A Primer on Foundation Science Support

In 1990 the nation's 32,000 grant-making foundations gave away $8.7 billion, of which an estimated $435 million, or 5%, went to science and engineering. (The share was higher for the very large foundations). Not an insubstantial figure, $435 million pales when compared with the $1.7 billion dollars spent by the National Science Foundation on education and research in 1990, or the $3.4 billion industry is estimated to be investing in basic research this year. But if you or your sponsoring institution benefited from these grant monies, you're no doubt grateful foundations exist. Moreover, you may not recognize the unique strength of foundation funding compared to government and corporate funding—its constancy.

Unlike federal funding, which has severe cyclical fluctuations—or corporate funding, which shrinks dramatically during recessions—the overall level of foundation support for science has not wavered appreciably over the past decade. Throughout the 1980s, when overall foundation giving grew by 60% after inflation, the large foundations disbursed between 6% and 9% of their total annual grants to science and engineering. Funding was most pronounced in the mid-1980s, a period of exceptional growth in foundation endowments and in new foundation creation, and also a peak period for corporate foundation giving (which faltered in subsequent years). Overall, the pool of science funders expanded (it still remains quite limited), some younger philanthropies whose founders had amassed fortunes from technology emerged as major players, and the size of individual grants increased dramatically. In these pages, we offer a surface probe of the principal trends in foundation science funding, along with advice on some foundations to watch and how to approach them. We include engineering as well as the life and physical sciences and biomedical science. We exclude precollegiate science education grants.

Trend I: Funding by discipline

Only 3% of U.S. foundations appear in the Foundation Center's annual *Grants Index*, but they dominate the field. In 1990, the elite foundations distributed more than $327 million in nearly 2400 science and technology grants. The standouts were engineering and technology and the medical sciences, accounting for about one-fourth of science funding each. The emphasis in these two areas is, however, different: in engineering, more than $1 of every $2 went to graduate education; in the medical sciences, nearly $3 of every $4 went to biomedical research.

Ranked third by discipline, "General Science" encompasses interdisciplinary funding, which gets more than $4 of every $5 in this area. Included are grants for research, education, and science centers.

Funding for biology and the life sciences fluctuated in the 1980s but stayed ahead of the physical sciences, of which chemistry absorbs a major share. Engineering support skyrocketed in the early '80s but fell back with the decline of corporate fortunes. General science advanced the most in the late '80s, benefitting from broad-based support and large gifts.

Trend II: Funding by research sector

A second way of looking at annual funding is by type of recipient. Academic institutions were far and away the

Where the Money Went, 1990

Subject	Value of Grants $ Thousands	%	# of Grants #	%	Average $ Grant
Engineering Technology	81,172	24.8	689	28.8	117,811
Medical Sciences	80,087	24.5	290	12.1	276,162
Biomedicine/Bioengineering	58,611	17.9	201	8.4	
Parasitic Diseases	11,059	3.4	22	0.9	
Neurology/Neuroscience	7,999	2.4	34	1.4	
Other	2,418	0.7	33	1.4	
General Science	68,263	20.8	460	19.2	148,398
Interdisciplinary Science	56,233	17.2	418	17.5	
Marine Science & Oceanography	8,132	2.5	15	0.6	
Other	3,898	1.2	27	1.1	
Life Science	58,288	17.8	361	15.1	161,463
Biological/Life ScienceResearch	40,605	12.4	217	9.1	
Botany/Plant Physiology	11,246	3.4	104	4.3	
Human Anatomy/Physiology	2,162	0.7	26	1.1	
Other	4,275	1.3	14	0.6	
Physical & Earth Science	38,041	11.6	566	23.7	67,210
Chemistry/Chemical Engineering	12,504	3.8	272	11.4	
Mathematics	5,862	1.8	58	2.4	
Astronomy	5,556	1.7	17	0.7	
Physics	5,452	1.7	84	3.5	
Geology	2,186	0.7	51	2.1	
Other	6,481	1.9	84	3.5	
Other Science	1,652	0.5	27	1.1	
Total Grants	**$327,503**	**100.0%**	**2,393**	**100.0**	

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Top 20 Science Grantees, 1990*

Recipient Name	Total Amount	%	# of Grants
Caltech	12,550,882	3.8	25
U. of Washington	9,940,638	3.0	19
Stanford	8,968,048	2.7	45
Harvey Mudd College	8,598,200	2.6	11
Duke University	8,532,238	2.6	8
Monterey Bay Aquarium Research Institute	7,500,000	2.3	1
U. of Virginia	6,728,433	2.1	6
Rockefeller U.	6,055,853	1.8	9
MIT	4,981,576	1.5	43
Baylor College of Medicine	4,200,721	1.3	7
Columbia U.	4,142,391	1.3	15
GMI Engineering and Management Institute	4,048,102	1.2	5
Thomas Jefferson U.	4,000,000	1.2	2
Yale	3,928,500	1.2	17
Johns Hopkins U.	3,530,592	1.1	15
Whitaker Health Sciences Fund	3,300,000	1.0	1
U. of California	3,269,936	1.0	38
U. of Michigan	3,093,425	0.9	25
Temple U.	3,053,715	0.9	3
Emory U.	2,783,000	0.8	2
Total	**$113,206,250**	**34.3**	**297**

*Excludes a single $30 million grant to Northwestern U. for construction of an engineering building.

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How to Research Foundations

As an individual investigator, you rarely qualify for foundation grants. Worse yet, your efforts to scout out prospects by phone and to pass those on to your employer's grants officer may not be rewarded. Most foundations, lacking staff, prefer that you do your homework before you approach them. That is why so many grant seekers begin their search with the Foundation Center.

An independent, nonprofit organization set up by foundations in 1956 and with headquarters in New York, the center provides free access to information on all of the 32,000 grantmaking foundations and on hundreds of corporate giving programs. Its many directories, guides, and indexes keep track of funders, their addresses, current funding interests, recent grants, application deadlines, and even contact names.

Key Resources

To get started, the Center's guidebook, *Foundation Fundamentals*, teaches grantseekers how to use all these resources effectively, takes them step-by-step through the funding research process, and offers tips on how to approach foundations. Then there's *The Foundation Directory*. Currently containing entries on over 8000 grantmaking foundations, grantseekers rely on this resource to find information on specific foundations or to identify foundations by their stated program interest.

Yet more extensive profiles and grants analyses of the largest foundations are included in *The Foundation 1000*. And *The National Guide to Corporate Giving* covers some 1600 corporate foundations and 600 corporate giving programs.

Still another tool is *The Foundation Grants Index*, consisting of listings of over 57,000 actual grants awarded. This allows grantseekers to pinpoint, through use of subject and type of support indexes, specific funders that have made grants to projects or organizations most like their own.

For more targeted research in the fields of science and medical science, grantseekers may use the following customized grants indexes: *Grants for Science and Technology* and *Grants for Medical Research*. Of particular interest to grantseekers with ties to academia, *The National Guide to Funding in Higher Education* presents current data on over 3000 foundations and corporate giving programs with a record of support for higher education.

The indexes above report almost exclusively on institutional grants. To research grants, fellowships, and awards made directly to individuals, grantseekers are referred to *Foundation Grants to Individuals*, which currently lists over 2000 funders and includes a bibliography of funding for individuals. Another source is the Oryx Press publication, *Directory of Research Grants*, which covers some research programs that fund individual research in areas including the physical sciences and medicine.

Accessing the Data

You don't have to go to New York to get your hands on some or all of these resources. Until recently, most university libraries and many public libraries have subscribed to one or more of the Foundation Center's directories and guides. Yet, faced with budget cuts, these collections may be incomplete or out of date. To learn the most about resources and the research process, grantseekers are encouraged to visit one of the four Center-operated libraries in New York, Washington, D.C., Cleveland, and San Francisco, or one of about 180 cooperating collections across the country.

Visitors to one of the Center's own staffed libraries are assured free access to all Foundation Center publications. In addition, these libraries have extensive collections of annual reports and other foundation literature, valuable materials from other publishers on foundation and corporate philanthropy, and information on topics ranging from proposal writing to managing a small nonprofit agency. The New York and D.C. libraries also house complete collections of tax returns (IRS form 990-PF) for all U.S. foundations. The Cleveland and San Francisco libraries maintain IRS records for more limited geographic areas. These returns are often the only source of detailed information on smaller foundations. To get the most out of your first visit to a center, inquire about regularly scheduled orientations.

For grant-seekers unable to reach one of its libraries, the center oversees a network of funding information centers housed in public and academic libraries, community foundation offices or in other nonprofit agencies. These network libraries provide free access to a core collection of Foundation Center reference publications and many house local grantmaker directories and collections of annual reports. State and local collections of foundation tax returns on microfiche are widely available through the cooperating libraries. Every state has at least one cooperating collection, as do Puerto Rico and the U.S. Virgin Islands. New York holds 14 and California 12; Texas holds 11. To locate the nearest network library, call 1-800-424-9836.

And then there's the armchair option: For those with access to a modem, the center's databases are available to the public through DIALOG Information Services, Inc. Alternatively, local research libraries frequently provide access to DIALOG.

Prospect Research: Some Tips

Once acquainted with the wide range of funding resources noted above, grantseekers should be prepared to invest many hours in prospect research. On the whole, the search process involves casting the widest possible net for potential funders and then narrowing the prospect pool to eliminate those grantmakers whose stated limitations—geographic, institutional, type of support, etc.—would disqualify a specific funding request.

Prospect research usually begins with one of three approaches: subject or discipline, type of support (fellowship, research, etc.), or geographic. All of the Foundation Center's directories and guides include indexes organized to facilitate research accordingly. Several of the back of the book indexes are cross referenced so that searching is more precise and less time consuming.

Once you have developed a list of prospective funders, the next step is to thoroughly research funders' annual reports or IRS information returns. This step will inevitably pare down your list, while providing the information you need to intelligently approach your remaining best prospects.

The next step is to apply. While it remains beyond the scope of this article to provide a complete guide to successful grantseeking, several pointers may be useful for those just learning how to apply for foundation grants. The process involves establishing initial contact with potential funders, developing unique proposals for each grantmaker, and following through with supporting documentation. Mostly, the process requires patience and persistence. Regardless of whether a foundation funds your first grant request, keep it abreast of the work you are doing. Remember, some funders turn down grantseekers two or three times before approving their request. Finally, if your proposal is funded, be sure to acknowledge the funder's support with a letter of thanks and do not fail to meet reporting deadlines.

–L.R. & S.L.

Selected Major Science Funders

Name/Address	Interest Areas
AT&T Foundation 550 Madison Ave. New York, NY 10022-3297	Special Purpose Grants in Science and Engineering: to equip supercomputer labs, optical sciences centers, chemistry labs, etc. Manufacturing Technology Grants: to create masters programs in—and establish labs for—manufacturing engineering. Ph.D. Scholarship Grants: to increase the supply of Ph.D.s in technical fields.
Arnold and Mabel Beckman Foundation c/o Hopper Kaufman & Co. 5140 Campus Dr., Ste. 100 Newport Beach, CA 92660	Mainly funds biochemistry. Also funds genetics, chemistry, neurobiology, and artificial intelligence. Has made large grants to the CalTech. Grants made only to preselected programs.
The Edna McConnell Clark Foundation 250 Park Ave., Rm. 900 New York, NY 10017	Program for Tropical Disease Research: funds parasitic disease research on schistosomiasis (snail fever), research on onchocerciasis (river blindness), and trachoma.
The Camille and Henry Dreyfus Foundation Inc. 555 Madison Ave. Suite 1305 New York, NY 10022	Focused on advancing chemistry, chemical engineering; supports promising young postdocs and new chemistry faculty. *Funds both institutions and individuals* sponsored by academic institutions.
General Electric Foundation 3135 Easton Turnpike Fairfield, CT 06431	Faculty for the Future Program offers undergraduate research grants, forgivable loans to Ph.D. candidates, and grants to junior faculty. Also funds graduate fellowships and scholarships for minorities in science.
The Howard Hughes Medical Institute 6701 Rockledge Dr. Bethesda, MD 20817	Not a private foundation under the federal tax code, but operates one of the largest private grants programs in science education and biomedical research. Since 1987, has awarded $168 million to universities, colleges, research laboratories, and *individuals*. Grants and fellowships are awarded under competitive science education programs only. Researchers are employed directly by HHMI.
W. M. Keck Foundation 555 South Flower St. Suite 3230 Los Angeles, CA 90071	Huge investor in astronomy through $144 million in grants for two observatories at Mauna Kea in Hawaii. Also provides capital grants for science and engineering labs. Through its Medical Research and Medical Education Grant Program, supports medical research labs and faculty. Strong interest in interdisciplinary medical research. *No grants to individuals.*
The Kresge Foundation 3215 W. Big Beaver Rd. P.O. Box 3151 Troy, NY 48007-3151	Offers challenge grants for major capital projects to upgrade or endow science labs and to purchase instruments. *No grants to individuals.*
The Henry Luce Foundation, Inc. 111 West 50th St., Rm. 3710 New York, NY 10020	Its Clare Boothe Luce Fund aids women in science and engineering through undergraduate scholarships, graduate fellowships, and term support for tenure-track appointments.
John D. and Catherine T. MacArthur Foundation 140 South Dearborn St. Chicago, IL 60603	Funds research and training of researchers in biological bases of parasitism. Worked to establish the International Consortium on the Biology of Parasitic Diseases. Also provides indirect support for scientists through the MacArthur Fellows Program (*applications not accepted*).
Lucille P. Markey Charitable Trust 3250 Mary St., Suite 405 Miami, FL 33133	Set to terminate operations in 1997, most programs no longer accept proposals. Has been largest funder of biomedical research in recent years. Known for backing novel and interdisciplinary research initiatives and for creating new programs or centers focused on a single aspect of biomedical research. Has also funded fellowships for outstanding young biomedical researchers and 2-year visiting fellowships for UK and Australian researchers. *No grants directly to individuals.*
The McKnight Foundation 600 TCF Tower 121 South Eighth St. Minneapolis, MN 55402	Supports neuroscience through the McKnight Endowment Fund for Neuroscience. Awards given to physicians and scholars early in their research careers, to mid-career scientists for innovative research into the mechanisms of memory and memory disorders, and to established neuroscientists. Also funds basic research in plant biology directed at world hunger.
The David and Lucile Packard Foundation 300 Second St., Suite 200 Los Altos, CA 94022	Major funder of marine research through support of the Monterey Bay Aquarium Research Institute (MBARI), founded by David Packard. Also currently spends $10 million annually for science and engineering fellowships for promising young university professors to continue research, and funds science programs at historically black colleges and universities. *No grants to individuals.*
The Pew Charitable Trusts Three Pkwy., Suite 501 Philadelphia, PA 19102-1305	Within education, health sciences, and health programs, funds capital projects and fellowships. Pew Scholars Program in the Biomedical Sciences supports young researchers. Pew Latin American Fellows Program helps young Latin and South American scientists work collaboratively with U.S. investigators and set up labs in their home countries. McDonnell-Pew Program in Cognitive Neuroscience supports training and research in the study of mind/brain interaction. *No grants directly to individuals.*
Research Corporation 6840 East Broadway Blvd. Tucson, AZ 85710-2815	Dedicated solely to science and technology through four programs: Partners In Science, providing opportunities for high school science teachers to participate in summer research; the Cottrell College Science Program, encouraging undergraduate research in chemistry, physics, and astronomy; Research Opportunity Awards, allowing mid-career faculty chemists and physicists to explore new research areas; Department Development Awards, seeking to improve science teaching. *No grants directly to individuals.*
The Rockefeller Foundation 1133 Ave. of the Americas New York, NY 10036	Funds science through its population, health, and international agricultural development programs mainly at academic centers and research institutions in less developed countries. Also funds Biotechnology Career Fellowships, enabling scientists from developing countries to conduct investigations at major U.S. research institutions. *No grants directly to individuals.*
Alfred P. Sloan Foundation 630 Fifth Ave., Ste. 2550 New York, NY 10111-0242	Sloan Research fellowships support young faculty members with great research potential in chemistry, physics, mathematics, and neuroscience. Also awards Dissertation Fellowships in math and economics. Makes grants for direct support of research in promising interdisciplinary areas. *No grants directly to individuals.*
The Whitaker Foundation 4718 Old Gettysburg Rd., Suite 405 Mechanicsburg, PA 17055-4380	Funds biomedical research and engineering. All grants to investigators early in their careers. Of particular interest: projects integrating physical science or engineering and likely to make significant contributions to medical science or technology. Recently decided to terminate operations in 15 years allowing for a doubling in the size of its grants program. No grants to individuals.

–L.R. & S.L.

primary beneficiaries of foundation giving for science in 1990, receiving about 77% of science and technology grant dollars ($252 million) and the remaining funds going to private research institutes, national science organizations, and professional associations. This picture too has changed: In times past, an even higher percentage of grants went to nonacademic institutions. And while foundations used to favor private colleges and universities over public institutions, the funding gap between public and private schools narrowed during the 1980s.

A glance at the top 20 recipients reveals another telling pattern: science dollars mainly benefited the haves. Together, these well-endowed organizations received more than one-third of all funding in the sample ($113.2 million) but only 13$ of grants. Of the 20 largest beneficiaries, 16 are universities. By geographic area, six are on the West Coast, including the top four.

Trend III: Type of grant support

How are foundation dollars for science earmarked? In 1990 the grants were largely divided between research (34 percent), capital projects (33 percent), special programs (28 percent), and fellowships and scholarships (11 percent). (Percentage totals exceed 100 percent due to double coding of grants awarded for multiple purposes, such as research fellowships.)

Over the past decade, science giving designated for research and for fellowships and scholarships increased, special project and capital support stayed about the same, and general support dropped.

Type of support strongly affects average grant size. In 1990, even excluding a $30 million gift to Northwestern University, by far the largest average grant paid was for building and renovation projects ($391,000). The mean grant for equipment was $174,000. Research grants averaged around $190,000. Support to institutions for scholarships and fellowships averaged $102,000.

Trend IV: Overview of funders

Who's making grants in science? The number of large foundations with a stated interest in science or medical science is limited. Of the 8,000 foundations listed in *The Foundation Directory*, approximately 300 include science or engineering among their primary interests. About 110 support medical sciences. Of the 1,000 largest foundations—those included in the *Foundation 1000*—approximately 140 demonstrate some interest in science or medical science.

Based on grants of $10,000 or more published in the most recent edition of the *Foundation Grants Index*, the 10 top-ranked science funders gave out $163 million, or about half of science dollars reported by all foundations in our sample. Looking back a decade, many of the largest funders have changed. Several corporate foundations have been replaced by independent foundations—such as Markey, Beckman, and Packard—whose funding jumped dramatically in the '80s.

To gain a clearer picture of funding interests, we present (on p. 1752) brief descriptions of the programs of 18 influential science funders, including the 10 largest. Most are large, independent foundations whose grant programs are varied. Only a portion of their annual grants budget supports science. A few are medium-sized independents wholly committed to science and research. Still others are corporate foundations whose company interests are closely tied to technology education and research. Finally, due to its size and importance, we have included one funder, the Howard Hughes Medical Institute, that is not a private foundation.

Top 10 Foundations in Science, 1990*

Foundation	Total Grants	%	# of grants
1. Lucille P. Markey Charitable Trust	30,035,000	9.2	16
2. W.M. Keck Foundation	21,965,000	6.7	41
3. David and Lucile Packard Foundation	18,650,487	5.7	34
4. Arnold and Mabel Beckman Foundation	17,340,623	5.3	7
5. Rockefeller Foundation	16,276,557	5.0	157
6. Whitaker Foundation	13,843,672	4.2	64
7. John D. and Catherine T. MacArthur Foundation	12,453,669	3.8	29
8. Pew Charitable Trusts	11,504,301	3.5	45
9. Alfred P. Sloan Foundation	10,399,104	3.2	58
10. Kresge Foundation	10,124,000	3.1	21
Total	$162,592,443	49.7	472

*Excludes a $30 million single grant by the Robert R. McCormick Tribune Foundation to Northwestern U.

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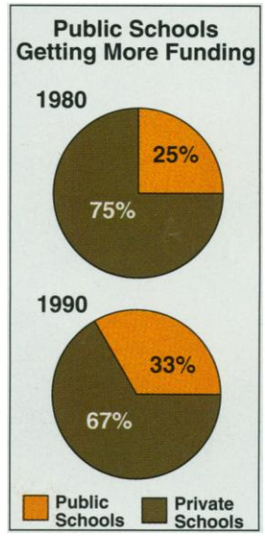

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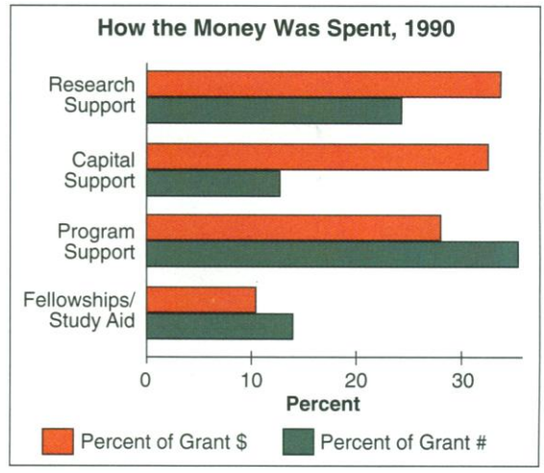

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Most of the profiled grant-makers issue detailed program guidelines and limitations statements. Nearly all have one thing in common: they *don't make grants directly to individuals*. Before contacting a funder, grant-seekers should carefully review its publications and application guidelines.

To the uninitiated, the foundation world remains a mysterious, alien, and seemingly impenetrable domain. Grants widely publicized by the media are few in number, and, as in the case of the MacArthur Foundation "genius grants," tend to add to the mystique. To most outsiders, the grants process must be viewed as an insiders's game; winners are either well connected or extremely lucky. At the opposite extreme, and equally misinformed, we find the grant-seeking Don Quixotes—naive beginners in blithe pursuit of the magic prospect list. For these hopefuls, the secret to identifying good prospects and clinching a grant is merely hitting the right computer keys.

In the real world, successful grant-seeking requires a mix of careful preparation, savvy, persistence, and luck. Getting to know foundations, identifying information resources, and learning how to access these tools are the essential first steps.

–Loren Renz and Steven Lawrence

Loren Renz is vice president for research and Steven Lawrence is research assistant at the Foundation Center in New York City. They recently coauthored the center's 1992 Foundation Giving: Yearbook of Facts and Figures on Private, Corporate, and Community Foundations. *This funding review might be updated every so often if it serves you the reader. Turn to the questionnaire on page 1769 and tell us whether you might wish for, say, biennial updates and, if so, what we might include next time around to serve you better.*