

ROBERT W. CONN, PETER F. COWHEY, CHRISTOPHER L. MARTIN,
AND JOSHUA GRAFF ZIVIN

Science Philanthropy's Implications for American Leadership in Innovation

Philanthropy has boosted the creativity and effectiveness of the US research system, but reaping the true benefits of these investments will require improving synergies between government and philanthropic efforts.

In 2011, The Kavli Foundation, the Allen Institute for Brain Science, and the Gatsby Charitable Foundation organized a meeting to examine opportunities at the intersection of the fields of nanoscience and neuroscience. This meeting and the resulting follow-on activities became the catalyst for the BRAIN Initiative (Brain Research through Advancing Innovative Neurotechnologies), a first-of-its-kind collaborative, grand challenge research program funded by an alliance of partners from the US government, philanthropy, and nonprofit organizations. More than a decade later, this collaboration has supported transformative projects and discoveries that have illuminated the inner workings of the mind. The BRAIN Initiative highlights the importance of the synergies between public and private funding that help steer the US science ecosystem to create new knowledge for the benefit of all.

Although philanthropic investment in scientific research is a less recognized contributor to US competitiveness than federal and industry funding, it plays an important role in making the US innovation ecosystem more creative, dynamic, and productive. By breaking down disciplinary siloes, allowing scientists to take risks on early exploratory research, and targeting big problem areas for solutions, public-private efforts such as the BRAIN Initiative and the

philanthropic support that catalyzes and sustains them are powerful drivers of breakthroughs. In addition, legacy philanthropy from university endowments supports research over generations in ways that are unique to the US research enterprise.

Over the past several years, we have worked to recognize philanthropy's contribution to US competitiveness by quantifying its scale and describing its particular characteristics. Armed with this information, decisionmakers in government, industry, and philanthropy can better envision new ways to make the American innovation ecosystem more productive for the people of the United States. As trends in US funding for R&D shift, it is important to acknowledge the resilience and collaborative opportunities philanthropic support affords the US research enterprise. But philanthropy should not be seen as a replacement for federal support for research—rather, what we have found is that these investments are most impactful as complements to robust federal and university support for basic and applied research.

Historically, more than half the money the US federal government invests in research goes to support basic and applied research (\$97 billion in 2022). This approach is based on the idea that a major lead in basic research

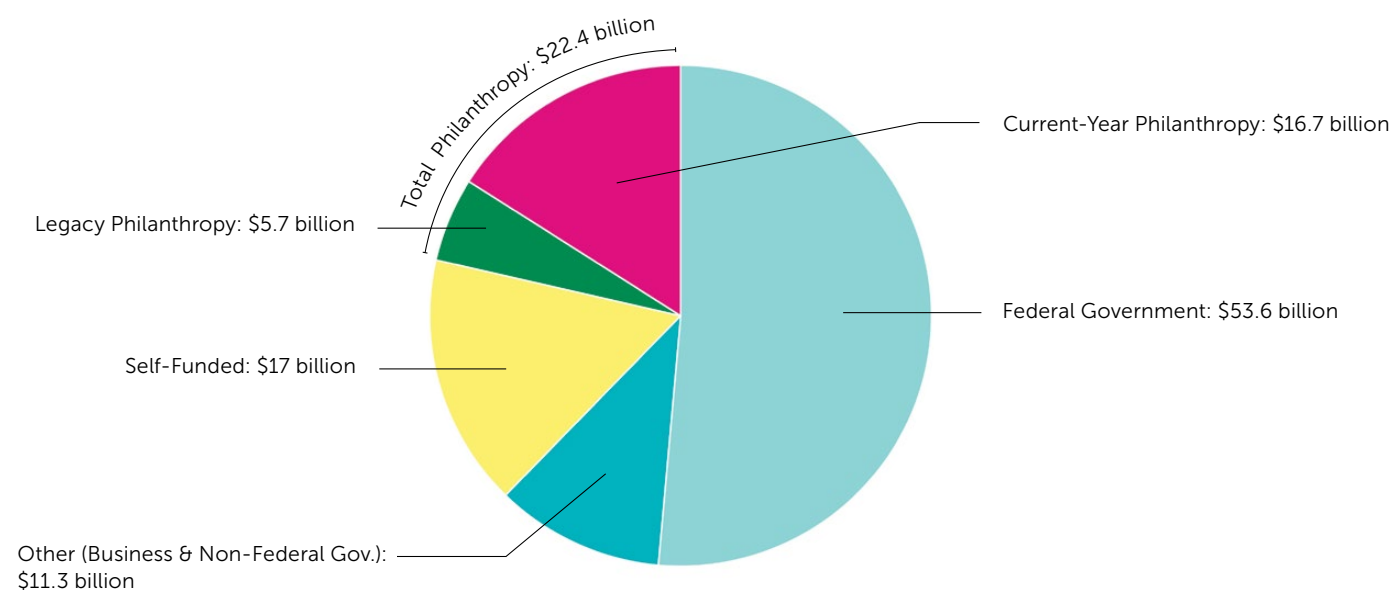
creates a decisive advantage for maintaining leadership in technological innovation. Federal support for research is, in large part, carried out by a diverse set of actors from public and private universities and large nonprofit research organizations, many of which emerged in the second half of the nineteenth century catalyzed by philanthropy. These institutions form an ecosystem of investigator-driven, high-risk basic and applied discovery.

This decentralized institutional landscape has fostered a far more diverse and dynamic set of philanthropic funders than in other countries that prioritize government control of research. In recent years, near flat-line spending by the US government on basic and applied research has been significantly compensated for by philanthropic funding. In 2022, philanthropy contributed about \$22.4 billion—just over 20% of all funding for basic and applied research at universities and nonprofits—through a combination of current giving and the yield from endowments (known as “legacy philanthropy”). A full breakdown of support from various sources to universities and nonprofits is shown in Figure 1.

Over the long term, the diversity of funding sources created by philanthropy, when combined with the freedom to pursue curiosity-driven research and experiment with its organization, has provided a substantial advantage to US researchers. From more than 30 interviews with government, university, and philanthropic leaders, from the literature, and from our own experiences, we find that decentralized research institutions and diverse private philanthropic funders incentivize the research system toward greater risk and innovation. This motivation sometimes arises from competition among institutions and sometimes from very flexible arrangements to cooperate among diverse institutions.

One way this is accomplished is by fueling the earliest stages of discovery when smaller amounts of money, available quickly and without elaborate reviews, allow ideas to be probed long before they are ready for peer-reviewed competition. Indeed, because philanthropic funders, including institutions that “bet” their legacy philanthropic funds on their own ideas, are a diverse set, the range of topics and research strategies very likely stays fresher over time.

Figure 1. SOURCES OF FUNDING FOR BASIC AND APPLIED RESEARCH AT US UNIVERSITIES AND NONPROFIT RESEARCH INSTITUTIONS, FY 2022



Amounts were derived from NSF-NCSES, 2024 (NSF 24-318 Tables 3 & 4) and are in 2025 dollars. Federal government amount includes funding to universities (\$43.8 billion) and nonprofits (\$9.8 billion). Current-year philanthropy is funding provided by nonprofit funders to universities (\$7.3 billion) and to nonprofit research institutions (\$9.4 billion). Legacy philanthropy is the estimate of university endowment payouts that derive from philanthropic support (25% of the NSF-reported figure of university self-funded research of \$22.7 billion). When combined, these two slices represent the total annual philanthropic support for basic and applied research at universities and nonprofits of \$22.4 billion, or slightly less than half of what the federal government provides (\$53.6 billion) to those same institutions. Self-funded research (75% of the NSF-reported figure of \$22.7 billion) is derived from sources other than philanthropy (clinical revenue, patent revenue, etc.). Finally, other sources of funding are provided by businesses and state and local governments.

For example, the Sloan Digital Sky Survey (SDSS), one of the most productive and highly cited surveys in the history of astronomy, started with an initial \$8 million grant from the Alfred P. Sloan Foundation to bring together the data science and basic astronomical research communities. Now with continuous funding for over 25 years from government and philanthropy, the SDSS is recognized as an accelerator of scientific discovery across the field of astronomy and a leader in its embrace of open data principles.

These diverse agendas and strategies have three sets of impacts beyond the crucial role of seeding fresh research insights, including those that are at too early a stage to command funds from the National Science Foundation (NSF) or National Institutes of Health. The first is that they enable institutions to experiment with new ways of defining and organizing the disciplines of discovery. This advantage has been especially important in driving new, or greatly transformed, interdisciplinary enterprises. In 1916, a large gift from the Rockefeller Foundation enabled

researchers stay in academia rather than move to industry.

A third way philanthropy is beginning to influence the innovation ecosystem can be seen in the emergence of a large crop of philanthropic megagifts (defined as gifts greater than \$100 million) to universities and nonprofit research organizations. The biggest of these megagifts (such as the examples at MIT and Stanford) are for new basic and applied research schools and institutes in universities, and they are generally organized around multidisciplinary subjects in an effort to more broadly educate and train new researchers. The sheer magnitude of such megagifts may even allow expansion of efforts by universities to use endowment funds to narrow the gap between capabilities of corporate research platforms and their own platforms available for open university research. For example, Princeton University tapped endowment funding to expand its Nvidia chip holdings to improve its ability to do advanced AI research.

Philanthropy has boosted the creativity and effectiveness of the US research system over time, but

We find that decentralized research institutions and diverse private philanthropic funders incentivize the research system toward greater risk and innovation.

creation of the first school of public health in the United States (at Johns Hopkins University), which opened up new fields including modern epidemiology. Philanthropy continues to support the founding of interdisciplinary schools with ambitious designs for artificial intelligence, computing, and data science, like the Schwarzman College of Computing at the Massachusetts Institute of Technology, or for climate science and sustainability, like the Stanford Doerr School of Sustainability. The outstanding successes of past initiatives suggest that reorganizing the institutions of knowledge creation and their teaching has been a winning strategy for raising the productivity of the system of knowledge creation.

The second impact of these philanthropic strategies is on human capital investment. Philanthropic funds are key enablers of an institution's bets on how best to staff and advance an emerging field of knowledge. Such support often provides early discretionary dollars to universities and nonprofit organizations deciding how to develop human capital with flexibility. Philanthropies also give grants that subtly shape the goals and behaviors of researchers in a given field. And early career awards help

changes to global and domestic innovation landscapes raise the question of how to meet the moment. Destabilizing changes to federal funding of research and the investigator-led university research model it sustains could have serious consequences for US competitiveness. Leading in basic and applied research has enabled the United States to sustain leadership in technological innovation for decades because the people and research tools that intermingled in this part of the research ecosystem led to early, strong advances in applications that other countries had neither the scale of research capabilities nor market customers to match. Today, faster translation at earlier stages is likely important for the United States to hold a competitive lead.

One virtue of philanthropy is that it can pursue diverse strategies. It would be consistent with this tradition if some philanthropists turn their attention to accelerating the speed of translation of basic to applied research, the precursors to new avenues of developmental work in downstream research and commercialization. But sacrificing federal support for basic and applied research weakens the effectiveness of philanthropic investment in this area as well.

Improving the synergies between government and philanthropic efforts in basic and applied research is critical to reap the true benefits of these investments. We suggest the following steps and provide key cautions so as to inform future policy discussions about the function and accountability of the US philanthropic system.

First, to wring the most value out of philanthropic investments, more avenues to inform federal decisionmakers about philanthropic efforts, and vice versa, must be created. Such exchanges could take many forms, formal and informal, including data exchanges, convenings, and strategic meetings to discuss how resources might be pooled to tackle specific problems.

To be clear, there is no single voice for the science philanthropy community, but federal agencies and nonprofits can more systematically invite participation by philanthropic institutions that are particularly engaged in key issues. At the same time, philanthropic leaders can make it clear that they are ready and willing to partner through participation in entities like the National Academies' Government-University-Industry-Philanthropy Research

reported estimates of allocations of their endowment funds for major research uses, this transparency could strengthen appreciation of the funds' consequential roles in contributing to US competitive advantage in research and innovation. Taxing endowments will likely put unnecessary pressure on universities' research spending, which would have a counterproductive effect on US innovation.

Finally, the philanthropic community should analyze its own best practices for increasing flexibility throughout the research enterprise, especially in regard to basic and applied research. Major philanthropic institutions should develop guidelines for voluntary data reporting, including information on how funds are allocated across scientific domains and human capital development, as well as details on institutional processes like proposal solicitation and review. Examination of common and novel practices could highlight new ways for funders to structure awards to influence risk-taking. In a time when there is greater emphasis on translation of R&D, learning more about the unique role philanthropy can play in encouraging robust linkages between basic and applied research is critical.

Destabilizing changes to federal funding of research and the investigator-led university research model it sustains could have serious consequences for US competitiveness.

Roundtable—which was recently renamed to explicitly include philanthropy in recognition of its rising importance. Simply mixing decisionmakers from across sectors around the table to exchange ideas has great potential: The BRAIN Initiative is a particularly dramatic example of the possible yields of such collaborative exchanges.

Second, to improve transparency around philanthropic support for research, organizations performing research (federal and state governments, philanthropies, universities, and private nonprofit research organizations) should expand the level of detailed data about sources of funding reported to NSF's National Center for Science and Engineering Statistics, which is tasked with providing objective data on the state of the research enterprise. While some general information is available, the level of detail on the source of funds for research expenditures is low, which limits the ability to assess the impact of each source.

More generally, universities should increase the transparency of their endowments. Legacy philanthropy in the form of endowments is key to the long-run productivity of the research ecosystem. If more universities voluntarily

It is important to recognize that philanthropy as a whole has an important impact on the productivity of our research enterprise that goes beyond the merits of individual projects. But as important as philanthropic support is to the US research enterprise, its greatest value is realized when it works in tandem with an ecosystem of equally dynamic partners.

Robert W. Conn is Walter J. Zable Distinguished Professor and dean of engineering, emeritus, at the University of California, San Diego, and president emeritus of The Kavli Foundation. **Peter F. Cowhey** is Qualcomm Professor of Communications and Technology Policy, emeritus, at UC San Diego and chair of the Board of Directors of the California Council on Science and Technology. **Christopher L. Martin** is the former director of physical sciences at The Kavli Foundation and founder of Vela Science Consulting. **Joshua Graff Zivin** is Pacific Economic Cooperation Chair in International Economic Relations at UC San Diego and holds faculty positions in the School of Global Policy and Strategy and in the Department of Economics.