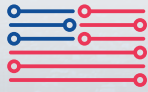
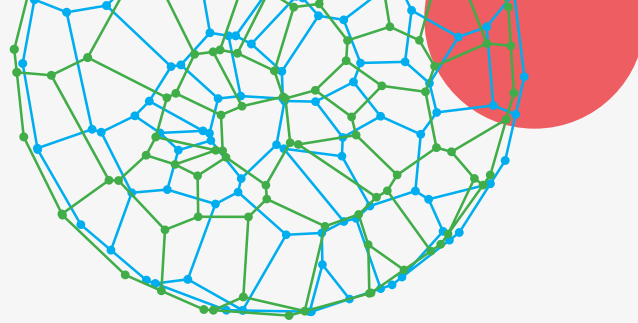


SCIENCE & TECHNOLOGY  
ACTION COMMITTEE



# STATE OF SCIENCE IN AMERICA



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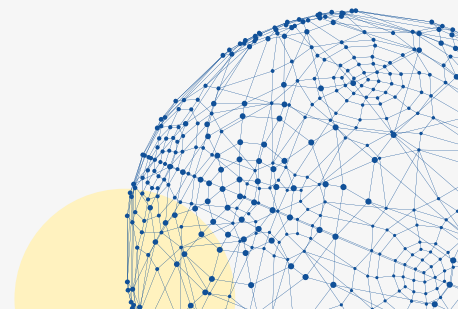
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# A LETTER FROM OUR CO-CHAIRS

The findings and recommendations in the State of Science in America report provide an undeniable clarion call and starting point for policymakers to develop and fund a national science and technology strategy that generates the greatest possible return on investment, addresses the existential threats of our time, and secures a brighter future for all Americans.

Federal investment in science and technology has long ensured our national security, improved our health and well-being, and grown our economy and the good jobs that come with it. From early breakthroughs in space exploration to the development of the microchip, from the mapping of the human genome to recent breakthroughs in fusion energy, these and many more accomplishments in dozens of sectors are all rooted in one thing: federal support for science and technology.

Despite this stellar record, science and technology investment has dropped down the list of national priorities over the past several decades. And while the U.S. remains highly innovative and competitive, we lack a long-term plan going forward. The decline in federal funding as a percentage of the gross domestic product (GDP), paired with the absence of a national strategy to maximize every dollar spent, has left us ill-prepared for the future. Today, government funding for research and development sits at just **0.7% of our GDP<sup>1</sup>** compared to our historical peak of 1.9% in 1964, and contrasts sharply with increases by our competitors, notably China, which seeks to overtake us in level of investment by the end of the decade.

While legislation such as the bipartisan [CHIPS and Science Act<sup>2</sup>](#), signed into law in 2022, illustrates how we can meet these challenges and compete on a global scale, it also highlights that standalone bills — no matter how urgent, important, and promising — don't address the full scope of what's needed. Although the measure made inroads in mending our dependence on other nations for semiconductor manufacturing, funding for many key science policies, such as spending



## GOVERNMENT FUNDING

FOR RESEARCH AND  
DEVELOPMENT SITS AT JUST

**0.7% OF OUR GDP<sup>1</sup>**  
**COMPARED TO**  
**1.9% IN 1964**



increases for research agencies, was only authorized — not appropriated. The result? Billions of dollars desperately needed to fund the next generation of transformative innovations and discoveries aren't available when we need them the most.

As co-chairs of the [Science & Technology Action Committee](#)<sup>3</sup> (STAC), a nonpartisan alliance of nonprofit, academic, foundation, and business leaders, we believe **continued robust investment in science and technology is absolutely essential**. Informed by interviews and expert insights from our full committee, as well as a national survey we commissioned of nearly 2,000 Americans working in five sectors, this report illustrates the consequences of not having a comprehensive national science and technology strategy to guide federal funding and coordination among the 20-plus agencies with scientific missions.

What we found in our survey is revealing: strong support for greater government investment and the creation of science and technology hubs throughout the country, agreement that federal leadership — both in funding and in setting strategic priorities — is essential, and widespread acknowledgement of the critical role science and technology play in our society.

We also uncovered clear areas of concern, including that many are worried about the impact artificial intelligence (AI) will have on society, that the United States is falling behind international competitors, and that our biggest opportunity to maintain leadership may lie in improving science, technology, engineering, and math (STEM) education at the K-12 level.

Tucked among the data is a striking finding: 70% of respondents believe today's children will be worse off in the future. Importantly, the 15% who believe they will be better off largely expect advances in science and technology will be the key reason why, underscoring the urgency and importance of these investments. It's one of the many reasons why STAC has called for at least doubling federal funding for science and technology over the next five years.

The State of Science in America report provides a clear direction that our nation desperately needs, one that responds to the concerns of both experts and workers, who by large margins believe America's future depends on our capacity to maintain our global leadership in science and technology.



*Bill Novelli*

### BILL NOVELLI

Professor Emeritus and founder of Business for Impact at Georgetown University and former CEO of AARP



*Sudip Parikh*

### SUDIP PARIKH

CEO, American Association for the Advancement of Science (AAAS) and Executive Publisher of the Science Family of Journals



*Mary Woolley*

### MARY WOOLLEY

President & CEO, Research!America



*Keith Yamamoto*

### KEITH YAMAMOTO

Vice Chancellor for Science Policy and Strategy at UCSF and President of the American Association for the Advancement of Science (AAAS)

We wish to express our thanks to the [many organizations and individuals](#) who provide funding for the Science & Technology Action Committee. Your contributions and support are very much appreciated.



## METHODOLOGY

The State of Science in America report includes in-depth interviews and expert insights, a survey of nearly 2,000 respondents working in five sectors, and comparisons to third-party data and research.

### Expert Analysis

The findings in this report are guided by interviews and analysis from STAC committee members, who are experts in the fields of science, health, business, national security, technology, and academia. These leaders provided extensive insights on the state of science in America, including areas of concern and opportunity, and helped develop policy priorities and recommendations to enhance U.S. competitiveness, both in their fields and for the nation's science and technology enterprise as a whole. The expert opinions complement and build upon the survey findings and are critical to this report.

## OUR EXPERT PANEL

### GEORGES C. BENJAMIN, M.D.

Executive Director, American Public Health Association

### ROBERT W. CONN, PH.D.

Distinguished Policy Fellow, School of Public Policy and Strategy, University of California, San Diego

### MICHAEL M. CROW

President, Arizona State University

### CHARLIE DENT

Former Republican Representative from Pennsylvania

### VICTOR DZAU, M.D.

President of the National Academy of Medicine

### ARTHUR C. EVANS, JR., PH.D.

CEO, American Psychological Association

### HARVEY V. FINEBERG, M.D., PH.D.

President of the Gordon and Betty Moore Foundation

### DARÍO GIL, PH.D.

IBM Senior Vice President and Director of Research

### BART GORDON

Partner, K&L Gates LLP and former Representative from Tennessee, 1985-2011

### MARGARET (PEGGY) HAMBURG, M.D.

President of InterAcademy Partnership and former FDA Commissioner

### INDIA HOOK-BARNARD, PH.D.

Executive Director, Engineering Biology Research Consortium

### KAYE HUSBANDS FEALING, PH.D.

Dean and Ivan Allen Chair, Ivan Allen College of Liberal Arts at Georgia Institute of Technology

### KRISTINA M. JOHNSON, PH.D.

Founder and CEO of KMJ and Associates, and former President of the Ohio State University and former Under Secretary, US Department of Energy

### TOM KALIL

Chief Innovation Officer, Schmidt Futures

### NEAL LANE, PH.D.

Senior Fellow in Science and Technology Policy, Rice University's Baker Institute for Public Policy and former Director, National Science Foundation

### ALAN LESHNER, PH.D.

CEO Emeritus, American Association for the Advancement of Science (AAAS)

### GENERAL LESTER L. LYLES\*

Retired Air Force Four-Star and former Commander Air Force Materiel Command

### MARCIA McNUTT, PH.D.

President, National Academy of Sciences

### BILL NOVELLI

Professor Emeritus and founder of Business for Impact at Georgetown University and former CEO of AARP

### ERIN K. O'SHEA, PH.D.

President, Howard Hughes Medical Institute

### SUDIP PARIKH, PH.D.

CEO, American Association for the Advancement of Science (AAAS) and Executive Publisher of the Science Family of Journals

### L. RAFAEL REIF, PH.D.

President Emeritus, Ray and Maria Stata Professor of Electrical Engineering and Computer Science, Massachusetts Institute of Technology (MIT)

### JAMES H. SIMONS, PH.D.

Trustee and Co-Chair, Simons Foundation

### MARY WOOLLEY

President and CEO, Research!America

### KEITH R. YAMAMOTO, PH.D.

Vice Chancellor for Science Policy and Strategy, UCSF and Director, UCSF Precision Medicine and President, American Association for the Advancement of Science (AAAS)

### ELIAS ZERHOUNI, M.D.

Professor Emeritus Radiology and Biomedical Engineering, Johns Hopkins University and former Director, National Institutes of Health, 2002-2008

\*General Lyles contributed to the report; his membership is pending.

## Survey of Workers in Five Workforce Sectors

This report features results from a survey of 1,981 Americans working in five sectors to examine their perceptions of U.S. competitiveness. The survey also assesses respondents' support for the development of a national strategy and increased federal funding of science and technology. All charts in this report reflect results from the Science and Technology Action Committee, State of Science in America Survey, July 2023. Other data sources cited are referenced in the End Notes.

### AMERICANS WORKING IN THE FOLLOWING FIVE WORKFORCE SECTORS WERE SURVEYED: K-12 EDUCATION, HEALTH CARE, BUSINESS, SCIENCE, TECHNOLOGY, ENGINEERING & MATH (STEM), MILITARY / NATIONAL SECURITY

		SAMPLE	SAMPLE (WEIGHTED)	SAMPLE % (WEIGHTED)
<b>PARTISANSHIP</b>	Republicans	910	943	48%
	Democrats	786	751	38%
	Independents	278	279	14%
<b>GENDER</b>	Men	1,039	1,114	56%
	Women	927	852	43%
	Non-binary	15	15	1%
<b>AGE RANGE</b>	18-34	506	523	26%
	35-49	608	600	30%
	50-64	753	739	37%
	65+	114	118	6%
<b>RACE / ETHNICITY</b>	White (non-Hispanic)	1,533	1,514	76%
	People of color	386	406	20%
	Other	62	61	3%
<b>SECTOR</b>	Health Care	502	369	19%
	K-12 Education	468	368	19%
	STEM Field	369	365	18%
	Military / National Security	251	358	18%
	Business / Finance	225	355	18%
	Other	166	166	8%
<b>UNION MEMBERSHIP</b>	Union Member	648	605	31%
	Non-Union Member	1,333	1,376	69%

Within these areas, we also polled both union and non-union workers to gain insight into where these two groups align and diverge given their unique political makeup and the increasing number of union workers throughout the country. In addition to being currently employed, all respondents reported themselves as registered voters and provided their political affiliations.

## Cross-Study Evaluation

To further validate the findings presented in this report, we cross-referenced them with public opinion polls, general population studies, and research data from outside sources, including the [National Science Board](#)<sup>6</sup>, [NORC at the University of Chicago](#)<sup>7</sup>, [Pew Research Center](#)<sup>8</sup>, and [Research!America](#)<sup>9</sup>.

# EXECUTIVE SUMMARY

## KEY SURVEY FINDINGS, EXPERT INSIGHTS, AND POLICY RECOMMENDATIONS

Government investment in science and technology has long enabled the United States to address societal challenges and leadership crises on a global scale. From the battlefields of World War II to the race to put a man on the moon to transforming HIV/AIDS from a death sentence to a manageable chronic disease, America has led the way for the better part of the past century because we made science and technology a top national priority.

**Today, the United States can no longer take its position in the world for granted.**

To fully understand the State of Science in America, we have taken a multi-layered approach, combining in-depth interviews and expert insights along with a survey of nearly 2,000 respondents from five workforce sectors and comparisons to a trove of data and additional research. This report draws from several sources to highlight the widespread view across political identifications and sectors that America is falling behind — and the steps we must take to regain our preeminence.

This assessment focuses on policies that respondents and experts across the political and employment spectrum agree upon: strengthening federal investment in science and technology, developing better coordination among federal agencies, improving K-12 STEM education, and empowering our national genius to stay ahead on a global scale.

### A CLARION CALL FOR ACTION

These findings provide a crystal-clear call to develop and fund a national science and technology strategy, informed by the expert insights of this report and others, to strengthen our nation for decades to come.

**26 EXPERTS' INSIGHTS**

**1,981 WORKERS SURVEYED**

**5 WORKFORCE SECTORS**

- K-12 EDUCATION
- HEALTH CARE
- BUSINESS
- SCIENCE, TECHNOLOGY, ENGINEERING & MATH (STEM)
- MILITARY / NATIONAL SECURITY

“The long-term prosperity, security, and vitality of the United States depend on our investing in science strategically and smartly. We can no longer thrive by muddling through because other countries have raised their game.”

**HARVEY V. FINEBERG, M.D., PH.D.**

President of the Gordon and Betty Moore Foundation





## TOPLINE SURVEY FINDINGS

### **The United States is perceived to be losing the race for global leadership in science and technology.**

More than 75% of respondents believe the United States is losing or has already lost this critical competition. Those who work in health care or in the military or national security were more likely to say the U.S. has already been overtaken by other countries, while those in STEM fields were more likely to say we're losing ground. In addition, 60% of respondents said China — not the United States — will be the leader within five years.

### **Respondents believe the top obstacle to future scientific advancement in the United States is the quality of K-12 STEM education.**

Respondents in every sector surveyed — including those in K-12 education — said the lack of adequate K-12 STEM education is the No. 1 obstacle to advancing science and technology in the United States. Rounding out the rest of the top five obstacles were foreign nations' undermining of U.S. research, the abundance of red tape in the U.S. scientific research process, the lack of a national science and technology strategy, and inadequate funding for research and development.

### **The federal government is viewed as the driver of science and technology advancements in the United States.**

A plurality of respondents (41%) said the federal government holds the primary responsibility for ensuring the strength of science and technology in the country. Another 23% chose private companies, while 22% chose academic institutions and 4% chose nonprofit organizations.

### **A majority of respondents across political ideologies and sectors agree that federal funding of science and technology is vital.**

In a moment of clear agreement, nearly 70% of respondents, including a majority in all sectors and across all political identifications — 86% of Democrats, 63% of independents, and 55% of Republicans — said federal government investment in science and technology is so important that it should be protected from budget cuts.

### **There is a strong desire for additional scientific leadership in public policy across all political identifications and sectors.**

In another area of clear agreement, more than 80% of respondents — including 89% of Democrats, 81% of independents, and 76% of Republicans — would like to see more input from science leaders in policymaking. In fact, more than 75% in each sector — not just those working in science — desire greater leadership.

### **Most respondents find the increasing distrust and politicization of science troubling.**

Nearly 80% of respondents — including 91% of Democrats, 79% of independents, and 69% of Republicans — are concerned about growing public distrust in science. More than 75% of respondents — including 89% of Democrats, 79% of independents, and 65% of Republicans — raised concerns about politicians discrediting scientists.

### **The rapid growth of artificial intelligence (AI) is raising significant concern.**

Overall, 39% of respondents believe AI will have a negative impact on society, while 25% believe the impact will be positive. Another 25% believe the impact will be neutral, while 12% said they're not sure. Those who work in STEM hold a more optimistic view with 32% saying AI's impact will be positive, while those in K-12 education are more pessimistic, with 44% saying AI's impact will be negative.

### **Those working in national security are especially worried about international intellectual property theft.**

Those in the military or national security fields were more likely to say that foreign powers undermining or stealing our research and technology is one of the biggest obstacles to scientific and technological advancement, placing it as the No. 2 barrier behind K-12 STEM education. This group also chose stronger enforcement of U.S. intellectual property rights as the policy that would have the largest impact on America's ability to lead in science and technology.

# THE PATH FORWARD

## RECOMMENDATIONS

The United States is no stranger to rivals. Again and again over the course of our nation's history, we have risen above global conflicts, leadership crises, and existential threats. The obstacles we face today are nothing we can't overcome — if we're willing to work together on thoughtful science and technology policy solutions supported across political lines, across industries, across sectors, and across disciplines.


Today, it's clear what many Americans want: greater scientific leadership in policymaking, enhanced investment in federal funding for science and technology, and a national strategy that not only makes sense but propels our country to new heights. The 2022 CHIPS and Science Act represents an important step that we can build on, provided that we fully fund the law's science provisions.

### Policy Recommendations


Combining the survey findings with analysis from subject matter experts in business, national security, academia, and science and technology, STAC identified six key recommendations for policymakers, each of which would strengthen science and technology in the United States.

 **CREATE A NATIONAL STRATEGY**  
FOR ADVANCING SCIENCE AND TECHNOLOGY INNOVATION IN THE UNITED STATES.

 **FOSTER ADDITIONAL COORDINATION**  
AMONG THE 20+ FEDERAL AGENCIES WITH SCIENTIFIC MISSIONS.

 **INCREASE FEDERAL FUNDING FOR S&T**  
FROM 0.7% TO AT LEAST 1.4% OF U.S. GDP IN THE NEXT FIVE YEARS.

 **BOLSTER STEM EDUCATION**  
AT ALL LEVELS, WITH AN EMPHASIS ON K-12.


 **ENSURE A DIVERSE STEM WORKFORCE**  
DOMESTICALLY WHILE ALSO CULTIVATING INTERNATIONAL TALENT.

 **PARTNER WITH OTHER NATIONS**  
BOTH ALLIES AND RIVALS ON GLOBAL CHALLENGES.


### Measuring Progress


Critical to the development of a national science and technology strategy is designating a list of metrics to assess its effectiveness. Several organizations — such as the [National Science Board](#)<sup>4</sup> and [Organization for Economic Co-operation and Development](#)<sup>5</sup> — regularly track key data and issue reports on a range of competitiveness topics, which policymakers should track as a measure of U.S. leadership in science and technology. STAC also believes public perception is an important indicator and recommends tracking other factors, such as:

 **FEDERAL INVESTMENT**  
THE LEVEL OF FEDERAL INVESTMENT IN RESEARCH AND DEVELOPMENT.

 **STEM EDUCATION & WORKFORCE**  
THE QUALITY OF STEM EDUCATION, PARTICULARLY K-12, AND THE STEM WORKFORCE.

 **GLOBAL COMPETITIVENESS**  
HOW GLOBALLY COMPETITIVE THE COUNTRY IS IN SCIENCE AND TECHNOLOGY.

 **SCIENTIFIC LEADERSHIP IN POLICYMAKING**  
WHETHER SCIENCE IS PLAYING A LARGE ENOUGH ROLE IN INFLUENCING POLICY DECISION-MAKING.

 **TRUST IN SCIENTIFIC FINDINGS**  
THE LEVEL OF TRUST OR DISTRUST IN SCIENTISTS AND THEIR SCIENTIFIC FINDINGS.

 **OUR CHILDREN'S FUTURE**  
WHETHER TODAY'S CHILDREN WILL LIVE BETTER, HEALTHIER, AND MORE SECURE LIVES THAN THEIR PARENTS.

# THE CHALLENGES OF TODAY

Today, our nation is at a critical juncture. Our public health care system is fragmented and weighed down by high costs. Food and water security remains precarious across large swaths of our nation and the world. Our energy infrastructure is not suited to meet the needs of a growing population. And climate change has begun to upend our everyday lives.

On the world stage, the United States is battling a fierce competitor — China. Nowhere is this competition more critical than in the global innovation race. Over the past few decades, China has accelerated its investment in research and development and boosted its STEM workforce, advanced manufacturing operations, and overall science and technology capabilities.

The United States must collaborate with friends and rivals alike to address the existential threats facing our planet. Given our deep economic and scientific research ties, that means finding ways to partner with China on key issues, such as our changing climate, even as we guard against the significant security risks Beijing continues to pose.

Major global challenges can be solved only by coming together — across political identifications, sectors, industries, ideologies, and even borders — to leverage the power of science and technology to reshape our world for the better.



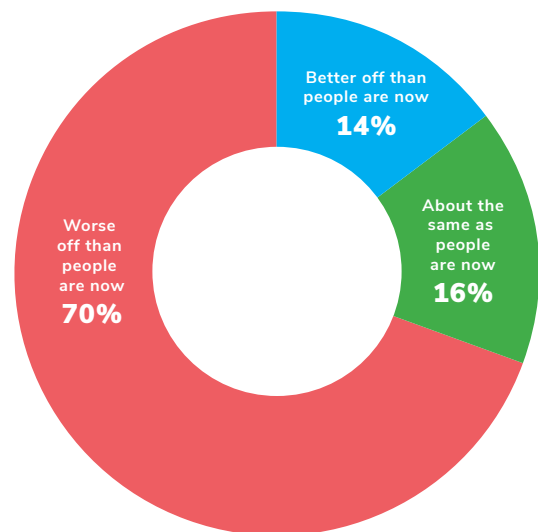
## KEY SURVEY FINDINGS

**70% OF RESPONDENTS BELIEVE THAT CHILDREN TODAY WILL GROW UP WORSE OFF** due to growing social and political divides, a weakening economy, and worsening effects of climate change, among other factors.

**69% OF RESPONDENTS RATE THE QUALITY OF U.S. STEM EDUCATION AS POOR OR FAIR.**

**39% OF THOSE SURVEYED BELIEVE AI WILL HAVE A NEGATIVE IMPACT ON SOCIETY**, and most say the government should regulate this emerging technology.

### MOST BELIEVE TODAY'S CHILDREN WILL GROW UP WORSE OFF IN THE FUTURE



“If you take your foot off the accelerator, progress doesn't keep happening. And if you give up leadership, you can't always get it back.”

**MARY WOOLLEY**  
President and CEO,  
Research!America





## SHAPING THE FUTURE

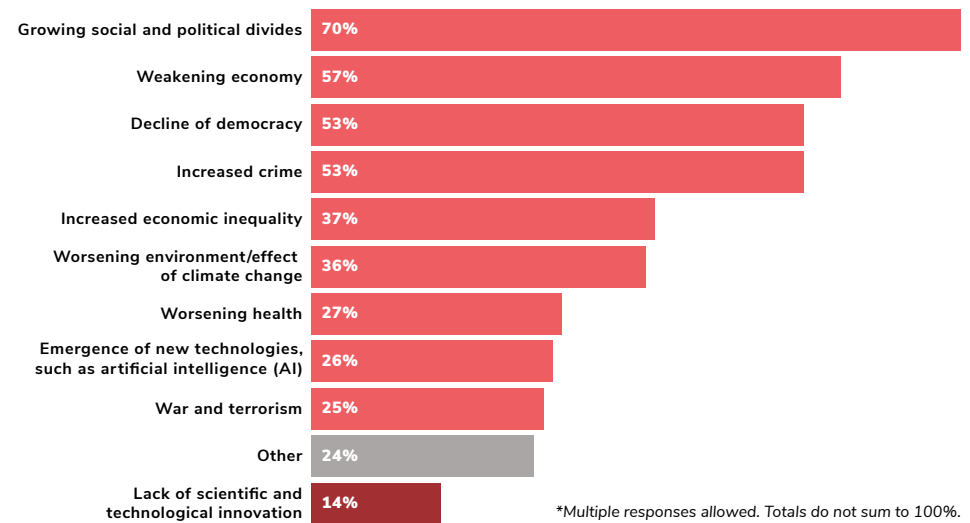
How we address the challenges of the 21st century will shape the future of our country, especially the legacy we leave our children.

A majority of respondents believe we're falling behind in several areas that are vital to meeting growing existential threats head-on and securing the future our children deserve.

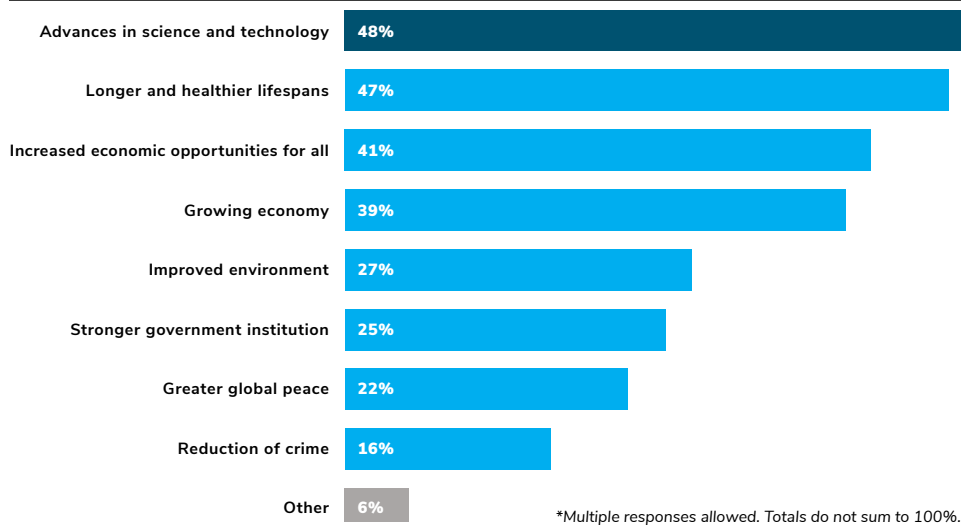
The top reasons respondents across sectors believe children today will grow up better off are advances in science and technology (48%), longer and healthier lifespans (47%), increased economic opportunities (41%), and overall economic growth (39%).



### RESPONSES FOR WHY CHILDREN WILL GROW UP WORSE OFF



### RESPONSES FOR WHY CHILDREN WILL GROW UP BETTER OFF



“It is imperative that the U.S. maintain a leadership role in science and technology that helps to provide the conditions for equitable human flourishing and optimal health for all.”

**ARTHUR C. EVANS, JR., PH.D.**  
CEO, American Psychological Association

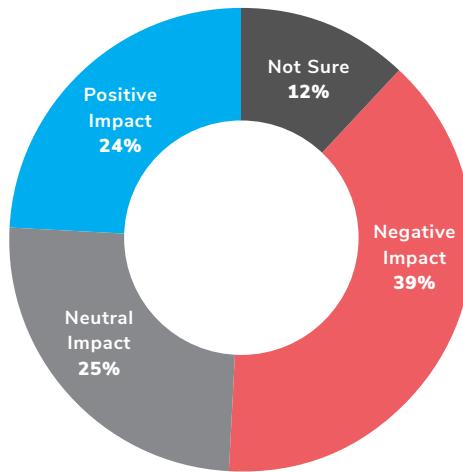


## EXAMINING AI'S POTENTIAL

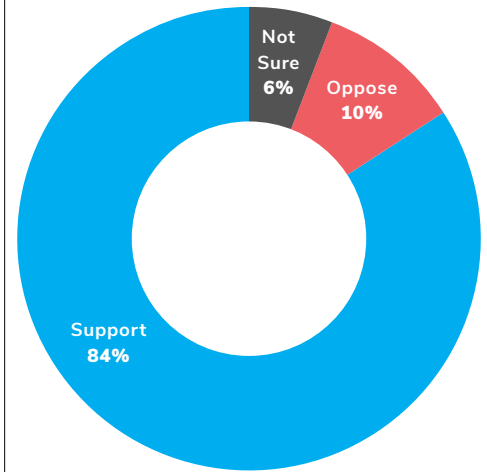
As technology using artificial intelligence (AI) continues to grow, many questions remain about its impact, particularly its potential to transform an array of industries and sectors. It's likely that this rapidly growing technology will need to be regulated, but policymakers and other stakeholders have yet to reach consensus on the most effective path forward.

Overall, the survey found 39% of respondents believe AI will have a negative impact on society, based on concerns about fake information or content, potential biases and misuse, and job displacement. On the other hand, 25% believe AI will have a positive impact through the acceleration of advancements in science and technology, increased productivity and efficiency, and by freeing up our time, ultimately leading to a better quality of life. Another 25% believe the impact will be neutral, while 12% said they're not sure.

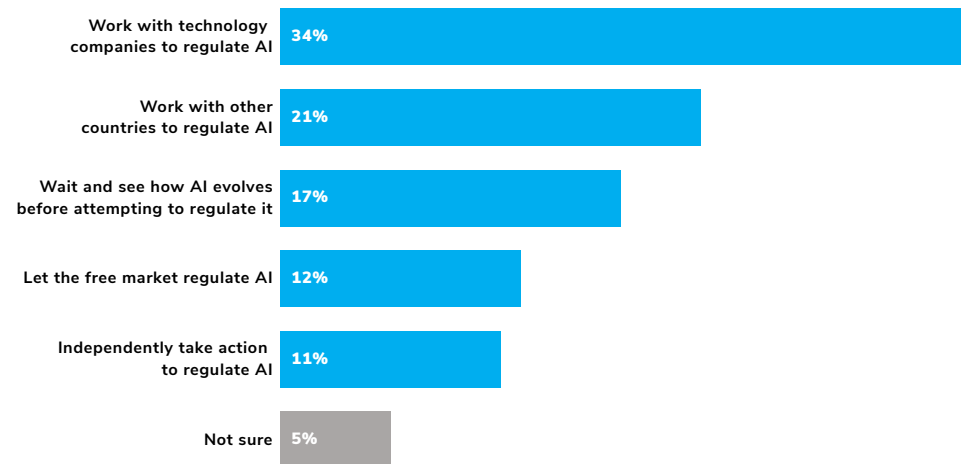
### RESPONDENTS MIXED ON IMPACT OF AI ON SOCIETY



### MAJORITY SUPPORT TRANSPARENCY AROUND AI USE



### HOW SHOULD THE FEDERAL GOVERNMENT REGULATE AI?



## CONGRESS MUST ACT ON AI

A majority of respondents agree the federal government should regulate AI, but most do not believe it should do so unilaterally. Instead, 34% want the federal government to work with tech companies and 21% would like the United States to work with other countries. Another 17% believe the country needs to take a wait-and-see approach before regulating AI. Overall, 84% of respondents said the use of AI should be transparent in all products.

U.S. leadership is needed on AI. But both lawmakers and tech companies, which are taking their own steps toward creating safety standards, are warning against overregulation in light of China's growing presence in this arena.

Congress must walk a tightrope to avoid stifling U.S. research and development on AI and ensure we lead this particularly competitive landscape, which represents both a novel opportunity and a nascent threat.



“If you look at all the technology of the future, whether it’s quantum computing, whether it’s artificial intelligence, whoever leads in those areas is going to lead economically and in national security.”

**BART GORDON**

Partner, K&L Gates LLP and former Representative from Tennessee, 1985-2011

# GLOBAL COMPETITIVENESS

The United States once ranked as the undisputed world leader in science and technology. Today, that leadership is in jeopardy.

Over the past several decades, the United States has failed to keep pace with science and technology spending in comparison to China and other nations. In fact, federal spending in this area has decreased, falling to just under **0.7% of our GDP<sup>10</sup>** today compared to 1.9% in 1964 at the height of the space race.

Between 2010 and 2019, the **U.S. share of global research and development spending<sup>11</sup>** declined from 29% of global R&D to 27%, while China's share increased from 15% to 22% of global R&D. China could surpass the United States in this area by the end of the decade.

The survey shows widespread awareness of China's growing science and technology capabilities and the threat the country presents.

- **More than 75% of respondents believe** the United States has either already been overtaken by other countries or is quickly losing ground in science and technology.
- **Just 8% of respondents believe** the United States is expanding its global lead, and 13% said it is remaining on par with other nations.

In addition, 60% believe that China — not the United States — will be the global leader in science and technology in five years, and a majority also said China poses a significant threat to our national security (63%) and economy (59%).

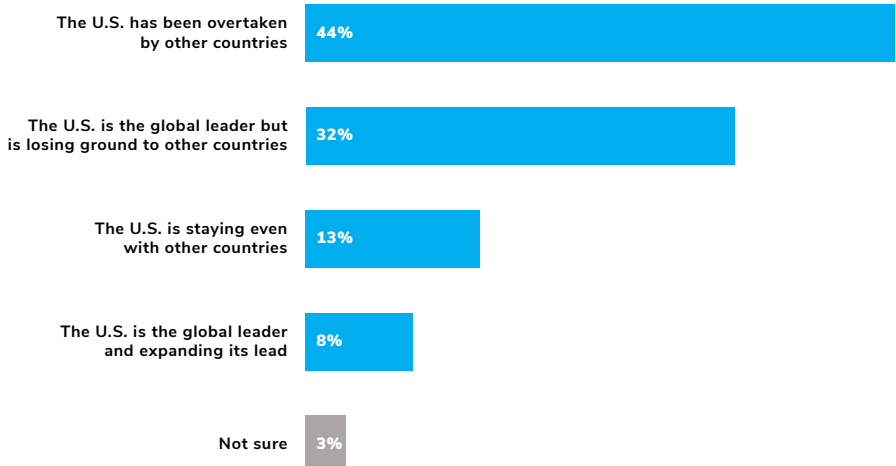
## KEY SURVEY FINDINGS

A majority of respondents believe **THE U.S. IS LOSING OR HAS ALREADY LOST ITS STATUS AS THE GLOBAL LEADER IN SCIENCE AND TECHNOLOGY.**

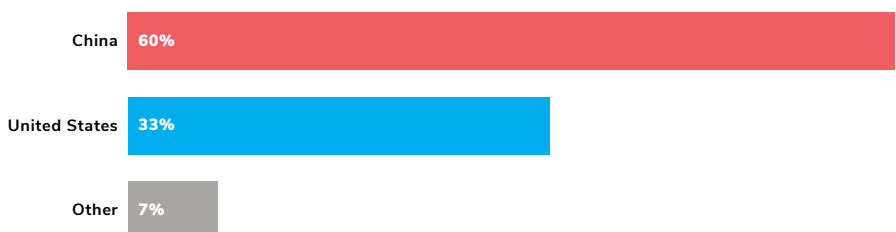
**CHINA IS VIEWED AS THE TOP COMPETITOR TO THE UNITED STATES,** and its science and technology capabilities are seen as a unique threat.

Those in the military or working in national security expressed **GREATER CONCERN ABOUT THE RISE OF CHINA THAN THOSE IN OTHER SECTORS.**

### MOST BELIEVE U.S. IS LOSING THE GLOBAL COMPETITIVENESS RACE

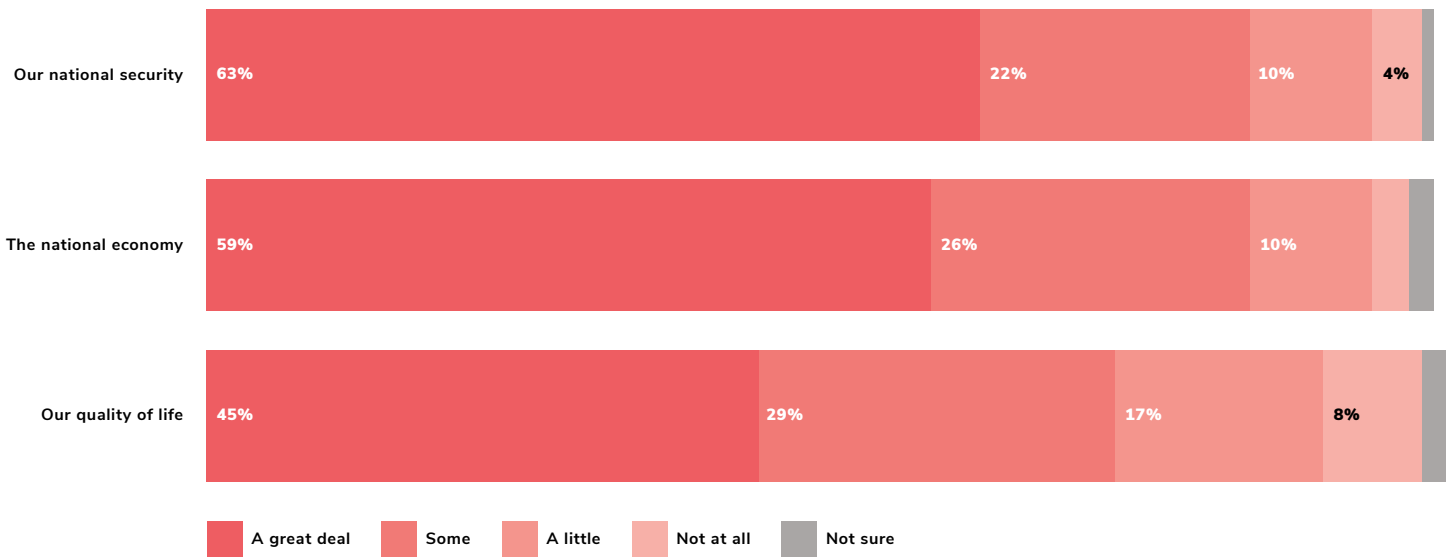


### RESPONDENTS EXPECT CHINA TO BE GLOBAL LEADER IN 5 YEARS

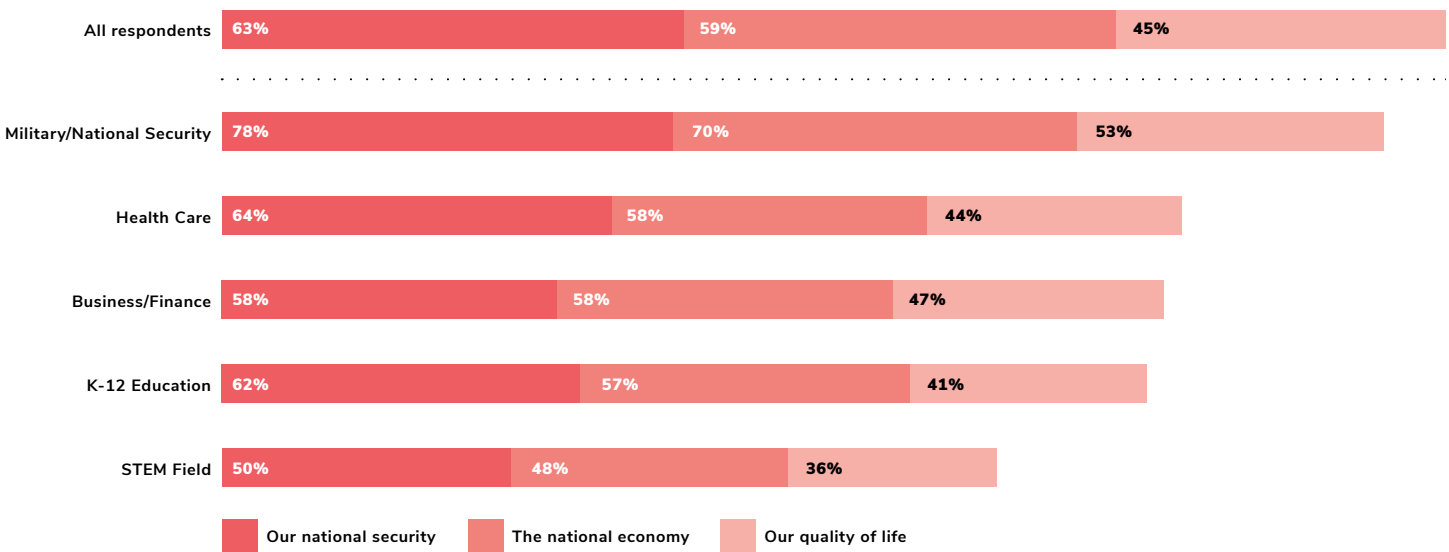




HOW CHINA'S S&T CAPABILITIES THREATEN U.S.



BROAD AGREEMENT ON THE THREAT TO U.S. FROM CHINA ACROSS ALL WORKFORCE SECTORS

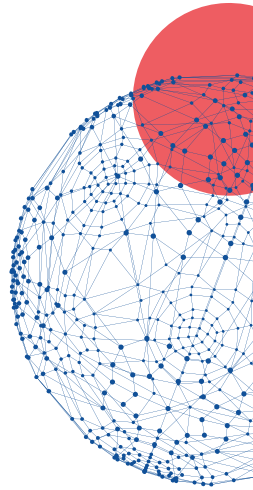
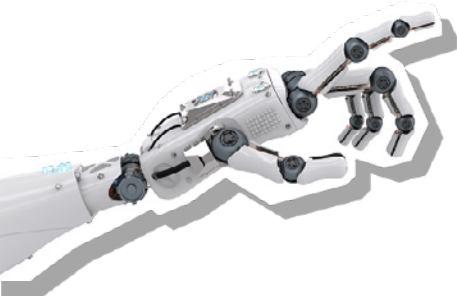
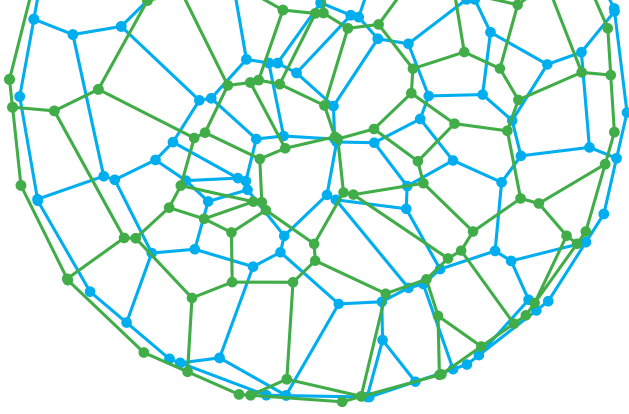


These survey results mirror other polls. Research!America's annual survey of U.S. adults, released earlier this year, **found 77% of respondents<sup>12</sup>** were concerned about China surpassing the U.S. as the world's leading science and technology power. And a Pew Research Center survey last year found that **38% of U.S. adults<sup>13</sup>** believe we are losing ground to other countries.

“We’re no longer in a huge strategic competition, we’re now dealing with an adversary who is completely different, and we have to make sure we are equipping our military in the same way. Yet, we must also collaborate with our global partners and, smartly and cautiously, our competitors.”

**GENERAL LESTER L. LYLES**  
Retired Air Force Four-Star and former Commander Air Force Materiel Command





## WINNING THE GLOBAL COMPETITIVENESS RACE

It's clear what happens when the United States takes its eye off the global competitiveness race. More than three decades ago, the United States produced **37% of all micro chips worldwide**<sup>14</sup>. Today, its share is just 12%, and the vast majority of chips are instead manufactured in Asia.

The pandemic opened the public's eyes to the risks of such offshoring, as supply chains ground to a halt and chip shortages snarled the availability of everything from smartphones to cars. The lessons learned sparked a greater understanding of the critical importance of semiconductors and other key technologies to our everyday lives and helped lead to the passage of the 2022 CHIPS and Science Act, which aims to bolster semiconductor manufacturing in the United States.

"We must regard science and technology as our primary productive force, talent as our primary resource, and innovation as our primary driver of growth."

**CHINESE PRESIDENT XI JINPING**  
October 2022<sup>17</sup>



While the bipartisan passage of that landmark legislation shows the strides we can make when we come together on an issue of great national importance, Congress' inability to fund the bill's science investments at the levels authorized highlights the work that remains.

China treats science and technology as a **primary driver of growth**<sup>15</sup>, and for the U.S. to remain hypercompetitive in this area, we must do so as well. And it's not just China, either. Our allies, **such as Japan**<sup>16</sup>, recognize the extraordinary benefits that come from robust investment in science and technology and are taking the steps needed to advance their countries' capabilities in these areas.

"I have high hopes that the popularization of science and technology — in other words, the development of a society where everyone can benefit from science and technology — will gain further prevalence in the coming decades."

**JAPANESE PRIME MINISTER  
FUMIO KISHIDA**  
October 2023<sup>18</sup>

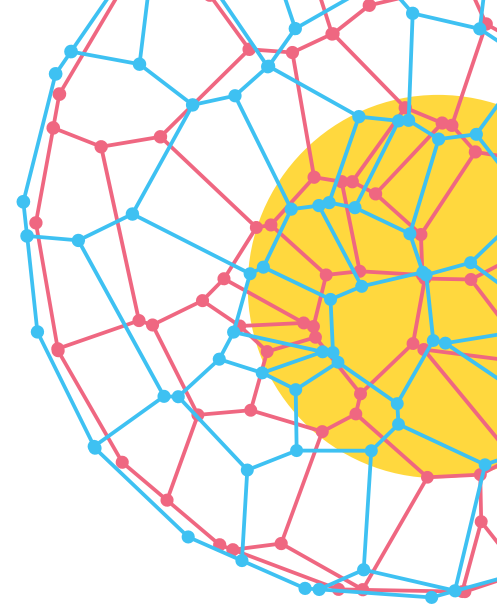


# BENEFITS OF SCIENCE & TECHNOLOGY INVESTMENT

The existential threats the United States — and the world — face today and in the decades ahead are substantial. Our greatest ally in overcoming them is advancements in science and technology.

In addition to the role it plays in addressing issues around energy security and infrastructure, respondents to the survey also believe science and technology can strengthen our national security, improve our health care system, bolster our economy and job growth, and mitigate threats such as those posed by climate change and drought.

Similarly, respondents pointed to several benefits from increased federal investment in science and technology, including advancing technologies, increasing jobs, boosting global competitiveness, and improving quality of life.



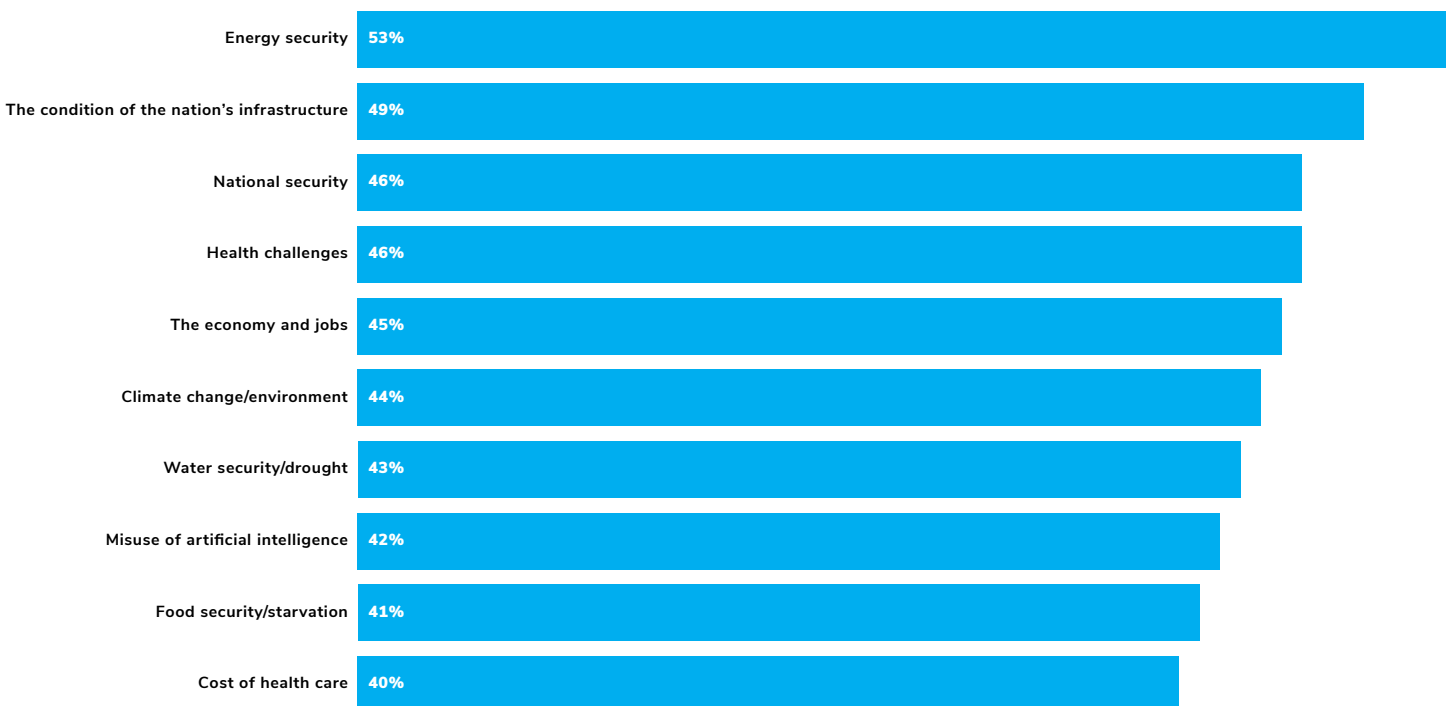
## KEY SURVEY FINDINGS

Science is believed to play a key role in **SOLVING MANY OF THE NATION'S ISSUES.**

The top three issues respondents believe science and technology can solve are **ENERGY SECURITY, THE CONDITION OF THE NATION'S INFRASTRUCTURE (E.G., ROADS, BRIDGES, AND BROADBAND), AND NATIONAL SECURITY.**

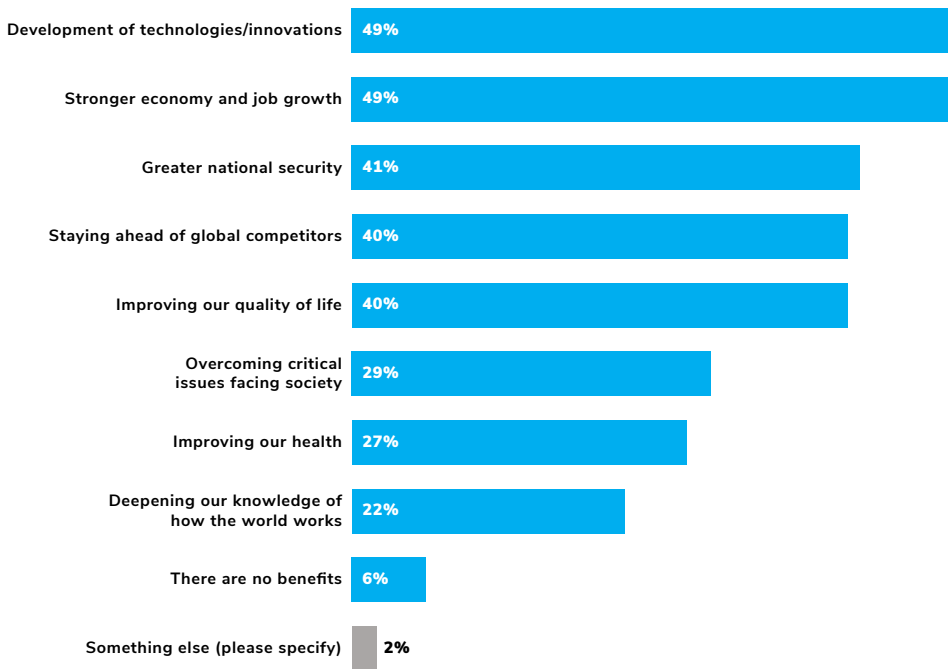
**RESPONDENTS SAID DEVELOPMENT OF TECHNOLOGIES/INNOVATION AND A STRONGER ECONOMY AND JOB GROWTH** are the primary benefits of increased federal investment in science and technology.

### RESPONDENTS BELIEVE SGT CAN HELP SOLVE MANY ISSUES



\*Respondents picked their top three issues. Totals do not sum to 100%.

RESPONDENTS SEE SPECIFIC BENEFITS OF GREATER FEDERAL INVESTMENT IN S&T



\*Respondents picked their top three issues. Totals do not sum to 100%.

“We learned during World War II that if you apply science in an all-in, large scale way, you can do almost anything. Since then, the American economy has shot up, and that’s changed everything — it’s changed the trajectory of innovation and competitiveness in our country, and it’s changed the trajectory of the world.”

**MICHAEL M. CROW**  
President, Arizona State University



PLANTING THE SEEDS OF INNOVATION

Basic research — curiosity-driven studies that seek to discover new knowledge rather than pursue specific applications — has proven essential for the scientific breakthroughs that improve lives and help address societal challenges. Today, the United States **remains the global leader in spending on basic research**<sup>19</sup>, outcompeting China. Importantly, the federal government provides a large majority of funding for basic research, **with philanthropic sources**<sup>20</sup> providing much of the remainder.

While private business plays a critical role in the U.S. innovation system, it supports little or no untargeted, basic research, as its research and development efforts must be mission-directed, centered on market and profit potential and rapid turnaround. Research funded by the federal government, on the other hand, can take greater risks and work on longer-term projects. This allows the federal government to essentially play the role of venture capitalist, investing in research that often sets the stage for private companies to later develop specific products.

“At scale, there’s nothing like the federal government and nothing’s going to replace it. If we don’t make the discoveries, if we depend on other countries like China to make those discoveries, they’re going to be the first to use it. And then we’re going to be behind all the time.”

**NEAL LANE, PH.D.**  
Senior Fellow in Science and Technology Policy at Rice University’s Baker Institute for Public Policy and former Director, National Science Foundation







The bottom line? Any decline in federal funding for basic research risks stalling society-serving technological breakthroughs yet to come.

One key example is biomedical science. Two recent studies highlight that federal government support undergirds the eventual development of life-saving treatments. One showed that 24 of the 28 “most impactful drugs on the market” originated from [basic research supported by the National Institutes of Health<sup>21</sup>](#). The other examined all 210 of the drugs approved by the Food and Drug Administration (FDA) from 2010 through 2016 and found that every [single one emerged from NIH-funded research<sup>22</sup>](#), with more than 90% of them derived from basic research.

While basic research does not provide an immediate return on investment, its crucial function and long-term value are demonstrated by its foundational role in countless advances, such as the [COVID-19 vaccines<sup>23</sup>](#), [CRISPR gene-editing technology<sup>24</sup>](#), and [PCR tests<sup>25</sup>](#) for infection by HIV, malaria, or flu. It is also providing the base of knowledge essential for the development of new therapies for diseases from [cancer<sup>26</sup>](#) to [Alzheimer's<sup>27</sup>](#).

Breakthroughs like these don't happen overnight or through a single research project. In some cases, it can take decades and dozens of individual studies to get there. Without sustained government funding, much of the fundamental knowledge at the heart of revolutionary technologies would remain undiscovered.

## FUELING THE CUTTING-EDGE TECHNOLOGIES OF TOMORROW

The United States faces many existential threats, and science and technology holds the key to solving these challenges. To achieve a bright future, we must accelerate the innovations already under development while also increasing funding for the research that fuels future transformative discoveries.

History shows us what's possible if we resolve to act: The push to put man on the moon in the 1960s helped create [much of the technology<sup>28</sup>](#) we now take for granted. Inventions such as [water purification systems<sup>29</sup>](#), [GPS<sup>30</sup>](#), [wireless headsets<sup>31</sup>](#), and [CAT scans<sup>32</sup>](#) date back to the early days of the space program. And in the decades after the Mercury and Apollo missions, NASA continued to spin off technologies that we use every day, from [cameras small enough to fit on your smartphone<sup>33</sup>](#) to the technology that makes [LASIK eye surgery<sup>34</sup>](#) possible.

Today, through advanced bioscience, clean energy, quantum computing, artificial intelligence, and other cutting-edge technologies, we have the power to lead the way once again on a global scale and with the determination for which the United States is so well known.



“Strengthening science and technology in the United States will allow our nation to effectively participate in the next scientific renaissance that is now emerging on a global scale.”

**GEORGES C. BENJAMIN, M.D.**  
Executive Director, American Public Health Association

# OBSTACLES TO ADVANCING SCIENCE & TECHNOLOGY

The U.S.'s position as a global leader in science and technology is no longer a role we can take for granted. For years, our students have lagged behind their global counterparts in **advanced industrial nations**<sup>35</sup> in science, math, and reading. The COVID-19 pandemic only worsened the divide as national testing scores in **math and reading**<sup>36</sup> fell to their lowest levels in decades.

## KEY SURVEY FINDINGS

**THE QUALITY OF K-12 STEM EDUCATION RANKED AS THE #1 CONCERN** named by respondents in every sector surveyed when asked about the biggest obstacles to advancing science and technology in the United States.

**THE SURVEY ALSO FOUND SIGNIFICANT CONCERN ABOUT INADEQUATE FEDERAL INVESTMENT** in science and technology and the lack of a national science and technology strategy.

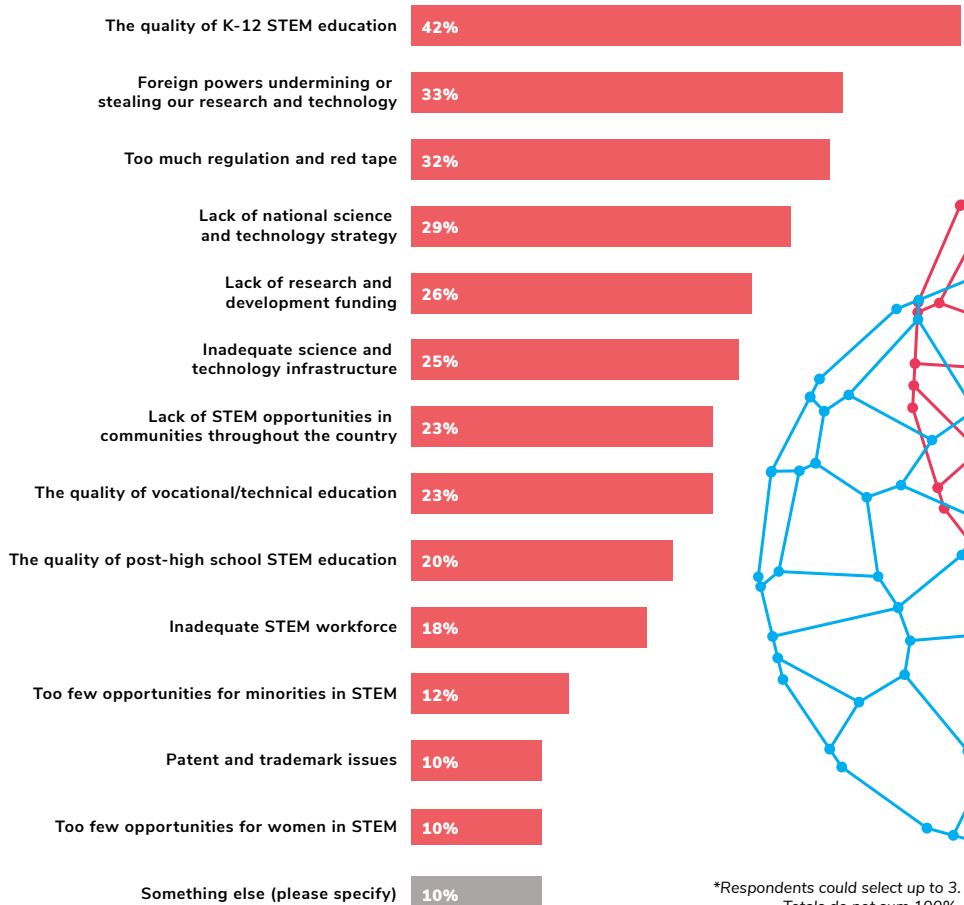
More than half of respondents rated the quality of the current STEM workforce, **POST-HIGH SCHOOL STEM EDUCATION, AND TECHNICAL/VOCATIONAL EDUCATION AS FAIR OR POOR.**



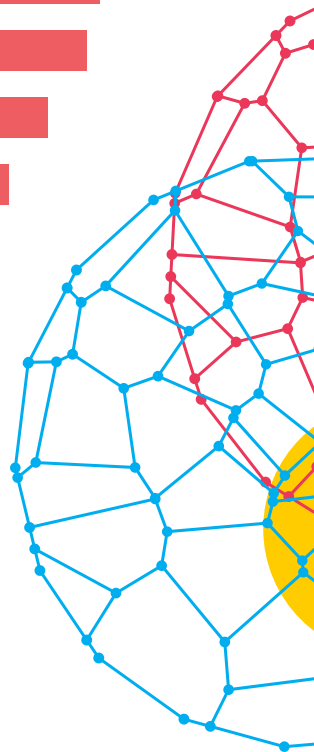
The decline in federal investment of science and technology is only one part of the equation when it comes to ensuring the United States stays ahead in the global innovation race. We also need to invest in human capital, which starts with providing a better foundation of learning in K-12 STEM education.

While the survey uncovered several areas where respondents see the need for improvement, it found they were particularly focused in on education, workforce development, and federal funding for science and technology.

## BIGGEST OBSTACLES TO S&T ADVANCEMENT



\*Respondents could select up to 3. Totals do not sum 100%.

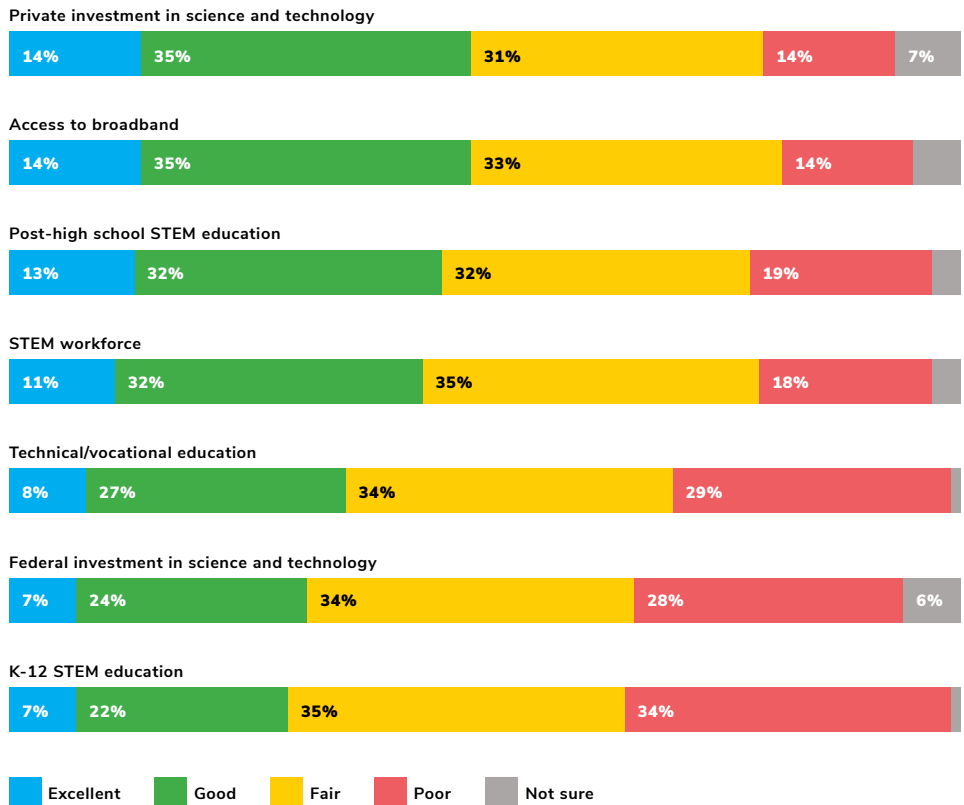


## GROWING CONCERN OVER QUALITY OF K-12 STEM EDUCATION

For the past few decades, the United States has trailed European and East Asian countries in math, reading, and science testing conducted every three years by the Programme for International Student Assessment. In math, the [latest report released in 2023<sup>37</sup>](#) ranked the U.S. 28th out of 37 participating countries from the Organization for Economic Cooperation and Development (OECD). In reading and science, the United States ranked higher at 6th and 12th place, respectively.

Given such scores, it’s not surprising that in a series of questions asking respondents to rate the quality of science and technology resources in seven areas, 69% rated K-12 STEM education as fair or poor, giving it the lowest score.

### MANY RATE THE QUALITY OF S&T RESOURCES AS FAIR OR POOR



## WIDENING GAPS HINDER STEM WORKFORCE

A majority (53%), of respondents in our survey rated the quality of the current STEM workforce as fair or poor, while 43% ranked it as excellent or good. When coupled with poor rankings for K-12 STEM education, these results show there’s much progress to be made.

The U.S. STEM workforce today includes [more than 36 million people<sup>38</sup>](#) and accounts for 23% of the total labor pool in the country. As technology continues to evolve at a rapid pace, this workforce also must adapt to keep up with the latest advances in AI, quantum computing, and biomanufacturing.

Through 2031, the number of STEM jobs in the United States is [expected to grow by 11%<sup>39</sup>](#), nearly twice as fast as all other occupations. Unfortunately, the talent pipeline is not growing quickly enough to meet such high demand — particularly in the semiconductor industry, which faces a significant workforce gap in the coming years.

While the number of semiconductor jobs in the United States is [projected to increase 33%<sup>40</sup>](#) by the end of the decade, the Semiconductor Industry Association predicts 58% of these positions will go unfilled at current degree completion rates. This challenge highlights that the landmark 2022 CHIPS and Science Act isn’t enough on its own to bring chip manufacturing back to our shores.

“My biggest concern about the future of American science and technology is the size and quality of the workforce going forward. We need more, not fewer, young investigators.”

**ALAN LESHNER, PH.D.**  
CEO Emeritus of the American Association for the Advancement of Science (AAAS)

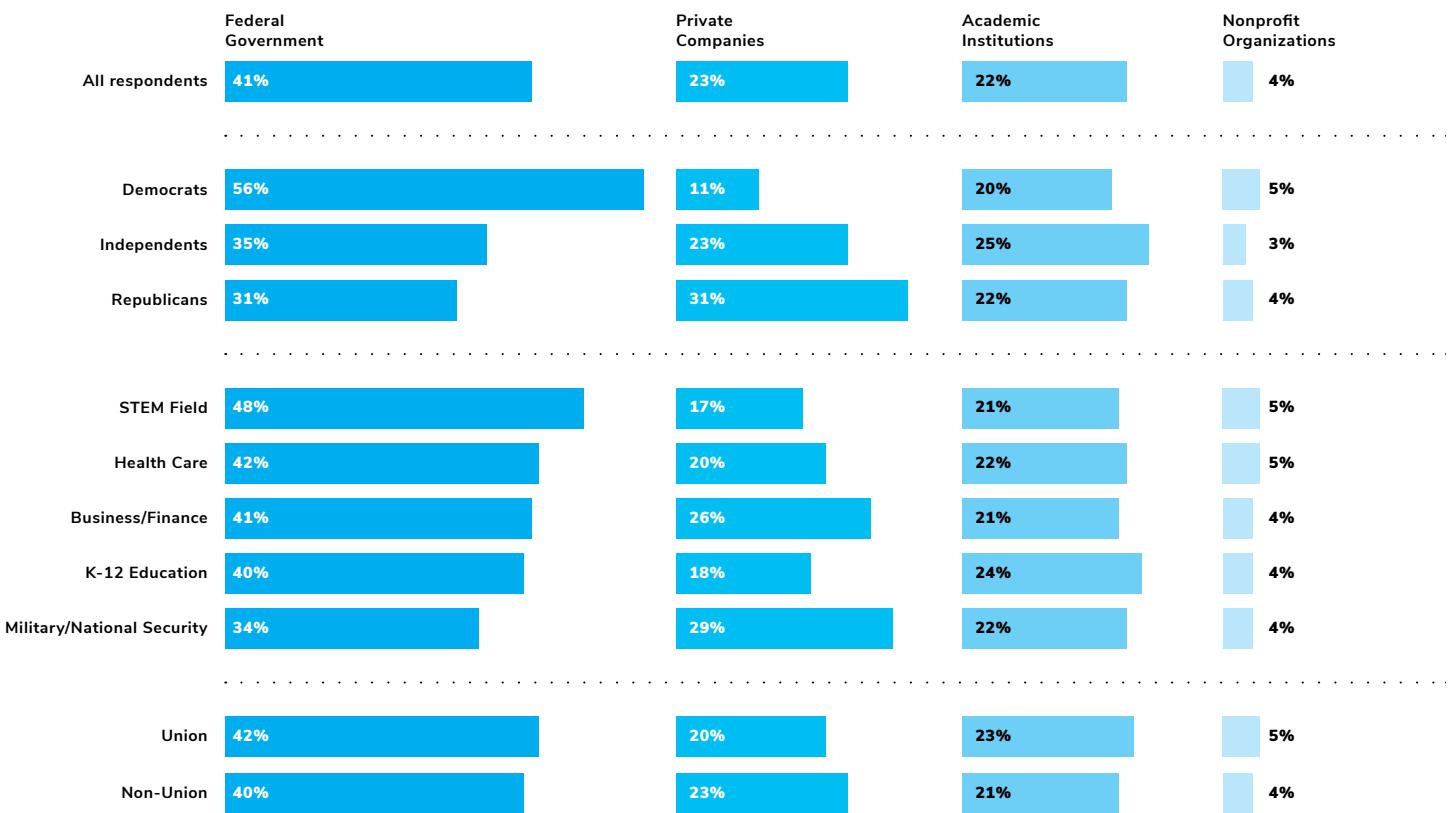


## DECREASING FEDERAL S&T INVESTMENT

Despite strong beliefs that the federal government is primarily responsible for U.S. science and technology vitality, over the past several decades federal funding of science and technology has decreased as both a percentage of GDP as well as a percentage of the total share of research and development spending in the country. Between 2010 and 2019 alone, the share of research and development funded by the federal government **decreased from 31% to 21%**<sup>41</sup>, a drop of nearly one-third.

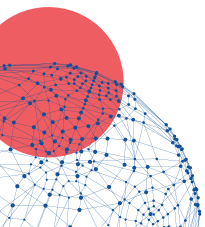
The survey shows that respondents across sectors believe the lack of federal spending on science and technology is one of the top five obstacles to advancing innovation in the United States. Overall, respondents said ensuring the strength of science and technology is primarily a job for the federal government, with 41% placing the responsibility there compared to 23% who placed the duty on private companies. Another 22% said it lands at the feet of academic institutions and 4% believe nonprofit organizations should take the lead.

### RESPONDENTS CONSISTENTLY BELIEVE FEDERAL GOVERNMENT IS PRIMARILY RESPONSIBLE FOR S&T STRENGTH



“We’re fortunate that the science and technology ecosystem in the U.S. is very hard for China to recreate. It’s not just government. It’s government, private industry, academia, philanthropies, and foundations all working together. But the heat that feeds that entire ecosystem is federal funding. If you take that away, the rest of it slowly collapses in on itself.”

**SUDIP PARIKH, PH.D.**  
 CEO, American Association for the Advancement of Science (AAAS)  
 and Executive Publisher of the Science Family of Journals



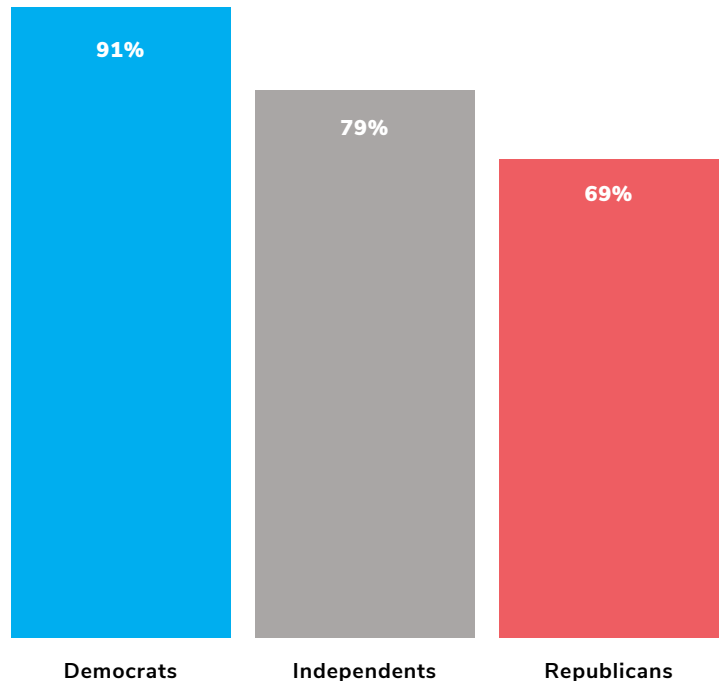
## DISTRUST IN SCIENCE: A WORRYING TREND

The growing distrust of science and scientists marks another barrier to advancing science and technology in the United States — one that respondents across sectors and political identifications find troubling.

Overall, 79% of respondents are concerned about the growing public distrust in scientists and scientific findings, including 91% of Democrats, 79% of independents, and 69% of Republicans. In addition, 76% of respondents said they are concerned about politicians discrediting scientists, including 89% of Democrats, 79% of independents, and 65% of Republicans.

Polls of U.S. adults conducted by [Research!America](#)<sup>42</sup>, the [Pew Research Center](#)<sup>43</sup>, and [NORC at the University of Chicago](#)<sup>44</sup> highlighted similar, widespread concerns about the impact of science misinformation and disinformation, as well as declining confidence and trust in scientists and their work.

### RESPONDENTS ARE BROADLY CONCERNED ABOUT DISTRUST IN SCIENTISTS AND SCIENTIFIC FINDINGS



## SCIENCE IS FACING A CREDIBILITY ISSUE

Widespread disinformation and misinformation about science, coupled with the lack of public engagement by scientists, are fueling a credibility crisis. The knock-on effects don't just harm scientific institutions; they also undermine public health by breeding confusion and suspicion about innovative treatments and medical products.

Taking on this challenge requires scientists to be proactive communicators, including engaging with the people in their communities. By getting out of their labs and being open and clear about what they're doing and why, scientists can better demonstrate the value of research and innovation for the public good.



“Nations all over the world are learning from the U.S. example that investment in science and technology is key to economic progress, national security, and good health, all essential for a prosperous tomorrow. We can no longer take U.S. leadership for granted.”

**MARCIA McNUTT, PH.D.**  
President, National Academy of Sciences

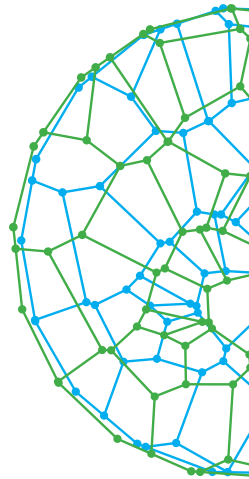
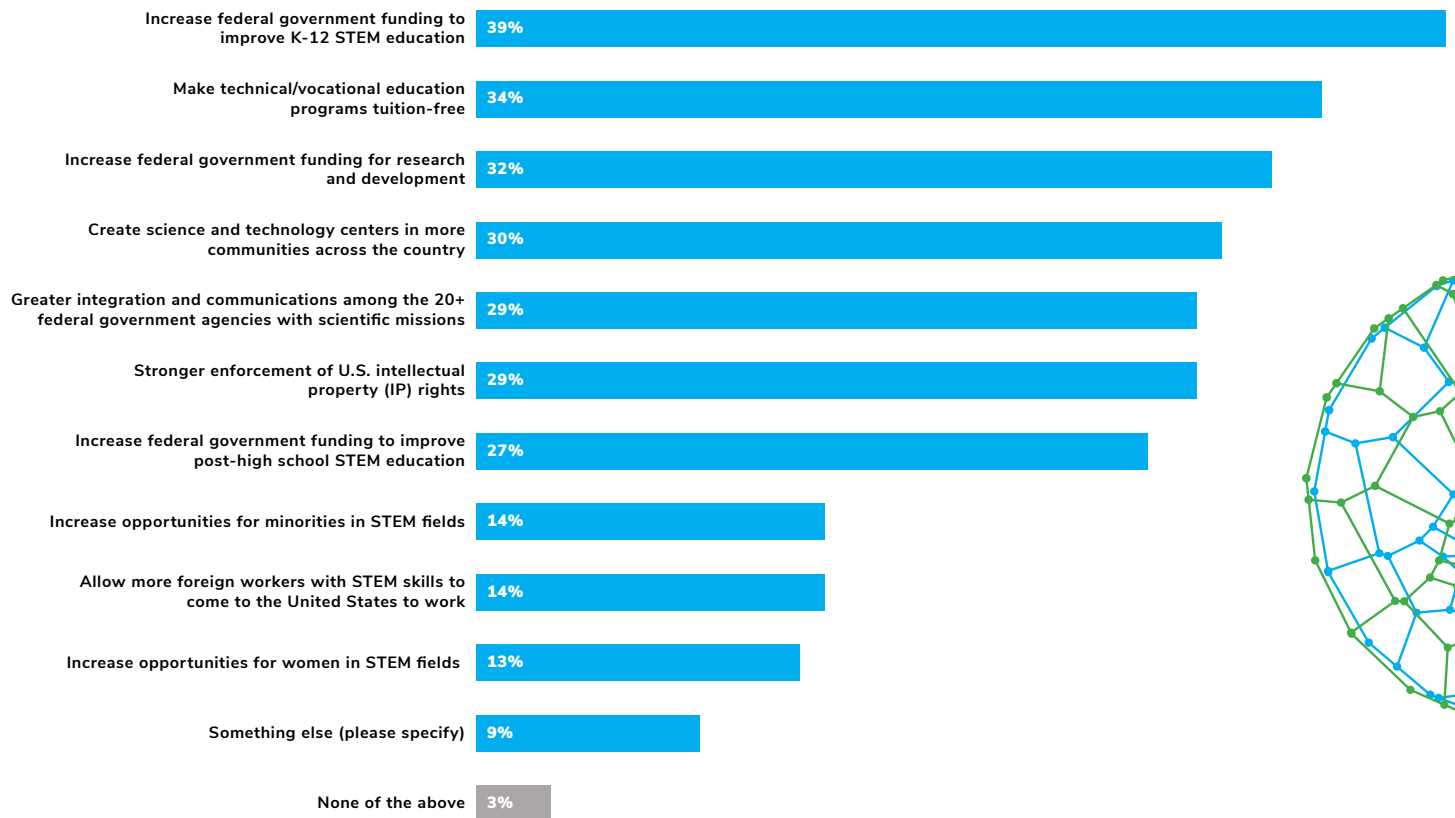


# SOLUTIONS TO FUEL INNOVATION

The survey uncovered significant concern that the United States is falling behind in the global leadership race. It also found some optimism that greater investments in key policy areas could reverse this trend.

These findings align with those released earlier this year in [Research!America's annual poll of U.S. adults](#)<sup>45</sup> as well as a separate poll, also of U.S. adults, by [Pew Research Center last year](#)<sup>46</sup>.

## POLICIES LIKELY TO STRENGTHEN U.S. ABILITY TO LEAD WORLD IN S&T



\*Multiple responses allowed. Totals do not sum 100%.

## KEY SURVEY FINDINGS

Three in five respondents said the **FEDERAL GOVERNMENT SHOULD INCREASE SPENDING ON SCIENTIFIC RESEARCH AND DEVELOPMENT.**

Most of those surveyed believe that **POLICIES DESIGNED TO IMPROVE STEM AND VOCATIONAL EDUCATION WOULD SIGNIFICANTLY IMPACT** on the United States' ability to lead in science and technology.

The survey also found support for building more science and technology hubs throughout the nation and **FOSTERING GREATER COORDINATION AMONG FEDERAL AGENCIES.**



# POLICY RECOMMENDATIONS

## SETTING THE COURSE ON A NATIONAL STRATEGY

The 20-plus federal agencies that advance science and technology programs and priorities in the United States lack a coordinated system through which to communicate and collaborate as they aim to solve the most pressing issues in our nation. Addressing this shortcoming is essential to developing a national science and technology strategy.

Today, due in part to competing budget priorities, as well as a lack of situational awareness, too many of our premier science agencies are siloed, with too little direct contact and coordination between not only different agencies but sometimes between different departments within the agencies themselves.

This lack of coordination is likely part of the reason that more than 80% of respondents said they would like to see greater input from scientific leadership in policymaking decisions. In fact, more than 75% across every political ideology and all five sectors surveyed agree on this point.

While the elevation of the Office of Science and Technology Policy (OSTP) director to a Cabinet-level position — which STAC strongly advocated for — marked a significant step forward in addressing the problem, the position doesn't include the budgetary authority that's critical to further advancing the innovation system in the United States. And while the 2022 CHIPS and Science Act included provisions supporting federal agency coordination, it lacks an all-encompassing plan that includes driving for efficiencies, adjusting course to take into account what is and isn't working, and fully taking advantage of the strengths we have across agencies.

### MAJORITY OF RESPONDENTS ACROSS THE PARTISAN DIVIDE WANT GREATER INPUT FROM SCIENTIFIC LEADERSHIP IN POLICYMAKING



The OSTP director should be fundamentally involved in developing and managing a national strategy that uses science and evidence-based decision making to tackle and coordinate across federal agencies on existential threats, while also attracting private sector participation.

By integrating and applying different perspectives, expertise, and resources to formulate a national plan, we can enhance the great work already being done across federal agencies and ensure the United States remains ahead of China and other nations in this critical area.

“We need Congress and policymakers to be willing to sit down with the scientific community, whether in industry, academia, or government, to shape the kinds of policies and legislative and regulatory frameworks that are necessary to advance innovation as well as appropriate budget commitments.”

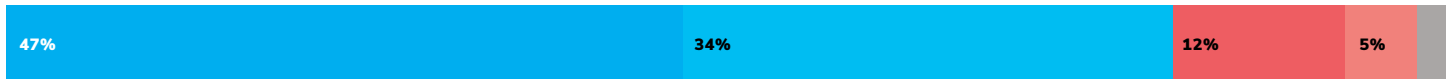
**MARGARET (PEGGY) HAMBURG, M.D.**

President of InterAcademy Partnership and former FDA Commissioner



**PLURALITIES AGREE FEDERAL INVESTMENT IN S&T IS IMPORTANT**

Innovations in science and technology improve the lives of all people, not just a select few.



The federal government investing more in science and technology will strengthen our economy and create many new jobs.



Federal government science and technology funding is so important to our future that it should be protected from budget cuts.



Federal government funding should be directed toward more important issues than science and technology.



Strongly agree   Somewhat agree   Somewhat disagree   Strongly disagree   Not sure

**MAJORITY BELIEVE U.S. SHOULD SPEND MORE THAN IT CURRENTLY DOES ON R&D**

America currently spends less as a percentage of its national income on research and development than we did 20 years ago. Do you think the federal government should spend:



China currently spends twice as much as a percentage of its national income as America on research and development. Do you think the American government should spend:



As a percentage of its national income, do you think the federal government should spend:



Much more than it currently does   Somewhat more than it currently does   About the same as it currently does  
 Somewhat less than it currently does   Much less than it currently does   Not sure

## INCREASED FEDERAL FUNDING OF S&T IS CRITICAL

A national strategy for science and technology must be bolstered by strong investment. But longstanding underfunding of federal spending in science and technology is threatening to stall American innovation at a critical time.

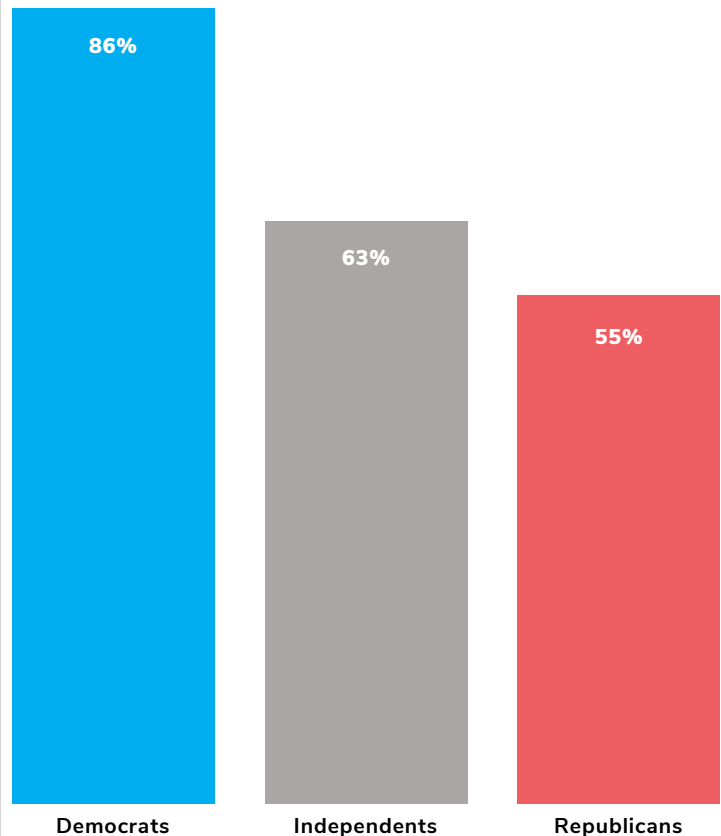
The survey found broad support across all political ideologies for not only increasing federal spending on science and technology but also protecting it from budget cuts, largely due to its importance to the economy and job growth.

Funding for priorities such as building the nation's STEM workforce, expanding research in artificial intelligence, and ensuring the latest technological advances are developed here in the United States is central to maintaining our position as a global leader in science and technology. And investing in the nation's premier science agencies is critical to combatting the growing threats facing the United States and the world — from pandemics to climate science to energy production and utilization.

That's why [STAC's Action Plan](#)<sup>47</sup> calls for at least doubling federal investment in science and technology from its current level of 0.7% of GDP to at least 1.4%. The increase in funding would largely be allocated to federal agencies with science and technology missions, including STEM education programs within the Department of Education. The additional funding would go a long way toward creating more high-paying jobs, developing a more robust STEM workforce, and increasing both our economic and national security.

Private companies can't take on the enormous scale of research and development in this country alone — nor do respondents in the survey view that as their responsibility. Federal government funding for science and technology is the backbone on which much of the private sector builds the incredible products and applications that allow us to live longer, healthier lives. Without federal investment, the whole system would fall apart.

OVERALL, A MAJORITY ACROSS POLITICAL IDEOLOGIES BELIEVE FEDERAL FUNDING OF S&T IS SO IMPORTANT THAT IT SHOULD BE PROTECTED FROM BUDGET CUTS



“As technology grows in importance, the relative percentage of GDP that gets spent on these areas needs to also increase because it's more and more important to many sectors of the economy.”

**DARÍO GIL, PH.D.**  
IBM Senior Vice President and  
Director of Research



## CREATING OPPORTUNITIES FOR ALL THROUGH STEM

Developing the diverse STEM workforce that the United States needs to meet the growing demand for talent calls for a multi-pronged effort to bolster education at all levels, from K-12 to technical or vocational programs, as well as traditional four-year colleges. We also must increase women and minority group representation in the STEM fields. And while building a domestic workforce is crucial, we must not lose sight of the societal and other benefits that international STEM workers bring in advancing science and technology in the United States.

The survey found tremendous support for increasing federal government funding to improve STEM education at all levels. Among the many steps worth considering, we can start by ensuring every student has a laptop and internet access at home, expanding K-12 curricula, training programs, and fellowships, developing federally supported retraining programs that provide a pathway to STEM-related employment, and providing support and resources to teachers to unleash creativity and innovation in young learners.



“If we can finally address something that the science community has failed at for so long – building a truly diverse workforce – our science will be stronger and better.”

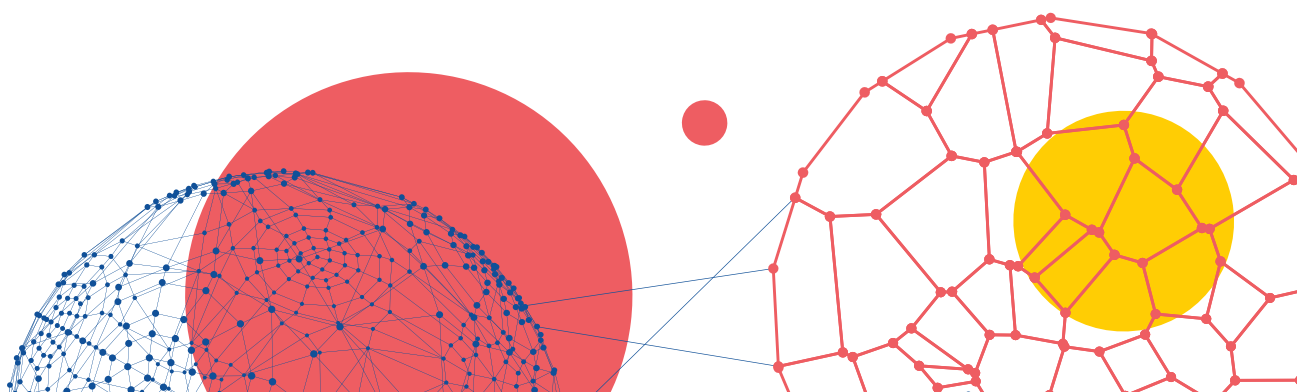
**KEITH R. YAMAMOTO, PH.D.**

Vice Chancellor for Science Policy and Strategy, UCSF and Director, UCSF Precision Medicine and President, American Association for the Advancement of Science (AAAS)

During elementary school, young learners are often fascinated by science. Yet, by high school and college, we've lost the attention of many of these bright minds. Shoring up our education system, nurturing the curiosity our children naturally exude at a young age, and involving parents long before their kids reach high school can build a more robust pathway to STEM beyond the K-12 level.

Making sure the future STEM workforce reflects the full diversity of the nation will require creating pathways and programs in schools throughout the country, particularly those with larger minority student populations. It also requires a full-scale approach backed by adequate funding for such programs to be successful.

Continuing to develop the talent pipeline after high school is another challenge we must undertake, one that requires rethinking the traditional pathway to a STEM career. For far too long, we've looked mainly to elite, four-year universities as the knowledge creators for these fields. Going forward, a significant percentage of the future STEM workforce must come not just from four-year universities but also from technical or vocational programs and two-year colleges. In fact, respondents placed making technical or vocational education tuition-free among the top three policy solutions that would have the greatest impact on our ability to lead in science and technology.





The side benefit of this shift is a better, more equal distribution of the skilled tech workforce throughout the country, including in smaller communities. As the 2022 CHIPS and Science Act spurs the development of more regional innovation hubs nationwide, higher education institutions at all levels can benefit by sharing university resources and developing private-public partnerships that leverage the combined capabilities of both human and infrastructure capital.

Finally, we must not forget the value of international students and workers in enhancing our STEM labor pool. The workforce gap in these fields cannot be addressed by focusing solely on domestic talent — nor should we pursue isolationist policies that place barriers on these workers coming to the United States. In fact, we must take steps to better ensure that international students who come here to learn from our renowned institutions can remain here after graduation, continuing to contribute to our nation’s science and technology success.



“A major theme is identifying what we do better than anybody in the world, and then ensuring that the government continues to fund that which is essential. And what we do better than anybody in the world is public-private partnerships.”

**KRISTINA M. JOHNSON, PH.D.**

Founder and CEO of KMJ and Associates, and former President of the Ohio State University and former Under Secretary, US Department of Energy

## PARTNERING ACROSS BORDERS ON GLOBAL CHALLENGES

The scale required to advance the incredible scientific and technological breakthroughs with the power to transform lives worldwide isn’t a task the United States can take on alone. Addressing the biggest challenges of our era, including climate change, poverty, and lack of water and other resources, requires global collaboration. This is an area we’re well-versed in, but one where there’s still room for improvement.

The United States regularly partners with our allies across all research levels. In fact, about **35% of science and engineering research papers**<sup>48</sup> by multiple authors from multiple countries have at least one U.S. author. More notably, the United States has partnered with other nations on large, important projects and initiatives such as the **Large Hadron Collider**<sup>49</sup>, the world’s most powerful particle accelerator, which U.S. researchers and engineers helped design and build.

But partnering with our allies isn’t enough in the face of the world’s problems: We also must collaborate with countries like China, despite our complicated relationship. This balancing act of science diplomacy requires competing with China in a peaceful way that avoids competition devolving into conflict and focuses on finding where there’s common ground and common interest to build upon.

“Attracting top talent from around the world, including from China, strengthens U.S. science and technology and benefits our country by making us more prosperous and more secure. Collaboration with China, with proper safeguards, also can help U.S. science advance while giving us needed insights into our chief competitor.”

**L. RAFAEL REIF, PH.D.**

President Emeritus, Ray and Maria Stata Professor of Electrical Engineering and Computer Science, Massachusetts Institute of Technology (MIT)



## DOUBLING DOWN TO LEVEL UP ON INNOVATION

The bipartisan 2022 CHIPS and Science Act marked a huge win for advancing the science and technology priorities that are critical to our country. This **bold commitment**<sup>50</sup> promises to fuel new innovations, strengthen domestic supply chains, and help build a robust talent pipeline of STEM workers.

But most of the science policies and programs created and expanded in the 2022 CHIPS and Science Act were only authorized — not appropriated. The result is that, to date, such programs remain **underfunded by billions of dollars**<sup>51</sup>.

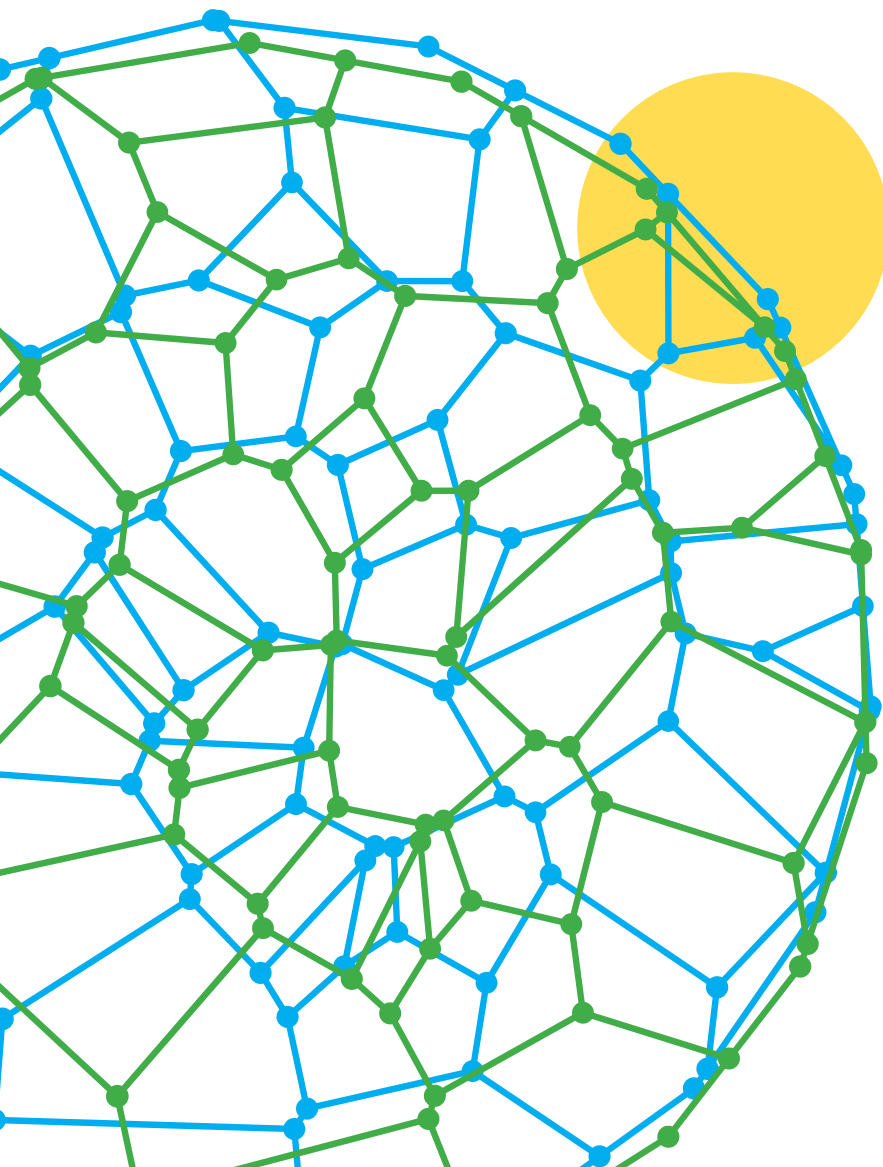
Today, the expectation that our position as a global innovation leader is set in stone no longer holds. Now, we must redouble our efforts to advance the science and technology capabilities that time and time again have secured our place as the world's leading innovation powerhouse, creating millions of jobs and strengthening our economy and national security in the process.



“Now is the time more than ever to double down on what we’re doing in innovation because we know that our competition is also thoroughly engaged and making massive investments.”

**CHARLIE DENT**

Former Republican Representative from Pennsylvania





# CONCLUSION

## IT'S TIME TO ACT

The lack of a national science and technology strategy and an across-the-board agency coordination plan coupled with erratic, uneven, and short-sighted funding mechanisms are shortcomings we can no longer ignore. We must seize this critical moment to devise and identify the priorities and goals that will inspire and engage the entire American science and technology ecosystem — across federal agencies, sectors, industries, academia, and philanthropy.

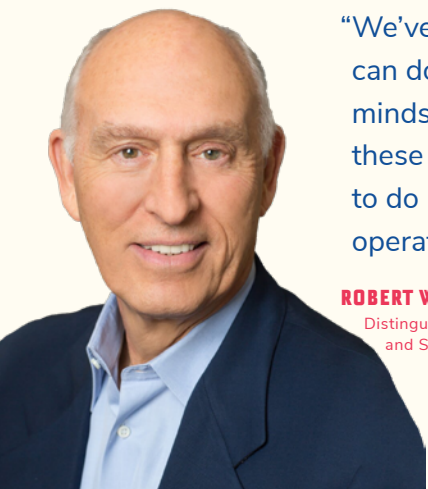
We must smartly spend our taxpayer dollars, including on the basic research that has driven and continues to fuel many of the greatest scientific breakthroughs of our time. We must proactively fund national centers of excellence throughout the country to address the decades-long challenges we face, including climate change and energy security. And we must invest in our K-12 STEM education system and the next generation of STEM workers.

This report should serve as a wake-up call. Empowering our great science and technology enterprise with a national strategy, increasing federal funding for research and development, boosting critical coordination among scientific agencies, and bolstering our K-12 STEM education are essential proposals that will result in a stronger America.

Since our earliest beginnings, the United States has risen again and again no matter the challenge — and always with a commitment to doing the right thing. Lawmakers should feel emboldened and encouraged by the resounding support for the critical policies laid out in this report that will strengthen the State of Science in America for decades to come.

**All that's needed now is the courage to come together and act.**

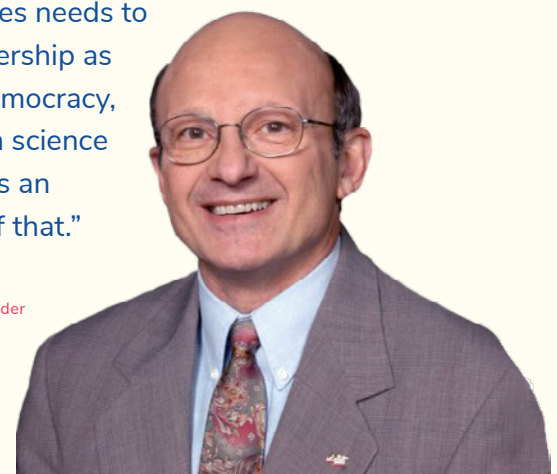
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**ROBERT W. CONN, PH.D.**

Distinguished Policy Fellow, School of Public Policy and Strategy, University of California, San Diego

“We’ve done it before, and we can do it again. We have brilliant minds, and we can think through these policy issues, but we need to do it with renewed vigor and operate from strength, not fear.”



**BILL NOVELLI**

Professor Emeritus and founder of Business for Impact at Georgetown University and former CEO of AARP

“The United States needs to maintain its leadership as the bastion of democracy, and leadership in science and technology is an important part of that.”

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Action Committee, Research!America

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