The Science Philanthropy Alliance

Funding Basic Research - The Foundation Of Our Future

Robert Conn[i], Paul Joskow[ii], Steve McCormick[iii], Jack Pladziewicz[iv], Jim[a] and Marilyn[b] Simons[v], and Robert Tjian[vi]

Basis for a Discussion at the Joint Meeting of the U.S. President's Council of Advisors on Science and Technology and the U.K. Prime Minister's Council on Science and Technology Meeting held at the National Academy of Science, Washington, D.C. July 17, 2013

Paper also provided to Attendees from Sixteen Universities and Six Foundations at a Meeting on Science and Philanthropy held at HHMI, Chevy Chase, MD. Sept. 13-14, 2013

Synopsis

In light of a steady diminution of funding for basic scientific research in America over the past several years, six foundations have come together to form the core of a Science Philanthropy Alliance, organized around the objective of turning this tide. The six are the Howard Hughes Medical Institute, the Kavli Foundation, the Gordon and Betty Moore Foundation, the Simons Foundation, the Alfred P. Sloan Foundation, and The Research Corporation for Science Advancement. Our premise is that building bridges within and among government, universities, and philanthropy, the three great American pillars that support and carry out basic research, is critical to ensuring our nation's science and innovation leadership. We know from history that the health of America's scientific enterprise has a profound impact on the nation's economy, defense, and discovery and innovation capability. We also know from history the certainty that basic discoveries in science and spin-offs from the process that leads to them will ultimately result in great improvements in the country's economic prospects and in the health and well being of our society.

The Alliance's specific goals are: 1) to create via a targeted effort a greater appreciation among philanthropists and foundations (both current and new) of the importance of scientific research to all aspects of our society. 2) to increase substantially philanthropic funding for basic research, with the specific goal of increasing that support by at least $1 billion annually within five years; 3) to work with America's world-leading research universities and non-profit basic research institutions to ensure that the support for basic research remains strong and at the heart of this extraordinary enterprise; and 4) to partner with industry and company foundations to enhance their support for basic research, conducted both internally and externally. Success in meeting these objectives will help ensure a strong vibrant future for America and the world.

Background

We remain in the midst of an extended period of financial stress and today, federal funding of basic research is on the decline. National Institutes of Health (NIH) disbursements have trended down by

---

[i] President, The Kavli Foundation, [ii] President, Alfred P. Sloan Foundation, [iii] President, The Gordon and Betty Moore Foundation, [iv] Interim President, Research Corporation for Science Advancement, [v] Chairman[a] and President[b], Simons Foundation, [vi] President, Howard Hughes Medical Institute

10% over the past decade, in real terms[1], and this trend accelerated over the past four years. There are likely to be further reductions, in real terms, in this coming year. Other agencies such as the National Science Foundation (NSF) and the Department of Energy (DOE) that support basic science, technology and engineering find themselves in similar straits. Moreover, federal agencies have been encouraged to stress translational research, doubtless important, but leaving less money for basic research, the seed corn of the enterprise. In the face of a world economy increasingly based on science and technology, the continuation of such trends can only lead to decline, both internally and relative to other nations.

Yet America retains extraordinary assets and unparalleled strength in three pillars that underpin basic, innovative scientific research: 1) America's great research universities and non-profit basic research institutions; 2) the federal government's continuing large but now decreasing support of scientific research; and 3) America's singularly large and historically strong philanthropic enterprise. These three pillars are at a scale exceeding those of any other country or organized economic region[2]. Since World War II, America has had an extraordinary relationship between the federal government and universities, while foundations play an important and often seminal role in enabling scientific discoveries.

Research Universities and Institutions

America's research universities are the envy of the world. No matter which rating source is used, at least fifteen of the top twenty research universities are American universities. Among the top one hundred in the world, roughly forty-five are American. In addition, America's non-profit basic research institutions, many of which were formed with major philanthropic gifts, contribute critically to the nation's basic research enterprise. Examples of such institutions are the Carnegie Institution for Science, Cold Spring Harbor Laboratory, the Institute for Advanced Study, the Salk Institute for Biological Studies, the W.M. Keck Observatory, and the Sloan-Kettering Cancer Institute, to name just a few.

There are multiple reasons for the scale and quality of our universities and non-profit research institutions, but three that have contributed significantly since World War II are: 1) federal funding for science and engineering research; 2) opportunities at both public and private universities and at non profit research institutions for students and faculty; and 3) the competitive hiring and tenure system that has provided young faculty with the chance to pursue their best ideas and be directly rewarded for their success. Today, this overall enterprise is at risk.

Federal Government as Research Funder

Federal support of discovery science is large, but as the federal budget has become increasingly constrained, there is concern and evidence that agencies responsible for funding science will take less risk. That is, there will be a tendency to emphasize projects whose outcomes are more certain, even though such projects are less likely to yield transformative discoveries. The strong emphasis on accountability of federal tax dollars, especially the recent need to demonstrate ties to job creation, and the growing emphasis on translational research, is shifting funding toward shorter term, more applied and more mission-driven research[3]. In a flat or declining budget environment, this has the inevitable effect of reducing support for early stage basic research that can require a decade or more to demonstrate societal impact. Last but not least, federal agency peer-review committees strongly emphasize extensive data and thorough proof of concept prior to funding. This leads to funding decisions that are ever more risk averse,

---

[1] M. Hourihan et al., Intersociety Working Group, Report XXXVIII, Research and Development FY 2014. AAAS, May 2013.

[2] See e.g. NSF Science and Engineering Indicators 2012, Chapter 4, http://www.nsf.gov/statistics/seind12/c4/c4h.htm

[3] This concern has been articulated in numerous reports e.g. "Assessment of Department of Defense Basic Research," National Academies Press, 2005, http://www.nap.edu/catalog/11177.html as well as indirectly by Congress, e.g. "America COMPETES Act," P.L. 110-69, Sec. 1008

an issue that is well recognized by the leading science funding agencies such as NSF, NIH, DOE and DARPA[4].

The concern of the Alliance is that, in these times of constrained budgets, the ability of agencies to address this issue will fall far short of what is needed. While we hope that thought leaders reached by the Alliance campaign may have some effect in mitigating this tendency, any major shift will almost certainly wait on better economic times and consequently on more robust federal budgets, developments which may be well into the future**.** The best hope for near term change lies with American philanthropy.

American Philanthropy

The U.S. has the largest philanthropic enterprise in the world, though a detailed accounting can be difficult. An estimate[5] of total charitable donations in 2012 from foundations, individuals and corporations in America is $316 billion. Donations by individuals totaled $229 billion, or 72% of the total. Foundations, with estimated assets totaling $690 billion, had annual expenditures of approximately $46 billion, or 15% of the total. Some of this funding by foundations is targeted at basic scientific research, but the total, about $2 billion per year[6], is less than 5% of total foundation expenditures. In addition, there are only a handful of foundations that support basic discovery science, and even fewer whose focus is outside biomedical research. Of the estimated $2 billion per year from foundations for basic science, approximately 25%, or $500 million, goes to the fields of physics, chemistry, mathematics and engineering. In other words, fully 75% of foundation support for science goes to medical and biological research.

Philanthropic institutions and philanthropists themselves often have more freedom to operate than do the science funding agencies of government, permitting them to be more flexible and nimble. We believe now is the time that they should take advantage of that flexibility by directing an increased fraction of their giving to support bold and innovative research in basic science. Moreover, we believe that these dollars can go further if funders can find new ways to collaborate in areas of shared interest. We also believe that research universities and non-profit basic research institutions can establish new mechanisms to attract increased and fresh philanthropic support for basic research, while at the same time not diminishing such support for other areas vital to their mission.

The Science Philanthropy Alliance's specific goals are to substantially increase philanthropic funding for basic research, with the specific goal of increasing that support by at least $1 billion annually within five years, to work with America's world-leading research universities and non-profit basic research institutions to ensure that the support for basic research remains strong and at the heart of this extraordinary enterprise, and to partner with industry and company foundations to enhance their support for basic research, conducted both internally and externally. This will require a targeted effort to create a greater appreciation among philanthropists and foundations (both current and new) of the importance of basic scientific research to all aspects of our society. Success in meeting these objectives will help ensure a strong vibrant future for America and the world.

---

[4] See e.g. "Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future," National Academies Press, 2005 http://www.nap.edu/catalog/11463.html

[5] Estimating the giving by individuals, corporations and foundations is difficult, and no figures should be considered definitive. Two well-regarded sources of data are The Giving Institute (reports are at www.givingusareports.org/) and the Foundation Center. Figures quoted here are from "The Annual Report on Philanthropy for the Year 2012" of the Giving Institute. A second source for Foundation giving, which also includes estimates of assets of foundations, is from the Foundation Center. See http://foundationcenter.org/gainknowledge/research/pdf/fgge12.pdf.

[6] Based upon estimates from the Foundation Center: "Distribution of Foundation Grants by Subject Categories, circa 2011" in the categories of "Medical Research" and "Science and Technology". See http://foundationcenter.org/findfunders/statistics/pdf/04_fund_sub/2011/10_11.pdf