NATIONAL ACADEMY OF ENGINEERING

Impact Report 2024–2025

NATIONAL ACADEMIES Sciences Engineering Medicine

MISSION STATEMENT

Founded in 1964, the National Academy of Engineering (NAE) is a private, independent, nonprofit institution that provides engineering leadership in service to the nation. The mission of the NAE is to advance the welfare and prosperity of the nation by providing independent advice on matters involving engineering and technology, and by promoting a vibrant engineering profession and public appreciation of engineering.

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photo: Christopher Michel

John L. Anderson: A Farewell Message

John L. Anderson,
President Emeritus,
National Academy of Engineering

As I prepare to conclude my term as president of the NAE, I do so with deep gratitude for the opportunity to serve this remarkable institution. Over the past six years, I have seen firsthand the power of engineering to drive progress, solve complex societal challenges, and shape a better future. I have also been continually inspired by the dedication and ingenuity of our members, whose work upholds the NAE's mission to advance the welfare and prosperity of the nation.

In 2024, we marked the NAE's 60th anniversary, a milestone that invited both reflection and ambition. At our 2024 Annual Meeting, we honored the legacy of engineering leadership while launching a bold conversation about the future: "Reimagining Supply Chains for National Resiliency." The event underscored how engineers must continually adapt and innovate, applying tools like AI and systems thinking to rebuild critical infrastructure and secure the nation's economic future. It also highlighted the unique strength of the NAE in convening talent across academia, industry, and government to catalyze solutions with broad societal impact.

Throughout my presidency, I have championed the idea that engineering is not merely applied science—it is a creative, collaborative discipline in its own right, one that turns imagination into reality. From technologies that enhance mobility and inclusion to efforts that revitalize American manufacturing, engineering has shaped lives in ways we could not have anticipated. As we look ahead to the NAE's next 60 years, I am confident that our members will continue to lead with vision, rigor, and purpose.

photo: Christopher Michel

Tsu-Jae King Liu: A Welcome Message

I am honored to serve as president of the NAE, building on the strong foundation laid by John L. Anderson and all of the past NAE presidents, to advance its noble mission. Now more than ever, our nation's leaders need our advice and support in navigating complex challenges and opportunities in a world that is increasingly dependent on technology.

Engineering drives technology innovation that shapes every aspect of modern life, from the way individuals live, work, and play, to the way societies promote and maintain health, safety, security, stability, and order. The NAE plays a critical role of helping to ensure that the United States maintains technological leadership, which has become necessary not only for long-term economic prosperity but also for national security—protecting our democracy and upholding American values of freedom and civil liberty.

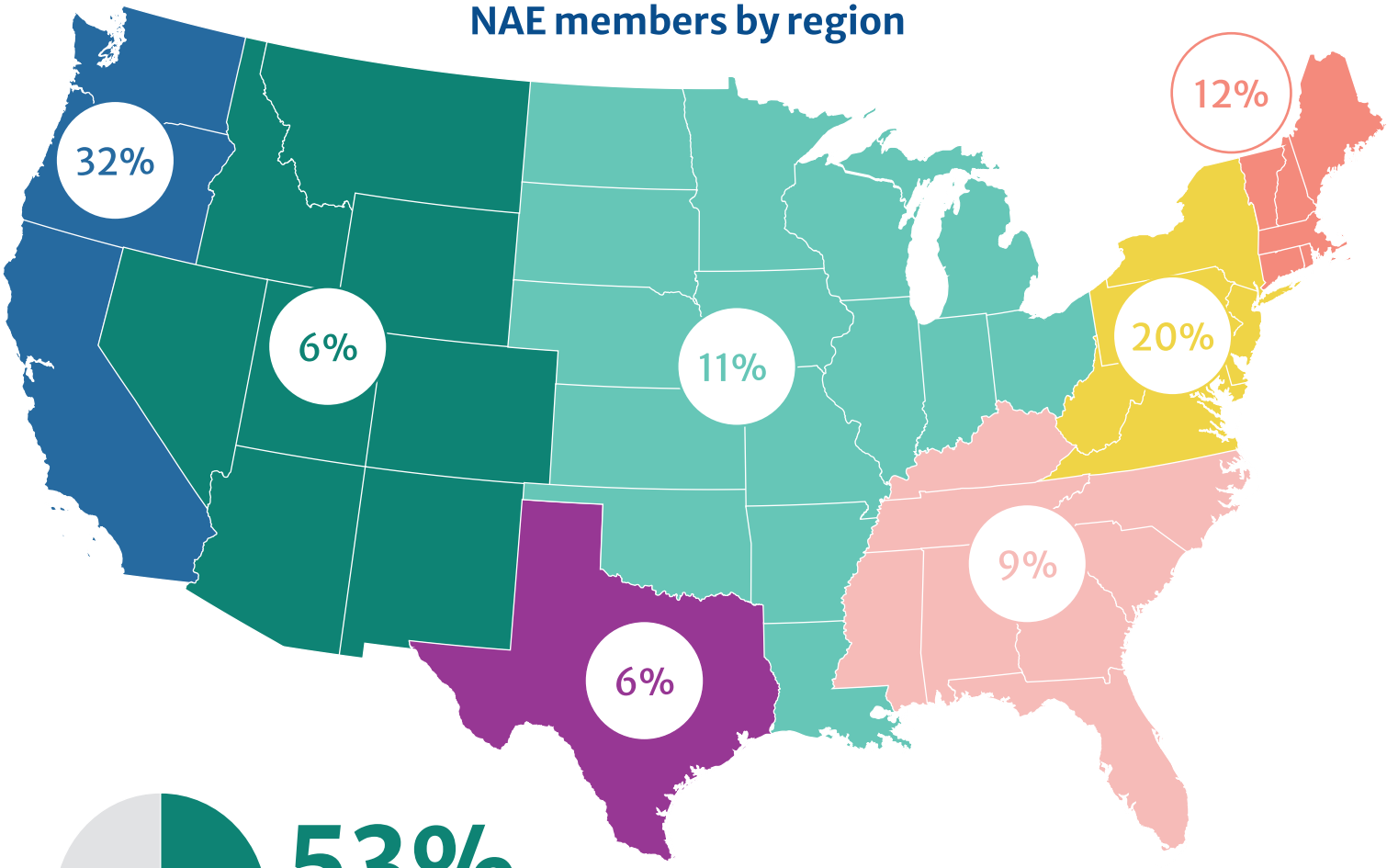
Tsu-Jae King Liu,
President,
National Academy of Engineering

The NAE's strength lies in the broad and deep experience and technical expertise of its members, engineering leaders drawn from across sectors and disciplines. We must bring this strength to bear on the societal challenges and opportunities of our time. Your voice, your ideas, and your support will be critical for the NAE to fulfill its mission of advancing the welfare of our nation. I look forward to all we will accomplish together in the years ahead!

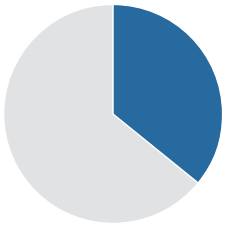
Membership Data

July 1, 2024 – June 30, 2025

NAE members by region



53%
new members from business sector



36%
of all NAE members were born outside the United States and have become naturalized citizens

129
new members elected

21
new international members elected

16
countries represented by new members

2,454
total U.S. members

54%
of members are volunteers in NAE and NASEM activities

334
total international members

Annual, National, and Regional Meetings

2024 NAE Annual Meeting (September 29–30, 2024)

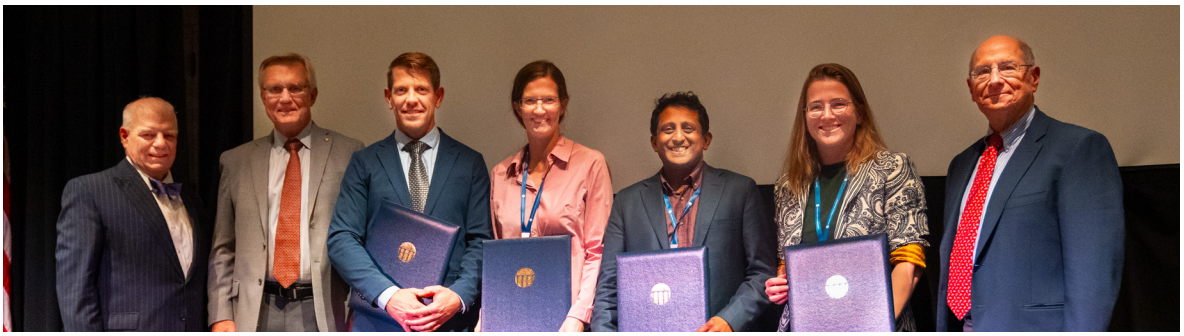
Reimagining Supply Chains for National Resiliency

The 2024 NAE Annual Meeting celebrated the organization's 60th anniversary at the National Academy of Sciences building in Washington, DC. Themed Reimagining Supply Chains for National Resiliency, this flagship event gathered engineers, industry leaders, and policymakers to tackle critical supply chain vulnerabilities exposed by global disruptions. Through a blend of keynote addresses, panel discussions, and exclusive member sessions, participants explored how emerging technologies—especially AI and digital manufacturing—can bolster supply chains and drive inclusion, diversity, and cross-sector collaboration.

Highlighting the event's dual purpose of celebration and strategic visioning, the meeting included a formal induction ceremony for new NAE members, special anniversary programming marking six decades of impactful service, and focused workshops aimed at enhancing resilience across sectors. Attendees delved into evolving strategies for national competitiveness, policy pathways, and engaged with spanning academia, government, and the private sector—all with the shared goal of engineering a more robust and adaptive future.

2024 NAE National Meeting (February 8, 2024)

From Mars to Minerals with Machine Learning and Motion in Between



The theme of the 2024 NAE National Meeting, From Mars to Minerals with Machine Learning and Motion in Between, captured the all-encompassing applicability and impact of engineering. Sharing their vision are the Gilbreth Lecturers, consisting of four early-career engineers selected based on their outstanding presentations at the NAE's 2023 FOE symposium.

Video: John Anderson, NAE President, Opening Remarks: 2024 NAE National Meeting

2024 NAE REGIONAL MEETINGS

Purdue University | Excellence in Manufacturing and Operations (XMO) at the Crossroads of America (March 24–26, 2024)

Purdue University hosted the regional meeting Excellence in Manufacturing and Operations (XMO) at the Crossroads of America. Attendees engaged with in-depth panels, interactive tours, and discussions focused on integrated digital, physical, and sustainable manufacturing. The event addressed critical industrial sectors such as defense and aerospace, transportation and logistics, semiconductor and microelectronics, agriculture, food, and biomedical health care.

Texas A&M University | Space and Time (April 2, 2024)

Texas A&M University hosted the regional meeting Space and Time. The meeting examined the questions: How does science fiction influence technology evolution, and vice-versa? How do we measure and perceive time and location when we are traveling in space? What are the engineering challenges we have begun to address for time and extended space travel, including quantum devices, growing food and medicine in space, and establishing permanent bases on the moon and Mars?

University of Delaware | Clean Hydrogen for Energy Transition (April 17, 2024)

The University of Delaware and The Chemorus Company hosted the regional meeting Clean Hydrogen for Energy Transition. The meeting examined topics such as how hydrogen holds immense promise as a clean and versatile solution to our growing energy needs. When produced through sustainable methods, hydrogen can serve as a clean and efficient energy carrier that has the potential to revolutionize various sectors, including transportation, industry, and electricity generation. This meeting addressed critical challenges and opportunities in the production, storage, transportation, and conversion of hydrogen for use in clean and efficient fuel cells.

Video: Clean Hydrogen for Energy Transition | 2024 NAE Regional Meeting

University of California, Davis | Tensions at the Edge: Competing Objectives in Engineering Solutions to Society's Most Pressing Problems (May 30, 2024)

The University of California, Davis, hosted the regional meeting Tensions at the Edge: Competing Objectives in Engineering Solutions to Society's Most Pressing Problems. The day featured a business session for NAE members and a symposium and reception for NAE members and researchers, practitioners, and partners throughout northern California.

2025 NAE National Meeting (February 12–14, 2025)

Engineering Innovation for a Brighter Future

The 2025 National Meeting, Engineering Innovation for a Brighter Future, emphasized the importance of taking risks, learning from failures, and addressing the evolving societal needs of the 21st century through innovative engineering.

Sharing their vision were four early-career engineers selected to serve as Gilbreth Lecturers based on their presentations at FOE symposia. The Gilbreth Lectures were established in 2001 by the NAE Council as a means of recognizing outstanding young engineers and are supported by the Armstrong Endowment for Young Engineers. The NAE invited students from Cabrillo High School in Long Beach, California, and Samueli Academy in Santa Ana, California, to participate in this engaging event.

On February 14, the NAE hosted the inaugural NAE Early Career Engineering Convocation (E2C2). The purpose of this forum was to foster enduring interactions among early-career engineers and NAE members to exchange perspectives and inspire the next generation of engineering leaders. The NAE asked the leadership of 7 universities, 2 national labs, and 31 businesses in southern California to nominate promising early-career engineers to attend this special event.

2025 NAE REGIONAL MEETINGS

Brown University | Hacking the Brain: Engineering Innovations (March 14, 2025)

Brown University hosted the regional meeting Hacking the Brain: Engineering Innovations, which explored cutting-edge innovations at the intersection of engineering and neuroscience. From brain–computer interfaces to sensory prosthetics, speakers shared groundbreaking work redefining how we understand and interact with the human brain.

Georgia Tech | Accelerating Clean Energy Manufacturing (April 1–2, 2025)

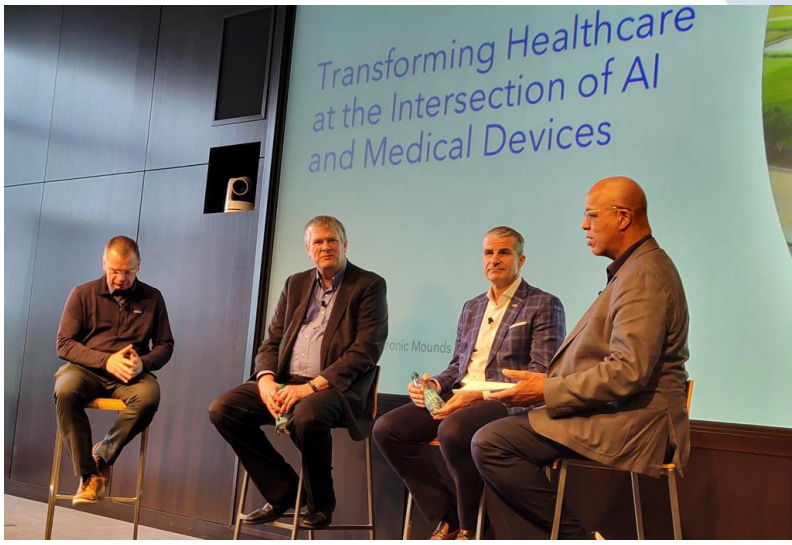
Georgia Tech hosted the regional meeting Accelerating Clean Energy Manufacturing. The event explored the future of clean energy manufacturing through the lenses of battery innovation, industrial decarbonization, and AI. From scalable electrification to smart manufacturing, speakers shared bold ideas driving the transition toward a more sustainable and competitive energy landscape.

University of California, Berkeley | Artificial Intelligence in Engineering (May 15, 2025)

The University of California, Berkeley, hosted the regional meeting Artificial Intelligence in Engineering. The event explored the transformative power of AI in engineering, with sessions on smarter infrastructure, energy-efficient buildings, robotics, and materials discovery. Speakers shared forward-looking insights on how AI is reshaping the profession while raising critical questions around equity, ethics, and innovation.

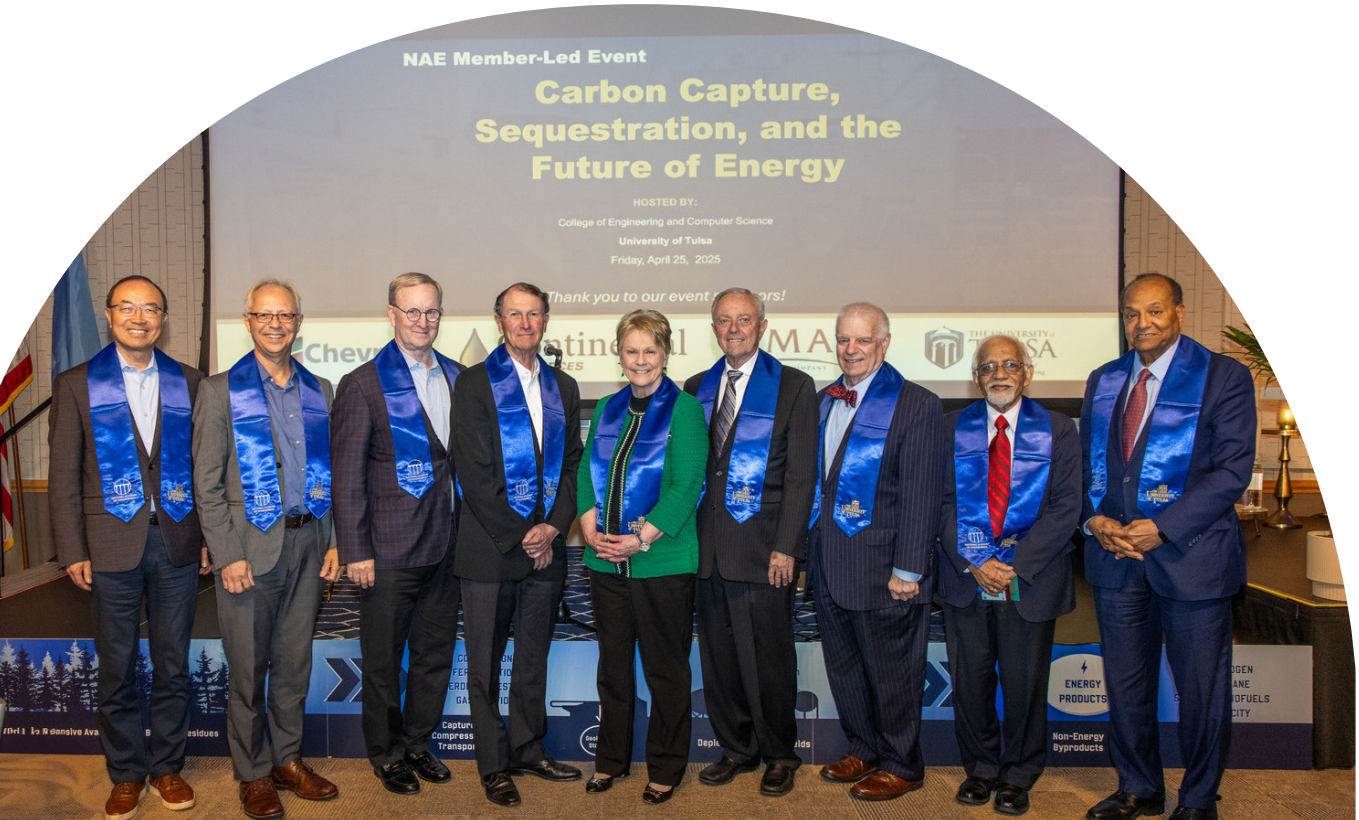
University of Minnesota | Transforming Healthcare at the Intersection of AI and Medical Devices (May 21, 2025)

The NAE's final regional meeting of 2025 took place at the University of Minnesota on Medtronic's Mounds View campus. The theme Transforming Healthcare at the Intersection of AI and Medical Devices brought together leaders and innovators across fields to explore how AI is a promising new tool in health outcomes, medical tools, and care systems.



Member-Led Events (MLEs)

MLEs are virtual or in-person gatherings independently organized by NAE members. MLEs empower members to take a more active role in advancing the NAE's mission while fostering peer-to-peer engagement and regional connectivity. In 2024, 15 MLEs were successfully held and 17 are scheduled for 2025—demonstrating strong momentum and member initiative. A highlight in 2025 was an in-person event hosted by the University of Tulsa from April 24–25, 2025, which brought together approximately 125 participants, including a guided tour of the campus's Mesoscale Research Facility.



Honoring Excellence

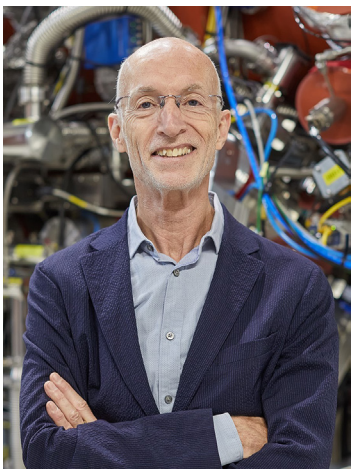
Each year the NAE salutes leaders in engineering for their lifetime dedication to their field and their commitment to advancing the human condition through great engineering achievement and/or through innovation in engineering and technology education. The NAE dedicates $1 million annually to recognize these leaders and to bring better understanding of the importance of engineering and engineering education to society.

The NAE presents seven awards for engineering achievement and innovation:

- **Charles Stark Draper Prize for Engineering**
- **Fritz J. and Dolores H. Russ Prize**
- **Bernard M. Gordon Prize for Innovation in Engineering and Technology Education**
- **Simon Ramo Founders Award**
- **Arthur M. Bueche Award**
- **Gibbs Brothers Medal**
- **J.C. Hunsaker Award in Aeronautical Engineering**

2024 Charles Stark Draper Prize for Engineering

Recognized as one of the world's preeminent awards for engineering achievement, the Charles Stark Draper Prize for Engineering honors an engineer(s) whose work has significantly benefited society through impactful technological contributions. Presented biennially in even-numbered years, the award includes a $500,000 cash prize, an inscribed certificate, and a commemorative medallion.



Stuart S. P. Parkin

"For engineering spintronic technologies, enabling digital information storage that serves as a foundation for our data-driven world."

2024 Simon Ramo Founders Award

The Simon Ramo Founders Award recognizes an outstanding U.S. or international NAE member whose accomplishments exemplify the ideals and principles of the NAE. It is presented annually during the NAE Annual Meeting, and the recipient receives an inscribed certificate and a commemorative medal.

Paul R. Gray

"For contributions to modern analog integrated circuit design through research and education, and for leadership of academic, philanthropic, and corporate enterprises."

2024 Arthur M. Bueche Award

The Arthur M. Bueche Award recognizes engineers whose personal contributions have advanced U.S. science and technology policy. Presented annually during the NAE Annual Meeting, the recipient receives an inscribed certificate and a commemorative medal.

Franklin M. Orr, Jr.

"For government, academic and industrial service in promoting clean energy policy, reduction of greenhouse gas emissions and developments in carbon sequestration."

NAE Flagship Programs

The NAE advances its mission through a dynamic portfolio of programs that reflect the evolving role of engineering in society. From shaping responsible practices and inclusive education to exploring the frontiers of innovation, these initiatives bring together experts, stakeholders, and the next generation of engineers. Each program—whether focused on complex systems, ethics, education, or global collaboration—embodies the NAE's commitment to excellence, equity, and impact across the engineering enterprise.

Pathways into Engineering

Pathways into Engineering supports and encourages youth, their families, and educators to explore and engage with the field of engineering. This initiative now encompasses both EngineerGirl and the newly launched EngineerTeen. EngineerGirl and EngineerTeen are key outreach initiatives of the NAE designed to broaden participation in engineering from an early age.

EngineerGirl

Launched in 2001, EngineerGirl is one of the NAE's signature outreach programs. It engages primarily middle school students, introducing them to the exciting possibilities within engineering and connecting them with professional role models for inspiration and meaningful engagement.

EngineerTeen

EngineerTeen, a new companion to EngineerGirl, builds on more than 25 years of research and outreach by engineers and scholars. To ensure that tomorrow's problem-solvers reflect the nation's full talent pool, all young people must have access and the opportunity to pursue engineering. EngineerTeen offers a platform where the engineering community can support that journey and help youth chart their own paths into technical careers.

2025 EngineerGirl Writing Contest Winners

The National Academy of Engineering (NAE) has announced the winners of its 2025 EngineerGirl Writing Contest, which invited students from elementary through high school to reimagine an everyday object as a "smart" innovation. This year's theme, "Innovating Smarter," encouraged participants to explore how technology could enhance a common item—considering its potential functions, required systems, and possible risks. NAE President John L. Anderson commended the winners for their imaginative and insightful essays, noting their ability to grasp both the opportunities and challenges involved in engineering design. First place awards went to Olive Monrad of Texas for her essay The Backpack of Tomorrow, Kendall Wilkerson of Virginia for The Smart Wardrobe, and Aleena Shaji of Texas for The Smart Solution to Hair Care Confusion. Winning students received cash prizes and had their work featured on the EngineerGirl website, along with second and third place recipients and honorable mentions.

1482

writing contest entries

2024 EngineerGirl Writing Contest Winners

The National Academy of Engineering (NAE) has announced the winners of its 2024 EngineerGirl Writing Contest, which invited students from elementary through high school to explore the lifecycle of an everyday object in their essays. This year's theme, "The Secret Life of Everyday Items," challenged participants to highlight the essential contributions of engineers in transforming raw materials into finished products. NAE President John L. Anderson praised the students for showcasing the ingenuity and innovation at the heart of engineering. First place winners included Hiya Ghosh from Minnesota for her essay on toothpaste engineering, Eesha Vanamala from New Jersey for her piece on Arduino, and Vivian Bootz from Wisconsin for her essay on the lifecycle of paper. Winners received cash prizes and recognition on the EngineerGirl website, with additional awards granted to second and third place finishers and honorable mentions across each grade level category.

942

writing contest entries

Cultural, Ethical, Social, and Environment Responsibility in Engineering (CESER)

CESER promotes awareness of how culture, ethics, society, and the environment intersect with engineering practice. By engaging engineers, educators, industry, and the public, CESER supports responsible engineering through studies and workshops. Recent work addressed indoor air pollution, societal impacts of NSF-funded research, and engineering and human rights.

Practices for Engineering Education and Research (PEER)

PEER advances engineering education through research, convenings, and system-level analysis across K–12 and higher education. It emphasizes how educational systems and their contexts interact, aiming to drive meaningful change. The program is currently being re-scoped to align with evolving educational priorities.

Forum on Complex Unifiable Systems (FOCUS)

FOCUS is a cross-disciplinary effort that connects experts from a variety of fields to tackle big, complicated problems in society and technology. It looks at issues in areas like health, security, democracy, infrastructure, education, and the environment. FOCUS shares key takeaways in brief, easy-to-read publications aimed at helping decision-makers. Recent topics include AI governance, remote patient monitoring, breakdowns in social systems, and a major international forum on delivering large-scale engineering projects.

The Grainger Foundation Frontiers of Engineering (FOE)

The Grainger Foundation Frontiers of Engineering (FOE) symposia, held annually since 1995, convenes 100 outstanding early-career engineers from industry, academia, and government for 2.5- day meetings focused on cutting-edge research across disciplines to foster cross-sector collaboration. In addition to the USFOE, the program includes rotating bilateral meetings with Germany, Japan, China, and the European Union—each involving 30 engineers from each side—with plans underway to expand international engagement further.

Each symposium is organized by young engineering leaders who select speakers with expertise in a broad range of topics such as fusion energy, quantum computing and A.I., digital twins, and additive manufacturing. The symposia format includes technical talks, Q&A, breakouts, and poster presentations, with proceedings published online. Participants must be within 12 years of earning an advanced degree, show notable research or technical achievements, and have leadership potential. Participation is by invitation following a competitive nomination and selection process. Continued engagement is encouraged through collaboration grants, newsletters, an alumni LinkedIn group, and opportunities to participate in future NAE activities.

2024 and 2025 The Grainger Foundation Frontiers of Engineering (FOE) Data

347

applicants to the 2024 USFOE; 77 were selected to participate, joining 23 organizing committee members

321

applicants to the 2025 USFOE

16

alumni elected to the NAE across the entire FOE program in Feb. 2024 (inclusive of U.S. and international-based FOE)

2024 US Frontiers of Engineering Symposium

The Grainger Foundation Frontiers of Engineering 2024 symposium was held at the National Academies' Beckman Center in Irvine, California, September 11–14, 2024. About 100 outstanding early-career engineers met for an intensive 2.5-day symposium to discuss cutting-edge developments in four areas: Water-Air-Surface Connections for Indoor Microbiology and Health; Building the Future of AI; Understanding and Engineering Connections Between the Gut and the Brain; and the Impending Revolution of Digital Twin.

2024 China-America FOE Symposium (CAFOE)

The 2024 CAFOE symposium was held on June 17–20, as a point-to-point meeting between the National Academies' Beckman Center in Irvine, California, and a facility in Beijing, China. Sixty highly accomplished early-career engineers from China and the United States met for an intensive 2.5-day symposium on developments at the cutting edge of engineering technology in four areas: Nanotechnology for Health; Energy Transitions and Challenges; Knowledge Engineering and Transportation; and A Sustainable Ocean Future. The event is intended to facilitate international and cross-disciplinary research collaboration, promote the transfer of new techniques and approaches across disparate engineering fields, and encourage the creation of a transpacific network of world-class engineers. CAFOE is carried out in cooperation with the Chinese Academy of Engineering and supported by The Grainger Foundation and the National Science Foundation.

2025 German-American FOE Symposium (GAFOE)

The 2025 German-American Frontiers of Engineering Symposium (GAFOE), A Digitally Connected World, was hosted by Oak Ridge National Laboratory (ORNL) in Oak Ridge, Tennessee, from March 25–28. The National Academy of Engineering (NAE) partnered with the Alexander von Humboldt Foundation (AvH) to organize this event, which was launched as the first bilateral Frontiers of Engineering program in 1998. Sixty early-career researchers from US and German universities, companies, and government labs were invited to attend the 2-1/2 day meeting that focused on four topics: energy-related manufacturing, distributed digital education planning, novel work models for a digital world, and the industrial metaverse. Attendees participated in a two-part brainstorming session, presented posters on their research, toured the Spallation Neutron Source, and sat for a fireside chat with AvH, NAE and ORNL leaders. Funding for the meeting was provided by The Grainger Foundation, the National Science Foundation, and the Alexander von Humboldt Foundation. The next GAFOE meeting will be held in 2027 in Germany.

2025 Japan-America FOE Symposium (JAFOE)

The 2025 JAFOE symposium was hosted by the University of California, San Diego, from June 1–4. Sixty highly accomplished early-career engineers from Japan and the United States met for an intensive 2.5-day symposium focused on developments at the cutting edge of engineering technology in four areas: Resurgence in Fusion Science and Engineering; Heterogeneous Integration in Semiconductors; Clinical-Grade Wearable Sensors; and Sustainable Ocean Engineering. In addition to poster presentations and breakout sessions, attendees toured UCSD's Center for Wearable Sensors, Center for Wireless Communications, Supercomputing Center and the Nanoscience, Nanoengineering and Nanomedicine Research Facility (NANO3). JAFOE is organized by the NAE and the Engineering Academy of Japan, and hosted by the University of California, San Diego. Support for JAFOE symposia is provided by The Grainger Foundation and the Japan Science and Technology Agency.

Inspiring the Next Generation: NAE at the ACES Professional Pathways Expo

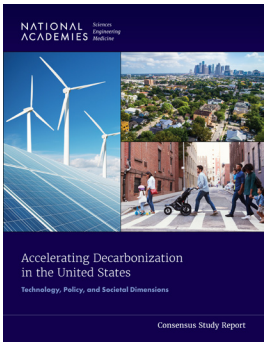
On June 27, the NAE participated in the Achieving Collegiate Excellence and Success (ACES) Professional Pathways Expo at the Universities at Shady Grove in Rockville, Maryland. The event connected high school students in Montgomery County Public Schools' ACES program with professionals to explore potential career paths.

NAE staff engaged students in conversations about engineering careers and shared resources from the EngineerGirl and EngineerTeen programs, platforms designed to inform and inspire young people, especially underrepresented groups, about pathways into engineering. These tools empower students with stories, career guidance, and real-world perspectives from practicing engineers.

This outreach directly supports the NAE's mission to foster workforce development and engage future innovators. The NAE is excited to continue this important work and invite NAE members to participate in similar local career events that inspire the next generation of engineers.

Publications

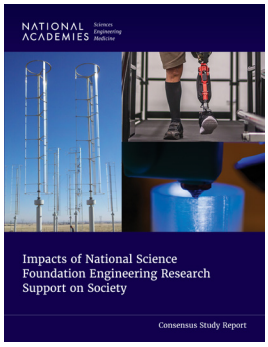
Across 2024, the NAE produced and copyedited a range of general publications that reflect its mission to inform, inspire, and guide. These included consensus study reports and workshop proceedings covering topics from engineering education reform to responsible technology development, societal resilience, and complex systems analysis. Designed for diverse audiences—from policymakers and educators to industry leaders and the public—these publications help translate technical insights into actionable knowledge that supports a healthier, more equitable, and forward-looking society.



Accelerating Decarbonization in the United States: Technology, Policy, and Societal Dimensions (2024)

Contributors: Committee on Accelerating Decarbonization in the United States: Technology, Policy, and Societal Dimensions; National Academies of Sciences, Engineering, and Medicine; Division on Engineering and Physical Sciences; Division on Earth and Life Studies; Division of Behavioral and Social Sciences and Education; Transportation Research Board; Board on Energy and Environmental Systems; Board on Atmospheric Sciences and Climate; Board on Environmental Change and Society

Addressing climate change is both essential and achievable, offering public health and economic benefits. The U.S. can lead global decarbonization by transitioning to net-zero emissions by 2050. While recent legislation made progress, further action is needed. Accelerating Decarbonization in the United States… provides detailed recommendations to guide a just, equitable energy transition. It identifies policy needs and strategies across sectors—including electricity, transportation, buildings, and finance—while emphasizing energy justice, workforce development, and public engagement.



Impacts of National Science Foundation Engineering Research Support on Society (2024)

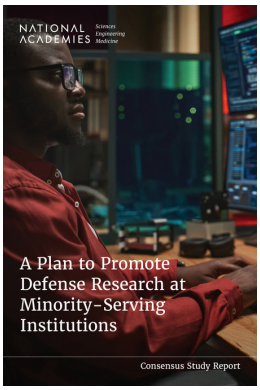
Contributors: Committee on Extraordinary Engineering Impacts on Society; Program Office; National Academy of Engineering; National Academies of Sciences, Engineering, and Medicine

Engineering drives economic growth, manufacturing, infrastructure resilience, healthcare improvements, and national security, yet its societal impacts often go unnoticed. Promoting public understanding of engineering's role is vital to maintain support for policies ensuring technology benefits humanity. Federal support, particularly from the National Science Foundation (NSF), has enabled researchers to pursue fundamental questions, technological breakthroughs, and practical solutions. Since 1950, NSF has funded critical engineering research. Impacts of National Science Foundation Engineering Research Support on Society highlights how these investments in engineering research have benefited society, sharing compelling stories of people behind these advances and offering recommendations on how to better communicate engineering's impacts effectively to diverse audiences.

A New Era in Space: Ensuring the Future of Biological and Physical Sciences Research: A Decadal Survey for 2023–2032 (2024)

Contributors: Committee on Biological and Physical Sciences Research in Space 2023–2032; Space Studies Board; Aeronautics and Space Engineering Board; Division on Engineering and Physical Sciences; National Academies of Sciences, Engineering, and Medicine

Research in biological and physical sciences in space provides the critical scientific and technological foundations that make space exploration possible. This booklet summarizes recent advances in the biological and physical sciences that have changed our understanding of the factors important to human, plant, animal, and microbial health, and then highlights research needs to make transformative advances in space.



A Plan to Promote Defense Research at Minority-Serving Institutions (2024)

Contributors: Andrea Christelle, Erin Lynch, and André N. Porter, Editors; Committee on the Development of a Plan to Promote Defense Research at Historically Black Colleges and Universities, Tribal Colleges and Universities, Hispanic-Serving Institutions, and Other Minority-Serving Institutions; Board on Higher Education and Workforce; Policy and Global Affairs; National Academies of Sciences, Engineering, and Medicine

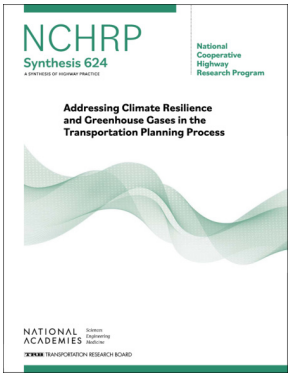
Engaging the full spectrum of U.S. talent is essential for sustaining leadership in R&D and ensuring national security. By 2030, the workforce will be more diverse and older, with one-fifth of Americans over age 65 and a rising share from historically underrepresented groups. To stay competitive, the U.S. must invest in developing talent across all communities. With over 800 Minority-Serving Institutions (MSIs), the nation has a cost-effective path to build a diverse STEM workforce, including for fields vital to the Department of Defense (DOD). This report, requested by DOD, outlines strategies to expand MSI participation in defense R&D and elevate their research capacity to R1 status.

A Research Agenda Toward Atmospheric Methane Removal (2024)

Contributors: Committee on Atmospheric Methane Removal: Development of a Research Agenda; Board on Atmospheric Sciences and Climate; Board on Chemical Sciences and Technology; Board on Energy and Environmental Systems; Division on Earth and Life Studies; Division on Engineering and Physical Sciences; National Academies of Sciences, Engineering, and Medicine

2023 shattered global climate records as the warmest year in the modern record, bringing with it devastating impacts on human and natural systems. Methane emissions, about 60% of which come from human activities, are a major

contributor to global warming, second only to carbon dioxide (CO_2). Methane is relatively short-lived in the atmosphere but is 80 times more potent than CO_2 at trapping heat over a 20-year period. Together with reducing CO_2 emissions, rapid and sustained reductions in methane emissions are critical to limit both near- and long-term warming in future decades. But given the many barriers to achieving needed emissions reductions at scale, researchers are exploring the potential of technologies to remove methane from the atmosphere. potent than CO_2 at trapping heat over a 20-year period. Together with reducing CO_2 emissions, rapid and sustained reductions in methane emissions are critical to limit both near- and long-term warming in future decades. But given the many barriers to achieving needed emissions reductions at scale, researchers are exploring the potential of technologies to remove methane from the atmosphere.



Addressing Climate Resilience and Greenhouse Gases in the Transportation Planning Process (2024)

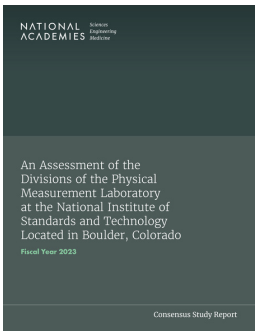
Contributors: John Zamurs and Mark L. Stout, National Cooperative Highway Research Program; Transportation Research Board; National Academies of Sciences, Engineering, and Medicine

Many state departments of transportation (DOTs) are undergoing organizational changes to address climate change. Changes range from hiring additional staff to creating new offices within the organizational structure of the agency. State requirements in the form of legislation, executive orders, and climate action plans are primary drivers for state DOT involvement with climate change. This publication documents practices and procedures at state DOTs regarding climate change.

AI for Scientific Discovery: Proceedings of a Workshop (2024)

Contributors: Robert Pool, Rapporteur; Computer Science and Telecommunications Board; Science and Engineering Capacity Development Unit; Policy and Global Affairs; Division on Engineering and Physical Sciences; National Academies of Sciences, Engineering, and Medicine

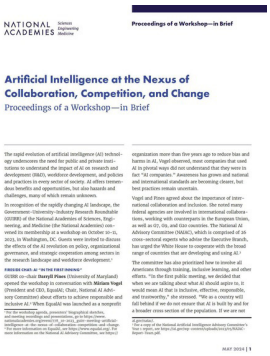
Over the past century, AI has grown from a theoretical concept to a widely used tool, gaining public, media, and scientific interest. Advances in computing and sensing have enabled AI to support scientific discovery in new and rapidly evolving ways. It is now used across disciplines in the physical and biological sciences and engineering. While its potential is vast, key questions remain about trust, oversight, and equitable resource allocation. To address these issues, the National Academies hosted the AI for Scientific Discovery workshop in October 2023, bringing together global leaders in AI, science, engineering, ethics, law, and social sciences to assess the field and explore its future role in autonomous research and discovery.



An Assessment of the Divisions of the Physical Measurement Laboratory at the National Institute of Standards and Technology Located in Boulder, Colorado: Fiscal Year 2023 (2024)

Contributors: Panel on the Assessment of the National Institute of Standards and Technology (NIST) Physical Measurement Laboratory; Laboratory Assessments Board; Division on Engineering and Physical Sciences; National Academies of Sciences, Engineering, and Medicine

Since 1959, the National Institute of Standards and Technology (NIST) has annually commissioned the National Academies to assess its various measurements and standards laboratories. This report appraises the Physical Measurement Laboratory (PML), assessing four divisions of PML situated at the NIST Boulder campus: the Applied Physics Division, the Time and Frequency Division, the Quantum Electromagnetics Division, and the Quantum Physics Division. The report compares the caliber of research at PML with similar international programs to determine whether programs adequately align with its objectives; assesses the range of scientific and technical expertise available within PML; considers the budget, facilities, equipment, and Human Resources to bolster PML technical endeavors and contribute to the fulfillment of its goals; and assesses the efficacy of PML methods for disseminating the products of its work.



Artificial Intelligence at the Nexus of Collaboration, Competition, and Change: Proceedings of a Workshop—in Brief (2024)

Contributors: Paula Whitacre, Rapporteur; Government-University-Industry Research Roundtable; Policy and Global Affairs; National Academies of Sciences, Engineering, and Medicine

The rapid advancement of AI highlights the need for public and private institutions to assess its impact on R&D, workforce development, and policy. While AI presents major opportunities, it also brings risks—many still emerging. To address these issues, the Government-University-Industry Research Roundtable held a workshop on October 10–11, 2023, in Washington, DC, bringing together experts to explore AI's influence on policy, governance, and cross-sector collaboration.

Carbon Utilization Infrastructure, Markets and Research and Development: A Final Report (2024)

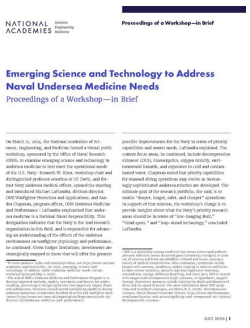
Contributors: Committee on Carbon Utilization Infrastructure, Markets, Research and Development; Board on Energy and Environmental Systems; Board on Chemical Sciences and Technology; Division on Engineering and Physical Sciences; Division on Earth and Life Studies; National Academies of Sciences, Engineering, and Medicine

Efforts to combat climate change center on cutting carbon dioxide (CO_2) emissions from fossil fuel use. While many processes can shift to low- or zero-carbon alternatives, some—such as aviation fuel, chemicals, plastics, and construction materials—cannot be fully decarbonized. These systems require effective CO_2 management to prevent emissions or enable reuse through circular processes. This second report of a two-part study explores markets and commercialization opportunities for CO_2- and coal waste–derived products, evaluates economic and environmental impacts, and outlines a research agenda for advancing carbon utilization technologies. The first report focused on CO_2 transport, use, and storage infrastructure.

Emerging Hazards in Commercial Aviation—Report 2: Ensuring Safety During Transformative Changes (2024)

Contributors: Committee on Emerging Trends in Aviation Safety; Transportation Research Board; National Academies of Sciences, Engineering, and Medicine

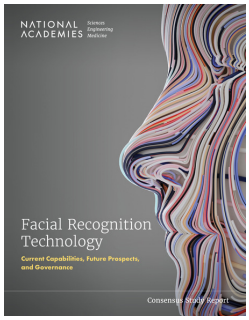
As commercial aviation evolves, it is essential to ensure aviation safety as transformative technologies and new industry entrants emerge. Supporting the safe adoption of innovation will require updating Federal Aviation Administration (FAA) processes for certifying novel aircraft designs, developing performance-based standards for flight-critical functions, and improving data collection and analysis to detect potential safety issues. Strengthening safety culture at FAA and across the aviation industry is also necessary as new players and technologies are introduced. This report was requested by Congress and FAA in order to help identify, monitor, understand, and address emerging aviation safety risks. It marks the second installment of a series of six reports to be issued within a span of 10 years by the National Academies' Committee on Emerging Trends in Aviation Safety.



Emerging Science and Technology to Address Naval Undersea Medicine Needs: Proceedings of a Workshop—in Brief (2024)

Contributors: Linda Casola and Chanel Matney, Rapporteurs; Board on Health Sciences Policy; Naval Studies Board; Health and Medicine Division; Division on Engineering and Physical Sciences; National Academies of Sciences, Engineering, and Medicine

In March 2024, the National Academies hosted a public workshop, sponsored by the Office of Naval Research, to assess the operational and medical needs of the U.S. Navy and how they might be met with developing science and technology. Speakers focused on innovations to address health and safety challenges among divers and submariners, including decompression sickness, oxygen toxicity, fatigue, contaminated water, extreme temperatures, and long deployments.

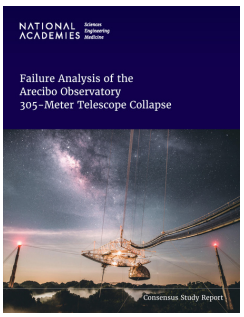


Facial Recognition Technology: Current Capabilities, Future Prospects, and Governance (2024)

Contributors: Committee on Facial Recognition: Current Capabilities, Future Prospects, and Governance; Computer Science and Telecommunications Board; Committee on Science, Technology, and Law; Committee on Law and Justice; Division on Engineering and Physical Sciences; Policy and Global Affairs; Division of Behavioral and Social Sciences and Education; National Academies of Sciences, Engineering, and Medicine

Facial recognition technology is increasingly used for identity verification and identification, from aiding law enforcement investigations to identifying potential security threats at large venues. However, advances in this technology have outpaced laws and regulations, raising significant concerns related to equity, privacy, and civil liberties. This report explores the current capabilities, future possibilities, and necessary governance for facial recognition technology. It discusses the legal, societal, and ethical implications of the technology and recommends ways that federal agencies and others developing and deploying the technology can mitigate potential harms and enact more comprehensive safeguards.

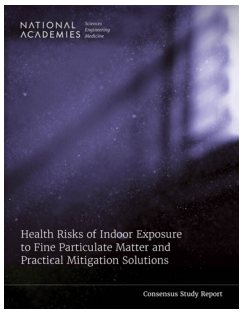
Failure Analysis of the Arecibo Observatory 305-Meter Telescope Collapse (2024)



Contributors: Committee on Analysis of Causes of Failure and Collapse of the 305-Meter Telescope at the Arecibo Observatory; Board on Infrastructure and the Constructed Environment; Division on Engineering and Physical Sciences; National Academies of Sciences, Engineering, and Medicine

Building and operating cutting-edge, custom-designed research facilities presents unique challenges, where prior designs and experience may not be a reliable guide and unprecedented modes of failure can never be fully anticipated. In 2020, the National Science Foundation's telescope at the Arecibo Observatory in Puerto Rico collapsed, impacting the work of the National Astronomy and Ionosphere Center. This report analyzes the causes of the collapse through extensive review of prior forensic investigations, information gathering from employees at the Arecibo Observatory, study of relevant research, consultations with other experts, and examination of structural analyses, engineering plans, inspection reports, photographs, and repair proposals. It presents lessons learned and makes recommendations to help ensure the safe operation of other unique, critical science facilities.

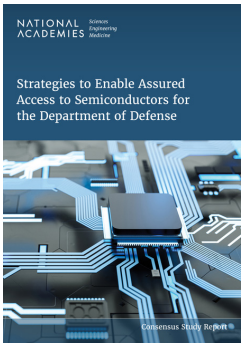
Health Risks of Indoor Exposure to Fine Particulate Matter and Practical Mitigation Solutions (2024)



contributors: Committee on Health Risks of Indoor Exposures to Fine Particulate Matter and Practical Mitigation Solutions; Program Office; National Academy of Engineering; National Academies of Sciences, Engineering, and Medicine

Airborne particulate matter (PM), a mix of solid and liquid particles, is present in all indoor

environments. Fine PM (PM2.5), PM with a diameter of 2.5 microns (<0.0001 inch) or smaller, is a particular health concern because it can penetrate deep into the lungs while its ultrafine component can exert neurotoxic effects on the brain. PM2.5 exposure is linked to cardiovascular, pulmonary, neurological, psychiatric, endocrine disorders, and poor birth outcomes, disproportionately affecting marginalized communities. Health Risks of Indoor Exposure to Fine Particulate Matter and Practical Mitigation Solutions reviews the latest research on the health risks of indoor PM2.5 exposure and presents engineering solutions and mitigation strategies to protect vulnerable populations, reduce health impacts, and fill knowledge gaps to improve public health.



Strategies to Enable Assured Access to Semiconductors for the Department of Defense (2024)

Contributors: Committee on Global Microelectronics: Models for the Department of Defense in Semiconductor Public–Private Partnerships; National Materials and Manufacturing Board; Board on Science, Technology, and Economic Policy; Division on Engineering and Physical Sciences; Policy and Global Affairs; National Academies of Sciences, Engineering, and Medicine

Semiconductor chips are essential to nearly all electronics, including critical defense systems. The Department of Defense relies on a wide range of semiconductors for mission systems, yet the U.S. is heavily dependent on foreign sources. At Congress's request, this report examines DOD's challenges in the global microelectronics sector and explores public–private partnerships to ensure secure, innovative chip production. Recommendations emphasize long-term strategic coordination, investment in emerging technologies, leveraging commercial advances, and adopting a flexible modernization strategy to stay competitive.to incorporate emerging technologies and be responsive to global competition.

The Current Status and Future Direction of High-Magnetic-Field Science and Technology in the United States (2024)

Contributors: Committee on the Current Status and Future Direction of High-Magnetic-Field Science in the United States, Phase II; National Materials and Manufacturing Board; Board on Physics and Astronomy; Nuclear and Radiation Studies Board; Division on Engineering and Physical Sciences; Division on Earth and Life Studies; National Academies of Sciences, Engineering, and Medicine

High magnetic fields are essential to technologies that affect daily life, from MRI diagnostics and drug discovery to fusion energy, quantum tech, and semiconductors. At NSF's request, the National Academies conducted a study to identify future scientific opportunities and applications in high-magnetic-field science. The report examines the current landscape and outlines recommendations to strengthen the U.S. workforce, facilities, magnet development, and access to critical materials to drive innovation.

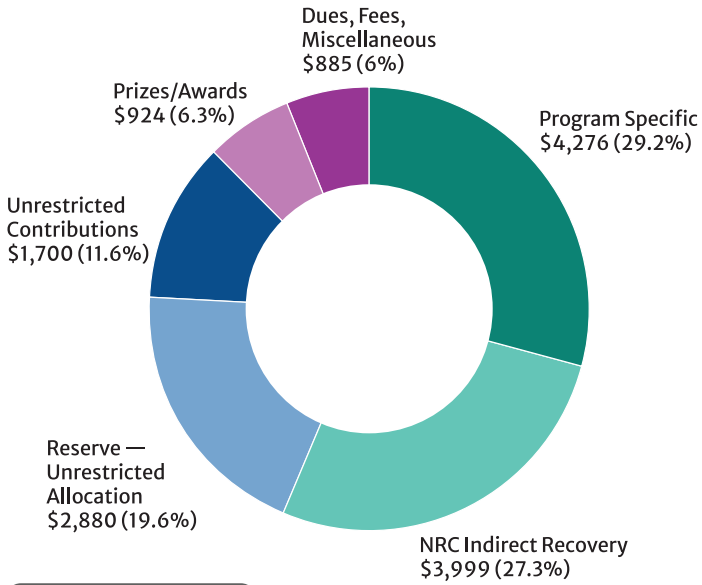
Financial Overview

The National Academy of Engineering (NAE) operates within the National Academies of Sciences, Engineering, and Medicine, a nonprofit organization chartered under Section 501(c)(3) of the Internal Revenue Code. While the National Academies manage administrative, operational, and financial infrastructure across its constituent academies, the NAE also benefits from the dedicated support of the National Academy of Engineering Fund (NAEF)—a separate legal entity established to manage endowments that fund the NAE's independent work. The NAEF ensures long-term financial sustainability and provides critical support for strategic initiatives, member engagement, and programs that advance engineering's role in society. Together, this integrated structure and the flexibility afforded by the NAEF enable the NAE to fulfill its unique mission through a combination of institutional alignment and philanthropic investment.

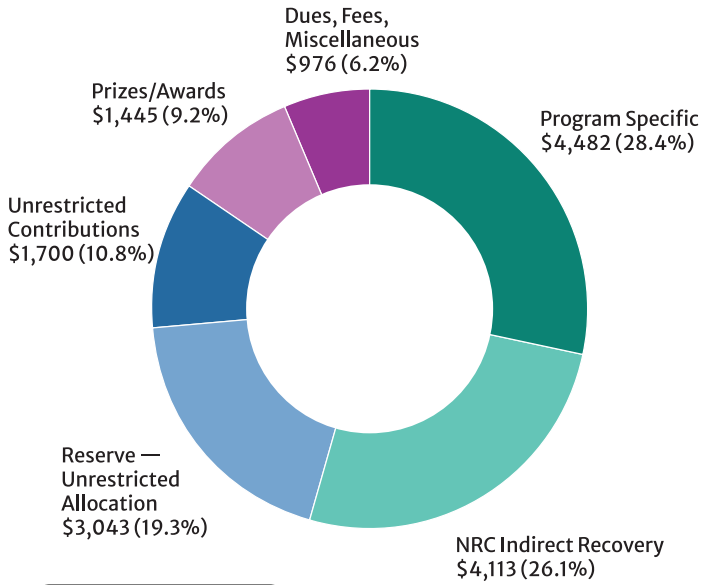
The following charts provide a snapshot of the NAE's financial activity, including 2024 and 2025 budget projections by sources and uses of funds, as well as an overview of the NAEF endowment. These visuals illustrate how our programs are funded and sustained.

NAE Sources of Funds

Operating Budget — Sources (in thousands)



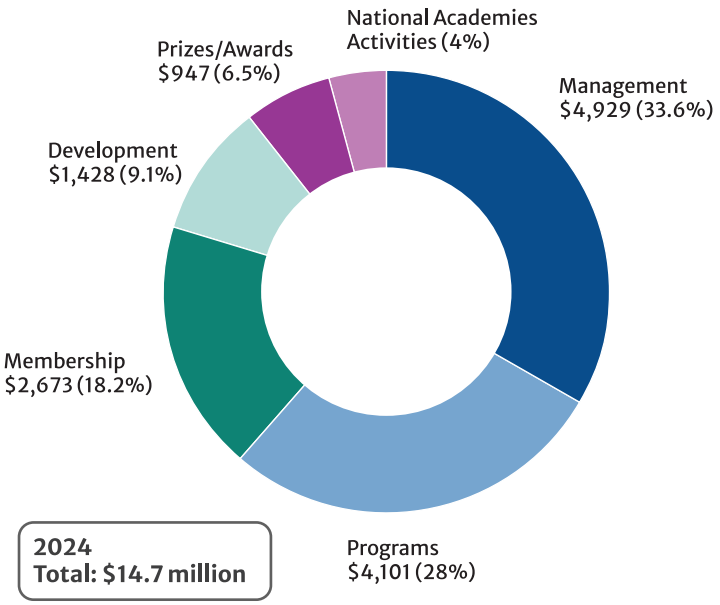
2024
Total: $14.7 million

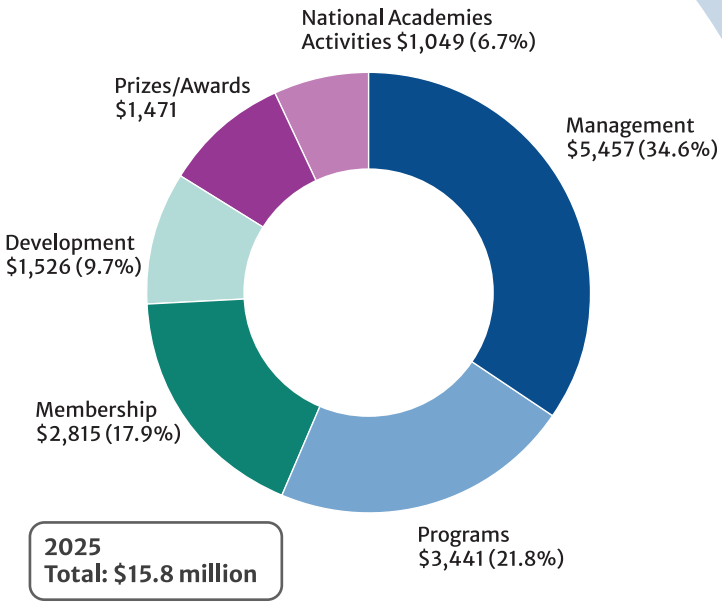


2025
Total: $15.8 million

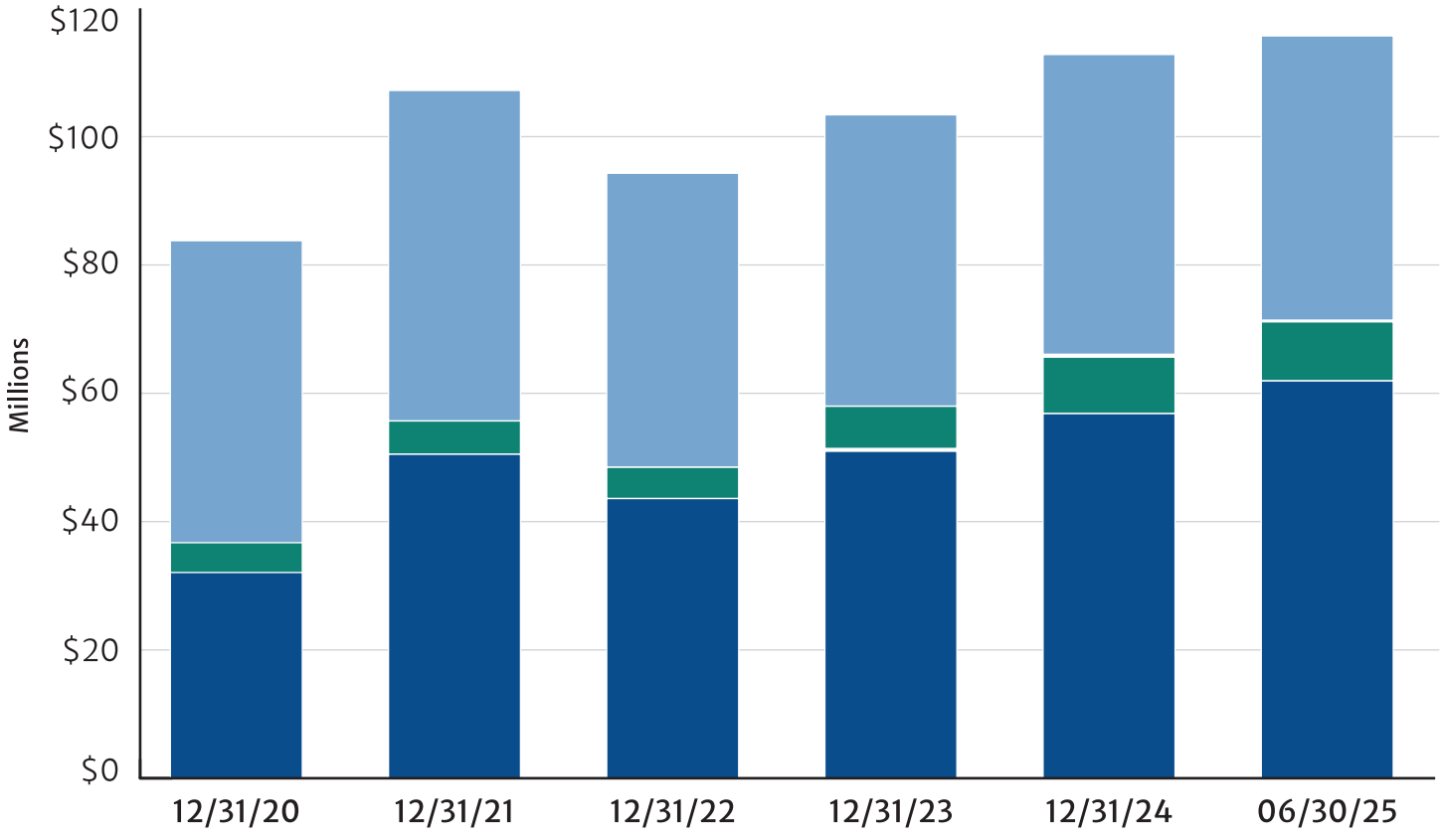
NAE Uses of Funds

Operating Budget — Uses (in thousands)



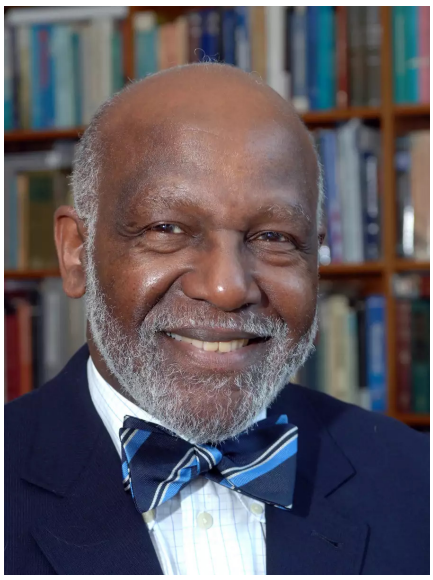


NAE Endowment Funds



- Restricted Endowment (Funds received to support activities such as the Draper / Gordon prizes and Senior Scholars . The original principle cannot be spent. Balance shown reflects current market value)
- Unrestricted Endowment (Funds received for no specific purpose — the original principle cannot be spent)
- Unrestricted Working Funds (Funds received for no specific purpose — principal and earnings can be spent)

Message from NAE Vice President Wesley L. Harris



I am pleased to share highlights from a remarkable year for the NAE. In 2024, thanks to your unwavering generosity and commitment, we raised over $8.3 million in new gifts, pledges, and planned gifts—bringing total contributions to our Campaign for Leadership in a World of Accelerating Change to an impressive $75.9 million.

The NAE commemorated its 60th anniversary in 2024 with the launch of the "60 for the 60th" initiative and made strong progress across all goals:

- 60 new members joined our Curie, Franklin, or Lincoln Donor Societies
- 50 new named or endowed funds were established
- 51% of members participated in giving
- 60+ new planned gifts in Legacy Challenge goal, raising $3 million, bringing total expectancies to $10.6 million

These milestones reflect extraordinary dedication from you—our community—and leadership from Corale Brierley, Chair of the Heritage Society, Elana Lippa, Director of Planned Giving, and all of our volunteer section solicitors.

We also celebrated 100% giving participation by the NAE Council for the 10th consecutive year, underscoring their steadfast commitment. In 2024, we welcomed 61 new members into our Lifetime Giving Societies. See pages 32–48 for the full list.

Looking ahead, we are building on this momentum in 2025. We secured over $3 million toward the $10 million goal for the NAEF Beckman Center Endowed Fund, including naming the John L. Anderson Boardroom, dedicated in February 2025. We also look forward to the 30th anniversary of The Grainger Foundation Frontiers of Engineering and the transition to a new NAE president, following six years of dedicated leadership from John L. Anderson.

Your continued support ensures that the NAE remains strong, forward-looking, and capable of addressing the world's most pressing engineering challenges. If you'd like to explore giving opportunities or make a gift, please contact Radka Nebesky, Senior Director of Development, at RNebesky@nae.edu or 202-207-8508.

Thank you again for your generosity and dedication.

Sincerely,
Wesley L. Harris
NAE Vice President (July 1, 2022–June 30, 2026)

Your support is critical to the success of the NAE and its mission.

Whether you contributed $50 or $5 million, your support in 2024 fueled progress and helped us shape a more innovative, inclusive, and resilient future for engineering. Because of you, the NAE continues to provide trusted, expert advice to the nation, inspire and empower the next generation of diverse engineers, and convene rising engineering leaders to address society's most pressing challenges.

In a year marked by breakthroughs in AI, climate concerns, and global shifts in technology and infrastructure, the work of the NAE has never been more essential. Your investment ensures that engineering remains a force for good—improving lives, informing policy, and preparing tomorrow's leaders.

This 2024 Year in Review offers a glimpse of what you made possible. Thank you for your vision, your commitment, and your belief in the power of engineering to build a better world.

2024 Development Data

$3.4M+
in unrestricted and restricted endowments

$1.5M+
raised in irrevocable and revocable planned gifts

$1.25M+
in program donations

$1.9M+
raised in unrestricted funds

2024 Donations and Member Participation

100%
giving participation from NAE councillors

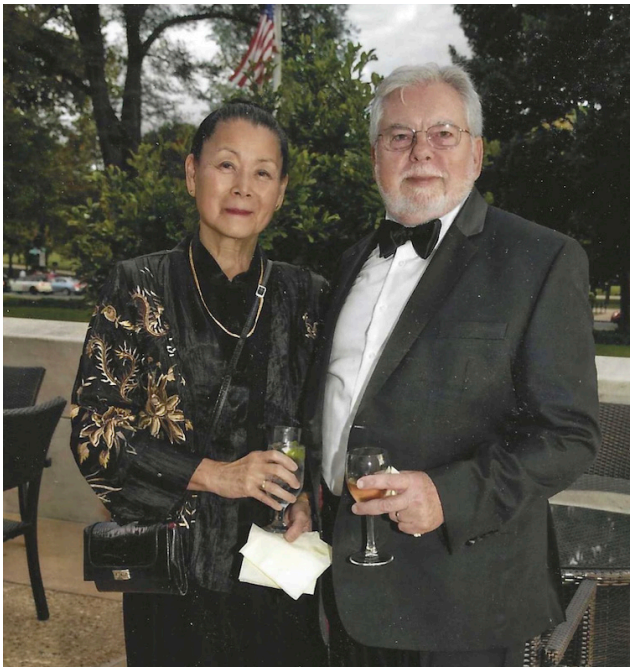
30%
of members donated to the NAE

2024 Lifetime Giving Societies Welcomed...

31 Golden Bridge
12 Einstein
6 Curie
6 Heritage
4 Franklin
2 Lincoln

Donor Profile: Dianne Chong

One Donor's Path from Perseverance to Philanthropy



Coming from a diverse background and raised in a home rooted in sacrifice and perseverance, Dianne Chong never imagined she would one day be inducted into the Women in Engineering Hall of Fame. As a first-generation college student, Dianne's educational journey was anything but typical. Her path to engineering was even more unconventional.

Originally planning to pursue a career in medicine, Dianne did not set foot in an engineering classroom until graduate school. It is hard to say whether the medical field lost out or the engineering world simply got lucky, but if you ask Dianne, she would tell you she was the fortunate one, and the profession found her. Dianne's foundation was built on the enduring values of her Chinese heritage. Her mother emigrated from Canton and, after the untimely passing of Dianne's father when she was just 13, raised five children on her own. Though just one person in Dianne's extended family (on her father's side) obtained a college education and her parents never had the chance to pursue secondary education themselves, they instilled in their children an unshakable belief in its importance. That belief propelled Dianne to become the first in her family to earn a college degree—a milestone that paved the way for her trailblazing career.

When her mother passed away, Dianne felt compelled to honor her parents' lasting impact by giving back in a meaningful way. She and her husband, David, decided to establish a first-of-its-kind endowed fund, the Dale and Helen Chong Endowed Fund for NAE Programs, which supports the various programs in the NAE Program Office. "I truly believe in the power of education. What NAE is doing in the programs area covers multiple aspects to help us learn and implement how to improve accessibility and quality of education for all," Dianne remarked.

Honor Roll of Donors and Giving Societies

The NAE is undertaking its first-ever fundraising effort—The Campaign for Leadership in a World of Accelerating Change—with a goal of raising $100 million to advance its mission. With more than $75 million already raised, the campaign supports the NAE's work to provide trusted national advice, strengthen engineering education and practice, and develop solutions to pressing global challenges.

Guided by the 2021–2026 Strategic Plan, the campaign focuses on three priorities: people, systems, and culture. It aims to expand awareness of engineering, promote inclusive environments, and inspire lifelong learning. The initiative also advances systems-level thinking and interdisciplinary collaboration, while encouraging a culture that balances technical excellence with social, ethical, and environmental responsibility.

With support from partners like The Grainger Foundation, and through programs like EngineerGirl, EngineerTeen, and Frontiers of Engineering, the NAE is cultivating the next generation of leaders. Now is a pivotal moment for bold action, and the NAE is ready to lead.

2024 Honor Roll of Donors

Lifetime Giving Societies

We greatly appreciate the generosity of our donors. Your contributions enhance the impact of the NAE's work and support its vital role as a national advisor. The NAE acknowledges the following members and friends who have made generous charitable lifetime contributions. To learn more about our lifetime giving societies, please visit our website. The gifts reflected on this list are as of December 31, 2024. Boldface names are NAE members. *Deceased

Abraham Lincoln Society
$1M+

Bruce and Betty Alberts
Richard and Rita* Atkinson
Norman R. Augustine
Craig and Barbara **Barrett**
Jordan and Rhoda **Baruch***
Stephen D. Bechtel, Jr.*
Arnold and Mabel **Beckman***
Leonard Blavatnik
Harry E. Bovay, Jr.*
Donald Bren
George* and Virginia **Bugliarello**
Ralph J.* and Carol M. Cicerone
Ross and Stephanie **Corotis**
Harvey V. Fineberg and Mary E. Wilson
Bernard M. Gordon
Cecil H. Green*
John O. and Candace E. **Hallquist**
Michael and Sheila Held*
Jane E. Henney and Robert Graham
William R. and Rosemary B. **Hewlett***
Ming and Eva **Hsieh**
Irwin and Joan* **Jacobs**
Robert L.* and Anne K. James
Kenneth A. Jonsson*
Fred Kavli*

Daniel E. Koshland, Jr.*
Tillie K. Lubin*
Whitney* and Betty MacMillan
John F. McDonnell
Robin K. and Rose M. **McGuire**
George P. Mitchell*
The Ambrose Monell Foundation
The Moore Family
Philip* and Sima Needleman
Peter O'Donnell, Jr.*
Gilbert S. Omenn and Martha A. Darling
Jonathan B. and Donna J. Perlin
Robert* and Mayari **Pritzker**
Richard L. and Hinda G. Rosenthal*
Martine A. Rothblatt
Jack W. and Valerie Rowe
Fritz J. and Dolores H. Russ Prize Fund of the Russ College of Engineering and Technology at Ohio University
William J. Rutter
Bernard and Rhoda Sarnat*
Leonard D. Schaeffer
Sara Lee and Axel Schupf
James H.* and Marilyn Simons
John and Janet **Swanson**
Marci and **James J. Truchard**
Tachi* and Leslie Yamada
Anthony J. Yun and Kimberly A. Bazar
Anonymous (1)

Benjamin Franklin Society
$500,000–$999,999

John and Pat **Anderson**
Rose-Marie and Jack R. Anderson*
John and Elizabeth **Armstrong**
Kenneth E. Behring*
Gordon Bell*
Elkan R.* and Gail F. Blout
Russell L. Carson
Charina Endowment Fund
Chau-Chyun and Li-Li **Chen**
Shu and Kuang-Chung **Chien**
James McConnell Clark*
Barry and Bobbi Coller
Henry David*
Richard Evans*
Eugene Garfield Foundation
Theodore Geballe*
Penny and **Bill George**, George Family Foundation
Christa and Detlef Gloge
William T.* and Catherine Morrison Golden
Jerome H.* and Barbara N. Grossman
Wesley L. Harris
John L. Hennessy
Lyda Hill Philanthropies
Alexander Hollaender*
Thomas V. Jones*
Cindy and **Jeong Kim**
Ralph and Claire **Landau***
Asta and **William W. Lang***
Marcia K. McNutt
Ruben F.* and Donna **Mettler**
Dane* and Mary Louise **Miller**
Oliver E. and Gerda K. Nelson*
Shela and **Kumar Patel**
Richard F. and Terri W. **Rashid**
Henry and Susan **Samueli**
Herbert A. and Dorothea P. Simon*
Raymond and Maria **Stata**
Roy and Diana Vagelos
Andrew and Erna* **Viterbi**
Alan M. Voorhees*
Anonymous (2)

Marie Curie Society
$250,000–$499,999

The Agouron Institute
W.O. Baker*
Warren L. Batts
Elwyn* and Jennifer **Berlekamp**
Gopa and **Arindam Bose**
Paul F. Boulos
Daniel and Lana Branton
Gail H. Cassell
Sigrid and **Vint Cerf**
Dianne Chong and David Squiers
Clarence S. Coe*
Rosie and Stirling A. Colgate*
W. Dale and Jeanne C. **Compton***
Ruth David and Stan Dains
Lance and Susan* **Davis**

"Philanthropy is all about enabling others while you are here and not simply after you are gone. If ever there was a way to build on your meaningful legacy here now and forever, this is it! I am using my philanthropy to help bring about change to how we view opportunity and talent. My goal is to find new, enabling ways to bring opportunity to talent. What we have been doing is simply too little and too late!"
–Nicholas Donofrio '95

Nicholas M. Donofrio
David and Miriam Donoho
Ruth and Victor Dzau
James O. Ellis, Jr. and **Elisabeth Paté-Cornell**
Dotty* and **Gordon England**
Edward H. Frank and Sarah G. Ratchye
William L.* and Mary Kay **Friend**
George and Christine Gloeckler
Paul and Judy **Gray**
Diane Greene and **Mendel Rosenblum**
Diane E. Griffin*
Robert A. Hicks*
Chad and Ann **Holliday**
William R. Jackson*
Anita K. Jones
Mary and **Howard Kehrl***
Jill Howell Kramer
Kent Kresa
Mark and Becky **Levin**
Frances and George **Ligler**
Azad M. and Carla C. **Madni**
Stella and **Steve*** **Matson**
William W. McGuire
Janet and **Richard M.*** **Morrow**
Clayton Daniel and Patricia L. **Mote**
Ralph S. O'Connor*
Kenneth H. Olsen*
Larry* and Carol **Papay**
Stephen Quake
Ann and **Michael Ramage**
Simon Ramo*
Anne and **Walt*** **Robb**
Matthew L. Rogers and Swati Mylavarapu
Julie and **Alton D. Romig, Jr.**
Jonathan J. Rubinstein
Stephen and Anne Ryan*
Wendy and **Eric Schmidt**
H.E. Simmons*
Charles and Lisa **Simonyi**
Pradeep Sindhu and Marie Bertrand
Robert F. and Lee S. **Sproull**
Edward C. Stone*
Judy Swanson
Ted Turner
Leslie L. Vadasz
Martha Vaughan*
Charles M.* and Rebecca M. **Vest**
Robert* and Robyn **Wagoner**
John C. Wall
David Walt and Michele May
Susan R. Wessler
Wm. A. Wulf*
Anonymous (2)

Albert Einstein Society
$100,000–$249,999

Nancy Adler*, Arnold Milstein, and Julia Adler-Milstein
Laura E. and John D. Arnold
Holt Ashley*
Nadine Aubry and John L. Batton
Francisco J.* and Hana Ayala
William F. Ballhaus, Sr.*
David Baltimore
Thomas D.* and Janice H. **Barrow**
H.H. and Eleanor F. Barschall*
Forest and Kathy **Baskett**
Sunanda Basu
Donald and Joan Beall
Daniel and Frances **Berg**
Diane and Norman Bernstein*
Bharati and **Murty Bhavaraju**
Chip and Belinda **Blankenship**
Erich Bloch*
Barry W. Boehm*
David G. Bradley
Lewis M. Branscomb*
John and Sharon Brauman
Sydney Brenner*
Eric A. Brewer
Corale L. Brierley and **James A. Brierley**
Lenore and **Rob Briskman**
Kristine L. Bueche
Malin Burnham
Ursula Burns and Lloyd Bean*
Eugen and **Cleopatra Cabuz**

Christine Cassel and Michael McCally
John K. Castle
Josephine Cheng
Priscilla and **Sunlin*** **Chou**
Vinay and **Uma*** **Chowdhry**
John and Assia **Cioffi**
Paul Citron and Margaret Carlson Citron
A. James Clark*
George W.* and Charlotte R. Clark
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***The Bridge*, NAE's quarterly flagship publication, continues to highlight leading-edge engineering research, societal challenges, and policy insights. With contributions from top engineers, scholars, and policy experts, *The Bridge* offers accessible, thought-provoking content that informs decision-makers and engages a broader public in the importance of engineering innovation.**

Spring Bridge on the U.S. Metals Industry: Looking Forward (Volume 54, Issue 1 – Spring 2024)

In the 2024 spring issue guest editors Greg Olson and Aziz Asphahani assemble feature articles that demonstrate how computational materials science and engineering are leading the way in the deployment of metallic materials that meet increasingly advanced design specifications.

Contributors: Raymond Monroe (The Rise of the U.S. Steel Industry); Timothy J. Warner, Bill Allemon, Craig B. Lewis, and Guillaume Bes (Current Challenges and Opportunities for the Aluminum Transformation Industry in the United States); Jim Warren (The Materials Genome Initiative and the Metals Industry); Jiadong Gong (Harnessing the Power of AI in Materials Digital Transformation: A Synergistic Hybrid Approach); and Charles Kuehmann (Concurrent Design of Materials and Systems)

Summer Bridge on Critical Materials (Volume 54, Issue 2 – Summer 2024)

The 2024 summer issue discusses leveraging new and emerging technologies, infrastructure, innovative approaches, and a resilient supply chain to ensure a stable and reliable supply of critical materials far into the future.

Contributors: Jennie S. Hwang (Key Issues, Approaches, and Strategies to Ensure Reliable Critical Materials); Mark E. Russell, Lindley Specht, Steve Klepper, and Alfred Pandiscio (Technology and Innovation Enablers for Critical Mineral Production); John W. Mitchel (Critical Materials Risks to Electronics Manufacturing: Global Impacts and Actions Needed); Paul E. Krajewski (An Automative View of Critical and Sustainable Materials); Pardeep Lall (Critical Needs for Non-PFAS Semiconductor Packaging Materials); Francisco F. Roberto and Robert C. Dunne (Lithium-Ion Batteries: A New Opportunity for the Circular Economy and Recycling); Remi Dingreville, Nathaniel Trask, Brad Lee Boyce, and George Em Karniadakis (Unlocking Alternative Solutions for Critical Materials via Materials Informatics); and Diran Apelian, Emily Malstad, Sean Kelly, Subodh Das, Barbara K. Reck, and Alan Luo (Sustainable Metal Production and Use in the Twenty-First Century: Challenges and a Path Forward)

Fall Bridge on Engineering a Diverse Future (Volume 54, Issue 3 – Fall 2024)

Guest edited by Wanda Sigur and Percy Pierre, the 2024 fall issue addresses the issues around sustaining a U.S. engineering workforce that builds on and integrates the talents and ideas of our diverse nation.

Contributors: Narman R. Augustine (The Uncapped Potential: Engineering an Opportunity of a Lifetime); Nicholas M. Donofria (Unlocking Hidden Value for Inclusive Innovation: The Real Power of DEI); Percy A. Pierre and Catherine J. Weinberger (The 50-Year History of Minority Engineering Effort: How the Engineering Profession Sparked the Movement to Diversify Its Workforce); Catherine J. Weinberger (Does the Minority Engineering Effort Have a Flat Tire?); Kesha Moore and Amalea Smirniotopoulos (Many Mountains to Climb: The Enduring Imperative to Expand Access to Engineering); Gilda A. Barabino and Susan T. Diske (The NASEM Diversity Science Report: Going Beyond Mere Participation Numbers); Audrey J. Murrell and Samuel Allen (Enhancing DEI Through Mentorship and Allyship for Career Advancement and Retention of Women in STEMM); and Megan Smith, Wanda A. Sigur, and Puneet Ahira (Endless Talent Is the American Dream: A Draft Blueprint for Realizing the Full National Potential)

Winter Bridge on The Grainger Foundation Frontiers of Engineering (Volume 54, Issue 4 – Winter 2024)

The 2024 winter issue features articles by The Grainger Foundation U.S. Frontiers of Engineering 2024 symposium participants. The articles examine cutting-edge developments in microbiology and health, AI, the gut–brain connection, and digital twins.

Contributors: Amanda M. Wilson (Achieving Impact Through Human Behaviors and Community Engagement in Human Health Risk Assessment); Ishi Keenum (Designing Waste Management Systems to Prevent the Spread of Antibiotic Resistance: Challenges and Opportunities); Carole Jean Wu, Bilge Acun, Ramya Raghavendra, and Kim Hazlewood (Scaling AI Sustainably); Maarten Sap (Artificial Social Intelligence?: On Challenges of Socially Aware and Ethically Informed Large Language Models); Mark Mimee (Precision Microbiome Engineering); and Olivia J. Pinon Fischer and Dimitri N. Mavris (Beyond Digital Twins: Realizing Value Through Digital Continuity)

Spring Bridge on AI: Promises and Risks (Volume 54, Issue 1 – Spring 2025)

The 2025 spring issue features fresh perspectives on AI's promises and risks from thought leaders across industry and academia.

Contributors: Laura Weidinger, Deb Raji, Hanna Wallach, Margaret Mitchell, Angelina Wang, Olawale Salaudeen, Rishi Bommasani, Sanmi Oyejo, and William Isaace (Toward an Evaluation Science for Generative AI Systems); Fernanda Viegas and Martin Wattenbrg (Dashboard for AI: Models of the User, System, and World); Fei-Fei Li (The New Frontier in AI: Understanding the 3-D World); Yassi Matias, Avinalan Hassidim, and Philip Nelson (AI's Capabilities Make It a Powerful Tool for Driving Societal Impact); Alonda Nelson (Disrupting the Disruption Narrative: Policy Innovation in AI Governance); Elizabeth Pate-Cornell (Alignment of AI Systems' Risk Attitudes and Four Real-Life Examples); and Shriya Srinivasan (Unlocking the Gut's Brain with Ingestible Bioelectronics)

Summer Bridge on Advanced Biomanufacturing for Medicines (Volume 55 Issue 2 – Summer 2025)

The 2025 summer issue features cutting-edge perspectives on the rapid progress and innovation in advanced biomanufacturing for medicines.

Contributors: J. Christopher Love (Transforming Manufacturing to Continue Leading the Innovation of Biopharmaceuticals); Paul C. Collins (Biopharmaceutical Manufacturing Platforms: Breaking Away from Our Past); Katharina S. Yandrofski, Megan H. Cleveland, Zvi Kelman, Mike J. Tarlov, and John P. Marino (NIST Biomanufacturing Reference Materials: Development, Applications, and Impact); Chris Williams, Eric Hacherl, Tim Charlebois, Erik Barton, Stephen Kaminsky, Brenna Kelley-Clarke, Angie Snell Bennett, Marco Thomann, and Anastasia Yemelyanova (An Open-Access Platform: A NIMBL Approach to Gene Therapy for Rare Diseases); Melanie Tomczak and Penny Norquist (Shaping Future Supply Chains with Bioindustrial Manufacturing); Misti Ushio and Barry C. Buckland (Revitalizing US Biomanufacturing to Strengthen the Global Supply and Security of Antibiotics); Mruthula Rammohan, Akash Vaidya, Spencer Grissom, Rachel Silvestri, Christopher Pirner, Kevin Solomon, and Mark Blenner (Synthetic Biology's Impact on Biopharmaceutical Manufacturing); Jerry Branson and Randy Roush (Revolutionizing National STEM Education to BUILD a Future-Ready Workforce)

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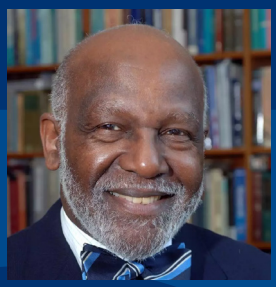

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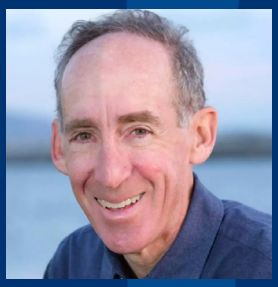

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