The Center

A Review of Measures Used in *U.S. News & World Report's* "America's Best Colleges"

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An Occasional Paper from
The Lombardi Program on
Measuring University Performance

Summer
2002

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Introduction

The ever-popular *U.S. News & World Report* annual rankings of colleges and universities, "America's Best Colleges," continue to be a topic of much interest and debate in the higher education community. In *TheCenter's* earlier paper on *U.S. News* rankings (*U.S. News & World Report's Methodology and Rankings of Colleges and Universities, June 2000*), we looked at the methodology changes in these rankings over a period of several years. Critics of the *U.S News* rankings claim that the measures and methodology change from year to year, making the rankings unreliable. In the June 2000 paper, our purpose was to get a sense of the changes in methodology and the resulting rankings from year to year as background for *TheCenter's Top American Research Universities* project. We did not examine each individual measure but simply documented that the methodology had been modified over time, resulting in changes in the rankings that give the impression that universities actually change significantly from one year to the next. *TheCenter* is interested in measuring and improving university performance, as well as identifying the nation's top public and private research universities, and offers an alternative to the weighted, rank-ordered listings such as those produced by *U.S. News.*

In this paper we examine the 16 measures of academic excellence that *U.S. News* uses in its ranking system and suggest alternative measures for making meaningful

comparisons among institutions. As we have pointed out, the *U.S. News* measures have changed over time as the magazine perpetually strives to enhance and improve them. For our purposes, we study the 16 measures in the 2002 rankings – with special attention to how well they assess research universities.

The measures for the "National Universities-Doctoral" group are shown below in order of their percentage of the final *U.S. News* score, from highest to lowest. The set of institutions in National Universities-Doctoral is based on categories developed by the Carnegie Foundation for the Advancement of Teaching. This group includes 249 universities that offer a wide range of undergraduate majors, as well as master's and doctoral degrees, and emphasize faculty research.

U.S. News & World Report
Ranking Criteria (2002 Rankings)

Criteria	% of Final Score
Academic Reputation	25.00%
Graduation Rates (6-year)	16.00%
Financial Resources	10.00%
Faculty Compensation (adjusted for COL*)	7.00%
Entrance Exam Scores	6.00%
Percent Classes Under 20	6.00%
High School Class Standing	5.25%
Graduation Rate Performance	5.00%
Alumni Giving Rate	5.00%
Freshman Retention Rate	4.00%
Faculty with Terminal Degrees	3.00%
Freshman Acceptance Rate	2.25%
Percent Classes of 50 or More	2.00%
Freshman Yield Rate	1.50%
Student-to-Faculty Ratio	1.00%
Percent Full-time Faculty	1.00%
	100.00%

*Adjusted for cost-of-living.

The magazine places the above measures into seven broad categories, which we examine in the next sections: academic reputation, graduation/retention rates, faculty resources, student selectivity, financial resources, alumni giving, and graduation rate performance.

Academic Reputation

(25% of total score)

One of the major criticisms of the *U.S. News* rankings is their heavy reliance on academic reputation ratings. The magazine defends assigning the greatest weight to reputation by claiming that it allows the top academics to account for intangibles and "because a degree from a distinguished college so clearly helps graduates get good jobs or gain admission to top graduate programs."

U.S. News sends surveys to the presidents, provosts, and deans of admissions at institutions within a single category of institutions and asks them to rate the schools' academic programs on a scale from 1 (marginal) to 5 (distinguished). Those who are not familiar enough with a school to evaluate it are asked to indicate "don't know."

Although the earliest and most widespread efforts to measure the quality of higher education institutions use reputational assessments, the literature suggests numerous limitations in using reputation as a quality measure for colleges and universities. Most obvious, reputation is a subjective measure and critics claim that assessments based on reputation are no better than popularity contests. Others argue that academics do not have firsthand knowledge about more than a dozen or so schools and tend to favor those schools they have attended or those with which they are most familiar. These raters typically base their evaluations on experience with an institution during a specific time period and do not have or consider updated objective information that might influence their perceptions. In addition, time lag in institutional reputation naturally occurs. Reputation rises and falls more slowly than actual changes can occur in institutions. While the top-ranked schools are not negatively affected by this time lag, those in the lower tiers that strive to improve performance (and rank) would be influenced.

Because the *U.S. News* editors claim that reputation is a factor in the ability of an institution's graduates to get good jobs and go on to top graduate schools, it might be preferable to assign less weight to the subjective reputation measure and add a measure that indicates a school's success in placing its graduates in jobs and in graduate school. While most schools collect this kind of information through student surveys, good comparable data are not currently available nationally. Perhaps schools would disclose this information if *U.S. News* were to incorporate such a measure in its survey. In addition, *U.S. News* could add a survey to CEOs and recruiters of major national and regional employers to gather ratings on

institutional reputation based on the graduates these employers hire. Canada's *Maclean's* university rankings use such a measure.

Another improvement to the reputation measure would be to work toward a better-informed system of raters – perhaps by including objective institutional data with the reputation survey forms sent to presidents and other college administrators.

Graduation/Retention Rates

(20% of total score)

The graduation/retention rates criteria include 6-year graduation rates (16% of total) and freshman retention rates (4% of total). *U.S. News* uses these as indicators of how satisfied students are with a school and also to assess whether a school is providing the courses and services that students need to succeed. The magazine claims that potential students can check freshman retention rates to learn how hard schools work to keep new students from dropping out.

Because this measure is insensitive to different student populations among institutions, it may not truly reflect an institution's performance. Graduation rates and retention rates are reported for only the subset of full-time students who began as freshmen, although many public institutions have missions to serve a fairly large proportion of part-time students as well as community college transfer students enrolled via articulation agreements in states such as Florida.

In addition, grade inflation can indirectly become a factor in an institution's graduation rate. Evidence suggests that when college students receive higher grades they are less likely to repeat courses and will graduate more quickly. Over the past several years, a lively debate has evolved in the higher education community regarding grade inflation, particularly among highly selective private institutions, although the problem appears to be of concern nationwide. The literature clearly indicates a history of grade inflation at colleges and universities over the past 30 years. While grade inflation is a complex issue and its causes, consequences, and implications require further research, users of comparative graduation rate data should be mindful of the potential influence of grade inflation on graduation rates.

An additional measure that would indicate what schools are doing to retain new students is to look at the programs in place that specifically target this group of students. Over the past few years, research universities have implemented many

such initiatives, such as freshman seminar programs, freshman cluster courses, freshman interest groups, residence colleges, freshman housing, freshman mentorship programs, first-year freshman classes, and so on.

Faculty Resources

(20% of total score)

Included in this measure are percent of classes under 20 (6% of total score), percent of classes of 50 or more (2% of total score), faculty compensation (7% of total score), faculty with terminal degrees (3% of total score), student-to-faculty ratio (1% of total score), and percent full-time faculty (1% of total score).

U.S. News uses these measures to describe the faculty resources available at an institution and provide some idea of the level of commitment of that school's faculty to instruction. These measures point to research that shows that the more satisfied students are with their contact with professors, the more they will learn and the more likely they will graduate. For the *U.S. News* rankings, more small classes and fewer large classes are equated with more/better contact and thus are considered more favorable.

Because this measure's class-size criterion fits the small-college model, it tends to favor the smaller colleges in the *U.S. News* rankings. A class size of 20 is even smaller than that typically recommended for K-12 (which is 25 to 30). Perhaps 30 or 35 would be more appropriate for the *U.S. News* rankings of research universities. Regardless of whether small classes are defined as less than 20 or less than 30, another consideration is that this percentage does not reveal the number of students who actually take advantage of the small classes. Some students may take many small classes; others may take very few. Transcript analysis of graduating seniors provides a much clearer picture of actual student experience at the university with respect to class size.

In addition, this logic ignores pedagogical evidence that indicates the ideal size of a class is a function of discipline. For example, fine arts courses are best taught in small classes, but large classes for beginning economics are acceptable. Further, the assumption that small classes equate to greater student satisfaction may not be entirely correct. Several years of experience at the University of Florida in offering and taping a group of live classes and then replaying them via cable television have shown that, contrary to what many may expect, students are quite satisfied overall with these classes and many value the flexibility of watching the lecture at their

convenience over the opportunity to interact with a faculty member during class. While one-on-one interaction between students is important, an increasing number of faculty also routinely communicate with their students via e-mail and become even more accessible in that manner than they can be during class time or during faculty office hours.

For the most part, the percentage of faculty with terminal degrees is not connected to a faculty member's ability to be an effective teacher, according to research by Alexander Astin of UCLA's Higher Education Research Institute (HERI). Average faculty salaries are largely an indicator of how much emphasis an institution places on research, and top researchers typically earn the highest salaries at research universities. Because the national supply of first-rate university researchers is limited, research universities compete with one another and pay a premium to hire the best research faculty.

Finally, we should also point out that the data that schools report on class size, faculty with terminal degrees, student-to-faculty ratio, and percent full-time faculty are not verifiable by *U.S. News*, other than by the individual institutions. Currently, no national data source contains this information. As is the case with all institutional data, schools can – and do – interpret instructions and definitions differently and naturally tend to report these data in such a way that will place them in a favorable light in the rankings. The following is an actual institutional query from a major university regarding the appropriate way to report data on class size (Common Data Set Digest, Monday, September 17, 2001):

> "Undergraduate class sections are defined as any sections in which at least one degree-seeking undergraduate student is enrolled for credit" as well as "Undergraduate subsections are defined as any subsections of courses in which degree-seeking undergraduate students enrolled for credit."
>
> The instructions state further: "Using the above definitions, please report for each of the following class-size intervals the number of class sections and class subsections offered in Fall 2001."
>
> [Question] If we have a single undergraduate enrolled in one subsection of a multi-subsection graduate-level course, should we report only that one undergraduate in the single section, or should we include all sections and all students?

Alternative choices to the above include reporting all students in the one section where the undergraduate student is enrolled, or not reporting these classes at all because they are graduate rather than undergraduate-level courses. Of course, the end results can vary dramatically depending on which definition a school uses.

A measure that could be added to the rankings to address an institution's commitment to instruction is the percentage of full-time ranked faculty who teach undergraduate classes versus the percentage taught by part-time faculty, visiting faculty, adjuncts, instructors, lecturers, and graduate teaching assistants. In addition, class size data on independent study and students in any one-on-one classes should be considered because this kind of instruction greatly increases the likelihood that students can work closely with faculty. These opportunities are especially important for undergraduates in large research universities. However, the survey instructions explicitly state that schools should exclude independent study, co-op programs, internships, foreign language taped tutor sessions, practicums, and all students in one-on-one classes.

Student Selectivity

(15% of total score)

Student selectivity includes entrance exam scores (6% of total), high school class standing (percentage of entering freshmen in top 10% of high school class) (5.25% of total), freshman acceptance rate (2.25% of total), and freshman yield rate (1.5% of total). The rationale by *U.S. News* for using these indicators is that the ability and ambitions of a school's student body contribute to the academic atmosphere of the school and are an indicator of the intellectual climate on campus, a notion that is widely accepted in the world of higher education.

The percentage of entering freshmen in the top 10% of their high school class sounds like a reasonable indicator of student quality. However, high school class rank is not always reported by the high schools of incoming freshmen because many universities do not require it for admission. The *U.S. News* survey does ask that institutional respondents report information only for those students from whom they collected high school class rank information. It would be helpful if *U.S. News* also reported information on the percentage of first-time, first-year students represented in a school's high school class rank data.

U.S. News may well need to examine alternatives to using SAT scores in the future for the student selectivity measure. In a widely publicized and discussed move, the

University of California System is currently considering a plan to abandon the use of **SAT** scores as a requirement for admission. Options under consideration include the five subject-based **SAT** II exams; the four-subject ACT, with a writing exam; or a comprehensive curriculum-based test that has not yet been developed. Standardized-testing critics have applauded California's initiative and continue to urge institutions of higher education to adopt admissions policies that increase their qualitative selection criteria. Furthermore, the College Board is considering major modifications to the SAT in response to criticism that the test does not reflect what students learn in school.

Rather than eliminating the SAT for admissions purposes, some institutions are making the submission of SAT scores by applicants optional. Critics speculate that some schools do this to improve their standing in the rankings. This can affect rankings in two ways. First, when SAT scores are optional, schools expect that applicants who have high SAT scores will be more likely to submit them. In addition, if SAT scores are optional for admission, the expectation is that a greater number of students will apply. Because institutions are usually limited in the number of students they can admit, the institution's acceptance rate would then be lower and appear to be more selective. The suggestion of a direct link between optional-SAT policies and improvement in the rankings is controversial and one that *U.S. News* has disputed.

Another controversy surrounds the issue of Early Decision admissions policies and their effect on an institution's selectivity and yield rates, and thus on their rankings. Former *U.S. News* editor James Fallows contends that colleges are implementing Early Decision policies for the purpose of advancing in the rankings. Early Decision programs allow students to apply early to one school and allow schools, in turn, to make acceptance decisions earlier than those made for regular admissions. However, applicants must commit to attending that one school if they are accepted. The original intent was to provide quick responses to a small number of top-quality students so they could be assured of their first choice of colleges. If schools admit more incoming freshmen under a binding Early Decision plan, they can improve their acceptance as well as yield rates. While it is possible that *U.S. News* rankings methodology may have been one factor in the growth of Early Decision policies among higher education institutions, acceptance rate and yield together account for only 3.75% of an institution's total score for the *U.S. News* rankings.

Financial Resources

(10% of total score)

U.S. News states that schools with high per-student expenditures are able to offer a greater variety of programs and services. Expenditures for instruction, student services, and related educational benefits are taken into account. The financial resources measure is based on data from IPEDS Finance; however, because public university and private university reporting rules are different, the calculations differ slightly. The calculations used for public universities and private universities are as follows:

Public Colleges and Universities:

Educational Expenses per Student = Education Expenses/Total FTE Enrollment

- Education Expenses = ((Research + Public Service) x Percent FTE Enrollment that is Undergraduate) + Instruction + Academic Support + Student Services + Institutional Support + Operation and Maintenance
  [Source: IPEDS Finance Expenditures, Total Column]

- Total FTE Enrollment = (Total Full-time Undergraduates + Total Full-time Post-baccalaureates) + .333 x (Total Part-time Undergraduates + Total Part-time Post-baccalaureates)
  [Source: IPEDS Fall Enrollment Survey]

Private Colleges and Universities:

Educational Expenses per Student = Education Expenses/Total FTE Enrollment

- Education Expenses = ((Research + Public Service) x Percent FTE Enrollment that is Undergraduate) + Instruction + Academic Support + Student Services + Institutional Support
  [Source: IPEDS Finance Expenditures, Total Column]

- Total FTE Enrollment = (Total Full-time Undergraduates + Total Full-time Post-baccalaureates) + .333 x (Total Part-time Undergraduates + Total Part-time Post-baccalaureates)
  [Source: IPEDS Fall Enrollment Survey]

As illustrated above, Education Expenses are adjusted for research and public service by the percentage of enrollment that is undergraduate. The rationale behind this

adjustment, according to Bob Morse (Director of Data Research at *U.S. News*) is that it is not reasonable to give full credit for research dollars to schools with large research and graduate programs because research mainly benefits graduate students, not undergraduates – particularly in institutions with medical schools.

After calculating each school's education expenses per student, *U.S. News* applied a logarithmic transformation to the spending per FTE student. That value was then standardized before the 10% weight for financial resources was applied. According to *U.S. News*, this methodology addresses the belief of many in higher education that, beyond a certain level, an increase in spending does not lead to a proportionate increase in quality.

The major flaw in this measure is that IPEDS Finance data do not accurately reflect an institution's spending in the specified categories of research and instruction because of the way that institutions must report their financial data using the principles of fund accounting. For example, if 49% of a faculty member's salary is paid from research funds and 51% is paid from instructional funds, 100% of the salary expenditure will be classified and reported as "instruction." As a result, an institution's expenditures on instruction can be overstated to comply with university accounting conventions and cannot be considered a true reflection of the institution's instructional expenditures. Using the sum of Education Expenses defined by *U.S. News,* without adjusting for the percentage of undergraduates, better captures expenditures for research universities. Also, keep in mind that a large portion of an institution's reported "instruction expenditures" is in fact spent on faculty salaries and benefits, giving even greater weight to faculty compensation, without adjusting for cost of living, which has already been accounted for as 7% of an institution's total score in the faculty resources criteria.

U.S. News recognizes the importance of categorizing and reporting schools for ranking purposes to reflect their missions. Therefore, it does not seem logical that research expenditures are weighted based on the proportion of the student body comprised of undergraduates for the group of National Universities-Doctoral because a fundamental part of that mission is research. Undergraduates at research universities, particularly those with medical schools, benefit in many ways through collaborative efforts on campus and various opportunities for research they would not otherwise have. Attempting to isolate and separate the numerous benefits of research to graduate students versus those to undergraduates is simply not reasonable.

Because *U.S. News* does adjust Education Expenses for research as described above, we can take a closer look at research expenditures by comparing research expenditure data reported in the IPEDS Finance Survey versus research expenditures reported on the National Science Foundation Research & Development (NSF R&D) Expenditures Survey. The IPEDS Finance Survey states that schools should report research expenditures that are separately budgeted, just as specified by the NSF R&D Expenditures Survey. Yet, when we compare the research expenditures figures reported in the IPEDS Finance Survey versus figures reported on the NSF R&D Expenditures Survey, we see wide differences among schools. A comparison of these reports for a subset of schools classified as National Universities-Doctoral is available in the Appendix. Although NSF expenditure reports are typically limited to science and engineering fields (reporting data on other fields is optional), this alone does not explain the disparity between the two sets of data. Some of the differences are due to system accounting practices as evidenced by the State Univeristy of New York (SUNY) schools and others. For example, research expenditures in IPEDS Finance for University at Buffalo are only 37% of the figures reported in NSF R&D Expenditures. The SUNY system office completes the IPEDS Finance surveys and includes primarily research money that is processed through its research foundation, although the University at Buffalo campus does not process *all* sponsored research through the research foundation. As a result, University at Buffalo's sponsored research expenditures are under-reported in the IPEDS Finance Survey.

Our purpose here is not to investigate and explain the differences between IPEDS Finance and NSF R&D Expenditures data but rather to point out that these differences exist. Since the data from the NSF R&D Expenditures Survey are accepted and used nationally as the primary source of information on academic R&D expenditures in the United States, they are the best source of data for indicators of university research expenditures.

Alumni Giving

(5% of total score)

The alumni giving measure used by *U.S. News* is a proxy for graduates' satisfaction. The alumni giving rate is calculated by dividing the number of donors by the number of alumni of record, based on *U.S. News* definitions. Schools are asked to report only gifts from undergraduate alumni who graduated from their institution. *U.S. News* instructs that gifts from students who attended the institution but did

not graduate are to be excluded, as are gifts from graduates who earned only a graduate degree at the institution. In reality, however, gifts from all alumni contribute to a university's ability to enhance instruction, programs, and facilities university-wide, as well as to offer scholarships to students at all levels. In major research universities, attempting to separate the benefits of alumni gifts by undergraduates from those by graduate students does not seem realistic and suggests that the undergraduate component of a major research university is isolated from the rest of the institution when, in fact, the opposite is true. An improved method of reporting alumni giving for the National Universities-Doctoral group is to draw on the definition of alumni used in the Council for Aid to Education's (CAE) Voluntary Support of Education (VSE) Survey:

> Former Students: Full- or part-time students, undergraduate or graduate, who have earned some credit toward one of the degrees, certificates, or diplomas offered by the reporting institution.

Graduation Rate Performance

(5% of total score)

Graduation rate performance is the difference between the proportion of students expected to graduate and the proportion that actually do. This measure's intent is to capture "added value," i.e., the effect that a school's programs and policies have on the expected graduation rate of its students, taking into account students' abilities and institutional resources.

Predicted graduation rate is calculated by using a linear regression to fit a school's 6-year graduation rate to its standardized test scores and expenditures per student. The calculations and rank are based on the ratio of the actual graduation rate/ predicted graduation rate. The higher the ratio, the better a school will rank. So, under- or over-performance is not the only factor in this ranking. The higher actual rate a school has to begin with, the lower its ranking. For example, consider two hypothetical schools:

	Actual Rate	Predicted Rate	Ratio	x 100	Performance (+ or -)	Rank
School #1	91%	79%	91/79 =	115.189873	+12	2
School #2	80%	68%	80/68 =	117.647059	+12	1

Even though both schools have a +12 performance and School #2 has a lower actual rate, School #2 has a higher ratio and therefore carries a higher value into the ranking model. In this case, the school that already has a high graduation rate is penalized even though its performance is the same as a school with a lower graduation rate.

As stated earlier, graduation rates are highly dependent on the composition of the undergraduate population at an institution (percentage transfer students, part-time/full-time ratio, etc.). In addition, we would not expect public universities that admit many students to meet state access requirements to have graduation rates as high as universities that are allowed to be more selective in their admissions.

Private universities with highly selective admissions will generally be expected to have (and do have) higher graduation rates than most public universities. The graduation rate performance measure also gives more weight to an institution's graduation rate than is warranted because graduation rates are considered in this measure (5%) as well as in the graduation/retention rates measure (16%).

In spite of the above arguments against using a predicted graduation rate measure, if such a measure continues to be used, consideration should be given to including average GPA of the entering class as a factor. Research has shown average high school GPA of first-time freshmen to be a better predictor of success in college than SAT score. *U.S.News* already collects average GPA data in its annual "America's Best Colleges" survey to institutions.

Conclusions

We face a challenging task in trying to depict and compare the richness and quality of the undergraduate educational experience and opportunities available to students at America's research universities. And while academic environment and culture at research universities are quite unlike those of four-year colleges (an important factor that students and parents consider when choosing a college), these characteristics are difficult to identify, quantify, and measure.

Even among research universities, there are broad differences in size, scope, mission, and discipline mix, such as the presence or absence of a medical school or engineering program. Some have proposed that *U.S. News* should identify and remove

medical school/NIH research dollars from overall university research expenditures for their financial resources ranking. However, this would cause further distortion of outcomes rather than improve the measure and "level the playing field." Universities with medical schools tend to generate much of their research volume on basic science in the medical school, while colleges without medical schools generate research in their science departments. Removing medical school dollars would misrepresent the results. The same argument can be made about any specialized focus of an institution (Physics, for example). If a university has experimental physics, one could argue that this should be excluded because that discipline requires expensive programs that compete for large amounts of research dollars whereas theoretical physics requires far fewer dollars. If the goal is the equalize comparisons among universities, the performance of *programs* – not universities – should be compared. *U.S.News,* the National Research Council, and other discipline-specific groups already produce a wide variety of graduate program rankings.

The *U.S. News* ranking model is more appropriate for comparing small, more homogeneous liberal arts colleges than it is for making meaningful comparisons of research universities due to the many complexities of these institutions, a few of which we mention above. The ranking model could be improved and made more applicable to National Universities-Doctoral institutions if *U.S. News* were to adopt the suggestions in this paper. Just as important, additional measures could be added to address areas currently not included in the survey that specifically characterize research universities.

The 1998 report "Reinventing Undergraduate Education: A Blueprint for America's Research Universities" from the Boyer Commission on Educating Undergraduates in the Research University could serve as a springboard for additional measures of quality research universities. The Boyer report reinforces the notion that undergraduate students in research universities can benefit immeasurably from the unique opportunities and resources available to them because they are in a research university environment.

The Commission recommended a new model of undergraduate education at research universities that makes the undergraduate experience a fundamental part of an integrated whole. The report stresses that research universities should take advantage of the special, vast resources offered by their graduate and research programs to strengthen the quality of undergraduate education, *rather than trying to reproduce the liberal arts college environment.*

The Boyer Commission report includes a list of recommendations for improving undergraduate education in research universities, including: Giving undergraduates more opportunities to do research and participate in creative learning, instituting freshman seminars and senior capstone courses and projects, putting more emphasis on teaching students to write, and offering faculty awards promoting excellence in undergraduate teaching. Developing specific measures based on these recommendations requires further study, but adding these dimensions to the ranking model would present a much better picture to consumers of the college rankings of the richness and wide range of opportunities afforded undergraduates in a research university.

APPENDIX

Comparison of IPEDS Finance and NSF Research & Development Expenditures (Selected National Universities-Doctoral)

Overall 2002 USN&WR Rank	Institution	1999 NSF Total Research (x $1,000)	1999 IPEDS Research (x $1,000)	IPEDS $/ NSF$
5	Massachusetts Institute of Technology	420,306	621,080	148%
5	Stanford University	426,549	539,861	127%
2	Harvard University	326,193	397,183	122%
41	Yeshiva University	111,771	136,058	122%
32	New York University	167,179	203,213	122%
16	Johns Hopkins University [1]	438,518	524,555	120%
48	Rensselaer Polytechnic Institute	39,034	40,311	103%
22	Carnegie Mellon University	142,174	143,310	101%
1	Princeton University	124,237	125,028	101%
22	Georgetown University	111,426	109,939	99%
18	Emory University	189,170	182,493	96%
21	Vanderbilt University	149,675	140,938	94%
9	Columbia University	279,587	262,869	94%
26	Wake Forest University	82,827	75,541	91%
46	Tulane University	87,324	79,522	91%
19	University of Notre Dame	30,483	27,682	91%
4	California Institute of Technology	212,216	187,234	88%
32	University of Wisconsin - Madison	499,688	440,483	88%
5	University of Pennsylvania	383,569	334,072	87%
24	University of Virginia	157,487	136,058	86%
48	University of Texas - Austin	258,122	221,142	86%
8	Duke University	348,274	296,856	85%
12	Rice University	41,069	34,632	84%
9	Dartmouth College	69,522	58,491	84%
14	Cornell University	395,552	328,727	83%
45	University of Washington - Seattle	482,659	400,332	83%
41	Georgia Institute of Technology	263,725	217,267	82%
9	University of Chicago	162,805	132,565	81%
48	University of California - Santa Barbara	104,561	84,061	80%
12	Northwestern University	233,809	182,171	78%
38	Case Western Reserve University	182,332	141,111	77%
25	University of Michigan - Ann Arbor	508,619	388,898	76%
34	Brandeis University	48,305	36,551	76%
2	Yale University	274,050	205,476	75%
31	University of California - San Diego	461,632	345,919	75%
41	University of California - Irvine	141,842	105,385	74%
26	University of California - Los Angeles	477,620	351,942	74%
36	University of Illinois - Urbana-Champaign	358,247	262,907	73%
14	Washington University	315,606	229,911	73%
36	University of Rochester	177,126	127,277	72%
34	University of Southern California	280,741	200,711	71%
41	University of California - Davis	307,950	215,688	70%
28	University of North Carolina - Chapel Hill	252,767	174,973	69%
20	University of California - Berkeley	451,539	289,253	64%
48	Texas A&M University	402,203	247,256	61%
16	Brown University	76,330	40,808	53%
28	Tufts University	100,872	42,055	42%
2nd tier	University at Buffalo	166,823	61,581	37%

[1] Because the IPEDS Finance Survey for Johns Hopkins excludes APL, $436 million has been subtracted from the reported NSF figure.

Sources: NSF/SRS Survey of R&D Expenditures at Universities and Colleges, FY99.
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