Compete.
Council on Competitiveness

2023 National Competitiveness Forum

Summary Report
December 14-15, 2023

Table of Contents

Introduction

On December 14-15, 2023 the Council on Competitiveness (Council) convened its annual Gala Dinner and National Competitiveness Forum (NCF). The NCF is a premiere assembly of our Nation's leaders from business, academia, labor, national laboratories, and other critical stakeholders who come together to explore the most important domestic and global competitiveness issues of the day, consider the challenges emerging on the horizon, and identify new pathways to greater economic and productivity growth, and prosperity for all Americans.

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 all around the country.

2023 National Competitiveness Forum Sponsors

Premier

BANK OF AMERICA

LOCKHEED MARTIN

University of Pittsburgh

Founder

ANCORA

Chair: Professional Service

Deloitte.

Chair: Manufacturing

Snap-on

President

Arizona State University

Benefactor

HEVOLUTION

HNTB

Patron

International Brotherhood of Electrical Workers

Northeastern University

SMU

University of Georgia

Annual Gala Dinner

On the evening prior to the December 15 formal program, NCF participants came together for the Council's Annual Gala Dinner. Guests included distinguished national government leaders—the Honorable Jill Hruby, Undersecretary of Energy for Nuclear Security, U.S. Department of Energy; The Honorable Anne Neuberger, Deputy Assistant to the President of the United States and Deputy National Security Advisor for Cyber and Emerging Technology, White House National Security Council; The Honorable Barbara McQuiston, Chair of the Board, NATO Defense Innovation Accelerator for the North Atlantic; as well as Dr. Victor Dzau, President, National Academy of Medicine.

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

National Competitiveness Awards honor American leaders. Council President and CEO Deborah L. Wince-Smith honored during the dinner three national champions whose actions have made significant contributions to U.S. competitiveness and innovation with the presentation of the 2023 National Competitiveness Awards. The first two awards recognized Senator Chuck Schumer and Senator Todd Young who played crucial roles in passage of the landmark 2022 CHIPS and Science Act which appropriated billions of dollars for revitalizing semiconductor manufacturing in the United States, and authorized billions in investments to advance U.S. science, technology, and innovation. Both Senators provided videos accepting their awards, and thanked the Council for its work to boost American innovation and competitiveness.

Senator Chuck Schumer. Senator Schumer emphasized CHIPS and Science Act investments will bring manufacturing back to the United States, strengthen U.S. supply chains, fuel competitiveness, and create many jobs. He is particularly proud of the Act's provision to help build tech hubs across the country, including in regions that have the potential to lead the world in the industries of tomorrow. He pointed to the National Science Foundation's new Directorate for Technology, Innovation and Partnerships (TIP); surging investment into research centers and STEM education; and direct investment in research at the National Science Foundation, National Institutes of Health, the Defense Advanced Research Projects Agency, and other agencies.

Senator Todd Young. Senator Young recounted progress catalyzed and driven by the CHIPS and Science Act, including $240 billion in private industry investment in the semiconductor industry. Recently, the Department of Defense selected eight hubs for the Microelectronics Commons to establish a U.S. network to develop mission critical components and their supply chains. In addition, the U.S. Department of Commerce received more than 500 statements of interest in connection with the CHIPS Act semiconductor manufacturing incentives, and finalized the board for the National Semiconductor Technology Center. Senator Young pointed to $170 billion in Federal investment over five years in research and development to advance technologies that will define the 21st century, and noted the Regional Technology and Innovation Hubs provision of the Act will spur innovation in places beyond the tech hubs in Silicon Valley and coastal cities.

Ms. Janet Foutty, Council Vice Chair Emeritus. Ms. Wince-Smith presented the third National Competitiveness Award to Ms. Janet Foutty, Council Vice Chair for Business Emerita, and former Chair of the Board at Deloitte US. She also served as a founding Commissioner of the National Commission on Innovation and Competitiveness Frontiers. The award honors her leadership on the Council's board and at Deloitte. During her tenure at Deloitte, the business grew by $10 billion, and she led the company's digital transformation of work. She is a champion for women in leadership roles, and in encouraging young women to enter STEM fields. Ms. Foutty has been a role model for cutting through disagreement and polarity to find common ground and achieve action. This record of success prompted Deloitte to create a Shine Your Light Janet Foutty Award recognizing someone that shines a bright light to help others succeed.

Janet expressed her gratitude for being honored with the award, and how inspiring it has been to work with the Council and its diverse group of creative and energetic leaders who care about serving and advancing our country. Her post-retirement work has been an extension of the relationships she forged and her work at the Council, including involvement with the Department of Commerce efforts to implement the CHIPS Act and stand up the National Semiconductor Technology Center.

Top: *Ms. Janet Foutty, Council Vice-chair for Business Emerita, and former Chair of the Board at Deloitte US.*

Bottom: *Mr. Charles O. Holliday, Jr., Chairman Emeritus, Council on Competitiveness; Ms. Joan Gabel, University Vice-chair, Council on Competitiveness, and President, University of Minnesota; Ms. Janet Foutty, Council Vice-chair for Business Emerita, and former Chair of the Board at Deloitte US; Mr. Dan Helfrich, Business Vice-Chair, Council on Competitiveness, and Chair and CEO, Deloitte Consulting; and The Honorable Deborah L. Wince-Smith, President and CEO, Council on Competitiveness.*

Key Takeaways from the 2023 National Competitiveness Forum

The United States is at a pivotal economic, social, and geopolitical moment. We are experiencing an aging population, declining birth rate, decarbonization of our economy, the green energy transition, and shifts in the balance of geopolitical power. The biggest economic gains over the last 30 years have been concentrated in coastal cities, while globalization has hollowed out communities around the country. That has contributed to polarization and pitted areas of the country against each other. However, the economy of the future we are starting to build at this moment could offer a wider and more diverse participation.

The CHIPS and Science Act, Bipartisan Infrastructure Law, and Inflation Reduction Act are making huge investments that could actualize U.S. economic potential. This includes new investments in R&D, semiconductor manufacturing, clean technology manufacturing, clean energy and technology hubs across the country, infrastructure modernization, transportation electrification, and renewable energy power generation. We have an opportunity where our communities can become globally competitive without having to be in competition with each other on a zero-sum basis.

U.S. national laboratories play a critical role in keeping the United States at the forefront of knowledge and technology. They are mobilizing more intellectual and innovation capacity through strategic partnerships with universities and industry. Sustained long-term support is needed to ensure they continue to produce the scientific and technical foundations for innovation. However, in many cases, their infrastructure, facilities, and tools need upgrading and modernization.

Speeding up the pace of innovation is a cross-cutting challenge—from environmental permitting processes, to regulating at the pace of AI advancement, to partnering across sectors, to negotiating agreements between universities and national laboratories and industry, and to developing a more adaptive industrial base for the 21st century: we need to look at what we can do to go faster in today's competitive environment.

The United States needs to optimize the growing reliance of the Nation's departments and agencies on new knowledge and technology developed in the commercial sector. For example, the Department of Defense is taking steps to open its aperture for innovation, but greater scale is needed with increased partnerships among defense primes, small companies, large commercial companies, national laboratories, and universities. The same holds for other mission-driven government departments and agencies that could innovate faster through greater engagement with the private sector.

Standards development is an underappreciated battleground for America's competitiveness. China and Chinese companies are organized in the standards arena, with a focus on advancing their national goals rather than technical outcomes.

To varying degrees, colleges and universities are playing critical roles in stimulating placed-based innovation through aggressive processes and places that foster university-industry collaboration. This includes, for example, playing a key role in end-to-end innovation ecosystems, driving technology hubs, establishing test-beds and research centers with industry partners around the technologies of the future, aligning higher education and training with regional employer needs, reaching into rural communities to build the talent pipeline, and more.

The United States needs to commercialize and scale modern nuclear energy. We can get back into this business through microreactors and small modular reactors, but we must develop trusted domestic supply chains, and address issues around proliferation, plant safety and security, and reversing the atrophy in nuclear engineering degrees and training.

A talent crisis is coming. The number of individuals coming into the workforce are not enough to backfill the individuals who are coming out. Birth rates declined during the Great Recession and the pipeline of undergraduate college students will decrease 9-13 percent over the next 5-7 years.

As baby boomers age out, the millennials are the next largest adult population in the workforce, but this generation is seeking more experiences and opportunities earlier than traditionally has been given. Students—from traditional 17-18 year-olds to lifelong learners—want experiential learning at the undergraduate and certificate levels. However, the higher education ecosystem is not set up to enable all students to have these experiences. We need to scale internship opportunities.

Universities, national laboratories, and industry face challenges in attracting Ph.D.s. The U.S. education enterprise is not producing enough PhDs, particularly those who are American citizens. This is a growing challenge today, as government places more and more constraints on publicly-funded research in terms of clearances, security, International Traffic in Arms regulation (ITAR), etc.

Workforce development must focus on more than just the college educated. Rather than looking at low end and high end, the United States needs a "continuum" approach: for example, looking at the continuum of people we need to bring into the workforce at all levels; and addressing an education continuum that spans the certificate to a four-year or graduate degree.

National Competitiveness Forum

Putting Competitiveness in Context—Challenges and Opportunities for 2024

SPEAKERS

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

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

Council on Competitiveness leaders shared the policy vision for the organization in the context of the economic, global, and political realities facing the United States in 2024.

Council President and CEO, The Honorable Deborah L. Wince-Smith, outlined the complex challenges and opportunities the United States faces today as it traverses a transforming economic, social, and national security landscape. These include operating in a multi-front, disruptive geopolitical environment—war in Ukraine; the Hamas attacks on Israel and ensuing battles in Gaza; the increasing severity of the multiple forces of climate change threatening global food, water, health, and economic security; and the urgent need to transition to clean, secure, and affordable energy.

The Council's priorities, themes, and four-pillar action agenda respond to this reality:

- Advancing research to technology development—and onward to commercialization at speed and scale
- The future of work and building a skilled 21st century workforce

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

Bottom: *The Honorable Deborah L. Wince-Smith, President and CEO, Council on Competitiveness*

- Accelerating clean energy technology and broader sustainability goals in communities across the country
- Enabling and accelerating innovation across all regions of the United States—broadening the deepening the geography and demography of America's innovation ecosystem

This includes promoting the critical role of partnerships across the innovation ecosystem, for example, in driving research into application and use, workforce development, university-industry collaboration, new resource sharing models, and collaboration with international allies and like-minded nations on issues such as securing supply chains and dual-use critical technologies.

The Council's signature initiatives are addressing these challenges and priorities across the Council's signature initiatives, including the:

- National Commission on Innovation and Competitiveness Frontiers
- Technology Leadership and Strategy Initiative
- University Leadership Forum, and
- Alliance for Transformational Computing.

Council Chair Mr. Brian Moynihan followed Ms. Wince-Smith's opening and focused his remarks to the Council membership on his take on the prospects for the U.S. economy in 2024. In particular, he flagged the likelihood at the moment of the United States having a soft economic landing, cushioned by stimulus from the Bipartisan Infrastructure Law, the CHIPS Act, and the Inflation Reduction Act. These legislative initiatives are investing in innovation, and measures that will stimulate economic growth and raise U.S. competitiveness. They dovetail with the Council's work of bringing together business, labor, universities, national laboratories, and government to solve big challenges and strengthen the links from pure science to application to commercialization—all leading to place-based innovation.

As an example, Mr. Moynihan participated in COP28, in his role as Chair of Bank of America which has done about $300 billion in sustainable finance over the past few years. He also participates in the Sustainable Markets Initiative, a large group of CEOs running global companies and working together to speed up the process of innovation towards a just transition. Last year, he suggested to the COP28 leadership in Dubai that the key to making this iteration of COP successful would be to expand its engagement with the private sector, universities, and other critical research institutions like the U.S. national laboratories. That conversation catalyzed the engagement of the Council and its sister organization, the Global Federation of Competitiveness Councils, to conceive and host a first-of-its-kind "Innovation Arena" at COP28. This is an example of how the Council can bring key entities together to drive more innovation and capability around the world.

The Four Pillars of Innovation

Place-Making Innovation, Deploying Tech-based Innovation at Speed and Scale, the Future of Sustainability, the Future of Work and the Workforce

PANELISTS

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

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

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

Dr. Thomas Mason
President and CEO, Triad National Security, LLC, and Director, Los Alamos National Laboratory

The Honorable Deborah L. Wince-Smith
President and CEO, Council on Competitiveness (Moderator)

Members of the Council Board and leadership of the National Commission on Innovation and Competitiveness Frontiers explored the four pillars of innovation and previewed the Council's next major policy report to be released late-2024. Key points from the panel discussion:

National laboratories play a critical role in keeping the United States at the forefront of knowledge and technology. The Department of Energy's recently completed, multi-laboratory, Exascale Computing Project involved more than $1 billion in Federal investment, and close coordination between the national laboratories, the technology community, and academic partners. They fielded the first exascale system, Frontier, at Oak Ridge National Laboratory. To overcome the limitations of Moore's law and build an exascale computer, the project took an innovative approach called accelerated systems with graphical processing units. These systems are powerful computational engines for modeling and simulation, and highly optimized for artificial intelligence. They can support large language models and massive data sets.

The Aurora exascale supercomputer at Argonne National Laboratory is nearing completion, and the El Capitan supercomputer at Lawrence Livermore National Laboratory will soon follow. Los Alamos National Laboratory will soon take delivery of a new system, Venado, developed in a partnership between the laboratory, Nvidia, and HPE enterprises. The system will be the first U.S. installation of the Nvidia Grace and Grace Hopper Superchips using an ultra-fast, chip-to-chip interconnect.

Going forward, supercomputers and the tools of synthetic biology are going to play crucial roles in modeling and simulation for a wide range of applications, like drug discovery and design, with significant implications for U.S. competitiveness, human health, wellbeing, and pandemic preparedness.

Industry-university collaboration can drive economic transformation. Pittsburgh was the epicenter of American steel production. And, for decades, the region believed steel was always going to drive the economy. But late in the 20th century, as global competition expanded, U.S. steel manufacturing collapsed, and many communities suffered from that

"There's a scene in the movie *Oppenheimer*, in which Robert Oppenheimer and General Groves are traveling to universities across the country to recruit scientists to come to Los Alamos. They go to Princeton and University of Chicago. And then shortly after that, they're walking down a hallway with laboratories on either side. And Oppenheimer is saying, we have brought together the best and the brightest from around the country…Certainly, today, part of the role of the national labs continues to be marshalling those forces—the intellectual capacity of the labs and universities, along with the power of U.S. industry—to solve the most pressing national security challenges."

Dr. Thomas Mason
Director, Los Alamos National Laboratory

decline. Today, Pittsburgh is having a renaissance as a global center for robotics, and it looks to leverage the region's manufacturing know-how to seize opportunities in alternative energy, biomanufacturing, and other areas. Pittsburgh is home to two long-standing, collaborative research universities. Carnegie Mellon University's signature is robotics and artificial intelligence (AI), and it has played a crucial role in developing Pittsburgh as a center for robotics. At the University of Pittsburgh, life and biological sciences are globally prominent. These strengths are complementary for innovation going forward. For example, the universities are working together in AI-empowered biotech, biomanufacturing, and AI-empowered epidemiology.

There are key ssues to address in the energy transition. Many other countries are doing what the United States should be doing in the transition to a cleaner, more sustainable energy matrix. While there is ongoing discussion about what approaches should be taken to reduce emissions—wind, solar, or capturing emissions, etc.—China is going to be highly competitive in the sustainable energy arena. For example, we need offshore wind for the energy transition, but China has more offshore wind operating than the rest of the world combined. The most important thing we could do is tackle how we use energy more productively, efficiently, and effectively; the United States could be a global leader as no other country is leading on that.

The Inflation Reduction Act includes $7 billion for hydrogen projects, and the U.S. government has selected seven hydrogen hubs around the country to receive significant government grants. The real need is to determine what to do with the hydrogen. The biggest application right now is exporting U.S. taxpayer-funded hydrogen. The Council, research universities, unions, and businesses need to form organizations in each of the hydrogen hubs to start creating the uses for hydrogen.

Even if the United States is partially successful at transitioning our economy away from fossil fuels and reducing CO2 emissions by mid-century, we are going to have the biggest infrastructure build out the country has ever seen in just two or three decades, and we are not ready for that. For example, our permitting system is broken.

Also, we cannot make the transition without ramping up nex- generation nuclear. And, we are not doing carbon tax or cap and trade very well, although the various subsidies in the Inflation Reduction Act are a tax because U.S. taxpayers are paying for them.

Ms. Joan Gabel, Chancellor, University of Pittsburgh, and Academic Vice-chair, Council on Competitiveness; Mr. Dan Helfrich, Chair and CEO, Deloitte Consulting LLP, and Business Vice-chair, Council on Competitiveness; Mr. Charles O. Holliday, Jr., Chair Emeritus, Council on Competitiveness, and Chair, Global Federation of Competitiveness Councils; Dr. Thomas Mason, President and CEO, Triad National Security, LLC, and Director, Los Alamos National Laboratory; and The Honorable Deborah L. Wince-Smith, President and CEO, Council on Competitiveness (Moderator).

"There are so many ways to slow down permitting offshore wind. If you do a very thorough job in planning and scoping a project, including doing all the right studies, two years is plenty of time to get a permit. But it is taking five years because the system is just broken."

Mr. Charles O. Holliday, Jr.
Chair Emeritus, Council on Competitiveness

Speeding up the pace of innovation is a general challenge. For very good reasons, we have built up processes over time, layered one upon the other, tending to slow down U.S. innovation capacity and capability. During a time in which we cannot afford to be slow, environmental permitting processes—as just one example—are taking too long to get to the outcome of protecting the environment, communities, and people. With respect to regulatory and permitting speed, we have the Operation Warp Speed model. That model dramatically cut the time to get those vaccines out versus the traditional process. What would be the competitiveness impact of learning the lessons from Operation Warp speed and applying to other mega-challenges, to other departments and agencies?

We have a real opportunity to tackle permitting challenges by providing government leaders new experiences to expand their peripheral vision—by helping to provide professional experiences that transcend a single sector or a single domain. We need to develop pathways so that, during their careers, people—from all sectors of our economy—can move between sectors. Yes, there will be a need to address concerns about the risks of revolving doors—but the effort to mitigate those risks would be worthwhile. Why? For example, some of the savviest outcome-oriented government procurement officials have had experience in other domains that allows them to apply the right thinking, still within regulation, law, and the best interests of the taxpayer.

"If we want our students to graduate into premier employment, and the employers are saying we favor students who have had this kind of (multidisciplinary) experience, well, we are going to react to that. That reaction is going to be driven like any other supply and demand conversation would be."

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

"At Deloitte, we do a manufacturing outlook every year. And the latest outlook reflects the most optimistic U.S. manufacturing base we have seen in quite some time, particularly when you ask medium to long-term questions. And why is that? Well, you have enabling legislation, and we look at the amount of investment in sustainability, in semiconductors, and in clean technology manufacturing. We're talking about 20X what it was in 2019."

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

In another example, the field of artificial intelligence is moving fast. An Executive Order on AI was recently released, and a budget process started for Fiscal Year 2025. But there is going to be another two generations of large language models before we get to budget outcomes that are going to have impact. That is a very slow process.

There is difficulty partnering across sectors, for example, striking agreements between companies and Federal laboratories. A venture capital investor could think a technology is great, but it has to get to an IPO and cannot wait for extended negotiations over an agreement. This is also an issue in investment in start-up and medium-sized companies languishing in the Valley of Death. When that occurs, we see foreign capital, not always from friendly nations, coming in to acquire the intellectual property that was created in the United States.

Incentives for research at the intersection of disciplines. Some universities are still conservative in terms of faculty departments having multidisciplinary programs for students and researchers. But some of the greatest incentives for university researchers come through high-fenced sectoral distribution of research support. Collaboration will increase as incentives for multidisciplinary and interdisciplinary research and research teams grow. That work, then, may start to permeate into the educational pipeline, even to K-12.

The intersection of education and manufacturing is profound. Through the CHIPS Act and Inflation Reduction Act, there is significant investment in advancing semiconductor manufacturing and clean technology manufacturing. We need to adjust degree programs to combine them with certifications and micro-credentials to get students ready to work and apply those skills.

We need resilient systems. There is a long list of things that could go wrong and events that organizations cannot anticipate, as was the case of the 9/11 terrorist attacks. We do not know from where the next punch is going to come, so we must have

resilient systems—including people trained to know why they are doing their jobs, not just what they are doing—so we are able to deal with whatever crisis may occur

Has the United States lost the tolerance for risk? In large enterprises and institutions, there is the risk of institutional calcification that defends and protects the status quo. Higher education is often viewed as having a lower appetite for risk compared to other entities such as business and government. However, higher education has been taking risks in response to intense pressure. For example, the pandemic caused higher education institutions to change the way they use technology to distribute content in classrooms and subject matter areas. Now technology is more integrated in classroom experiences. Sometimes, there is risk of not getting something done that could result in harm from reduced competitiveness, loss of industrial base, or a system that does not make it to the Department of Defense in a timely way to meet deterrence needs. We have to get the balance right.

There are lessons in history. In the 1930s, there were major river floods in the United States. We saw that as an opportunity to create dams and build lakes, but also to use those dams to generate electricity. The Tennessee Valley Authority launched a major program and was successful because regulatory issues were recognized and TVA was given some regulatory authority to make sure the program was implemented. We can look to examples where we took great risks—such as TVA, the development and work at national laboratories like Los Alamos, and the space program—and examine what we did to make sure they were successful, and apply those lessons in the future.

Elevator Speech to the Next President

The most important things we need to do:

- In this competitive global environment, it is important to protect our assets. Part of the way we win in this environment is by going faster. We cannot solely focus on slowing down our competitors. We need to look at what we can do to go faster.
- Value our relationships with our strategic partners around the world. If we think we can go it alone without partners in other countries in multiple ways, we are kidding ourselves.
- Pace and speed. There are a lot of things the President's administration can do at the intersection of speed and multisector collaboration and integration. Focus there.
- Invest in the talent pipeline. Ensure everyone has access to high quality education and, therefore, has the tools to generate the ideas that drive innovation, economic growth, and long-term competitiveness.
- Invest and mobilize our entire country to be an innovation nation, from coast to coast.

Expanding America's Tech, Talent & Innovation Potential

Two "Tech Talks" on the Biden Administration's Focus on Advancing Technology in 2024 and Beyond

KEYNOTE

The Honorable Anne Neuberger
Deputy Assistant to the President and Deputy National Security Advisor for Cyber and Emerging Technology
National Security Council

In strategic technologies defining the future and key to the competitiveness of the U.S. military, the United States, in many cases, is either competing for the lead or lagging behind. We face a serious long-term challenge from the People's Republic of China that is engaged in a key effort to dominate a number of the industries of the future.

Telecom is a prime example of a technology bridge between national and economic security. Telecom presents the opportunity to transform traditional sectors. It is a core technology for the economy, but also for the U.S. military, intelligence community, and the networked battlefield. For example, a computer network attack against Ukraine's largest telecom briefly impacted a broad swath of people's access to missile warning communications in a war zone. In the evening before for the war, Russia attacked a different commercial system, Viasat, because the path to disrupt Ukraine's military communications was disrupting a commercial communications entity.

From a competitiveness, geopolitical, and technology perspective, the U.S. government takes a four-prong approach to telecom:

1. Government policy that shapes innovation

Spectrum is key in telecommunications. The biggest user of spectrum in the United States is the Federal government, making its use of spectrum a key to enabling economic competitiveness and innovation. The United States recently released a national spectrum strategy, committing to study how the government can share and enable the private sector to use five spectrum bands. Also, the government is launching new approaches to telecom use, for example, a 12-18 month pilot in spectrum sharing to test that approach with the private sector. The government seeks input from traditional players, businesses that use telecom such as the automotive industry because it matters to the industry's future, as well as innovators and startups thinking about new ways to use radio frequency spectrum.

2. Government investment in R&D and supply chains

The Biden Administration has made investments in critical core technologies, including hardware, 5G, and 6G. Advancements will depend on silicon as, increasingly, advanced computing is necessary to efficiently transmit data over the radio spectrum. The CHIPS and Science Act includes investments in research, semiconductor manufacturing, an investment tax credit for chip manufacturing, and in wireless technologies with a $1.5 billion Public Wireless Supply Chain Innovation Fund.

The Administration is focused on developing Open RAN, an approach to mobile networks that leverages open, interoperable standards to integrate chips and software from different vendors in different parts of the tech stack, as well as our broader telecom stack. Connectivity underpins so many other sectors. For example, numerous applications, companies, and innovators have transformed a phone into an ecosystem on the iPhone platform.

International partnerships. In the global telecom marketplace, China closes its domestic market, allowing it to sell products at a premium domestically, while massively subsidizing its vendors in markets around the world. Many American companies say they face a competitive bid that is 30 percent less, and below market prices.

The Administration is using U.S. financing arms such as the Exim Bank and the U.S. International Development Finance Corporation in new ways. The first example was a $300 million Exim financing deal for Costa Rica—home to many American companies, including Intel. Protection of their intellectual property on a trusted network is vital, so that $300 million financing deal is enabling Costa Rica to use trusted telecom vendors.

3. Engagement in standards bodies

Throughout the history of information and communications technology, the use of open and interoperable standards has enabled many different types of companies to innovate. Standards bodies are an underappreciated battleground in America's competitiveness. U.S. companies are concerned about where international regulatory policy is headed with regard to satellites, space, and how setting different rules for interference could enable other countries' satellite constellations to launch more quickly.

U.S. government, academia, and U.S.-based companies are seeing a troubling pattern. China is actively engaged in setting international technology standards to benefit its companies. China and Chinese companies are organized in the standards arena, focused on advancing their national goals rather than technical outcomes. American companies hesitate to say this publicly because they want to compete in Chinese markets. So in international technology policy, we must ensure that decisions continue to be the right technical advancements and maintain our traditional private sector-led approach, while ensuring we are not out competed in these international standards bodies, and able to mitigate threats to national security.

KEYNOTE

The Honorable Barbara McQuiston
Director of Defense for Research and Engineering, for Research and Technology, U.S. Department of Defense (DoD); and Chair of the Board, NATO DIANA (Defence Innovation Accelerator for the North Atlantic)

The National Defense Science and Technology Strategy 2023 highlights the Department of Defense's science and technology priorities, goals, and investments, and makes recommendations for future defense research and engineering. The strategy is guided by three critical lines of effort—the joint mission, creating and fielding capabilities at speed and scale, and ensuring the foundation for research and development. DoD identified 14 critical technologies to guide its investment and protect the joint force. It has implemented a number of programs to advance these technologies, and accelerate their transition and fielding to the joint force, partners, and allies.

Accelerating fielding of new technologies and capabilities. More rapidly turning technology into capability for the warfighter, and acting at speeds greater than our adversaries—faster than DoD has traditionally developed capabilities—is paramount. The Rapid Defense Experimentation Reserve is a whole-of-DoD effort to expand multi-DoD component experimentation in a multi-year campaign of accelerating new capabilities to fill critical joint warfighting gaps. Executed on a recurring basis, the program provides resourcing for promising prototypes, advanced experimentation, evaluation and, if warranted, accelerated transition to the warfighter to create and field capabilities at scale.

Bridging the valley of death. DoD's Accelerate Procurement and Fielding Innovative Technologies program is focused on accelerating the transition of technologies from development into production. This funding is helping deliver capabilities one to two years earlier than scheduled, while contributing to the health of the U.S. industrial base through investments in small business, non-traditional defense companies, and dual use technologies. In 2022, DoD delivered $100 million to ten small companies ($10 million each) to ramp up initial production and accelerate capability delivery to the services in two years. In 2023, DoD awarded 11 companies $10-$20 million each, for example, to help the Navy accelerate delivery of anti-jam conformal arrays that provide high data rates for satellite communications, and delivery of detection sensors for autonomous underwater vehicles.

DoD Manufacturing Commons. Semiconductors are fundamental to nearly every piece of equipment the DoD fields. Part of the CHIPS Act, the DoD Microelectronics Commons is funding a national network that will create direct pathways to commercialization for U.S. microelectronics researchers and designers, and more opportunity to prototype rapidly in the integrated circuit space. The Commons is establishing regional innovation hubs, that include partners with core fabrication facilities. These hubs will mature emerging microelectronics technologies, enhance existing microelectronics infrastructure, and foster a pipeline of domestic talent and innovative ideas.

Small Business Innovation Research Program. The DoD's SBIR program awards about $2 billion per year in grants. To date, the program has played a pivotal role in creating 70,000 patents, supported the development of close to 700 publicly traded companies, and stimulated approximately $41 billion in venture capital investments. In 2022 alone, DoD made more than 6,500 SBIR awards. SBIR projects

have involved, for example, accurately measuring hypersonics, testing bio-cement to rapidly repair runways, development of lightweight/higher resolution night vision goggles for special forces, and extending the range of anti-jam communications.

NATO Defence Innovation Accelerator for North America (DIANA). DIANA is a key allied investment, over, above, and independent of the requirement of each NATO member to invest at least 2 percent of GDP on defense spending. Focused on entrepreneurs, innovators, and start-ups from the United States and across the alliance, DIANA sponsors challenges to stimulate technology solutions and their applications to national security.

In DIANA's Phase 1, innovators and companies evolve their proposed technology solutions. In Phase 2, successful ideas are selected to move into test, acceleration, and demonstration. DIANA's third phase is rapid adoption of the key technologies that are successful, for example: moving the technology to the warfighter or one of the NATO nations, or working with the industrial base to quickly adopt the technology.

In its first three challenges—focused on security and interoperability, sensors and surveillance for coastal maritime areas, and microgrid technology—DIANA received 1,300 proposals from across the alliance, and 44 companies received grants in 2023. DIANA intends to launch more challenges each year.

DIANA is incorporating accelerators and test centers that will be available to program cohorts. The initial pilot phase involves two accelerators in the United States—the MIT MassChallenge and the Pacific Northwest Mac accelerator site in Seattle.

An essential element of success for NATA DIANA is to build an ecosystem of trusted capital that excludes adversarial players or adversarial capital. DIANA is identifying those partners so there is a trusted investment pathway for the entrepreneur. In addition, a NATO investment fund is structured as a limited partnership and designed to support seed capital or rounds in security startups across the alliance. It is the first multi-sovereign billion dollar/euro fund making investments in security performers, and successful DIANA performers would be good candidates for investment. Currently 23 countries in the alliance participate in the fund.

University partnerships for R&D, education and workforce development. DoD must have a foundation of science and technology on which to build its core innovations and capabilities, and R&D and workforce development are crucial:

Defense STEM Education Consortium. Since 2019, with $90 million in funding over five years, the Defense STEM Education Consortium has partnered with 25 industries, academia, and non-profits to provide students and educators with mentorships, internships, career opportunities, and exposure to other education and workforce development opportunities within DoD. One of the more recently established programs is the University Consortium for Advanced Hypersonics, based out of Texas A&M University, aiming to deliver the innovation and workforce needed to advance hypersonic systems.

University Affiliated Research Center (UARC). Through centers of excellence and UARCs, American universities are tackling some of DoD's biggest technical challenges in microelectronics, AI, biotech, quantum science, advanced materials, etc. For example, the University of Texas at Austin is conducting groundbreaking research into underwater acoustics for the Navy. Recognizing the importance of uplifting communities underrepresented in defense, science, and technology, in 2022, DoD's established its 15th UARC at Howard University, DoD's first UARC at an HBCU. This Air Force sponsored UARC is focused on tactical autonomy.

SMART Scholarship. The highly competitive SMART Scholarship sponsors students in the 24 STEM fields critical to the national security functions of DoD. Selected students match with relevant DoD labs and receive a full-tuition scholarship. Each summer, they intern at that DoD lab, learning and building relationships. Upon graduation, they go to work at the installation for a period commensurate to their scholarship, for example, one year scholarship is one year of paid service.

Setting Strategic Priorities from the Council's Technology Leaders

PANELISTS

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

Dr. William Greene
Chief Investment Officer, Hevolution

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

Dr. Steve Walker
Vice President and CTO, Lockheed Martin

Mr. Chad Evans
Executive Vice President, Council on Competitiveness (Moderator)

Representing leaders from across sectors, the panel explored the future of technology, its impact on innovation and growth, and related policies. Key points from the panel discussion:

The United States must address five priority needs created by the unprecedented speed of technological advancement and change.

The United States needs to:

1. Develop a new, agile, and more adaptive industrial base for the 21st century
2. Optimize the growing reliance of the Nation's defense on new knowledge and technology developed in the commercial sector and at universities
3. Lower a whole range of barriers to the commercialization of cutting-edge technologies
4. Explore a new type of technology statecraft, and
5. Create new models of collaboration and investment to address a range of complex national and global challenges.

Turning America's innovation and technology into capabilities in defense is a critical challenge. For example, connectivity is crucial for the future battlefield. The United States has the best platforms but, to deter peer adversaries, such as China—which takes advantage of its entire ecosystem—we must do a much better job at plugging into the digital technologies that enable connectivity on the battlefield.

The universities bring new ideas. The national laboratories bring a government workforce and an expertise that matters to national security. The commercial sector brings the bleeding edge of digital technology. And defense companies bring the defense applications, and how to put it all together and engineer a system that matters for the warfighter.

For example, while Lockheed Martin is focused on the technologies it needs—such as telecom, AI, and machine learning—some defense primes are not necessarily leaders in those technologies. Lockheed Martin established a center to be a leader in AI in the defense space, but is partnering with companies such Microsoft, Nvidia, Intel, and Global Foundries to plug into that technology at the leading or bleeding edge. Lockheed Martin then brings applications into

The Honorable Patricia Falcone, Deputy Director for Science and Technology, Lawrence Livermore National Laboratory; Dr. William Greene, Chief Investment Officer, Hevolution; Mr. Chad Evans, Executive Vice President, Council on Competitiveness; Dr. Steve Walker, Vice President and CTO, Lockheed Martin; and Dr. Sally Morton, Executive Vice President for Knowledge Enterprise, Arizona State University.

the context of the warfighter and future battlefield, for example, by plugging AI and machine learning into helping humans make decisions faster; or by bringing 5G's higher bandwidth and lower latency to advanced tactical data links that the military, warfighter, and allies are going to use together.

The Department of Defense is taking steps to open its aperture for innovation through partnerships, but greater scale is needed. Over the last several years, the DoD stood up new ways for commercial and small companies to come into the defense innovation and technology ecosystem. These tend to be fairly small offices, and they have done some good work. But they need greater scale. One approach could be major programs that encourage defense prime, small company, large commercial company, national laboratory, and university joint efforts. The new DoD microelectronics hubs is a model moving in that direction. Another could involve specific DoD calls that require that kind of partnership.

The United States needs to double down on developing a culture of collaboration and cooperation for national security and economic competitiveness. For example, the U.S. Department of Energy national laboratories create multidisciplinary teams that go after big, important problems. Translating that model to the bigger competitiveness, economic, and national security environment could bring lots of skills and perspectives to solving big problems.

That model requires facilities and physical spaces where people brush up against each other, and where they can do hands-on work, for example, putting real materials in conditions where safety protocols are needed.

Universities can be a catalyst for placed-based innovation. For example, Phoenix is one of the fastest growing semiconductor hubs in the United States. In the last three years, Phoenix has had $63 billion in investment from Intel and TSMC. Amkor just announced a $2 billion manufacturing facility there.

Mr. Chad Evans, Executive Vice President, Council on Competitiveness; and Dr. Steve Walker, Vice President and CTO, Lockheed Martin.

"Defense primes, the commercial sector, U.S. universities, national laboratories, and the venture community all need to play an important role in the U.S. innovation system."

Dr. Steve Walker
Vice President and CTO, Lockheed Martin

The region wants to be more than just a manufacturing city; it wants to develop a lab-to-fab, end-to-end semiconductor ecosystem, and Arizona State University plays a critical role.

For example, ASU established a $270 million partnership with Applied Materials to create a materials-to-fab facility; Applied Materials is contributing $200 million worth of tools. One of the biggest barriers for startups in microelectronics is having access to these very expensive tools. Also, recently, ASU was awarded one of the eight Department of Defense microelectronics hubs. ASU has 70 partners including, for example, Sandia National Laboratories, Lockheed Martin, Intel, SkyWater, Nvidia, and Microsoft. Since the award was announced, 40 additional partners have asked to be part of the hub.

There is complexity in partnerships that must be managed. This includes having a common mission that partners understand, and open engagement. For example, the DoD recently released its first request for proposal for projects for the Manufacturing Commons hubs, and all partners must feel they have access to that information and an ability to compete. Bringing together collaborations is important. Prior to receiving the DoD hub award, ASU and some of its partners funded a competition for seed grants to start those collaborations, hoping it would make them more competitive in the DoD competition. Getting the right leader is important. You need a professional who can bridge the involved sectors, with some program management experience and, perhaps, some technology transition experience. A forum of DARPA alumni would make a good pool of talent.

A new model takes innovation partnerships global. Hevolution has developed a new model that is global in scope that includes early stage grants and investments to drive research and, ultimately, entrepreneurship and commercialization. The model is focused on extending the healthspan—living healthier, longer. On average, humans are now living about 30 years longer than generations past, but most will spend a majority of those years suffering from one or more chronic diseases. It is a looming disaster as populations in the United States and abroad age and fertility rates drop. We need older folks to be engaged, productive, and innovative far longer than in the past.

"We are looking to universities to train students with a full toolbox of skills. But students also need curiosity, an appetite to work on problems and to work together. And as a nation, we need an appreciation that no one set of tools, no matter how robust or major they are, is going to be all we need. In the end, U.S. competitiveness will depend on many perspectives, many tools, and many skills."

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

Hevolution started with a blank sheet of paper, and made three intentional choices for its model:

- **No siloes.** Typically, the pharm and bio life cycle looks something like: there is research resulting in intellectual property; there are technology transfer offices that get involved; maybe a start-up company emerges or the intellectual property gets licensed to a company; maybe something gets developed; and maybe, 20 years later, a drug or therapeutic hits the marketplace. That is not fast or soon enough. The Hevolution model brings together all of that "system"—from the start to the beginning, driving innovation from ideation to delivery. The aim is to drive forward this process much faster.
- **Fresh approach to translation and company incubation.** The time-honored way of starting a company is to do the work and hope for the best. It is a risk intolerant way to get science translated into products because, once the company is started, it does not want to fail. The Hevolution Breakthrough Innovation Alliance brings together, at the start, leaders from pharma and biotech, venture capital, and successful entrepreneurs. Working together, they select scientific ideas with big breakthrough potential, and invest in risk reduction and value creation experiments first, but expect most of these high-risk/high-potential projects will fail. However, if a project portfolio is built, some will work, and those are likely to be ideas that would not have seen the light of day if they did not have the best mentorship, the best financial and other support, and a nurturing environment. Projects that do work will start companies with investors, partners, and mentors already in place giving a much better chance of success.
- **Global from the start.** The Hevolution model seeks to source great ideas globally. Health is a national good, a global good, and global opportunity. Health does not know borders, and the therapeutics Hevolution aims to develop need to be available globally. The idea is to take the best lessons from COVID and apply them in a non-emergency situation.

Priorities for the Council in 2024. Panelists identified issues on which the Council should consider taking action or advocacy or making recommendations:

- Workforce development and STEM education across the lifespan, and retraining our workforce and engineers in new technology areas. This includes investments in every zip code to develop literacy and mathematical fluency. Also, all students need to be able to work with data.
- Data policy. There is a whole set of new companies whose business proposition is gathering and curating good data sets. Why should their data be open if it is part of their business proposition? Also, we do not have policies that allow us to share data with allied nations.

"We can do more to catalyze new collaborations and increase the speed of developing complex partnerships. For example, I think we do need to speed up practical issues like establishing NDAs and agreements. Despite some successes, we are still not as quick as we need to be."

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

"If we could extend healthy lifespan by 12 months on average, we would create, globally, nearly $40 trillion in value with saved health care expenses, and increased value creation and productivity."

Dr. William Greene
Chief Investment Officer, Hevolution

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

- National security requires a unique workforce, mostly U.S. citizens, many with clearances. Keeping those people and ensuring they can work in up-and-coming fields of technology is important.
- Upgrading national laboratory, NIST, and NASA facilities; some are 40 or 50 years old. This is important to keep them competitive in attracting the best and brightest.
- Create an environment that supports risk-taking and appropriate failure. Some of the best ideas come out of left field, where conventional wisdom said that was not going to work.

Building the National Security Research and Technology Infrastructure for the Future

PANELISTS

Dr. Kimberly S. Budil
Director, Lawrence Livermore National Laboratory

The Honorable Jill Hruby
Under Secretary for Nuclear Security and Administrator of the National Nuclear Security Administration, U.S. Department of Energy

Dr. James Peery
Director, Sandia National Laboratories

The Honorable Deborah L. Wince-Smith
President and CEO, Council on Competitiveness (Moderator)

Leaders from the U.S. Department of Energy and its national laboratories discussed the impact of the 2022 CHIPS and Science Act investments, and the need to sustain investment to ensure U.S. leadership in technologies ranging from AI to nuclear to high performance computing. Key points from the panel discussion.

U.S. advanced user facilities, their tools, and infrastructure must keep pace with modernization. This includes U.S. national laboratories. The United States has to produce nuclear deterrents, but it has not manufactured them for a long time. And when you stop working everyday with nuclear materials, or manufacturing anything in this space (or in any manufacturing endeavor), it is hard to bring those capabilities back up when lost—and it costs a lot of money to do so.

Sandia National Laboratories' Mesa facility is a fabrication and foundry facility for microelectronics, but it was built and finished about 25 years ago. In the microelectronics industry, that is a very old facility. But it serves the nuclear weapons mission well because it is the only place in the country that can produce trusted, radiation-hardened, microelectronics for the hostile environments that would be encountered. But there is no money in the CHIPS and Science Act appropriated or even to some extent authorized to recapitalize the Mesa facility.

Mesa has submitted concepts and proposals to the National Nuclear Security Administration (NNSA) on heterogeneous integration, the newest microelectronics the industry can produce, and marrying that with Mesa's radiation-hard microelectronics to provide new capabilities for new missions in the future. Mesa has already shown how to do heterogeneous integration for focal plane arrays, but is more than ten generations behind in microelectronics, so there is not a big calling for the chips made there outside of the nuclear weapons mission. However, the Mesa facilities produce ion traps for quantum computing, and provide those to universities and other Federal government agencies.

Fusion energy breakthrough was the result of 60 years of effort. On December 5, 2022, researchers at Lawrence Livermore National Laboratory's National Ignition Facility (NIF) for the first time anywhere by any approach achieved a fusion experiment that produced more fusion energy than the

Dr. Kimberly S. Budil, Director, Lawrence Livermore National Laboratory; The Honorable Jill Hruby, Under Secretary for Nuclear Security and Administrator of the National Nuclear Security Administration, U.S. Department of Energy; Dr. James Peery, Director, Sandia National Laboratories; and The Honorable Deborah L. Wince-Smith, President and CEO, Council on Competitiveness.

laser energy required to trigger the reaction—a huge advancement for the field, repeated in three subsequent experiments at NIF. This achievement was 60 years in the making, with contributions from thousands of people, breakthroughs in material science and engineering, and a series of laser facilities built over those decades.

Building and sustaining support for the NIF took substantial effort—building an industrial supply base across 50 states, forging domestic and international partnerships, building partnerships with researchers interested in NIF capabilities, communications to sustain support from Congress, and building a talent pipeline that ranged from skilled crafts to facility operators to those who invented new techniques and technologies (from crystal growth, to target fabrication, to optics conditioning) from which new spin-outs have emerged.

When ground was broken to build the NIF more than 20 years ago, there was no idea around how complicated that process would be, how long it would take, or a good understanding of what the facility would be able to do. But the NIF is revolutionizing how we think about fusion technology and materials in extreme environments, and the astrophysics community is using it to understand the properties of giant planets and conditions at the Earth's core. The NIF has been in operation for more than ten years, and more than 400 experiments are conducted a year.

"(NIF) is teaching us things we could not anticipate, because when you conceive a facility, you just simply cannot understand all the applications of that facility. And I would contend that as we, as a nation, think about investments and research infrastructure, we often forget this important lesson when we consider and make these large-scale investments. They bear fruit that we do not anticipate."

Dr. Kimberly S. Budil
Director, Lawrence Livermore National Laboratory

NIF needs sustainment activities, as many of its systems are aging. The facility was built in 2005, so some of the computer systems that control this precision machine are aging, and many of the optics have been through many duty cycles and need attention.

Getting to commercial scale laser fusion in the United States. There have been very significant scientific and technical advances in laser fusion, and the United States has an enormous lead in this technology. But a lot of work needs to be done going forward to maintain and grow that lead. To operate a plant with fusion reactions going ten times a second rather than once a week is going to require new laser technologies, blanket and wall materials for the chamber, understanding of the tritium cycle, and new ways to build targets. We have the fundamental physics building block, but need investment and the private sector to come in if we are going to build a power plant. Time is money. So, if you want fusion energy in ten years, we need a ten X scale up in the investment quickly because these are significant technology challenges.

Nuclear energy is great for clean energy, but there is a proliferation risk. Currently, about 38 nuclear power plants are under construction around the world. Only four of those are not Russian or Chinese designed. The United States needs to get back in the business, and small modular reactors is one way to do that.

However, nuclear energy sits at the intersection of two existential threats—climate change and nuclear weapons. These is potential for these vectors to conflict. If there is a nuclear energy renaissance, we have to be very careful, use U.S. technology, and create a domestic enriched uranium supply chain, which has largely been a Russian supply chain. There is other work that must be done around proliferation, safeguards, building safe plants, and plant security. In addition, we have allowed, over time, the atrophy of nuclear engineering degrees and training, and that must be addressed by the universities.

"We just got the latest economic analysis on Sandia's impact to the country—not just in New Mexico—from 2000 to 2020. Analysis done by Techlink shows that Sandia had a national economic impact of $140 billion over those two decades. So, if you take into account the amount of taxpayer dollars that came to Sandia over that time, it is a return to the nation of more than a factor of three."

Dr. James Peery
Director, Sandia National Laboratories

Taking Talent to the Next Level—Preparing the Workforce for a Sustainable U.S. Manufacturing Renaissance

PANELISTS

Dr. Steven Ashby
Director, Pacific Northwest National Laboratory

Dr. Carol Burns
Deputy Laboratory Director for Research and Chief Research Officer, Berkeley Lab

Dr. Elizabeth Cantwell
President, Utah State University

Mr. Nicholas T. Pinchuk
Chairman and CEO, Snap-on Incorporated

Dr. Gregory Washington
President, George Mason University

Dr. Pradeep Khosla
Chancellor, University of California, San Diego (Moderator)

Panelists explored the talent challenge. Ensuring the country has the skilled workers to take advantage of the tremendous opportunities presented by the move to sustainability and the reinvestment in manufacturing will determine whether the country continues to lead in critical sectors. Key points from the panel discussion:

A talent crisis is coming. The number of individuals coming into the workforce are not enough to backfill the individuals who are leaving. Birth rates declined during the Great Recession, and that smaller cohort of young people are now becoming college age. The pipeline of undergraduate students will decrease 9-13 percent over the next 5-7 years, although some regions of the country will see an increase upwards of 20 percent.[1]

As baby boomers age out, the millennials are the next largest adult population in the workforce, and they have very different expectations. They want more experience and opportunity earlier than traditionally has been given. To attract this generation, jobs may need to be structured to make that possible, and universities will need to produce people ready for continual upgrading of their skills.

Demand for experiential learning is on the rise. Students—from traditional 17-18 year-olds to lifelong learners—want experiential learning at the certificate and undergraduate levels. National laboratories need every engineering and physics student they can find.

However, there is a scaling problem. The higher education ecosystem is not set up to enable all students to have these experiences. We need an Apollo-like internship initiative. Companies should have internships aligned with the hiring they will need over the next five years. For example, if the company is going to hire 10,000 people, it needs 10,000 internships. Students need experiential learning opportunities and education institutions need partnerships that connect them to those opportunities.

1 Higher education enrollment: Inevitable Decline or Online Opportunity, McKinsey and Company, November 2020.

Mr. Nicholas T. Pinchuk, Chairman and CEO, Snap-on Incorporated; Dr. Steven Ashby, Director, Pacific Northwest National Laboratory; Dr. Carol Burns, Deputy Laboratory Director for Research and Chief Research Officer, Berkeley Lab; Dr. Elizabeth Cantwell, President, Utah State University; Dr. Gregory Washington, President, George Mason University; and Dr. Pradeep Khosla, Chancellor, University of California, San Diego (Moderator).

"We call it the demographic cliff. It is a real concept. It is not something that is coming. In many parts of the country, it is already here."

Dr. Gregory Washington
President, George Mason University

Universities, national laboratories, and industry face challenges in attracting PhDs because not enough are being produced, particularly PhDs who are American citizens. Institutions used to be able to pick the best people from all over the world. However, today, there are more constraints being placed on publicly-funded research in terms of clearances, security, International Traffic in Arms regulation (ITAR), etc. For example, Pacific Northwest National laboratory works at the cutting edge of material science and nuclear science. That cannot be sustained if there are not enough American PhDs being produced. In addition, limiting the number of the best coming to this country will reduce our ability to sustain wealth generation.

"One of the best solutions, besides changing the way we produce the talent, is continuing to keep America open to the brightest minds from around the world to come here, contribute where they can, and eventually get citizenship and contribute across the full range from science to energy to national security."

Dr. Steven Ashby
Director, Pacific Northwest National Laboratory

Part of the challenge is the willingness of students to enter some of these disciplines. They have to get excited about the fields and the impact they could make. Educators have to tell prospective students that

"We are a bit of a gateway STEM employer. Get them in, get them interested in science- or mission-oriented work, send them off to other sectors. So, we are keenly interested in helping to be part of that ecosystem to develop that talent. How do we facilitate the flow of people? How do we make sure those investments are made in the specialized tools and facilities that are really going to get people hooked on innovation?"

Dr. Carol Burns
Deputy Laboratory Director for Research and Chief Research Officer
Berkeley Lab

"I really would like to have us walk away from the language around the best and the brightest come to us, then the best and the brightest get access to the creation of new ideas, and then the best and the brightest get access to translation of those ideas. Because there are a lot of people and students today who do not identify that way when they come into my university. I want them to feel like they can have access to that translation of ideas piece, the innovation piece, without being the best and the brightest out of the gate."

Dr. Elizabeth Cantwell
President, Utah State University

you might learn to solve a partial differential equation, but you are also going to learn how to build a business case, how to adapt across different disciplines, how to sell yourself, how to work with others, and how to create a team environment and manage projects.

Workforce development must focus on more than just the college educated. During the pandemic, many people stayed at home in fear, ordering food and Amazon deliveries. That food and those packages were delivered by a truck driver who could not work from home…a warehouse worker who could not work from home loaded that food and those packages…a mechanic who kept those delivery trucks and cars running also could not work from home…and a factory worker who produced or processed that food could not work from home. There are hundreds of thousands of jobs open in manufacturing alone. But it is a challenge to get people to work in factories because they view it as the consolation prize of our society, and not the essential calling the work truly represents."

At the Pacific Northwest National Laboratory, of the 6,000 working there, a minority have PhDs or an advanced degree. There are technicians and skilled crafts people who make things. During the pandemic, they were the essential workers who kept the laboratory's campus open, enabling the lab work or classified work that could not be done at home. There are hundreds of thousands of jobs open in manufacturing. But it is challenge to get people to work in factories because they view it as the consolation prize of our society.

"Two thirds of Americans were not working from home. The people of work stood their posts and kept our society from disintegrating while we engaged and defeated COVID. Who is more essential? We need more of those people. Upskilling the American workforce is the seminal issue of our time because this is what has kept the United States ascendant all these years."

Mr. Nicholas T. Pinchuk
Chairman and CEO, Snap-on Incorporated

"The American economy is like a Shakespearean stage. It takes all types. The country does not work with just PhDs or just undergrads or just high-school grads. We need everybody to be participating, to be taking part in the economy. And social mobility has to exist for everybody. And I think the higher education system in this country, as much as we might malign it, if you go through high school, community college, undergrad colleges, and research universities, it is a beautiful continuum."

Dr. Pradeep Khosla
Chancellor, University of California, San Diego

Rather than looking at low end and high end, the United States should look at a continuum of people we need to bring in at all levels—as well as an education continuum from certificate to a four-year or graduate degree—to be successful as a nation.

Utah State University is one of the few public institutions in the country offering programs and degrees that range from certificates to associate's degrees to bachelor's degrees that relate to regional company needs. Students will come to the university's training and associate's programs if companies come to the table, with or without an internship, because students want to understand what that world of work will be like when they get there.

Launching a Competitiveness Conversation Across America

Setting the Vision for the "Competitiveness Conversations Across America"

SPEAKERS

Dr. James Clements
President, Clemson University

Mr. Josh Parker
Chair and CEO, Ancora L&G

The Honorable Deborah L. Wince-Smith
President and CEO, Council on Competitiveness (Moderator)

Panelists discussed the current moment of potential to drive substantial improvements in economic outcomes across the United States, and examples of places creating successful innovation ecosystems. Council President and CEO Deborah L. Wince-Smith announced a major new Council initiative to vitalize innovation ecosystems: "Competitiveness Conversations Across America."

The United States is in an unusual macro moment. We are experiencing an aging population, declining birth rate, decarbonization of our economy, the green energy transition, and shifts in the continental and maritime power balance—and all of this is playing out both domestically and globally. The biggest economic gains over the last 30 years have been concentrated in coastal cities, in an ever-consolidating set of privately owned companies, in an era defined by a hollowing out of communities around the country. That has contributed to polarization and intractable politicization in pitting areas of the country against each other.

"We have this opportunity now when our communities can become globally competitive without having to be in competition with each other on a zero sum basis."

Mr. Josh Parker
Chair and CEO, Ancora L&G

However, the economy of the future we are starting to build at this moment could offer a wider and more diverse participation. The enormous investments being made with the CHIPS and Science Act, the Inflation Reduction Act, and other economic policies could be used to actualize U.S. economic potential. Our economy could be resilient when industries or asset values are disrupted, offer sustainable growth across limitless technological innovation, regrow the strongest middle class that exists across the globe, and offer job opportunities to all.

For all the talk of the world being flat, the United States is flat. We have seamless integration across local and state lines for business activity. The United States has protections for intellectual property that other countries do not have. We live in a place rich with natural resources, probably the most import-

Dr. James Clements, President, Clemson University; Mr. Josh Parker, Chair and CEO, Ancora L&G; and The Honorable Deborah L. Wince-Smith, President and CEO, Council on Competitiveness.

ant being our talent, which can be mobile and allow regions to grow and evolve, specializing in or accelerating innovations as they come up.

The Federal government and universities have an efficient partnership to drive basic research. And universities, being geographically distributed, have the ability to create job opportunities and innovation out of that basic science. They have moved further into the forefront of translation, commercialization, and partnership with industry around the platform technologies of the future. We need to lower even further the barriers to university partnerships with industry and entrepreneurs. We need to bring to the surface the competitive advantages each of our communities has, identify the barriers to their success, and then develop actionable solutions around them.

South Carolina's recipe for competitiveness and economic development. Clemson University and other South Carolina universities are helping drive manufacturing and competitiveness in South Carolina, forging partnerships with a wide range of automotive, aviation, and energy companies. South Carolina has become a magnet for advanced automotive manufacturing. A key catalyst was one of Europe's largest manufacturers coming to the state—and from where they now make more cars than anywhere else in the world. Also, Clemson's Center for Automotive Research has received several hundred million dollars of Federal, state, and private investment, and has many industry research partners from around the world.

Clemson led the Nation with the first National Center for Transportation Cybersecurity and Resiliency or TraCR, supported by a $20 million U.S. Department of Transportation grant over five years. Clemson is partnering with Purdue University, the University of Alabama, the University of Texas at Dallas, industry leaders, and others. TraCR focuses on attacks to our transportation system, whether it is subway, monorail, cars, airlines, etc.

South Carolina has significant military assets and is home to the Savannah River National Laboratory. Clemson, along with others like the University of South Carolina, South Carolina State University, and the University of Georgia set up a partnership with Savannah River to do research there. Clemson's University Restoration Institute has the largest wind

Dr. James Clements, President, Clemson University; Mr. Josh Parker, Chair and CEO, Ancora L&G; and The Honorable Deborah L. Wince-Smith, President and CEO, Council on Competitiveness.

"We set up a President's Industry Council with 24 CEOs of major companies in our region. Through internships, co-ops, research and curriculum development, we are creating a more robust workforce for the future. When we went to the state with this model, they supported us with funding. Then, industry matched that funding because they knew this partnership would significantly impact our region. This model could be replicated across the country and has the potential to transform our communities, our states and beyond."

Dr. James Clements
President, Clemson University

turbine test facility in the world, where they simulate attacks on the grid, assess how long grids are down, and how to get them back up.

Challenges in the state include workforce development and the speed of innovation, and Clemson is tackling those challenges in partnership with industry in the region.

Making innovation more inclusive is an imperative. We have not done a good job at including all of our people and places in the innovation future. Some industrial enterprise is coming back to the Midwest, but parts of the country are totally hollowed out and the devastation is severe.

In addition to building up their infrastructure, it is important to bring tribal nations, Hispanic-serving institutions, and HBCUs into research and innovation partnerships. For example, South Carolina State, an HBCU, is a critical partner in the multi-university partnership with the Savannah River National Laboratory. It is also partnering with 27 other entities in to carry out a $70 million USDA grant to advance smart climate production across the state, especially in underserved areas. South Carolina State will also be working with Clemson on its $100 million project with the Department of Army to build next generation autonomous ground combat vehicles.

Tennessee—Redefining Place & Building the Future Innovation Ecosystem for Mobility, Energy & Manufacturing

SPEAKERS

Dr. Daniel Diermeier
Chancellor, Vanderbilt University

The Honorable Deborah L. Wince-Smith
President and CEO, Council on Competitiveness (Moderator)

Dr. Daniel Diermeier, Chancellor, Vanderbilt University; and The Honorable Deborah L. Wince-Smith, President and CEO, Council on Competitiveness.

The United States is seeing a significant shift of economic activity to places such as Nashville, Phoenix, Miami, and other parts of the Sunbelt. For the first time, Southern states—including Florida, Texas, Georgia, Tennessee, North and South Carolina—together have contributed more to U.S. GDP than the Northeast. There are a lot of people, capital, and businesses relocating to hotspots like Nashville, Chattanooga, and Knoxville.

Collaboration state-wide. In Tennessee, there has been significant long-term collaboration among civic leaders, mayors, and governors with the strategic intent of attracting business to the state. That started with attracting auto manufacturing from Japan, followed by battery makers from Korea, and Ford Blue Oval. Volkswagen is expanding its presence. The state's assets include a business-friendly climate, a skilled workforce, and cost-competitive energy.

While Tennessee has a sustainable competitive advantage in auto manufacturing, it needs to do more science-driven innovation. It does not have that deep tech or PhD-level innovation. That is where universities fit in, where they want to play a role. Also, Oak Ridge National Laboratory is in the state, and playing a critical role in many areas, including science, advanced materials, and exascale computing that enables AI applications.

Partnerships to drive toward the future of mobility. Vanderbilt University is a leader at the intersection of computing and connected cars. Cars are becoming like iPhones on wheels, and iPhones can talk to each other. That opens up all sorts of opportunities to think about traffic. Vanderbilt researchers are using mathematical models to explore how to get phantom traffic jams to disappear. The researchers demonstrated that, once you have a pacer car that drives at the average of all the other cars, there are complicated waves that create these traffic jams. To test this theory in the real world, a ten-mile long testbed was created on I-24, the biggest real world test-

"We want to create these partnerships in a deep way, not in a sequential way in which you're saying, well, first we get the funding, and then we do this and that. Rather, our focus is to bring all of the assets, elements, partners, and partnerships together in an integrated fashion so that we can advance knowledge and social impact in a way that no institution could do on its own."

Dr. Daniel Diermeier
Chancellor, Vanderbilt University

"Tennessee has about 7 million people. That is like a small Scandinavian country. We are bigger than Denmark and smaller than Sweden. What that means is that everybody knows each other. It is easy to work together. And when we work together, we can harness the capabilities that the state can bring to the forefront."

Dr. Daniel Diermeier
Chancellor, Vanderbilt University

Dr. Daniel Diermeier
Chancellor, Vanderbilt University

bed in the world. Vanderbilt collaborated with other universities, as well as with the Tennessee Department of Transportation to get permits and funding to install sensors to track the vehicles. Vanderbilt had started building a deep partnership with Nissan about two yeas ago. And Nissan provided 100 cars for the experiment. The project could not have happened without the collaboration between a university, the government, and private entities. Now Tennessee has a testbed that can be used for all sorts of traffic modeling moving forward.

Tennessee leverages regional collaboration. Fort Campbell is in Kentucky, but Tennessee has leveraged its presence. Ever year, 4,500 veterans leave Fort Campbell, and veterans are a phenomenal source of talent for Tennessee. In addition, Vanderbilt wanted to work in soldier-driven innovation, and set up a design lab collaboration with the 101st Airborne, 160th, and fifth Special Forces to apply engineering and design thinking to problems they have. The first great project that came out of that collaboration is an exoskeleton you put on like a harness that creates additional back support on command with smart materials, which reduces back injuries. The project created a prototype that has spun out into a start-up company called HEROWEAR.

Powering Innovation: Semiconductors and Clean Energy, Including Advanced Nuclear

A Competitiveness Conversation in the Mountain West

PANEL

Dr. Marlene Tromp
President, Boise State University

Dr. Marianne Walck
Director, National Energy Technology Laboratory, and former Chief Research Officer, Idaho National Laboratory

Mr. Chad Evans
Executive Vice President, Council on Competitiveness (Moderator)

Idaho is building a high-tech engine. The number of high-tech companies in Idaho has increased by more than 60 percent over the past decade. Idaho is the home of the only U.S.-based memory chip maker, Micron Technology, and the state's semiconductor industry supports more than 8,200 jobs.

Boise State University has the largest engineering school and the largest business school in Idaho. It is part of the U.S.-Japan University Partnership for Workforce Advancement and Research & Development in Semiconductors for the Future, a global semiconductor effort to advance U.S. competitiveness in the semiconductor industry. At the heart of the State's innovation engine is the greater metropolitan area of Boise, one of the fastest growing cities and towns in the United States, but also one of the most isolated in terms of its location from other major cities.

Reaching into rural communities could make an enormous contribution to the skilled and educated workforce pipeline. Boise State is reaching out to that population where there has been a massive decline in college attendance. It is planting itself in rural communities all over the state, sending faculty out and building a cohort that gets an education. Boise State is part of a National Consortium called Rapid Educational Prototyping and has asked students how they would redesign higher education, and it is piloting those redesigns.

> "If we do not want to be faced with that demographic cliff, what we need to think about is how do we tap a population of students that has remained largely untapped. And in rural communities, there has been a massive decline in college attendance."
>
> **Dr. Marlene Tromp**
> President, Boise State University

Boise State and partners are reaching down into middle school with programs such as Semiconductors for All, preparing students for industries growing rapidly in Idaho. Micron is covering K-5, and Boise State is doing grades 5 and up. Idaho National Laboratory has two missions, nuclear and cybersecurity. Idaho is likely to become a destination state for cybersecurity, so Idaho universities are collaborating to ensure workforce gaps in cybersecurity are filled.

Dr. Marlene Tromp, President, Boise State University; Mr. Chad Evans, Executive Vice President, Council on Competitiveness; and Dr. Marianne Walck, Former Chief Research Officer, Idaho National Laboratory.

Scaling-up nuclear energy. Idaho National Laboratory designed, created, and produced the world's first nuclear reactor that generated usable electrical power. The nuclear energy industry was born west of Idaho Falls, when the Department of Defense developed the nuclear Navy after World War II.

Over the years, 52 different test reactors have been built in Idaho and, currently, three new demonstration projects for microreactors are being developed. These are very small reactors, a few tens of kilowatts up through a few megawatts in size, that could be used for forward operating military bases, the sites of mines, in remote Alaskan communities, and other niche applications. They are built in a factory, transportable, and have a long core life so they would not have to be refueled every 18 months as large nuclear power plants require. Then we can springboard into small modular reactors in the few hundred megawatt size range that could replace retiring coal plants. Idaho has mapped out an ecosystem for the decade ahead, including a variety of clean nuclear energy demonstrations.

"I think it has been made clear in a number of venues, including at the recent COP28, that if we are going to meet decarbonization goals for the world, we need a lot more nuclear energy than we have right now because it is clean, firm power."

Dr. Marianne Walck
Former Chief Research Officer, Idaho National Laboratory

Growing Innovation: Chips, Qubits and Molecules

A Competitiveness Conversation across the Midwest

PANEL

Dr. Mung Chiang
President, Purdue University

The Honorable Deborah L. Wince-Smith
President and CEO, Council on Competitiveness (Moderator)

Winning in Indiana. Indiana is a very competitive state with great manufacturing enterprises. Indiana was selected for three out of three national hub competitions—a hydrogen hub supported by the Department of Energy, a microelectronics hub for the Department of Defense Manufacturing Commons, and designation as a tech hub by the Department of Commerce making the hub eligible to compete for substantial funding. The tech hub is in biopharmaceutical manufacturing in Indianapolis where Purdue University is opening its first urban comprehensive campus. Purdue is the only university in central-to-northwest Indiana, and this is the only region in the United States to have won three out of three.

Jobs and talent together. The middle of the country has a lot to gain from reshoring manufacturing back to the United States. Indiana has been able to attract a lot of capital from elsewhere to the state, $50 billion in the last 24 months. Purdue has been participating in that on a per capita basis. We have the number one manufacturing capability in the United States. But Indiana, Illinois, and other Midwest states have to ensure they can create jobs and a talented workforce together.

Dr. Mung Chiang, President, Purdue University.

"Without jobs, the workforce will not stay. Nobody will stay to be unemployed. But without the workforce, the jobs will not come."

Dr. Mung Chiang
President, Purdue University

Purdue University is one of the Nation's leading land grant universities, among the top 50 American universities, and has the largest undergraduate STEM enrollment. Its College of Engineering is a top four graduate engineering school, educating as many

Dr. Mung Chiang, President, Purdue University; and The Honorable Deborah L. Wince-Smith, President and CEO, Council on Competitiveness.

students as the other three in the top four—MIT, Stanford, and the University of California, Berkeley—combined. That excellence at scale drives the workforce, and you need to scale to create new and sustain jobs.

Chips, qubits, and molecules. While we have to work with bytes and silicon chips, we also have to work with the atoms of the things we make, what we move, what we grow, as part of manufacturing industry 4.0, modern air mobility, the transportation revolution, and digital agriculture and forestry. We have to weave bytes of AI into these physical implementations, which will then translate into many new types of jobs in those industries. Purdue has a project using AI and robotics to count every tree in America, collecting data important for understanding tree species' diversity which is key to maintaining healthy, productive forests, and important to the economy and environment.

"I always say Purdue University is all about national security, economic security, job security, and food security. There are still people going hungry around the world for sure, and even within our own country as well. So, there is a lot to be done by combining digitization with agriculture (to solve longstanding challenges)."

Dr. Mung Chiang
President, Purdue University

Competitiveness Conversations across America. The National Commission on Innovation and Competitiveness Frontiers is launching a new initiative—Competitiveness Conversations Across America—led and shaped by Council on Competitiveness members from universities, national laboratories, industry, and labor, also involving community leaders and others. Some will be convened in individual states, and some in cross-state regions. The goal is to assess where the United States stands in terms of our innovation and competitiveness capabilities and capacities in these states and regions, what we still need to do, and the path to get us there.

Competitiveness Conversations Across America—2024

Idaho and the Mountain West

August 6-8, 2024
Boise, ID

CO-CHAIRS
Marlene Tromp
President, Boise State University

John Wagner
Director, Idaho National Laboratory

Chips, Qubits, and Molecules—Innovation in the Midwest

September 9-10, 2024
West LaFayette, IN

CO-CHAIRS
Mung Chiang
President, Purdue University

Paul Kearns
Director, Argonne National Laboratory

Tim Killeen
President, University of Illinois System

Tennessee—Redefining Place & Building the Future Innovation Ecosystem for Mobility, Energy & Manufacturing

April 25-26, 2024
Nashville, TN

CO-CHAIRS
Daniel Diermeier
Chancellor, Vanderbilt University

Donde Plowman
Chancellor, University of Tennessee, Knoxville

Council on Competitiveness Members, Fellows and Staff

BOARD

Mr. Brian Moynihan
Chair
President & CEO
Bank of America

Mr. Kenneth Cooper
International President
IBEW

Ms. Joan Gabel
Vice-Chair
Chancellor
University of Pittsburgh

Mr. Dan Helfrich
Business Vice-Chair
Chair and CEO
Deloitte Consulting

Mr. Charles O. Holliday, Jr.
Chairman Emeritus
The Council on Competitiveness

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

EXECUTIVE COMMITTEE

Dr. Gene D. Block
Chancellor
University of California, Los Angeles

Mr. William H. Bohnett
President
Whitecap Investments

Mr. Walter Carter, Jr.
President
The Ohio State University

Dr. Mung Chiang
President
Purdue University

Dr. James Clements
President
Clemson University

Mr. Jim Clifton
Chairman and Chief Executive Officer
Gallup

Dr. Michael M. Crow
President
Arizona State University

Dr. John J. DeGioia
President
Georgetown University

Dr. Suresh V. Garimella
President
University of Vermont

Dr. Sheryl Handler
President & Chief Executive Officer
Ab Initio

Dr. Farnam Jahanian
President
Carnegie Mellon University

Dr. Mehmood Khan
CEO
Hevolution Foundation

Dr. Pradeep K. Khosla
Chancellor
University of California, San Diego

Mr. John May
Chief Executive Officer
Deere & Company

Mr. James B. Milliken
Chancellor
University of Texas System

Dr. Santa J. Ono
President
University of Michigan

Mr. Nicholas T. Pinchuk
Chairman and CEO, Snap-on Incorporated

Ms. Randi Weingarten
President
American Federation of Teachers, AFL-CIO

Dr. David Kwabena Wilson
President
Morgan State University

Dr. W. Randolph Woodson
Chancellor
North Carolina State University

Mr. Paul A. Yarossi
Executive Vice President
HNTB Holding Ltd.

GENERAL MEMBERS

Mr. Jonathan Alger
President
James Madison University

Dr. Michael Amiridis
President
University of South Carolina

Dr. Joseph E. Aoun
President
Northeastern University

Dr. Dennis Assanis
President
University of Delaware

The Honorable Sandy K. Baruah
Chief Executive Officer
Detroit Regional Chamber

Dr. Stuart R. Bell
President
The University of Alabama

Dr. Richard Benson
President
University of Texas at Dallas

The Honorable Sylvia M. Burwell
President
American University

Dr. Elizabeth R. Cantwell
President
Utah State University

Mr. Rehan Chaudri
Chairman
Altan Partners LLC

The Honorable David T. Danielson
Managing Director
Breakthrough Energy Ventures

Mr. Ernest J. Dianastasis
Managing Director
The Precisionists, Inc.

Dr. Daniel Diermeier
Chancellor
Vanderbilt University

Mr. Jeff Donofrio
President and Chief Executive Officer
Business Leaders for Michigan

Dr. Taylor Eighmy
President
University of Texas at San Antonio

Dr. Kimberly Espy
President
Wayne State University

Dr. Greg Fenves
President
Emory University

Mr. Mike Freeman
CEO & General Manager
Innosphere Ventures

Dr. Julio Frenk
President
University of Miami

Dr. David A. Greene
President
Colby College

Dr. José-Marie Griffiths
President
Dakota State University

Dr. Bill Hardgrave
President
University of Memphis

Mr. Joseph Harroz, Jr.
President
University of Oklahoma

Dr. Eric Isaacs
President
Carnegie Institution for Science

The Honorable Steven Isakowitz
President and CEO
The Aerospace Corporation

Dr. Robert E. Johnson
President
Western New England University

Dr. Mark E. Keenum
President
Mississippi State University

Dr. Martin Keller
Director, National Renewal Energy Laboratory
President, Alliance & Sustainable Energy

Dr. Timothy L. Killeen
President
University of Illinois System

Dr. Sunil Kumar
President
Tufts University

Ms. Rhea Law
President and CEO
University of South Florida

Dr. Michael Lovell
President
Marquette University

Dr. Larry Marshall
Chief Executive
Commonwealth Scientific and Industrial Research Organisation (CSIRO)

Dr. Harold L. Martin
Chancellor
North Carolina A&T

Dr. Gary S. May
Chancellor
University of California, Davis

Dr. Maurie McInnis
President
Stony Brook University

Brig. Gen. John Michel
Executive Director
Skyworks Global

Dr. Jennifer L. Mnookin
Chancellor
University of Wisconsin—Madison

Mr. Jere W. Morehead
President
University of Georgia

Mr. Joshua Parker
Chief Executive Officer
Ancora

Mr. Jeff Peoples
Chairman, President and CEO
Alabama Power Company

Dr. Darryll Pines
President
University of Maryland

Lt. Gen. Michael T. Plehn, USAF
President
National Defense University

Ms. Donde Plowman
Chancellor
University of Tennessee, Knoxville

Dr. Jason Providakes
President and CEO
The MITRE Corporation

Mr. John Pyrovolakis
Founder and CEO
Innovation Accelerator Foundation

Mr. Rory Riggs
Managing Member
Balfour, LLC

Mr. Alex Rogers
President, Qualcomm Technology Licensing
Qualcomm

Dr. Rodney Rogers
President
Bowling Green State University

Dr. James E. Ryan
President
University of Virginia

VADM John Ryan, USN (Ret.)
President & Chief Executive Officer
Center for Creative Leadership

Dr. Timothy D. Sands
President
Virginia Polytechnic Institute and State University

Mr. John Sharp
President
The Texas A&M University System

Mr. Paul P. Skoutelas
President & CEO
American Public Transport Association

Ms. G. Gabrielle Starr
President
Pomona College

Dr. Elisa Stephens
President
Academy of Art University

Mr. Steven Stevanovich
Chairman & CEO
SGS Global Holdings

Dr. Elizabeth Stroble
Chancellor
Webster University

Dr. Kumble Subbaswamy
Chancellor
University of Massachusetts Amherst

Mr. Sridhar Sudarsan
Chief Technology Officer
SparkCognition, Inc.

Mr. Andrew Thompson
Managing Director
Spring Ridge Ventures

Ms. Van Ton-Quinlivan
CEO
Future Health

Dr. Satish Tripathi
President
University at Buffalo

Dr. Marlene Tromp
President
Boise State University

Dr. Gerald Turner
President
Southern Methodist University

Dr. Martin Vanderploeg
President and CEO
Workiva

Dr. Steven Walker
Vice President and Chief Technology Officer
Lockheed Martin

Dr. Gregory Washington
President
George Mason University

The Hon. Olin L. Wethington
CEO & Co-Founder
Graham Biosciences LLC

Ms. Mary Ellen Wiederwohl
President & CEO
Accelerator for America

Dr. Kim Wilcox
Chancellor
University of California, Riverside

Dr. Wendy Wintersteen
President
Iowa State University

Mr. John Young
Founder
The Council on Competitiveness

NATIONAL LAB PARTNERS

Dr. Steven F. Ashby
Director
Pacific Northwest National Laboratory

Dr. Kimberly Budil
Director
Lawrence Livermore National Laboratory

Dr. Paul Kearns
Director
Argonne National Laboratory

Dr. Thomas Mason
Director
Los Alamos National Laboratory

Dr. James Peery
Director
Sandia National Laboratories

Dr. Stephen K. Streiffer
Director
Oak Ridge National Laboratory

Dr. John Wagner
Director
Idaho National Laboratory

Dr. Michael Witherell
Director
Lawrence Berkeley National Laboratory

CORPORATE PARTNERS

HP Federal

Intel Corporation

PepsiCo, Inc

UNIVERSITY PARTNERS

University of California, Irvine

University of Pennsylvania

NATIONAL AFFILIATES

Dr. Dean Bartles
Chief Executive Officer and President
Manufacturing Technology Deployment Group

Ms. Caron Ogg
President
ARCS Foundation, Inc.

Dr. David Oxtoby
President
American Academy of Arts and Sciences

DISTINGUISHED FELLOWS

The Honorable France Córdova
President
Science Philanthropy Alliance

The Honorable Paul Dabbar
Chairman and CEO
Bohr Quantum Technologies

Adm. James G. Foggo, USN (Ret.)
Former Commander, U.S. Naval Forces Europe and Africa and Commander, Allied Joint Force Command, Naples, Italy

Dr. William H. Goldstein
Former Director
Lawrence Livermore National Laboratory

The Honorable Bart J. Gordon
Partner
K&L Gates LLP

Mr. Thomas Hicks
Principal
The Mabus Group

Dr. Klaus Hoehn
Former Senior Advisor—Innovation & Technology to the Office of the Chairman, and Vice President, Advanced Technology & Engineering
Deere & Company

Dr. Paul J. Hommert
Former Director
Sandia National Laboratories

Dr. Lloyd A. Jacobs
Former President
University of Toledo

Dr. Ray O Johnson
CEO
Technology Innovation Institute

The Honorable Martha Kanter
Executive Director
College Promise Campaign

The Honorable Alexander A. Karsner
Senior Strategist
X: Alphabet's Moonshot Factory

The Honorable Steven E. Koonin
Professor, Department of Civil and Urban Engineering, Tandon School of Engineering
New York University

The Honorable Michael Kratsios
Former Acting Under Secretary of Defense for Research and Engineering, and Former Chief Technology Officer of the United States, and Managing Director, Scale AI

Mr. R. Brad Lane
Co-Founder and Chief Executive Officer
Ridge-Lane Limited Partners

The Honorable Alan P. Larson
Senior International Policy Advisor
Covington & Burling LLP

Mr. Edward J. McElroy
Board of Directors, Executive Committee of Ullico
AFL-CIO

Mr. Jon McIntyre
Former CEO
Motif Ingredients

Dr. Harris Pastides
Former President
University of South Carolina

Dr. Luis M. Proenza
President Emeritus
University of Akron

The Honorable Kimberly Reed
Former President
Export-Import Bank of the United States

The Honorable Branko Terzic
Managing Director
Berkeley Research Group

Dr. Anthony J. Tether
Former Director
Defense Advanced Research Projects Agency (DARPA)

Dr. Thomas M. Uhlman
Founder and Managing Partner
New Venture Partners, LLC

The Honorable Olin Wethington
CEO & Co-Founder
Graham Biosciences LLC

Dr. Mohammad Zaidi
Strategic Advisory Board Member
Braemar Energy Ventures

SENIOR FELLOWS

Mr. Bray Barnes
Director
Global Security & Innovation Strategies

Ms. Jennifer S. Bond
Former Director
Science and Engineering Indicators Program
National Science Foundation

Dr. Thomas A. Campbell
Founder & President
FutureGrasp, LLC

Mr. C. Michael Cassidy
Director, Emory Biomedical Catalyst
Emory University

Ms. Dona L. Crawford
President Emeritus
Livermore Lab Foundation

Dr. Jerry Haar
Professor & Executive Director
Florida International University

Mr. Dominik Knoll
President & CEO
AVA Ventures

Mr. Alex R. Larzelere
President
Larzelere & Associates

Mr. Abbott Lipsky
Partner
Latham & Watkins LLP

The Honorable Julie Meier Wright
Strategic Advisor
Collaborative Economics

Mr. Mark Minevich
Principal Founder
Going Global Ventures

Dr. Rustom Mody
CEO
Vintech NM

Ms. Michelle Moore
Chief Executive Officer
Groundswell

Mr. Toby Redshaw
CEO
Verus Advisory, LLC

Ms. Jody Ruth
CEO
Redstones LLC

The Honorable Reuben Sarkar
President & CEO
American Center for Mobility

Mr. W. Allen Shapard
Senior Director, Chair of Public Engagement Strategies
APCO Worldwide

Ms. Maria-Elena Tierno
Sr. Business Development Capture Manager - Integrated Missions Operations
Leidos

Dr. William Wescott
Managing Partner
BrainOxygen, LLC

Dr. David B. Williams
Monte Ahuja Endowed Dean's Char &
Dean of the College of Engineering
The Ohio State University

STAFF

Mr. Chad Evans
Executive Vice President and Secretary to the Board

Mr. Michael Nelson
Vice President

Mr. William Bates
Senior Advisor

Ms. Marcy Jones
Special Assistant to the President & CEO, Office Manager and Director of Member Services

Compete.
Council on Competitiveness

Contact

For more information, please contact:

Mr. Chad Evans
Executive Vice President
cevans@compete.org

Council on Competitiveness
900 17th Street, NW
Suite 700
Washington, D.C. 20006

Join the Conversation

@CompeteNow

/USCouncilonCompetitiveness

/company/council-on-competitiveness/

CompeteTV

Compete.org

About the Council on Competitiveness

For more than three 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 lab 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.