The Center

The Top American Research Universities

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Contents

The Top American Research Universities

The Myth of Number One

Americans love the eternal pursuit of the mythical number one. *First Place*, *Número Uno, Best of Class*... . We have many ways to express our enthusiasm for placing things in ordered lists: The best wine, the best dressed executive, the best cities, the best cars, and the best movies. This pursuit of the best carries with it a significant commitment to defining and measuring the quality that underlies the ranking and a recognition that competition tends to drive individuals and organizations towards higher performance. Yet, with all of our enthusiasm for identifying number one, there is a remarkable amount of controversy over exactly what we can measure that will define the best. We often qualify our understanding of the "best" and talk about the best minor league team, the best small cities, the best of show, or the personal best.

The Rankings Game

We who live in America's research universities also worry about which one is the best. When the various surveys and rankings appear from time to time, we eagerly consume them in search of the best colleges, the best American universities, the best business schools, the best MBA programs, or the best medical colleges in an ordered and numbered list. In almost every case, universities decry the commercialism of the rankings, attack the methodology of the ranking process, and proudly distribute to their alumni those rankings in which they appear high.

The most famous—and perhaps most controversial—of the rankings come from *US News & World Report*, whose annual issue ranking colleges and universities carries the same suspense for some academics that the final college football polls have for sports fans. University administrators, public relations officials, and fundraisers wait expectantly for the rankings, and institutional research officials fill out the forms for *US News* with great care and attention in hopes of improving their rank. The compilers of the *US News* rankings modify the criteria and weightings that drive their rankings with considerable frequency in an effort to improve the reliability of the results. Each change in methodology, however, changes the rankings of individual universities, creating an illusion that universities rise

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and fall in their relative significance from year to year.

This illusion of rapid and dramatic institutional change has some perhaps unintended benefits. From the magazine's perspective, it creates great interest, for if the rankings change from year to year, the newest issue attracts a larger audience. When a university rises in the *US News* lists, the administration promotes the new ranking widely as an example of superb management and high quality faculty productivity. When an institution falls in the lists, the administration highlights the errors and inappropriate methodology. Sometimes it simply ignores the rankings altogether. The variability of the *US News* methodology generates the interest that sustains the process. ‡

All major American research universities compete for their share of a relatively limited supply of highly productive research faculty.

While those of us who study the rankings know their faults well, we also know that underneath the hype lies a fundamental and important truth. American universities exist in a highly competitive marketplace, competing for the people and money that deliver excellence. All major American research universities compete for their share of a relatively limited supply of highly productive research faculty. These faculty, through their discoveries and writing, create the knowledge that drives our economy and defines our era. The larger the number of highly productive research faculty at a university, the more intellectually powerful the institution becomes.

The academic and public reputation of research institutions closely follows their success in acquiring research faculty, although reputations rise and fall much more slowly and uncertainly than the reality they reflect. Universities that seek to rise into the ranks of the nation's elite research institutions need reliable measures of performance that will reflect their success in the competitive higher education marketplace.

Characteristics of Universities

Most of the currently available rankings, focused as they are on an ordering of institutions from number one on down, obscure some of the fundamental characteristics of university change and the university marketplace. Over the past several years, *TheCenter* has developed a structure for identifying some key characteristics of top research universities in America. This structure helps institutions to understand the characteristics of the marketplace and the opportunities for improvement. *TheCenter* clusters universities into groups defined by their relative performance on a variety of research university characteristics: research, private support, faculty, doctorates, postdoctoral appointees, and undergraduate quality. While issues of scope (land-grant

‡ The literature on ranking, including critiques and alternative ranking methodologies, is extensive. By far the best guide to these resources is a web page maintained by the University of Illinois library. For those interested in following the debate, the on-line and printed sources available here are kept current and provide a comprehensive and annotated resource. *College and University Rankings*, (Education and Social Science Library, University of Illinois at Urbana-Champaign, March 2000) at [http://www.library.uiuc.edu/edx/rankings.htm]. A complete discussion of the *US News & World Report* methodology is available in a report published on *TheCenter* web site by Denise S. Gater at [http://thecenter.ufl.edu/usnews.html].

mission, health and engineering programs, affiliated laboratories and hospitals, and professional schools) provide a context within which research universities function, they do not determine the success of the research university. Institutions of quite different scope and scale (student, faculty, budget size) appear at all levels among America's top research institutions.

Any definition of university quality will provoke controversy and disagreement. This is both healthy and expected. For the purposes of this study, we use measures that identify institutional performance relevant for a top research university. We could imagine other measures as well, but in most cases, the data for more complex evaluations do not exist in a reliable form. Indeed, for all the intellectual sophistication of universities, they resist accurate, consistent, and standardized measurement of almost everything they do. Accounting practices, definitions of such fundamental concepts as teaching and research, and the methodologies for calculating measures of faculty productivity vary significantly from institution to institution, from state to state, and from private to public ownership. As a result, systematic evaluation of research universities must rely on surrogates, data elements with some degree of consistency and face-validity in the academic community that provide direct or indirect measures of institutional performance.

Universities of the highest quality tend to do most things very well. Other institutions will perform very well on some elements but not as well on all. Many institutions do not participate in the research competition at high levels, and for that reason the indicators used to characterize research institutions do not apply to them. While it is possible to proliferate measurements, we believe that for research universities a relatively few indicators provide sufficient evidence of overall quality. In most cases, the use of more indicators contributes little additional information. This is so because the difference among research universities with high levels of performance is not great. Ranking Berkeley, Michigan, and Wisconsin or Harvard, Stanford, and Chicago from one to three tells us very little more than if we ranked them in a different order. These institutions are different in many ways, but these six represent premier American public and private research universities. By using multiple indicators and combining them with different weights and formulas, we could produce rankings with these institutions in many different sequences. For this reason, we use the fewest measures needed to identify groups of outstanding institutions and make no effort to rank the institutions within groups.

For all the intellectual sophistication of universities, they resist accurate, consistent, and standardized measurement of almost everything they do.

Defining the Research University

American public and private universities come in a bewildering variety of institutional forms, embedded in political arrangements and governance structures of remarkable diversity. Some universities consist of multiple campuses, each governed independently with its own curriculum and student body. Others have geographically diverse campuses that function as a single institution.

Although this often appears in the form of a single geographic campus at Ann Arbor, Palo Alto, or Seattle, for example, it can also appear in multiple geographical locations in

Baltimore and Washington D.C. The key element is the organizational focus that permits the university to operate as a single institutional entity.

American public and private universities come in a bewildering variety of institutional forms, embedded in political arrangements and governance structures of remarkable diversity.

To take an example, the University of North Carolina has many campuses but only one president. For the purposes of our analysis, *TheCenter* considers the University of North Carolina at Chapel Hill as one research university and does not include the productivity of the faculty at other UNC campuses as part of the Chapel Hill data. This study defines the research university as the main campus of multi-campus universities, and we use the institutional definition of the main campus in adjusting the data.

Most private universities do not present as many definitional difficulties as do the complex political structures of public institutions, but The Johns Hopkins University is an instructive example. This university consists of various schools scattered over a wide geographic area from north Baltimore to Washington, D.C. Hopkins, nonetheless, operates as one institution with one governance and institutional structure, and the productivity of the faculty in all of the university's schools form part of The Johns Hopkins institutional data.

Hopkins offers an additional illustration of the difficulty of defining the scope of a university. It currently includes the research productivity of its Applied Physics Laboratory (APL) as part of the university's work. This rests on the recognition that APL's staff has a variety of teaching and academic missions that connect this laboratory organically to the university, even though the primary funding of APL derives from special appropriations from the federal government.

An alternative model occurs for the Department of Energy labs managed by the University of California system. Although The Lawrence Livermore Laboratory, for example, exists in close geographic and intellectual connection to the University of California campus at Berkeley, this institution does not include the research funding of the Lab in its totals.

Perfection in classification is difficult to achieve. Fortunately, while the Hopkins case creates an outlier in the research data, removing the APL component would not affect its inclusion within the top group, illustrating one benefit of the clustering methodology.

Universities also have complex and differing relationships with their teaching hospitals. In some cases, clinical research done by faculty physicians with appointment and tenure in the sponsoring university appears in the totals for the hospital that is the host for this research. In other cases, the clinical research flows through the university and appears in the university totals. These differences in organization affect both public and private institutions and led to the clustering strategy that puts high performing institutions in groups rather than in precise numerical rank order.

Often multi-campus public universities or university systems report data for the larger collection of campuses rather than for the research campus. In those cases, *TheCenter* staff worked with the campus institutional research offices and used data available from institutional and national sources to determine what portion of the reported data

we should assign to the research campus. This process serves to make the research universities comparable for the purposes of this analysis of institutional performance. An alternative research project might well choose to review the productivity of university systems composed of multiple campuses, but that is not the purpose of this project. A complete description of the adjustments made to the officially reported data for individual institutions appears in the Appendix and on *TheCenter* web site [http://thecenter.ufl.edu].

Indicators of Performance

The identification of performance indicators is the most important task facing any project that hopes to assess comparative institutional performance. Academics can identify a wide range of useful indicators, but only a few have reliable data available. Fortunately, there are enough measures with reliable data to support a clustering of universities by quality. The indicators of university performance used here permit the development of reliable comparative data that have face validity as reasonable references for research university performance.

No available data can accurately capture the totality of a university's quality and productivity. No available indicator can measure the complete performance of these complex and diverse institutions. At the same time, some measures provide quite reliable *indicators* of institutional performance, even when they do not capture all of that performance. This is particularly true of research universities, whose core competency and competitiveness in research define the institution's character.

While the measures we use bear some relationship to each other (for example, institutions with high research volume tend to have a significant number of doctorates and postdoctoral appointees),[‡] the relationship is not particularly strong. This is partly because research volume captures only a portion of a university's research productivity, while the doctorates indicator includes all disciplines: arts, humanities, social sciences, and professions, as well as the sciences. SAT scores for the undergraduate entering class bear almost no relationship to the research volume of the institution, but high quality undergraduates form an important part of America's premier research universities.

The following nine measures provide us with the reference points for identifying the top research universities:

- *Total research expenditures;*
- *Federal research expenditures;*
- *Endowment assets;*
- *Annual giving;*
- *Faculty members in the National Academies;*
- *Faculty awards;*
- *Doctoral degrees;*
- *Postdoctoral appointees;* and
- *Entering freshmen SAT scores.*

The measures used here provide quite reliable indicators of institutional performance even when they do not capture all of that performance.

[‡] Federal research and postdoctoral appointees correlate at .544 for all universities in this group; for federal research and doctorates, the correlation is .464. However, federal research and SAT scores correlate at only .287, a level that is not significant for either private or public universities at the .01 level.

TheCenter evaluates public and private universities in the same way, using exactly the same data. We present the performance of public and private universities separately, however, because the public and private research universities operate in significantly different contexts by virtue of their governance and funding structures. Private universities tend to have much larger endowments than public universities, while public institutions enjoy a much higher level of tax-based public support. Public universities tend to serve much more diverse constituencies in ways that affect their size and organization. Private universities often focus their efforts more closely and define their missions more precisely.

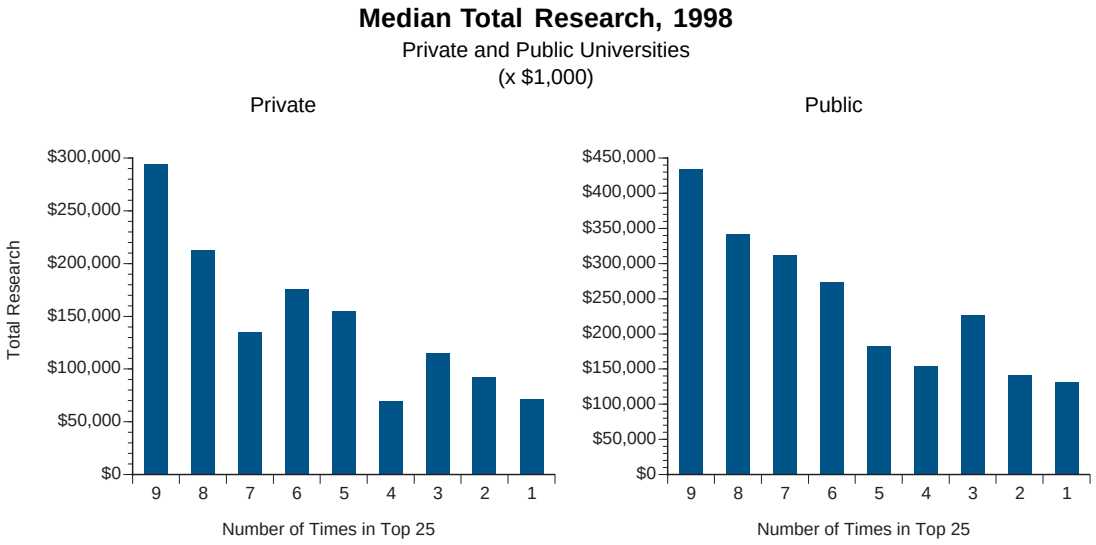
Public and private institutions compete for the same research grants, the same faculty talent, the same quality students, and in a similar fashion for private annual giving.

The goal of this analysis is to identify research university performance, not to analyze relative funding or governance. Public and private institutions compete for the same research grants, the same faculty talent, the same high quality students, and in a similar fashion for private annual giving. The top categories of American research universities include both public and private institutions, and *TheCenter* conducts the evaluation of top universities without regard to ownership, although it presents the results for public and private universities separately.

Because we believe that the top universities have strength in research, private support, faculty, graduate and post-graduate programs, and quality undergraduates, the methodology we use for the evaluation considers all nine indicators described above. At the same time, the precise ranking of a university on these indicators is less important than their inclusion within the top groups. For this analysis, we defined the top category in terms of the performance of the top 25 public and the top 25 private institutions on each indicator. To create the groups of universities, we identified the universities that ranked among the top 25 on each of the nine measures, again taking public and private institutions separately. We then grouped the institutions by the number of indicators for which their performance put them in the top 25. Obviously, the choice of 25 as the top quality cohort is somewhat arbitrary. A smaller definition of the top cohort would have included fewer institutions and would also have left out some clearly significant research universities. A larger cohort would have created groups that, upon closer inspection, do not always share reasonably equivalent levels of quality.

The top category in the public and private lists, then, includes universities that rank in the top 25 on all nine of the indicators. These institutions have high levels of research funding (total and federal), substantial endowments and strong programs of annual giving, excellent faculty in the sciences and in the humanities and social sciences, strong doctoral and postdoctoral programs, and outstanding undergraduate students. The second group includes universities with eight of the nine indicators in the top 25, and so on for the rest of the groups in the public and private lists.

For the purposes of this analysis, *TheCenter* includes only research universities with at least $20 million in federal research expenditures per year. This number is somewhat less than the Carnegie Classification cutoff for Research I ($40 million) and somewhat more than Carnegie used for Research II ($15.5 million).



Forty-seven public universities and thirty-five private institutions have at least $20 million in federal research and appear in the top 25 on at least one of the measures. These 82 institutions meet our criteria and thus appear in the lists. Each of the criteria, described in detail below, contributes to an understanding of the breadth of performance needed for a top research university.

Total and Federal Research Expenditures

Even with research, however, we must settle for something less than a measurement of an institution's total research and creative productivity. The only comparable and reliable indicators of university research measure the dollars spent by the institution from research grants and contracts. These measures, while expressed in mostly comparable terms for all institutions, are less a complete measurement of the university's research than they are representative of that research. The reason for this distinction is that the dollar numbers for total and federal research expenditures (*TheCenter* uses both measures) do not reflect many other kinds of significant university research.

The data used come from the NSF annual *Survey of Scientific and Engineering Expenditures at Universities and Colleges.* They explicitly exclude non-science and engineering research in such fields as law, education, humanities, business, fine arts, and journalism. While historians, poets, literary scholars, some social scientists, and most artists and composers, for example, produce exceptional research and creative products, these activities do not appear in the indicators of total or federal research because of the methodology defined by NSF's survey.

An additional element involves the mix of disciplines even within the externally funded marketplace of science and engineering. Research in experimental physics, for example, requires large grants to deliver modest results. Research in theoretical physics or mathematics, in contrast, may well produce significant results with relatively small grants. Meanwhile, federal preferences for physical or biological science research may shift funding opportunities differentially among institutions.

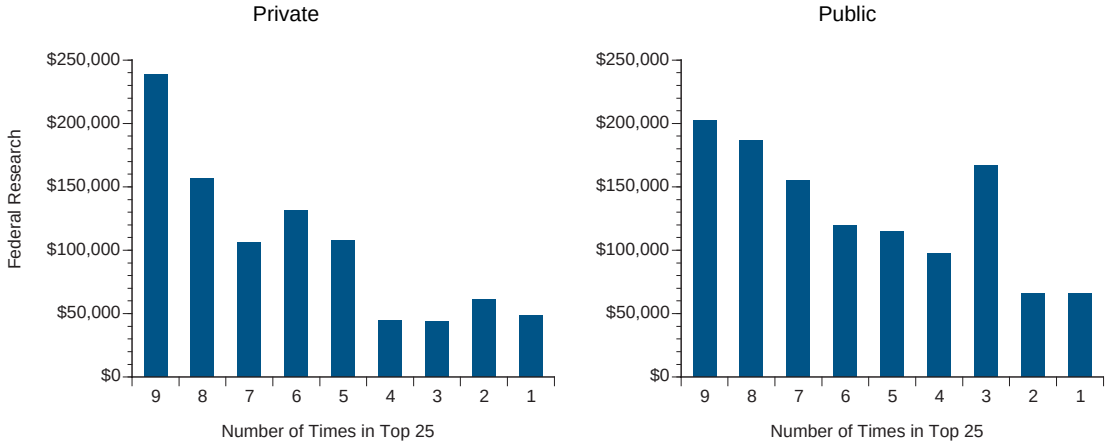
Finally, some forms of research in professional and other programs compete in an external marketplace that does not involve the university. For example, faculty in a business or engineering school may develop

The only comparable and reliable indicators of university research measure the dollars spent by the institution from research grants and contracts.

Median Federal Research, 1998

Private and Public Universities

(x $1,000)



research products within the context of relationships that pay consulting fees and reimburse expenses, which do not become part of the university's accounting system for grants and contracts.

Although these issues make the total and federal research numbers incomplete representations of research competitiveness, they nonetheless serve as good measures of an institution's overall commitment to and success in research. The numbers help us to understand the strength of research universities and provide two of the elements for grouping institutions. *TheCenter*'s approach to identifying top universities creates groups of institutions that demonstrate equivalent strength rather than sorting the institutions on a composite, weighted numerical scale.

While federal research expenditure is a relatively straightforward measure, the total research number requires some explanation. Total research includes all those expenditures on research reported by the university to NSF, including corporate, state, and local as well as federal sources. This number creates some potential for differential reporting by institution depending on the definition of local and state expenditures for research, but for the purposes of this clustering approach, the possible error does not appear too great. This research measure captures an important element of research for many institutions that have a large corporate support structure for their research or a mission that includes agricultural research funded by the state through a land-grant system.

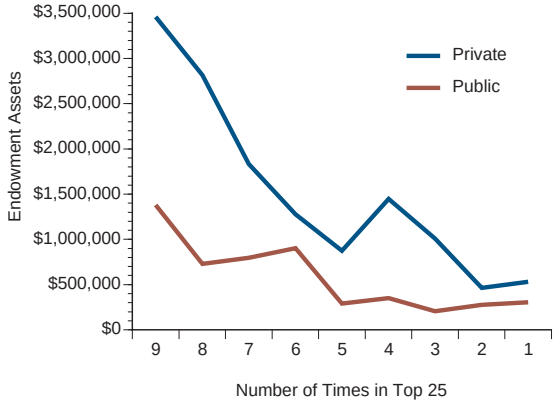
Private Support

The total financial resources of universities prove difficult to measure accurately given the wide diversity of mission and the varying structure of public and private funding sources in American research universities. Endowment

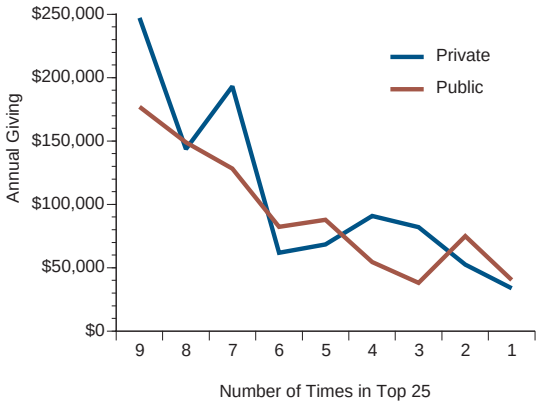
Median Endowment Assets, 1999

Private and Public University Groups

(x $1,000)



Median Annual Giving, 1999
Private and Public University Groups
(x $1,000)



assets capture a stable and common element in the financial resources of all research universities, both public and private. While private universities tend to have an economy that relies significantly on tuition revenue and endowment income, and public institutions receive significant tax-based support, all research universities devote considerable effort to raising private dollars. The endowments of public universities do not yet approach the level of private institutions, but within the context of public higher education, a university's endowment represents a significant source of revenue in support of research and quality education. This source of revenue is even more significant in the context of private research institutions. When looking at public and private universities separately, endowment serves as a useful indicator of an institution's available resources. Although endowments represent stable resources, their value at the end of each fiscal year also reflects the investment wisdom of managers and the portfolio composition of institutional endowment funds.

Endowment reflects generations of gifts and the investment growth of those gifts, not necessarily the current work of the university. *TheCenter*, then, also includes annual giving as one of its measures. All research universities commit themselves to the task of raising private money, and success in this competition serves as a useful indicator of the institution's ability to mobilize financial support from its many constituencies.

While these two measures serve as good references for institutional financial strength, they do so only within the separate contexts of public and private universities. Private universities with large endowments may appear better supported than they actually are in comparison to public universities with large tax-based contributions. Further complicating an evaluation of total financial strength, public and private universities often have very different mechanisms for acquiring capital investment for buildings and for funding the depreciation cost of those physical assets.

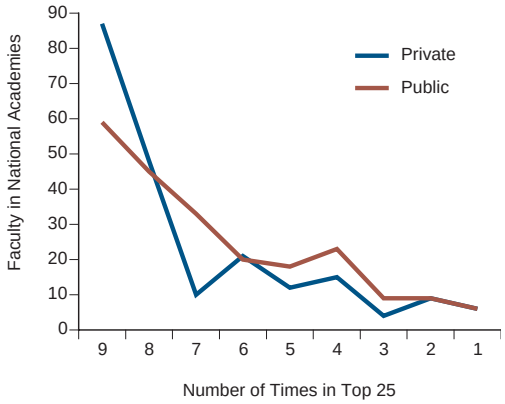
The measures of private support identify the success of the university in persuading its various constituencies that its programs represent a good investment.

Faculty quality, of course, is the primary source of the institution's strength as a competitive academic enterprise.

Faculty

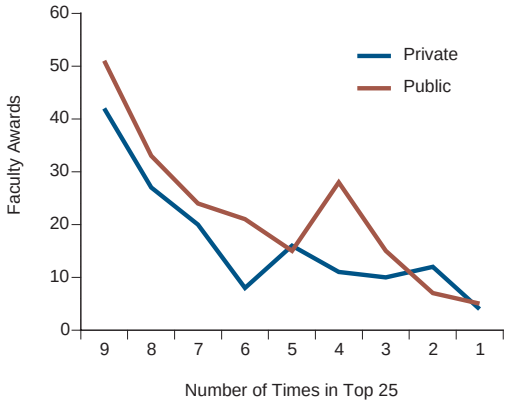
If research and private resources provide key measures for identifying America's top research universities, some other characteris-

Median Number of Faculty in National Academies, 1999
Private and Public University Groups



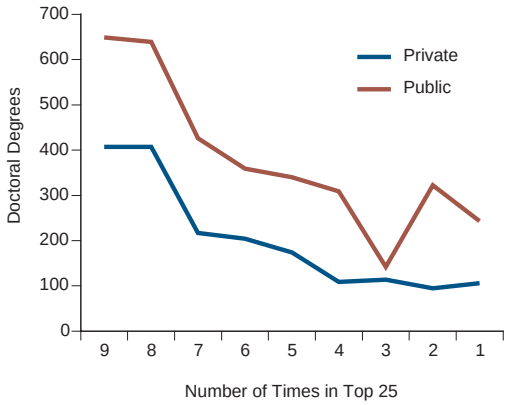
Median Number of Faculty Awards, 1999

Private and Public University Groups



Median Number of Doctorates, 1998

Private and Public University Groups



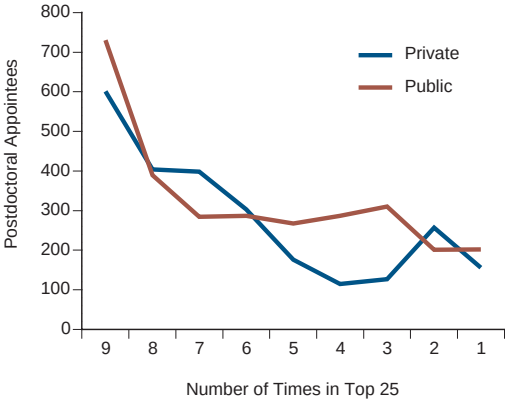
tics offer additional evidence of institutional quality for this analysis. Faculty quality, of course, is the primary source of the institution's strength as a competitive academic enterprise. While the research numbers offer an indication of the faculty's ability to compete for grants and contracts, the honors and awards of the faculty provide a somewhat different perspective on the institution's distinction and capture some elements of quality not reflected in the data on research expenditures. *TheCenter* uses two measures of faculty quality: membership in the three National Academies (National Academy of Sciences, National Academy of Engineering, and Institute of Medicine); and the number of faculty receiving a range of academic awards in the sciences, social sciences, humanities, and health professions. The Appendix lists the awards included in this analysis.

Advanced Training

Research universities not only produce research, they also make a major contribution to the education and training of the next generation of researchers. As an indicator of a university's participation in this activity, *TheCenter* counts the number of doctorates awarded and the number of postdoctoral positions supported. These measures serve as indicators of the strength of an institution's graduate and post-graduate education and research training activities. The number of postdoctoral appointees also reflects the strength of medical school research programs that often support many postdoctoral positions.

Median Number of Postdocs, 1998

Private and Public University Groups



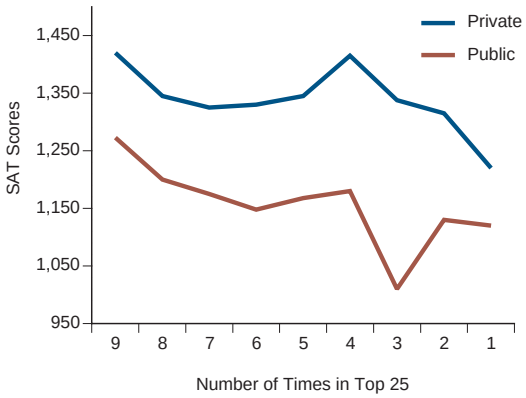
Undergraduates

While almost all of America's most successful research universities serve undergraduate student populations, the variation on this dimension is large. Public land-grant universities, for example, may have 30,000 undergraduates; smaller private universities may have 1,500 to 3,000; and specialized academic medical centers may have no undergraduates at all. Although *TheCenter* includes specialized medical centers in its evaluations since they are major competitors for faculty and research support, we make the judgment that a quality undergraduate program is an essential feature of America's top research universities.

The quality of undergraduate programs proves difficult to measure directly. The data on placement rates, persistence rates, and the like are often unreliable and difficult to acquire in consistent ways. These and other calculations, such as graduation rates, also fluctuate as a function of size, mission, geographic location, and ownership rather than as a function of quality or effectiveness.

We considered two possible measures of undergraduate quality: the median SAT scores and the number of National Merit and National Achievement Scholars in the entering class. Of these, the median SAT scores of the entering class offer the best general indicator of undergraduate quality. The number of National Merit and National Achievement Scholars varies depending partly on the size of the undergraduate population and partly on institutional policies that award special financial aid and scholarships to these students. The median SAT, while not a complete measure of student quality, is relatively standard because most institutions use it as part of the admissions process, and it is also less influenced by differences in undergraduate population size or financial aid practices. The median SAT scores for the top private universities are much higher than the scores for the top publics, reflecting the mission of public universities to provide access to a greater number of students.

Median SAT Scores, Fall 1999
Private and Public University Groups



The Purpose of The Top Universities

TheCenter's interest in this topic comes from the experience of observing universities and their supporters as they pursue improvement programs. Many universities want to get better, to improve their standing among their research university colleagues, and they have a keen interest in the variables that determine institutional performance. Traditional rankings that put universities in order by some weighted index of prestige, resources, or other categories do not help institutions to understand what makes research universities succeed. Sometimes the rankings fail to serve a useful purpose because they use inappropriate criteria. Primarily, however, the difficulty comes from the ranking and weighting process that, in its complexity, obscures the

relative strength of the institution's many elements.

In addition, weighted rank ordering – while it presents an easily referenced list – does not capture the complexity of American research university mission and performance. These rankings give the false impression that the precise order of institutions reflects precise differences. The very best universities excel in almost everything; very good universities excel in some things and perform less effectively in others. Aspiring research universities do well, but not at a level close to the top performers.

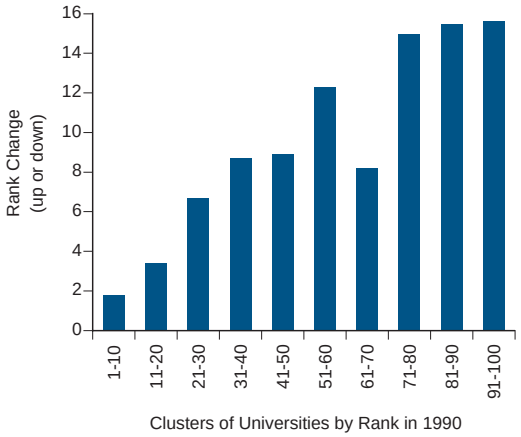
Successful research universities must have a constant, continuing commitment to competition and performance. Assertions about performance aspirations rarely have any effect unless accompanied by some sense of where an institution fits into the competitive structure of American higher education and unless supported by measurable indicators of comparative performance.

Successful research universities must have a constant, continuing commitment to competition supported by measurable indicators of comparative performance.

TheCenter's Top Universities provide that context and offer universities a reference for measuring their own achievement and clearly understanding the nature of the competition. When over-enthusiastic people assert institutional goals, such as reaching the top ten of American research universities by some not-too-distant date, they usually do so without understanding what this achievement actually entails. Research universities live in a highly competitive marketplace, and none of those in the top categories is likely to cease improving. This means that to get relatively better, a university must match and then exceed the growth of its competitors. This is a major challenge, and the indicators in these tables provide explicit reference points to measure this kind of success.

Average Absolute Change in Rank in Federal Research between 1990-1998

Top 100 Universities in 1990



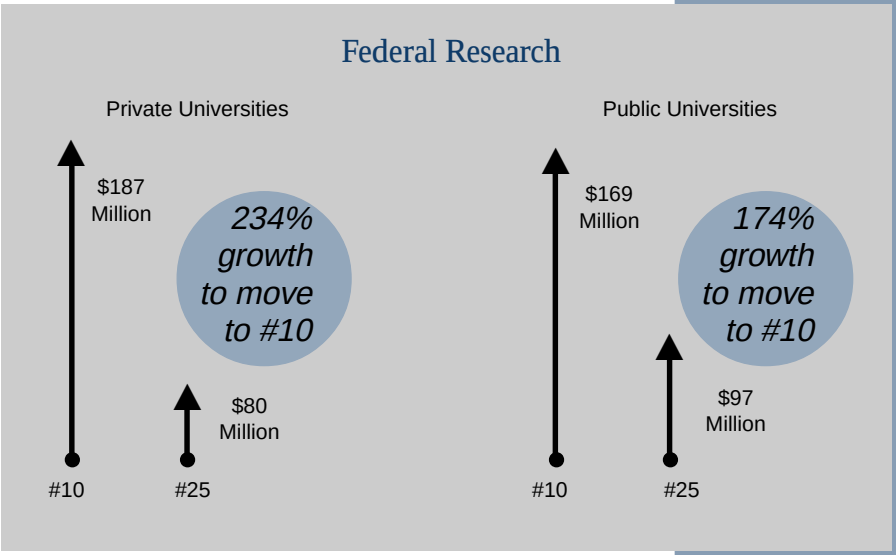
Although universities improve and decline in performance relative to each other, the patterns of change are much different in the top group than in the groups nearer the bottom of the table. In terms of federal research, for example, over a ten-year period, universities in the top groups change position infrequently. Members of these groups may move up or down by one position at most. In the bottom groups, however, universities change position by much larger margins.

This pattern reflects the increasingly greater intensity of the competition towards the top. Universities with $20 million of research can receive a few major grants and increase their spending by one or two million dollars over ten years and still improve their position, while other universities at similar levels of funding can easily lose the same amount of funding and decline. Institutions at the top, with $300 million or

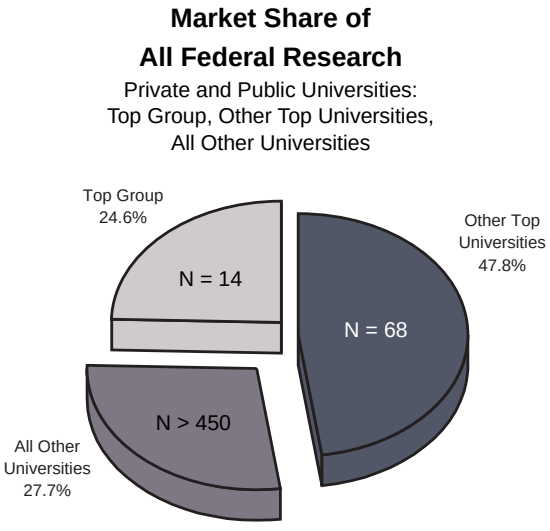
more of research, have so many people engaged in the research enterprise at such a high level that they rarely rise or decline much more than the other institutions in their group. This is partly because the scale of their research operations is so large that failures to win grants balance the successes in the acquisition of new grants.

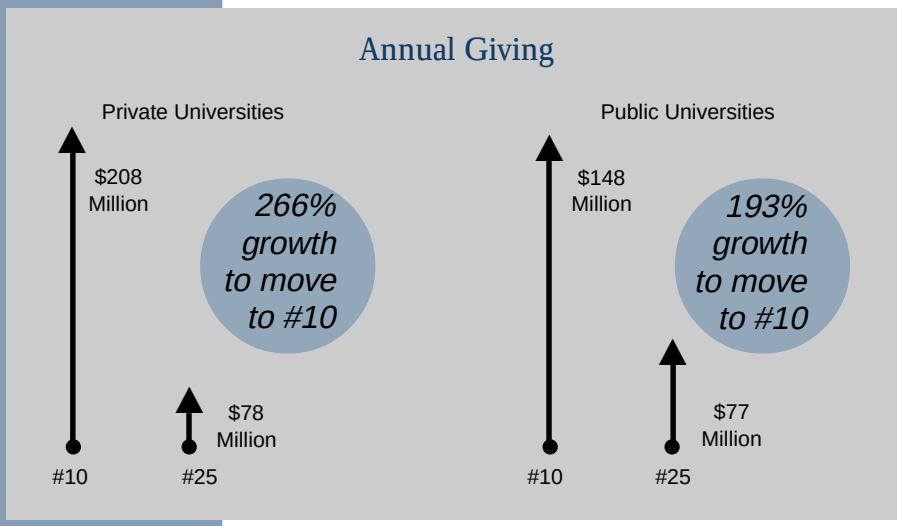
This group of universities also controls a large share of the federal research market. The relatively few universities identified by *TheCenter* as the very top group of universities (14 private and public universities) have 24.6% of the total federal research expenditures of all universities receiving federal funds. The other top universities in this study (68 private and public institutions) control 47.8% of the market, leaving all other private and public universities with a 27.7% market share. From another perspective, the 82 top universities included in this study have a 72% share of the total federal research expenditures reported by NSF for all universities in the country. The size of this group's participation in the research marketplace creates significant barriers to challenges from rising institutions, whether from outside the group included in this study or from the institutions included here but located at a considerable distance from the top group of institutions.

Another way of looking at this barrier is to isolate the federal research dollars among these very competitive institutions. The number 10 private university has about $187 million and number 25 has $80 million. To move from number 25 to number 10 in research performance would require the number 25 institution to more than double its research base. This would have to come, of course, from the market share of other institutions. On the public side, the number 10 public institution has $169 million and number 25 has $97 million. For the number 25 public university to move into the top ten will require an increase of 174%, again an increase that would have to come at the expense of other highly competitive institutions.



In the case that all universities are equally successful in gaining grants (which means that they all increase their grant volume by the percentage increase of the total pool), the top group of universities will continue to grow faster in total volume than the bottom groups. However, many universities in the





lower brackets grow faster in percentage terms than those in the upper brackets. This narrows the gap somewhat between the top institutions and those substantially below them in federal research. Recent increases in federal research spending have hovered around 8% per year. The rate of change required for a number 25 institution to make it into the top ten within ten years approaches 28% per year for a private university and 24.5% per year for a public institution. This represents a very challenging task and also explains the continued success of the top performers among research universities and the relative stability of American research university reputations.

If the competition at the top level seems daunting, movement at lower levels of the hierarchy is also challenging, despite the smaller margins of change. Among the private universities in this analysis, the institution with the least amount of federal research expenditures has about $23 million, and the number 25 institution has $80 million. For the last institution to reach the level of the number 25 institution, the faculty would need to more than triple their research productivity. For public institutions, the smallest federal research volume in this group is about $29 million and the 25th is $97 million, presenting the faculty of the public institution with a similar challenge of a more than threefold increase in research productivity.

Although large changes in the rank ordering of universities on many of these criteria appear difficult, smaller changes of one to three or four places on the list are well within the competitive capabilities of most institutions. Thus, a university that moves up from 25 to 23 in the federal research list has beaten some formidable competition. The university that sets a goal of moving from 25 to number 10 is probably engaged more in public relations than in academic competition or planning.

Similar calculations would produce similar results for other indicators in this study, although the dynamics differ. For example, the data show considerable volatility in the annual giving category as universities launch and complete successful capital campaigns. Even so, the range separating the fundraising capabilities of the top universities in this category from those in the middle is even larger than the range for research.

For the most recent year, the number 10 private institution raised about $208 million and number 25 brought in $78 million; the number 10 public institution gained about $148 million with number 25 raising about $77 million. For the 25th private university to achieve the fundraising success of the 10th most successful private institution, it would need to increase its annual giving by over two and a half times. For their public counterparts, the increase would need to be just under two times. Here, as in the case of research funding, the leading institutions do not stand still, but increase their annual giving every year. As a result, competitors

need not only to improve their own performance, they need to improve it by a factor larger than the improvement of their competitors.

We believe that universities have an organizational model that emphasizes self-replication. Institutions with large numbers of competitive faculty and students tend to replace these faculty and students with individuals of equivalent competitiveness. Those with less competitive faculty also replace themselves with less competitive faculty. Overall, and absent a strong drive for change, most institutions stay more or less the way they are: stable, competitive at their level, but unlikely to move dramatically without significant and unusual impetus.

This project to identify the top American research universities provides a frame of reference and the data to understand the structure of this segment of American higher education. This publication captures the current condition of these institutions, and subsequent editions will update the data as they become available. No observer is limited to the decisions and evaluations used here, for *TheCenter*'s web site provides all the data so others can construct and analyze the information for their own purposes.

As the work of *TheCenter* continues, additional publications will look at the process of change over the past decade that has produced the structure of research institutions outlined here.

Absent a strong drive for change, most institutions stay more or less the way they are: stable, competitive at their level, but unlikely to move dramatically without significant and unusual impetus.

Top Private Universities

Universities by Number of Measures in Top 25 of All Private Universities (Alphabetically within Groups)	No. of Measures in Top 25	Research				Private Support	
		Total Research 1998 x $1,000	Rank Total Research	Federal Research 1998 x $1,000	Rank Federal Research	Endowment Assets 1999 x $1,000	Rank Endow Assets
California Institute of Technology	9	$ 185,066	14	$ 177,748	11	$ 1,333,229	21
Columbia University	9	$ 267,007	10	$ 229,723	6	$ 3,636,621	8
Duke University	9	$ 282,388	7	$ 172,532	12	$ 1,678,728	17
Harvard University	9	$ 306,100	6	$ 251,876	4	$ 14,255,996	1
Johns Hopkins University	9	$ 853,620	1	$ 752,983	1	$ 1,520,793	19
Massachusetts Institute of Technology	9	$ 413,098	2	$ 310,741	3	$ 4,287,701	6
Northwestern University	9	$ 223,235	12	$ 127,911	15	$ 2,634,850	13
Stanford University	9	$ 410,309	3	$ 342,426	2	$ 6,005,211	4
University of Pennsylvania	9	$ 333,477	5	$ 247,914	5	$ 3,281,342	9
Yale University	9	$ 262,680	11	$ 205,046	7	$ 7,197,900	2
Cornell University	8	$ 363,511	4	$ 204,187	8	$ 2,869,103	11
New York University	8	$ 156,452	18	$ 101,426	22	$ 1,035,900	24
Princeton University	8	$ 115,996	25	$ 69,005	27	$ 6,469,200	3
University of Chicago	8	$ 151,635	19	$ 125,982	16	$ 2,762,686	12
University of Southern California	8	$ 268,806	9	$ 190,547	9	$ 1,589,833	18
Washington University	8	$ 269,550	8	$ 187,173	10	$ 3,761,686	7
Vanderbilt University	7	$ 135,214	22	$ 106,325	19	$ 1,831,766	15
Case Western Reserve University	6	$ 176,330	15	$ 132,274	13	$ 1,434,200	20
University of Rochester	6	$ 174,617	16	$ 130,773	14	$ 1,119,027	23
Baylor College of Medicine	5	$ 216,528	13	$ 110,610	18	$ 1,029,156	25
Boston University	5	$ 130,054	23	$ 104,428	20	$ 652,161	46
Carnegie Mellon University	5	$ 137,450	20	$ 95,046	23	$ 719,320	39
Emory University	5	$ 172,884	17	$ 118,045	17	$ 4,475,755	5
Brown University	4	$ 73,977	35	$ 44,412	36	$ 1,181,514	22
Dartmouth College	4	$ 64,964	37	$ 45,053	35	$ 1,710,585	16
Georgetown University	3	$ 116,611	24	$ 84,801	24	$ 684,193	40
Rice University	3	$ 41,067	42	$ 34,772	40	$ 2,936,622	10
Rockefeller University	3	$ 115,494	26	$ 43,845	37	$ 1,007,600	27
University of Miami	3	$ 136,972	21	$ 101,492	21	$ 428,571	64
University of Notre Dame	3	$ 28,873	48	$ 23,053	47	$ 1,984,256	14
Brandeis University	2	$ 44,589	41	$ 28,098	43	$ 355,012	78
Tufts University	2	$ 92,130	30	$ 61,167	29	$ 464,107	61
Yeshiva University	2	$ 99,000	28	$ 80,000	25	$ 674,833	44
George Washington University	1	$ 74,481	34	$ 45,072	34	$ 673,589	45
Thomas Jefferson University	1	$ 69,460	36	$ 51,728	33	$ 384,973	71

Private Support		Faculty				Advanced Training				Undergraduate	
Annual Giving 1999 x $1,000	Rank Annual Giving	National Academy Members 1998-99	Rank National Academy	Faculty Awards 1999	Rank Faculty Awards	Doctorates Granted 1998	Rank Doctorates	Post Docs 1998	Rank Post Docs	Median SAT Fall 1998	Rank SAT
$ 138,091	15	92	5	19	17	195	23	471	9	1495	1
$ 284,487	5	70	9	38	8	469	7	379	13	1370	22
$ 330,992	3	38	13	38	8	238	17	730	5	1395	15
$ 451,672	1	250	1	69	1	803	1	3407	1	1485	2
$ 206,973	11	61	10	42	6	360	13	1006	3	1385	19
$ 208,437	10	227	3	42	6	520	4	456	10	1480	3
$ 144,550	14	33	15	25	14	377	10	258	22	1370	22
$ 319,590	4	230	2	67	2	606	2	1089	2	1445	7
$ 270,061	6	82	6	50	4	436	9	904	4	1390	17
$ 224,443	8	98	4	61	3	365	12	203	25	1450	6
$ 341,359	2	75	7	27	11	505	6	554	7	1355	26
$ 128,044	16	25	17	27	11	446	8	329	15	1315	47
$ 159,080	13	74	8	26	13	263	15	319	16	1465	4
$ 120,663	17	59	11	43	5	368	11	281	20	1355	26
$ 216,784	9	36	14	16	19	515	5	479	8	1240	93
$ 114,367	20	33	15	34	10	212	21	623	6	1335	35
$ 193,183	12	10	27	20	16	217	20	398	12	1325	42
$ 75,342	27	22	18	10	26	187	25	318	17	1355	26
$ 48,321	41	19	20	6	33	220	19	287	19	1305	52
$ 63,647	33	10	27	15	21	49	79	406	11	NA	
$ 73,375	29	14	23	16	19	307	14	98	33	1260	73
$ 40,814	51	21	19	5	36	203	22	150	29	1370	22
$ 233,900	7	8	31	17	18	144	28	201	26	1345	32
$ 75,090	28	16	22	13	22	174	26	155	28	1395	15
$ 106,893	22	13	24	9	29	44	84	74	37	1435	8
$ 82,078	24	4	37	7	31	79	54	80	35	1355	26
$ 78,362	26	18	21	10	26	114	39	127	30	1420	10
$ 53,198	38	40	12	24	15	24	127	225	24	NA	
$ 85,736	23	1	48	7	31	136	29	186	27	1155	189
$ 113,527	21	2	45	12	24	118	36	89	34	1320	43
$ 43,534	48	12	25	13	22	95	46	79	36	1315	47
$ 52,555	39	4	37	12	24	82	53	257	23	1335	35
$ 65,383	30	9	29	8	30	100	42	369	14	1260	73
$ 44,019	46	7	32	5	36	193	24	37	46	1220	104
$ 23,400	73	5	34	2	69	19	141	274	21	NA	

Top Public Universities

Universities by Number of Measures in Top 25 of All Public Universities (Alphabetically within Groups)	No. of Measures in Top 25	Research				Private Support	
		Total Research 1998 x $1,000	Rank Total Research	Federal Research 1998 x $1,000	Rank Federal Research	Endowment Assets 1999 x $1,000	Rank Endow Assets
University of California - Berkeley	9	$ 420,435	5	$ 171,135	9	$ 1,654,557	3
University of California - Los Angeles	9	$ 447,367	2	$ 233,702	5	$ 1,103,038	7
University of Michigan - Ann Arbor	9	$ 496,761	1	$ 311,450	2	$ 2,424,588	2
University of North Carolina - Chapel Hill	9	$ 235,296	19	$ 171,505	8	$ 925,746	10
Pennsylvania State University - University Park	8	$ 319,126	11	$ 163,921	14	$ 712,967	17
University of Florida	8	$ 274,862	15	$ 106,510	23	$ 601,813	21
University of Illinois - Urbana-Champaign	8	$ 338,841	10	$ 168,871	10	$ 612,430	20
University of Minnesota - Twin Cities	8	$ 345,910	9	$ 204,741	7	$ 1,283,934	5
University of Washington - Seattle	8	$ 432,383	4	$ 336,748	1	$ 745,217	16
University of Wisconsin - Madison	8	$ 443,695	3	$ 240,513	4	$ 909,834	11
Texas A&M University	7	$ 393,720	7	$ 144,938	16	$ 3,596,759	1
University of California - San Francisco	7	$ 379,970	8	$ 219,912	6	$ 701,933	18
University of Iowa	7	$ 199,063	25	$ 115,312	20	$ 476,800	22
University of Texas - Austin	7	$ 244,843	18	$ 165,082	13	$ 894,113	13
Georgia Institute of Technology	6	$ 259,233	16	$ 113,643	22	$ 948,600	9
Ohio State University - Columbus	6	$ 301,518	13	$ 124,177	19	$ 1,086,350	8
Purdue University - West Lafayette	6	$ 216,479	23	$ 92,844	27	$ 1,222,411	6
University of Arizona	6	$ 302,328	12	$ 161,999	15	$ 272,950	42
University of California - Davis	6	$ 288,796	14	$ 114,912	21	$ 300,828	39
University of California - San Diego	6	$ 418,790	6	$ 262,303	3	$ 200,552	64
University of Pittsburgh - Pittsburgh	6	$ 213,842	24	$ 168,511	11	$ 854,840	14
University of Virginia	6	$ 133,049	46	$ 93,328	26	$ 1,398,068	4
University of Maryland - College Park	5	$ 223,190	21	$ 129,198	18	$ 314,183	38
University of Utah	5	$ 142,956	37	$ 100,722	24	$ 269,430	43
Rutgers the State University of NJ - New Brunswick	4	$ 137,937	43	$ 48,880	57	$ 350,741	30
University of Colorado - Boulder	4	$ 186,211	27	$ 137,241	17	$ 195,585	66
University of Texas SW Medical Center - Dallas	4	$ 153,711	32	$ 97,200	25	$ 406,415	26
University of Alabama - Birmingham	3	$ 227,720	20	$ 166,830	12	$ 205,860	59
Indiana University - Bloomington	2	$ 68,702	80	$ 38,336	69	$ 400,000	27
Michigan State University	2	$ 193,611	26	$ 81,146	35	$ 265,238	45
North Carolina State University	2	$ 254,254	17	$ 79,533	37	$ 275,532	41
University at Stony Brook	2	$ 141,766	38	$ 91,531	28	$ 22,383	171
University of California - Irvine	2	$ 130,415	47	$ 65,902	44	$ 100,276	96
University of Georgia	2	$ 217,945	22	$ 54,712	53	$ 334,534	35
University of Nebraska - Lincoln	2	$ 118,857	50	$ 41,888	66	$ 416,340	25
Iowa State University	1	$ 156,766	31	$ 51,196	55	$ 266,348	44
University at Buffalo	1	$ 151,650	34	$ 76,037	39	$ 438,002	23
University of California - Santa Barbara	1	$ 96,034	57	$ 68,408	43	$ 100,276	96
University of Cincinnati - Cincinnati	1	$ 159,695	30	$ 90,307	29	$ 898,976	12
University of Colorado Health Sciences Center	1	$ 121,624	49	$ 89,022	30	$ 97,793	99
University of Delaware	1	$ 69,896	79	$ 33,688	73	$ 777,349	15
University of Illinois - Chicago	1	$ 151,739	33	$ 73,797	40	$ 204,143	60
University of Kansas - Lawrence	1	$ 66,756	82	$ 28,823	80	$ 613,338	19
University of Texas MD Anderson Cancer Center	1	$ 141,260	39	$ 63,074	45	$ 162,566	71
University of Texas Medical Branch - Galveston	1	$ 86,488	67	$ 48,588	58	$ 243,849	51
Virginia Polytechnic Institute and State University	1	$ 167,118	28	$ 82,734	33	$ 340,244	33
Washington State University - Pullman	1	$ 95,422	58	$ 44,510	61	$ 421,402	24

Private Support		Faculty				Advanced Training				Undergraduate	
Annual Giving 1999 x $1,000	Rank Annual Giving	National Academy Members 1998-99	Rank National Academy	Faculty Awards 1999	Rank Faculty Awards	Doctorates Granted 1998	Rank Doctorates	Post Docs 1998	Rank Post Docs	Median SAT Fall 1998	Rank SAT
$ 184,231	4	188	1	56	2	756	3	945	4	1340	1
$ 208,204	3	64	5	61	1	607	8	813	5	1275	8
$ 169,914	5	53	8	45	3	690	6	646	6	1270	9
$ 148,310	10	35	11	26	12	382	18	559	7	1235	17
$ 135,948	11	22	17	23	16	571	9	212	38	1205	25
$ 135,389	12	15	26	25	14	456	14	312	16	1245	14
$ 105,480	18	54	7	30	8	706	5	255	26	1230	19
$ 161,966	6	36	10	28	9	729	4	532	8	1165	43
$ 210,745	2	70	3	42	4	479	12	953	3	1155	50
$ 245,382	1	66	4	36	6	757	2	465	10	1195	32
$ 123,580	16	13	28	18	24	525	10	293	20	1170	42
$ 151,700	9	60	6	41	5	91	87	1165	1	NA	
$ 81,512	23	14	27	22	18	327	25	274	25	1175	40
$ 132,940	13	51	9	26	12	836	1	246	27	1200	29
$ 82,702	21	18	23	6	55	263	42	0	192	1310	2
$ 153,437	8	11	32	25	14	636	7	218	36	1130	67
$ 81,964	22	20	18	23	16	496	11	231	35	1100	93
$ 76,839	25	25	13	11	34	411	16	478	9	1100	93
$ 53,229	38	24	15	20	21	337	23	292	21	1160	45
$ 114,736	17	85	2	36	6	310	27	982	2	1180	38
$ 65,574	29	13	28	20	21	380	19	393	13	1135	61
$ 132,184	14	20	18	21	20	302	30	281	24	1310	2
$ 50,309	43	19	22	11	34	474	13	237	30	1205	25
$ 125,544	15	17	25	18	24	205	51	296	19	1130	67
$ 54,567	36	23	16	22	18	402	17	171	45	1205	25
$ 51,873	40	25	13	28	9	309	28	287	22	1155	50
$ 64,393	31	20	18	28	9	65	112	400	11	NA	
$ 38,095	57	9	36	15	27	142	70	310	17	1010	227
$ 79,718	24	7	38	13	30	361	21	175	44	1130	67
$ 104,136	19	7	38	10	39	451	15	234	33	1110	83
$ 74,999	26	18	23	6	55	322	26	145	52	1155	50
$ 11,583	123	13	28	20	21	265	40	345	14	1110	83
$ 48,545	45	20	18	6	55	197	54	302	18	1125	72
$ 42,534	50	9	36	6	55	369	20	201	42	1190	34
$ 155,000	7	2	68	7	51	282	36	106	64	1145	54
$ 49,490	44	7	38	4	82	300	31	185	43	1210	22
$ 16,759	99	5	48	14	29	295	33	236	32	1120	76
$ 19,435	91	30	12	15	27	264	41	166	47	1165	43
$ 40,765	53	2	68	12	33	274	39	218	36	1050	152
$ 25,937	77	6	46	11	34	61	115	344	15	NA	
$ 40,107	55	10	33	5	65	142	70	123	58	1135	61
$ 35,160	59	5	48	18	24	222	48	239	28	1050	152
$ 64,736	30	5	48	4	82	278	37	130	57	1110	83
$ 63,189	33	1	76	1	162	0	236	399	12	NA	
$ 24,380	81	1	76	1	162	30	150	285	23	NA	
$ 71,373	28	10	33	5	65	349	22	101	67	1160	45
$ 41,268	51	7	38	5	65	170	58	151	51	1050	152

Other Data Elements

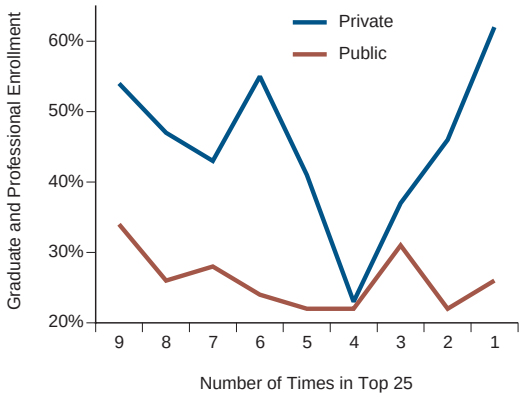
The purpose of this study is to talk about research universities. The issue that matters for us is to discover measures that identify America's strongest research universities. The emphasis on this perspective is critical, for universities have many other values and products. Some of us may want to know which universities have the most effective and ethnically diverse undergraduate programs, which ones place most of their students in high paying jobs, which institutions have the best programs in community service, which institutions do the best job of teaching values. Those are separate questions not addressed here.

TheCenter recognizes that the measures in the preceding tables do not fully capture the range of institutional characteristics that may be of importance to some audiences. For that reason, although we use the nine measures for the identification of the Top Research Universities, we also collect additional data on a wide range of other institutional characteristics related largely to questions of the size and composition of the various institutions. *TheCenter* provides the data used in the Top Research Universities evaluation and the other data elements in files, accessible from *TheCenter* web site [http://thecenter.ufl.edu], so that colleagues can develop their own evaluations and emphasize issues of importance for particular institutional priorities.

Within this context, *TheCenter* provides data online for all universities with over $20 million of federal research expenditures. The data in this set include the following indicators, in addition to the nine measures: institutional ownership (private or public); medical school (yes or no); enrollment (undergraduate, professional, graduate by full- and part-time); and National Merit and National Achievement Scholars.

Median Percent Graduate and Professional Fall 1998 Enrollment

Private and Public University Groups

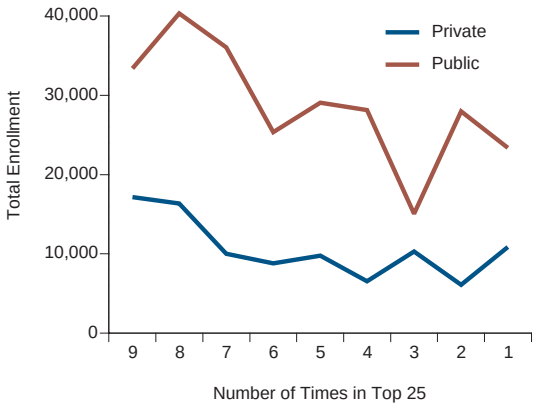


Size and Composition

TheCenter does not use the institution's absolute size as an indicator, whether in terms of budget or undergraduate student population or total faculty and staff. Such institutional characteristics are important in other contexts, but our focus is on elements of research quality and productivity. This is a complex issue, of course, because large universities often have resources unavailable to smaller institutions to compete for quality faculty. At the same time, large universities, and particularly public institutions, often perform a wide range of functions that do not contribute to the research distinction of the institution. They may do agricultural extension; they may perform community

Median Total Enrollment, Fall 1998

Private and Public University Groups



service; they may teach large numbers of undergraduates; and they may have significant programs in various forms of continuing or distance education. All these represent important and useful services, and although they often require faculty to support the effort, their existence does not necessarily increase or decrease the academic research quality of the institution.

In addition, while there is clearly a difference between the percentage of graduate and professional students in private and public universities, the differences, once the institution is above the mid 20% range for publics and the 40% range for privates, most likely reflect disciplinary emphasis and distribution rather than differential success as research institutions.

Schools and Colleges

Other institutional characteristics attract our attention as well. Some research institutions have medical schools and own hospitals, others have medical schools only, and some have no medical school at all. While a medical school can be a source of outstanding research faculty and produce a considerable volume of high quality research, not all universities that have medical schools become significant research institutions and some universities without medical schools compete very effectively on academic quality and productivity. In addition, the distribution of disciplinary focus will vary depending on how a university organizes its faculty and delivers its instruction and research.

Institutions with strong research programs in agriculture, engineering, and medicine tend to have many of their research faculty in the life and other sciences located in these programs rather than in colleges of arts and sciences. Institutions without those programs will see much more research in colleges of arts and sciences. In some institutions, economics research takes place in business schools; in others it occurs in the economics department of arts and sciences colleges; and in some, it takes place in all of these as well as in certain programs in agriculture.

American research universities vary considerably in their internal organization so that metrics focusing on faculty size, student size, specific college productivity, and the like, will often prove less useful than anticipated.

Sources of Funding

Universities also vary considerably in the sources of funding and the size of institutional budgets. Large public research universities can often have total budgets of approximately $1 to $2 billion while outstanding private research universities may have budgets that do not reach a billion dollars. Again, these differences represent many things, only some of which affect the research productivity and the quality of the institution. Universities may support extensive athletic programs with budgets that reach into the $30 million range and beyond. Public institutions may carry on agricultural extension work or support statewide library services, and in many cases, they teach very large undergraduate student populations. All of these functions increase the budget and faculty size, but they often do not enhance the university's research capability.

If an institution owns and operates a hospital, that budget may form part of the institutional resources. Public universities often receive substantial income from public funds, while their private counterparts draw more heavily on income from large endowments and high tuition. Even within the category of public universities, the distribu-

Research universities vary considerably in their organization so that metrics focusing on faculty size, student size, and college productivity will often prove less useful than anticipated.

tion of funding sources between public funds, private gifts and endowments, and student tuition varies widely. Comparisons of such indicators as budget per student or budget per faculty member, because they combine many dissimilar entities and purposes, produce data of marginal usefulness and deceptive meaning.

Another source of revenue comes from earnings on patents, licenses, and royalties. While some institutions have a diversified portfolio of patents, licenses, and royalties that reflects the breadth of their research, many other institutions with significant revenue in this category rely on a very few exceptionally successful items. Moreover, in some cases, large income reflects the value of a trade name, on a royalty basis, rather than the value of a scientific invention based on a patent. Patents, of course, have a limited lifespan, but royalties on trademarks last as long as a market exists for the branded product. The research strength of the institution appears to be more accurately reflected in the total and federal research expenditure indicators.

In reputational surveys, the opinions often do not reflect actual current performance. They are not necessarily wrong; they are just unreliable and insensitive to institutional change.

Institutional Reputation

Then there is the question of reputation. Many university rankings rely on various forms of reputation assessment. Usually based upon survey data, the reputation of a university comes from the opinions of presumably informed academic observers. In most cases, the reputations of institutions in the top rank of American universities have a basis in performance, often with reference to undergraduate student quality and undergraduate program prestige that may very well match objective data.

However, when a reputation survey includes more than twenty or so institutions, we should view the validity of the ranking with considerable skepticism. Most academics do not know much about more than ten or fifteen universities. They may have a good idea about Berkeley, Michigan, Yale, Harvard, Hopkins, and Illinois (and a variety of small prestigious liberal arts colleges such as Grinnell, Pomona, or Swarthmore). Many observers, however, may not have a clear understanding of the differences between the University of California at Santa Barbara and the University of California at Santa Cruz or between Brown and Rice.

Furthermore, much opinion about university quality reflects wisdom acquired at one point in time and rarely reassessed. For example, once people have a clear sense that Berkeley is a great institution, they rarely reassess this judgment over time by reviewing any objective data about Berkeley's subsequent performance. Is Berkeley getting better, is it declining, and if so, on what basis do we make such a judgment? In such surveys, the opinions generated often do not reflect the actual current performance of the institution. Reputation rankings are not necessarily wrong; they are just unreliable and insensitive to institutional change.

For America's best research universities, this may not matter, since these institutions do not change much over time. However, for the institutions below the top ten or fifteen public or private institutions, and for the many more quality universities not included in this study, reputation does not accurately reflect either performance or improvement.

Average Faculty Productivity

Some have approached the issue of evaluating universities from the perspective of average productivity; that is, how much research or other productivity does an institution generate per faculty member. Such analysis, while attractive in theory, fails in practice. As outlined above, universities differ dramatically

in their size and composition; in the functions they perform; and in the ways they define faculty and non-faculty. Reliable data for an approximation of average faculty productivity by institution simply do not exist. The major source of data for faculty numbers is IPEDS (Integrated Postsecondary Education Data System, U.S. Department of Education), and institutions should theoretically report their faculty numbers using the same criteria. Unfortunately, institutional definitions of faculty categories differ so much that not only are the data inconsistent between institutions, but the definitions used vary within each institution by program and by year. Some subsets of undergraduate colleges with similar student populations and similar disciplinary distributions might find such an analysis of value, but for America's research universities, this kind of analysis obscures more than it reveals.

By using inappropriate measures, such a methodology catapults unexpected institutions to high ranks by virtue of a different system of counting faculty than is used by other institutions in the same cohort. To give but a simple example, imagine two universities with $100 million in research grants and contracts. Both report 2,000 faculty members, and in productivity terms, they each generate $50,000 of research per faculty member. Are they equally productive? No, because one university counts librarians in its faculty and the other one does not. This example is but a one-dimensional illustration of the complex reality that underlies the deceptively simple data element: number of faculty.

National Merit and Achievement Scholars

The National Merit Scholarship Corporation (NMSC) is an independent, non-profit organization that awards scholarships to the nation's outstanding high school seniors based on their academic achievement; qualifying test scores; high school principal and counselor recommendations; and their activities, interests, and goals. The NMSC names approximately 14,000 National Merit Finalists each February. Of these, about one-half will receive a National Merit $2,000 Scholarship, a corporate-sponsored scholarship, or a college-sponsored scholarship.

National Achievement Scholars are selected and funded in a similar fashion and represent the nation's outstanding African-American students. Ideally, the National Hispanic Scholars Program should also be included in this category, but they do not track the enrollment of their scholarship winners. Should they do so in the future, we will include these students in *TheCenter*'s data. *TheCenter*'s data, available on the web, credit Merit and Achievement scholarships to the main campus if the National Merit Scholarship Corporation Annual Report does not indicate a branch campus.

While the number of National Merit and National Achievement award winners in the entering class provides an indication of the attractiveness of a university's undergraduate program to outstanding students, it is also an indicator that is sensitive to institutional policies on financial aid. Because the number of merit scholars is small, relatively small changes in institutional aid policies can have a significant impact on the number of National Merit Scholars enrolling in institutions. The average SAT score provides a broader based and more reliable measure of overall undergraduate quality, and for those reasons we prefer the SAT scores to the number of National Merit and Achievement Scholars as an indicator of undergraduate quality.

Reliable data for an approximation of average faculty productivity by institution simply do not exist. For America's research universities, this kind of analysis obscures more than it reveals.

Appendices

The following materials provide a review of the sources, notes, and adjustments for the Top Universities tables.

Source Notes for the Nine Measures

Total Research Expenditures

Federal Research Expenditures

Endowment Assets

Annual Giving

National Academy Members

Faculty Awards

Doctorates Awarded

Postdoctoral Appointees

SAT Scores

Data Notes for Private Universities

Data Adjustments for Public Universities

Source Notes for the Nine Measures

Total Research Expenditures
Federal Research Expenditures

Source: NSF/SRS Survey of R&D Expenditures at Universities and Colleges, FY 1998.

Each year the National Science Foundation (NSF) collects data from hundreds of academic institutions on expenditures for research and development in science and engineering fields by source of funds (e.g. federal government, state and local government, industry, etc.). These data are the primary source of information on academic R&D expenditures in the U.S. Included in this survey are all activities specifically organized to produce research outcomes that are separately budgeted and accounted for. This "organized research" may be funded by an external agency or organization ("sponsored research") or by a separately budgeted organizational unit within the institution ("university research"). Excluded from this report are activities sponsored by external agencies that involve training and instruction (except training in research techniques, which is considered organized research), and health service, community service, or extension service projects.

All Federally Funded Research Labs (FFRLs) are excluded from these academic expenditures data, including the following: Jet Propulsion Laboratory (California Institute of Technology); Los Alamos National Lab; Lawrence Livermore Lab; Lawrence Berkeley Lab (University of California); Software Engineering Institute (Carnegie Mellon); Argonne National Laboratory (University of Chicago); National Astronomy and Ionospheric Center (Cornell); Ames Laboratory (Iowa State University); Lincoln Laboratory (MIT); Plasma Physics Lab (Princeton); and Linear Accelerator Center (Stanford). The Applied Physics Lab (APL) at Johns Hopkins is no longer classified as an FFRL, but the vast majority of research conducted there is federally funded. The APL makes up about one-half of Johns Hopkins' total R&D expenditures and nearly sixty percent of their federal R&D expenditures.

While inconsistencies in reporting (known and unknown) do exist here, as in any survey of this type, problems arise mostly when one breaks out the data by source of funds. NSF expects institutions to use year-end accounting records to complete this report, and there are nationally recognized accounting guidelines for higher education institutions. However, there are also countless variations in institutional policy that determine whether a particular expenditure is reported as coming from one source or another, or possibly not counted at all. Take federal formula funds for agriculture (e.g. Hatch-McIntire, Smith-Lever) as an example. We conducted an informal survey of the appropriate institutions in the Association of American Universities (AAU) and found that two out of eleven land-grants did not include any of these federal funds in their 1997 NSF data, while others included all or some of these monies. Because these funds make up a very small percentage of the total research expenditures in any given year, the impact on our total research rankings is slight. It will have a somewhat greater, but still small, impact on the federal research rankings. NSF notes, "An increasing number of institutions have linkages with industry and foundations via subcontracts, thus complicating the identification of funding source. In addition, institutional policy may

determine whether unrestricted state support is reported as state or as institutional funds."[1]

We believe the reporting inconsistencies in the data are relatively minor when using the total research expenditures and the federal research component. Federal and state government audits of institutional accounting make deceptive practices highly unlikely, even though these entities do not audit the NSF data directly. NSF goes to great lengths to verify the accuracy of the data, especially federal expenditure data—checking them against several other federal agencies that collect the same or similar information. In fact, all major federal agencies and their subdivisions submit data to NSF, identifying research obligations to universities each year. Historically, the NSF data have tracked very closely university-reported data.[2] Further, for their National Patterns of R&D Resources series, NSF prefers to use the figures reported by the performers of the work (that is, academic institutions, industry, nonprofits) because they believe the performers are in the best position to accurately report these expenditures.

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1. Academic R&D Expenditures, FY 1996: Technical Notes *(Online: http://www.nsf.gov/sbe/srs/nsf98304/secta.htm)*
2. National Patterns of R&D Resources, 1996: Technical Notes *(Online: http://www.nsf.gov/sbe/srs/nsf96333/append.htm)*

Endowment Assets

Source: NACUBO Endowment Study as reported in the *Chronicle of Higher Education*, endowment market value as of June 30, 1999.

Institutions report the market value of their endowment assets as of June 30 to three different sources, and they quite often use three different values. For this project we use the National Association of College and University Business Officers (NACUBO) Endowment Study because of NACUBO's long history of reporting endowments of higher education institutions, their emphasis on using audited financial statements, and their focus on net assets (i.e., includes returns on investments and excludes investment fees and other withdrawals). NACUBO conducts its study annually and reports the results each February in the *Chronicle of Higher Education*.

Another source for data on endowment assets is the Council for Aid to Education's (CAE) annual Voluntary Support of Education (VSE) survey, co-sponsored by the Council for Advancement and Support of Education (CASE) and the National Association of Independent Schools. The VSE survey is useful as a secondary resource because it provides the most single-campus data of the three sources. For those institutions that report a system-wide total to NACUBO, we use the VSE data to calculate a campus percentage contribution to the entire system—applying that factor to the NACUBO figure.

The NCES IPEDS Finance Survey also collects information on endowment assets, but these figures are often quite lower than the two other sources and also are available much later. Although IPEDS instructions say to report endowment assets for "the institution and any of its foundations or affiliated organizations," it appears that not all institutions do so.

The fact that the NACUBO study requests net assets while IPEDS and the VSE survey request gross assets cannot explain the large differences found in some cases. In contacting various institutions, we found it very difficult to determine exactly why the numbers vary so greatly. Oftentimes, two or more individuals at an institution indepen-

dently report figures for these three reports, with no clear understanding of how or why the numbers differ. An examination of the 1997 endowment figures provided by these institutions showed only one university (University of North Carolina-Chapel Hill) that submitted the same figure to each of the three organizations. We discovered no consistent pattern to explain reporting variations among the institutions. This area definitely warrants more study.

Annual Giving

Source: Council for Aid to Education's Voluntary Support of Education (VSE) Survey, FY 1999.

The Council for Aid to Education, an independent subsidiary of RAND, has produced The Voluntary Support of Education (VSE) Survey since 1986. The annual giving data include all contributions actually received during the institution's fiscal year in the form of cash; securities; company products; and other property from alumni, non-alumni individuals, corporations, foundations, religious organizations, and other groups. Not included in the totals are public funds, earnings on investments held by the institution, and unfulfilled pledges.

CAE's VSE Data Miner service provides the last 10 years of data on all participating institutions online. Although this is a subscription-based service and requires a user id and password, a free week-long trial offer is available at [http://www.cae.org/dataminer.home.html].

National Academy Members

Source: National Academy of Sciences, National Academy of Engineering, and Institute of Medicine membership directories for 1999.

One of the highest honors that academic faculty can receive is membership in the National Academy of Sciences (NAS), National Academy of Engineering (NAE), or the Institute of Medicine (IOM). All three are private, nonprofit organizations and serve as advisors to the federal government on science, technology, and medicine. Nominated and voted on by existing members, newly elected members of these organizations receive life terms. Individuals elected to membership come from all sectors—academia, industry, government, and not-for-profit agencies or organizations. Member election dates are in February (NAE), April (NAS), and October (IOM).

The data collected for these rankings use active or emeritus members at their affiliated work institution, as reported in the online membership directories. In all cases, we were able to determine the specific campus for individual members. We re-check institutional affiliation annually to account for established members who have changed employers or whose membership is no longer active.

Faculty Awards in the Arts, Humanities, Science, Engineering and Health

Source: Directories or web-based listings for multiple agencies or organizations.

For this category, we collected data from several prominent grant and fellowship programs in the arts, humanities, science, engineering, and health fields. Included in this measure:

- American Council of Learned Societies (ACLS) Fellows, 1998-99
- Beckman Young Investigators, 1999
- Burroughs-Wellcome Fund, 1999
- Cottrell Scholars, 1999
- Fulbright American Scholars, 1999-00
- Getty Scholars in Residence, 1999-00
- Guggenheim Fellows, 1999
- Howard Hughes Medical Institute Investigators, 1998-99
- Lasker Medical Research Awards, 1999
- MacArthur Foundation Fellows, 1999
- National Endowment for the Humanities (NEH) Fellows, 1999-00
- National Humanities Center Fellows, 1999-00
- NIH MERIT (R37) and Outstanding Young Investigator (R35), FY 1999
- National Medal of Science and National Medal of Technology, 1999
- Newberry Library Long-term Fellows, 1999-00
- Pew Scholars in Biomedicine, 1999
- Presidential Early Career Awards for Scientists and Engineers (PECASE), 1998
- Robert Wood Johnson Policy Fellows, 1998-99
- Searle Scholars, 1999
- Sloan Research Fellows, 1999
- NSF CAREER awards (excluding those who are also PECASE winners), 1998
- US Secretary of Agriculture Honor Awards, 1999
- Woodrow Wilson Fellows, 1999-00

While the vast majority of these programs clearly identify a particular campus, in a few instances we used the institution's web-based phone directory to determine the correct campus.

Doctorates Awarded

Source: NCES IPEDS Completions Survey, doctoral degrees awarded between July 1, 1997 and June 30, 1998.

Each year, universities report their degrees awarded to the National Center for Education Statistics in the IPEDS Completions Survey. IPEDS provides straightforward instructions for reporting doctoral degrees awarded, and we do not find any inconsistencies in reporting among the universities included in our rankings. IPEDS asks institutions to identify the number of Doctor of Education, Doctor of Juridical Science, Doctor of Public Health, or Doctor of Philosophy degrees awarded between July 1 and June 30.

Each campus in our study submits degree data by campus except for Ohio State University and Washington State University. However, these institutions offer doctoral degrees at the main campus only.

Postdoctoral Appointees

Source: NSF/SRS Survey of Graduate Students and Postdoctorates in Science and Engineering, Fall 1998.

Each year, NSF and NIH collect data from all institutions offering graduate programs in any science, engineering, or health field. The Survey of Graduate Students and Postdoctorates in Science and Engineering (also called the Graduate Student Survey, or GSS) reflects graduate enrollment and postdoctoral employment at the beginning of the academic year. Postdoctorates are defined in the GSS as "individuals with science and engineering Ph.D.'s, M.D.'s, D.D.S.'s or D.V.M.'s and foreign degrees equivalent to U.S. doctorates who devote their primary effort to their own research training through research activities or study in the department under temporary appointments carrying no academic rank."

The definition excludes clinical fellows and those in medical residency training programs unless the primary purpose of their appointment is for research training under a senior mentor. In the technical notes for this survey, NSF does not mention any potential measurement errors associated with this data item.

Although each doctorate-granting campus submits data separately, NSF aggregates them in its published reports for Indiana University, Pennsylvania State University, Rutgers, University of Colorado, and the University of Kansas. We obtained the single campus data for these schools directly from NSF. Other schools are not clearly identified as a single campus, but we confirmed that all main campuses of the following institutions are the only doctorate-granting institutions: Ohio State, Purdue, Texas A&M, University of Cincinnati, University of Pittsburgh, and University of Washington.

SAT Scores

Source: The College Board's College Handbook 2000, reflects the 1998 freshmen class.

The College Board reports the middle 50% range of verbal and math SAT I scores for most institutions in our study. The institutions submit these data to the College Board each spring through their Annual Survey of Colleges. For our measure, we calculated the median of that range. Some institutions report the ACT instead of the SAT to the College Board. In those cases, we used a conversion table provided by The College Board to generate a comparable SAT equivalent score.[1] When an institution did not submit either an SAT or ACT score, we substituted data from the prior year reported.

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1. Concordance Between SAT I and ACT Scores for Individual Students, *Research Notes 07, June 1999 (Online: http://www.collegeboard.org/research/html/rn_indx.html)*

Data Notes and Adjustments

Private Universities

TheCenter did not adjust the private universities data because of multi-campus or system reporting, and it considers all private universities in this study as single-campus institutions. While some may have multiple campuses, they generally are in or around a single city and considered an integral part of the main campus. Further, private institutions generally do not break out their data by regional, branch, or affiliated campus as often happens with public institutions. As an example, although Harvard officially merged with Radcliffe on October 1, 1999, they have essentially operated as one institution for years. Consequently, *TheCenter* data for Harvard include Radcliffe.

The following table indicates any data substitutions we made and other pertinent information about specific schools.

Table of Data Notes for Private Universities

University/STATISTIC	ORIGINAL DATA (dollars in thousands)	*TheCenter* DATA (dollars in thousands)	COMMENTS
Baylor College of Medicine			
1999 Endowment Assets (NACUBO)	Not Reported	$1,029,156	Baylor College of Medicine did not report endowment assets in NACUBO Study. Used the 1999 CAE Voluntary Support of Education survey as a substitute.
Cornell University			
1998 Science and Engineering R&D Expenditures (NSF)	$363,511	$363,511	Cornell's research expenditures reflect approximately $30 million in NY State budgeted dollars in support of their land grant mission.
Emory University			
1999 Annual Giving (CAE VSE)	Not Reported	$233,900	Emory did not submit giving data to the 1999 VSE Survey. Substituted FY 1999 data obtained from their web site.
Johns Hopkins University			
1998 Science and Engineering R&D Expenditures (NSF)	$853,620	$853,620	Johns Hopkins' primarily federally funded Applied Physics Lab had $443 million in total FY 1998 R&D expenditures.
1998 Federal Research Expenditures (NSF)	$752,983	$752,983	Johns Hopkins' primarily federally funded Applied Physics Lab had $425 million in FY 1998 federal R&D expenditures.
Thomas Jefferson University			
1999 Annual Giving (CAE VSE)	Not Reported	$23,400	Thomas Jefferson did not submit giving data to 1999 VSE Survey. Used data provided on institution's web site.
University of Notre Dame			
1998 SAT Score (College Board)	Not Reported	1320	Notre Dame did not report 1998 SAT. Used 1997 SAT as a substitute.
Yeshiva University			
1998 PhDs Awarded (IPEDS)	Not Reported	100	Yeshiva did not report their doctoral degrees awarded to IPEDS in 1997 and 1998. Used 1996 data as a substitute.
1998 SAT Score (College Board)	Not Reported	1260	Yeshiva did not report 1998 SAT. Used 1997 SAT as a substitute.

Georgia Institute of Technology

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Indiana University - Bloomington

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North Carolina State University

Public Universities

Using information gathered from the reporting agency or from the institution itself, for public universities we adjusted the data contained in the original published reports to represent only the primary research institution of a state university system or the primary research campus of a multiple campus university. In cases where the published data represent a single campus, we did not adjust the data. When the data represent more than a single campus, we first attempted to obtain a figure directly from NSF (for research expenditure data or postdoctorates), from the institution itself, or from the system office that submitted the data. If unavailable from one of these sources, we used an estimated figure derived from information found on the institution's web site.

When the reporting agency or institution provides an actual figure, we used that figure in our rankings. If the institution provided an estimate (directly or indirectly through their web site) representing at least 97% of the originally published figure, then we credited the full amount to the main campus. Otherwise, we used the estimate provided by the institution.

The following table indicates if, and how, we adjusted the data when a public institution submitted aggregated data for multiple campuses, and it notes other instances where the published data do not match what *TheCenter* reports.

Table of Data Adjustments for Public Universities

University/STATISTIC	ORIGINAL DATA (dollars in thousands)	*TheCenter* DATA (dollars in thousands)	COMMENTS
Georgia Institute of Technology			
1999 Endowment Assets (NACUBO)	$948,600	$948,600	Data represent both the Georgia Tech Foundation and the Georgia Institute of Technology, per institution.
Indiana University - Bloomington			
1998 Science and Engineering R&D Expenditures (NSF)	$171,754	$68,702	Estimate 40% is Bloomington campus, per institution.
1998 Federal Research Expenditures (NSF)	$95,840	$38,336	Estimate 40% is Bloomington campus, per institution.
1999 Endowment Assets (NACUBO)	$802,395	$400,000	Estimate about 50% is Bloomington campus based upon FY 98 endowment data provided by institution.
1999 Annual Giving (CAE VSE)	$159,437	$79,718	Estimate 50% is Bloomington campus based upon FY 98 endowment data.
1998 Postdoc Appointees in Sci, Eng & Hlth (NSF)	408	175	Data obtained directly from NSF.
North Carolina State University			
1999 Endowment Assets (NACUBO)	$301,518	$275,532	Data represent both the North Carolina State U Foundations and North Carolina State U Endowment, per institution.

University/STATISTIC	ORIGINAL DATA (dollars in thousands)	*TheCenter* DATA (dollars in thousands)	COMMENTS
Ohio State University - Columbus			
1998 Science and Engineering R&D Expenditures (NSF)	$301,518	$301,518	Regional campuses comprise less than 1% of research dollars, per institution's annual report on web site. All dollars credited to Columbus campus.
1998 Federal Research Expenditures (NSF)	$124,177	$124,177	Regional campuses comprise less than 1% of research dollars, per institution's annual report on web site. All dollars credited to Columbus campus.
1999 Endowment Assets (NACUBO)	$1,086,350	$1,086,350	Virtually all is Columbus campus, per institution.
1999 Annual Giving (CAE VSE)	$153,437	$153,437	Estimate at least 97% is Columbus campus based upon endowment information provided by institution. All dollars credited to Columbus campus.
1998 Postdoc Appointees in Sci, Eng & Hlth (NSF)	218	218	Columbus campus is the only doctorate-granting campus.
Pennsylvania State University - University Park			
1998 Science and Engineering R&D Expenditures (NSF)	$362,643	$319,126	Medical campus and regional campuses comprise about 12% of total research dollars, per institution's annual report on web site. University Park campus estimated at 88% of total expenditures reported.
1998 Federal Research Expenditures (NSF)	$186,274	$163,921	Used the same method described in Total Research above. No federal expenditure data available on web site.
1999 Endowment Assets (NACUBO)	$792,185	$712,967	Estimate 90% is University Park campus based upon FY 98 research expenditures.
1999 Annual Giving (CAE VSE)	$151,053	$135,948	Estimate 90% is University Park campus based upon FY 98 research expenditures.
1998 Postdoc Appointees in Sci, Eng & Hlth (NSF)	249	212	Data obtained directly from NSF.
Purdue University - West Lafayette			
1998 Science and Engineering R&D Expenditures (NSF)	$216,479	$216,479	Estimate 98% is West Lafayette campus, per institution. All dollars credited to main campus.
1998 Federal Research Expenditures (NSF)	$92,844	$92,844	Estimate 98% is West Lafayette campus, per institution. All dollars credited to main campus.
1999 Endowment Assets (NACUBO)	$1,222,411	$1,222,411	Estimate at least 97% is West Lafayette campus based upon FY 98 data provided by institution. All dollars credited to main campus.
1999 Annual Giving (CAE VSE)	$81,964	$81,964	Estimate at least 97% is West Lafayette campus based upon FY 98 data provided by institution. All dollars credited to main campus.
1998 Postdoc Appointees in Sci, Eng & Hlth (NSF)	231	231	All postdocs on West Lafayette campus, per NSF.
Rutgers the State University of NJ - New Brunswick			
1998 Science and Engineering R&D Expenditures (NSF)	$197,053	$137,937	Estimate 70% is New Brunswick campus, per institution.
1998 Federal Research Expenditures (NSF)	$69,829	$48,880	Estimate 70% is New Brunswick campus, per institution.
1999 Endowment Assets (NACUBO)	$389,712	$350,741	Estimate 90% is New Brunswick campus, per institution.
1999 Annual Giving (CAE VSE)	$60,630	$54,567	Estimate 90% is New Brunswick based upon endowment information provided by institution.
1998 Postdoc Appointees in Sci, Eng & Hlth (NSF)	209	171	Data obtained directly from NSF.

University/STATISTIC	ORIGINAL DATA (dollars in thousands)	*TheCenter* DATA (dollars in thousands)	COMMENTS
Texas A&M University			
1999 Endowment Assets (NACUBO)	$3,746,624	$3,596,759	Estimate 96% of system is College Station campus based upon endowment share of total as reported in the CAE Voluntary Support of Education Survey.
University of Alabama - Birmingham			
1999 Endowment Assets (NACUBO)	$541,737	$205,860	Estimate 38% of system is Birmingham campus based upon endowment share of total as reported in the CAE Voluntary Support of Education Survey.
1998 SAT Score (College Board)	Not Reported	1010	Birmingham campus did not report 1998 SAT, but did report median ACT. Converted ACT score to SAT score.
University of California - Berkeley			
1999 Endowment Assets (NACUBO)	$5,013,910	$1,654,557	Estimate 33% of system is Berkeley campus based upon endowment share of total as reported in the CAE Voluntary Support of Education Survey Survey. The NACUBO figure is the sum of the U of California System, the UCLA Foundation, the UC San Francisco Foundation, and the UC San Diego Foundation.
University of California - Davis			
1999 Endowment Assets (NACUBO)	$5,013,910	$300,828	Estimate 6% of system is Davis campus based upon endowment share of total as reported in the CAE Voluntary Support of Education Survey. The NACUBO figure is the sum of the U of California System, the UCLA Foundation, the UC San Francisco Foundation, and the UC San Diego Foundation.
University of California - Irvine			
1999 Endowment Assets (NACUBO)	$5,013,910	$100,276	Estimate 2% of system is Irvine campus based upon endowment share of total as reported in the CAE Voluntary Support of Education Survey. The NACUBO figure is the sum of the U of California System, the UCLA Foundation, the UC San Francisco Foundation, and the UC San Diego Foundation.
University of California - Los Angeles			
1999 Endowment Assets (NACUBO)	$5,013,910	$1,103,038	Estimate 22% of system is UCLA campus based upon endowment share of total as reported in the CAE Voluntary Support of Education Survey. The NACUBO figure is the sum of the U of California System, the UCLA Foundation, the UC San Francisco Foundation, and the UC San Diego Foundation.
University of California - San Diego			
1999 Endowment Assets (NACUBO)	$5,013,910	$200,552	Estimate 4% of system is San Diego campus based upon endowment share of total as reported in the CAE Voluntary Support of Education Survey. The NACUBO figure is the sum of the U of California System, the UCLA Foundation, the UC San Francisco Foundation, and the UC San Diego Foundation.
University of California - San Francisco			
1999 Endowment Assets (NACUBO)	$5,013,910	$701,933	Estimate 14% of system is San Francisco campus based upon endowment share of total as reported in the CAE Voluntary Support of Education Survey. The NACUBO figure is the sum of the U of California System, the UCLA Foundation, the UC San Francisco Foundation, and the UC San Diego Foundation.
University of California - Santa Barbara			
1999 Endowment Assets (NACUBO)	$5,013,910	$100,276	Estimate 2% of system is Santa Barbara campus based upon endowment share of total as reported in the CAE Voluntary Support of Education Survey. The NACUBO figure is the sum of the U of California System, the UCLA Foundation, the UC San Francisco Foundation, and the UC San Diego Foundation.

University/STATISTIC	ORIGINAL DATA (dollars in thousands)	*TheCenter* DATA (dollars in thousands)	COMMENTS
University of Cincinnati - Cincinnati			
1998 Science and Engineering R&D Expenditures (NSF)	$159,695	$159,695	Branch campuses offer AA degrees or less, per IPEDS. Estimate at least 97% is Cincinnati campus. All dollars credited to main campus.
1998 Federal Research Expenditures (NSF)	$90,307	$90,307	Estimate at least 97% is Cincinnati campus. All dollars credited to this campus.
1999 Endowment Assets (NACUBO)	$898,976	$898,976	Estimate at least 97% is Cincinnati campus. All dollars credited to this campus.
1999 Annual Giving (CAE VSE)	$40,765	$40,765	Estimate at least 97% is Cincinnati campus. All dollars credited to this campus.
1998 Postdoc Appointees in Sci, Eng & Hlth (NSF)	218	218	Cincinnati campus is the only doctorate-granting campus.
University of Colorado - Boulder			
1998 Science and Engineering R&D Expenditures (NSF)	$311,203	$186,211	Data provided by institution.
1998 Federal Research Expenditures (NSF)	$228,342	$137,241	Data provided by institution.
1999 Endowment Assets (NACUBO)	$325,975	$195,585	Estimate 60% is Boulder campus, per institution.
1999 Annual Giving (CAE VSE)	$86,455	$51,873	Estimate 60% is Boulder campus based upon FY 98 endowment information provided by institution.
1998 Postdoc Appointees in Sci, Eng & Hlth (NSF)	631	287	Data obtained directly from NSF.
University of Colorado Health Sciences Center			
1998 Science and Engineering R&D Expenditures (NSF)	$311,203	$121,624	Data provided by institution.
1998 Federal Research Expenditures (NSF)	$228,342	$89,022	Data provided by institution.
1999 Endowment Assets (NACUBO)	$325,975	$97,793	Estimate 30% of system is Health Center campus based upon information provided on institution's web site regarding current fundraising campaign.
1999 Annual Giving (CAE VSE)	$86,455	$25,937	Estimate 30% of system is Health Center campus based upon information provided on institution's web site regarding current fundraising campaign.
1998 Postdoc Appointees in Sci, Eng & Hlth (NSF)	631	344	Data obtained directly from NSF.
University of Delaware			
1998 SAT Score (College Board)	Not Reported	1135	Delaware did not report 1998 SAT. Used 1997 SAT as a substitute.
University of Illinois - Chicago			
1999 Endowment Assets (NACUBO)	$816,573	$204,143	Estimate 25% is Chicago campus based upon giving patterns in the 1991-98 fundraising campaign.
1999 Annual Giving (CAE VSE)	$140,640	$35,160	Estimate 25% is Chicago campus based upon giving patterns in the 1991-98 fundraising campaign.
1998 SAT Score (College Board)	Not Reported	1050	Chicago campus did not report 1998 SAT, but did report median ACT. Converted ACT score to SAT score.

University/STATISTIC	ORIGINAL DATA (dollars in thousands)	*TheCenter* DATA (dollars in thousands)	COMMENTS
University of Illinois - Urbana-Champaign			
1999 Endowment Assets (NACUBO)	$816,573	$612,430	Estimate 75% is Urbana campus based upon giving patterns in the 1991-98 fundraising campaign.
1999 Annual Giving (CAE VSE)	$140,640	$105,480	Estimate 75% is Urbana campus based upon giving patterns in the 1991-98 fundraising campaign.
University of Kansas - Lawrence			
1998 Science and Engineering R&D Expenditures (NSF)	$117,115	$66,756	Estimate 57% based upon the Lawrence campus proportion of total reported for FY 97 on institution's web site.
1998 Federal Research Expenditures (NSF)	$50,567	$28,823	Estimate 57% based upon the Lawrence campus proportion of total reported for FY 97 on institution's web site.
1999 Endowment Assets (NACUBO)	$766,673	$613,338	Estimate 80% is Lawrence campus based upon FY 98 endowment data provided by the Kansas Endowment Foundation.
1999 Annual Giving (CAE VSE)	$80,921	$64,736	Estimate 80% is Lawrence campus based upon FY 98 endowment data.
1998 Postdoc Appointees in Sci, Eng & Hlth (NSF)	188	130	Data obtained directly from NSF.
1998 SAT Score (College Board)	Not Reported	1110	Lawrence campus did not report 1998 SAT, but did report median ACT. Converted ACT score to SAT score.
University of Maryland - College Park			
1999 Endowment Assets (NACUBO)	$498,703	$314,183	Estimate 63% of system is College Park campus based upon endowment share of total as reported in the CAE Voluntary Support of Education Survey.
University of Michigan - Ann Arbor			
1998 Science and Engineering R&D Expenditures (NSF)	$496,761	$496,761	Branch campuses conduct very little research, per institution. All dollars credited to Ann Arbor campus.
1998 Federal Research Expenditures (NSF)	$311,450	$311,450	Branch campuses conduct very little research, per institution. All dollars credited to Ann Arbor campus.
1999 Endowment Assets (NACUBO)	$2,525,612	$2,424,588	Branch campuses comprise less than 5%, per institution. Ann Arbor campus estimated at 96% of total reported.
1999 Annual Giving (CAE VSE)	$176,993	$169,914	Estimate at 96% is Ann Arbor campus based upon endowment information provided by institution.
1998 Postdoc Appointees in Sci, Eng & Hlth (NSF)	647	646	Data obtained directly from NSF.

University/STATISTIC	ORIGINAL DATA (dollars in thousands)	*TheCenter* DATA (dollars in thousands)	COMMENTS
University of Minnesota - Twin Cities			
1998 Science and Engineering R&D Expenditures (NSF)	$360,323	$345,910	Estimate 96% for Twin Cities campus based upon research expenditures report on institution's web site.
1998 Federal Research Expenditures (NSF)	$204,741	$204,741	Estimate 98% for Twin Cities campus based upon research expenditures report provided by institution in FY 1997. All dollars credited to Twin Cities campus.
1999 Endowment Assets (NACUBO)	$1,283,934	$1,283,934	Estimate at least 97% is Twin Cities campus based upon information provided by institution. All dollars credited to Twin Cities campus.
1999 Annual Giving (CAE VSE)	$161,966	$161,966	Estimate at least 97% is Twin Cities based upon endowment information provided by institution. All dollars credited to Twin Cities campus.
1998 Postdoc Appointees in Sci, Eng & Hlth (NSF)	539	532	Data obtained directly from NSF.
University of Nebraska - Lincoln			
1999 Endowment Assets (NACUBO)	$682,525	$416,340	Estimate 61% is Lincoln campus based upon FY 98 endowment data provided by institution.
1999 Annual Giving (CAE VSE)	$218,746	$155,000	Data obtained from institution's web site.
University of Pittsburgh - Pittsburgh			
1998 Science and Engineering R&D Expenditures (NSF)	$213,842	$213,842	Regional campuses conduct very little research, per institution. All dollars credited to Pittsburgh campus.
1998 Federal Research Expenditures (NSF)	$168,511	$168,511	Regional campuses conduct very little research, per institution. All dollars credited to Pittsburgh campus.
1999 Endowment Assets (NACUBO)	$854,840	$854,840	Virtually all is Pittsburgh campus, per institution. All dollars credited to Pittsburgh campus.
1999 Annual Giving (CAE VSE)	$65,574	$65,574	Estimate at least 97% is Pittsburgh campus based upon endowment information. All dollars credited to Pittsburgh campus.
1998 Postdoc Appointees in Sci, Eng & Hlth (NSF)	393	393	Pittsburgh campus is the only doctorate-granting campus.
University of Texas - Austin			
1999 Endowment Assets (NACUBO)	$8,128,298	$894,113	Estimate 11% of system is Austin campus based upon endowment share of total as reported in the CAE Voluntary Support of Education Survey.
University of Texas MD Anderson Cancer Center			
1999 Endowment Assets (NACUBO)	$8,128,298	$162,566	Estimate 2% of system is Anderson Cancer Center campus based upon endowment share of total as reported in the CAE Voluntary Support of Education Survey.
University of Texas Medical Branch - Galveston			
1999 Endowment Assets (NACUBO)	$8,128,298	$243,849	Estimate 3% of system is Galveston campus based upon endowment share of total as reported in the CAE Voluntary Support of Education Survey.
University of Texas SW Medical Center - Dallas			
1999 Endowment Assets (NACUBO)	$8,128,298	$406,415	Estimate 5% of system is SW Medical Center campus based upon endowment share of total as reported in the CAE Voluntary Support of Education Survey.

University/STATISTIC	ORIGINAL DATA (dollars in thousands)	*TheCenter* DATA (dollars in thousands)	COMMENTS
University of Utah			
1999 Endowment Assets (NACUBO)	Not Reported	$269,430	Utah did not report 1999 Endowment assets to NACUBO nor VSE survey. Applied the average growth among the public universities (13%) to their 1998 NACUBO endowment assets.
University of Washington - Seattle			
1998 Science and Engineering R&D Expenditures (NSF)	$432,383	$432,383	Less than 1% of research expenditures can be attributed to branch campuses, per institution. All dollars credited to Seattle campus.
1998 Federal Research Expenditures (NSF)	$336,748	$336,748	Less than 1% of research expenditures can be attributed to branch campuses, per institution. All dollars credited to Seattle campus.
1999 Endowment Assets (NACUBO)	$745,217	$745,217	Virtually none of the endowment money came from outside Seattle in 1997 and only about 1% came from outside Seattle in 1998, per institution. All dollars credited to Seattle campus.
1999 Annual Giving (CAE VSE)	$210,745	$210,745	Estimate at least 97% is Seattle campus based upon endowment information provided by institution. All dollars credited to Seattle campus.
1998 Postdoc Appointees in Sci, Eng & Hlth (NSF)	953	953	Seattle campus is the only doctorate-granting campus.
University of Wisconsin - Madison			
1999 Endowment Assets (NACUBO)	$923,323	$909,834	Madison campus reports under U of Wisconsin Foundation (100% Madison) and U of Wisconsin System. Estimate 95% of system is Madison campus based upon endowment share of total as reported in the CAE Voluntary Support of Education Survey.
Washington State University - Pullman			
1998 Science and Engineering R&D Expenditures (NSF)	$95,422	$95,422	Estimate at least 97% is Pullman campus, per institution. All dollars credited to Pullman campus.
1998 Federal Research Expenditures (NSF)	$44,510	$44,510	Estimate at least 97% is Pullman campus, per institution. All dollars credited to Pullman campus.
1999 Endowment Assets (NACUBO)	$421,402	$421,402	Estimate at least 97% is Pullman campus, per institution. All dollars credited to Pullman campus.
1999 Annual Giving (CAE VSE)	$42,987	$41,268	Branch campuses account for at least 4% of the 1999 giving based upon data provided on institution's web site. Pullman campus estimated at 96% of total.
1998 Postdoc Appointees in Sci, Eng & Hlth (NSF)	151	151	Pullman campus is the primary doctorate-granting campus. All postdocs credited to this campus.

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