

SHAPING TOMORROW: THE FUTURE OF ARTIFICIAL INTELLIGENCE

HEARING

BEFORE THE

SUBCOMMITTEE ON CYBERSECURITY,
INFORMATION TECHNOLOGY,
AND GOVERNMENT INNOVATION

OF THE

COMMITTEE ON OVERSIGHT AND
GOVERNMENT REFORM

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* Article, *Google*, “AlphaEvolve, A Gemini Powered Coding Agent for Designing Advanced Algorithms”; submitted by Rep. Burlison.

The documents listed above are available at: docs.house.gov.

ADDITIONAL DOCUMENTS

* Questions for the Record: Dr. Nicol Turner Lee; submitted by Rep. Brown.

These documents were submitted after the hearing, and may be available upon request.

SHAPING TOMORROW: THE FUTURE OF ARTIFICIAL INTELLIGENCE

WEDNESDAY, SEPTEMBER 17, 2025

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM
SUBCOMMITTEE ON CYBERSECURITY, INFORMATION TECHNOLOGY,
AND GOVERNMENT INNOVATION
Washington, D.C.

The Subcommittee met, pursuant to notice, at 2:02 p.m., in room 2247, Rayburn House Office Building, Hon. Nancy Mace [Chairwoman of the Subcommittee] presiding.

Present: Representatives Mace, Burlison, Crane, McGuire, Brown, and Subramanyam.

Ms. MACE. Good afternoon. The Subcommittee on Cybersecurity Information, Technology, and Government Innovation will now come to order, and welcome everyone.

Without objection, the Chair may declare a recess at any time. I recognize myself for the purpose of making an opening statement.

OPENING STATEMENT OF CHAIRWOMAN NANCY MACE REPRESENTATIVE FROM SOUTH CAROLINA

Good afternoon and thank you all for being here for today's important hearing on the future of artificial intelligence. From the tools powering your smartphone to the algorithms predicting weather, recommending medicines, or helping farmers improve crop yields, AI is already shaping the world around us.

Just as we once competed for dominance in space or nuclear technology, the United States is now in a race for leadership in AI. American companies are at the frontier for this race. These companies are pushing the boundaries of what advanced language models can do, and countless startups and research labs are finding new applications for AI in every corner of the economy.

The stakes are high. If the United States leads, we get to shape the standards, the ethics, and the economic benefits of this powerful technology. If we fail, we cede such influence to adversaries who do not share our values. So, the risks are high.

AI will have an impact on all Americans across all industries. AI is driving new efficiencies and creating breakthroughs to improve lives. In healthcare, AI is helping to detect cancer early and accelerating drug development. And transportation is making cars safer and logistics smarter. In agriculture, it is reducing waste and helping farmers feed more people with fewer resources.

These advances are not abstract. They are happening now and are creating better services, lower costs, and new opportunities for American workers and American families. But the technological future of AI remains uncertain.

Some experts warn we are just a few years away from the emergence of artificial general intelligence or the singularity. Others argue that technology has inherent limitations, and we are decades away from the singularity, if it is even possible.

We do not know for certain what future of AI will look like, but what I do know is the future is too important to leave up to chance. We are going to do our best to understand what kinds of impact AI can have on our economy, our society, and develop potential solutions now before it is too late.

This Subcommittee takes seriously its responsibility to examine these issues, and I am looking forward to hearing today from everyone on both the current state of AI and the possible futures which lie ahead.

It is essential the United States lead, not just in building these technologies but ensuring they are developed responsibly, deployed safely, and used in ways which advance American values. When we get this right, we will ensure artificial intelligence fulfills its extraordinary promise.

I look forward to today's discussion and to working with my colleagues on this Committee to ensure America leads in shaping the future of AI.

I now recognize Ranking Member Brown for her opening statement.

**OPENING STATEMENT OF RANKING MEMBER
SHONTEL BROWN, REPRESENTATIVE FROM OHIO**

Ms. BROWN. Thank you, Chairwoman Mace.

Artificial intelligence is here, and it is already reshaping our economy, workforce, and daily life. As we work to ensure that America leads in AI innovation, we must also lead in responsible and trustworthy use of this technology.

AI holds the promise to strengthen our economy and make government more efficient. However, when commonsense safeguards are absent, technology can deepen inequalities, leave workers behind, or allow bad actors to take advantage of gaps in policy.

Even as we look toward the future, we cannot ignore the ways AI is already changing the workplace. And, while some of these changes are promising, we must also work to prepare the American people for change.

Workers in my Cleveland district and across the country are worried about what automation and emerging technologies mean for their job and their security. Black workers in particular remain disproportionately concentrated in positions most at risk of automation according to research by McKinsey & Company. If we fail to provide retraining, education, and pathways into the jobs of the future, we risk leaving entire communities behind.

A diverse prepared workforce is not just good for our economy, but a necessity for our national competitiveness. If we do not ensure that employees most at risk of being replaced by AI have other pathways for employment, adoption of AI will not only drive

greater economic disparity, it will also miss opportunities to diversify and elevate the workforce. A diverse and adequate workforce not only builds up our communities, it also advances our AI ambitions.

We know that foreign adversaries, particularly the Chinese Communist Party, are aggressively pursuing technological dominance. They are not only racing to outpace us in artificial intelligence and cybersecurity, but also actively targeting our institutions, businesses, and citizens.

At the same time, everyday Americans face scams, fraud, and data breaches that threaten their livelihoods and erode trust in government and the private sector. The future of AI will be shaped by our commitment to getting it right today and our ability to learn serious lessons and mitigate future risk.

That is why our oversight work must focus on several areas: defending against hostile foreign governments, holding accountable scammers who prey on vulnerable communities, and investing in our workforce to ensure resiliency. We must ensure that innovation does not come at the expense of fairness, security, or opportunity.

Thank you to all the witnesses that are here today to discuss this critically important topic.

And, with that, I yield back.

Ms. MACE. Thank you, Congresswoman Brown.

I am pleased to introduce our witnesses for today's hearing.

Our first witness today is Ms. Kinsey Fabrizio, President of the Consumer Technology Association.

Our second witness is Mr. Samuel Hammond, Chief Economist at the Foundation for American Innovation.

And our third witness today is Dr. Nicol Turner Lee, Senior Fellow of Governance Studies and Director of the Center for Technology Innovation at the Brookings Institute.

Welcome everyone, and we are pleased to have you this afternoon. And pursuant to Committee Rule 9(g), the witnesses will please stand and raise your right hand.

Do you solemnly swear or affirm that the testimony that you are about to give is the truth, the whole truth, and nothing but the truth, so help you God?

Let the record show that the witnesses all answered in the affirmative.

We appreciate all of you being here today. You may sit back down, and we look forward to your testimony.

Let me remind the witnesses that we have read your written statements, and they will appear in full in the hearing record. Please limit your oral statements to 5 minutes.

As a reminder, please press the button on the microphone in front of you so that is on and the Members can hear you. When you begin to speak, the light in front of you will turn green. After 4 minutes, the light will turn yellow. When the red light comes on, your 5 minutes has expired, and we would ask that you please wrap it up.

So, we will first recognize Ms. Fabrizio to please begin her opening statement.

**STATEMENT OF KINSEY FABRIZIO, PRESIDENT
CONSUMER TECHNOLOGY ASSOCIATION**

Ms. FABRIZIO. Thank you. Good afternoon, Chairwoman Mace, Ranking Member Brown, and Members of the Subcommittee. Thank you for holding this hearing and for the opportunity to testify.

CTA represents over 1,200 companies, and more than 80 percent are startups, small, and mid-sized businesses. Our numbers power the American economy and support more than 18 million jobs. But, before I talk about AI's broader impact, I want to share how it is reshaping my own life.

I am a wife, and I am a mom of two wonderful kids, and I also run CES, the world's most powerful technology event. Each week, I use AI to organize my life at home, pulling together school pickups, drop-offs, sports schedules; and, at work, these tools help me make smarter decisions, research competitors, and come up with new ideas for products and services.

In many ways, AI is a personal assistant that gives me back time, time I can spend with my family while staying focused on leading a complex organization, and it makes a big difference in my daily life. I am really excited to share the even greater impact it has at scale across society.

While so much of the public debate around AI focuses on how this technology might evolve in the future, AI is here now, and it is integrated into our lives and delivering benefits for millions of Americans. We see these technologies in action at CES, where innovators come together, from AI-powered health insights from Abbott and Withings, to John Deere's autonomous tractor, to Oshkosh and Waymo's collision avoidance and autonomous technologies, and even Siemens' digital twin platform for manufacturing.

These products are already in the market and making amazing changes. Still, we are just scratching the surface of what AI can do.

Today we see AI and digital twins that can simulate everything from factories to city planning; agentic AI, which are autonomous systems that can manage everyday tasks; vertical AI models, which are specialized in areas like healthcare and mobility or agriculture; industrial AI, which is augmenting the workforce and improving safety; and physical AI, which includes more lifelike and useful robots.

American companies are leading the AI race, but their success is not guaranteed. In China, the government has made AI central to its national strategy and invested heavily in areas like semiconductors, robots, and data centers.

To counter this strategy, we need policies that help American companies out-innovate the competition. If America falters in AI, we risk ceding entire industries, supply chains, and influence over global standards.

That is why CTA has urged Congress to adopt a 10-year pause on enforcement of state and local AI laws. In 2025 alone, legislators across all 50 states introduced more than a thousand often conflicting AI-related bills. For a startup or a small business, navigating this patchwork is crippling.

A pause gives Congress the time it needs to develop a preemptive Federal framework for AI. The Administration's recently released AI Action Plan is a powerful and positive blueprint ensuring American AI innovators have the guardrails they need to build, grow, and compete.

We also need a comprehensive Federal privacy law to power up innovation with more clarity and protect consumers and lower compliance costs for industries that rely on responsible data use and give Americans confidence in these life-changing technologies.

Congress must also recognize where our laws and frameworks are working. The law is clear. Simply reading or processing content does not constitute infringement. This clarity is a huge competitive advantage for America, and it is the foundation that allows U.S. companies from the smallest startup to the largest global brand to win the AI race.

America has led every major technological wave from electricity to the internet, and if we get AI policy right, this technology will be the next great American growth engine. If we get it wrong through fragmented or restrictive regulation, like the EU's AI Act, we risk exporting those jobs and that leadership overseas.

CTA believes the path is clear: foster innovation, protect consumers, and ensure America sets the rules of the road for AI. I look forward to working with this Committee on a bipartisan basis to shape our AI future.

Thank you, and I look forward to your questions.

Ms. MACE. Great. I now recognize Mr. Hammond to please begin his opening statement.

**STATEMENT OF SAMUEL HAMMOND, CHIEF ECONOMIST
FOUNDATION FOR AMERICAN INNOVATION**

Mr. HAMMOND. Chairwoman Mace, Ranking Member Brown, Members of the Committee, thank you for the opportunity to testify today.

My name is Samuel Hammond. I am the Chief Economist for the Foundation for American Innovation. We are a group of technologists and policy experts focused on developing technology, talent, and ideas to support a freer and more abundant future.

The capabilities of frontier AI systems are improving at a stunning rate. Five years ago, large language models could barely generate coherent English text. Today, they can hold forth on any topic, reason through Ph.D.-level math problems, and code entire applications from scratch.

Recent AI progress, including the rise of reasoning models and AI agents, has been largely driven by breakthroughs in reinforcement learning applied to Large Language models (LLMs). Language models gain their raw intelligence by predicting sequences of text but, with reinforcement learning, can be trained to follow instructions, use tools, and pursue complex goals.

Scalable reinforcement learning for language models to give them reasoning goal-directed behavior was only unveiled a year ago but is already driving rapid improvements in domains like math and programming. The scope and significance of this breakthrough is still not fully appreciated, though.

In principle, these techniques can be used to create superhuman AI agents in any domain where success can be objectively benchmarked. Math and software engineering are just the low-hanging fruit.

The AI research organization Model Evaluation & Threat Research (METR) carefully measures progress in AI autonomy and has found that the length of tasks that AI agents can perform doubles roughly every four to seven months, a trend that has held for the past six years.

While the earliest chat bots could only perform tasks measured in seconds or minutes, OpenAI's latest model, GPT-5, can coherently execute tasks that take human engineers two hours and 17 minutes on average. If this trend continues, we are only two doublings away, roughly eight to 14 months, from AI agents that can autonomously perform tasks that take humans a full 8-hour workday.

Progress in nonverifiable and open-ended domains is also accelerating, recently leading to some of the first major examples of AIs that have made novel scientific and mathematical discoveries. It is now plausible that we will have the first superintelligent AI scientists and mathematicians by the year's end, portending a dramatic speed-up in the pace of R&D going forward. This includes AIs optimized for AI research itself, creating the glimmers of a self-improving feedback loop whereby AIs rapidly help build their own successors.

What happens when AIs get better at AI R&D than the best human researchers in the world? At a minimum, we should expect a discontinuous leap in the power and efficiency of the frontier models. But where this process tops out is still a matter of significant uncertainty.

It is possible that, even with fully automated AI R&D, progress will remain bottlenecked by the availability of compute, data, and energy. It is also possible that we are only one or two major breakthroughs away from systems that can learn continuously in an unbounded fashion.

Regardless, the jump in capabilities unlocked by recursively self-improving AI is likely to be profound, even within the bounds of existing infrastructure, and is coming sooner than many realize.

It is worth emphasizing that creating Artificial General Intelligence (AGI) and superintelligent AI that is capable of outperforming humans in every domain is the explicit goal of every leading U.S. AI company. While some dismiss this as science fiction or marketing hype, I assure you the leaders of these companies are deadly serious.

As for timing, Anthropic cofounder Jack Clark testified recently that he expects transformative AI to arrive as soon as the end of 2026 or early 2027. Even if these forecasts are on trend, AI capabilities will remain uneven for at least several more years.

For a brief paradoxical moment, we will have superintelligent AIs that can prove new math theorems but still struggle to do many things that humans find trivial. This is especially true in areas like robotics, which, despite remarkable progress, are still many years away from outperforming humans in every physical domain given the paucity of high-quality training data.

So, as we run headlong into this new world, I see four major takeaways for national policymakers.

First, monitoring frontier AI capabilities in real time should be a national security imperative of the U.S. Government. Early and differential access to the developments of the frontier can provide policymakers and national security advisers with the foresight into the capabilities that are coming down the pike, giving us time to prepare and adapt.

Second, as AI systems become human-level and beyond, geopolitical power will be increasingly proxied by the global distribution of computing resources. America's existing lead is downstream of our massive advantages in AI hardware and data centers, but this is tenuous at best. With China outbuilding us on new energy, we must double down on semiconductor export controls or risk being leapfrogged.

Third, we must quickly advance the frontier of AI control interpretability, review our laws and regulations for the compatibility with powerful AI, and invest in much more robust cyber and infrastructure security, all priorities outlined in President Trump's AI Action Plan.

Fourth and finally, we must open our minds to radically new forms of institutions and structures of government. From the printing press to the Industrial Revolution, every major technological transition has driven equally transformative changes to our system of government. I believe the AI revolution will be no different.

It raises unique challenges given AI's use cases for surveillance and censorship, as seen in China's model of the digital panopticon. Reconciling the advent of powerful AI systems with America's tradition of individual liberty and limited government is, thus, the challenge of our time.

Thank you, and I look forward to your questions.

Ms. MACE. Thank you.

I now would like to recognize Dr. Turner Lee for 5 minutes.

STATEMENT OF NICOL TURNER LEE (MINORITY WITNESS)
SENIOR FELLOW, GOVERNANCE STUDIES
DIRECTOR, CENTER FOR TECHNOLOGY INNOVATION
THE BROOKINGS INSTITUTION

Dr. TURNER LEE. Thank you. Thank you, Chairwoman Mace, Ranking Member Brown, and distinguished Members of the Committee for this invitation to testify.

My research focuses on policies that govern AI, digital divide, as well as innovation. Artificial intelligence is not the future; it is here. Today several workplaces require use of AI by workers, and one report shows that 92 percent of companies have plans to increase their investment in the technology.

In just about every sector, companies are figuring out the role of AI-enhancing productivity, as well as the most appropriate investment in talent. Beyond enterprise use cases, AI is transforming the delivery of critical services, domains, such as government services, healthcare, and education. And, with so much on the horizon, it is imperative that we strike the correct balance of innovation and regulation.

We must safeguard consumers, institutions, and critical infrastructure from AI risk, including workplace displacement, bias and discrimination, and the irreparable harm of machines.

In my testimony today, I just want to offer three points that I think Congress should take, which will be critical to the future of AI: the need for responsible and ethical frameworks of AI design and governance, the importance of a ready and agile talent pipeline and workforce, and the importance of monitoring the unknowns in AI to ensure its safety and security while addressing the clear and present challenges.

AI depends on responsible and ethically designed models in national governance. The stakes are too high. The rapid advancements of generative AI in video text and voice extraction have contributed to consumer fraud. Our Nation's seniors are increasingly being targeted, in some cases falling for financial AI voice cloning and deepfake scams that ask them to send their money to relatives.

Being responsible requires national governance, and we have laws, existing laws, for highly regulated industries that protects consumers in digital spaces, including the Fair Housing Act, the Equal Credit Opportunity Act, among others. But, without congressional resolution in other critical policy areas, like data privacy, everyday Americans will be exploited by malicious uses of AI systems.

We need clear measures that ensure human oversight, disclosures, and independent audits over automated and autonomous decisions. We have started this process with the AI Action Plan this past summer, but our focus on promoting U.S. leadership against China as the prime goal will only allow these consumer protection goals to fall to the wayside.

Yes, recently, states, in the absence of Federal legislation, have actually moved forward with their own legislation. And, since January, over a hundred measures across 38 states have been enacted to law. Multiple state attorney generals have also issued guidance on how to apply these laws to AI.

The rejected proposed 10-year moratorium on states would have threatened states' rights and the public interest, and leadership needs to continue to protect the independence of Federal agencies so they can serve as the bulwark against deceptive and unfair consumer-facing AI applications. Cuts to these agencies weaken our ability to hold bad actors accountable, but they also undermine consumer trust.

Second, the future of AI depends on a ready and agile talent pipeline and workforce. Maintaining our edge means that we have robust talent that incorporate diverse viewpoints in the design, development, and deployment of AI.

Immigrants are central to the story of innovation. 77 percent of the top AI companies were founded or cofounded by first-generation immigrants. Policies that restrict immigration may threaten our innovation capabilities, and defunding research at world-class universities and scientific institutions may also do the same.

Let me just share a few statistics of what is happening as a result of other countries exploiting these opportunities. Spain opened its doors to students subject to U.S. restrictions. European universities are offering scientific asylum to scientists. China is using the

reverse brain drain to aggressively recruit our top technological talent.

Cultivating talent at that level has impacts as well as ensuring that researchers here in the United States have what they need to get the research done for the next big idea, and we cannot neglect our domestic talent pipeline. Recent declines in math and reading scores are warning signs that much more needs to be done to cultivate homegrown talent, not only through national apprenticeships, but also realigning our core objectives in schools so that we meet the demands of the future workforce.

Casualties will abound in the workplace if we have a less agile, ready workforce capable of shifting gears.

And, finally, I will just say this. Though the future of AI is largely unknown, we need to solve the first point I made and the second point to ensure that we actually get to a place where we understand the power of artificial intelligence or artificial general intelligence, agentic AI, as well as what is largely unknown at this point.

However, people like me are far more skeptical of AGI and generally the existential threats for the foreseeable future simply because we just do not know enough, and it is important for us to have those guardrails in place so that we ensure the rights and safety of all Americans central to that development, and we not abandon consumer protection in the rush to just innovate.

So, I will close here and implore Congress to continue to think about policies that allow us to grow a healthy ecosystem where consumers are centered and our economy and our trust in these products are also prioritized.

Thank you again to the Members of the Committee. I look forward to working with you and taking your questions.

Ms. MACE. Thank you, ma'am.

And I will now recognize myself for 5 minutes and for questioning.

Ms. Fabrizio, thank you for being here today. What has surprised you the most about AI?

Ms. FABRIZIO. At CES, I think the most surprising thing are all the different ways that AI is solving the world's biggest challenge. The healthcare applications are the most exciting to me personally. I saw a digital twin of a heart at CES, which is used to train surgeons so that they can understand how to safely do heart surgery. That is a huge impact and very amazing.

Ms. MACE. And then you talked about the 10-year moratorium and for states. Why is it so important—the states' rights thing has to be balanced, but also we do not want to stifle innovation.

We know China, Russia, Iran, they are not—they do not have any guardrails, they do not care. Talk about that a little bit.

Ms. FABRIZIO. Yes. Well, you said it. China does not have that. It is impossible for our member companies—like I said, we have 80 percent small businesses, and they cannot compete and understand when there are a thousand different potential laws that they have to comply to. It just stifles innovation completely. And, for us to win the AI race, we need to remove that barrier.

Ms. MACE. And it is a Federal issue because it is commerce across state lines, and having all those—that regulatory environ-

ment—a patchwork in every state—does make it very difficult to operate.

And, then, Mr. Hammond, one thing that struck me in your testimony, you talk about compute energy. Talk to me a little bit more about that.

Let us go into detail because I agree with you. It is a huge problem. How do we solve it?

Mr. HAMMOND. It is a great question. So, you know, there are only a handful of inputs that go into training and competing at the frontier with these models. There is the data, the human talent, the compute, and the energy.

With China, we are basically at parity with talent. With data, they may have advantages because they do not have privacy laws. They can—

Ms. MACE. They have stolen a bunch of our data, right?

Mr. HAMMOND. Of course. And they also steal data and intellectual property (IP).

Ms. MACE. Yes.

Mr. HAMMOND. And so, really, it comes down to hardware energy. China has added over 400 gigawatts to their grid last year. They are about to do the same thing this year, so only—

Ms. MACE. How much have we added to our grid?

Mr. HAMMOND. Approximately zero. I mean, we have removed coal and added renewables. And that has canceled out.

So, what that means is, in lieu—but for these export controls that are barring China from our most advanced hardware, they would surely leapfrog us within a matter of years.

Ms. MACE. You think nuclear is the way?

Mr. HAMMOND. I support nuclear. I think the earliest that we will see new reactors come online is in the 2030s.

Ms. MACE. You know, it is frustrating because we see small nuclear reactors, or SMRs, in Japan and in France, and we do not have them here. We have them in our nuclear subs.

Like, I just—can we just—it is a joke, but it is like why can we not just plug one into an outlet? I mean, I just—we have the technology here. Why are we not using it—particularly with our data centers—and allow them to grow as data center technology—as data centers to grow as well.

But I do want to talk to you about the future of AI. Elon Musk has said that, as early as 2026, we would have singularity, basically. Define singularity, and how quickly do you think we are going to get there?

Mr. HAMMOND. So, I think there are two ways to think of singularity. One is as a metaphor for our ability to predict the future. So, whatever the technology it is, a singularity is a point in time where it becomes impossible to look beyond that point.

And then there is the technological singularity, which is, when we have AIs, they can build their own successors, and then potentially go off to infinity, and we do not really know what comes out of that process.

I think 2026 is a pretty aggressive expectation, but I think something like that crossing that threshold will happen this decade.

Ms. MACE. And I have talked with some folks in tech space that say a thousand days or 2,000 days.

What do you think it will take to get there, where AI is creating its own AI?

Mr. HAMMOND. So, you know, I got into this topic as a young kid reading Ray Kurzweil's 1999 book where he predicted we would have human-level AI by 2029. That was a 30-year forecast, and actually current trend lines suggest he was dead on 30 years ago. And so, I tend to lean toward that as a date.

But I think this will not look like some threshold that we pass and looks completely different. I think we are on this, sort of, continuous exponential. And the thing about exponentials is they look flat looking backward and vertical going forwards.

Ms. MACE. What is the biggest concern with when we do get there, when we do hit that milestone?

Mr. HAMMOND. That we lose control in some manner, whether literally over the AIs themselves or that—the proliferation because, while it does cost billions of dollars to train these models at first, subsequent generations, the cost comes down in orders of magnitude. That there will be a mass proliferation of powerful capabilities that our institutions are just not capable of adapting to.

Ms. MACE. That can hack every system, every grid everywhere all at the same time all around the world, essentially, potentially. That is the way I see it.

Mr. HAMMOND. Yes. I think there are going to be attacks on critical infrastructure, but there will also be, you know, the high school student that hacks their school's IT system and the system admin happens to be the gym teacher.

Ms. MACE. Or personal medical records or whatever the case may be. Yes, that is one of my greatest concerns on the cyber side.

I have run out of time. I could have—I could talk all day. Maybe we will have some more time later.

So, I will yield back to the Ranking Member and recognize her for 5 minutes.

Ms. BROWN. Thank you, Madam Chair.

Artificial intelligence has the potential to be in every aspect of the workforce in every corner of our daily life. This means that the Federal Government and private sector must collaborate to adapt to an AI present and future.

Algorithms and automation are not inherently harmful, but the way in which they are developed and deployed has the potential to have profound consequences for American workers, especially those from diverse backgrounds.

Black and Brown communities have long carried the weight of the wage gap in this country, and we cannot allow AI to deepen those inequities, whether through bias algorithms in hiring or automation that displaces jobs. We cannot afford to be caught flat-footed or let AI run unchecked.

So, Dr. Turner Lee, can you speak of the work that AI Equity Lab and Brookings is doing to ensure that AI does not worsen historical inequities and the importance of acting proactively?

Dr. TURNER LEE. Thank you, Ranking Member.

So, what I actually figured out as a sociologist is that we are not a lot of sociologists sitting at the table or people of various backgrounds when it came to thinking about the outcomes of these models. And so, writing on the back of a napkin, I thought about

an experiment to actually bring into disciplinary experts, people from various backgrounds, various industries together to think about areas in which we are going to have the most high risk and consequential outcomes, particularly with marginalized communities.

To your point, not only do some AI models come with a series of bias in the training data where it is actually picking up information that may be false, inaccurate, or under-representative, the outcomes of that data can contribute to a widening wealth gap, when that algorithm suggests that I am not creditworthy, I cannot get a home loan, in essence, my quality of life is actually impacted.

So, I think one of the best ways to start with this is to widen the seats at the table and to ensure that we have scientists, alongside social scientists, alongside industry sector, alongside people with various backgrounds who have concerns with the lived experiences of populations that you spoke about, especially those that are Black and Brown communities.

Ms. BROWN. Thank you. And, as more AI companies adopt AI technology, we must accept that the future of work is changing.

Dr. Turner Lee, what steps can the Federal Government take to ensure that American workforce is prepared to succeed in the AI future, and what legislative steps can Congress take to ensure that there are adequate guardrails overseeing AI adoption throughout the economy and society while also encouraging AI innovation?

Dr. TURNER LEE. Well, first and foremost, I would like to commend the work you have done in a bipartisan manner on your act, which is around training the Federal workforce to be exposed to AI. I think that is the first step.

But, to be very transparent, again, the train has left the station. AI is not only dictating how they do work, but it is also managing their productivity in how they are processing that work as well. So, it may help them with research, but it is managing the time that it takes to do the research.

Being transparent with the Federal Government, I think, is one way to actually help disclose the use of AI there, also making available all types of data. We have some concerns, given the recent scrub of a lot of information from Federal datasets, et cetera, that there just will not be the quality of data and integrity of data that we need. So, just making sure the Federal Government stays on point with that and does the appropriate audits of the data that is available.

I would just suggest, in terms of guardrails, there is enough AI for everybody to eat is a statement that I have been making lately. And that means that, wherever you are in the workforce, you are going to in some way touch this. Improving upon our literacy, our upskilling, our ability to mentor people who may be from different generations where AI was not necessarily something that they ever thought of—I used to watch the Jetsons. I never thought that AI would come to fruition. I think, Ranking Member, those are the steps that I think the U.S. Government can put in place that really in the long run promote transparency, disclosure, and effective use.

Ms. BROWN. Thank you very much. I will close with this. Our future is one where AI technology will, no doubt, impact our everyday lives, which is why we must carefully consider AI development

now. We need Federal legislation that protects Americans' rights and freedoms by preventing bias and injustice.

I look forward to continuing to explore this topic with experts so that we can ensure safe and responsible innovation.

And, with that, Madam Chair, I yield back.

Ms. MACE. Thank you.

I will now recognize Mr. McGuire for 5 minutes.

Mr. MCGUIRE. Thank you, Madam Chair, and thank you to our witnesses for being here today.

For the first few questions, if you would, let us answer as quickly as possible. Let us see.

Mr. HAMMOND, you said you think singularity, based on your experience, will be 2026. And, just real quick, Dr. Lee, when do you think we will have that? Just real simple.

Dr. TURNER LEE. I am a little less optimistic. I think it is going to take longer because I still think it is a little bit more hypothetical in its framing.

Mr. MCGUIRE. All right.

Ms. FABRIZIO.

Ms. FABRIZIO. I feel the same way. I think right now human in the loop is still important, and we are seeing AI augment what humans can do.

Mr. MCGUIRE. All right. This is just a yes or no. Do you believe China is using AI to manipulate their people, or do they have plans for that? Yes or no, Ms. Fabrizio?

Ms. FABRIZIO. I think China is using AI in ways that we are not, and that is why it is important for us to continue to focus on winning the AI race with the issues I laid out earlier.

Mr. MCGUIRE. Mr. Hammond?

Mr. HAMMOND. Yes. Absolutely, in some cases using U.S. technologies provided by U.S. companies.

Dr. TURNER LEE. I do agree that the Chinese Government has a highly surveilled state, and they are using AI not to the protection of their citizens.

Mr. MCGUIRE. All right. Just yes or no, because we are running out of time. Yes or no, the stakes are very high for AI development in the United States?

Ms. FABRIZIO. Yes.

Mr. HAMMOND. Extremely.

Dr. TURNER LEE. Yes.

Mr. MCGUIRE. So, very important that we have the best workforce possible to win this battle, yes or no?

Ms. FABRIZIO. Yes.

Dr. TURNER LEE. Yes.

Mr. HAMMOND. Yes. In the short run, I wonder what the workforce will look like when AIs can do everything.

Mr. MCGUIRE. Yes, I am with you. So, we are developing this workforce, and I got to tell you, as a Navy SEAL veteran, if somebody saved my life on the battlefield, I do not care if they are pink or blue, male or female, Democrat, Republican; we are all human beings. But I believe that the decisions that we make should be colorblind because we need the best force, and I do not care if you are pink or blue.

Do you agree that it should be colorblind, that we should have the most qualified people to win this race? Ms. Fabrizio, yes or no?

Ms. FABRIZIO. We need the best and brightest.

Mr. HAMMOND. Colorblind, yes. Not necessarily nationality blind. One of the challenges here is some of the most sensitive technologies are being developed by foreign nationals, including Chinese nationals.

Mr. MCGUIRE. But, again, if they are the best, they are the best.

Mr. HAMMOND. They are the best of the best. But we have to compartmentalize in some cases.

Dr. TURNER LEE. I think we should have the best of the best, but I also think that we need to have the doors open for people who are the best of the best and all of our communities to actually participate.

Mr. MCGUIRE. Okay. Mr. Hammond, I have got a lot to learn, but I am listening, and I am learning. And I liked what you talked about, the digital twin and practicing the heart surgeries. There is so much more I want to learn.

But, in your testimony, you said, even if we were to reach AI singularity, we might not have enough energy to keep going. So, this question is for all of the witnesses, and hopefully it is an easy one. Let us keep it real simple because we do not have time.

Would unleashing American energy give us a better chance of winning the AI race? And I am talking the ability to drill, nuclear, all of the above, coal plants.

Ms. FABRIZIO. We need to modernize our energy grid. It cannot handle what is in store with AI.

Mr. HAMMOND. Might be the single-most important factor, yes.

Mr. MCGUIRE. Ms. Lee?

Dr. TURNER LEE. I do agree that we need to do more to upgrade the energy grid, particularly if we are actually building data centers, but I want us to be cautious about the environmental consequences of actually moving too fast in communities where we already know we have a disadvantage.

Mr. MCGUIRE. And, personally, I would not care about that. I want to win.

All right. Ms. Fabrizio, I have to say I agree with your testimony that overly strict regulations can stifle innovation.

The first thing I think about, the so-called Green New Deal, better known as the “green new scam”, the Biden Administration spent hundreds of billions of dollars on these green energy projects, like solar panels and windows.

Yesterday, I asked an AI chat box, how many acres of solar panels would you need to power AI in the United States by 2030? Anyone take a guess how much that would be? A thousand acres. Actually, let me see here. It is way more than a thousand acres. It is 500,000 acres. That is half the size of Delaware.

We should be investing in fossil fuels and nuclear, small modular nuclear reactors, as we discussed earlier. We will only need 500 acres to do the same job nationally by 2030. We should be using coal, natural gas, traditional nuclear power until SMRs are ready, not solar panels.

All right. So, let me ask this question. Is China building thousands of solar farms to power their AI, yes or no?

Ms. FABRIZIO. China is looking at energy in different ways than we are, but there are solutions that we can look at, too, to modernize our energy grid, and AI will help—AI will help develop solutions and help us be smarter about the future.

Mr. MCGUIRE. Mr. Hammond?

Mr. HAMMOND. Both. AI—over 30 new coal plants, while also adding 300 gigawatts of renewables.

Mr. MCGUIRE. So, with today's technology, what is more effective, solar or fossil fuels? Just keep it simple because I am running out of time.

Ms. FABRIZIO. That—I would have to get back to you on that.

Mr. HAMMOND. I support all of the above. In the short run, these data centers are only going to go up with natural gas.

Dr. TURNER LEE. I cannot answer the particulars. I can get back to you that from my team.

But I want to go back, Congressman, to your question—

Mr. MCGUIRE. I am very limited on time.

Dr. TURNER LEE. No problem.

Mr. MCGUIRE. I am sorry. All right. So, let us see.

Mr. Hammond and Ms. Fabrizio, what are some of ways AI superintelligence might actually help us solve the energy problem?

Ms. FABRIZIO. Well, when it comes to research and data and looking for solutions, AI is faster and can help predict different models and find different solutions where we may not be able to find them on our own.

Mr. HAMMOND. I believe we are a year or two away from having fully autonomous AI labs that could discover new materials, new energy sources, all of the above.

Mr. MCGUIRE. I am out of time. I yield back. Thank you.

Ms. MACE. Thank you. I will now recognize Mr. Subramanyam for 5 minutes.

Mr. SUBRAMANYAM. Thank you, Madam Chair.

Thank you to the witnesses for coming today.

I wanted to talk about a couple things. We have had several hearings on Capitol Hill about AI in recent months and since I have been here, certainly. And one thing that has not been talked about as much is job displacement as a result of AI.

I think—you know, I served in the Obama White House as a technology policy adviser, and we were talking about this, but it was a little bit theoretical. I mean, there was job displacement happening because of emerging technologies, certainly, making jobs easier, but automating some jobs and some tasks. But now we are seeing it at a different level.

We are seeing companies now, basically, lay off entire departments and replace them with AI. They are saying this publicly, and they are saying this, you know, very—they are not hiding it anymore, right? And it is their prerogative. I mean, we are not here to tell companies how to run their business.

But it is creating a problem that Congress has to figure out how to address, which is jobs, because one thing we want is jobs available for people. We have been telling people—we have been telling kids for to the past 10 or 15 years, go into STEM, right, learn to code, like, that is going to be your meal ticket. You can have a job

for 30 years being a coder, an engineer. And now we have AI that can do their job.

I talk to a lot of kids who got their IT degrees in cybersecurity or different types of technology, and now they are having trouble finding a job in this market. So, I would love to hear maybe 30 seconds each witness, your thoughts on what Congress can do about it, whether we can do anything about it at all, whether it is a fixable problem right now. Ms. Fabrizio?

Ms. FABRIZIO. Thank you for the question. I think the important thing to continue to focus on is investment in STEM education for AI and investment in reskilling and upskilling the existing workforce. Apprenticeships will help there.

The White House AI and education pledge is looking at these areas, and CTA was happy to sign on to that. I will also say that, while the workforce will shift, workers will be given new tools if they use AI properly, and they will be able to take on more capacity, be more efficient, and work smarter.

Mr. SUBRAMANYAM. Mr. Hammond?

Mr. HAMMOND. I am relatively optimistic about the jobs picture over the short run, in particular because I think the people who are going to be most displaced are often white collar workers who are more adaptable.

However, just look at wages for electricians; they have spiked dramatically. We have a shortfall in Heating, ventilation, and air conditioning (HVAC) and cooling, construction, all these things are going—as inputs for data centers that could be a major source of job growth. And, more generally, I think we need to deregulate aspects of the labor markets to make transitions easier.

Mr. SUBRAMANYAM. What do you mean by deregulate aspects of the labor market?

Mr. HAMMOND. Things like occupational licensing, what kind of accreditations you need.

Mr. SUBRAMANYAM. Okay. And Ms. Turner Lee—Dr. Turner Lee?

Dr. TURNER LEE. Yes. I would say this, on the education side, and I do agree with you, Congressman, that we spent so much time in STEM and computer science, and since those efforts were actually made, we have evolved and sort of retracted on those investments.

I think we still need to use AI to augment education. We often put AI in the classroom instead of talking about the education of AI for students, which I think is somewhat of a challenge for many teachers and educators.

I think it is important to ensure that there is equitable distribution of resources that actually train students on AI literacy so that they are actually prepared to do more of a K through 20 shift as opposed to teaching it in early education and then teaching it in college and different levels would provide more consistency, more opportunities.

And I think that companies need to do a better job of qualifying what jobs are going to be lost. I think it is still an unknown number of where jobs—companies are going to be affected by AI based on the decision of what departments they choose to absorb it.

And then I also want to just respond to the data center side. I think we need to be careful in thinking that data centers will gen-

erate post-construction jobs and really focus on how many jobs will actually be created as a result of the data center ecosystem versus what are going to be the job creation numbers going into its construction.

Mr. SUBRAMANYAM. Do you think AI will create more jobs than it is displacing, yes or no? Ms. Fabrizio?

Ms. FABRIZIO. Yes. I think whole new industries will be developed because of AI and a tremendous amount of new jobs in the workforce will be created.

Mr. SUBRAMANYAM. Mr. Hammond?

Mr. HAMMOND. When we have fully AI automated software engineers, it is less that we lose that job category and more that we all become software engineers. And I think that will be a general pattern where we are all empowered as individuals to take on these new roles.

Mr. SUBRAMANYAM. Dr. Turner Lee?

Dr. TURNER LEE. Well, I think if we believe that AGI is coming quite quickly that they will take on more of the jobs of people because of the superintelligence.

I honestly think, Congressman, that AI will change the nature of jobs, and that is a conversation that we need to be having as opposed to job loss.

Mr. SUBRAMANYAM. I have more questions, but my time is up. We might have a second round.

But I will yield back. Thank you.

Ms. MACE. All right. I am now going to recognize Mr. Burlison for 5 minutes.

Mr. BURLISON. Thank you, Madam Chair. Thank you for conducting this hearing. This is one of my favorite topics.

I am going to begin by quoting Irving John Good, who was a British cryptologist or mathematician, famous for working with Alan Turing. He is quoted as saying, "Let an ultraintelligent machine be defined as a machine that can far surpass all the intellectual activities of any man, however clever. Since the design of machines is one of these intellectual activities, an ultraintelligent machine could design even better machines, there would then be unquestionably an intelligence explosion, and the intelligence of man would be left far behind. Thus, the first ultraintelligent machine is the last invention that man may ever need to make."

Mr. Hammond, can you elaborate on some of the success recently of some of the AI self-improvement that is occurring, where it is constantly improving itself?

Mr. HAMMOND. Yes, absolutely. I think it is coming in in gradations. So, we already have AIs that are good at coding, and a lot of the job of an AI engineer is coding. And so, there is a joke now at these AI labs, they are no longer coding; they are just kicking the AI to fix the bugs.

Beyond that, we also have AIs that are now writing their own algorithms. So, earlier this year, Google released AlphaEvolve, which was an evolutionary AI algorithm that discovered new bounds on a mathematical theorem that had not been beaten in 47 years.

Mr. BURLISON. And, with that, Madam Chair, I have got an article about AlphaEvolve, which is a power coding agent for designing advanced algorithms, if I could submit that for the record.

Ms. MACE. So ordered.

Mr. BURLISON. Thank you.

When—Ms.—Dr. Lee, when it comes to jobs, I am of the opinion—and I think you kind of touched on it—that things will change. It does not mean there will not be any—there will no longer be the need for us to have work to do. I think of it often this way.

My great-great grandparents, your great-great grandparents, probably everyone in this room's great-great grandparents were all farmers because that is what it took. It took everyone working the fields in order to produce enough food to feed people. Today, very few people farm. It is because of machinery.

And no one would go back in time—would agree that we should go back in time and say, “Do not let them have the tractor or the harvester,” right? If anything, it has taken the power or the productivity of one person and magnified it manyfold. And that is the way I think we should think about AI.

In fact, AI will be a magnifier for productivity for any individual no matter what they do and, thus, you need the individual. You need that individual that is the core. Would you agree with that, Dr. Lee?

Dr. TURNER LEE. Oh, I definitely agree. I published a book last year called “Digitally Invisible,” where I went to talk to farmers in places in Southern Maryland, across the country, and guess what? They said, “A tractor is only as good as the broadband that it has to actually be more productive in the work that they do.”

But, most importantly, with the compute power of AI, it will only be as good as the facilities that we offer them to be able to be connected to these new resources, and it will just change and transform how they do their work in ways where they do not have to go out there and measure how much rain came. They will actually know from the comfort of their office that is sitting on their land.

So, I do agree that we need to have conversations about job loss, as well as the transformational capacities in which jobs will change the way in which we work. I do not agree that we will have robots bossing us around yet.

Mr. BURLISON. I do not either. I do not either. Ms. Fabrizio, the European Union has—they reportedly—their regulations have kind of created a chilling effect. Can you elaborate on that?

Ms. FABRIZIO. Yes. It has been hard for companies to innovate, and that is why you see fewer unicorns and fewer tech innovations out of Europe. I think the United States is doing it right, and we have many companies here.

We have the most robust startup ecosystem in the world here, and we see that firsthand at CES, 1,400 startups, and many of them creating new AI innovations and launching them at CES. That is why it is really important to make sure that we have a framework that supports them.

Mr. BURLISON. And I think we are at a place now where we just realize, if we are going to stay on top competitively, we have to be the location for these data centers. We have to have these AI, you

know, housed in the United States. In order to do that, we need electricity.

And, Mr. Hammond, would you agree that, right now, we are in an electricity crunch? We do not have what is needed for that demand, and we have got to change that?

Mr. HAMMOND. Absolutely. Not just the data centers, but all forms of things are being electrified from vehicles on down.

Mr. BURLISON. Thank you. My time has expired.

Ms. MACE. Okay. I will now recognize Mr. Crane for his 5 minutes.

Mr. CRANE. Thank you, Ms. Chairwoman. Thank you guys for coming today.

I want to start with Ms. Fabrizio. I meet with organizations tied to blue collar jobs all the time, and they are constantly in my office begging for more help and people that need training in specialized fields like plumbing, electrical work, and carpentry. Meanwhile, CEOs are warning that AI will take 30 percent of the workforce by 2045.

My questions are, how do we ensure we are sending more people to go to trade schools for these blue-collar jobs and not just allowing them to get laid off by AI?

Ms. FABRIZIO. We need to continue to invest in reskilling and upskilling, and we need to make sure that we have the resources available. At CES, we are doing AI trainings for the first time at CES 2026 for people who are in the industry and want to learn more. This is an important solution to this challenge.

Mr. CRANE. Do you agree with those assessments that AI will take 30 percent of the workforce by 2045?

Ms. FABRIZIO. AI is going to change the workforce, but it is going to make it better. It is going to create new jobs, and it is going to augment the existing jobs. It is going to make people smarter. It is going to make them more efficient and give them tools that they never had before to do their work.

Mr. CRANE. Thank you. I would just like to say—make a statement for the young generation out there watching, what is going on with AI and who may be in college or may be in high school.

You know, I think one of the fields that is the least susceptible to AI taking over and eliminating your career opportunities are the trades.

What advancements right now are we seeing with technology that are creating new job opportunities for Americans?

Ms. FABRIZIO. Well, we are seeing it in many areas. In healthcare, you know, we are seeing individuals that are learning how to create autonomous healthcare monitoring systems for first-line intake that will help nurses and doctors get better information so that they can be physically with patients that they need to be with while an autonomous system is collecting information on patients. And that would be hugely helpful given the healthcare crisis we have.

Mr. CRANE. Thank you. I want to shift to Mr. Hammond. Last week, we lost a true American patriot, Charlie Kirk. Following his assassination, there were reports of Chinese and Russian bots encouraging violence through spreading misinformation, attempting to create division.

Did you see any of those reports, sir?

Mr. HAMMOND. I did not.

Mr. CRANE. Okay. How should the American people be wary of the increase of inflammatory speech following the assassination of Charlie and other mass violent events from Chinese and Russian bots?

Mr. HAMMOND. It is a really big open challenge. These social media platforms have their work cut out for them. We do not yet have a reliable means of identifying what is a bot, what is not, especially as these systems become more and more human-like in the way they speak. And so, I think it is something we need to put most of our resources into.

Mr. CRANE. Okay. What do you think Federal agencies should be doing to prevent the spreading of misinformation by these bots to sow discourse in our communities and our country?

Mr. HAMMOND. I mean, at a minimum, we should stop selling China and Russia the technology they use to run those bots. You know, these H20 chips, which just got approved or liable to be approved for export to China, if they all go through, it is going to roughly double their data center capacity for running advanced AI models.

We know from the past that they have used these chips to power their surveillance drones, to power their gate recognition technology. So, we have given them the ammunition that now they are using on us.

Mr. CRANE. Next question for you, sir. When I was growing up in school, it was often considered cheating to use a calculator on a test, right? Now we have CEOs of Fortune 500 companies basically telling their employees that they need to be using AI a few times a day, or they will be falling behind or become obsolete.

My question is, how do we balance the expanded use of AI and not demonize the use of AI while preparing our students for the future?

Mr. HAMMOND. I think education is a good example of how AI is going to force a massive rethink and reckoning in how we do a lot of things, including how we design curriculum for K-12. And, you know, there is going to be resistance.

But there are already new models that are emerging. There is Alpha School in Austin, which is trialing running AI-assisted tutoring in the mornings and project-based learning in the afternoons and seeing tremendous results.

And so, I think we just need much more innovation in how we do education.

Mr. CRANE. What advice for this Committee and for Congress do you have in regards to any regulations that you think are responsible regarding AI in the future?

Mr. HAMMOND. My three big bullet points are, one, we need to monitor the frontier; so we need to know what is coming and be able to prepare and adapt because it is going to be a very fast-moving period of human history. So, we do not want the government to be the last one to know.

Number two is going to be investing in research and development, especially around issues like control and interpretability. How do we interpret how these models work? How do we under-

stand their behavior? How do we control their behavior? Still, the companies are underinvesting in that.

And, third, we need to protect our comparative advantage, which is AI hardware. So, as I mentioned earlier, our one big advantage is chips and hardware. China is trying to catch up, but they are cutoff right now. And, if we open up those chips to China, they are going to jump ahead.

Mr. CRANE. Thank you. I yield back.

Ms. MACE. All right. Thank you. We are going to do a second round, if that is okay with the witnesses.

I request unanimous consent that the Subcommittee have a second round of questioning of the witnesses.

So, without objection, it is so ordered.

I want to pick up where Mr. Crane left off about the chips. You are referencing the H20 chip, right, Nvidia? Basically, I know China just said that they were encouraging folks not to buy from Nvidia, but it was a different chip, right? Do you know anything about that?

Mr. HAMMOND. Yes. China is trying to indigenize their own chips made by Huawei. DeepSeek was reported to have had some botched efforts using the Huawei chips, and so the Chinese companies are all hungry for American chips.

Ms. MACE. And how do we—I mean, how do we prevent China from getting the chips?

Mr. HAMMOND. First order is we should not approve the sale of the chips. And, to the extent that we do, try to minimize the damage. Senator Jim Banks has a bill called the GAIN AI Act, which would give U.S. companies a first right of refusal to buy the chips that are destined for China. I think that is the least we could do.

Ms. MACE. Is there a House version of that bill?

Mr. HAMMOND. I do not believe so, not yet.

Ms. MACE. Okay.

Mr. HAMMOND. You know, even with these controls in place, China has very sophisticated smuggling operations. So, not a month after the Blackwell series of chips were announced, there was an FT report that China had already smuggled in a billion dollars' worth of them.

So, we need to do much more to crack down on——

Ms. MACE. How did they do that? How were they able to get away with that?

Mr. HAMMOND. Through third-party intermediaries in Malaysia, Singapore, Taiwan. They just—they buy them through these third parties that—on the list. In some cases, they are even incorporated in the United States, and it is just a matter of getting them over the border.

Ms. MACE. And are we cracking down on the intermediaries here in the United States now? Have you heard anything about that?

Mr. HAMMOND. There have been some DOJ-style investigations that there have been actions taken in Malaysia and Singapore. We have enlisted the governments in those countries in some cases.

The challenge is really one of scale. So, once these chips are at the door, how do we know where they are ending up? There is a bill called the CHIP Security Act. There is a House version of that that would require these chips to have basic location verification.

Ms. MACE. Who is doing that bill?

Mr. HAMMOND. It is before the House Foreign Affairs Committee (HFAC) right now.

Ms. MACE. Okay. And then—so, Ms. Fabrizio, you said earlier in one of the questioning about China, using AI differently. Can you give some examples?

Ms. FABRIZIO. Well, China is using AI for surveillance, they are using it for military purposes, they are—you know, they also do not have privacy in China. So, they use the data differently than we do here.

That is why I think it is really important that we continue to move forward, we look for a national AI framework that addresses some of these big issues. It is risk-based, It is tech neutral, and it allows innovation to continue to flourish here so we can continue to beat China.

Ms. MACE. Is China our greatest threat?

Ms. FABRIZIO. Yes.

Ms. MACE. Do you agree, Mr. Hammond, China being the greatest threat?

Mr. HAMMOND. Certainly on the chip—

Ms. MACE. Dr. Turner Lee, would you agree?

Dr. TURNER LEE. Yes.

Ms. MACE. What are the consequences—and this is for all the panelists—if the United States fails to outpace China in the race for domination in AI? Ms. Fabrizio?

Ms. FABRIZIO. Well, it is important that we move forward in the best way that we can and that we focus on innovation. We have the best startup ecosystem here. We have the best tech companies here, but we need to not get in their way.

So, that means a pause on state legislation. It means a Federal framework where companies can innovate and know the guardrails and be able to move forward.

Ms. MACE. Mr. Hammond?

Mr. HAMMOND. I worry that we need to buy time with China because over the last 40 years—this is part of the industrialization story—we have shifted all our industries into services, entertainment, law, finance, all things that are about to be deflated by AI whereas—so there is a world where we build the AGI, we build the general intelligence, but China is the one that puts in factories and has the growth benefits.

Ms. MACE. There have been people—because I know one personally, someone I am suing—literally, he is using ChatGPT as his attorney. I just cannot think of any—I mean, okay, yes. But—we are going to beat the LLM in court. Dr. Turner Lee?

Dr. TURNER LEE. I would agree with my colleagues in terms of China being a threat to our dominance in the AI space. I also would put out there, though, that we have to find alternative markets if we are actually going to grow the economy and scale of U.S. companies.

So, I am thinking about my experiences with 5G, where we actually opened up other markets, we missed the opportunity to work with the global majority, African Union. So, just thinking—rethinking our industrial policy as we think about China as a threat as to if we want people to have American products embedded in their

technology, where are we selling it to, and making sure we are agile.

I do also want to respond that I do think states have to play a role in experimentation. I think the Federal Government would be too premature to come up with a national policy that limits states' rights because what we are seeing in terms of experimentation of states is that they are looking at more consumer protection.

AGs are trying to figure out ways to keep our grandmothers safe from AI. They are not necessarily trying to compete against China. They are just competing against the various misnomers and lack of information that people—

Ms. MACE. We already have that. I got a Nigerian scam the other day in an email that, you know, I took a screen shot and forwarded to my family, and I am, like, "Don't click on this."

Dr. TURNER LEE. We do the same thing because we are not coming to Congress; we are going to our state AGs. So, we can evaluate what they are able to do to make sure people are safe.

Ms. MACE. Yes. Okay.

I will now recognize Mr. Subramanyam for 5 minutes.

Mr. SUBRAMANYAM. Thank you, Madam Chair.

I just want to finish the job displacement conversation, and, Mr. Hammond, you said something interesting about the United States has shifted its economy toward industries that are susceptible to AI. You mentioned law. I am a lawyer too, and so I am sensitive to that, but can you expound a little bit on that as well as what should we be doing? I know Mr. Crane made some good points as well about, you know, different industries that might be more important moving forward, but I would love to hear more about that.

Mr. HAMMOND. It is a story of relative scarcity. So, if intelligence becomes abundant, if service labor, cognitive labor becomes abundant, then what remains scarce? And it will be the heavy industry, the factories, the actual—not just the factories, but also the know-how, the tacit knowledge that is embedded within the workforces that China has that we do not. And so, you know, one of the reasons that we need to buy time is in part to try to rebuild some of those new sectors in part to ensure that we do not just give away our economy.

Mr. SUBRAMANYAM. And what would buy time? What can we do to buy time?

Mr. HAMMOND. Well, number one, denying China access to the most advanced AI chip.

Mr. SUBRAMANYAM. Oh, I see. Okay. Got it. You mean like export controls, and that sort of thing. I would ask, I guess, the other witnesses as well what your thoughts are on this? Like, what jobs are we going to lose in the future as well? What jobs are we going to be gained? Ms. Fabrizio mentioned this is going to create more jobs than we are losing. Do we even know right now what those jobs would be? I know it is—you know, there is this idea of, okay, well, AI is going to displace this IT department but it is going to replace it with AI buddies that, you know, help fix the AI or make it better. But, you know, I look at what is actually happening and that is not quite the reality right now. Perhaps it will be in the future, but right now what I am seeing is, you know, 40 people get laid off in an IT department. They are replaced with AI and, like, five

people, and so I am just curious what you think that future would look like, what jobs will be gained.

Ms. FABRIZIO. Well, every major shift we have seen new industries and new jobs created. Think about the internet. Things—you know, so many new industries were developed, and we see that at CES. You know, in terms of jobs, there are AI data scientists, AI ethicists. There are new ways of building and manufacturing technology that did not exist before, and we will continue to see more and more of that as new industries use AI and as new—whole new industries that we do not even know what they are yet emerge. But agriculture is one great example where we have seen new roles develop because of AI.

Mr. SUBRAMANYAM. Ms. Dr. Turner Lee?

Dr. TURNER LEE. Yes. And I would just say, in sort of looping back to the previous question as well, I think we have to be distinguishing between the loss of jobs in the blue-collar sector and the white-collar sector, right? So, I think on the white-collar sector it has been very clear that AI is going to improve the efficiencies of lawyers or paralegals who do the type of research that AI can do expeditiously. On the blue-collar side, it becomes a little bit more tricky, because when we are talking about trade jobs that are going to be lost. I am not sure yet if a robotic plumber can come to my house and fix my toilet, but we still have to see that we are going to be running these parallel workforce opportunities, and it is important for that plumber to have the skills necessary to be able to innovate and to grow into the new economy where maybe they are not actually doing the physical labor, but they are managing schedule, or they are managing invoices, or they are trying to do trade service calls. I want to put that out there.

I think the question that we all should have is we are going to lose collective bargaining jobs when AI comes in, because it is going to replace front line workers who essentially have had that job security as well as a union to be able to do the work that they do. So, I think we have to just look at the scan and do a better scan of what that means when we say job loss—Congressman, you are right on point—and sort of divide that out based on not only productivity but where we are going to see the most vulnerability.

Mr. SUBRAMANYAM. And I would ask all the witnesses what should Congress do, if anything, about job displacement? Ms. Fabrizio?

Ms. FABRIZIO. I think investing in workforce development and training and apprenticeships. I mean, you are right, you might not have a robotic plumber, but you might have a plumber that is able to look at a digital twin of your home and identify a better solution faster that they would not have had the ability to do before. So, continuing to invest in upskilling is extremely important.

Mr. SUBRAMANYAM. Mr. Hammond.

Mr. HAMMOND. I would say two things. One, that the U.S. Government has a poor track record of running employment and training and retraining programs. They tend to not work very well. And I believe GAO last reported that there are 46 of them already. And so, I would look to opportunities that shift training on the job as much as possible, and, to the extent possible, reducing barriers to enter new jobs so that you do not need to get that certificate or do

not need to get the extra piece of education just to enter the workforce.

Dr. TURNER LEE. And I would say the same thing. Upskilling, obviously, cross-skilling as the nature of jobs actually are transformed. I love the example of my colleague with regards to digital twins in some of the trade areas. And I also would say national AI literacy so that people also understand that AI is not just the job. It is the behavior in which you approach the task that is before you. That is one of the most transformative aspects of this technology compared to any internet technologies that we have had. You can actually see AI through an appliance and figure out ways in which you are interacting with it. As a student, you can see it on your phone. So, really thinking about what does AI literacy look like so that people understand how that actually fits into the labor force.

Mr. SUBRAMANYAM. Thank you. I yield back.

Ms. MACE. Thank you.

Mr. Burlison, would you like to be recognized for 5 minutes?

Mr. BURLISON. Sure. Thank you. Ms. Fabrizio, at one point in your, I think in your, testimony you talked about that, without Federal privacy law, businesses and consumers are navigating the confusing state by state patchwork. I could not agree more. But can you elaborate on what—by us not having some kind of standardized laws in place and really kind of open the door for one state to squelch this industry.

Ms. FABRIZIO. Well, yes, and more so it is very harmful to businesses, especially small businesses or startups with a unique idea to try to figure out how to scale. It is very stifling to try to comply with many different state laws and to grow your market and to grow your product, and so that can be discouraging and that can discourage innovation, and that is not what we want to do here. We want to encourage innovation, and a Federal privacy framework would help give some consistency and some clear guardrails and rules of the road so that our innovators can innovate.

Mr. BURLISON. Right. Do you think we need in general, just more broadly speaking, privacy laws related to our own personal data?

Ms. FABRIZIO. Well, in terms of looking at a framework for privacy or for AI, it should be risk based, and we should approach it that way, but I do think, versus a patchwork approach that, again, companies just cannot adhere to it. They cannot. Small companies cannot afford big privacy law firms to support them. That gives the big companies a competitive advantage and boxes out small companies.

Mr. BURLISON. So, with that being said, what would you like to see as a framework for setting wide sweeping Federal law?

Ms. FABRIZIO. So, we would be looking for something that is tech-neutral, that is preemptive—it is one framework—and that it is risk based, and that it identifies those core categories, and it also, you know, removes liability for companies that are compliant, and that I think would really unlock and propel innovation and move us forward.

Mr. BURLISON. Interesting. You were speaking kind of esoterically or a little bit philosophically there, but specifically, can

you think of specific rules or regulations that you would want to see implemented?

Ms. FABRIZIO. I would love to get back to you with specifics and have a further conversation about it.

Mr. BURLISON. I respect that. Thank you.

Mr. HAMMOND, a lot of this debate is about what the values that we are going to teach this AI, which I find interesting that we cannot even agree on what free speech means as humanity; how can we trust AI to determine or how can we attribute or provide some kind of values to AI?

Mr. HAMMOND. This is an unsolved problem as it stands. So, you know, right now, you know, chat bots will adopt whatever value you put into it. If you tell it to talk like a pirate, it will talk like a pirate. The question is when these systems become more autonomous and acting on their own, how do they not just follow our values but follow them reliably. I think that is an area still needed for further research.

Mr. BURLISON. Thank you. Because I am touching back on the question I asked Ms. Fabrizio, which is that I think that the vulnerability for each one of us is that we are entering into an era where an AI can devour as much information about you as possible and weaponize that against you, and so that is something I think is a concern, and the question is how do we protect people's rights?

For example, every day I get annoying phone calls for people from, like, people that want to know if I want to sell my rental homes. Every day. I never signed up for anything. Somehow they know which homes I have, and they just always want to call me. I can only imagine how bad that is going to get when—how much worse it is going to get, which is why I think we should be considering as—on a Federal level having a tighter grip or control on the data about individuals, particularly important data, whether it is the electronic medical record. We may need to do something like what we did with Health Insurance Portability and Accountability Act (HIPAA) or extend that beyond just your medical privacy. Dr. Lee, you are nodding your head.

Dr. TURNER LEE. I am nodding my head. We are way overdue in the United States for a national privacy standard that would actually dictate what goes into the machines, what comes out of it in terms of what we consent to, not consent to implicitly as well as, you know, the ability of third parties to get ahold of that. You get calls about your rental properties. I am offered \$100,000 every day through some type of voice clone. So, I think that, alongside deep fakes, which actually only exploits the opportunities you are talking about. We really do need Federal privacy legislation to slow this down.

Mr. BURLISON. Thank you. I yield back.

Ms. MACE. All right. I will now recognize Mr. Crane for 5 minutes.

Mr. CRANE. Thank you.

I want to get back on this chip conversation that we were having, Dr. Hammond. You were talking about the need to buy time. I believe we were talking about the H20 chip. Is that correct?

Mr. HAMMOND. Yes, sir.

Mr. CRANE. Are those manufactured in Taiwan or the United States?

Mr. HAMMOND. Primarily Taiwan.

Mr. CRANE. Do you have fears that—China has stated repeatedly that their plans are to take Taiwan, and by doing so would have access and control of all of these chip companies that the United States has invested in?

Mr. HAMMOND. I am very concerned about a potential invasion or blockade against Taiwan. I would say that, if that were to occur that Taiwan Semiconductor Manufacturing Company Limited (TSMC) would not be long for the world.

Mr. CRANE. On that note, just to unpack it for the American people that might be watching, what percentage of chips that we use as American consumers and in AI come from Taiwan?

Mr. HAMMOND. When it comes to the most advanced AI logic chips like the products Nvidia produces, over 90 percent.

Mr. CRANE. 90 percent.

Mr. HAMMOND. With the new TSMC factories going up in Arizona and elsewhere, we are going to try to grow our share, but right now it is—

Mr. CRANE. Is it not, like, 60 percent of semiconductors that we use come from Taiwan as well?

Mr. HAMMOND. Yes. Across the board.

Mr. CRANE. What do you think would look like if that scenario were to unfold within the next couple years, what do you think—effects that would have on the U.S. economy?

Mr. HAMMOND. I think we would have a global depression, number one, and then number two, all our products from our car door to our toaster have semiconductors in them.

Mr. CRANE. When I have heard experts talk about, you know, standing up these manufacturing capabilities that, you know, building these advanced chips, it is not easy. It often takes decades. Would you agree with that?

Mr. HAMMOND. It can from scratch, but the fab going up in Arizona is actually ahead of schedule and showing very good results after only a couple years.

Mr. CRANE. So, you think, within a couple years, we can be producing these most advanced chips right here in the United States?

Mr. HAMMOND. If similar style, like if a CHIPS Act 2.0 were to come across, we could do this again, yes.

Mr. CRANE. Ms. Fabrizio, you talked about other eras within history, like the invention of the internet, and you compared that to AI to kind of make your point that, you know, any time there has been serious innovation within industry, it often leads to new jobs, other fields that we do not even yet know about. Do you think that that is coherent and fair looking at what we are facing here with AI? Do you think it will be similar, or do you think AI will be a lot more disruptive for jobs in the economy than anything we have ever seen?

Ms. FABRIZIO. I think it will be a good shift that we see. There will be disruption, but I think it will be positive. I think it will allow us to solve some of the biggest challenges that we have. Think in healthcare: we have a healthcare worker shortage. We have more sick patients. Think food insecurity, think farming, agri-

culture, energy, mobility, smart cities. I see all of these solutions at CES. I see amazing groundbreaking technologies, and I would invite you all to come to CES and see them, too, and see how the future will be amazing once we continue through this shift if we allow the United States to be the leader and continue to be the leader.

Mr. CRANE. Do you agree with that, Mr. Hammond?

Mr. HAMMOND. Yes. I would add a component to this. A vital component is cybersecurity, infrastructure security. So, it is one thing—we need these data centers in this country first and foremost for sovereignty if we are going to be running through the economy through these data centers. If they are going to be contributing to GDP, they should be within our borders, within our jurisdiction, but that also creates a single point of failure, right? If the power goes out today, we are still able to have a conversation; but, in the future, if the world is running on AI, that is a huge critical piece of infrastructure that could be taken out.

Mr. CRANE. I think we did a hearing on this same topic probably a couple months back, and one of the AI titans, you know, we brought in an article, and he said within the next one to five years, like, 50 percent of all entry-level white-collar jobs are going to be gone. So, you think those folks are all going to be able to find new jobs?

Ms. FABRIZIO. Well, I do not think those jobs will be gone. I think there will be different jobs, and those people hopefully will be focusing on upskilling. They will be using AI. We have all heard that AI will not replace people, but people who use AI will replace people who do not, and so that is how I look at it, and I do think that is the shift that we will experience.

Mr. CRANE. Okay. So, you guys do not think this is going to be, like, one of those times where we told coal miners, “Hey, when your plant goes under and we get rid of it, we are going to teach them how to code?” Do you guys remember that a couple years ago? What do you think those coal miners are thinking right now? How many of them do you think learned how to code?

Mr. HAMMOND. Teach coders how to mine.

Mr. CRANE. I am not saying it is your responsibility. I am just saying this is one of the biggest concerns that I have when I look at what is going on with AI.

Ms. FABRIZIO. I agree. I think upskilling and investing in the future workforce is extremely important, and it is something that we have to do, and we have to bring people along, but that involves education. It starts with STEM education early in AI and continued investment there and being future looking.

Mr. CRANE. I get it, but a lot of these folks that already have these jobs. They already got their education that, in many cases, are going to be worthless. Would you agree, Dr. Turner—or—

Dr. TURNER LEE. Oh, of course. I think what you are actually pointing out, Congressman, is that we need to do more research on this, and we need a little bit more data before we jump in here and start asserting what we think the workforce will look like.

Mr. CRANE. Thank you. I yield back.

Ms. MACE. Okay. In closing, as we wrap this up, I want to thank our panelists once again for being here this afternoon and pro-

viding your testimony. I would like to yield to the Ranking Member for any closing remarks.

Mr. SUBRAMANYAM. Thank you, Madam Chair.

I think some really interesting points were made by Members of the Committee today, and I just—I want people to understand that we should not downplay the job losses, the job displacement that is already happening. This is not theoretical. I had a job fair in my district a couple months ago, and I was ready to meet many folks who had lost their jobs because they were Federal workers, and I have a lot of Federal workers in my district that have been laid off, and certainly there were those. But there were even more IT students and graduates who were there because they had lost the ability to get a job because companies were not hiring them anymore. They wanted ten years of experience. Well, if you are an IT student who just graduated from a 4-year college, you were told your whole life to go into STEM, and you got the best STEM education from the best STEM education schools, and now there is no job, and they are asking me why; what happened?

And then I look at what is happening at the companies, and they are laying off entire departments and replacing them with AI and putting out press releases in some instances, bragging about it to their shareholders. Again, I am not here to run their business. I think it is reality. If you could replace 100 people that you spend a million dollars paying with a tool that costs \$50,000, it is part of your mandate to do that, but I think we have to understand that this is an imminent problem, that certainly we have invested a lot already in STEM education and in job training programs.

But I actually kind of agree with you, Mr. Hammond, we have a lot of them already. I do not know if that is the only solution here. I do not have any answers for you today. That is why I was asking these questions, but I do want to work with my colleagues on both sides of the aisle to figure out what comes next, because I have a lot of students with really good skills. They do not need to be upskilled anymore. They have really good tech skills. They just cannot find jobs, right? And so, I want to see if there is something we can do about that. I yield back.

Ms. MACE. Thank you.

And, with that, without objection, all Members will have five legislative days within which to submit materials and to submit additional written questions for the witnesses which will be forwarded to the witnesses for their response.

And, if there is no further business, without objection, the Subcommittee stands adjourned.

[Whereupon, at 3:20 p.m., the Subcommittee was adjourned.]