Compete.
Council on Competitiveness

2024 National Competitiveness Forum Summary Report

December 2-3, 2024

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Introduction

On December 2–3, 2024, the Council on Competitiveness (Council) convened its annual Gala Dinner and National Competitiveness Forum (NCF). The NCF is the premiere assembly of our nation's leaders from across business, academia, labor, national laboratories, and other critical stakeholders committed to a more prosperous, secure, innovative, and competitive United States. More than 250 NCF participants gathered in Washington, D.C., for a program of keynote addresses and panels featuring leaders and key representatives from all sectors of the economy—and from across the country.

During the NCF, these leaders and innovators came together to explore the most import competitiveness topics facing the nation, from AI and quantum computing to workforce development and place-making innovation. Together, they considered the challenges and opportunities on the horizon, asked what we need to do today to ensure a brighter tomorrow for the U.S. innovation economy and everyone who relies on it.

Council members, committed to the competitiveness and innovation capacity and capability of the United States, generously sponsored this year's NCF.

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Competing in the Next Economy: Innovating in the Age of Disruption and Discontinuity

The 2024 NCF took place during a critical time for U.S. competitiveness. Converging and compounding technology revolutions are upending huge swaths of our economy, with unpredictable results, and acute challenges and opportunities. At the same time, an ascendant China seeks to supplant the U.S. free-market, open-source system with a closed, state-run model, challenging American global innovation leadership.

To address the moment shaped by significant change and transition, the Council on Competitiveness' National Commission on Innovation and Competitiveness Frontiers released its latest landmark report, *Competing in the Next Economy: Innovating in the Age of Disruption and Discontinuity*, in the opening session of the NCF. This report explores the evolving dynamics across the economic, technology, and security landscapes, and identifies the most important policies and actions that the federal government, states, private sector, and research ecosystem must take to position the United States at the forefront of technology leadership, economic strength, and global competitiveness.

Included in the report are seven critical pillars, comprised by 55 total recommendations—seven of which the Council calls out as the highest priority recommendations for the new Administration and 119th Congress to boost U.S. innovation tenfold—10x.

Read the full report here.

2024 Gala Dinner and National Competitiveness Forum Agenda

December 2, 2024
Annual Reception and Gala Dinner

EVENING

6:00 Registration and Reception

7:00 Welcome

The Hon. Deborah L. Wince-Smith
President and CEO, Council on Competitiveness

7:15 Annual Gala Dinner

8:15 2024 National Competitiveness Award Ceremony

9:00 Annual Gala Dinner Concludes

December 3, 2024
National Competitiveness Forum

MORNING

7:45 Registration, Networking, and Breakfast

8:30 A Fireside Chat: Contextualizing Competitiveness—The Challenges and Opportunities for 2025

Mr. Brian T. Moynihan
Chair and CEO, Bank of America
Chair, Council on Competitiveness

The Hon. Deborah L. Wince-Smith
President and CEO, Council on Competitiveness

8:50 *Competing in the Next Economy: The Agenda for an Age of Disruption and Discontinuity*

Ms. Joan Gabel
Chancellor, University of Pittsburgh
Academic Vice-Chair, Council on Competitiveness

Mr. Dan Helfrich
Chair and CEO, Deloitte Consulting LLP
Business Vice-Chair, Council on Competitiveness

Mr. Charles O. Holliday, Jr.
Chair Emeritus, Council on Competitiveness, and Chair, Global Federation of Competitiveness Councils (GFCC)

Dr. Thomas Mason
Director, Los Alamos National Laboratory

Moderator: The Hon. Deborah L. Wince-Smith
President and CEO, Council on Competitiveness

9:30 A New Compact for America: Tech Takes Center Stage in the Global Competitiveness Arena

The Hon. Patricia Falcone
Deputy Director for Science and Technology, Lawrence Livermore National Laboratory

Dr. Sally Morton
Executive Vice President for Knowledge Enterprise, Arizona State University

Dr. Richard "Rick" Muller
Director, Intelligence Advanced Research Projects Agency (IARPA)

Dr. Jeffrey Rhoads
Vice President for Research, University of Notre Dame

Dr. Steve Walker
Vice President and Chief Technology Officer, Lockheed Martin

The Hon. Evelyn Wang
Director, Advanced Research Projects Agency–Energy (ARPA-E)

Moderator: Mr. Chad Evans
Executive Vice President and Chief Operating Officer, Council on Competitiveness

10:10 The National Laboratories' "Horizon Scan": A Strategic Roadmap For U.S. Competitiveness and Security

Dr. Steven Ashby
Director, Pacific Northwest National Laboratory

Dr. Thomas Mason
Director, Los Alamos National Laboratory

Dr. Stephen Streiffer
Director, Oak Ridge National Laboratory

Dr. John Wagner
Director, Idaho National Laboratory

Moderator: Dr. Kimberly Budil
Director, Lawrence Livermore National Laboratory

10:45 Innovation Anywhere, Opportunities Everywhere: Accelerating the Frontiers of Science and Technology

The Hon. Sethuraman "Panch" Panchanathan
Director, National Science Foundation

11:05 Higher Education: Optimizing Its Role as a Lynchpin of U.S. Competitiveness

Dr. Kimberly Espy
President, Wayne State University

Dr. Jennifer Mnookin
Chancellor, University of Wisconsin—Madison

Dr. Susan Poser
President, Hofstra University

Dr. David Wilson
President, Morgan State University

Moderator: Dr. Santa Ono
President, University of Michigan

11:45 Radical Collaboration: An Imperative in the Age Of Technology Disruption And Discontinuity

The Hon. Steve Isakowitz
President and CEO, The Aerospace Corporation

Mr. Jérémie Papin
Chairperson, Nissan Americas

Dr. Donde Plowman
Chancellor, University of Tennessee, Knoxville

Dr. Marlene Tromp
President, Boise State University

Moderator: Dr. Daniel Diermeier
Chancellor, Vanderbilt University

AFTERNOON

12:25 Lunch

1:10 The Competitiveness Conversations Across America: Defining What's Next in Place-making Innovation

Dr. Bernard Arulanandam
Vice Provost for Research, Tufts University

Dr. Elizabeth Cantwell
President, Utah State University

Dr. Taylor Eighmy
President, The University of Texas at San Antonio

Mr. Mike Freeman
CEO, Innosphere Ventures and the CO-WY Engine

Moderator: Mr. Josh Parker
Chairman and CEO, Ancora

1:45 Breakthroughs in The Bioeconomy: Rewriting the DNA of U.S. Competitiveness, From Farms, Forests, and Forks to Factories, Hospitals, and Homes

Dr. Jeffrey Gold
President, University of Nebraska System

Dr. Mehmood Khan
CEO, Hevolution

Dr. Jonathan McIntyre
Founding Partner, Nodl Advisors

Mr. Jim Stutelberg
CEO, Primient

Moderator: Mr. Charles O. Holliday, Jr.
Chair Emeritus, Council on Competitiveness, and Chair, Global Federation of Competitiveness Councils (GFCC)

2:20 Pioneering the Future of Transformative Computing: Scaling Quantum, AI, and Cybersecurity to Solve Tomorrow's Greatest Challenges

Dr. Susan Hubbard
Deputy Director for Science and Technology, Oak Ridge National Laboratory

Dr. Chris Langer
Fellow, Quantinuum

Dr. Darryll Pines
President and Glenn L. Martin Professor of Aerospace Engineering, University of Maryland, College Park

Mr. Gunjan Sinha
Executive Chairman, MetricStream

Moderator: Dr. Mark Peters
President and CEO, The MITRE Corporation

2:55 National Competitiveness Forum Recap

Council leadership will share core insights and reflections from the day of conversations.

Mr. Brian T. Moynihan,
Chair and CEO, Bank of America
Chair, Council on Competitiveness

The Hon. Deborah L. Wince-Smith
President and CEO, Council on Competitiveness

3:00 NCF Concludes

Opening Remarks from the Hon. Deborah L. Wince-Smith

The Hon. Deborah L. Wince-Smith
President and CEO, Council on Competitiveness

Key Discussion Points

The Honorable Deborah L. Wince-Smith, Council on Competitiveness President and CEO, delivered opening remarks at the 2024 Gala Dinner and National Competitiveness Forum (NCF), setting the tone for a pivotal gathering of leaders from industry, academia, labor, and government. She began by welcoming attendees and thanking the event's sponsors, whose contributions made the evening possible and help sustain the Council's ongoing efforts to advance U.S. competitiveness.

Ms. Wince-Smith framed the evening and the Forum within the context of the "Age of Disruption and Discontinuity," a period marked by rapid technological breakthroughs, economic volatility, and intensifying geopolitical competition. While the economy has remained resilient, as evidenced by low unemployment and steady GDP growth, there remain pressing challenges such as persistent inflation, rising national and consumer debt, and dependency on foreign nations for critical resources like rare earth minerals and semiconductors. China's ambitions were also a point of emphasis.

Central to Ms. Wince-Smith's remarks was the transformative potential of emerging technologies. Artificial intelligence (AI), in particular, is a game-changer: accelerating innovation, redefining the relationship between humans and machines, and driving productivity gains, while creating disruption for workers and industries. She also under-

scored the importance of energy security during a global transition to clean energy, citing advancements in nuclear energy, including small modular reactors and nuclear fusion, as vital to achieving sustainability and economic growth.

Ms. Wince-Smith also took a moment in her opening remarks to preview the *Council's Competing in the Next Economy: Innovating in the Age of Disruption and Discontinuity* report. This report identifies seven 10x pillars and 55 recommendations for the Trump Administration and 119th Congress, focusing on enhancing U.S. productivity, strengthening national security, and fostering prosperity. Her remarks also highlighted the importance of accelerating technology development, deepening collaboration between universities and national laboratories, and building capacity for innovation across the nation to ensure U.S. leadership in industries like advanced biotechnology and high performance computing (HPC).

In her concluding statement, Ms. Wince-Smith focused on the collaborative spirit of the event, which brought together leaders from across sectors to navigate the challenges and seize the opportunities of the era. The discussions at the NCF would catalyze actionable solutions, ensuring the United States remains a global leader in innovation and competitiveness.

"The country is navigating an unprecedented era characterized by rapid technological advancements and geopolitical shifts—one the Council is calling the Age of Disruption and Discontinuity."

The Hon. Deborah L. Wince-Smith
President and CEO, Council on Competitiveness

National Competitiveness Award Ceremony

Honoring Mr. Brian T. Moynihan

Charles O. Holliday, Jr., Chair Emeritus, Council on Competitiveness, and Chair, Global Federation of Competitiveness Councils (GFCC); Brian T. Moynihan, Chair and CEO, Bank of America, and Chair, Council on Competitiveness; Deborah L. Wince-Smith, President and CEO, Council on Competitiveness; Dan Helfrich, Chair and CEO, Deloitte Consulting LLP, and Business Vice-Chair, Council on Competitiveness; Joan Gabel, Chancellor, University of Pittsburgh, and Academic Vice-Chair, Council on Competitiveness.

Key Discussion Points

The annual Gala Dinner is a night to celebrate the achievements of Council members and guests, including the presentation of the Council's prestigious National Competitiveness Award. This award recognizes individuals from the public and private sectors who have made lasting contributions to America's prosperity by advancing U.S. leadership in talent, technology, and innovation. Previous winners include Cabinet Secretaries, U.S. Senators, and innovators from across the competitiveness ecosystem.

Following dinner, Ms. Wince-Smith introduced Mr. Brian T. Moynihan, Chair and CEO of Bank of America and Chair of the Council on Competitiveness, as the recipient of the 2024 National Competitiveness Award. In her introduction, she recognized Mr. Moynihan's leadership in competitiveness, and his significant contributions to the nation's growth and prosperity.

Under Mr. Moynihan's leadership, Bank of America has garnered numerous accolades, including being named one of America's "Most Just Companies" and the "World's Best Bank" in 2023.

"America's unique position enables the country to lead in innovation, and the Council's work brings together pragmatism, research, entrepreneurship, and creativity to solve global challenges."

Mr. Brian T. Moynihan
Chair and CEO, Bank of America
Chair, Council on Competitiveness

"Under Mr. Moynihan's leadership, the Council not only weathered a period of uncertainty and global disruption, but it emerged as strong as ever."

The Hon. Deborah L. Wince-Smith
President and CEO, Council on Competitiveness

Beyond his role at Bank of America, Mr. Moynihan is deeply involved in initiatives aimed at strengthening U.S. resiliency, innovation, and sustainability. He also serves on various boards, including the Sustainable Markets Initiative with His Majesty King Charles III, and he became Brown University's Chancellor in July 2024.

In his acceptance, Mr. Moynihan reflected on the opportunity to serve as Chair of the Council on Competitiveness. In particular, he focused on the value of America's university system, the U.S. Department of Energy National Laboratories, and the collaboration between labor, business, and research platforms to drive innovation. He also praised Council initiatives, such as the series of Competitiveness Conversations across America, as having profound impacts on the future of the U.S. innovation enterprise.

He also noted the Council's domestic priorities, and how the strengths of the U.S. innovation model have caught global attention. Bank of America helped to open a door for the Council—and its sister organization, the Global Federation of Competitiveness Councils—to share with the world innovation and competitiveness best practices at COP28 in the United Arab Emirates. This

"Innovation Arena" brought together leaders from industry, the research enterprise, and universities to elevate the private sector's voice in the sustainability policy discussion.

As he closed his remarks, Mr. Moynihan commented on the value of the Council to ensure the United States continued to lead in innovation, productivity gains, prosperity, and competitiveness. He encouraged the Council's continued efforts to nurture cross-sector collaboration, as well as to increase funding and support for innovation and infrastructure to drive the long-term success of the nation.

A Fireside Chat: Contextualizing Competitiveness

The Challenges and Opportunities for 2025

PANELISTS

Moderator: The Hon. Deborah L. Wince-Smith
President and CEO, Council on Competitiveness

Mr. Brian T. Moynihan
Chair and CEO, Bank of America
Chair, Council on Competitiveness

Session Overview

Opening the National Competitiveness Forum, Council leadership shared the policy vision for the organization in the context of the economic, global, and political realities facing the United States as we enter 2025.

Key Session Insights

The Hon. Deborah L. Wince-Smith, Council on Competitiveness President and CEO, and Mr. Brian T. Moynihan, Bank of America Chair and CEO and Council on Competitiveness Chair, kicked off the 2024 National Competitiveness Forum with a fireside chat, discussing the issues and opportunities facing U.S. competitiveness.

Mr. Moynihan started the conversation unpacking a major, emerging trend that will drive change in the coming decade, "deglobalization." While he was skeptical of the idea the interconnected global economy could truly disconnect, he acknowledged the impulse for nations to insulate themselves from the impacts of technological innovation, climate change, and price wars could lead to future turbulence. However, no matter how far deglobalization might go, the United States is in a strong position, with its 350 million consumer economy and the "perpetual motion machine" of research and innovation rewarded by capitalism.

While there is a great deal of economic, political, and social upheaval today, Mr. Moynihan reminded participants the United States has dealt with tough times. Looking back to 1969, the United States was embroiled in the Vietnam War, suffered two high-profile political assassinations, and was beset with riots across the country. At the same time, innovators and entrepreneurs were developing the personal computer, and along with that development came predictions that computers would replace middle management professions, leaving millions jobless. Yet, that dire prediction did not come to pass. Indeed, the American workforce grew from 75 million then to 150 million today, outpacing population growth thanks to higher female workforce participation.

Mr. Moynihan cautioned many of the same fears we have today, of technology replacing large categories of the workforce, are not new, and we have previously overcome them. New innovations will undoubtedly replace some jobs, but the new opportunities they present will more than make up for this churn.

When asked what sets the American economy apart from its international competitors in innovation, Mr. Moynihan praised the ability for American innovators to secure the funding they needed for their creations to have a global impact. He offered an example from an entrepreneur he had met at dinner the night before: a Notre Dame student who invented a device to improve the experience for those needing CPAP ventilators during sleep was able to secure funding. Because of this access to capital, the student was able to build a successful business—shipping product around the world—within a year. This capitalistic ecosystem is a differentiator for the United States compared to much of the world.

While other nations have invested heavily in research, the United States has the greatest ability to leverage its university system and capital markets to turn those ideas into products, crossing the so-called "valley of death." This system of incredible reward for marketable research has led to many innovators globally to migrate to the United States. It also has led to the U.S. economy growing to 160 percent the size of Europe's from a position of parity in 2007.

However, Mr. Moynihan is less concerned about the "valley of death" than many others have expressed. The phenomenon, in his view, would be more accurately thought of as "time and money" getting out of sync—a mismatch between long-term returns and short-term investors.

Looking at the pace of AI deployment in banking and finance, Mr. Moynihan sees it as a next step in the long-running trend of automation of financial decisions. His bank has been using data-driven models to make decisions

"We have a perpetual motion machine, which is core research and innovation rewarded through the capitalist process."

Mr. Brian T. Moynihan
Chair and CEO, Bank of America
Chair, Council on Competitiveness

about loans and credit for twenty-five years, with a large literature already existing on the nexus of finance and computing. To him, AI is going to serve as the next iteration of that arch of innovation, giving banks more refined and flexible tools to make smarter and more complex decisions. However, he noted that AI would truly show its impact in the analysis work being done by Bank of America, informing their strategies and recommendations for clients. Bank of America is already reaping the rewards, seeing large savings in how much they spend on analysis and an increased ability to process customer data to make smart decisions.

Mr. Moynihan acknowledged there are ongoing challenges related to AI regulation, such as managing copyright protections. However, he anticipates that within five to seven years, AI will be capable of performing large-scale data analysis, delivering tremendous productivity gains. He referred to this advancement as "Einstein at 50," in contrast to today's "Einstein at 13" models. He expressed concern that regulators might pursue overly stringent regulations on AI, potentially sti-

fling its transformative potential. Instead, he proposed that the responsibility for content generated by AI—whether a financial statement or a new type of medicine—should reside with the companies creating it. This content should be held to the same regulatory standards as any product developed by humans. By doing so, existing regulatory frameworks can be applied, placing the onus on companies to act responsibly rather than creating an entirely new set of regulations for AI.

On cybersecurity, Mr. Moynihan warned the bad guys are out there, and they are getting more sophisticated. The classic spam email full of misspellings has given way to complex and realistic communications designed to deceive even those on the lookout for fraud. Bank of America's cybersecurity department is constantly playing "whack-a-mole." To combat cyber-criminals, more diligent enforcement by government authorities is needed. If someone robs a bank with a gun, they can expect severe repercussions. But using digital techniques for the same end can obfuscate culpability and involvement. What is needed, according to Mr. Moynihan, is a robust public response.

At the nexus of energy and sustainability, Mr. Moynihan argues that corporate actors have an indispensable role to play. Collaborating with Council Chair Emeritus Chad Holliday, Mr. Moynihan reflected on how he developed a framework known as "Sustainable Energy for All," which asserts that everyone in the world has a right to energy and electricity. This is easiest for developing countries to achieve through fossil fuels, but that presents environmental drawbacks. Renewable infrastructure is therefore necessary, but that presents a financing challenge. Fortunately, private industry is stepping up. Bank of America, for example, has increased its commitments from $25 million to over $500 billion for renewable energy projects. When combined with efforts from other financial institutions, private enterprise can significantly surpass the $100 billion commitments outlined in the Paris Climate Accords.

These investments in sustainable energy are becoming increasingly widespread, benefiting regions from small island nations to Texas, which has emerged as the fifth largest producer of renewable energy in the world. Bank of America has also assisted developing nations in restructuring their debt to safeguard vital natural resources, such as those in the Bahamas, Ecuador, and, more recently, Gabon. By offering improved debt structures, banks encourage these nations to invest more in environmental protection, which Mr. Moynihan considers a critical "asset class." In this way, private finance can drive more effective sustainability initiatives by public entities globally.

However, Mr. Moynihan pointed out the United States is not currently leading in the renewable technology race. China and India, which aim to reduce dependencies on global energy markets, have made significant investments in renewable technology.

Looking ahead in the next decade, Mr. Moynihan reminded the participants of the importance of the value of the United States's research institutions. The U.S. Department of Energy National Laboratories, universities, and the organizations which commercialize innovation provide tremendous returns to the American people, but periodically, those investments come under attack as an unnecessary expense. Those investments have produced and continue to produce world-changing innovations, from computers to lasers to solar panels to oil drilling. The intellectual power in these research institutions is an invaluable national asset that requires vigilant, robust maintenance and investment.

In closing, Mr. Moynihan noted how a successful United States powers global economic activity. By reminding people of the value of investment in innovation, and advancing a bipartisan agenda to ensure that investment remains strong, the Council is helping shore up American innovation and competitiveness leadership for years to come.

Competing in the Next Economy: Innovating in the Age of Disruption and Discontinuity

PANELISTS

Moderator: The Hon. Deborah L. Wince-Smith
President and CEO, Council on Competitiveness

Ms. Joan Gabel
Chancellor, University of Pittsburgh
Academic Vice-Chair, Council on Competitiveness

Mr. Dan Helfrich
Chair and CEO, Deloitte Consulting LLP
Business Vice-Chair, Council on Competitiveness

Mr. Charles O. Holliday, Jr.
Chair Emeritus, Council on Competitiveness
Chair, Global Federation of Competitiveness Councils (GFCC)

Dr. Thomas Mason
Director, Los Alamos National Laboratory

Session Overview

Since the National Commission on Innovation and Competitiveness Frontiers released *Competing in the Next Economy in 2020*, the competitive landscape has shifted radically. Change is accelerating, and the United States now faces its most formidable competitiveness challenger. The country has entered uncharted territory, also driven by major technological discontinuity, which is creating both great uncertainty and unimaginable opportunity.

The Council's leadership gathered on this panel to discuss the Commission's new report, *Competing in the Next Economy: Innovating in the Age of Disruption and Discontinuity*, which offers a strategic set of recommendations for U.S. productivity growth, national security, and prosperity

Key Session Insights

As the first panel of the 2024 National Competitiveness Forum kicked off, Council on Competitiveness President and CEO Deborah L. Wince-Smith invited her fellow Council leaders to share how they thought the new *Competing in the Next Economy: Innovating in the Age of Disruption and Discontinuity* report could influence U.S. innovation.

University of Pittsburgh Chancellor and Council Academic Vice-Chair **Joan Gabel highlighted the importance of the report as a framework for innovators coming from disparate contexts.** The report provides a framework for different perspectives from across the innovation economy to harmonize into a single vision for modernizing the innovation ecosystem—one that is more expansive, collaborative, and productive. By providing this roadmap, the report's pillars and recommendations can guide the—at times—unwieldy U.S. innovation ecosystem toward a more prosperous future.

When asked about the challenges of strategic planning, Ms. Gabel noted leadership changes in the United States occur as frequently as every two years in Congress and every four years in the White House. This turnover of committee leaders, department heads, and agency administrators can complicate efforts to anticipate and plan for the future. While this may seem like a disadvantage when compared to more centrally planned economies with more stable leadership, it also represents a significant strength for the United States. This dynamic allows for regular opportunities to revise and update strategies to reflect better current realities.

"As we look around this room, we are looking at intersections. We are looking at the different strengths we bring to the table. We are looking at partnerships. We are looking at what it takes to create an ecosystem."

Ms. Joan Gabel
Chancellor, University of Pittsburgh
Academic Vice-chair, Council on Competitiveness

When asked about the importance of the National Laboratories to the country's competitiveness, Los Alamos National Laboratory Director Thomas Mason described in detail how partnerships between the national laboratories and industry have shaped the history of fields like computing. Nearly eighty years ago, the national laboratories initiated the shift from human "computers" to computing machines. And soon thereafter, the national laboratories realized the advantages of partnering with private firms for machine development. While the national laboratories focused on research and development, industry took on construction and implementation. This model proved so fruitful that, by the 1980s, private companies and their cus-

tomers—often still in deep collaboration with the national laboratories—became the world's computational leaders.

As their role shifted, national laboratories have had to redefine their position within the computing ecosystem. Although they still excel in basic research and development, today, the national laboratories' investment in computing power pales in comparison to the billions being poured into the ecosystem by the private sector, particularly in AI.

Nevertheless, national laboratories can still play a pivotal role in deploying new technologies for public benefit. Much of American AI investment is directed toward commercial applications, often neglecting fundamental research and defense projects with no clear business model. This gap presents an opportunity for national laboratories to leverage commercial AI for public science and defense initiatives. Successful collaboration with industry, which has already shown interest, could herald a new era of leadership for national laboratories.

When asked to give the perspective of someone with a background in business, Chair Emeritus of the Council on Competitiveness and Chair of Global Federation of Competitiveness Councils (GFCC) **Charles O. Holliday, Jr., performed a thought experiment. He put himself in the mind of first President Joseph Biden, and then in-coming President Donald Trump, to look at the recommendations in the report, finding that leaders from either end of the political spectrum had something to like in it.** It is hardly a secret that right now is a time of political change in the United States, but according to Mr. Holliday, that may well present an opportunity. The discontinuity and disruption we are currently experiencing, and that the report's title implies, can be harnessed to press for the changes we need to see today. This process is already beginning to happen overseas in places like the United Kingdom and France, and soon, it will be our turn to use a radical political shakeup to push for bold new policies.

"We need to embrace the disruption and discontinuity the report suggests in its title, and make it our friend, not our enemy."

Mr. Charles O. Holliday, Jr.
Chair Emeritus, Council on Competitiveness
Chair, Global Federation of Competitiveness Councils

One of the most pressing areas that change is needed is in the energy sector. Today, the United States produces enough energy to supply itself, but due to a mismatch of supply and demand, we are both importers and exporters of energy in different forms. Due to this inefficiency but also the U.S. position of energy abundance, the national can explore new energy technologies without risking its broader energy system. However, he cautioned that, when building new technologies that are more sustainable and energy efficient, he had been told to keep two rules in mind: never assume the government would provide assistance, and never assume that consumers would pay a penny more for a more "green" product.

Energy is not the only area in which we need to be prepared for a transition. Mr. Holliday likened the coming of AI to the advent of the printing

press; while in the short term, it may lead to friction in employment, in the long term, it promises to open a vast new frontier of capabilities and productivity for the average person, just as printed books widened education unimaginably.

Finally, as climate change becomes a greater concern, he suggested sticking to topics that everyone can understand, like the weather getting hotter and natural disasters becoming visibly more destructive would be the best way to make progress on the issues without triggering backlash.

Running a company who advises businesses across sectors and industries, Chair and CEO of Deloitte Consulting LLP and Business Vice-Chair of the Council on Competitiveness **Dan Helfrich recognized that one of the most important steps American businesses can take to enhance their competitiveness is to reinvent their models of collaboration.** Mr. Helfrich sees the competitive advantages of the U.S. innovation ecosystem clearly, with businesses and CEOs worldwide acknowledging its strength. However, to foster the next generation of the innovation economy, U.S. industry leaders need to improve their coordination within this broader ecosystem. Mr. Helfrich noted that discussions are underway in boardrooms across the country regarding the purpose of their businesses and their responsibilities to the community. Reflected in these conversations is a willingness among companies to engage in and contribute to the nation's innovation progress.

Yet, he pointed out that while this willingness exists, there remains a need to enhance understanding of what effective partnerships can look like. Echoing a point made by Mr. Moynihan, Mr. Helfrich admitted that when he became CEO of Deloitte, he had limited awareness of the valuable work being done in U.S. Department of Energy National Laboratories and universities that could impact his company. He suggested that better educating corporate leaders about these efforts and highlighting opportunities for collaboration could yield significant benefits. Moreover, fostering collaboration should not be limited to executives; he proposed that personnel exchanges between innovative institutions could facilitate the cross-pollination of ideas and strengthen partnerships.

"I find the Council's report extraordinarily compelling and clear. This is a town where we tend to trade in very bloated reports that say very little. And then you open this call to action, and the first words you read are about the importance of a minimum corporate tax rate. Okay, that is getting to the point."

Mr. Dan Helfrich
Chair and CEO, Deloitte Consulting LLP
Business Vice-Chair, Council on Competitiveness

Speaking on the effect of regulations on innovation progress, Mr. Helfrich was quick to dispel the notion that the private sector is reflexively opposed to regulation. On the contrary, the myriad businesses that he advises believe that a smart regulatory framework is cru-

cial for success. What is a drag on innovation and business success are regulatory frameworks that significantly, and unjustifiably, slow projects and initiatives to what he described as a "plodding" pace. In one frustrating example, Mr. Holliday relayed how a wind turbine project, despite an attempt by Congress to put a limit on the amount of time regulators could review it, was stalled for more than five years as different agencies began their reviews at different times, leading to intense uncertainty and frustration. Improving times for permitting and approvals, rather than simply tearing down regulatory structures, would catalyze significant acceleration of the pace of innovation, something Mr. Helfrich praised the report for strongly raising.

Dr. Mason has encountered similar slowdowns in his work at national laboratories, primarily due to regulatory requirements. As a key designer and manufacturer of American nuclear capabilities, he acknowledges the need for caution. However, he points out that while labs invest significant time and resources evaluating the costs and risks associated with taking new actions, they pay far less attention to the costs and risks of inaction. Although there are ways to manage the former, the latter is often undervalued. This situation is particularly alarming given the current geopolitical climate, where countries like China are taking decisive actions, making U.S. inaction increasingly costly. Dr. Mason clarified that he is not advocating for a regulatory approach similar to China's; however, the United States needs to adapt its business practices. The existing systems were designed for the relatively stable post-Cold War era, but recent events—ranging from a land war in Europe to escalating crises in the Middle East—demonstrate that geopolitical dynamics are evolving at a rapid pace. These "system shocks" should serve as a wake-up call for meaningful change.

"You look at companies like Meta, OpenAI, and Google, making $20 billion investments to generate these large language models. The government investments are inconsequential on that scale. So, how do we operate in this world?"

Dr. Thomas Mason
Director, Los Alamos National Laboratory

One crucial area for global cooperation is the protection of intellectual property rights. Mr. Helfrich noted that multinationals are increasingly concerned about international IP protection and that stronger collaboration between the United States and its allies could lead to a more effective global IP system. Ms. Wince-Smith added that IP issues are also gaining prominence domestically.

She expressed concern over the proposed expansion of march-in rights under the Bayh-Dole Act to control pharmaceutical prices, arguing that such measures could stifle innovation by overreaching.

With the last few minutes, Ms. Wince-Smith turned the conversation to the place-making innovation efforts and experiences of each of the panelist. Dr. Mason relayed a unique challenge that Los Alamos National Laboratory faced: its intense isolation. When created to serve the Manhattan Project, the laboratory's isolation was a security benefit, but seventy years later, it has become a hurdle to growth and innovation. The lab is two hours from the nearest major city, Albuquerque, and only has 250,000 people within a one hour's drive. While the laboratory's important work and prestige makes it easier to attract high-level scientific talent form across the country, getting the accountants, communicators, and electricians required to keep a huge national laboratory running is far more difficult. This has required the laboratory to "grow its own" workforce, partnering with local universities and community colleges to develop workers with the skills the lab needs. This approach has proven effective, with the laboratory adding five thousand staff in the past five years and creating opportunities for local residents. This talent creation effort will be one of the features of the Competitiveness Conversation being hosted in Santa Fe, New Mexico in May, which Dr. Mason will co-host.

The University of Pittsburgh, Ms. Gabel said, is almost two hundred and forty years old, and in that time has seen the whole history of the city. Pittsburgh rose to prominence as "the city that built America," struggled as its premier steel industry largely left the region, and now it is rising again with a new focus on an economic model built on education, cutting-edge medicine, and technological innovation. Collaboration with local partners like Carnegie Mellon, who leads in AI and cybersecurity, and with partners across the

"By advancing the recommendations in this report and working together, a high-powered, high-speed system of innovation will be our future."

The Hon. Deborah Wince-Smith
President and CEO, Council on Competitiveness

Great Lakes region in places like Cleveland and Buffalo, have enhanced the University's ability to innovate, deploy new technologies and processes globally, and in doing so lift its local economy. This collaboration will be discussed during the Pittsburgh Competitiveness Conversation from October 19-21.

Mr. Holliday pointed to the way that the Delaware innovation ecosystem, in which he has long been involved, has evolved since before place-based innovation was a concept. The two major universities that served Wilmington, DE, having two different primary areas of focus, used to see little reason for collaboration, instead engaging in competition that left local innovators frustrated. That is changing as regional innovation has gained recognition as to its importance. In his view, finding out what the local barriers are to cooperation is one of the most important first steps to building a vibrant innovation ecosystem.

Mr. Helfrich has observed a significant shift in attitudes toward locating new ventures over the past decade. Previously, clients focused solely on finding locations in established cities like New York or Boston. Today, the landscape is much broader; companies are more interested in identifying vibrant and complementary ecosystems for their operations than establishing themselves in a few prominent business hubs. This change has greatly democratized the innovation landscape. Similarly, Deloitte has leveraged remote work to become one of the largest employers in the United States. Before the rise of telecommuting, rural residents had limited opportunities to work for a company like Deloitte. The shift toward remote work has opened doors for individuals to engage with these large, innovative employers.

To conclude, Wince-Smith highlighted a thread that ran through each of the panelists' remarks: optimism for the future. By advancing the recommendations in the report, a high-speed, high-powered, innovative ecosystem could be built across the United States, enhancing the work of businesses, national laboratories, and universities nationwide.

A New Compact for America

Tech Takes Center Stage in the Global Competitiveness Arena

PANELISTS

The Hon. Patricia Falcone
Deputy Director for Science and Technology, Lawrence Livermore National Laboratory

Dr. Sally Morton
Executive Vice President for Knowledge Enterprise, Arizona State University

Dr. Richard "Rick" Muller
Director, Intelligence Advanced Research Projects Agency (IARPA)

Moderator: Mr. Chad Evans
Executive Vice President and Chief Operating Officer, Council on Competitiveness

Dr. Jeffrey Rhoads
Vice President for Research, University of Notre Dame

Dr. Steve Walker
Vice President and Chief Technology Officer, Lockheed Martin

The Hon. Evelyn Wang
Director, Advanced Research Projects Agency–Energy (ARPA-E)

Session Overview

With the multiple converging technology revolutions that have reshaped the world order, the United States now faces unprecedented challenges to its economic competitiveness and geopolitical leadership. The pressure is intensifying as geostrategic rivals aggressively work to gain superiority in key future technologies. To set the global pace of tech-based innovation, the United States must rethink its defense industrial base while continuing to innovate in the private sector with agility and at scale. In this panel, leaders discussed the crucial steps America must take to continue to lead in several crucial areas of technology, highlighting the upcoming "Compact for America" from the Council's Technology Leadership and Strategy Initiative (TLSI).

Key Session Insights

Reflecting on the recent 15-year anniversary of the Council's Technology Leadership and Strategy Initiative (TLSI), Chad Evans, Executive Vice President and Chief Operating Officer of the Council on Competitiveness, remarked, "The only constant since the TLSI's inception has been the rapid pace of change."

The TLSI brings together CTOs, deputy directors of U.S. Department of Energy National Laboratories, and vice chancellors of university research, all committed to fostering investments in technology, infrastructure, and talent essential for a robust innovation economy. Joining Mr. Evans on stage were the three cochairs of the TLSI, along with three additional leaders from the science and technology sector, to address the tumultuous landscape of discontinuity and disruption that has led to increased challenges and turbulence for U.S. innovators.

Dr. Steve Walker, Vice President and Chief Technology Officer of Lockheed Martin, views the rapid change and turbulence as a significant source of opportunity. He asserts that the American innovation ecosystem—which includes industry, universities, and national laboratories—is the strongest in the world but often underutilized. Walker notes if innovators remain entrenched in their silos, national innovation capacity will not grow in the manner necessary to compete in the 21st century.

"Today, the only constant is ever-accelerating change across imagination, insight, ingenuity, invention, and, ultimately, in impact and innovation."

Mr. Chad Evans
Executive Vice President and Chief Operating Officer, Council on Competitiveness

Drawing from his experiences at Lockheed Martin, Dr. Walker discussed how partnerships have evolved to integrate cutting-edge technology into the defense sector. While Lockheed Martin is well-known for its advancements in weaponry, such as stealth aviation and directed energy, the company is also a leader in applying dual-use technologies like machine learning and AI in defense. However, just a decade ago, leading tech firms such as Google, IBM, and Microsoft were hesitant to engage directly with the defense sector. Today, however, these companies are actively forming partnerships with Lockheed Martin and the Department of Defense to develop next-generation systems for national security applications.

The Hon. Patricia Falcone, Deputy Director for Science and Technology at Lawrence Livermore National Laboratory, then expressed concern that cultural differences could hinder the formation of partnerships. She noted various organizations, such as universities and national laboratories focused on national security, often operate under distinct value systems, which can create friction between them.

In contrast, Sally Morton, Executive Vice President for Knowledge Enterprise at Arizona State University, suggested the current turbulence in the academic sector could drive necessary change. She recognized the education sector has a unique opportunity to enhance the value of education across all levels—from K-12 to community colleges to research universities—making its contributions more evident during a time when higher education faces increasing scrutiny over its economic value to students.

Dr. Jefferey Rhoads, Vice President for Research at the University of Notre Dame, concurred this is a critical moment for universities to demonstrate their value. The importance of seeking deeper partnerships will be critical not only to achieve this goal, but also for the United States to remain competitive. Dr. Rhoads noted the American free-market innovation ecosystem often struggles to compete with vertically integrated innovation systems employed by global competitors, and to compete, universities—and other institutions within the innovation enterprise—must focus on their areas of excellence rather than attempting to lead across all domains.

When asked about the perspective of the Advanced Research Projects Agencies, Dr. Evelyn Wang, Director of the Advanced Research Projects Agency–Energy (ARPA-E), said one of the most significant roles of public research organizations is to serve as conveners within the diverse innovation ecosystem. With a mission to advance new energy technologies for the American energy market, collaboration is essential for success. Dr. Wang stated it is insufficient to merely fund projects that generate innovative technologies; her agency must also facilitate their integration into the broader energy ecosystem.

By maintaining a dedicated team of experts focused on identifying commercialization opportunities, ARPA-E collaborates with industry, academia, and investors to identify and overcome barriers to technology implementation—challenges that none of these groups could tackle on their own. The recognition of the power of such partnerships has enhanced the capacity of federal research organizations to thrive amidst current innovation turbulence.

In contrast, Dr. Richard Muller, Director of the Intelligence Advanced Research Projects Agency (IARPA), acknowledged broad partnerships and ecosystem-building initiatives can be effective; however, this approach would be less practical for IARPA due to its focus on serving the intelligence community. As Muller explained, “The intelligence community wants five items of something that you’re developing, and they want to own all five of them.” Nevertheless, he expressed optimism that new models for using dual-use information technology—especially from emerging defense contractors like Anduril and Palantir—might pave the way for innovative partnerships. He hopes these companies will create new “rungs on the ladder” to help transition information technologies developed by IARPA into viable products for the intelligence community and for commercial use.

When asked about what one or two technologies the United States most critically needed to set the global pace, Dr. Wang made clear emerging energy technologies were crucial. In her words, “energy is prosperity;” more efficient and expanded energy production are the cornerstone of U.S. economic strength and resiliency. With continuously growing demand sparked by the growth of AI and the electrification of vehicles, the need for more abundant and efficient energy

"It is a jump ball worldwide for artificial intelligence—a game the United States must win against China and the rest of the world."

Dr. Richard "Rick" Muller
Director, Intelligence Advanced Research Projects Agency

generation is greater than ever. For Dr. Wang, this meant the exploration of new viable energy technologies was of paramount importance.

Small modular nuclear reactors (SMRs) show great promise, but are still nascent. And while nuclear fusion holds tremendous promise and potential, she argued the technology remains at least a decade out from implementation. Work is also being done on underground hydrogen capture, but any of these new techniques for clean and abundant energy generation will require the collaboration of universities, national laboratories, research agencies, and industry to be taken from idea to implementation.

For Dr. Muller, the world faces a new Sputnik moment driven by the sudden advancement of AI, kicking off a race toward greater AI capabilities that, according to him, the United States absolutely must win. AI has both offensive and defen-

"We have the best innovation ecosystem in the world. We have universities, industry, and the laboratory system working together. But we do not always take advantage of that ecosystem. We do not always turn the innovation that comes from it into real capability."

Dr. Steve Walker
Vice President and Chief Technology Officer, Lockheed Martin

sive security implications the United States needs to both understand and leverage, lest it be caught off guard by rivals like China seeking to do so. Beyond software, he called for a greater emphasis on creating the physical hardware like GPUs and CPUs that make up the "brain" of AI systems, as well as on integrating sensors and other inputs that allow AI systems to absorb and process information in useful ways. Dr. Muller believes the United States must build AI capabilities while being judicious and watchful about the potential harms and threats they can present to security.

When asked to comment on the most important emerging technology, Dr. Falcone pointed to the important role that materials science would play in future development. AI is being used to hunt for new molecules with useful properties, and new techniques like biomanufacturing and additive manufacturing are creating opportunities for innovative new products.

Dr. Morton, by contrast, argued she did not have an answer, and that trying to define what one or two new innovations were the most crucial may be counterproductive. Rather than trying to predict the future, we would be better served by building environments that allows new ideas in all fields to germinate and develop.

Dr. Rhoads echoed the idea, stating the way we approach technological innovation as a whole should be the focus. Building on that idea, he commented that U.S. leadership in technology is important, but equally so in technology ethics.

Dr. Walker pointed to the need to develop policy around the deployment of new technologies. For example, AI technologies have outpaced the policies designed to manage them, so the policy needs to catch up to reality. He pointed to how Lockheed Martin recently began deploying AI systems to help protect sailors on deployed U.S. Navy warships in the Red Sea, one of the most hazardous sea environments today. While an exciting moment for the deployment of AI, it also presents risks as Lockheed Martin and defense planners work to figure out what policies are needed to keep an AI system functional for the servicemembers using them.

While progress on cutting-edge technologies is important, so is expanding the innovation economy to more people and places. Mr. Evans pointed out that given the fault lines growing ever more apparent in American society, the need to reknit the nation's economy to not be so dependent on one or two clusters of innovation is more important than ever.

"The desire in Phoenix is not to be just a manufacturing town. We are building the whole lab to fab pipeline."

Dr. Sally Morton
Executive Vice President for Knowledge Enterprise, Arizona State University

Dr. Rhoads, noting the power of universities to be a hub of innovation in a region, gave the example of a Notre Dame partnership with the Lily Endowment Foundation. Northern Indiana is a per capita leader in manufacturing jobs, but many small and medium sized manufacturers still operate with 1950s era techniques, hampering the competitiveness. Through this partnership, Notre Dame was able to bring new technologies like AI into these smaller manufacturers, boosting their productivity and ensuring that new technologies are a benefit to small business, rather than something to fear.

Dr. Morton, who lives in the center of the booming Phoenix semiconductor industry, has seen the rise of massive fabrication facilities across Arizona. However, rather than being content with just manufacturing microelectronics, she and other leaders

"The inputs for innovation fall into three buckets: resources, people, and connections. How do we get enough resources? How do we support people? How do we make those connections? Those are the questions we should focus on."

The Hon. Patricia Falcone
Deputy Director for Science and Technology Lawrence Livermore National Laboratory

"The success of every program we support is due to the new people who come in and contribute in innovative ways."

The Hon. Evelyn Wang
Director, Advanced Research Projects Agency—Energy

in Arizona innovation are working to build a holistic "labs to fabs" pipeline that encompasses the entire semiconductor ecosystem.

Dr. Morton has worked closely with industry and educators at all levels to design an education system that could create the skilled workforce needed for the semiconductor industry. By translating industry workforce needs into education plans at the K-12, college and PhD levels, educators can ensure students graduate with the skills they need for employment at these fabs. Alongside workforce development, integrating small companies and startups into the ecosystem is crucial for its development. Given the intensely expensive nature of the semiconductor industry, startups can face extreme difficulty. ASU has partnered, for example, with Applied Materials to create a lab space where startups can use advanced tooling to try new ideas, giving a much-needed boost to these small firms where new ideas can easily germinate.

For Lockheed Martin, with 120,000 employees, their focus is primarily centered on where their employees are, according to Dr. Walker. For example, a large employee count in Colorado led to them joining the Colorado-Wyoming Climate Resilience Engine, expanding a stream of business and innovation for the company. But Lockheed Martin has also begun to focus on international place making. Lockheed Martin has set up locations around the world, especially in Eastern Europe, where they are helping to build local

capability in order to make the global defense industrial chain more resilient. Even with more than 20,000 suppliers, Lockheed Martin is still seeking to diversify its supply base. The strength of the U.S. national security system, and its global network of allies, allows it to serve as a catalyst for innovation place-making that improves security at home and abroad.

Lawrence Livermore National Laboratory, as Dr. Falcone explained, sits in between the Silicon Valley and Central Valley of California, two vastly different regions in terms of economic outlooks and job opportunities. That central location has led to the laboratory extending partnerships in both directions, with university, corporate and local governments that seek to bridge the gap between the two and open new opportunities. In one example, she highlighted a program that has sought to use the sensors in students' smartphones to replace the physics laboratory equipment that many rural schools did not have access to, paving the way for education at community colleges and universities in the region.

Despite its intimate connection to the intelligence community, Dr. Muller explained the vast majority of the work that IARPA does is unclassified. This is so the agency can seek out the best minds to solve a problem, no matter where they are located, even abroad. By casting a wide net, IARPA has the power to work with small businesses, sometimes with only one employee, and invest in them to build ecosystems without having to worry about running afoul of classification requirements. Therefore, despite its limited budget and at-first-glance restrictive mission, IARPA is capable of standing up new ecosystems across the country.

Dr. Wang touched on the fact that, at ARPA-E, external innovators from universities, national laboratories, and startups lead most projects—leaving these stakeholders and projects deeply embedded in all parts of the innovation ecosystem. This wide reach gives ARPA-E the ability to bring in fresh talent and ideas from outside. Two programs have been established with that specific goal in mind, one granting funding to newly-minted Ph.D.s, along with the chance to move to D.C. and learn how to navigate the federal government, as well as another focused on bringing in talent from minority-serving institutions that may not have the same tools as those attending top universities.

To conclude, Mr. Evans asked the three TLSI co-chairs to preview what would be coming in the upcoming "Compact for America," releasing in 2025. Dr. Walker noted the importance of bridging the infamous "valley of death," and remained hopeful the incoming administration would be proactive in creating mechanisms to do so. He also expressed the need for greater partnership between the DoD and defense contractors, using the growing number of people interested in working on defense-related applications to enhance efficiency. Dr. Morton identified investment as one of the biggest hurdles, challenging participants to be ambassadors for the message of sustained federal investment. She also renewed emphasis on people—noting how, in her engagements with industry, talent is often their biggest concern. Finally, Dr. Falcone offered the model of resources, people, and connections as the three big "buckets" needed in order to build a sustainable innovation ecosystem.

The National Laboratories' Horizon Scan

A Strategic Roadmap for U.S. Competitiveness and Security

PANELISTS

Dr. Steven Ashby
Director, Pacific Northwest National Laboratory

Dr. Thomas Mason
Director, Los Alamos National Laboratory

Dr. Stephen Streiffer
Director, Oak Ridge National Laboratory

Dr. John Wagner
Director, Idaho National Laboratory

Moderator: Dr. Kimberly Budil
Director, Lawrence Livermore National Laboratory

Session Overview

In this era of disruption and discontinuity, the United States holds a significant advantage in the global pursuit of new opportunities: the U.S. Department of Energy (DOE) National Laboratories, which have among the world's most highly skilled, mission-driven multidisciplinary workforces and advanced scientific infrastructure. How can the nation best leverage these assets to enhance economic competitiveness while still fulfilling the laboratories' primary missions of ensuring national security by addressing energy, environ-

mental, and nuclear challenges? Leaders of five of the seventeen national laboratories sat down to discuss the future of the national laboratory enterprise, as outlined in the National Laboratory Directors Council's *2024 Horizon Scan*.

Key Session Insights

Leading off the discussion of the national laboratory enterprise, Lawrence Livermore National Laboratory Director **Kimberly Budil laid out the framework of the national laboratory system and its place, both conceptually and geographically, in the American innovation ecosystem.** Growing out of the Manhattan Project, the national laboratories have for eight decades created and deployed technologies critical for national security and competitiveness. Eighty thousand people across 17 national laboratories in 13 states operate under the U.S. Department of Energy on various missions, ranging from scientific inquiry to nuclear weapons to energy investigations and engineering and technical projects. Each of the labs has large, interdisciplinary workforces, geared toward tackling challenges that may have time horizons too distant to make them attractive for private investment.

The national laboratories fill a critical "middle space" between the fundamental research primarily conducted by universities and the commercialization efforts pursued by industry. In this role, these laboratories serve as essential conduits for long-term, practical research. To achieve this, they rely on partnerships with universities and private enterprises. Universities contribute foundational research and supply much of the scientific talent that supports the national laboratories' operations. Conversely, the laboratories offer facilities where industry can test innovative technologies at scale before full deployment, such as the one-hundred-kilowatt grid managed by Pacific Northwest National Laboratory.

DOE's 17 National Laboratories Address Critical Societal Challenges

Despite this crucial role, the purpose and breadth of the national laboratories' mission is too often little understood by those not in their immediate orbit. While Budil credited the Council and its members with introducing the work of the labs to a wider audience of innovation leaders, she made clear the entire nation would benefit from a greater understanding of the labs, and how to engage with them.

Pacific Northwest National Laboratory Director **Steven Ashby shared the role of the national laboratories was too often a "secret" that made communicating their role in the wider innovation economy difficult.** While the laboratories recently got a boost in public image with the move *Oppenheimer*, too many people do not understand the laboratories' place in the broader context of U.S. innovation.

Dr. Ashby pointed out the national laboratories' abilities to act as technological disruptors, introducing and advancing innovations and techniques that have the potential to radically change industries. By investing in potentially disruptive technologies that are difficult to finance from other sources, the national laboratories accelerate the development and deployment of innovations. The national laboratories' investments in high performance computing (HPC) are a good example of how the system expands and strengthens the capacity and capability of the U.S. innovation ecosystem.

"The national laboratories do big science. We have large, multidisciplinary, technical workforces that come together to take on problems at a scale and level of complexity hard to do in other environments."

Dr. Kimberly Budil
Director, Lawrence Livermore National Laboratory

Los Alamos National Laboratory Director Thom Mason noted how, as one of the three National Nuclear Security Administration (NNSA) labs, Los Alamos is intimately familiar with the research to deployment pipeline. The nuclear weapons developed by his lab, and by the other two NNSA labs, Lawrence Livermore National Laboratory and Sandia National Laboratories, are the backbone of U.S. nuclear deterrence, the oldest and perhaps most important of the laboratories' national security missions. But in creating these weapons over time, Mason noted the laboratories had built up expertise in other technology areas like space. Recognizing the value of these additional competencies, in the 1960s, the federal government set up a system of "Strategic Partnerships" for laboratories to make these skills available to the rest of the federal government, avoiding duplicative effort and boosting the technical skills available across agencies.

"If we want world class science, you have to engage the world, and we have to engage it smartly."

Dr. Steven Ashby
Director, Pacific Northwest National Laboratory

The value of the national laboratories for U.S. security is astonishing. They have provided the arms necessary for the strategic stability that kept the Cold War cold, allowing for competition between the United States and the U.S.S.R to move to the economic and technological realms. There, too, the national laboratories helped the United States ultimately to triumph in the Cold War and enjoy some thirty years of strategic stability as the sole global power. However, today, strategic stability is less certain given the growth of adversarial powers like China and Russia, meaning that military competition will now join economic and technological competition as a means of global competition. The role of the national laboratories is as important today as it has been in decades.

On the energy side of the laboratories' mission, Idaho National Laboratory Director John Wagner has focused on working with private companies to prepare technologies, especially nuclear energy technologies, for deployment nationwide. In partnering with private companies looking to develop and deploy new technologies for energy systems like new reactor designs, Idaho National Laboratory provides expertise and technical assistance that would be difficult to find elsewhere. Alongside spinning out their own designs for commercialization, his lab provides technical resources to companies looking to refine existing technologies or put the finishing touches on novel ones. By providing services as varied as developing novel nuclear fuels to guiding them through federal regulatory processes, INL can facilitate the development and deployment of energy technologies that would otherwise be stymied by high development costs and timeframes. This is another prime example of the national labs filling the "middle" of the development curve for promising but complex new technologies, allowing them to make the difficult transition from theoretical to commercial viability.

The importance of partnerships in the work of the national laboratories was echoed by Dr. Stephen Streiffer, Director of Oak Ridge National Laboratory. However, as a federal body, the national laboratories have inherent restrictions on how they collaborate. While universities and industry move nimbly and quickly, the laboratories must adhere to stringent federal requirements. Dr. Streiffer stressed that, for the labs to deliver their full potential for the innovation ecosystem, they had to move at the speed of industry, not the speed of government, something Dr. Budil predicted would become a common area of focus among the labs in the coming years.

Dr. Mason then turned to the criticality of research security. As the national laboratory system came online after World War II, the United States's economy and research enterprise was not just the world's largest, but eclipsed the rest of the world put together, and the benefits from technological advancements made by national laboratories flowed to the American taxpayers who had funded them. Today, however, ROI from these investments is no longer certain. With competitors like China, technologies developed in the United States may end up commercialized overseas.

"The role of the national laboratories is to make sure we have the technical and scientific edge we need to maintain our national security."

Dr. Thomas Mason
Director, Los Alamos National Laboratory

In response, there has been a growing debate over how to govern collaboration among researchers in critical technologies. During the crafting of the CHIPS & Science Act, while laboratories and industry successfully made the case that innovation investments were critical to

"What is important is for the national laboratories to move at the speed of industry, not at the speed of government. And we need innovative mechanisms for partnership that will allow us to do that."

Dr. Stephen Streiffer
Director, Oak Ridge National Laboratory

"We must look beyond our borders and work with the best people, no matter where they are."

Dr. John Wagner
Director, Idaho National Laboratory

national success, Congress had concerns over how the benefits of these investments would be directed to the United States.

Dr. Mason warned while the United States has clearly benefited from an open research ecosystem, it risks shooting itself in the foot by being overly restrictive in its efforts to prevent IP from falling into the wrong hands. He acknowledged that, based on what was being researched, he had varying levels of comfort working with outside collaborators, with anything of immediate military or economic importance worth being restrictive. But he warned that, while national laboratories could control who did and did not use their facilities, for example, universities would need to be more proactive in assessing their own vulnerability, especially as they continued to rely on federal research grants.

Dr. Ashby agreed that a balance between security and collaboration was essential for the laboratories' continued success. His lab, with a mission spanning both national security and basic research, employs thousands of interns, many of whom come from abroad. They bring with them intellectual diversity and increase the laboratory's intellectual vitality, and many go on to become American citizens and contribute to the nation for decades to come. But those same interns may work across the street from a place where highly sensitive research is being conducted. Dr. Ashby argues basic steps like controlling access, background checks, and keeping tabs on student work can help the labs safeguard critical intellectual property without shutting off the pipeline of skilled talent from overseas.

To conclude, Dr. Budil asked each of the laboratory directors for a final thought or insight about the national laboratories. Dr. Ashby reiterated though the national laboratories have a wide footprint, they remain relatively unknown. He encouraged participants to find labs near them and begin seeking out partnerships. Dr. Mason added that the *Horizon Scan* from the National Laboratory Directors' Council was a great look into the work of the national laboratories and how they were planning for the future beyond the short term. He encouraged those not familiar with the laboratories' mission to read it, hoping to expand the public knowledge of the labs' work.

Dr. Streiffer added while the national laboratories fall under the jurisdiction of the Department of Energy, their mission is far, far wider than energy. Basic research, artificial intelligence, cybersecurity, materials science, and everything in between are fields to which the labs contribute heavily. Dr. Wagner further notes too many people mistakenly believe the national laboratories are closed boxes foreign nationals or non-classified research cannot penetrate. Making sure people are aware of the breadth of the national laboratories' research, and their openness in a secure context, will be a key to expanding the system's reach and impact.

To close, Dr. Budil notes a range of incredible national laboratory achievements in addition to the Manhattan Project: the Human Genome Project, advanced lithography, and computing for biology. By expanding the public perceptions of what the labs do and are, their ability to enhance U.S. competitiveness and innovation will continue to grow.

KEYNOTE

Innovation Anywhere, Opportunities Everywhere

Accelerating the Frontiers of Science and Technology

The Hon. Sethuraman Panchanathan
Director, U.S. National Science Foundation

Key Session Insights

The Honorable Sethuraman "Panch" Panchanathan's keynote address offered an inspiring vision of the agency's role as a catalyst for innovation and collaboration, emphasizing the importance of democratizing access to emerging technologies and fostering cross-sector partnerships to drive the nation's innovation capacity. He framed the NSF as an enabler, empowering institutions, researchers, and communities to lead transformative efforts across critical fields such as artificial intelligence, energy, and quantum technologies. Dir. Panchanathan underscored many of the areas in which the NSF invests today do not yet have labels, reflecting the agency's forward-looking mission to lay the groundwork for industries of the future.

Central to innovation is the democratization of access to technology and innovation. Advancements in AI and other transformative fields must not be concentrated in the hands of a few but should be accessible to all. The NSF's commitment to expanding access to this technology is evident in initiatives like the National Artificial Intelligence Research Resource (NAIRR) and the 27 NSF-supported AI institutes, which integrate disciplines like law and policy into technological development to ensure solutions are comprehensive. By fostering partnerships across sectors, the NSF aims to create a collaborative ecosystem that can address the complex challenges posed by emerging technologies.

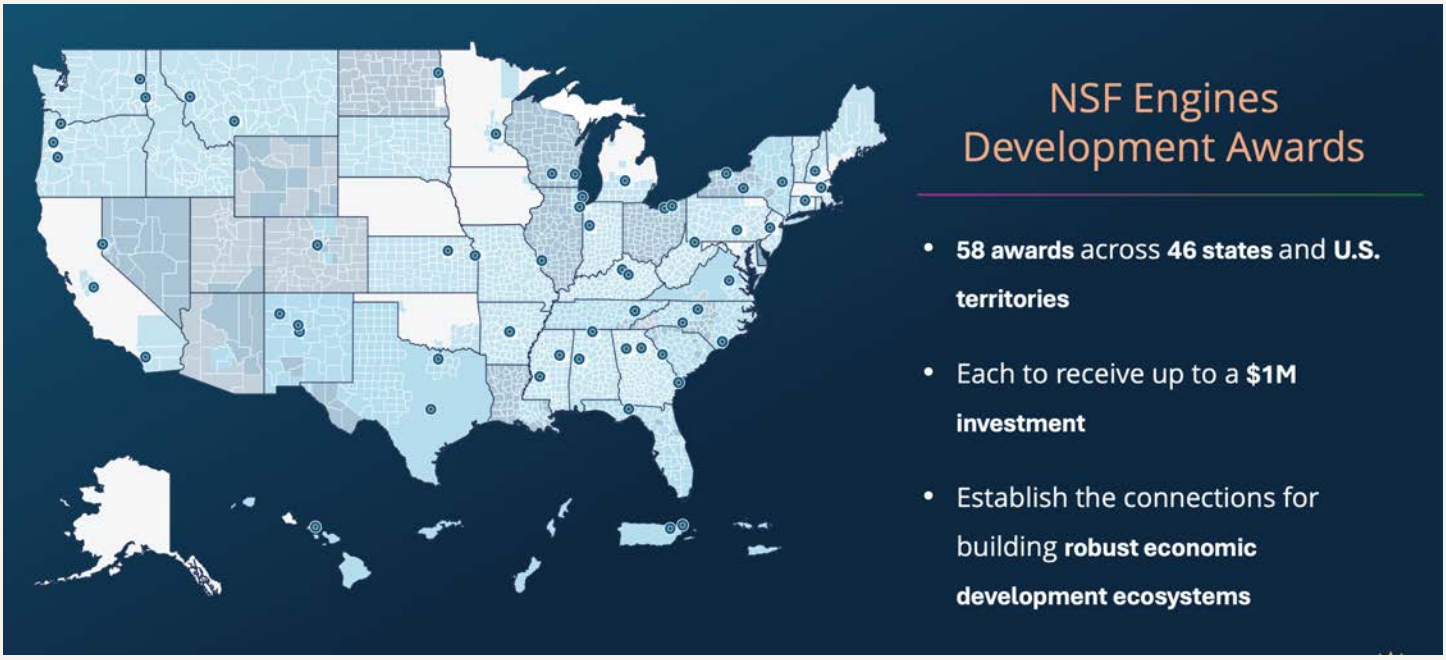
Furthermore, Dir. Panchanathan highlighted the importance of bringing together academia, industry, and government to scale innovation effectively. He cited several examples of successful partnerships, such as semiconductor packaging development in Florida, quantum nanofabrication at the University of Colorado Boulder, and AI research at Ohio State University. These initiatives reflect NSF's focus on place-based innovation, leveraging regional strengths to drive localized development with speed, scale, and intensity. This approach ensures that innovation is not only cutting-edge but also regionally relevant and impactful.

To build the industries of the future, the workforce needs to be equipped with the skills to support these emerging industries. Recognizing the urgency of maintaining global competitiveness, Dir. Panchanathan stressed the need to unlock the full potential of talent across the country. Programs like STEM Connect and cybersecurity scholarships aim to cultivate a skilled workforce, engaging not only universities but also community colleges to broaden the pipeline of talent.

Besides talent development, a region must also have the infrastructure and resources to unleash its innovative potential, and the NSF has taken an active role in promoting the development of these economic components across the country. Dir. Panchanathan pointed to the role of NSF research centers in advancing technologies such as refrigerants and quantum systems, illustrating how foundational investments can translate innovative ideas into scalable solutions. He also discussed the importance of major infrastructure projects, such as the NSF Engines initiative, that supports domestic development in areas essential for achieving energy independence to bolstering national economic security.

"There is no point talking about competition without unleashing every ounce of talent and ideas across the country."

The Hon. Sethuraman Panchanathan
Director, U.S. National Science Foundation



Higher Education

Optimizing its Role as a Lynchpin of U.S. Competitiveness

PANELISTS

Dr. Kimberly Espy
President, Wayne State University

Dr. Jennifer Mnookin
Chancellor, University of Wisconsin—Madison

Dr. Susan Poser
President, Hofstra University

Dr. David Wilson
President, Morgan State University

Moderator: Dr. Santa Ono
President, University of Michigan

Session Overview

In the face of shifting demographic, structural, and political realities, along with increasing global competition, the nation needs colleges and universities to help it meet its urgent research, knowledge creation, and talent development needs. And, increasingly, towns, cities, and states are turning to academic institutions as key drivers in regional innovation ecosystems. This session examined the multiplicity of roles colleges and universities play in a complex world.

Key Session Insights

Dr. Santa Ono, President of the University of Michigan, led the discussion on how universities can address societal challenges, foster innovation, and strengthen workforce development.

"We need to address the fragmentation of our approach to national competitiveness. We need a national plan."

Dr. Santa Ono
President, University of Michigan

"We must challenge ourselves to collaborate with institutions that are different."

Dr. David Wilson
President, Morgan State University

A key focus of the discussion was the integration of universities with their surrounding communities to address local challenges and foster regional development. Dr. Wilson, President of Morgan State University, discussed his university's commitment to aligning its research agenda with the needs of Baltimore and Maryland. The university has established eight state-funded research centers addressing critical issues such as AI, cybersecurity, and climate change. Similarly, Dr. Espy, President of Wayne State University, described her university's role in revitalizing Detroit's economy by acting as a bridge between large corporations, small businesses, and entrepreneurs. Through initiatives like WSU OPEN, Wayne State provides local businesses with access to university resources, demonstrating how institutions can simultaneously promote regional innovation, and maintain accessibility and excellence.

Universities play a vital role in translating research into practical applications that benefit society. Dr. Mnookin, Chancellor of the University of Wisconsin-Madison, shared how her university contributes to Madison's growing tech ecosystem, including its partnership in a Phase 2 EDA Tech Hub focused on personalized biomedicine. At Hofstra University, President Susan Poser described how partnerships with institutions like Cold Spring Harbor Laboratory support innovation through boot camps that help scientists translate research into startups. Hofstra's ideaHUb incubator, a business school initiative, further supports local entrepreneurs by providing startup resources, illustrating how smaller universities can make significant contributions to innovation ecosystems.

"We must keep teaching the humanities. We must keep teaching critical thinking, good communication skills, and how to write."

Dr. Susan Poser
President, Hofstra University

"Universities are contributing in extraordinary ways to the future competitiveness of our nation."

Dr. Jennifer Mnookin
Chancellor, University of Wisconsin—Madison

To better serve their students and to unleash the innovative potential of higher education, universities should prioritize collaborating with industry and national labs. Dr. Wilson described how Morgan State's partnerships with U.S. DOE National Laboratories, including Los Alamos, have resulted in internships and research contracts for students. He also advocated for breaking traditional biases in partnerships to include non-traditional and smaller institutions, highlighting the potential for these collaborations to drive innovation. Dr. Mnookin then shared how there are challenges in engaging industry partners. She argued academic research must be aligned with workforce needs, and mechanisms for stronger industry engagement are needed.

The panel also addressed workforce development and skills alignment, particularly in the context of declining public confidence in higher education. Dr. Ono identified three major concerns contributing to this decline: the rising cost of education, perceptions of ideological radicalization, and the misalignment between graduates' skills and workforce needs. Ideas from the panel to address this included stressing the importance of equipping students with interdisciplinary skills, including critical thinking, communication, and adaptability. Dr. Poser argued the liberal arts remain essential for fostering these competencies, even as technical skills and AI-related expertise become increasingly critical.

The university leaders also focused on the need to rebuild public trust in higher education. With growing skepticism toward universities, Dr. Ono stressed the importance of promoting critical discussions on campuses, suggesting that initiatives like "Deliberation Dinners," which

encourage open dialogue on contentious topics, could help address concerns about ideological bias. The panelists also called for targeted reforms to address issues of cost, access, and workforce alignment, emphasizing the need for higher education to demonstrate its relevance and value to society.

A recurring theme throughout the discussion was the importance of a unified national strategy to address skills gaps and bolster innovation. Dr. Espy called on policymakers to champion the role of universities in driving economic growth and innovation. Dr. Wilson compared the U.S. higher education system with China's growing competitiveness, highlighting the unique strengths of liberal arts education in fostering creativity and Nobel Prize-winning discoveries. However, this value is often overlooked or not understood by the broader innovation stakeholder community. It is the prerogative of the university leaders to proactively engage with policymakers and industry leaders to rebuild confidence in higher education's indispensable role to the United States' competitiveness.

"We need all of you to speak up about the value universities bring to your bottom line, because we cannot do it alone."

Dr. Kimberly Espy
President, Wayne State University

Radical Collaboration

An Imperative in the Age of Technology Disruption and Discontinuity

PANELISTS

Moderator: Dr. Daniel Diermeier
Chancellor, Vanderbilt University

Dr. Marlene Tromp
President, Boise State University

Not Pictured:

The Hon. Steve Isakowitz
President and CEO, The Aerospace Corporation

Mr. Jérémie Papin
Chairperson, Nissan Americas

Dr. Donde Plowman
Chancellor, University of Tennessee, Knoxville

Session Overview

A central theme that emerged from the three 2024 editions of the Competitiveness Conversations Across America series is the concept of radical collaboration. This panel builds on insights from these Conversations, as leaders discuss strategies for effectively transforming disruption into creative destruction and rapid growth. They discussed how to accelerate place-making innovation, foster public-private partnerships, and cultivate a national culture of innovation.

Key Session Insights

Radical collaboration is a powerful tool in place-making innovation. Partnerships between academia, industry, and government are essential to drive transformative innovations and address complex societal challenges. Dr. Daniel Diermeier, Chancellor of Vanderbilt University, opened the discussion by outlining the institution's strategic efforts to create an integrated, cooperative innovation ecosystem across Tennessee. With healthcare a hub of economic activity in Nashville, energy in Knoxville, and quantum technology in Chattanooga, Dr. Diermeier stressed the need for a concerted effort to bridge these regions.

Dr. Diermeier described radical collaboration as a framework for breaking down silos and fostering interdisciplinary partnerships, which he argued are essential for transformative progress in areas like biomedical engineering, transportation, and education technology.

From challenge to opportunity: Dr. Marlene Tromp, President of Boise State University, described how Boise's geographic isolation has driven the city to focus on growing its innovation-driven economy. Boise State's partnerships with local industries, such as companies in the

"We think about radical collaboration on three levels: the university itself, the metropolitan area, and the state."

Dr. Daniel Diermeier
Chancellor, Vanderbilt University

"We need to rethink how we reward risk-taking and interdisciplinarity truly to unleash faculty talent."

Dr. Marlene Tromp
President, Boise State University

microelectronics and the cybersecurity sectors, develop programs that address both workforce needs and educational gaps. One standout initiative involved introducing semiconductor and cybersecurity certifications in K-12 education, aimed at reducing students' fear of technical fields and fostering early interest in STEM careers. Additionally, Boise State's Math Learning Center tackled math-related barriers to student success in technology disciplines, ensuring more students could pursue opportunities in these high-demand industries. These efforts required not only collaboration with industry and government but also a willingness to adapt institutional structures to meet real-world demands. Dr. Tromp framed this adaptability as a critical component of radical collaboration, enabling institutions to remain relevant and impactful in a rapidly changing landscape.

Drawing on her background as a management professor, Dr. Donde Plowman, Chancellor of the University of Tennessee, Knoxville, shared the observation that there is robust collaboration in research and academic writing but not in other university operations. However, that is changing at the University of Tennessee in two distinct ways. The first is via a partnership with Arizona State University (ASU) to develop an online education program targeting nearly one million Tennesseans with some college credit but no degree. This innovative program leverages ASU's courses for the first two years of the program's launch, overcoming significant faculty resistance and structural challenges to creating a scalable solution. The second initiative involves the creation of the College of Emergent and Collaborative Studies, a faculty-less entity designed to respond directly to industry needs. This college facilitates modular degree programs that combine disciplines like business analytics and communication, breaking traditional academic silos to address the demands of a rapidly evolving economy.

Collaborations connect universities to the broader industrial ecosystem, as well. From an industry perspective, Mr. Jérémie Papin, former Chairperson of Nissan Americas and current Chief Financial Officer of Nissan Motor Corporation, Ltd., provided a compelling account of how radical collaboration can benefit both academia and business. He described Nissan's evolving partnership with Vanderbilt University, which began informally during a Titans football game and grew into a structured collaboration. Initiatives such as a "speed dating" event brought Vanderbilt faculty and Nissan management together to exchange ideas and identify opportunities for joint projects. This has facilitated greater access to cutting-edge academic research for Nissan, practical business insights for students and faculty, and a robust talent pipeline for internships and employment. His advice to industry leaders: View universities as strategic partners in driving innovation, solving complex challenges, and fostering a culture of continuous learning.

Reflecting on Vanderbilt's relationship with Nissan, Dr. Diermeier introduced the concept of a "collaboration accelerator" as a structured approach to overcoming the common mismatch between problems and solutions in partnerships. This process creates visible milestones and is focused on delivering tangible outcomes to sustain momentum and engagement, noting that annual reviews of progress can transform can reinforce the value of partnerships and encourage further innovation. Unlike informal networking events, this model enables participants to better understand each other's needs and capabilities through structured mechanisms that facilitate effective collaboration. Vanderbilt has implemented collaboration accelerators with Nissan, the city of Nashville, Bridgestone, and others.

Drawing parallels to historic projects like the Manhattan Project and the Apollo Program, The Hon. Steve Isakowitz, President and CEO of the Aerospace Corporation, argued that radical collaboration involves aligning resources, autonomy, and urgency to tackle pressing issues. He shared an example from his organization, where they proactively formed a consortium to address urgent national security concerns. This initiative brought together competitors, demonstrating the power of setting aside differences for a common purpose. Mr. Isakowitz emphasized that government support, open architectures, and strategic investments are essential to sustaining the United States's competitive edge in innovation.

"To me, the common threads in radical collaboration are scale, a sense of urgency, and empowerment—a team of teams coming together with autonomy to move fast."

The Hon. Steve Isakowitz
President and CEO, The Aerospace Corporation

To harness the power of radical collaboration, policies must be implemented to address the potential barriers to it. Dr. Plowman identified the tendency of universities to prioritize individual achievements over collaborative efforts, calling for internal reforms to align institutional structures with collaborative goals. Adding to these points,

"Internal processes often go against the outcomes universities desire. We need to have the courage to realign our structures with our goals."

Dr. Donde Plowman
Chancellor, University of Tennessee, Knoxville

Dr. Tromp pointed to structural challenges in higher education, such as tenure systems that discourage interdisciplinary work, and advocated for rethinking evaluation criteria to reward bold, innovative contributions. For innovations to emerge from collaborations, organizations must be equipped to evolve and grow.

Mr. Papin stressed the importance of fostering learning organizations within industry to drive continuous improvement and embrace vulnerability. He argued that creating environments where innovation is encouraged and external knowledge is welcomed is critical to overcoming resistance to change.

Adding to the importance of organizations being flexible, Mr. Isakowitz highlighted the risk of complacency, warning that the "innovator's dilemma" could erode national leadership if not addressed with forward-thinking policies and investments.

"We need to create learning organizations within businesses to foster a culture where people are open to taking risks. It is about systematically showing vulnerability in being open to learning."

Mr. Jérémie Papin
Chairperson, Nissan Americas

But ultimately, radical collaboration comes down to effective leadership with the courage to challenge norms and take risks. Dr. Diermeier noted the need for leaders to take responsibility. They must prioritize and embody collaboration by co-chairing events, eliminating barriers, and supporting interdisciplinary initiatives. Dr. Plowman supported this view with an example from Tennessee, where committed leadership among Vanderbilt University, the University of Tennessee, and Oak Ridge National Laboratory has transformed multi-institutional partnerships into a dynamic force for progress.

The Competitiveness Conversations Across America

Defining What's Next in Place-Making Innovation

PANELISTS

Dr. Bernard Arulanandam
Vice Provost for Research, Tufts University

Dr. Elizabeth Cantwell
President, Utah State University

Dr. Taylor Eighmy
President, The University of Texas at San Antonio

Mr. Mike Freeman
CEO, Innosphere Ventures and the CO-WY Engine

Moderator: Mr. Josh Parker
Chairman and CEO, Ancora

Session Overview

In 2024, under the auspices of the National Commission on Innovation and Competitiveness Frontiers, the Council launched the Competitiveness Conversations Across America series. These Conversations uncover and amplify best and next practices to expand the number of individuals and communities actively engaged in the U.S. innovation economy. This panel highlighted upcoming Conversations in 2025 and beyond—exploring topics ranging from AI and quantum, to the convergence of health and IT, to the growth of the green and blue economy, to the future of fusion, to the industrialization of "agile space."

"Our goal with these Conversations is to convene regional and national leaders to uncover emerging ideas and best practices for place-based innovation that can be amplified for national scale-up."

Mr. Josh Parker
Chairman and CEO, Ancora

"In the middle of the country, about 85 percent of all venture capital is imported. Take Innosphere as a case in point: we supported about 220 startups over the last decade, helping them raise $1-2 billion in a capital-constrained environment. Imagine the potential if venture capital was more accessible outside of Boston and Silicon Valley—what could those numbers be?"

Mr. Mike Freeman
CEO, Innosphere Ventures and the CO-WY Engine

Key Session Insights

The Competitiveness Conversations Across America series was born out of the realization that not enough Americans and communities around the country were actively engaged and involved in the nation's innovation ecosystem of growth. As Ancora Chairman and CEO Mr. Josh Parker explained, by focusing innovation attention and assets into a few urban areas, much of the country was being left behind, unable either to contribute to American innovation or to reap its rewards. To expand the national innovation footprint, the Competitiveness Conversations convene regional and national leaders to uncover emerging ideas and best practices for place-based innovation that can be amplified for national scale-up.

2024 saw three successful Conversations, in Nashville, Boise, and West Lafayette. 2025 has an even more robust agenda, with Conversations planned in San Antonio, Boulder, Santa Fe, and Boston, before finishing the year in Pittsburgh. These Conversations will explore AI, quantum, the convergence of health and IT, the future of fusion, and agile space, among many others. Each,

"The places that will continue to thrive are anchored by trilateral partnerships involving government, universities, and industries, creating a density of talent, investment, and energy to advance innovation."

Dr. Taylor Eighmy
President, The University of Texas at San Antonio

however, will also focus on the creation of "place" in their regions, and how to build ecosystems that can grow and adapt nationwide.

When asked about what place meant for their regions, Innosphere Ventures CEO and CEO of the CO-WY Engine Mr. Mike Freeman notes that, in the Front Range of the Rocky Mountains, "place" has expanded over time to include the three states of Wyoming, Colorado, and New Mexico. While some efforts remained hyper-local, others continue to grow the region's geographic size, expanding the reach of the I-25 innovation corridor. This expanded regional view will be the focus of a 2025 Competitiveness Conversation in Boulder.

Similarly, University of Texas at San Antonio President Dr. Taylor Eighmy describes how South Texas's sense of place was growing. At the same time, high levels of federal investment into national security infrastructure in San Antonio, including from the NSA, Pentagon, and defense contractors, are creating a national security space to rival the D.C. area. Dr. Eighmy's school is investing in this growing area, inaugurating a new National Security Collaboration Center, with more yet to come. Securing U.S. critical infrastructure through innovation will be the topic of a Competitiveness Conversation Dr. Eighmy is Cohosting at the University of Texas San Antonio.

According to Vice Provost for Research at Tufts University Dr. Bernard Arulanandam, Massachusetts is dealing with the opposite question: how to take the vibrant and well-developed innovation ecosystem of Boston and spread it throughout the rest of the state and region. One answer started by the Massachusetts state government is the concept of "gateway cities," where innovation-related investments are flowing to communities outside of Boston. Bernard invited everyone at the National Competitiveness Forum to attend the A Competitiveness Conversation: Growing New England's Next Generation Innovation Economy June 5-6, 2025.

Finally, Utah State University President Elizabeth Cantwell described how, despite the Salt Lake City metro area being one of the nation's fastest growing, much of Utah remained very rural. Faced with water and climate challenges, like changes in the Great Salt Lake, these rural communities need the support of innovation tools. By engaging with these communities, not only does her university improve quality of life across the state, but it also brings an untapped well of innovators into the state's ecosystem.

"In Massachusetts, the challenge is not just about place-making in Boston—it is about taking that success and applying it to underserved communities across the Commonwealth."

Dr. Bernard Arulanandam
Vice Provost for Research, Tufts University

"If we do not bring all our brains to the table, national competitiveness will suffer. Innovation must reach every corner, rural or urban, to ensure we maximize our collective potential."

Dr. Elizabeth Cantwell
President, Utah State University

Turning to the idea of funding innovation ecosystems, Dr. Cantwell asked how investment capital could be brought to places like Utah where it would have an outsized impact. Mr. Freeman brought up the stark statistic that, when you exclude Silicon Valley and Boston, 85 percent of the venture capital going into innovation was imported from outside the region. His organization, Innosphere, has supported more than two hundred companies that raised one or two billion dollars in the capital-constrained Front Range ecosystem, but he wondered how much more they might have received had more local capital been available.

Dr. Arulanadam made sure to raise the importance of academic accelerators as drivers of regional innovation. In Boston, MIT's Lincoln Labs have, with the additional support of federal funding, been highly successful in commercializing innovations. He warned, however, that the lumpy nature of federal funding limits the effectiveness of these accelerators.

Dr. Arulanandam shared more about Tufts University's research enterprise. Once solely a liberal arts school, the university has doubled its research expenditure during his tenure, adding research schools, like the country's only nutritional school. Tufts has leveraged its liberal arts heritage to bring communities and citizens along as they develop and implement new technologies and ideas.

The San Antonio ecosystem is heavily tied to the geopolitical relationship between the United States and Mexico, according to Dr. Eighmy.

Investment flows both ways across the border, and any disruption brought on by tariffs and trade restrictions could be severe.

For Mr. Freeman, the transition from the startup and nonprofit space to running an NSF Engine has come with challenges, particularly in navigating the complex governance structures required to run an Engine. However, by partnering with Wyoming, he has increased the effectiveness of the Colorado-based initiative in realizing the Engine's potential for the region. While building and managing such a diverse coalition of partners is "not for the faint of heart," he said, the positive outcomes for the region are evident.

For Dr. Cantwell, the United States is already a "nation of innovators," but we have a long way to go before becoming a "nation of collaborators." In her view, innovation is baked into America's identity. We are pioneers. But in the geographically dispersed country, distance is a limiting factor in forming partnerships. Technology has begun to bridge the gap, but technology is not a substitute for in-person meetings and partner proximity. According to Dr. Cantwell, the "technology of partnership" needs to be developed for places like Utah to reach their full potential as collaborations.

Dr. Arulanandam was concerned about access to talent. Boston attracts students and startups from around the world, so if immigration restrictions rise, the model for talent the region relies on will be strained.

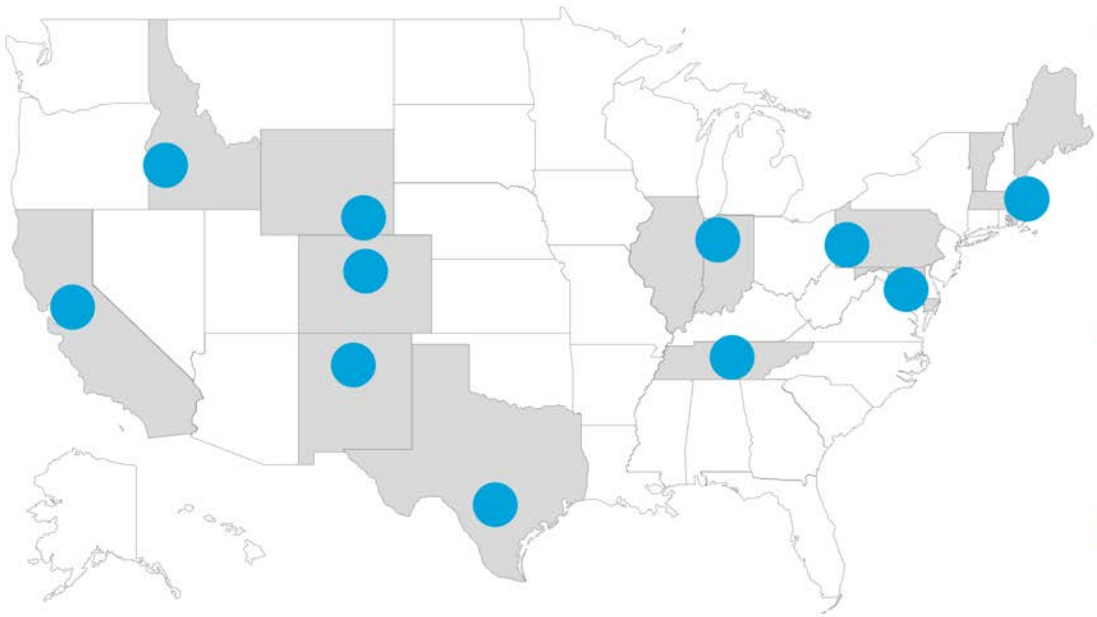
Despite recent public questioning of the value of higher education, Dr. Eighmy felt that even among skeptics, its role as an incubator for innovation and a cornerstone of the ecosystem is evident. At this pivotal moment in the national dialogue about the value of universities, he advocated for messaging that highlights innovation as a fundamental aspect of higher education's mission.

To conclude, each of the participants highlighted their upcoming 2025 Competitiveness Conversation, which you may learn more about here.

National Commission on Innovation & Competitiveness Frontiers

Competitiveness Conversations Across America

Compete. Council on Competitiveness



2022 Conversation
Jun. 21-22 Laramie, WY

2023 Conversation
Mar. 27-28 Davis, CA

2024 Conversations
Apr. 25-26 Nashville, TN
Aug. 6-8 Boise, ID
Sep. 9 West Lafayette, IN

2025 Conversations
Mar. 10-11 San Antonio, TX
Mar. 30 - Apr. 1 Boulder, CO
May 5-6 Santa Fe, NM
Jun. 5-6 Medford, MA
Oct. 19-21 Pittsburgh, PA

2026 Conversations
Jan. (TBA) Baltimore & College Park, MD

Breakthroughs in the Bioeconomy

Rewriting the DNA of U.S. Competitiveness from Farms, Forests, and Forks to Factories, Hospitals, and Homes

PANELISTS

Dr. Jeffrey Gold
President, University of Nebraska System

Dr. Mehmood Khan
CEO, Hevolution

Dr. Jonathan McIntyre
Founding Partner, Nodl Advisors

Mr. Jim Stutelberg
CEO, Primient

Moderator: Mr. Charles O. Holliday, Jr.
Chair Emeritus, Council on Competitiveness
Chair, Global Federation of Competitiveness Councils (GFCC)

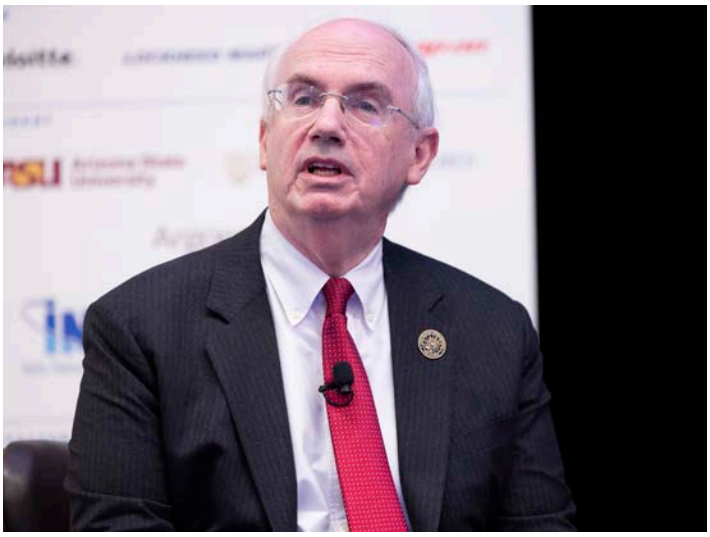
Session Overview

Leaders discussed the next chapter in America's bioeconomy, highlighting groundbreaking advancements in genetic engineering, synthetic biology, and biomanufacturing that are reshaping entire sectors of the economy—from pharmaceuticals to sustainable materials; from renewable energy to industrial processes; from food manufacturing to extending healthspans.

Key Session Insights

Why is the bioeconomy critical for U.S. competitiveness? According to Dr. Jeffrey Gold, the bioeconomy is integral to addressing some of the world's most pressing issues, including health, national security, food safety, improving crop yields, and creating healthier products.

For Dr. Jonathan McIntyre, advances in the bioeconomy offer a new way of manufacturing across many industries. By using biological resources and processes, the bioeconomy promotes domestically produced materials, chemicals, energy, and packaging. This shift secures supply chains and drives innovation in sectors like agriculture, healthcare, and manufacturing. Embracing these technologies can lead to more sustainable growth and new high-value industrial jobs.



"Your dependence on the bioeconomy—not just on the production of food and the availability of clean and safe water—is critically important."

Dr. Jeffrey Gold
President, University of Nebraska System

"Biology has become digitized, and it is now an engineering problem. When you take a discipline, digitize it, and make it an engineering problem, not only do you break it into its components and systems, but you can figure out how to scale and model it."

Dr. Mehmood Khan
CEO, Hevolution

For Dr. Mehmood Khan, the bioeconomy offers exciting opportunities for overcoming hunger and improving the health and well-being of aging populations. Dr. Khan noted that one billion people are currently hungry, while another billion are over 60, many facing age-related diseases. "The burden of disease from age is going to rise exponentially. The only way to address that economically, at prices we can afford, is through the bioeconomy." Given the limited availability of land and water resources, scaling traditional food production is no longer feasible. The bioeconomy, fueled by new technologies, is uniquely positioned to offer scalable solutions.

One catalyst for the rising importance of optimizing the innovation potential for and outcomes of bioeconomy now is the convergence of advanced technologies. Today, biology has become digitized, meaning that we now have the power to break down and model biological problems. With an engineering approach, mathematics, and statistics, we can study a range of biological challenges, like food production. Scientists, engineers, technologists, innovators, and entrepreneurs can then scale these models to serve the country and the world.

Dr. Jonathan McIntyre, with his experience in corporate research and development, focused on the practical challenges faced by early-stage companies in food and agriculture technology. Dr. McIntyre noted that while fermentation technology

"What happens in 2050 if we are not number one in the bioeconomy and just say, for example, China is? It would be a missed opportunity for this country because when the United States leads, a rising tide lifts all boats for the rest of the world."

Mr. Charles O. Holliday, Jr.
Chair Emeritus, Council on Competitiveness and Chair, Global Federation of Competitiveness Councils (GFCC)

has been used for centuries, it lacks significant advancements, making large-scale bio-based production difficult. **There is a vital need for innovation in the entire bioeconomy supply chain, from feedstock development to the final product.** According to Dr. McIntyre, breakthroughs in fermentation, separation sciences, and processing are essential to scaling the bioeconomy and reducing costs to compete with traditional industries.

"The Council is a great organization to address two major challenges of the bioeconomy, which is the infrastructure challenge and the talent challenge."

Dr. Jonathan McIntyre
Founding Partner, Nodl Advisors

Furthermore, Dr. McIntyre argued for holistic thinking across the bioeconomy's supply chain. While biological innovations are essential, progress in areas such as feedstock production and process engineering will be just as important for scaling the sector. Without advancements in these downstream areas, the bioeconomy will struggle to compete with traditional industries.

However, Mr. Jim Stutelberg, CEO of Primient, provided hope for the future of the U.S. bioeconomy. He expressed confidence in the United States's ability to maintain its leadership, citing its agricultural scale, innovative spirit, and skilled workforce.

Dr. Gold added that more than 50 countries now have bioeconomy strategic plans in place, and many are making substantial investments. While the United States has a technological advantage, Dr. Gold agreed with Mr. Stutelberg that the country needs to focus its efforts and continue to invest in research and development to stay ahead. He and pointed to the United States's leadership in science, using the COVID-19 vaccine development as an example of how U.S. innovation can benefit the world. Dr. Gold, with Dr. Khan, stressed the importance of federal funding for foundational research, which often takes place in national labs and universities.

One area in need of investment for the rise of the bioeconomy is infrastructure. Dr. McIntyre described the "Valley of Death" that many start-ups face, where they struggle to transition from small-scale experiments to large-scale production. He called for more investment in regional hubs and infrastructure to support the scaling process, referencing a recent government program called BIOMED, which funds such initiatives. In addition to infrastructure, a workforce ready to support the emerging bioscience industries is essential to the survival and expansion of these new economic engines.

The panel then discussed industry collaboration in the bioeconomy, with Dr. Gold acknowledging that public-private partnerships in this space are less advanced compared to healthcare or energy. Dr. Gold called on higher education institutions to take more risks and build partnerships that can keep pace with the bioeconomy's rapid changes.

Mr. Stutelberg concluded by reflecting on his decision to lead Primient, recognizing the transformative potential of the bioeconomy. Just as chemistry revolutionized industries in the past, biology is now poised to do the same, and plant-based solutions will create a sustainable future.

"Growth opportunities like this do not come around often, and it is important the United States capitalizes on it. The bioeconomy is a generational opportunity."

Mr. Jim Stutelberg
CEO, Primient

In closing, Mr. Stutelberg announced a new Council-led initiative focused on writing the next chapter of the bioeconomy, which he will co-lead. The initiative will aim to develop strategic, policy, and regulatory frameworks to ensure progress of the U.S. bioeconomy, with plans to begin work in mid-2025.

Pioneering the Future of Transformative Computing

Scaling Quantum, AI, and Cybersecurity to Solve Tomorrow's Greatest Challenges

PANELISTS

Dr. Susan Hubbard
Deputy Director for Science and Technology, Oak Ridge National Laboratory

Dr. Chris Langer
Fellow, Quantinuum

Dr. Darryll Pines
President and Glenn L. Martin Professor of Aerospace Engineering, University of Maryland, College Park

Mr. Gunjan Sinha
Founder & Chairman, Opengrowth.Ventures

Moderator: Dr. Mark Peters
President and CEO, The MITRE Corporation

Session Overview

The rapid growth of artificial intelligence and the deep innovations taking place at the quantum levels are at the heart of the massive disruptions and discontinuities driving the national and global economy. This discussion highlighted the urgent need to strengthen the nation's capabilities in these areas, and it introduced the Council's Alliance for Transformational Computing initiative that seeks to advance a major strategic investment in research and prototyping at the leading edge of computing in concert with U.S. global allies.

Key Session Insights

President and CEO of the MITRE Corporation Dr. Mark Peters kicked off the session focused on the transformative potential of AI and quantum computing.

According to Deputy Director for Science and Technology at Oak Ridge National Laboratory Dr. Susan Hubbard, the national laboratories have emerged as a key testing ground for how AI can assist the research process. Combining scientific data and the world's most powerful supercomputers, the national laboratories are on the cutting edge of implementing AI as a scientific tool, from data analysis to more advanced hypothesis generation and simulation. One climate model emulator at Oak Ridge National Laboratory, Orbit, uses 113 billion parameters. In the future, AI models might design, run, and analyze experiments with only one human in the loop, dramatically streamlining the scientific process and helping the United States keep pace as a global innovator through this incredible boost to researcher productivity. Despite its potential as a research tool, Dr. Hubbard points out the challenges that remain for the scaling of AI, including in maintaining energy efficiency and guaranteeing security.

Opengrowth.Ventures Founder and Chairman Mr. Gunjan Sinha echoed Hubbard's point about AI being in its infancy. He made it clear that, while the explosion of large language models like OpenAI's ChatGPT have given us a perception of a field that has already taken off, the growth going forward is going to be exponential. What we see today is just the tip of the iceberg, comparable to the first proliferation of internet browsers in the early 1990's: a landmark step, but only the beginning. Mr. Sinha stressed that one of the Council's and its initiative, the Alliance for Transformational Computing's, most important tasks concerning the future of AI would be helping to design intentionally what the future of AI ought to look like, rather than just letting it unfold by chance.

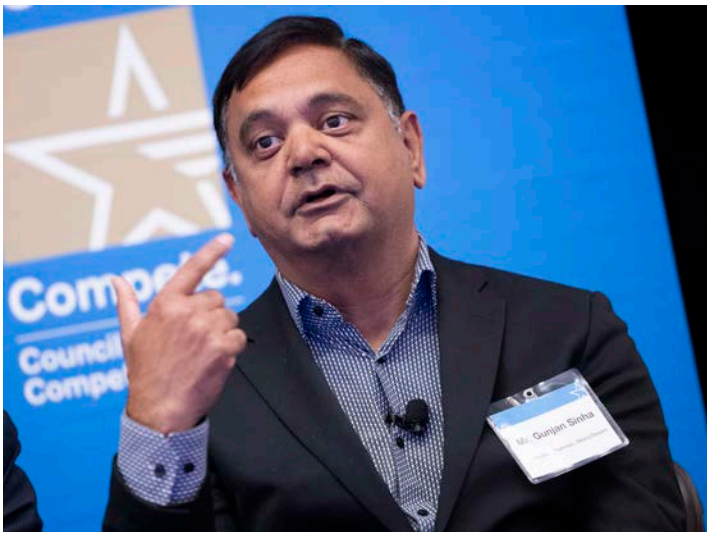
"We need to have a strategy, sustained investments, and partnership modality that enables the United States to retain superiority in AI and quantum computing."

Dr. Mark Peters
President and CEO, The MITRE Corporation

Quantum computers are rapidly catching up with their conventional counterparts and will soon radically change how we approach computation. According to Quantinuum Fellow Dr. Chris Langer, quantum computers, exploiting the unique characteristics of quantum particles, perform tasks that conventional computers cannot. However, quantum computations have error rates about a trillion times higher than conventional ones, meaning huge leaps in precision and error resistance will be needed before computers relying on quantum computations can have practical utility. But our current machines are getting larger and less prone to errors, with a few leading machines now on the cusp of commercial deployment. While it may yet be some years before quantum computing is widely available, there is a clear path ahead toward viable machines.

"The sky is the limit for quantum computing applications."

Dr. Chris Langer
Fellow, Quantinuum



"AI is in its infancy. We have to figure out exactly what the future state ought to be by design, not by accident."

Mr. Gunjan Sinha
Founder & Chairman, Opengrowth.Ventures

President and Glenn L. Martin Professor of Aerospace Engineering at the University of Maryland, College Park Darryll Pines, made clear quantum computing was still very much in the "punch card" stage of development. Resting on several enabling technologies and techniques, like ion traps, superconductors, and neutral atoms, quantum computing has no theoretical barriers, but is still grappling with experimental ones. Dr. Pines hoped to avoid a "quantum winter" like the AI winter that was finally ended by the proliferation of large language models. To do so, he suggested a focus on incremental steps and better fault tolerance to bring real-world viability closer.

When discussing the future application of the new computing methods, Mr. Sinha predicted an AI future dominated not by large language models, but by small language models. He again compared the current era of AI to that of the early internet where, over time, proliferation and more targeted development led to far greater innovation. Tomorrow's AI would be more focused on specific tasks, and more integrated with a sensor infrastructure to better collect real-world data to enable it to do so. Thus, building out a better infrastructure for AI is critical; Mr. Sinha criticized the at-times single-minded focus on GPUs when, in his opinion, the host of other technologies that will complement them are just as important.

Dr. Pines notes the University of Maryland is working with one of its successful spin-out start-ups, IonQ, to advance the application of new quantum computing technologies. They have set up the "National Quantum Lab," with user facilities designed to let startups test their quantum algorithms and to make it widely to those interested in collaborative efforts. Work in computational biology, solid-state physics, and battery designs is underway. And beyond quantum computing, other quantum technologies—including quantum

"We need partnership in quantum and AI in the same way we have used the to build up classical computing over the years."

Dr. Susan Hubbard
Deputy Director for Science and Technology, Oak Ridge National Laboratory

"We share facilities, we share people. That is why partnerships are strategic and geographical."

Dr. Darryll Pines
President and Glenn L. Martin Professor of Aerospace Engineering, University of Maryland, College Park

imaging, sensing, navigation, and timing—are ready to revolutionize fields as diverse as navigation and medicine.

Dr. Langer argued the most consequential application of quantum computing was going to be the simulation of new materials and chemicals. For example, quantum computers could help identify room-temperature semiconductors, new fertilizers, medicines, and batteries. These high-value use cases could give quantum computing the funding needed for its initial commercial development.

When asked how to win the global race for AI and quantum, Mr. Sinha observed that many of the necessary systems are already in place, but they are not adequately advertised. In his view, greater communications could demonstrate the incredible work being done in universities and national laboratories related to advanced computing. Such a public awareness campaign would draw in the resources and talent, especially from young STEM workers, that could supercharge the industry.

Dr. Hubbard highlighted the need to avoid seeing these advanced computing technologies as discrete units to be pursued separately and rather as parts of a potential groundbreaking whole. For example, hybrid conventional-quantum computers should not be seen as a mere step toward a fully quantum system, but rather as necessary to maximize efficiency in calculations. She imagined a system governed by an AI, assigning tasks to different computers based on whether a task was best done by quantum or conventional computers.

Dr. Pines echoed the need for strong collaborations, nodding to the longstanding partnership between the University of Maryland and the National Institute of Standards and Technology

(NIST). While originally a very basic agreement, it has over 20 years resulted in fruitful partnerships that have led to a robust quantum ecosystem in Maryland. This sort of co-location and place-building will be critical going forward.

To conclude, Dr. Peters asked each participant what needed to be the focus for the next five years. Dr. Pines argued for national quantum use facilities, democratizing access to the latest technology to spur new ideas, was a key way to stay ahead of the United States's global competitors. Agreeing, Dr. Langer hoped, this would help avoid the "quantum winter" problem by speeding up compute times. Finally, Mr. Sinha looked back at how the Industrial Revolution and Information Revolution spurred the creation of the "blue" and "white" collar professions, respectively, and suggested that, with a new AI revolution on the horizon, a new "silver" collar would be needed to manage it.

Conversation Conclusion

"The Council put together a call to action. Our job is to go out and execute it."

Mr. Brian T. Moynihan
Chair and CEO, Bank of America
Chair, Council on Competitiveness

To conclude the 2024 National Competitiveness Forum, Mr. Brian T. Moynihan, Bank of America Chair and CEO, and Council on Competitiveness Chair, and the Hon. Deborah L. Wince-Smith, Council on Competitiveness President and CEO, reflected on their takeaways from the day's speakers, the Council's mission, and this critical moment in American competitiveness and innovation.

Mr. Moynihan, after thanking the panelists and speakers who made the event so successful and engaging, looked back on his own tenure as the Chair of the Council, thankful to have been a part of so many high-level discussions on American innovation and for the opportunity to contribute to the Council's work. Most importantly, he called on all attendees to work diligently to implement the recommendations called for in the Council's *Competing in the Next Economy: Innovating in the Age of Disruption and Discontinuity*.

The Hon. Wince-Smith then charged all attendees to take the call to action back to their own communities so it could begin to transform innovation ecosystems nationwide. Ms. Wince-Smith argued there is no time to wait, and a good immediate step is to act on the concept of radical collaboration. She invited the Council community to come together and start doing the "big things" needed to ensure continuing U.S. innovation leadership.

The 2024 National Competitiveness Forum was a great success, thanks to the incredible speakers and leaders who came together to chart the course towards a more and competitive U.S. economy in the decades to come. In a final note of gratitude, Ms. Wince-Smith thanked the Council community for their extensive contributions to the Council, its mission, and the country, and she extended an open invitation to continue their active engagement in advancing U.S. productivity, security, and prosperity in the year ahead.

"Twenty years ago, the Council released our seminal report, *Innovate America*, which first addressed many of today's competitiveness issues. But we do not have twenty more years to get these things done. Moving forward, speed and scale must be the mantra."

The Hon. Deborah L. Wince-Smith
President and CEO, Council on Competitiveness

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About the Council on Competitiveness

For nearly four decades, the Council on Competitiveness (Council) has championed a competitiveness agenda for the United States to attract investment and talent, and spur the commercialization of new ideas.

While the players may have changed since its founding in 1986, the mission remains as vital as ever—to enhance U.S. productivity and raise the standard of living for all Americans.

The members of the Council—CEOs, university presidents, labor leaders and national laboratory directors—represent a powerful, nonpartisan voice that sets aside politics and seeks results. By providing real-world perspective to Washington policymakers, the Council's private sector network makes an impact on decision-making across a broad spectrum of issues—from the cutting-edge of science and technology, to the democratization of innovation, to the shift from energy weakness to strength that supports the growing renaissance in U.S. manufacturing.

The Council's leadership group firmly believes that with the right policies, the strengths and potential of the U.S. economy far outweigh the current challenges the nation faces on the path to higher growth and greater opportunity for all Americans.