN**

Senator BALDWIN. Thank you so much, Mr. Chairman, and thank you to the witnesses who are appearing before our subcommittee today.

Given the focus of today's hearing, I wanted to begin by raising the troubling news from last week regarding the Trump administration's actions to force artificial intelligence companies to deploy systems without guardrails and safety measures.

Anthropic refused to have their technology used for mass surveillance of Americans or for the deployment of autonomous weapons without human oversight. The Trump administration then labeled Anthropic as a security risk, and Secretary Hegseth has taken the unprecedented step to blacklist the company.

Our witnesses are here to testify about how artificial intelligence can be used to improve worker safety and efficiency, but we cannot ignore the stakes at play here. Workers and consumers alike are rightfully worried about the deployment of AI systems.

A study done by Stanford last year found that 45 percent of workers expressed concerns about the accuracy and reliability of AI systems. Twenty-three percent feared job displacement and 16 percent worried about a lack of human oversight built into the systems.

And that does not even begin to touch on the concerns regarding privacy, intellectual property, and energy use that comes along with AI.

But if designed with workers at the table during all stages, from research and development to deployment to negotiating guardrails with employers, artificial intelligence has the potential to improve productivity, reduce safety risks, and ease burnout in the workplace.

The best innovations come from the factory floor. The people actually doing the work know better than any senior executive what the needs, inefficiency, and liabilities are day to day.

So I look forward to hearing our witnesses today and, again, thank you for being here.

Senator BUDD. I thank the Ranking Member.

I would like to introduce our witnesses for the day. Our first witness is Demetri—and help me on this one, OK? Pronounce your last name for me.

Mr. GIANNIKOPOULOS. Giannikopoulos.

Senator BUDD. I even have a phonetic spelling here, but thank you for that.

Mr. Giannikopoulos is the Chief Innovation Officer at Rad AI, a San Francisco-based company using AI to help radiologists save time on reporting, allowing them to spend more time on patient care. His experience applying new technologies to health care spans over two decades.

Our second witness is Brittany Ng. Ms. Ng is Vice President at Siemens Digital Innovative Industry Software. Ms. Ng is an expert in business matters and she has extensive expertise in the deployment of AI across manufacturing context.

Our third witness is Damion Shelton. Dr. Shelton is Co-Founder and Chairman of the Board at Agility Robotics. He has almost two decades of experience in academia, innovation, and business, and Dr. Shelton founded two highly successful robotics companies.

Our final witness is Mark Muro. Mr. Muro is a Senior Fellow at the Metropolitan Policy Program at the Brookings Institution. At

Brookings, his research focuses on how technology development plays out differently across regions.

All right. Mr. Giannikopoulos, you are recognized to deliver your open statement if you are ready.

**STATEMENT OF DEMETRI GIANNIKOPOULOS,  
CHIEF INNOVATION OFFICER, RAD AI**

Mr. GIANNIKOPOULOS. Chairman, Ranking Member, and members of the Subcommittee, thank you for the opportunity to testify.

I come before you as a health care AI expert who has deployed artificial intelligence nationwide, as a caregiver who has supported my wife through cancer, as the spouse of a nurse practitioner with more than a decade of frontline primary care experience, and as a patient who has lived with multiple sclerosis for more than two decades.

These experiences have shaped who I am and are why I am here today. They have fueled my more than 20-year career in health care. They have given me a firsthand view of how care is delivered, how decisions are made, and what happens when the system works and when it does not.

In each of these roles, I have seen the same reality. Outcomes often hinge on whether a diagnosis is made quickly and accurately, because in health care the most dangerous failure is not a machine failure. It is a missed or delayed diagnosis.

Research from Johns Hopkins Medicine estimates that nearly 800,000 Americans each year die or are permanently disabled because of diagnostic error. Extensive research has shown that errors often occur because clinicians are operating within an increasingly complex and strained health care system, managing rising volumes, time pressures, and expanding information.

Imagine a patient arriving in a community emergency department with sudden chest pain. A CT is performed. The cause is something rare but deadly—an aortic dissection, a tear in the body's main artery. Without rapid diagnosis and treatment, a quarter of patients can die within 48 hours.

Today, AI is helping at multiple points in that patient's care. Within minutes, AI can analyze the images and help flag the findings so it is reviewed immediately.

When the radiologist opens the case, AI can help integrate trusted clinical guidance directly into their workflow, drawing on peer-reviewed evidence developed through organizations like the Radiological Society of North America.

It does not replace the physician. It strengthens competence and trust in the diagnosis. Once the diagnosis is made, the care team must act quickly. The patient may need to be transferred for life-saving surgery.

AI can help ensure the diagnosis is clearly communicated, documented efficiently, and shared across care teams so treatment can begin without delay.

That is productivity. That is coordinated care. Research published by the American Heart Association shows that coordinated care pathways for aortic dissection reduce delays and improve survival.

We see the same reality in stroke care, where every minute of delay risks permanent death of millions of brain cells, controlling vital functions of the body. Faster diagnosis and transfer can mean survival and less disability.

But the story does not end there. That same scan may reveal a quiet lung mass—not an emergency today, but something that must be followed carefully. AI can help ensure follow-up imaging is scheduled, care teams are alerted, and patients do not fall through the cracks months or years later.

Unfortunately, over half of patients never receive the follow-up care their conditions require. For those Americans, the risk is not theoretical. It becomes their reality.

That is, this is not just about efficiency. It is about trust. We are asking clinicians to manage rising imaging volumes, expanding documentation requirements, and increasingly complex patient needs, while the health care workforce is shrinking and burnout remains high.

AI, when implemented responsibly, is not replacing clinicians. It is acting as a pressure release valve, helping reduce cognitive burden and supporting clinicians in delivering safe and timely care.

I have deployed both FDA-cleared AI tools and other clinical software that does not require FDA clearance. In both cases, these systems undergo extensive clinical, privacy, and governance reviews before deployment.

Physicians remain responsible for patient care, and their tools—these tools operate within existing health care laws and professional accountability frameworks.

Based on my experience deploying these systems nationwide, the most important determinant of safety is not only how they are evaluated before deployment, but how they are governed, monitored, and supported once they are in clinical use.

This is where thoughtful lifecycle governance and consistent national standards are essential. This is especially important for rural and underserved communities, where access to subspecialty expertise may be limited.

AI can help extend the reach of clinical expertise and support clinicians caring for patients, regardless of geography and access to local resources. AI is most powerful not when it replaces human judgment, but when it strengthens it.

AI will not replace physicians. It will help them do what they train their entire lives to do, care for patients.

Less hype, more help—that is not a future promise. It is happening today, because behind every scan is a person, a family, and a moment where getting the diagnosis right can change everything.

Thank you. I look forward to your questions.

[The prepared statement of Mr. Giannikopoulos follows:]

PREPARED STATEMENT OF DEMETRI GIANNIKOPOULOS, CHIEF INNOVATION OFFICER,  
RAD AI

### **Introduction**

Chairman, Ranking Member, and Members of the Subcommittee:

Thank you for the opportunity to testify today on the role artificial intelligence can play in strengthening healthcare for patients and clinicians across the United States.

My name is Demetri Giannikopoulos, and I serve as Chief Innovation Officer at Rad AI, where I oversee the development and responsible clinical integration of artificial intelligence technologies used by radiologists and health systems nationwide. My work focuses on ensuring these systems are safely integrated into clinical workflows, support physicians in delivering accurate and timely diagnoses, and help strengthen care coordination and patient outcomes.

I previously served as Chief Transformation Officer at Aidoc, where I led the clinical, operational, and governance protocol transformation required to safely integrate multiple FDA-cleared artificial intelligence medical devices into frontline physician workflows across health systems nationwide. This work involved close collaboration with clinicians, health system leadership, and regulatory stakeholders to ensure these technologies functioned reliably in real-world clinical environments and strengthened, rather than disrupted, the delivery of patient care.

In parallel, I have been actively involved in national governance efforts focused on establishing standards for responsible artificial intelligence in healthcare. I participate in the Applied Model Card Workgroup of the Coalition for Health AI, a clinician-led coalition advancing transparency, accountability, and safety in healthcare artificial intelligence. I also serve on the Artificial Intelligence Accreditation Advisory Committee for URAC, where we are developing accreditation frameworks to help ensure artificial intelligence is implemented safely, consistently, and responsibly across diverse healthcare settings.

I have also served on the Patient and Family Centered Care Clinical Excellence Committee of the American College of Radiology, where I contributed to the development of the *Scanxiety Toolkit*, which addresses the anxiety patients experience while waiting for imaging results. I bring this perspective not only through my professional work, but also through personal experience. I supported my wife through her cancer diagnosis and treatment, and I have also lived for more than two decades as a patient with multiple sclerosis, undergoing regular imaging and waiting for results that help determine the course of my care. These experiences reinforced for me how deeply patients and families depend on timely, accurate diagnosis, and clear communication during some of the most vulnerable moments of their lives.

Together, these experiences have given me a comprehensive perspective on both the extraordinary potential and the profound responsibility associated with integrating artificial intelligence into the practice of medicine. Artificial intelligence in healthcare has reached an inflection point. The central question is no longer whether these technologies are promising, but how they perform in real clinical environments and whether they meaningfully improve safety, productivity, and patient care.

### Imaging as a Critical Component of Modern Diagnosis

Radiology plays a foundational role in modern medicine. Imaging is often the step that confirms a diagnosis, rules out life-threatening conditions, and determines the course of treatment. That matters because diagnostic error remains a major source of preventable harm. Research from Johns Hopkins Medicine, published in *BMJ Quality & Safety*, estimates that each year nearly 800,000 Americans die or are permanently disabled because of diagnostic error.<sup>1</sup> Conditions such as aortic dissection and stroke are among the exact types of time-sensitive diagnoses that contribute to that harm.

Acute aortic dissection is a race against the clock. National cardiology guidelines tell us that for dissections involving the ascending aorta, the risk of death rises by about 1 to 2 percent every hour without treatment.<sup>2</sup> And we see the impact of that urgency very clearly. Nearly one in four patients treated with medication alone died within two days, compared to fewer than one in twenty patients who received surgery.<sup>3</sup>

Stroke care follows the same pattern. Nearly 1.9 million neurons are lost each minute that treatment is delayed.<sup>4</sup> In both cases, rapid imaging is what makes

<sup>1</sup>David E. Newman-Toker *et al.*, Burden of Serious Harms from Diagnostic Error in the USA, *BMJ Quality & Safety* (2023), <https://pubmed.ncbi.nlm.nih.gov/37460118/>.

<sup>2</sup>2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease (James de Lemos *et al.*, eds., American College of Cardiology/American Heart Association 2022) (noting that acute aortic dissection of the ascending aorta is “highly lethal in symptomatic patients left untreated, with an early mortality of 1 percent to 2 percent per hour after symptom onset”), <https://www.ahajournals.org/doi/10.1161/CIR.0000000000001106>.

<sup>3</sup>Kevin M. Harris *et al.*, Early Mortality in Type A Acute Aortic Dissection: Insights From the International Registry of Acute Aortic Dissection, *JAMA Cardiology* (2022), <https://jamanetwork.com/journals/jamacardiology/fullarticle/2795672>.

<sup>4</sup>Jeffrey L. Saver, Time Is Brain—Quantified, 37 *Stroke* 263 (2006), <https://pubmed.ncbi.nlm.nih.gov/16339467/>.

timely treatment possible. It is what allows physicians to see the problem, make the diagnosis, and act before irreversible harm occurs. In these moments, imaging is not just diagnostic. It is decisive.

Artificial intelligence can help strengthen this process. It can flag life-threatening findings for rapid physician review, support accurate interpretation, and help ensure that critical diagnoses are communicated quickly so patients receive the care they need without delay. This responsibility exists across all healthcare settings, including rural and community hospitals where subspecialty expertise may not always be immediately available. Artificial intelligence can help reinforce this diagnostic infrastructure, supporting clinicians in delivering timely and accurate care regardless of geography.

### Artificial Intelligence Across the Diagnostic Continuum

Artificial intelligence supports care across the full diagnostic continuum, from triage to interpretation to communication and follow-up.

The first stage is triage and prioritization. Artificial intelligence can analyze imaging studies shortly after acquisition and help identify findings that require urgent attention. This helps ensure that time-sensitive conditions are reviewed promptly, improving patient safety.

The second stage is interpretation. Artificial intelligence can help integrate trusted clinical knowledge and evidence directly into physician workflows, supporting radiologists as they make diagnostic decisions. These tools support clinicians, not replace them, and help improve consistency and efficiency in care delivery. Artificial intelligence can also improve clinical documentation and communication by helping ensure diagnoses are clearly recorded, reports are completed efficiently, and information is shared accurately across care teams. This supports faster clinical action and reduces delays in treatment.

The third stage is follow-up and longitudinal care. Imaging frequently identifies findings that require monitoring over time, yet failure to complete recommended follow-up remains a significant patient safety challenge. In one large academic health system study, only about half of patients completed recommended follow-up imaging, with completion rates of just 51.9 percent at one institution and 52.0 percent at another.<sup>5</sup> Similarly, studies of pulmonary nodules have shown that more than half of patients may not receive recommended follow-up imaging.<sup>6</sup>

Artificial intelligence systems can help address this gap by identifying patients who need follow-up, tracking whether that care occurs, and supporting care teams in closing the loop. This helps ensure that important findings do not fall through the cracks and that patients receive the care they need. Together, these capabilities improve safety, strengthen productivity, and support better care for patients.

### Workforce Challenges and Cognitive Burden

Healthcare systems today face growing workforce challenges. Imaging volume has increased substantially over time, while workforce growth has not kept pace with demand.<sup>7</sup> This imbalance reflects broader trends in healthcare, driven by population aging and expanded reliance on diagnostic imaging. At the same time, clinician exhaustion, cognitive overload, and burnout remains widespread, affecting a substantial portion of the clinical workforce.<sup>8</sup>

Artificial intelligence can help address this challenge by improving productivity, reducing administrative burden, and supporting clinicians as they manage increasing workload demands. A recent task-based analysis by Dr. Curtis Langlotz of Stanford University, the immediate past President of the Radiological Society of North America, projects that artificial intelligence could significantly reduce the time radiologists spend on certain tasks, particularly report drafting and workflow coordination. However, the study also concludes that because imaging demand continues to grow and the radiology workforce has remained relatively stable, artificial intel-

<sup>5</sup>Thusitha Mabotuwana *et al.*, Automated Tracking of Follow-Up Imaging Recommendations, *Am. J. Roentgenology* (2019), <https://ajronline.org/doi/full/10.2214/AJR.18.20586>.

<sup>6</sup>Denitza P. Blagev *et al.*, Follow-up of Incidental Pulmonary Nodules and the Radiology Report, 11 *J. Am. Coll. Radiology* 378 (2014), <https://pubmed.ncbi.nlm.nih.gov/24316231/>.

<sup>7</sup>Eric C. Christensen *et al.*, Projecting the Future Radiologist Workforce Supply in the United States Through 2055, 21 *J. Am. Coll. Radiology* (2024); Eric C. Christensen *et al.*, Projecting Imaging Utilization in the United States Through 2055, 21 *J. Am. Coll. Radiology* (2024), [https://www.jacr.org/article/S1546-1440\(24\)00898-6/fulltext](https://www.jacr.org/article/S1546-1440(24)00898-6/fulltext), [https://www.jacr.org/article/S1546-1440\(24\)00909-8/fulltext](https://www.jacr.org/article/S1546-1440(24)00909-8/fulltext).

<sup>8</sup>Tait D. Shanafelt *et al.*, Changes in Burnout and Satisfaction With Work–Life Integration in Physicians and the General U.S. Working Population Between 2011 and 2023, 100 *Mayo Clinic Proc.* 1142 (2025), [https://www.mayoclinicproceedings.org/article/S0025-6196\(24\)00668-2/fulltext](https://www.mayoclinicproceedings.org/article/S0025-6196(24)00668-2/fulltext).

ligence is unlikely to eliminate the need for radiologists.<sup>9</sup> Instead, these technologies are expected to help clinicians work more efficiently and focus more of their time on direct patient care.

In addition to improving efficiency, artificial intelligence can help reduce cognitive burden by assisting with information management, documentation, and follow-up tracking. This support helps clinicians focus their attention on patient care and clinical decision making, which is especially important as workforce shortages and burnout continue to affect healthcare nationwide. Artificial intelligence supports clinicians; it does not replace them.

### Improving Access to Care

Healthcare access challenges are particularly acute in rural and underserved communities. More than 46 million Americans live in rural areas, where access to specialists may be limited.<sup>10</sup> Many rural hospitals operate with constrained clinical staffing and may not have immediate access to subspecialty expertise, including radiologists with advanced training in specific conditions.

Artificial intelligence can help address these gaps by supporting clinicians in delivering timely and effective care. For example, artificial intelligence can help identify urgent findings, assist with interpretation, and ensure that critical results are communicated promptly. These capabilities help clinicians work more efficiently and reduce the risk that important findings are delayed or missed. Ensuring that patients receive consistent, high-quality diagnostic care regardless of geography is one of the most important opportunities for artificial intelligence to improve healthcare nationally.

### Governance, Oversight, and Accountability

The safe and effective use of artificial intelligence requires strong governance, clear accountability, and ongoing oversight.

Based on my experience deploying these systems nationwide, the most important determinant of safety is not only how artificial intelligence is evaluated before deployment, but how it is governed, monitored, and supported once it is in clinical use. Importantly, artificial intelligence systems operate within existing legal and professional accountability frameworks. Physicians remain responsible for clinical decision making, and health systems are responsible for safe implementation. Existing laws, including patient privacy protections, medical malpractice standards, and civil rights protections, continue to apply. Artificial intelligence does not replace these safeguards; it operates within them.

Governance initiatives such as those led by the Coalition for Health AI and accreditation programs such as those being released by URAC play an important role in supporting safe and responsible implementation. Maintaining clinician leadership in patient care decisions remains essential to ensuring patient safety and preserving trust.

### Regulatory Considerations and Responsible Innovation

The United States has established strong regulatory frameworks to evaluate medical devices and protect patient safety. Through my experience implementing FDA-cleared artificial intelligence systems, I have seen how regulatory clarity and predictability support responsible innovation and safe deployment. Peer-reviewed research has consistently shown that artificial intelligence performs best when used to support clinicians, not replace them.<sup>11</sup>

Artificial intelligence introduces new considerations because these technologies operate within complex clinical environments and continue to evolve over time. Ongoing collaboration among regulators, healthcare providers, and developers can help ensure regulatory frameworks continue to support patient safety while enabling beneficial innovation. Thoughtful evolution of regulatory approaches can strengthen both safety and public trust.

### Conclusion

Artificial intelligence is already helping strengthen healthcare delivery when it is implemented responsibly, governed carefully, and designed to support clinicians and

<sup>9</sup> Langlotz CP. The Effect of AI on the Radiologist Workforce: A Task-Based Analysis. *medRxiv* [preprint]. Posted December 22, 2025. doi:10.64898/2025.12.20.25342714, <https://www.medrxiv.org/content/10.64898/2025.12.20.25342714v1>.

<sup>10</sup> U.S. Census Bureau, New Census Data Show Differences Between Urban and Rural Populations (2016), <https://www.census.gov/newsroom/archives/2016-pr/cb16-210.html>.

<sup>11</sup> Eric J. Topol, High-Performance Medicine: The Convergence of Human and Artificial Intelligence, *Nature Medicine* (2019), <https://www.nature.com/articles/s41591-018-0300-7>.

patients. These technologies can help clinicians diagnose disease earlier, improve productivity, strengthen care coordination, and improve patient outcomes.

Artificial intelligence supports clinicians; it does not replace them. It helps clinicians do what they trained their entire lives to do: care for patients. Behind every scan is a patient, a family, and a moment where getting the diagnosis right can change the course of a life. Thank you for the opportunity to testify. I look forward to your questions.

Senator BUDD. Thank you for your remarks.

Ms. Ng, you are recognized for 5 minutes.

**STATEMENT OF BRITTANY NG, VICE PRESIDENT,  
SIEMENS DIGITAL INDUSTRIES SOFTWARE**

Ms. NG. Good morning, Chairman, Ranking Member, and members of the Subcommittee. Thank you for the opportunity to testify today.

The United States does not need AI as an abstract capability. Our global competitiveness requires AI deployed on factory floors, in shipyards, and across production systems where it generates measurable productivity gains.

I am proud to take on this challenge. I lead Siemens' maritime business in the United States where we work hand in hand with shipyards and manufacturers.

At Siemens, we are a global leader in industrial AI. Last year alone we invested \$15 billion in the United States to further our leadership in this transformational technology.

We are continuing to bring industrial AI to customers and seeing firsthand how AI is most powerful when it connects data to operational decisions in the real world.

Through our maritime work, shipbuilders are using our physics-based, AI-enabled digital shipbuilding platform to connect, design, simulation, and production planning so that teams can identify bottlenecks before they occur.

They can reduce rework, improve first-time quality, and compress production timelines, and by training AI in virtual environments, shipyards can improve planning and performance even in complex production conditions.

Industrial AI, alongside digital twins and software-defined automation, is transforming manufacturing across industries. We are seeing machine downtime reduced by 50 percent, energy consumption cut by 20 percent, and quality control with 99.99 percent accuracy.

Industrial AI is helping manufacturers to achieve up to 40 percent in productivity improvements and it is transforming traditional factories into flexible digital enterprises.

In modern shipbuilding, innovation looks like being able to create a full digital twin of a vessel before steel is even cut. This means that our customers can simulate how the ship will be built, how systems will integrate, and how production will flow through the yard, all in a virtual environment.

On the deck plate, industrial AI can help sequence work packages, flag quality issues earlier, predict equipment downtime, and optimize the flow of material. The crews deploying these technologies are spending less time waiting and doing rework and more time building.

When these tools are broadly adopted, they become economic multipliers. However, technology does not just transform industry unless the people understand it, trust it, and see how it improves their lives.

At Siemens, we have learned that digital transformation works best when the worker is at the center. Manufacturing today faces a shortage of 400,000 open jobs nationwide.

The issue is not AI coming for industrial jobs. It is a shortage of skilled workers amid increasing production complexity. Industrial AI does not just solve the workforce shortage; it changes the entire equation.

These technologies reduce repetitive and hazardous tasks while elevating the skill sets of American workers. As Congress considers AI and manufacturing policy, I respectfully offer three considerations.

First, distinguish industrial AI from consumer AI. Industrial AI operates in structured, safety-critical, business-to-business environments with validated data and rigorous testing.

Second, focus on adoption. Federal policies and investments should integrate digital modernization from the outset and accelerate deployment through public-private collaboration.

Programs like Manufacturing USA and the DOE's Genesis Mission provide that bridge, moving from innovation into real-world production.

Last, the government should send a clear and consistent signal that digital capability is core industrial infrastructure. America's competitive edge will be determined by who most effectively deploys AI in the physical world.

Our nation is indisputably the world's greatest innovation leader. Our challenge is scaling advanced technologies through the industrial base.

Thank you, and I look forward to your questions.

[The prepared statement of Ms. Ng follows:]

PREPARED STATEMENT OF BRITTANY NG, VICE PRESIDENT,  
SIEMENS DIGITAL INDUSTRIES SOFTWARE

### **Introduction**

Chairman Cruz, Ranking Member Cantwell, Chairman Budd, Ranking Member Baldwin, and distinguished Members of the Subcommittee, thank you for the opportunity to testify today.

I lead Siemens' maritime business in the United States, where we work directly with shipyards, defense contractors, and manufacturers modernizing some of the most complex production systems in the world.

Siemens is a global technology company with deep roots in the United States, including the global headquarters of our software business in Plano, TX. Across our businesses, we help design, simulate, build, and operate the infrastructure and industrial systems that underpin the American economy. Last year alone, Siemens invested approximately \$15 billion in the U.S. to deepen our leadership in Industrial AI, simulation, and digital engineering.

Through that work, we have learned a simple lesson: AI is most powerful not as a standalone capability, but when it connects data to operational decisions in the physical world.

### **Siemens in the USA**

Siemens has been part of the American industrial landscape for over 160 years. Our presence in the United States spans manufacturing floors, shipyards, software labs, and engineering classrooms. In many ways, our technologies are embedded in nearly every chapter of the American industrial story—from designing semiconduc-

tors and building aircraft, to modernizing shipyards, powering data centers, strengthening the electric grid, and advancing next-generation manufacturing. Approximately 50,000 Siemens employees across the country are designing, building, and deploying the technologies that power American production.

In Fort Worth, Texas, one of our newest advanced manufacturing facilities illustrates what that commitment looks like in practice. Before the first piece of equipment was installed, the factory existed as a full digital twin—a physics-based virtual replica used to simulate production flows, validate line configurations, and stress-test material movement. By resolving bottlenecks in the virtual environment first, the facility ramped up faster with greater precision and flexibility. It is a clear example of how digital-first planning accelerates real-world industrial capacity.

That same approach extends beyond a single facility. Across the Midwest—from Missouri to Ohio—thousands of Siemens engineers and software developers build the digital engineering platforms that make these deployments possible. The simulation and industrial software developed by these teams form the backbone of AI-enabled production systems used across the United States and globally. Industrial AI adoption is not just happening on factory floors—it is being coded, tested, and refined in American software hubs.

Building on this momentum, Siemens is also advancing an AI build-out in Washington state to scale AI and digital infrastructure where industrial transformation is accelerating. The goal of our Data and AI team, which will be globally headquartered in the United States, is to unify data, software, and engineering platforms to deliver AI-native solutions across the industrial lifecycle, from design through operations. Coupled with Siemens' broader U.S. investment strategy—totaling investments of over \$100 billion in 20 years—this build-out reinforces our belief that scaling Industrial AI is essential to competitiveness.

Our commitment to the United States is not limited to facilities and software—it is equally a commitment to people. Siemens has pledged to help train 200,000 electricians and manufacturing experts in the United States by 2030 to close the skills gap that increasingly defines industrial competitiveness. This initiative reflects a simple reality: as production systems become more software-defined and AI-enabled, the competitive advantage of the United States will depend not just on innovation, but on whether America's workforce is prepared to lead that innovation on the factory floor, in the software suite, and at the intersection of design and execution.

That commitment comes to life through deep partnerships across the country with universities, apprenticeships, vocational schools, and other workforce institutions preparing the next generation of industrial leaders. At Purdue University, Siemens collaborates to advance digital twin research and embed simulation tools directly into engineering education—ensuring graduates are fluent in the digital environments they will encounter in modern manufacturing. In Colorado, Siemens drives microcredentialing initiatives that provide modular, industry-recognized digital skills training. And in Kansas, Siemens technologies power smart factory initiatives that demonstrate how AI-enabled automation can scale across manufacturers of all sizes.

The list can go on. But, all of our efforts reflect a consistent theme: Siemens' role in the United States is operational, not abstract. We design here. We manufacture here. We train the workforce here. And we deploy Industrial AI here—in ways that strengthen American productivity and industrial readiness.

### **Industrial AI in the Physical World**

In modern shipbuilding, we can now create a full digital twin of a vessel before steel is ever cut. A digital twin is a high-fidelity, physics-based virtual demonstration of a physical asset or production process. In shipbuilding, that means we can simulate how the ship will be built, how systems will integrate, how materials will flow through the yard, how production constraints may emerge—all before physical construction begins.

For example, through our work with HD Hyundai, shipbuilders are deploying an AI-enabled digital shipbuilding platform that connects design, simulation, and production planning. Teams can test decisions virtually, identify bottlenecks before they occur, reduce costly rework, and compress production timelines.

By training AI in virtual environments using digital twins and synthetic data, shipyards can improve real-world planning and performance in highly complex production environments. This is what AI looks like in the physical world.

On the deck plate, it means sequencing work packages more efficiently, flagging quality issues earlier, predicting equipment downtime, and optimizing material movement across congested yards. Workers also get to spend less time waiting and correcting mistakes, and more time building.

AI also offers tangible improvements for worker safety in manufacturing, as systems can identify hazardous conditions before they escalate—whether that is equipment operating outside safe thresholds, congestion in high-traffic work zones, or potential conflicts between tasks. Digital twins allow crews to simulate complex lifts, confined-space operations, and workflow changes virtually before executing them in the physical environment. Workers spend less time navigating uncertainty and fewer hours exposed to avoidable risks. Instead of reacting to problems after they occur, teams can anticipate them—improving both safety outcomes and operational confidence.

What is true in maritime manufacturing is true across sectors. Industrial AI and software-defined automation are delivering measurable gains across aerospace, automotive, semiconductors, energy systems, food & beverage, advanced manufacturing, and more.

We're seeing machine downtime reduced by 50 percent, energy consumption cut by 20 percent, and quality control with 99.99 percent accuracy across industrial operations. Furthermore, Industrial AI capabilities are helping manufacturers achieve up to 40 percent productivity improvements through predictive maintenance, quality control optimization, and automated decision-making—transforming traditional factories into flexible, efficient digital enterprises.

For example, through our partnership with JetZero—an American aerospace innovator—we are helping bring to market a next-generation blended-wing aircraft and a digitally native “Factory of the Future” in North Carolina. Using Siemens’ AI-enabled digital twin and engineering platforms, JetZero can explore thousands of design configurations, model aerodynamic performance, and simulate its production system before physical assembly begins. AI tools support both engineering and shopfloor operations—from optimizing aircraft performance to assisting technicians in diagnosing equipment issues. The result is a more efficient aircraft and a smarter manufacturing system built here in the United States.

Across all these sectors—the result of this adoption is faster time to market, reduced waste, lower cost structures, and more resilient supply chains.

AI is not an abstract capability. AI is deployed on factory floors, in shipyards, and across production systems where it generates measurable productivity gains.

### **Accelerating Adoption**

America’s competitive edge will not be determined by who builds the most AI models. It will be determined by who most effectively deploys AI in the physical world.

That requires adoption.

The United States does not have an innovation problem—we have an adoption challenge. We lead in developing breakthrough technologies. The strategic challenge is scaling them across manufacturers of all sizes and across every sector of our industrial base.

This adoption challenge is particularly acute for small and medium-sized manufacturers, which often lack the ability to experiment with emerging technologies. Through our work with Haddy—an American advanced additive manufacturing company—we are demonstrating how automation-first production can lower those barriers. Haddy operates localized micro-factories that combine large-scale robotic 3D printing with digitally coordinated workflows. AI is embedded directly into factory control and execution systems, enabling faster iteration and scalable distributed production. This model shows how smaller manufacturers can compete in advanced industrial supply chains without the footprint of traditional larger-scale facilities.

This is also true in national security contexts. In shipbuilding, small improvements in production or quality can compound across thousands of tasks and millions of labor hours. Adoption translates directly into more predictable schedules, lower costs, and stronger industrial capacity.

At Siemens, we create technology to transform the everyday, for everyone. But technology alone does not transform an industry. Deployment at scale does. The companies and nations that integrate AI into core production systems—not as isolated pilots, but as operating infrastructure—will lead in productivity and competitiveness.

### **AI & The Manufacturing Workforce**

Technology cannot transform industry unless people trust it, understand it, and see how it improves their work. At Siemens, we view AI as a people-centric transformation designed to help the workforce make better decisions at a faster pace, rather than replace human expertise.

Manufacturing today faces more than 400,000 open jobs nationwide. The issue is a shortage of workers combined with increasing production complexity. Across the country, an aging workforce is retiring faster than it can be replaced, and many employers struggle to attract and retain the next generation of digitally native talent. Young workers expect modern tools, intuitive systems, and career mobility—not paper-driven processes and repetitive manual tasks.

Industrial AI doesn't just solve the workforce shortage. It changes the equation.

Digital twins are a force-multiplier and allow workers to train in simulated environments before stepping onto the production floor. AI-powered copilots help technicians diagnose issues faster. Software-defined systems make production more intuitive and adaptable. Across environments, from the deck plate to the factory floor, this means fewer repetitive and hazardous tasks, faster troubleshooting, and more predictable execution.

These technologies elevate the skill sets of American workers for the higher paying jobs of tomorrow, while also increasing productivity per worker. At Siemens, we've learned digital transformation works best when the worker is at the center—when welders, machinists, planners, and engineers are part of the process from day one.

Industrial AI empowers workers to operate more advanced and competitive ecosystems—thereby strengthening both productivity and opportunity.

### **Policy Considerations**

As Congress considers AI and manufacturing policy, we offer three considerations.

#### *1. Distinguish Industrial AI from Consumer AI*

Industrial AI operates in structured, safety-critical, business-to-business environments using validated operational data generated by machines, sensors, and engineering systems. These applications are deployed in regulated industries such as shipbuilding, aerospace, energy, and semiconductor manufacturing, where safety and quality are non-negotiable.

Industrial AI applications often occur upstream in design and simulation environments before physical products are built. Digital twins allow manufacturers to test and optimize processes virtually, reducing risk before deployment in the real world. In these settings, AI systems operate within defined parameters and controlled data environments—very different from open-ended consumer applications.

To foster innovation, policy frameworks should reflect these distinctions. Approaches designed for consumer-facing AI should not unintentionally slow adoption in manufacturing environments that already operate under rigorous technical and safety standards.

#### *2. Focus on Adoption*

The United States faces adoption and scaling challenges, especially as emerging technologies are being deployed worldwide at a rapid pace. To compete in the global economy, breakthrough technologies developed in labs and leading firms must be adopted broadly across the industrial base—including small and medium-sized manufacturers—to drive economy-wide productivity gains.

In tandem, Federal policies and investments—from shipbuilding to semiconductors—must integrate digital tools from the outset to ensure advanced manufacturing initiatives include the technology necessary for AI-enabled production.

Public-private collaboration plays a critical role in accelerating this deployment. Programs that connect advanced computing, simulation, and industrial software with real-world production environments can shorten commercialization timelines and reduce barriers to adoption. Through the Department of Energy's Genesis Mission, Siemens is excited to help translate Industrial AI, digital twins, and advanced computing into scalable, operational industrial applications.

Innovation creates meaningful potential. Adoption converts that potential into measurable productivity, resilience, and competitiveness.

#### *3. Send a Clear Signal for Digitally Native Production*

Both industry and government should send clear and consistent signals that digital tools are core infrastructure for competitiveness.

For example, Manufacturing USA Institutes provide platforms where manufacturers, suppliers, technology providers, and workforce institutions collaborate on applied innovation. Managing these partnerships as a true network to focus on

specific manufacturing challenges can help pursue the goal of bridging the gap between basic research and commercialization.

Tailored regulatory sandboxes complement this effort by proposing structured environments where AI-enabled production systems can be deployed and tested within defined guardrails. This approach allows responsible experimentation to move forward with clarity and confidence, putting technology and innovation before regulation.

Additionally, challenge-based partnerships such as the Department of Energy's Genesis Mission help translate breakthrough capability development into operational systems that can create real-world impact. By connecting advanced research infrastructure to real use cases, these programs bridge the gap between innovation and deployment.

Modernization scales fastest when expectations are clearly set in Federal programs, such as procurement standards, financing mechanisms, workforce programs, and public-private partnerships. A coordinated signal from policymakers that digitally native industrial strategy is a national priority will accelerate technology adoption, strengthen domestic supply chains, and reinforce long-term industrial readiness.

### **Closing**

In closing, consider the story about Albert Einstein riding on a train. When the conductor came by to collect tickets, Einstein began searching his pockets but couldn't find his ticket. The conductor recognized him and said, "Professor Einstein, it's okay—I know who you are."

Einstein kept searching. He looked in his briefcase, under his seat, even on the floor. The conductor said again, "Dr. Einstein, I trust you."

Einstein replied, "Young man, I know who I am. What I don't know is where I'm going."

America knows who it is: the world's great innovation leader. But if we don't focus on where we're going—on how we deploy these groundbreaking innovations across our industrial base—we risk losing direction.

If we lead in adoption, we lead in productivity.

If we lead in productivity, we lead in competitiveness.

Thank you, and I look forward to your questions.

Senator BUDD. Dr. Shelton, you are recognized for 5 minutes.

### **STATEMENT OF DR. DAMION SHELTON, CO-FOUNDER AND CHAIRMAN, AGILITY ROBOTICS**

Mr. SHELTON. Thank you, Chairman Budd and Ranking Member Baldwin, for inviting me to speak today. Also, thanks to the rest of the Committee.

I would like to open with a quote from "Peter Pan"—all of this has happened before and it will all happen again.

The United States first started collecting census data around agricultural employment in 1820, almost exactly 200 years before Agility Robotics launched its humanoid robot.

In 1820, the vast majority of Americans worked on farms using simple tools and assisted by animals. Over the next 200 years, agricultural employment shrank to about 2 percent of the workforce.

This is not, however, a story of decline. Absolute employment, the total number of Americans working in agriculture, has actually increased by about 30 percent since the 1820s.

Why? In a single word, technology. In the 50 years after the patenting of the McCormick reaper in 1834, nearly 12,000 additional farm implement patents were filed in the U.S. Far from destroying jobs, automation in agriculture expanded both direct agricultural employment and unlocked truly staggering growth in the United States, a 30X increase in population and a 40X increase in per capita GDP.

The modern AI and robotics boom promises to bring these sorts of transformative changes to the rest of our economy. Agility Robotics started in 2015 as a spinoff from Oregon State University.

From our DARPA-funded academic roots we have grown to more than 300 employees, primarily in Oregon, Pennsylvania, and California. Our Oregon facility co-locates both our R&D teams and our factory, RoboFab, where we assemble 100 percent of our robots in the U.S.

Our humanoid robot, Digit, was launched in 2020 as the first full-size humanoid robot available for purchase. Our customers include warehouse and logistics work, Amazon, GXO, and Mercado Libre, and manufacturing and automotive suppliers Schaeffler and Toyota with the common theme of providing a solution for repetitive material handling alongside human co-workers.

I would like to address the impact of automation on jobs and human workers. Many manual labor jobs in the U.S. are facing pressure from an aging workforce, high turnover, and a high injury rate, which is where Agility has focused its deployments.

The Bureau of Labor Statistics projects average annual vacancies of more than one million positions in warehouse and logistics work. Each robot deployed here not only does not take a job from a human, it enables the business to grow and expand overall hiring elsewhere in the organization.

To cite one example from an Agility partner, in 2012, Amazon employed about 88,000 people and acquired the robotics startup Kiva. Over the next 13 years, they deployed more than a million robots while also hiring an additional 1.4 million people.

Prior to the modern AI boom, it took a skilled engineer many months to develop a new application for a robot. Modern AI can dramatically shorten the time to deployment for small and medium-sized businesses that desperately need to solve labor challenges but lack the technical and financial resources to run their own IT department.

However, as we have seen from self-driving vehicles, safety often lags behind technical ability. It is imperative that robots not endanger their human colleagues, members of the public, or our homes and workplaces.

Focusing first on controlled environments has allowed Agility Robotics and our partners like Boston Dynamics to focus on developing responsible industry-led safety standards for robots in the workplace.

Gaining experience in these environments first with a focus on continuous safety improvement and industrial best practices is the fastest and most responsible path toward a successful long-term buildout of general purpose automation.

As an industry, we owe the general public a solid safety argument backed by data. I will conclude by briefly addressing the challenges posed by China's extremely rapid progress in humanoid robots.

To be as blunt as possible, they are doing a good job. Their technology is well-designed, highly capable, and backed by a formidable supply chain. Two recent papers by security researchers have identified a critical security vulnerability in a Chinese humanoid robot

allowing for remote takeover as well as a phone home data logging mechanism that sends data to a remote server.

As of this week—and I did check this before the hearing—that robot is available for sale in the U.S. for less than \$20,000. Combined with open source and open weight AI models, China is creating a compelling value proposition for early adopters of general purpose humanoid robots.

This is a siren’s call that we would be well-served to take seriously or risk ceding the future of automation and, by extension, economic growth to others.

Thank you again for the opportunity to speak today and I thank for this committee’s focus and leadership on these important issues, including the regulatory sandbox approach.

Agility Robotics is ready to help the U.S. solve its labor challenges, expand the economy, and ensure American competitiveness and economic security as we move into the next industrial revolution.

[The prepared statement of Mr. Shelton follows:]

PREPARED STATEMENT OF DR. DAMION SHELTON, CO-FOUNDER AND CHAIRMAN OF  
THE BOARD, AGILITY ROBOTICS

Thank you Chairman Budd and Ranking Member Baldwin for inviting me to speak to you today. And thank you as well to Full Committee Chairman Cruz and Ranking Member Cantwell, and all the other Members of this subcommittee.

I’d like to open with a quote from Peter Pan: “All this happened before, and it will happen again.”

The United States first started collecting census data on agricultural employment in 1820, almost exactly 200 years before Agility Robotics launched its humanoid robot. In 1820, the vast majority of Americans worked on farms, using simple tools and assisted by animals. Over the next 200 years, agriculture employment shrank to about 2 percent of the overall workforce. This is not, however, a story of decline. Absolute employment—the number of total Americans working in agriculture—has actually *increased* by almost 30 percent since the 1820s. Why? In a single word: technology. In the 50 years after the patenting of the McCormick Reaper in 1834, nearly 12,000 additional farm implement patents were filed. Far from destroying jobs, automation in agriculture expanded both direct agricultural employment, and unlocked truly staggering growth in the United States: a 30x increase in population and a 40x increase in per-capita GDP. The modern AI and robotics boom promises to bring these sorts of transformative changes to the rest of our economy.

Agility Robotics was started in 2015, as a spin-off from Oregon State University. From our DARPA-funded academic roots, we’ve grown to more than 300 employees primarily in Oregon, Pennsylvania, and California. Our Oregon facility co-locates both our R&D teams and our factory—RoboFab, and 100 percent of our robots are assembled in the USA. Our humanoid robot, Digit, was launched in 2020 as the first full-size humanoid robot available for purchase. Our customers include warehouse and logistics work (Amazon, GXO, and Mercado Libre) and manufacturing and automotive (Schaeffler and Toyota), with the common theme of providing a solution for repetitive material handling tasks alongside human coworkers.

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Prior to the modern AI boom, it took a skilled engineer many months to develop a new application for the robot. Modern AI can dramatically shorten the time to deployment for the small and medium-sized businesses that desperately need to solve labor challenges but lack the technical and financial resources to run their own IT

department. However, as we've seen with self-driving vehicles, safety often lags behind technical ability. It's imperative that robots not endanger their human colleagues, members of the public, or our homes and workplaces.

Focusing first on controlled environments has allowed Agility Robotics and our partners like Boston Dynamics to focus on developing responsible, industry-led safety standards for robots in the workplace. Gaining experience in these environments first, with a focus on continuous safety improvement and industrial best practices, is the fastest and most responsible path towards a successful long-term buildout of general-purpose automation. As an industry, we owe the general public a solid safety argument backed by data.

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Thank you again for the opportunity to speak today, and I thank you for this committee's focus and leadership on these important issues, including the regulatory sandbox approach. Agility Robotics is ready to help the U.S. solve its labor challenges, expand the economy, and ensure American competitiveness and economic security as we move into the next industrial revolution.

Senator BUDD. Thank you, Dr. Shelton.  
Mr. Muro, you are recognized for 5 minutes.

**STATEMENT OF MARK MURO, SENIOR FELLOW,  
METROPOLITAN POLICY PROGRAM,  
BROOKINGS INSTITUTION**

Mr. MURO. Mr. Budd, Ms. Baldwin, thanks so much. And to the distinguished members of the Committee, I really want to thank you for the opportunity to comment here.

I will just say my remarks here are my personal views, you know, separate from Brookings Institution, and I think I want to start by reaffirming the basic premise here that I think is very compelling, that America's innovators are day by day introducing incredible new tools and solutions that are allowing more and more people, firms, and entrepreneurs to expand and reach—reach and achievement of human expertise.

It is a compelling moment, and that is creating in the country significant excitement, and yet a degree of pessimism also complicates this moment. We should be frank about that and the Committee has been frank about that.

Some worry that the technology will not be smoothly adopted, that adoption will be challenging. Others fear what has been deemed the greatest automation technology in history, and still others worry about safety questions and which skills will serve them in the future to enable this work.

So I want to say just a few words about areas where Federal support can help maintain the sector's momentum, reinforce its value, and promote optimism about its possibilities.

In this direction, my fellow panelists have done an excellent job of inspiring confidence by detailing some of the possibilities. I want to touch on just a few ways my written testimony suggests we can sustain AI success.

First, broader AI innovation and adoption like we are seeing requires maintaining a dominant research base—abundant research flows generate talent—but also the ideas, intellectual property, innovation, and startups that we are hearing about.

I will provide more detail in the written remarks, but the Nation remains—does retain clear global leadership. With that said, it has fallen short of the doubling of AI research that have been suggested in 2019 by the National Security Commission on Artificial Intelligence, an important bipartisan watchword.

Beyond that, to address the scale issue, the Nation should prioritize a step change in total AI R&D outlays, at the same time seeking to rejuvenate the AI Research Institute’s program for accelerating research on new topics, establish a new testbed programs involving Federal research units, private sector, and even data centers that can be brought into this, and then direct grant making toward investments in what some of us call pro-worker AI that supports such values as education systems, health, human learning, and human decisionmaking.

Accelerating AI adoption also requires promoting the growth of emerging AI clusters in geographic regions. Nvidia, OpenAI, Microsoft, and Anthropic have all advocated for this kind of development, sometimes using the term economic zones to envision regional investment areas that fuse permit and energy solutions with Federal and state creation, small business empowerment, and community level prosperity.

Such regional development, including through linkages with local testbeds, could foment a powerful surge of optimism in communities. We believe that bottom-up economic innovation in regions is an important part of this work ahead of us.

More boldly, Congress and the Trump administration could build new prize competitions or recent challenge grant programs, such as the tech hubs’ and NSF’s innovation engines to further develop these regions and hub engines that have so much to give.

Finally, AI adoption leadership will further hinge on ensuring that adequate pools of high-quality talent exist all across the country and in every sector and every region.

The challenge is both narrow and wide. The narrow part of the challenge is the Nation’s diminishing homegrown share of the world’s elite talent. Speaking of this, ITIF has shown that while the U.S. attracts and employs a high share of elite talent, its domestic production of such talents has slowed. That is a worry and needs to be addressed.

At the same time, concerns around the broad degree of AI readiness are important, and starting now virtually all workers will need to understand AI principles, be able to understand and direct AI effectively, and be able to evaluate its outputs.

AI literacy instruction, as the Department of Labor has been describing in recent months, will need to cultivate agility and install such human skills as judgment, teamwork, creativity, and problem-solving.

If that is widely achieved, workers will feel optimistic about the technology. If not, I worry they will not, and so a supportive AI talent strategy must foster AI readiness among both elite and general populations.

Fortunately, immigrants and U.S. higher ed are proven talent sources. Thoughtful visa reforms can help the Nation retain its edge on elite talent, and even more important is the need to prioritize broad AI literacy, not just at elite institutions but throughout the region and regional AI——

Senator BUDD. Mr. Muro——

Mr. MURO.—the entire workforce system.

Senator BUDD. Mr. Muro, if we could.

Mr. MURO. Yes.

[The prepared statement of Mr. Muro follows:]

PREPARED STATEMENT OF MARK MURO, SENIOR FELLOW, BROOKINGS INSTITUTION

### Introduction

Chairman Cruz, Ranking Member Cantwell, and distinguished members of the committee, I want to thank you for the opportunity to testify today on how we can maximize and sustain the value for human flourishing of America's extraordinary artificial intelligence (AI) sector.

My name is Mark Muro and I'm a senior fellow at the Brookings Institution. Acknowledging that affiliation, I should note here at the top that these remarks and anything I say today are my personal views and do not reflect the views of the institution or its other scholars, employees, officers, or trustees. These are my own thoughts about a timely topic.

Nearly every week, America's AI innovators are introducing incredible new tools and solutions that are allowing more and more people, firms, entrepreneurs, and communities to expand the reach and achievement of human skills and expertise. This progress has generated significant cause for optimism. In recent years, most notably, AI's capacity to drive productivity, advance science, promote health, and magnify what humans can do has been demonstrated time and again. These achievements reflect the power of AI's special ability to weave digital innovations and human skills into a transformative collaboration.

And yet, for all that, significant pessimism has begun to complicate the moment. Some fear what has been deemed the greatest automation technology in human history.<sup>i</sup> Others worry about how they will weather likely employment disruptions and about the uncertainty of what skills will serve them in the future. Still others worry about the impacts of data center development<sup>ii</sup> on local communities, and the potential for highly uneven geographic build-out of the AI economy.<sup>iii</sup>

In view of that, I want to say a few words about areas where Federal support can help maintain the sector's momentum, reinforce its value, and promote optimism about its possibilities. Above all we should ensure that AI is pro-human and pro-community. In this direction, my fellow panelists have done an excellent job of inspiring optimism by detailing some of the possibilities. Now I'd like to follow them by noting a few areas of policy that have helped businesses like those we've just heard about innovate and that will now be needed to sustain more of such innovation.

### The nation should build a strong AI-support platform.

To speak about what it will take to sustain AI innovation to support human flourishing, I want to draw on my work at Brookings on "AI readiness" to suggest that the Nation needs to build a strong AI-adoption platform.<sup>iv</sup> To that end, I would encourage the committee and Congress coalesce around a core set of AI-adoption readiness priorities. I'll touch on *five areas* of needed attention:

<sup>i</sup>Daron Acemoglu, David Autor, and Simon Johnson, "Building pro-worker artificial intelligence." Working paper 34854. (Cambridge: National Bureau of Economic Research, 2026).

<sup>ii</sup>Daniel Goetzl, Mark Muro, and Shriya Methkuppally, "Turning the data center boom into long-term local prosperity." (Washington: Brookings Institution, 2026).

<sup>iii</sup>Mark Muro, Shriya Methkuppally, and Molly Kinder, "The geography of generative AI's workforce impacts will likely differ from those of previous technologies." (Washington: Brookings Institution, 2025).

<sup>iv</sup>Mark Muro and Shriya Methkuppally, "Mapping the AI economy: Which regions are ready for the next technology leap." (Washington: Brookings Institution, 2025).

### Research

First, broader AI innovation and adoption requires maintaining a dominant AI research base. Abundant research flows generate talent, but also ideas, intellectual property, innovation, and start-ups. Given that, there is work to be done.

To be sure, the United States maintains clear leadership in AI R&D and consistently outperforms other countries on innovation and investment. In 2024, for example, the U.S. developed 40 AI models while the second-best performer, China, produced 15. As to private investment, U.S. companies invested \$109.1 billion in AI research in 2024, vastly outpacing China's \$9.3 billion.<sup>xiii</sup>

Yet recent developments suggest these figures won't be enough for the U.S. to maintain dominance. According to the International Data Corporation's (IDC) spending report, China is expected to see an 86 percent compound annual growth rate in generative AI investments from 2022 to 2027, meaning the country's generative AI spending could grow to represent 33 percent of the world's AI investment—up from less than 5 percent in 2022.<sup>xiv</sup>

Against this backdrop, Federal AI research funding trends are concerning. To be sure, U.S. government investment in AI research did increase from \$2.98 billion in 2024 to \$3.32 billion in 2025.<sup>v</sup> However, this came at a moment when the authoritative National Security Commission on Artificial Intelligence (NSCAI) had advised doubling non-defense AI R&D investments annually to reach \$32 billion by 2026.<sup>vi</sup>

The nation's current mix of research activities also falls short on several areas of potential opportunity. First, U.S. private sector investments dwarf government outlays for basic (mostly academic) research. This may limit creative leaps forward and progress on novel use cases in underinvested sectors. Dwindling support for the NSF-led National AI Research Institutes—launched during the first Trump administration—is a case in point. Another missed opportunity is the thinness of AI research and computing flows into high-quality but farther-flung universities. As of now, the Nation's Bay Area Superstars and Star Hubs account for about 60 percent of the Nation's R&D flows, leaving institutions in many regions underserved.<sup>vi</sup> Likewise, computational support for basic research in academia too often remains spotty, likely limiting the Nation's innovation potential.

And so, the Nation should build out its platform for broader AI adoption by expanding the scale of AI R&D and improving its character. To address the scale issue, the Nation should *prioritize a step change in total AI R&D outlays* in the next decade. Rather than cut research outlays, Congress needs to “run faster” if it wants to outpace China, because R&D is a critical accelerant.

At the same time, to improve the composition of overall AI research, the Nation should *expand investments in basic R&D research and in mechanisms for broadening access to essential computational and data resources*. On this front, increased basic research expenditure into universities appears critical. But so does rejuvenation of the *AI Research Institutes* program for accelerating research on new topics in new universities and locations. Additionally the build out of something like the *National AI Research Resource (NAIRR)* pilot program could provide a mechanism for increasing more and different researchers' gaining access to high-speed computing resources and datasets, including in more and different locations.<sup>vii</sup> Related to all of this, it would be valuable if some Federal research grant-making was directed towards investments in “pro-worker AI” that supports such values as education, human learning, and human decision making.<sup>viii</sup>

In a word, an expanded and enhanced research agenda is critical for creating a national platform capable of bolstering AI innovation, entrepreneurship, and adoption in the country.

### Regional innovation clusters

Accelerating AI adoption also requires promoting the growth of emerging AI clusters in geographic regions. Dense, vibrant AI clusters are national assets that contribute to national progress. Neglecting such clusters is a missed opportunity that leaves innovation and adoption potential untapped.

With that in mind, the Nation's overall AI platform should promote broad AI adoption through region-focused industrial development. Nvidia, OpenAI, and Anthropic have all advocated for this kind of development, sometimes using the term “economic zones” to envision regional investment areas that fuse permit and energy

<sup>v</sup> NITRD, “Artificial intelligence R&D investments—FY 2019 to FY 2025.”

<sup>vi</sup> Muro and Methkuppally, “Mapping the AI economy.”

<sup>vii</sup> Mark Muro and Julian Jacobs, “The case for promoting the geographic and social diffusion of AI development.” Washington: Brookings Institution, 2024.

<sup>viii</sup> Daron Acemoglu, David Autor, and Simon Johnson, “Building pro-worker artificial intelligence.” Working paper 34854. (Cambridge: National Bureau of Economic Research. 2026).

solutions with Federal and state job-creation, small-business empowerment, and community-level prosperity. Such regional development work could foment a powerful surge of optimism in communities.

Given that, the Federal government should *draw on its recent experience with “place-based” industrial investment* to accelerate AI cluster scale-up in promising regions and sectors across the country.

What might this look like? Some of this region-catalyzing work could leverage the National AI Research Institutes from the previous Trump administration, as well as the NAIRR program, by orienting their research and computational supports toward the needs of promising local clusters. These steps would support early-stage activities in key clusters. More boldly, Congress and the Trump administration could revamp recent challenge grant efforts—such as the Commerce Department’s Regional Technology and Innovation Hubs program and the NSF’s Regional Innovation Engines—to focus new hubs and engines specifically for AI.<sup>ix</sup> A number of the current hubs and engines are leveraging AI technologies already. Why not develop new centers fully focused on compelling AI verticals grounded in dynamic regional ecosystems?

Taken together, approaches like these will help ensure the national AI adoption platform promotes new expansion across the Nation’s regions. They will also foster optimism and counter concerns that AI is somehow an industry working exclusively for others somewhere else.

#### *Talent*

AI adoption leadership will further hinge on ensuring that adequate pools of high-quality AI talent exist all across the economy, available to every sector and every region. The challenge is both narrow and wide.

The narrow part of the challenge is the Nation’s diminishing home-grown share of the world’s elite AI talent. Speaking to this, the Information Technology and Innovation Foundation (ITIF) has shown that while the U.S. attracts and employs a high share of elite talent its domestic production of such talent has slowed.<sup>x</sup> That’s a worry.

At the same time, there are also concerns about the broad degree of AI-readiness needed across the Nation’s workforce. Starting now, virtually all workers will need to understand AI principles; be able to understand and direct AI effectively; and be able to evaluate AI’s outputs, as notes the Department of Labor’s new Artificial Intelligence Literacy Framework.<sup>xi</sup> In addition, such “AI-literacy” instruction—as continues the DOL—will need to cultivate agility at scale and instill such “human” skills as judgement, teamwork, creativity, and problem-solving. If that is widely achieved, workers will feel optimistic and engaged about AI. If not, they won’t.

And so, a supportive Federal policy platform for AI needs to foster AI readiness among both top scholar echelons and everyone. Fortunately, U.S. immigrants and higher education stand out as proven sources of talent. Given that, *thoughtful visa reforms* will help the Nation retain its talent lead. But even more important is the need to *prioritize broad AI education and workforce literacy at higher education institutions and all across the workforce system*, not only in the usual elite locations. Likewise, Congress should support the creation of regional AI learning networks, with employer-led, cross-sector partnerships that serve as training and innovation centers for the AI economy. Aligned to industry demand, all of this training will go a long way toward ensuring AI unleashes creativity and optimism among American workers. Connecting all of this to the emergence of AI industry clusters near universities and community colleges will help educate, engage, employ, and retain critical technical talent.

#### *Infrastructure*

Boosting regional AI adoption will further depend on the delivery of key infrastructure that is not now solidly in place, but on which national leadership depends.

On this front, the AI era is elevating the need for large-scale chip production, vast data and computational resources, new energy sources, and the build out of huge data centers in accordance with important electricity, water, and other permitting issues.<sup>xii</sup> To be sure, work has begun on some of these issues, such as through the CHIPS and Science Act’s subsidies for semiconductor plant construction and the

<sup>ix</sup> Muro and Methkupal, “Mapping the AI economy.”

<sup>x</sup> Trelysa Long, “AI is powering the U.S. economy, but who’s powering AI?” (Washington: ITIF, 2025).

<sup>xi</sup> Employment and Training Administration, “Training and Employment Notice No. 07–25.” Washington, 2026.

<sup>xii</sup> Muro and Methkupal, “Mapping the AI economy.”

launch of the NAIRR pilot for giving more scientists, innovators, and educators access to the computing and data resources necessary for game-changing research.

With that said, AI-related infrastructure gaps stand as major impediments to regional and national scale-up. The demand for computing resources and energy is projected to challenge available supplies. Permitting and grid hurdles exacerbate the delivery problem. And to many communities, data center siting decisions seem secretive and disruptive—divorced from regional economic planning.<sup>xiii</sup>

In light of these challenges, the Federal government should work to facilitate timely, carefully planned, and environmentally sound data center and power development. A portion of that work must clearly involve policy and regulatory efforts to *bring new clean energy generation sources and grid links online*. Some of this will involve speeding up the complicated federal, state, and local siting and permitting process for conventional or nuclear power plants, including by leveraging suitable public lands or replacing coal plants. But it will also be important to streamline the permitting processes for clean energy generation and related transmission capacity.

Otherwise, the Federal government should do what it can to *facilitate strategic data center development*. With data center development at times disruptive and localities increasingly wary of it, Federal and other stakeholders should work with industry to optimize the process so that it supports AI build-out that maximizes local AI gains.

Development could be streamlined and rationalized through the establishment of AI economic zones within states or through the release of suitable public lands. Likewise, the government could encourage data center developers to negotiate beneficial partnerships with local stakeholders, which would complement construction with community AI development. In this vein, Brookings has suggested how regions might trade expedited data center regulatory approvals for shared computing resources, research collaborations, and talent initiatives.<sup>xiv</sup> The Federal government could aid in that. Federal agencies could create and fund an AI tech hubs program, where data center developers and the Federal government are co-investors in region-level tech ecosystems along with universities and regional firms. Alternatively, Congress could approve funding for AI test-bed collaborations involving the co-location of national labs, data centers, universities, and startups on Federal land. The Department of Energy has already moved in this direction with its plan to leverage 16 Federal land parcels for rapid data center construction on sites that have in-place energy infrastructure and fast-track-permitting.<sup>xv</sup> Some of these sites could be managed to create community economic development as part of the build out.

#### *Worker security*

Finally, any national platform for regional AI scale-up needs to include strategies to provide basic worker security. Such provisions are necessary because successful AI adoption will involve both gains for many workers and dislocation for others. Minimizing worker dislocation will smooth adoption, keep talent engaged, and maintain morale.

Recent work from Brookings shows that higher-tech, higher-value, information-based industries—especially in cities—are likely to see elevated levels of AI impact.<sup>xvi</sup> Specifically, Brookings analysis suggests 30 percent of all workers could see at least 50 percent of their occupation’s tasks disrupted by generative AI in the coming years, with higher “exposure” levels for higher-skill computer and office activities.<sup>xvii</sup> While some of those impacts will enhance worker well-being and create new jobs, others could bring about sudden task shifts, depressed work demand, or even chronic under-or unemployment. Others may shred long-reliable pathways for worker mobility.<sup>xviii</sup> This matters because such disruption could produce “adjustment” challenges for local labor markets, weaken confidence in the AI revolution, and undermine support for regional AI scale-up.

Given that, the Nation’s Federal AI platform needs to provide elements of a work-adjustment strategy that helps regions deliver on Vice President JD Vance’s

<sup>xiii</sup> Goetzl, Muro, and Methkuppally, “Turning the data center boom into long-term local prosperity.”

<sup>xiv</sup> Ibid.

<sup>xv</sup> Office of Policy—Department of Energy, “Request for information on artificial intelligence infrastructure of DOE lands.” Request for information.

<sup>xvi</sup> Mark Muro, Shriya Methkuppally, and Molly Kinder, “The geography of generative AI’s workforce impacts will likely differ from those of previous technologies.”

<sup>xvii</sup> Mark Muro, Shriya Methkuppally, and Molly Kinder, “The geography of generative AI’s workforce impacts will likely differ from those of previous technologies.”

<sup>xviii</sup> Forthcoming research from the Brookings Institution and Opportunity@Work.

promise that AI adoption will bring workers “higher wages, better benefits, and safer and more prosperous communities.”<sup>xix</sup>

Much remains to be worked out on how to deliver this. But for sure, the Nation will want to *invest more in “active labor market policies”* that help people shift into new jobs. These policies may involve rapid retraining programs for individuals impacted by AI-related job displacement, such as the pilot efforts the Trump administration has advanced.<sup>xx</sup> Relatedly, these policies may entail flexible benefits, including for wage insurance, and health care that is not tied to one employer. Other supports may include policies that give a measure of economic security to workers who want to be retrained and learn new careers. For example, Brookings has described the idea of a “Universal Basic Adjustment Benefit” that would help displaced workers transition to new work with the help of temporary income support that allows for intensified training access.<sup>xxi</sup> Such provisions can provide a measure of stability as the nature of work evolves while also kindling optimism among workers who may currently be discouraged due to their fears of displacement costs.

In sum, innovative firms of all kinds—whether AI developers themselves, the increasing millions of AI-adopting firms, or the thousands of AI start ups entering the space—are providing abundant grounds for excitement about AI’s future potential. Their entrepreneurship gives much cause for optimism. And yet, sustaining that optimism requires sustaining those firms’ growth and Americans’ confidence in the future—and that means reinvesting in the fundamentals of American AI strength and vibrancy.

Which is why Congress should build a strong AI-support platform, one that begins with robust investments in R&D and regional innovation clusters, and that leans in on talent, infrastructure, and worker security. Implemented well, such a platform will foster both continued growth and a broader, more widely shared confidence in the AI future.

Senator BUDD. Thank you so much. If we could take a few questions for the rest of the panel.

Mr. MURO. Absolutely.

Senator BUDD. If we have additional thoughts, we will come back to that and—when you are recognized, if that is OK.

Mr. MURO. Great, thank you.

Senator BUDD. Yes, thanks again for being here. Thanks for your opening remarks.

You know, it has been said that the four main inputs of AI are talent, compute, energy, and data. The Federal Government houses a tremendous amount of scientific and important datasets that could be leveraged as strategic assets in the U.S. AI leadership.

The Open Government Data Act of 2018 requires data assets owned by the Federal Government whose sharing would not otherwise be prohibited by law to be published in machine-readable format.

If each of you first three with particular companies—operating companies—what would each of your companies’ efforts to deploy AI—how would that be affected by more access to data? If it is AI-ready and if it is machine-readable and compatible, how would that affect each of your companies?

We will start with you.

Mr. GIANNIKOPOULOS. Senator Budd, the access to data is a critical aspect of development for artificial intelligence.

However, in health care the ability to have validation data by which you can measure the quality of your solutions that are devel-

<sup>xix</sup> Reuters., “Quotes from U.S. Vice President JD Vance’s AI speech in Paris.” February 11, 2025.

<sup>xx</sup> U.S. Departments of Labor, Commerce, and Education. “America’s talent strategy: Building the workforce for the golden age.” (Washington, 2025).

<sup>xxi</sup> Mark Muro and Joseph Parilla, “Maladjusted: It’s time to reimagine economic ‘adjustment’ programs.” (Washington, Brookings Institution, 2017).

oped by which deployers at the institutional level can assess the fit within their personal institution is one of the greater challenges.

So having more robust access to this machine-readable, translatable, and ideally in health care outcomes-linked data will provide opportunities to actually assess these solutions, not in a vacuum but against real American data as part of that.

So, you know, more robust access to that would be a significant enabler of adoption and innovation of this new technology.

Senator BUDD. So in the world of radiology, what would be a specific dataset that you would look to make more accessible?

Mr. GIANNIKOPOULOS. Radiology, there are two key areas. It is the images and the reports, and the reports in radiology are one piece of siloed information. Yet, what happens with that?

If a—that quiet lung mass that I referenced in my opening statement, if that is identified what percentage of that turns into cancer? How do you understand the progression of that? Being able to access that longitudinal information at scale would enable significant development.

Senator BUDD. And for something like that in particular with radiology, that would not violate patient privacy?

Mr. GIANNIKOPOULOS. If appropriately de-identified, which would be a very important aspect of this, absolutely not.

Senator BUDD. Great. Thank you for that.

Ms. Ng, what are your thoughts for Siemens Industries?

Ms. NG. Chairman, thank you for the question.

More available, highly trusted data is gold in industrial AI environments and something that is very important to recognize is that for industrial AI, the underlying data comes from machines. It comes from manufacturing systems and engineering datasets within the four walls of that factory or the shipyard or production environment.

So the more readily available that data is and in usable formats, the better the generative insights and recommendations that the industrial AI products can make.

Senator BUDD. That is very helpful, thank you.

Dr. Shelton?

Mr. SHELTON. So I think from an operating company perspective, we have to remember that there are really only three ways that we can actually have access to data.

The most expensive is we can go out and generate it ourselves, and you see robotics companies trying to do that today by a teleoperation.

The second is when the data is available on the public Internet for free and this is one of the ways that the modern AI frontier labs have made such rapid progress training their LLMs specifically.

But that data does not exist for robots generally. There is no description of human movement or industrial tasks that you can really find on the open internet.

And then the third way is simulation, and although there has been a lot of rapid progress—I am sure you have seen news reports with Nvidia and others who have done that kind of work—we are still in the early days of that really being viable for large scale training of robots.

So the government release of data is actually helpful a couple of ways. First is it gives us a very broad look at the economy as a whole.

Although Agility has been focused to date on these internal warehouse jobs, there are broader classes of job that would pull on things like large geospatial datasets and other large public data sources that would be very exciting to have access to.

And second is I think it gives us a broad representative look at what people are doing. That is part of the reason why I cited the census data is that the government has a very large role to play here identifying areas where there are opportunities for robots to get out and do useful work. So I will excited to be a part of that.

Senator BUDD. Dr. Shelton, do you have an example of those ideas inside the census data?

Mr. SHELTON. Yes. I mean, I think what is fascinating with this is how large of an opportunity there really was with underemployment in sectors like the warehouse and logistics world.

Feeding things like accident data, human performance data, and stuff allows us to focus on the very high-value tasks that actually improve worker safety, improve worker health, and allow those workers to redeploy elsewhere within the org.

So we are excited about being able to tailor what our product offerings are to the needs of the broader workforce.

Senator BUDD. Dr. Shelton, do you think that would help with adoption? I mean, there is a general fear out there about job replacement as sort of a generalized concern.

But if you show massive areas of underemployment in a sector such as warehouse and logistics where there is need for much more workers, do you think that would help with adoption in those areas?

Mr. SHELTON. Absolutely. In fact, we see a lot of pressure from the small and medium business community as well that would love to adopt this kind of technology and, you know, it is—without name checking a specific retailer, we were approached by a small but nationwide retailer a number of years ago, looking for a back warehouse automation solution because they were having staffing challenges.

Unfortunately, it was not possible at the time with the technology that was available to us circa 2020 to really engage with them. But I think the broader look at the labor pressures that are faced by those businesses in particular would be super helpful.

Senator BUDD. To give us a quick snapshot of the timeline, if you had that conversation in 2020.

Mr. SHELTON. Correct.

Senator BUDD. Now in 2026, if you had the same conversation, do you have more capabilities?

Mr. SHELTON. We do. I think there is a rollout question that we have, which is do you tackle the low hanging fruit first or do you go for the harder end of the spectrum.

But, certainly, technologically the advances that AI has shown just in the last I would call it 3 years significantly lowers the barrier to entry to address those businesses.

Senator BUDD. Thank you.

Ranking Member.

Senator BALDWIN. So the administration suggests through its recently released Maritime Action Plan that AI can be used to increase domestic shipbuilding capacity. Currently, the United States produces less than one percent of ships globally.

We used to be dominant in the industry. The effort to revitalize domestic shipbuilding requires cooperation and input from government, the private sector, labor, and more.

So, Ms. Ng, where do you see the most promising opportunities to use AI to increase domestic shipbuilding capacity and how is Siemens working with organized labor and workers in the shipbuilding sector to identify opportunities to use AI to expand and enable our workforce to increase output, including repair and maintenance?

I am going to give you a cluster of questions here. Do you think we can attract workers to expand our capabilities if they continue to hear that AI might displace their jobs?

So go at it.

Ms. NG. Ranking Member, thank you very much for the question.

I will start by sharing a little bit about what industrial AI can do to recapture the American dominance of shipbuilding here in the U.S.

What we are seeing is that by the usage of industrial AI in all aspects of the life cycle for shipbuilding is really critical, and I will give three quick examples.

First of all, in design. Industrial AI allows us to be able to test and model thousands of configurations of a ship in hours as opposed to months. This allows us to do quicker design churn and to be able to design ships very quickly.

Second, we are seeing with production we are using industrial AI to help basically simulate material flow, workforce allocation, and sequencing of work packages so that work done in a back shop, on a shipyard, is very efficiently sequenced and done quickly.

This allows us to execute on that work and on those great designs even faster.

The third example that I can give is in sustainment. We are using industrial AI applications with predictive maintenance to be able to preserve uptime so that all of our machines and all of our capabilities in the shipyards and in the back shops are able to operate efficiently.

We are seeing that bringing that entire life cycle view together, we are very able to be able to reestablish that dominance.

The other question that you had around how do we continue to support the workforce and make sure that we are being able to retain that workforce is, I would say, pretty straightforward.

We have to have a strategy to attract workforce and retain them, meaning the workforce is becoming increasingly digitally native. They have expectations. They want to work with top-of-the-line software and AI-enabled tools.

So we are really honored to be able to provide that as part of talent acquisition strategies for manufacturers and shipbuilders specifically.

Senator BALDWIN. And I certainly want to just encourage you to have them at the table from the beginning, not introduce them at the end.

Ms. NG. Absolutely.

Senator BALDWIN. Mr. Muro, I have a question for you.

Last month, you co-authored a piece titled "Turning the Data Center Boom into Long-Term Local Prosperity." In this article, you note that local officials have the leverage to engage data center developers on becoming true local partners in their community.

The article highlights some efforts in Wisconsin, specifically Microsoft's partnership with the University of Wisconsin-Madison, in the development of the AI Co-Innovation Lab and their partnership with Gateway Technical College to train workers.

What should local officials be trying to get out of these negotiations? We have got a lot of them going on in Wisconsin.

Mr. MURO. Wisconsin actually is a demonstration, almost like an aerial view of data center development that is benefiting a region that is tied to broader economic achievement for the region, too.

That is because the—they are technology themselves. They are a source of computer processing, high-speed technology of—that could be tied in and is being tied into regional university activity, research, and so on. And then there are users of energy and places for energy innovation.

So data centers can be thought of in a very broad way along with their important national demonstration or their national push toward powering the whole technology.

But places have the possibility to work—enter into interactions with the hyperscalers early in the process. We think there is an opportunity for them to trade essentially very quick initial ability to save—excuse me, to establish, you know, quick permitting in response and in a trade with the companies to build these kind of partnerships in the region.

So I think the more a region has a sense of its technology goals and where those intersect with the hyperscalers, and I think there are lots of areas for particular research, work on energy issues, testbeds of all sorts. So I think there is just a wider array of possibilities in regions.

Senator BUDD. Thank you, Mr. Muro.

Senator Cruz, you are recognized.

**STATEMENT OF HON. TED CRUZ,  
U.S. SENATOR FROM TEXAS**

The CHAIRMAN. Thank you, Mr. Chairman. Welcome to all the witnesses.

Let us start with a broad question. AI is a fundamentally transformational technology, and like past waves of innovation, we do not know exactly how it is going to impact our economy, including what it is going to do to employment.

One of the greatest fears that I hear from people is concern that AI is going to take their jobs and it is going to lead to fewer jobs.

Mr. Giannikopoulos, what do you say to those concerns? What are you experiencing in your current job markets and how do you anticipate AI shifting the job market in respective industries?

Mr. GIANNIKOPOULOS. Chairman Cruz, thank you for the question.

The crisis in health care is real and it is happening right now. There are around 900,000 physicians in the United States. The pro-

jected shortage of physicians by 2030 is 187,000—excuse me, by 2037.

The projected shortage of nurses by 2030 is 194,000. So the gap is growing. The need is there, specifically within radiology. If you look at the attrition rate over the past 5 years, it is up by 50 percent compared to historical norms.

Meanwhile, the projection is that imaging volume will rise by 26 percent in the next 30 years. So a continued growth and a continued need.

Dr. Curtis Langlotz, the immediate past president of the Radiological Society of North America, recently did a task-based analysis of the work of a radiologist, and he estimated that within the next 5 years the amount of work a radiologist will need to do could possibly go down by 33 percent.

Yet, the need for them to perform that understanding and ultimately, you know, make those diagnoses so the patient can get the care will only increase.

So AI is not replacing the physician at any point along this. It is enabling them so that we can leverage them to get where we need to be as a health care society.

The CHAIRMAN. Ms. Ng, how would you answer the same question?

Ms. NG. Chairman Cruz, in our experience, advanced technologies support workforce expansion, not contraction. This is especially true in my sector of shipbuilding, where we are seeing these advanced technologies drive an increased demand for highly skilled trades.

AI is not diminishing the need for skilled workers. It is amplifying it. AI's expansion reinforces the need for strong technical skills and for people who are passionate about innovating it.

The best example that I have is actually in Fort Worth, Texas, where we have the latest and greatest Siemens facility that was just stood up. In Fort Worth, we used our digital twin and AI-enabled tools to be able to model the entire production floor and simulate it before even breaking ground.

This facility created hundreds of new jobs in that area, and was—and the employees that are working there are operating in reduced complexity and much better training.

So in summary, the greater risk to jobs, in our opinion, is that—is losing industrial competitiveness. It is not responsible modernization. Thank you.

The CHAIRMAN. Dr. Shelton.

Mr. SHELTON. Yes, thanks for the question.

I can give two examples with human labor. The first in the warehouse and logistics world is there are sort of two problems.

First right now is an extreme growth in that sector over the last, say, 10 or 15 years—all of us love our next-day Prime shipping—has created a completely unsustainable growth trajectory in that industry.

So there are only two ways you can do that. One is you could pull slack out of the rest of the economy from a human labor standpoint, and second is you can deploy automation.

Companies right now have tried to do both, like the Amazon example that I cited. However, as a sector, it is still coming up short

from a total employment count standpoint. So that is the backfill side of this.

The second and the more exciting piece of this is I think it changes fundamentally the nature of what a job is. So as a private pilot, there was a time in the U.S. history where delivering air mail meant you put on your goggles, you got into your biplane, and you flew across the U.S. personally carrying the mail.

There is now an enormously complex logistics system for shipping things by air, and you could say that you work in that industry while someone from the 1930s would simply not recognize what the job has evolved into.

That is why I got into robotics. That kind of stuff is super exciting to me and the evolution of things like agriculture. As a notoriously terrible grower of corn, I think people do not—are not aware of how hard modern agricultural jobs are and just how far we have come on that side of the economy.

So I am an optimist about this. I do think we should be cognizant that there are evolutions of jobs over time and we should be sensitive to that, but it is also the path forward.

The CHAIRMAN. Two final questions. What is something that you hope AI could do in your industry that we cannot currently do yet, number one? And number two, what is a surprising way you have seen AI used that you did not expect?

Mr. GIANNIKOPOULOS. I will answer the same way, but from two different perspectives. If you look at precision medicine pathways, AI has already opened those up in ways that we have never seen.

Take my personal diagnosis journey. It was 10 years to that, ultimately—10 years of varying symptoms that were ultimately dismissed because I was a white male with Greek heritage in Florida, which is not exactly common for multiple sclerosis.

Being able to identify that this, you know, varying numbness, all these different parts and pieces personalized to me as an individual and understanding in our broader health care system, could have shortened that cycle of diagnosis.

That is what it is already starting to do, but with better integration, better understanding, better tailoring of the medicine and the understanding to the individual, it will be able to take that to the next level.

This is where we are getting into, you know, predictive cancer scores, different things like that, so that you can identify a path that a person is on, not when they are already on it but before they start it, and really make a big difference.

The CHAIRMAN. OK. Briefly, Ms. Ng, and then Dr. Shelton.

Ms. NG. To answer your first question, we want to see AI adopted throughout the entire life cycle as opposed to in silos so, say, maybe just design or just production or just sustainment.

For the second question, what has surprised me the most is seeing the application of industrial AI with the U.S. Navy, which is my customer.

We have been able to work with the Navy to digitally model the four shipyards and help them to be able to plan for future work.

So when you build a submarine, you have a whole maintenance plan that comes associated with that, and what is surprising to me is the ability to use industrial AI to actually model out new dry

docks, new back shops, all of this new physical infrastructure that does not disrupt the current availabilities and work happening there.

Thank you.

Mr. SHELTON. So the very first time we deployed one of our robots, Digit, the humanoid, doing a task, it took an engineer, as I recall, somewhere about five and a half weeks to really prototype that.

By 2023—and this video is actually on our YouTube channel for anybody who is curious, we decided to hook an early version of ChatGPT up to it to see if it could write code, if it could run the robot.

And shockingly, and I was completely gobsmacked by this, it worked on the first try. Nothing in technology ever works on the first try so that was a really interesting outcome.

Now, at the time, it was not hardened. It was not deployable. But as sort of a shot across the bow of things that were to come, it was super interesting.

I would love—and this gets back to Chairman Budd's question about the dataset availability—that that worked is a sign that we can take descriptions of tasks that we want robots to do and use automated tool sets to get them deployed as rapidly as possible.

It is an exciting and completely novel side of the industry that continues to surprise most of us who have been in the field for a while.

The CHAIRMAN. Thank you.

Senator BUDD. Thank you, Chairman.

Senator Blunt Rochester.

**STATEMENT OF HON. LISA BLUNT ROCHESTER,  
U.S. SENATOR FROM DELAWARE**

Senator BLUNT ROCHESTER. Thank you, Chairman Budd and Ranking Member Baldwin, and thank you so much to the witnesses for this hearing.

I get very excited about this topic. I was former secretary of labor in Delaware as well as head of state personnel.

But I also had the opportunity in the House when I served in the House to start a bipartisan Future of Work Caucus, because for me, if anybody says they know what the answers are or whether the economy is going to—you know, we are going to have more jobs or less jobs, you really do not know.

This is all so new and so—and so impactful in so many parts of our lives. I am on the HELP Committee, so health care. I have a nursing workforce shortage bill, so health care is important.

I am from an ag state so we think about precision agriculture. I saw a woman use an iPad in her kitchen to control her crops.

So to me, this is very important. Our state has a statewide AI commission and we are setting up clear guardrails on ethics, safety, transparency across models, on training, creating a regulatory sandbox, and also new legislation.

We also have two land grant institutions, the University of Delaware and Delaware State University, that are actually turning AI into real-world innovation and workforce pathways, and we have a

lot of local companies like Qnity who are deploying new hardware to improve AI systems.

And we also have to pair AI adoption with real safety guardrails and policies that ensure that we strengthen our workforce instead of sidelining it, and I think, you know, that is one of the—for me, there is the—I am a pragmatic optimist.

Let us put it that way. So there are the good things, but I also understand that we do not want to leave people behind. Whether it is a podcast, whether it is magazines like the Atlantic, the AI and the Future of Work, it is truly everywhere. We are reshaping how we work.

I want to really kind of tailor my questions to something, kind of picking up on Senator Baldwin about the workforce and how the workforce is included as these changes are happening, and I will start with Ms. Ng.

What does engagement with your workforce look like when it comes to designing and implementing AI-related changes? Can I start with you?

Ms. NG. Absolutely. Thank you for the question.

As I mentioned in the opening statement, what we have found at Siemens is that digital transformation truly does work best when the worker is at the center, and that is over a multitude of ways.

The best way that I can provide a story, though, is actually a story from the Puget Sound Naval Shipyard. There is a superintendent of Backshop 31 at Puget Sound and she truly demonstrates what effective partnership looks like when we are trying to solve a problem using a digital technology.

And what I mean by that is this superintendent, she leads from a place of empathy. She knows the struggles and the pain points that her workforce is managing. So working with leaders like that.

Senator BLUNT ROCHESTER. Do you have like a—is there a specific—and for all of you, I will just submit questions for the record because I have a lot of questions and I do not have a lot of time.

But I will follow up with you on, like, is there a specific process that you use of a way to get that information and then turn it into your policies?

I know that, Mr. Muro, you said in your testimony Brookings analysis suggests 30 percent of all workers could see at least 50 percent of their occupation tasks disrupted by generative AI in the coming years.

So even with the updating of tasks, can someone share with me how you include workers in making sure that their jobs—they are re-skilled, that they are trained, that they have what they need to keep up?

And I will start with—maybe I will start with you, Mr. Muro. And I have 41 seconds.

Mr. MURO. Yes. No, it is—first, those statistics are directional. Clearly, there is tremendous uncertainty around the—but we are talking about a pathway. We know that there will be significant disruption.

Disruption, though, is—can be positive or negative and we think significant aspects of AI's impact on work will be disruptive, but also beneficial.

Senator BLUNT ROCHESTER. I mean, I understand the difference between a horse and a buggy, and now we have cars. I get that part.

I am looking for—and we will follow up with each of you—what specific things are we doing to prepare the workforce and also include them in the help and decision-making of how to make sure that it is not so disruptive?

I love the issue of coding. We were pushing people to go into coding, and now the machines can code.

And so as I am thinking about the future and how I think Dr. Shelton said the changing nature of the workforce, I would love to have a conversation with each of you about what can we do as Congress to ensure that we are not leaving anybody behind, but at the same time we are benefiting from the technology that is before us.

And I am out of time. I yield back.

Thank you, Mr. Chairman.

Senator BUDD. Thank you, Senator.

Senator Blackburn.

**STATEMENT OF HON. MARSHA BLACKBURN,  
U.S. SENATOR FROM TENNESSEE**

Senator BLACKBURN. Thank you, Mr. Chairman, and to each of you, thank you for being here.

Establishing a framework for AI is something that is going to be very important for Congress to do. President Trump asked me to take the first stab at drafting the Trump America AI Act, and it is based off of his executive order.

I was pleased that the executive order included protections for what I call the four Cs: children, creators, communities from job loss and high electric rates, and then censorship.

We know that AI and the LLMs are biased against a lot of conservatives, and in Tennessee I like to say we have a good, bad, and ugly relationship with AI. Our manufacturing, logistics, health care, really like it.

A lot of our innovators that hold patents and trademarks and work with our auto industry and then, of course, our entertainment industry with our musicians, our songwriters, our screenwriters, our script writers are really quite concerned about what it is going to do and their ability to protect their name, image, likeness.

So having the proper guardrails in place are important, and we know that every industrial sector has had those guardrails except the virtual space, and once we define what the rules of the road are, we free up innovators to take off and do great work because they know what the playing field is so thereby they can develop a strategy to win.

So that is the purpose of our having the Trump America AI Act and putting these protections in place, and I want to—I think it is Mr. Giannikopoulos. Am I saying that anywhere near right?

Mr. GIANNIKOPOULOS. Very close, Giannikopoulos.

Senator BLACKBURN. Kopoulos. I did get very close.

Mr. GIANNIKOPOULOS. You did.

Senator BLACKBURN. All right.

As you know, Nashville area really is the health care informatics and health care interactive technology hub, and we are seeing so

much innovation that is taking place there and we are really—when it comes to predictive diagnosis, disease analysis, remote surgeries, telehealth even, we see the benefit of these applications.

The but comes into place when we talk about creating a digital health ecosystem and privacy concerns that are there. So in your work, I want you to talk about that importance as an innovator and a patient.

I am going to give you a total of a minute, and then if you want to submit something longer form to me, I would welcome that.

Mr. GIANNIKOPOULOS. Excellent. As a developer within health care governed by business associate agreements, we are, you know, clearly within the scope of HIPAA. HIPAA is an elastic rule. It started out as an insurance—

Senator BLACKBURN. It needs to be modernized.

Mr. GIANNIKOPOULOS. It does need to be modernized, but it started out as an insurance portability.

Senator BLACKBURN. In order to include all of this.

Yes, as I say, it came about—it covers the fax and the fax machine, the paper in the fax machine. So we can modernize it.

Mr. GIANNIKOPOULOS. It covers the access to data and with electronics we have the ability to audit it.

Senator BLACKBURN. That is right.

Mr. GIANNIKOPOULOS. That is really key with the transformation we have gone through.

Nashville, as you have mentioned, has led the pack in that, and what I see out of the large institutions is they are approaching this as workforce transformation. It is not simply leveraging technology to do what you have always done.

It is how can we leverage the technology to do something new with it, and as a patient that is where the benefit sits for us, if we can receive better care pathways as a result of that.

Senator BLACKBURN. Ms. Ng, I want to come to you and your work.

Let us talk about the difference between industrial applications and commercial applications, because I think this gets lost many times as we talk about how consumers approach the utilization of a technology and their expectation of that.

And as we have developed tech policy through the years, I have told people, look at the computer and look at the backside and the front side, and there is truly a difference that is there.

And with AI and the fact that AI, coupled with the other computational sciences like quantum, is going to yield faster, more accurate results. But talk about the difference in the industrial and the commercial.

Ms. NG. Thank you, Senator.

You touched on it perfectly, which is that in a manufacturing and industrial environment, oftentimes the work is safety critical and operating in a high tolerance environment, meaning that precision matters extremely importantly.

So consumer AI is using, you know, all of the Internet to analyze data and do various things. Industrial AI is using much more controlled datasets from machines on the floor, from manufacturing systems, and from digital engineering datasets, and it is using that control data to generate insights and make recommendations.

Ultimately, the human is still the decision authority to confirm what to do next.

Thank you.

Senator BLACKBURN. And, you know, as we look at training our children and we need to have STEM labs in all of our schools. Even though much coding will be done by AI from the consumer side, kids need to code just like they need to learn a language. They need to have that understanding.

So we look forward to helping build this policy out as we move forward. Thank you.

Thank you, Mr. Chairman.

Senator BUDD. Thank you, Senator Blackburn.

Senator Moreno.

**STATEMENT OF HON. BERNIE MORENO,  
U.S. SENATOR FROM OHIO**

Senator MORENO. Thank you. I did not see where—I did not see that pattern coming. That is great.

Thank you for this hearing. It is, obviously, very, very important and very topical.

I will start with you, Demetri, because I am not going to—I am not going to take a swing at your last name so I will just call you Demetri. We are going to make it informal, part of I will call you by your first name, so you can call me Bernie.

In the 1920s, would it surprise you that there was people saying machines will devour man?

Mr. GIANNIKOPOULOS. I believe they were called cars.

Senator MORENO. Exactly. And in the 1950s, an MIT professor did a study that said that basically we are stumbling into the automation era and all workers will be replaced. Does that sound familiar as well?

Mr. GIANNIKOPOULOS. Absolutely.

Senator MORENO. And in the 1980s, there was a book written, "The Robot Is After Your Job." Does that sound familiar as well?

Mr. GIANNIKOPOULOS. The Excel spreadsheet was also going to replace accountants.

Senator MORENO. Right, exactly. So the doom and gloom has been around forever, and I think it is important for the record is just to talk about employment numbers in America from the 1920s to the 1950s to the 1980s.

So in 1920s, when machines were going to devour man, there was 42 million Americans employed. In the 1950s, that number went to 63 million. So, obviously, decently wrong.

In the 1980s, that number is 108 million, and in 1990s with the Internet that was going to replace all retail businesses. There was no point in being in retail—I remember that being in the car business—because the Internet was just going to completely disintermediate everybody, 131 million people employed.

In the 2000s, at the beginning of smart phones, 160 million people employed, and thanks to the policies that we put in place in the—this Congress, we now have a record number of Americans employed, 172 million.

So the Mark Twain expression, "The news of our death is sorely exaggerated," meaning employment continues to grow.

Now, with that said, I think what we can all agree on—and I want to get your thought, and I will start with you, Brittany, sorry, because there is no way I am taking a shot at your name either—on what is different about this period of time, from your point of view, with the introduction of AI versus what I have just laid out?

Ms. NG. Thank you for the question, Senator.

There is an incredible story about Albert Einstein riding on a train, you know, back in the day, and the conductor is coming through, stamping tickets, and he sees Einstein scrambling, looking for his ticket.

And he looks up and says, “Mr. Einstein, it is OK, I trust that you bought a ticket. I know who you are.” Continues on his way. Sees Einstein still scrambling on the floor.

Goes back and says, “Mr. Einstein, truly, it is fine. I know who you are. I know that you bought a ticket.” And Albert Einstein looks at him and says, “Thank you, sir, I also know who I am. What I do not know is where I am going.”

And I think that that story really gets at the heart of what you are mentioning, which is ultimately what we need to be doing now is partnering with industry to define what that compelling vision and that roadmap is, and that is what I do every single day on the ground at Siemens with my customers is partnering with them to define what are the actual business outcomes that you are trying to achieve, and how can we fully channel these industrial AI solutions and applications toward achieving that outcome.

So to answer your question, I truly believe that what is interesting and new about this technology is that we have the ability to explicitly help specific business outcomes.

Thank you.

Senator MORENO. Yes, and obviously, productivity improvements is key, and I think the expression has been used, you are not going to lose your job to AI but you may lose your job to somebody who uses AI.

And, Dr. Shelton, I will kind of shift to you on this part of the questioning. Part of what I see as a worry is that this is moving much faster than these other rollouts, right?

So this is definitely at a speed which we are not used to, and what I worry about is are our institutions that train people, are they prepared for the speed?

What are your thoughts on that?

Mr. SHELTON. It is a qualified yes, I think, to your question, although I would agree that the speed here is very different.

I think something that everybody in this room has had to grapple with with AI is we did not perceive automation coming for our jobs or evolving the nature of work for us as, largely, knowledge workers.

And I think, you know, ironically, people more on the manual labor and the blue collar side of the universe has had, you know, several hundred years to get used to the idea of using tools to accomplish more than they could have accomplished on their own.

That is why I used the farming example in my opening statement. Those of us who deal primarily on the knowledge side of the universe have not had options to deploy autonomous agents until the last, let us call it 6 months, to go off and do portions of the

tasks that we are using them for, not to do the job, per se, but to do a sub-component of it.

So I think all of us who are on the more knowledge end of the economy are going to have to evolve very rapidly to start understanding our job as managing fleets of autonomous workers who are working on our behalf as opposed to doing that work ourselves, and that is quite different.

From a university standpoint, I think there is going to be a rapid pivot back to the liberal arts. This is something that my wife, who is an English professor, likes to remind me with some rapidity is she has known all along that it was all about talking, and I have to concede that that is probably looking like it is going to be the case over the next 20 years.

Senator MORENO. All right. Thank you.

Senator BUDD. Thank you, Senator Moreno.

Senator Hickenlooper, you are recognized.

**STATEMENT OF HON. JOHN HICKENLOOPER,  
U.S. SENATOR FROM COLORADO**

Senator HICKENLOOPER. Thank you, Mr. Chair. Thank you all for being here. Certainly, a very timely hearing, and I commend the Chair for that.

Let me start just to talk a little bit about product testing.

Mr. Giannikopoulos—I think that is close—thank you for sharing how Rad AI is integrating the software to support quality—the delivery of quality health care to patients.

As you know, software, hardware, are rigorously tested before they are used with patients. There is endless testing and backing up.

We are working on bipartisan legislation called the Vet AI Act, which promotes evidence-based best practices to help companies have their AI tools independently evaluated by independent third parties. Let us leave it at that.

This helps increase transparency, promote accountability for responsible system design. I think, to a large extent, it creates trust in customers.

So, Mr. Giannikopoulos, would you describe how—what Rad AI is doing now to test—you know, to looking at what are its—whether its products are sufficiently tested before they go into action?

Mr. GIANNIKOPOULOS. We are a company founded by a radiologist for radiologists. Dr. Jeff Chang, the youngest radiologist at the time of his graduation, 17 years of age—

Senator HICKENLOOPER. Jesus.

Mr. GIANNIKOPOULOS. Yes, a very, very smart man. Has been central to the design ethos of our solutions. He was a practicing radiologist when he created the idea of Rad AI to begin with.

We have continued to engage with the radiologists, validate the usage, and understand exactly how it integrates into the workflow.

The other key piece that really needs to be built with the adoption of AI in health care in particular is trust, and a way to gain trust is—there is the technical nature, there is the transparency, the information about how you have built your models.

But there are also leveraging relationships. For example, we have one with the RS&A Ventures Group to integrate the century

of knowledge that RS&A has available directly into the application at the point of care for the radiologist.

So it is not AI assisting them with the diagnosis, it is AI plus trusted and validated information right at the point of care.

Senator HICKENLOOPER. Cool. It is worthy of a longer discussion.

Ms. Ng—is that right? Somehow close? See, I am not scared of these, well, you know, difficult names. Unusual names, we will call them. I have a difficult name, Hickenlooper.

Thanks for your testimony and sharing how all the work that Siemens is doing around, you know, how AI is going to enter new sectors of the economy and especially the industrial economy.

It is clear that we are in the middle of a revolution. I think of it as a great transition and I think we are doing several things at once. We are going into AI. We are moving toward clean energy. This will look back—50 years or 100 years from now, they will look back into the beginning of this great transition.

I think it is going to—in the terms of AI, it is going to define how AI supports this growth of small businesses and entrepreneurs, but also attracts students to STEM fields and ultimately will transform our workforce.

Now, when two companies enter into a contract, it is essential that the service agreements are transparent but also that they are enforceable for—well, for how an AI system can be used or not used or misused.

So, Ms. Ng, how does Siemens ensure it is transparent with its customers about the design limitations of the AI products it sells? Do you understand what I am asking?

Ms. NG. Yes. Thank you, Senator, for the question.

So transparency is critical to trust, which we were just speaking about, and there are several ways that we as Siemens ensure that we are providing full visibility into not only how industrial AI is being used in environments like a beer manufacturing customer that we have in Colorado, but throughout all of the sectors in the United States.

And it really comes down to two things. One is allowing the industrial AI application to be able to share the source data, so pulling from which machines, which engineering datasets, and which manufacturing systems that it is producing from.

The second is providing explanation or evaluation of why that recommendation is being made, which comes down to the ability that we were speaking about earlier of training folks to be able to work in systems oversight types of roles so that they can engage more effectively with that industrial AI capability.

Thank you.

Senator HICKENLOOPER. Great. I am going to hold off. I have a couple other questions but I will submit them in writing. I appreciate—they are slave drivers here in terms of keeping us on our time.

Senator BUDD. Only because more showed up. So thank you for the question.

Senator Young, you are recognized.

**STATEMENT OF HON. TODD YOUNG,  
U.S. SENATOR FROM INDIANA**

Senator YOUNG. Well, thank you to our witnesses for being here today.

And Ms. Ng, I would like to build maybe on the previous questioning and your response. We need to unlock more industrial data, spatial data, as I understand it, a lot of it, so that embodied AI or AI used to control machines in the physical space can continue to move forward.

China, a country we care about because we compete with them on a number of different levels, they lead the world in terms of deploying industrial robots, collecting this sort of data. We are going to have to come up, of course, with a different set of rules and practices, ones consistent with our values and laws.

But I think for starters, we need to distinguish between industrial AI and consumer AI. I have some legislation with several colleagues called the AI Public Awareness and Education Campaign Act.

This seeks to provide transparency into AI, its promises, limitations, and what consumers can expect from it. Too often, we think about AI and our minds immediately—I think naturally—move toward generative AI rather than the AI we have been living with and using for the past several decades.

You are correct in your testimony that what we in Congress do on consumer-facing AI should not impede the innovation and deployment of technology in manufacturing like with the work you are doing in the maritime space, for example.

As you may know, I introduced some legislation called the Ships for America Act. This is legislation to reinvigorate American shipbuilding, an item that, fortunately, Republicans and Democrats alike have gotten behind.

It is something that President Trump has prioritized for his administration, and I understand that Siemens recently created a new maritime business to address the opportunities the company perceived in the shipbuilding and ship repair industries.

Can you walk me through, Ms. Ng, the benefits these types of industrial AI capabilities can have in the effort for America to reclaim our shipbuilding dominance?

Ms. NG. Absolutely. Thank you for the question.

So what I would start with is by saying that if America truly does want to reclaim shipbuilding dominance globally, we have to outpace our competitors, not just in labor but in building out these digital capabilities, and industrial AI is indisputably a force multiplier here.

We think about tackling industrial AI and shipbuilding across three different areas of a ship's lifecycle. So starting in design, through production, and then into sustainment, we apply applications of industrial AI across each area of that lifecycle, everything from doing faster, more precise design using AI-enabled simulation, through predictive maintenance, making sure that the machines and the back shop are available and ready to roll for every single task that is needed.

But if I were to summarize, the most important thing is that we are using industrial AI to help sequence work so that it is done

more efficiently and more quickly, and what this does is it reduces rework and it makes work better on the deck plate in the shipyards because people are able to execute first time—you know, the first time, and operate in a more productive environment.

Thank you.

Senator YOUNG. And as some of my constituents watch this hearing they may think, wait a second, more productivity—that means higher wages too, right? So that is—that is a byproduct oftentimes of these types of investments, whether it is yesterday's capital investments or today's AI investments.

So I do want to underscore that. What is relatedly Siemens doing, Ms. Ng, to upskill the American workforce more broadly to ensure workers can succeed in these high-tech, high-demand AI-empowered roles?

Ms. NG. Thank you for the question, Senator.

We are doing a lot, but if I were to summarize I would pick two different things. One is we are working with an ecosystem of partners to develop what we call micro credentials for shipbuilding specifically but, more broadly, for manufacturing.

What this is doing is it is creating pragmatic, kind of ready-to-use credentials that might be a day, a week, a month long, and they prepare the workforce to go into modern shipbuilding and start operating on day one.

The second piece is that I am incredibly proud that Siemens has committed to training 200,000 electricians and manufacturing experts by 2030.

We are not doing it alone. We are working with public-private partners, universities, community colleges, and trade programs to be able to do that, and I am extremely proud to share that today.

Thank you.

Senator YOUNG. Great. Thank you for your answers, Ms. Ng.

Mr. Chairman.

Senator BUDD. Thank you, Senator Young.

Senator Cantwell, you are recognized.

**STATEMENT OF HON. MARIA CANTWELL,  
U.S. SENATOR FROM WASHINGTON**

Senator CANTWELL. Thank you, Chairman, and I thank you and Ranking Member Baldwin for this important hearing, and the witnesses for being here.

We are here today to talk about some of the most innovative things that could help our economy, going forward, but I want to mention we do have an NSF AI Education Act that Senator Moran and I have introduced, and it talks about some of the workforce issues you guys have been discussing and a Small Business AI Training Act, that also with Senator Moran, so that we are getting this across all aspects of our economy, and a Future of AI Act that my colleagues Senator Young and Hickenlooper and Blackburn and I. This is about voluntary standards for infrastructure and innovation, mostly on safety and security.

But the thing I wanted to focus on is the science side of the equation. I represent a big national lab and—but the laboratories across our country represent a unique opportunity to take science re-

search that basically might take you years to do and now drive it down to months.

And so one of the things I am very worried about that we cut 10,000 STEM Ph.D.s from the Federal agencies in 2025, so that is not a good idea.

I represent also one of the most scientific regions of our country and so we like scientists because they are in there creating the next generation of economic competitiveness and solutions and, certainly, when you look at the massive amount of AI investment that China's making, you want to keep your scientific workforce because they are going to help you.

But one of the things that I am most interested in hearing from maybe you, Mr. Muro, or Dr. Shelton is how transformative biology and chemistry lab work could be compressing it into a few months.

As I mentioned, the Pacific Northwest Lab is doing that already on deploying autonomous experimental platforms that you are basically, you know, creating everything from discovery in bio energy to advanced materials and fusion, but you are getting it done in months instead of years.

And so I would assume that people think that this kind of AI—I would call it AI-accelerated discovery—is, you know, worth the commitment and worth getting this done and probably one of the most important things that we could be doing.

Dr. Shelton or Mr. Muro, either one.

Mr. MURO. I would just say one general thing here is that we can make alignments of our—or our computing, our AI systems, our data, and our talent, but we have to have the ongoing basic scientific activity functioning at a high level as well because, really, all of that is essentially trading data for the next iteration of all of that innovation.

So I think that is one of the things that a comprehensive attempt to leverage AI for national good would want to look at is making sure that you have all dimensions of the AI machinery working, and we do think that actual science—scientific activity and the talent it collects is absolutely central.

Senator CANTWELL. Dr. Shelton.

Mr. SHELTON. So logistics and warehouse work has already seen the problem that in that industry we call islands of automation, so you may have a conveyor belt and you may have a ground vehicle that is carrying something and you have to get a piece of material transferred from the autonomous ground vehicle over to the conveyor belt.

Academic research has similar problems, although typically with higher tech devices where you have existing automated processes, say, a PCR machine that does DNA analysis and some other piece of lab equipment that you have to connect together, and robotics and specifically general purpose platforms are a way to address that.

There is also—and this is not my field, although I do have friends who work in this—one of the most exciting things I think that AGI or narrow AGI specifically is able to offer up is vastly out-sized performance within a particular problem area.

So if you are familiar with the AlphaFold project out of DeepMind looking at protein folding, you can get AIs that are

superhumanly good at a very narrow task and that, feeding into a lab structure that is highly automated, allows you to go from the conceptual computation side of it down to the wet lab work in a very compressed process.

Senator CANTWELL. OK. So somebody at home, how do they understand what you just said?

Mr. SHELTON. Sure.

Senator CANTWELL. I mean, I am just—I am just trying to say, we spend a lot of money on our national labs. We have already decided they are critical to our competitiveness as a nation, and we are also proud of our universities.

But when I look at UW versus PNNL, we are talking about a size—a huge size difference in the amount of research that is done.

So now you are saying you are going to apply AI to that and basically translate that science into faster application, as I am saying, not years, but months, then I think this is a huge initiative that we should be undertaking is to take all of that research.

You just gave one example. You are basically taking one of our big research arms and you are basically saying, let us make sure we apply AI to it because it really is one of our most competitive R&D efforts, right?

Mr. SHELTON. One of the things, and we have seen this in robotics research itself, is you have, you know, a human who comes up with an idea and wants to see that translated into something practical.

So for your question of how would I explain this to someone who is not sitting here in the perspective of robotics land, you have an idea. You have to get that translated into some sort of physical reality and then you have to test that physical reality.

I think where AI allows us to inject the best short-term safety-controlled piece of this is to work with the human researcher to get the math part of the process turned into something physical that can then be tested, whether it is in the medical space or elsewhere in industry, and allow us to actually reduce something to practice as rapidly as possible.

Senator CANTWELL. Yes, I—just the last point. I know I am over my time.

It is that we are spending, like, about \$10 billion on lab efforts that are all about all these issues. So I am just saying one area to double your investment is to basically say, we are spending \$10 billion here. So we have already decided we think this is really, really important.

We are saying apply AI to that effort to make it more efficient, because we have already decided that is where we are spending our money, and you just gave two really good examples of what that acceleration can deliver.

So thank you, Mr. Chairman.

Senator BUDD. Thank you, Senator.

Senator Rosen, you are recognized.

**STATEMENT OF HON. JACKY ROSEN,  
U.S. SENATOR FROM NEVADA**

Senator ROSEN. Well, thank you, Chair Budd, Ranking Member Baldwin. It is really an important hearing and I want to thank all the witnesses for being here today.

And so I am going to start with you, Ms. Ng. I am going to talk a little bit about AI standards and trust.

Earlier this year, I led a congressional delegation to CES in Las Vegas with a few senators. I have been leading one almost every year—senators from this committee. We were able to stop by the Siemens booth, hear how Siemens is innovating on AI, other new tools, and I am excited you are here to testify today.

In your testimony, you outlined how using AI in advanced manufacturing has a potential for enormous benefits. However, the financial risk of an inaccurate outcome from an unreliable AI tool is still very high.

Therefore, your customers have to have a clear incentive to ensure AI tools that they integrate with their products are trustworthy and reliable.

And so what standards of trust and reliability are your customers demanding? Are there best practices or standards that this Center for AI Standards and Innovation should consider from the industry?

Ms. NG. Absolutely, Senator, and I am so glad that you got to visit CES. It is always a wonderful event.

To answer your question, the most important thing in defining trust is having really strong underlying data that informs the industrial AI application.

So what that means is being able to tap into machine-generated operational data on a shop floor, manufacturing systems data, and digital engineering datasets that all come together to be able to support analysis and recommendations and generate insights.

So what is interesting is that that is a huge piece of my business today at Siemens is supporting our customers and delivering what we call the sort of digital authoritative backbone for engineering.

That serves as the foundation of which all operational capabilities are built on top. Thank you.

Senator ROSEN. Thank you. And, you know, I really do believe, and I am sure you do too, without clear Federal standards and guardrails, AI tools that are sold to consumers, small businesses, large businesses, but small businesses in particular, they have less, if any, leverage. They may not be safe and reliable.

They could have potential to cause significant harm. So we do have to be sure that we are paying attention. And so I want to talk about small business and AI adoption because many companies have prioritized AI adoption, trying to find where this tool can improve efficiency, add value to their business, right? How do you grow?

However, we need to ensure that the potential benefits, as we are seeing from AI, do not continue to disproportionately benefit only the largest corporations that have the capital and the influence, really, to adopt safe AI and large language models and all the other things that go along with it.

So I want to stay with you, Ms. Ng. You have a range of customer sizes, large legacy brands like PepsiCo to very small businesses, startups.

What is the biggest challenge you would say that your smaller customers face adopting AI? And what can Congress do as we think about—I am also on the Small Business and Entrepreneurship Committee so I want to think about the large businesses and the small.

What can Congress do to ensure that the AI adoption gap it just does not widen, leaving our smaller innovators potentially behind?

Ms. NG. Absolutely, Senator, and this is an incredibly important question.

We think about adoption for small and mid-sized businesses in three ways. It is awareness, ability, and willingness.

So awareness is being able to communicate and understand the art of the possible, of truly what are the business outcomes that industrial AI can unlock for that business.

Ability is, yes, to your point, sometimes capital, but it is also the aligned incentives with both leadership and, as Ranking Member Baldwin mentioned, the ability to also have the factory floor workers involved in the process.

The third piece is willingness, and this is my biggest passion in life is organizational change management. So making sure that there is an intentional rollout plan to all segments of the workforce to ensure that that adoption happens.

Senator ROSEN. You set me up for—I only have a few seconds for my last question because your passion is going to lead me to Mr. Muro to ask this question.

AI literacy, right? Because you are enthusiastic about getting it out to everyone, but can we talk about how AI literacy closes that AI adoption gap that we want to happen?

So thank you for setting me up for that question.

Mr. MURO. I would just say that this is where regional ecosystems can be extremely helpful. Regional learning ecosystems, regional technology ecosystems, and as part of that work to make sure that adoption does include these features.

More and more regions are beginning to find their own level on these technology solutions, and I think the Federal Government has historically, you know, had a role in supporting regional economic development.

I think we can be more pointed about that and maybe making this a central area, because the talent piece—and the talent piece are intimately connected to the—to the kind of broad adoption that we are talking about technologically.

Senator ROSEN. Well, thank you. Thank you again for all of your work for being here.

Great hearing. Thank you, Mr. Chair.

Senator BUDD. Thank you, Senator Rosen.

Ranking Member Baldwin, you are recognized for additional questions.

Senator BALDWIN. Thank you. Senator Rosen has cued me up for my next question and my last question as we do a quick second round before closing.

Mr. Muro, I appreciate your highlighting worker security in your testimony. In Wisconsin, we are very proud of being the first in the country to pass a law relating to apprenticeships and registered apprenticeships. We did that in 1911.

The U.S. did not follow suit until 1937, but with the first apprenticeship law in the country we continue to break enrollment records in part because our apprenticeships focus on in-demand fields.

I would like it if you could talk a little bit more about the opportunities to integrate artificial intelligence into registered apprenticeships and how these programs can help with retraining workers in an AI world?

Mr. MURO. I mean, first, I think our view of apprenticeships is highly shaped by its industrial past, and that is an incredibly important theme and a place that it can be utilized and merged with AI.

AI can also add to the learning and training dimensions of apprenticeship through tutorials, AI—AI online supports, and all of those.

But I think that we should think of apprenticeship as especially a way to get hands-on work experience, and we are going to need that more and more because it is going to become clearer that strictly, you know, higher education degrees are not going to be maybe more—maybe more vulnerable to change than very specific subject matter, hands-on experience with people learning a technology.

So I think that this is an extremely important dimension that you have put your finger on here because in some ways, apprenticeship points exactly at a—at a gap that I think we are going to face in especially launching careers and setting up pathways for development.

Senator BALDWIN. Thank you.

Senator BUDD. Thank you, Ranking Member Baldwin.

Mr. Giannikopoulos, there is—since you are in the radiology world, there was a famous prediction made by the father of AI. I am sure you are familiar with it.

I think it is Geoffrey Hinton. He said that with the rise of AI there would be no more need for radiologists, but someone as smart as he was is completely wrong, and your company, your work, just proves that wrong every day.

How could someone as smart on AI as he was originally get that sort of prediction wrong? And how could we use that as sort of wisdom for the future as we think about the application of AI in—personally and commercially?

Mr. GIANNIKOPOULOS. As we look at all of this, all of this transformation, it is not unique to radiology. That was a field that was early identified as potential for, you know, automation and replacement. That did not work out.

It is part of the way the AI is trained. You know, it is trained on this medical information that is generated by a radiologist through an interpretation process. That judgment cannot be replaced. There are going to be edge cases. There are going to be zebras.

Again, my personal diagnostic journey, I do not fit any algorithmic assessment that would normally get to that diagnosis,

which is why we need the human directly involved. Like, medicine is both a science and an art, being able to put that together and synthesize it.

Now, what AI offers as an opportunity is the ability for the radiologists, the clinicians, to synthesize more, understand more, access it without having to dig through records and, you know, all these complicated systems, but instead see it presented to them in a really easy way so that they can make that determination.

And if you look at rural health care in particular, that is an area where we need to augment those institutions, and in North Carolina, ARA Health Specialists in Asheville where they were originally based out of, they cover most of western North Carolina right now and serve as the safety net to make sure that patients do not have to be flown over mountains literally, you know, to get to other health care systems.

They do that by early adoption of technology. I met them 20 years ago on the documentation side, and in my last company they were the first—some of the first in the states to adopt image analysis for improvement of understanding.

Now they are using new documentation tools like ours to be able to augment that and integrating the Radiology Society of North America evidence directly into that to really speed it up.

So I cannot comment on how Jeff got that quite so wrong, but I can share he did get it wrong and today, they also said self-driving cars would take over by this time, too. Radiologists are still driving to work in their cars.

Senator BUDD. We are still waiting on that one.

I just want to thank each of you and thank the—those that came and asked great questions. I thank the Ranking Member and, again, each of your companies and allowing time for you all to be here today.

Senators will have until the close of business on March 10 to submit questions for the record. The witnesses will have until the close of business on March 24 to respond to those questions.

This concludes today's hearing. The Committee stands adjourned. Thank you.

[Whereupon, at 11:56 a.m., the hearing was adjourned.]



# A P P E N D I X

PREPARED STATEMENT OF DEREK MONSON, EXECUTIVE DIRECTOR,  
SUTHERLAND INSTITUTE

## 25 WAYS AI IS HELPING PEOPLE FLOURISH

### I. Introduction: A Pro-Human Framework for Artificial Intelligence

Chairman Budd, Ranking Member Baldwin, and members of the Subcommittee, thank you for the opportunity to submit this statement regarding the intersection of Artificial Intelligence (AI) and human flourishing. While much of the public debate surrounding AI focuses on controversy and risks, AI is already creating concrete improvements to human lives behind the scenes.

Drawing from the Sutherland Institute's recent report, *25 Ways AI is Helping People Flourish* (February 2026), authored by Ford Copple and myself, my statement emphasizes a *pro-human* approach to AI policy. As articulated by Utah Governor Spencer Cox during the recent Utah AI Summit, such an approach empowers workers with better tools, strengthens communities through accessible innovation, and enables problem-solving at an unprecedented scale. Below, I outline *25 specific examples* where AI is currently improving life in education, government, health care, and family life. It is vital that AI regulation does not jeopardize these proven benefits, as it is contradictory to call safeguards *pro-human* if they eliminate the very tools helping Americans today.

### II. Education: Empowering Teachers and Students

AI innovations are helping teachers prioritize their time more efficiently and effectively while aiding students in far-reaching ways.

1. *Reducing Burdens on Teachers*: Tools like SchoolAI in Utah help teachers spend less time on administrative duties and more time focusing on instruction. This shift allows educators to give more personalized attention to their students' unique needs.
2. *Protecting Student Safety*: New monitoring systems powered by AI automatically detect firearms on campuses through security camera feeds. By enhancing situational awareness, these tools provide an additional layer of protection against school shootings and enable faster emergency response.
3. *Personalizing Student Learning*: AI tools are adapting instruction to each student's unique strengths, weaknesses, and pace. This technology creates personalized learning plans at scale, which increases student engagement and improves overall outcomes.
4. *Helping with Learning Disabilities*: Software such as Dysolve AI is specifically designed to help students with dyslexia improve their reading skills. Local parents have noted that this kind of support levels the playing field for children with learning disabilities.
5. *Increasing Student Engagement*: Tools like MagicSchool AI allow students to personally engage with historical figures, bringing history to life. These unique lessons allow for a level of personal interaction with curriculum that was previously impossible.
6. *Improving Reading and Language Skills*: AI tools like Amira are improving the fluency of bilingual students. Students who do not speak English as their first language can interact with these tools to practice and refine their reading and speaking skills.

### III. Government: Efficiency and Integrity

AI offers innovations that create efficiencies that save taxpayer dollars and make essential government services more effective.

7. *Saving Taxpayer Dollars on Infrastructure*: AI-generated "digital twins" allow public infrastructure projects to be tested under simulated scenarios before

construction begins. This predictive capability reduces costs and improves efficiency by an estimated 20 percent to 30 percent.

8. *Reducing Wasted Time:* AI tools reduce routine administrative tasks, allowing government employees to save up to two weeks of time annually. This frees civil servants to focus on high-value work rather than paperwork.
9. *Improving Election Integrity:* AI helps election officials flag errors in processes and simulate various security scenarios. These applications strengthen election security while simultaneously reducing unnecessary waste.
10. *Better Emergency Response:* In Utah, AI helps screen non-emergency calls to speed up 911 response times. This ensures that emergency operators can stay focused on life-threatening situations while other needs are addressed.
11. *Faster Approvals while Protecting Public Safety:* The FDA uses the AI tool Elsa to streamline clinical protocol reviews and reduce the duration of scientific assessments. This allows lifesaving and life-improving treatments to reach the market quicker without sacrificing patient safety.
12. *Cutting Government Red Tape:* Cities like Portland use AI to ease the burden of complex permitting requirements for citizens and businesses. This saves significant time for both the public and government employees by simplifying bureaucratic hurdles.

#### IV. Health Care: Better Lives and Better Outcomes

AI is helping improve and save American lives, putting citizens in the driver's seat for their own health, providing better health information, and helping practitioners make more informed decisions about care.

13. *Treating Chronic Diseases:* A new Utah pilot program uses AI to speed up prescription renewals for chronic disease patients. Simultaneously, the system detects dangerous medication interactions to ensure patient safety.
14. *Better Lives for Prosthetic Patients:* Researchers at the University of Utah have integrated AI with prosthetic limbs to create "bionic" limbs. These advancements help patients perform everyday tasks, such as reaching and gripping objects, in more natural ways.
15. *Saving Lives from Breast Cancer:* AI detects breast cancer in mammograms with increased speed and accuracy. Because early detection is a critical variable in survival rates, this technology is a literal lifesaver.
16. *Quicker Treatment for Debilitating Disease:* The Cleveland Clinic Genome Center uses AI to detect Parkinson's Disease using genetic, proteomic, and pharmaceutical datasets. This allows doctors to spot early warning signs far earlier than was previously possible.
17. *Upgrading Heart Disease Diagnosis:* University of Utah Health and Intermountain Health successfully used AI to predict heart disease onset and outcomes. This is especially helpful for analyzing large health data records that are traditionally difficult for humans to process.
18. *Faster Skin Cancer Treatment:* Doctors use AI algorithms that can scan for skin cancer in five minutes with 99.9 percent accuracy. This dramatically increases the speed of diagnosis and leads to much faster treatment for patients.
19. *Improving Recovery from Injuries:* Apps like Wound Assistant allow patients to monitor their own healing process from home. Additionally, AI wearable devices using miniature cameras are being developed to rapidly improve the healing process for physical injuries.

#### V. Family Life: Support and Connection

While family policy is often fiercely debated, we must not lose sight of the benefits AI is already offering to parents and families.

20. *Connecting Loved Ones with Language Barriers:* AI-generated sign language avatars and interpreters help the deaf and hearing-impaired connect with family members. Generative AI translators are assisting over 70 million sign language users globally in communicating with loved ones.
21. *More Time to Spend with Children:* Virtual assistants like Ohai.ai help busy parents manage daily tasks like school schedules. This technology frees up parents to spend more quality time with their children.
22. *Better Customer Service:* Companies like Remi use AI to simplify the process of replacing a home's roof. Customers can scan their roof with software and receive a quote for repairs almost immediately.

23. *Saving Money, Boosting Home Values*: Tools like Neighborbrite generate custom landscaping designs tailored to a homeowner's specific environment and taste. This reduces both the cost and the hassle of home improvement projects.
24. *Healthier, Quicker Family Meals*: AI tools craft meals catered to a family's specific dietary requests and restrictions. These tools simplify the often-complex daily question of "what's for dinner" for busy working families.
25. *Improving Child Safety*: Smart baby monitors like Monai use AI to ensure infants are safe and healthy in their cribs. The monitor sends alerts to a parent's phone if it detects concerns like a covered face.

## VI. Conclusion: A Call for Balanced Innovation

As a society, we are in the initial stages of a civilization-altering technological change. While controversial uses draw attention, AI is quietly and consistently improving our lives behind the scenes, and promising even bigger life improvements in the future. The regulatory decisions made today will determine whether AI remains a source of human flourishing or becomes a generational lost opportunity. We urge the Subcommittee to follow a *pro-human* path that protects against harm without stifling the many essential ways AI is helping Americans thrive, both today and tomorrow. Thank you for the opportunity to submit this written statement.

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ASSOCIATED BUILDERS AND CONTRACTORS  
Washington, DC, March 3, 2026

Hon. TED BUDD,  
Chair,  
Senate Committee on Commerce,  
Science, and Transportation,  
Subcommittee on Science,  
Manufacturing, and Competitiveness,  
U.S. Senate,  
Washington, DC.

Hon. TAMMY BALDWIN,  
Ranking Member,  
Senate Committee on Commerce,  
Science, and Transportation,  
Subcommittee on Science,  
Manufacturing, and Competitiveness,  
U.S. Senate,  
Washington, DC.

Dear Chairman Budd, Ranking Member Baldwin and Members of the U.S. Senate Commerce, Science, and Transportation Subcommittee on Science, Manufacturing, and Competitiveness:

On behalf of Associated Builders and Contractors, a national construction industry trade association representing 67 chapters, more than 23,000 member companies and millions of construction workers, I thank you for holding this important hearing to examine how artificial intelligence can enhance safety, increase productivity and improve care across industries. As the voice of America's merit shop construction industry, ABC and our contractor members are committed to building the Nation's infrastructure safely, efficiently and responsibly. AI and emerging construction technologies are transforming the way we work, empowering contractors to deliver projects faster, safer and more efficiently than ever before.

ABC launched its Technology and Innovation Initiative in 2020 to integrate construction technology into every facet of our strategic priorities, particularly industry-leading safety, total human health and workforce development. Through this initiative, ABC is helping contractors thoughtfully assess, adopt and leverage technology solutions that strengthen safety performance, address labor shortages and manage compressed schedules.

At ABC, safety is the foundation of everything we do. AI and advanced technologies are reshaping jobsite safety management in profound ways. Contractors are digitizing safety inspections, audits, checklists and incident reports, replacing paper-based systems with real-time, data-driven tools. By tracking both leading and lagging safety indicators, contractors can identify risks earlier and intervene before incidents occur. According to ABC's *2025 Health and Safety Performance Report*, companies that track these indicators experience a 62 percent reduction in total recordable incident rates and a 65 percent reduction in Days Away, Restricted, or Transferred rates compared to those that do not. These measurable improvements show that, when technology is integrated into a strong safety culture, it leads to safer jobsites and ensures more workers return home safely each day.

Beyond safety, AI and related technologies are transforming productivity and cost control. Labor and productivity tracking systems provide real-time visibility into workforce deployment and materials usage, enabling contractors to manage resources more effectively and protect thin margins. Jobsite monitoring tools, includ-

ing 360-degree imaging and drone-based documentation, allow owners, general contractors and subcontractors to collaborate with unprecedented transparency.

Paul Hedgepath, director of virtual construction for ABC member MJ Harris, serves as chair of ABC's Construction Technology and Innovation Committee. He explained that one of the industry's biggest challenges is simply accessing the information contractors already have. "The data is there—but it is fragmented and time-consuming to retrieve," he noted, pointing to the thousands of requests for information, submittals, specifications, schedules and safety documents stored across multiple systems on a typical project. Secure, construction-specific AI platforms allow field leaders to ask direct questions within their own project data and receive source-linked answers in seconds. "This is not automation replacing people. It is decision support that reduces search time and increases clarity," Hedgepath added. With faster access to verified information, superintendents can prevent mistakes before work begins, and project managers can shift time away from document hunting toward risk management and execution, improving both safety and productivity when deployed with proper governance and clear use cases.

Through *ABC's Tech Alliance*—a curated group of leading construction technology companies—and our Tech Marketplace, we provide contractors, most of which are small businesses, access to cost-effective digital solutions. These partnerships deliver tools that support bidding, project management, safety analytics, workforce management and field collaboration. Our annual *Tech Reports*, including insight papers from *Hensel Phelps* and *Dodge Construction Network*, provide case studies and forward-looking insights to help contractors evaluate and implement AI responsibly.

With innovation comes responsibility. AI evolves rapidly, and without clear guidance, its use can introduce risks, including data privacy concerns, misinformation and bias. ABC encourages contractors to establish clear AI usage policies that ensure technologies are deployed safely, ethically and in compliance with applicable laws.

Congress plays an important role in fostering an environment where innovation can thrive while protecting workers, taxpayers and national security interests. Policymakers can support responsible AI adoption in construction by promoting regulatory clarity and ensuring that small businesses have access to the tools and training necessary to compete in a digital economy.

AI is not replacing the skilled men and women of the construction industry; it is empowering them. By augmenting human expertise with real-time data, predictive insights and intelligent automation, AI helps contractors complete projects on time, reduce costs and, most importantly, protect the health and safety of their workforce. The result is stronger infrastructure, greater productivity and safer jobsites across America.

ABC and our members stand ready to work with Congress to advance policies that support innovation and strengthen the construction industry's ability to build safely, ethically and efficiently.

Sincerely,

KRISTEN SWEARINGEN,  
Vice President, Government Affairs.

UVEYE  
Teaneck, NJ, March 3, 2026

Hon. TEDD BUDD,  
Chairman,  
Subcommittee on Science,  
Manufacturing, and Competitiveness,  
Committee on Commerce, Science, and  
Transportation,  
United States Senate,  
Washington, DC.

Hon. TAMMY BALDWIN,  
Ranking Member,  
Subcommittee on Science,  
Manufacturing, and Competitiveness,  
Committee on Commerce, Science, and  
Transportation,  
United States Senate,  
Washington, DC.

Dear Chairman Budd and Ranking Member Baldwin:

On behalf of UVEYE, a New Jersey-based developer and manufacturer of advanced vehicle inspection systems, I am writing to commend the U.S. Senate Committee on Commerce, Science, & Transportation Subcommittee on Science, Manufacturing, and Competitiveness for its upcoming hearing entitled, "*Less Hype, More Help: AI That Improves Safety, Productivity, and Care.*" As a company focused on vehicle safety, we believe AI-driven technologies can bring tangible benefits in safety and productivity to the American people and help preserve and improve the safety of vehicles nationwide.

UVeye is dedicated to creating safer vehicles and safer roadways for drivers, passengers, and pedestrians, by providing objective, consistent, and instant evaluations of the condition of a vehicle that help identify issues before they become safety hazards. Our patented AI-driven system uses 360° imaging to scan each vehicle in seconds, detecting under-body damage, tire wear, exterior dents or scratches, alignment issues, and windshield damage. The system operates in all weather conditions—rain, snow, or mud—and delivers standardized, easy-to-read inspection reports. UVeye systems are installed in Original Equipment Manufacturing (OEM) facilities, auctions, dealerships, and heavy-duty/commercial fleets, scanning more than 2.5 million vehicles each month. This includes customers testing and deploying autonomous vehicles (“AVs”), another AI-enabled technology.

#### **Ensuring Vehicle Safety**

UVeye’s technology is helping make vehicles safer and more efficient by identifying issues that may be invisible during manual inspections—such as leaks, under-body damage, and worn or outdated tires—that can lead to breakdowns or accidents. UVeye provides an “always on” inspection process to substantially increase the likelihood of detecting safety issues. Faster inspections also keep vehicles on the road and mission ready.

#### **Protecting Consumers**

For new-and used-vehicle buyers, UVeye provides transparent, documented condition reports reducing “hidden defect” risk and liability disputes. At vehicle auctions, the system reduces disputes over damage by providing visual proof and standardized inspection data. By improving the accuracy and consistency of vehicle inspections, UVeye supports fairer pricing, improved confidence in used-vehicle markets, and fewer “surprise” repair costs for consumers.

#### **Boosting Efficiency**

UVeye’s automation reduces the burden of manual inspection, resulting in faster, more cost-efficient inspections. Earlier detection of damage or malfunctions means fewer breakdowns, less downtime, and lower warranty and repair costs, generating savings for businesses and, ultimately, consumers. When scaled across commercial fleets, AV operators, and OEM supply chains, UVeye’s technology yields multiplier benefits in safety, transparency, and cost-efficiency.

These are just some of the ways UVeye’s AI-enabled technologies are benefiting Americans across the economy. As the Subcommittee considers how it can support the further development and deployment of AI-enabled systems, we urge you to consider more real-world success stories like ours, that demonstrate the true potential of AI technologies.

Thank you again for holding this critical hearing. Please do not hesitate to contact our counsel, Ariel Wolf ([ASWolf@Venable.com](mailto:ASWolf@Venable.com)) if you have any questions on this letter, or if there is any further information we can provide to the Subcommittee. We look forward to engaging with members of the Subcommittee on this and other issues as it continues its work to support innovative and tangible uses of AI technologies.

Sincerely,

UVeye.

*March 3, 2026*

Hon. TED BUDD, Chairman,  
Subcommittee on Science, Manufacturing, and Competitiveness,  
Committee on Commerce, Science, and Transportation,  
United States Senate,  
Washington, District of Columbia.

Hon. TAMMY BALDWIN, Ranking Member,  
Subcommittee on Science, Manufacturing, and Competitiveness,  
Committee on Commerce, Science, and Transportation,  
United States Senate,  
Washington, District of Columbia.

RE: Subcommittee hearing, “Less Hype, More Help: AI That Improves Safety, Productivity, and Care”

Dear Chairman Budd and Ranking Member Baldwin,

ACT | The App Association (ACT) appreciates the opportunity to submit this Statement for the Record for the Senate Committee on Commerce, Science, and

Transportation’s Subcommittee on Science, Manufacturing, and Competitiveness hearing titled “Less Hype, More Help: AI That Improves Safety, Productivity, and Care.” This hearing’s focus on concrete uses of AI that improve safety, productivity, and care is timely. Americans most often encounter AI incrementally through practical improvements to existing tools, such as streamlining workflows, enabling accessibility, improving diagnostics, optimizing logistics, and strengthening cybersecurity.

Small businesses are leading the way on AI. As some of the leading consumers, developers, and adapters of AI tools, ACT members have a major stake in how policymakers view AI markets. ACT represents an ecosystem valued at approximately \$1.8 trillion domestically, supporting 6.1 million American jobs.<sup>1</sup> ACT members are innovators that create the software bringing your smart devices to life. They also make connected devices that are revolutionizing healthcare, agriculture, public safety, financial services, and virtually all other industries. We are concerned that state-level efforts to regulate AI technologies before the risks and the benefits of their use are fully understood could unnecessarily preempt ACT members’ ability to compete in AI markets and leverage the technologies.

AI is an evolving constellation of technologies that enables computers to simulate elements of human thinking, including learning and reasoning. In practice, Americans most often encounter AI incrementally through improvements to existing digital services, such as streamlined workflows, image analysis, voice recognition, and predictive analytics. We urge policymakers to recognize these applications as “narrow” AI, meaning systems that already deliver significant societal benefits and are widely deployed by small and medium-sized innovators. Examples of these “narrow” AI applications include detecting financial fraud, strengthening cybersecurity, enabling accessibility tools for people with disabilities, improving healthcare diagnostics, and supporting more efficient infrastructure and resource management. These “narrow” and applied AI systems already deliver significant benefits in the real world. The policy challenge is to ensure that governance approaches remain risk-based, interoperable, and grounded in existing legal guardrails, while supporting the infrastructure, standards, and workforce needed for responsible deployment at scale.

ACT urges the Subcommittee to keep the following principles in mind.

#### **Existing Law Already Provides Strong Guardrails Against Harmful Conduct**

A wide range of Federal and state laws already prohibit harmful conduct regardless of whether AI is involved,<sup>2</sup> and there is no AI exemption. Section 5 of the Federal Trade Commission Act<sup>3</sup> prohibits unfair or deceptive acts or practices (UDAP), and state consumer protection statutes apply similar standards to digital services. These authorities reach a broad set of practices relevant to AI-enabled products and services, including misleading claims about safety or efficacy, failing to mitigate reasonably foreseeable risks, or designing systems in ways that create foreseeable harms. Together, these existing frameworks already provide meaningful guardrails for AI developers and deployers.

Congress could take meaningful action by passing a comprehensive Federal data privacy law, laying out a single set of rules for how companies should handle consumer data. In the absence of a Federal privacy law, we urge Congress and Federal agencies to continue evaluating the application of these longstanding authorities before considering new legal structures. To support a more grounded approach, ACT launched a research initiative examining how existing federal, state, and local laws already apply across common AI use cases.<sup>4</sup> This project aims to map notable current legal obligations across areas such as civil rights, consumer protection, privacy, safety, labor, competition, and intellectual property, demonstrating that AI systems are already subject to extensive legal accountability. By establishing a clear baseline of existing law, this effort aims to inform Federal coordination, reduce regulatory duplication, and help policymakers distinguish between genuine gaps and areas where improved guidance or standards may be more effective than new legislation.

<sup>1</sup> <https://actonline.org/wp-content/uploads/APP-Economy-Report-FINAL-1.pdf>.

<sup>2</sup> How Existing Laws Apply to AI Chatbots for Kids and Teens, Georgetown Law Institute for Technology Law & Policy (Nov. 10, 2025), <https://www.law.georgetown.edu/tech-institute/insights/how-existing-laws-apply-to-ai-chatbots-for-kids-and-teens/>.

<sup>3</sup> Federal Trade Commission Act § 5(a), 15 U.S.C. § 45(a) (prohibiting “unfair or deceptive acts or practices in or affecting commerce”).

<sup>4</sup> ACT | The App Association. Mapping Existing Laws to AI, [https://actonline.org/wp-content/uploads/ACT\\_Mapping\\_Existing\\_Laws\\_to\\_AI\\_Outline.pdf](https://actonline.org/wp-content/uploads/ACT_Mapping_Existing_Laws_to_AI_Outline.pdf).

### **Use Risk-Based Governance and Voluntary Standards, Not Fragmented, Precautionary Regulation**

ACT strongly supports risk-based approaches to AI governance aligned with recognized standards of safety, efficacy, and reliability. Frameworks such as the National Institute of Standards and Technology (NIST) AI Risk Management Framework (RMF) provide a flexible and interoperable foundation for managing risks across diverse sectors and use cases.<sup>5</sup> In addition, industry-led, voluntary, consensus-based standards are a cornerstone of U.S. technological leadership. The U.S. approach reflected in OMB Circular A-119 has historically supported innovation, interoperability, and global adoption while allowing standards to evolve with rapidly changing technologies.<sup>6</sup> Congress should continue to support agency participation in voluntary standards development and remove barriers that limit small business engagement in these processes. A standards-forward, risk-based approach is especially important for the types of applied AI at issue in this hearing, including industrial systems, robotics, and health-care workflow tools. These domains often depend on multi-layer supply chains and interoperable technology stacks where clarity, testability, and practical risk controls matter more than formalistic compliance.

### **Clarify Roles and Shared Responsibility Across the AI Value Chain**

Effective governance depends on clearly understanding the roles and responsibilities of different actors across the AI value chain, from developers to deployers to downstream integrators and end users. Assigning obligations based on demonstrated harms and each actor's ability to mitigate risk promotes accountability while avoiding misplaced burdens. To support this approach, ACT developed an AI Roles & Interdependencies Framework aligned with the NIST AI RMF, describing key stakeholders across development, distribution, deployment, and use, and identifying practical responsibilities that support safety and reliability.<sup>7</sup> This shared-responsibility model reflects the reality that risk mitigation is most effective when implemented by the actors best positioned to identify and reduce risks at each stage of the lifecycle.

### **The Need for a National AI Framework to Avoid a Patchwork of State Laws**

Congress should avoid a fragmented AI regulatory environment. States are already advancing a growing number of AI-specific laws, many of which would impose overlapping or inconsistent requirements for disclosures, data practices, and risk assessments.<sup>8</sup> This patchwork is creating significant uncertainty for developers and deployers, especially small businesses that lack the resources of their larger competitors to navigate 50 different compliance regimes. Early evidence shows that even small deviations in state requirements can trigger substantial compliance costs, diverting limited resources from product development to legal review, recordkeeping, and bespoke technical implementations. Recent analyses show that state AI laws modeled on European-style precautionary approaches can impose unknown and potentially significant costs to companies,<sup>9</sup> while delays in state-level implementation underscore the difficulty of managing complex AI obligations at the state level.

A single national baseline is preferable to a system where the most restrictive state rules dictate outcomes nationwide. Federal preemption of conflicting state AI requirements, paired with state attorney general enforcement of that Federal baseline, would give consumers clarity, reduce compliance burdens, and ensure that small business innovators can safely build and deploy the beneficial AI tools that enhance safety, productivity, and care for all Americans.

### **Conclusion**

ACT appreciates the Subcommittee's leadership in focusing on practical AI tools that improve safety, productivity, and care. Congress can reinforce the benefits of applied AI by emphasizing: (1) risk-based governance grounded in existing law; (2)

<sup>5</sup>National Institute of Standards and Technology. AI Risk Management Framework. U.S. Department of Commerce, <https://www.nist.gov/itl/ai-risk-management-framework>.

<sup>6</sup><https://www.whitehouse.gov/wp-content/uploads/2017/11/Circular-119-1.pdf>.

<sup>7</sup>ACT | The App Association. AI Roles & Interdependencies Framework (May 2024), <https://actonline.org/wp-content/uploads/ACT-AI-Roles-Interdependencies-Framework-final-text-May-2024-UK-English.pdf>.

<sup>8</sup>Stevens, Morgan. "State of Confusion: How a Patchwork of AI Laws Hurts Small Businesses and U.S. Competitiveness." ACT | The App Association, Oct. 2025, <https://actonline.org/2025/10/10/state-of-confusion-how-a-patchwork-of-ai-laws-hurts-small-businesses-and-u-s-competitiveness/>.

<sup>9</sup>"The Hidden Cost of AI Regulations: A Survey of EU, UK, and U.S. Companies." ACT | The App Association, Oct. 2025, <https://actonline.org/the-hidden-cost-of-ai-regulations-a-survey-of-eu-uk-and-u-s-companies/>.

voluntary standards and interoperable frameworks; (3) clarity on shared responsibility across the AI value chain; and (4) a national approach that avoids fragmented, inconsistent state-by-state mandates. We stand ready to work with the Subcommittee, Federal agencies, and standards bodies to support responsible AI deployment that delivers measurable benefits for workers, consumers, and patients, while ensuring that small business innovators can continue to compete and contribute to American technological leadership.

Thank you for your consideration.

Respectfully submitted,

GRAHAM DUFALT,  
General Counsel,  
ACT | The App Association.  
KEDHARNATH SANKARAMAN,  
Policy Associate,  
ACT | The App Association.

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PREPARED STATEMENT OF THE NATIONAL COUNCIL ON DISABILITY

Dear Chairman Budd, Ranking Member Baldwin and Members of the Subcommittee:

I am writing as Acting Chairman of the National Council on Disability (NCD), an independent, bipartisan Federal agency that advises Congress, the President, and other Federal agencies on matters affecting the lives of people with disabilities, to provide this statement for inclusion in the written record of this Subcommittee's hearing, *"Less Hype, More Help: AI That Improves Safety, Productivity, and Care."* NCD is providing this statement to make policymakers aware of the susceptibility of artificial intelligence (AI) to develop explicit and implicit biases about people with disabilities and to advise policymakers on effective ways to ensure that these technologies are developed with data sets that include people with disabilities.

While NCD's research recognizes the potential benefits of utilizing AI to improve healthcare outcomes for people with disabilities, there exist some vulnerabilities in these technologies that could negatively impact the diagnosis and treatment of people with disabilities and provide policymakers with erroneous information rather than accurate solutions.

The ultimate goal of AI is to create machines that can make the same decisions as humans.<sup>1</sup> NCD's 2024 report, titled *The Implicit and Explicit Exclusion of People with Disabilities in Clinical Trials*, analyzed the use of AI in clinical trials.<sup>2</sup> One study NCD examined described how technologies such as AI, machine learning, and natural language processing can be incorporated into several aspects of clinical trial research.<sup>3</sup> Some examples include data mining, prescreening for possible participants, and automating invitations to possible participants who have been prescreened through automation. Academic researchers and the pharmaceutical industry are using AI to mine and utilize data from electronic sources such as health records and devices.<sup>4</sup>

Our 2024 report found that a contributing factor to health care disparity outcomes for people with disabilities was physicians' erroneous assumptions about the values and expectations of their patients, assumptions that mirror widespread, stigmatized societal views about the disabled.<sup>5</sup> Due to these concerns, NCD found that disability cultural competence should be a core strategy for the healthcare system in order to reduce healthcare disparities for people with disabilities.<sup>6</sup> Strong evidence exists that cultural training for health care professionals improves providers' knowledge,

<sup>1</sup>Harrer S, Shah P, Antony B, *et al.*, "Artificial Intelligence for Clinical Trial Design," *Trends in Pharmacological Science*, 2019;40(8):577–591. doi:10.1016/j.tips.2019.05.005.

<sup>2</sup>National Council on Disability, "The Implicit and Explicit Exclusion of People with Disabilities in Clinical Trials," (2024) available at: *National Council on Disability | Federal report illuminates need for disability inclusion in clinical trials*.

<sup>3</sup>Von Itzstein MS, Hullings M, Mayo H, *et al.*, "Application of Information Technology to Clinical Trial Evaluation and Enrollment: A Review," *JAMA Oncology*, 2021;7(10):1559–1566. doi:10.1001/jamaoncol.2021.1165.

<sup>4</sup>Woo M, "An AI Boost for Clinical Trials," *Nature*, 2019;573(7775): S100–S102. doi:10.1038/D41586-019-02871-3.

<sup>5</sup>Shakespeare T, Iezzoni LI, Groce NE, "Disability and the Training of Health Professionals," *Lancet*, 2009;374(9704):1815–1816.

<sup>6</sup>Association of American Medical Colleges, *Cultural Competence Education for Medical Students*, 2005. <https://www.aamc.org/download/54338/data/culturalcomped.pdf>.

understanding, and skills for treating patients from culturally, linguistically, and socioeconomically diverse backgrounds.<sup>7</sup>

While NCD's 2024 research was limited to AI and clinical trials, we reasonably believe our findings and recommendations can be generalized to other forms of AI technology in healthcare. Our findings were based on published studies, legislation, and clinical trial protocols as well as subject matter expert interviews, trial participant interviews, healthcare provider and participant surveys as well as feedback from stakeholders at the National Institutes of Health (NIH) and Food and the Drug Administration (FDA).

Because AI is intended to develop the same decision-making capabilities as humans, NCD is similarly concerned that AI technologies may inadvertently develop the same assumptions and biases about people with disabilities. For this reason, NCD advises policymakers to *review the use of AI in healthcare in general and establish regulations as needed to ensure that these technologies are built on data sets that include people with disabilities*, so that implicit and explicit biases are not accidentally developed or "learned."

Thank you for the opportunity to provide a brief summary of NCD's relevant research, analysis, and recommendations on ways to improve the use of AI technology in the healthcare system for people with disabilities. We welcome the opportunity to brief the Committee and its staff in depth on any of these or related topics at your direction and request.

To that end, please do not hesitate to contact our Executive Director, Ana Torres-Davis, [atorresdavis@ncd.gov](mailto:atorresdavis@ncd.gov), and Director of Legislative Affairs and Outreach, Anne Sommers McIntosh, [amcintosh@ncd.gov](mailto:amcintosh@ncd.gov), who will be glad to address any request for follow-up you may have or provide a more in-depth briefing on any of our reports and advisement.

Respectfully,

NEIL ROMANO,  
Acting Chairman,  
National Council on Disability.



<sup>7</sup>Govere L, Govere EM, "How Effective Is Cultural Competence Training of Healthcare Providers on Improving Patient Satisfaction of Minority Groups? A Systematic Review of literature," *Worldviews on Evidence-Based Nursing*, 2016;13(6):402–410. Accessed January 16, 2024. <https://sigmapubs.onlinelibrary.wiley.com/doi/full/10.1111/wvn.12176>.