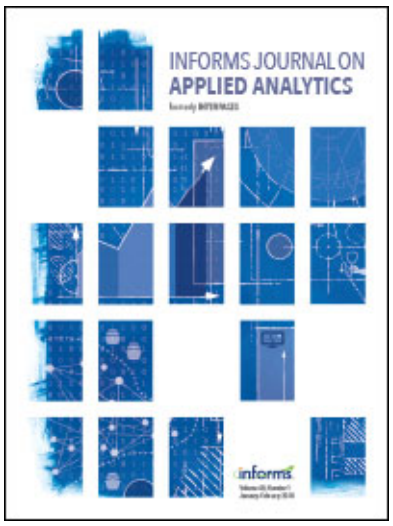

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The 14th Rothkopf Rankings: Continuing the Tradition of Measuring Academic Contributions to Operations Research Practice Literature

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Abstract. This 14th Rothkopf Rankings continues a 30-year tradition that Michael Rothkopf began in 1996 of measuring the contributions of academic institutions to the research on the application of operations research, management science, and analytics. I assess the activity of universities in the production of practice-centric operations research over two different overlapping seven-year periods—2015–2021 and 2018–2024—to maintain consistency with prior Rothkopf Ranking studies. I use the evolving ranking methods, presenting three different measures of output and one blended ranking. Although there are some very familiar and regular top contributors (notably, the Massachusetts Institute of Technology, the Colorado School of Mines, the Georgia Institute of Technology, and the Naval Postgraduate School, among others), there is considerable randomness in the coverage of applied research across most ranked institutions.

History: This paper was refereed.

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Introduction

The ranking of universities' contributions to the practice literature began in 1996 when Michael Rothkopf developed an index of which universities contribute most to the practice literature. This ranking is now known as the Rothkopf Rankings in his honor, and this article represents the 14th in the series spanning 28 years. The purpose of these rankings is to identify the universities that contribute to the practice literature through applied operations research and analytics, as measured by contributions to the journal *Informs Journal on Applied Analytics* (formerly known as *Interfaces* (*INT/IJAA*)). There may be other journals that have practice-oriented articles, but they typically have not gone through the vetting process of *INT/IJAA* to ensure that the work was actually put into practice.

As Table 1 describes, Rothkopf conducted seven applied research rankings between 1996 and 2007 (Rothkopf 1996, 1997, 1999, 2002, 2004, 2005, 2007). Rothkopf's efforts were followed by three rankings conducted by Ronald Fricker from 2009 to 2013 (Fricker 2009, 2011, 2013) and, most recently, by three rankings that I have conducted from 2016 to 2020 (Gorman 2016, 2019, 2020). Table 1 summarizes the date range evaluated for each ranking effort and the measures of research output calculated in each.

Methodological Evolution

The rankings have undergone some methodological development since their inception. Rothkopf's original approach (Rothkopf 1996) employed a single "visibility" measure that counted institutional participation in practice-oriented publications based on a per-author basis. Fricker's contributions (2009–2013) introduced the "yield" measure, which provided an assessment of institutional contribution on a per-article basis to address some limitations of the visibility approach. More recent contributions to the series have included the "academic yield" measure (Gorman 2016), which removes the penalty imposed by the yield measure for collaborating with practitioners. Finally, Gorman (2019) proposed a "blended ranking" approach to provide a more comprehensive assessment of institutional contributions.

In all cases, the only articles that are considered are peer-reviewed articles. Peer-reviewed columns (shorter submissions with different acceptance criteria, such as Art and Science of Practice and Practice Summaries) are included as well at one-half the value of a full-length paper. Editorials, book reviews, and other similar articles are excluded.

The original measure, created by Mike Rothkopf (1996), was later termed "visibility" by Fricker (2009) to differentiate it from his yield measure. This measure gives a single point to every author of a paper, or a

Table 1. The Rothkopf Rankings Tradition: Evolution of Methodology and Coverage

Ranking	Author	Year	Years of coverage	Primary measures
1	Rothkopf	1996	1988–1994	Visibility
2	Rothkopf	1997	1990–1996	Visibility
3	Rothkopf	1999	1992–1998	Visibility
4	Rothkopf	2002	1994–2000	Visibility
5	Rothkopf	2004	1996–2002	Visibility
6	Rothkopf	2005	1998–2004	Visibility
7	Rothkopf	2007	2000–2006	Visibility
8	Fricker	2009	2002–2008	Visibility, yield
9	Fricker	2011	2004–2010	Visibility, yield
10	Fricker	2013	2006–2012	Visibility, yield
11	Gorman	2016	2009–2015	Visibility, yield, academic yield
12	Gorman	2019	2012–2018	Visibility, yield, academic yield, blended
13[a]	Gorman	2020	1971–2020	Visibility, yield, academic yield, blended
14	Gorman	2025	2015–2021 and 2018–2024	Visibility, yield, academic yield, blended

[a]The 13th Rothkopf Ranking was unique in its coverage, spanning the entire 50-year history of *Interfaces/INFORMS Journal on Applied Analytics* in celebration of its 50th anniversary year.

half-point to every author on a column (e.g., Practice Summary, Art and Science of Practice, etc.). The total academic points for an article equal the number of academic authors on the paper. Nonacademic authors are not included in the measure and are not counted in any way. There is some inflation to this score; one article with many authors generates multiple points for various institutions, and, accordingly, if multiple authors are from the same institution, that institution gets multiple points.

Rothkopf's idea was to capture the breadth of interest in academic research across researchers in an institution and thus provides an author-weighted measure representing the visibility of applied research at an institution. His logic was that if multiple authors participate in applied research, the research has broader awareness (i.e., "visibility") and support in the institution.

The yield measure was created by Ron Fricker (2009) to eliminate the multiple-author inflation of the visibility measure. This measure splits a single point for an article (half-point for a column) proportionally among all the authors contributing to an article, thereby measuring the applied research yield of an institution at the research project level. Thus, if three authors from an institution produce an article, the institution is granted a single point; however, if the authors are from three institutions, each institution gets a third of a point. If one of the authors is from a nonacademic institution, the article produces only two-thirds of a yield point in total; one-third of the article is nonacademic.

Fricker's intent with this measure was to create an article-centric count of total research productivity, eliminating the double-counting problem of the visibility measure. He provided a proportional assessment of institutional contribution to the total body of applied research.

Finally, Gorman (2016) suggested an "academic yield" measure, which follows a similar formula as Fricker's yield but counts only academic authors in the denominator of the measure, thereby not penalizing participation of practitioners in the contribution of academics to applied research. If, as above, a third author is nonacademic, each academic author gets a half-point; each author produced one-half of the academic output.

Gorman's logic was to remove the penalty created by the yield measure that academic authors face when collaborating with practitioners to encourage academic-practitioner collaboration by not reducing academic credit when nonacademic authors participate.

An example calculation from a fictious article is given in Table 2. For the four-author article in Table 2, University A gets visibility of 2, yield of 0.5, and academic yield of 0.67; and University B gets visibility of 1, yield of 0.25, and academic yield of 0.33.

Of course, the sum of all the points over an interval reveals an institutional ranking. The rankings, then, vary by measure. Gorman (2019) suggested a "blended ranking," which simply took the average rankings of each measure (visibility, yield, and academic yield) of an institution to create an overall ranking. The idea was to provide a single, unified measure that combines awareness (visibility), productivity (yield), and academic contribution (academic yield) while mitigating the individual flaws inherent in each separate measure. The comparisons of the advantages and disadvantages of each measure are discussed in Table 3.

Table 2. Example Calculations of Visibility, Yield, and Academic Yield

Author	Institution	Visibility	Yield	Academic yield
Author 1	University A	1	0.25	0.333
Author 2	University A	1	0.25	0.333
Author 3	University B	1	0.25	0.333
Author 4	Company	0	0	0

The 13th ranking (Gorman 2020) represented a departure from the traditional seven-year rolling window to examine the complete 50-year history of *Interfaces* and the *INFORMS Journal on Applied Analytics*, providing unprecedented insight into long-term institutional commitments to and trends in applied research. As such, it is somewhat of an outlier in the Rothkopf Ranking history, but it represents a unique historical perspective on the evolution of applied research across academia.

This 14th ranking returns to the established tradition of examining a seven-year rolling window. In order to maintain comparability to the approximate three-year spacing of prior Rothkopf studies (and, frankly, to atone for dropping the ball three years ago when this analysis should have been completed!), the 14th rankings are split into two seven-year periods, 2015–2021 and 2018–2024. This approach allows for assessment of recent institutional performance, while maintaining comparability with the historical series. The ranking employs all four established measures—visibility, yield, academic yield, and blended rankings—to provide a comprehensive view of institutional contributions to the practice literature.

This analysis is particularly significant, as it captures the period following the widespread adoption of business analytics and data science programs (Gorman and Klimberg 2014) across academic institutions, allowing us to assess whether these developments have translated into any significant shifts in contributions to the practice literature.

Results

As in prior Rothkopf Ranking studies, the results of the different measures are presented individually, separating out U.S. schools and international schools. The date ranges 2015–2021 and 2018–2024 are shown side-by-side. In the interest of space and table consistency, rankings were cut off at a rank of 20, but each interval's school list is only approximately equal in length due to schools that were tied in rank. As has been done since the advent of the Rothkopf Rankings, the data collection was manual. All articles from *INT/IJAA* were downloaded, and their key attributes were collected: volume, issue, page, title, author(s), contribution type (article, column, editorial, others), institution(s)/organization(s), country, and continent. Every effort to collect information accurately was made, but due to manual collection of much of the detailed data, some recording errors may have been made. Examples include authors reporting school name instead of university, authors with an unclear primary affiliation, and authors with unclear location. Of course, all errors are exclusively the responsibility of the author.

Visibility Ratings

The U.S. visibility ratings are shown in Table 4. The Georgia Institute of Technology (Georgia Tech) and the Massachusetts Institute of Technology (MIT) take the top spots in the two intervals and continue their long-time leadership roles in applied research, with the University of Alabama, the Colorado School of Mines, and Rensselaer Polytechnic Institute close behind rounding out the top 4 in the most recent ranking. The University of Tennessee, the University of Michigan, and the U.S. Air Force Academy continue to consistently rank in the top 10 in visibility.

The international visibility results are shown in Table 5. There is considerably more "noise" in the international visibility rankings, with institutions moving many slots or disappearing altogether from period to period. The Eindhoven University of Technology, a long-time applied research institution, has shown a recent spike in applied research. However, the Indian Institute of Technology–Bombay has shown a surge to take the top spot in the most recent ranking. The University of Chile, a long-time leader in international applied research and the prior period number-one-ranked school, has seen its output fall off in recent years.

Table 3. Rothkopf Calculation Methodology Comparison

Measure	What it counts	Point distribution	Key advantage	Key limitation
Visibility	Number of participating authors	Full points to each author	Shows breadth of institutional involvement	Inflates scores for multiauthor papers
Yield	Proportional contribution to articles	Points split among all authors	Eliminates double-counting	Penalizes academic-practitioner collaboration
Academic yield	Academic portion of contribution	Points split only among academics	Encourages practitioner collaboration	May overvalue academic-only contributions
Blended	Average of all three rankings	Combines rank positions	Comprehensive assessment	May mask specific strengths/weaknesses

Table 4. The U.S. Visibility Rankings

Rank	Institution	Visibility
North American Rothkopf Visibility Ranking 2015–2021		
1	Georgia Institute of Technology	21.0
2	Rensselaer Polytechnic Institute	18.0
3	Massachusetts Institute of Technology	14.0
3	Naval Postgraduate School	14.0
5	University of Michigan	11.5
6	Pennsylvania State University	11.0
7	University of Tennessee	10.5
8	Colorado School of Mines	10.0
9	University of Dayton	8.5
10	University of Illinois	7.0
10	University of South Carolina	7.0
10	U.S. Air Force Academy	7.0
13	Lehigh University	6.0
13	University of Cincinnati	6.0
13	Northwestern University	6.0
16	University of Alabama	5.0
16	Carnegie-Mellon University	5.0
16	Cornell University	5.0
16	Emory University	5.0
16	Stanford University	5.0
North American Rothkopf Visibility Ranking 2018–2024		
1	Massachusetts Institute of Technology	22.0
2	University of Alabama	19.0
3	Colorado School of Mines	18.0
3	Rensselaer Polytechnic Institute	18.0
5	Georgia Institute of Technology	15.0
6	University of Tennessee	12.0
7	University of Michigan	11.0
8	Cornell University	9.0
9	U.S. Air Force Academy	7.0
9	Clemson University	7.0
9	Lehigh University	7.0
9	Northwestern University	7.0
13	University of Illinois	6.0
13	Stanford University	6.0
13	Columbia University	6.0
13	Naval Postgraduate School	6.0
13	University of Dayton	6.0
18	Worcester Polytechnic Institute	5.0
19	University of Northern Iowa	4.0
19	Loyola Marymount University	4.0
19	University of Cincinnati	4.0
19	University of South Carolina	4.0
19	Furman University	4.0
19	West Virginia University	4.0
19	South Dakota School of Mines and Technology	4.0
19	The Ohio State University	4.0

Table 5. The International Visibility Rankings

Rank	Institution	Visibility
International Rothkopf Visibility Ranking 2015–2021		
1	University of Chile	10.0
2	Indian Institute of Technology, Bombay	7.0
2	Instituto de Investigaciones Eléctricas	7.0
4	University of Modena and Reggio Emilia	6.0
4	Korea Advanced Institute of Science and Technology	6.0
4	Leiden University	6.0
7	University of Groningen	5.0
7	University of Florence	5.0
7	Tsinghua University	5.0
7	University of Porto	5.0
7	Polytechnic of Turin	5.0
12	University of Maribor	4.0
12	Planta Piloto de Ingeniería Química	4.0
12	Erasmus University Rotterdam	4.0
12	Universidad Autonoma Metropolitana Unidad Iztapalapa	4.0
12	Eindhoven University of Technology	4.0
12	Universidad Popular Autónoma del Estado de Puebla	4.0
12	Vrije Universiteit Amsterdam	4.0
12	University of British Columbia	4.0
12	National University of Singapore	4.0
12	Adolfo Ibanez University	4.0
12	Polytechnic University of Madrid	4.0
International Rothkopf Visibility Ranking 2018–2024		
1	Indian Institute of Technology, Bombay	16.0
2	Eindhoven University of Technology	13.0
3	Instituto Sistemas Complejos de Ingeniería (ISCI)	11.0
4	University of Cambridge	9.0
5	Technische Universität Braunschweig	7.0
6	Tsinghua University	6.0
6	Ghent University	6.0
6	Shanghai University	6.0
6	Leiden University	6.0
10	University of Augsburg	5.0
10	University of Florence	5.0
10	Erasmus University Rotterdam	5.0
10	Polytechnic of Turin	5.0
10	Universidad de Buenos Aires	5.0
10	Shanghai University of Finance and Economics	5.0
16	Universitat Oberta de Catalunya	4.0
16	University of Chile	4.0
16	University of British Columbia	4.0
16	National University of Singapore	4.0
16	University of Toronto	4.0
16	The University of Hong Kong	4.0
16	Polytechnic University of Madrid	4.0
16	Planta Piloto de Ingeniería Química	4.0
16	National and Kapodistrian University of Athens	4.0
16	Universidad Autonoma Metropolitana Unidad Iztapalapa	4.0
16	Vrije Universiteit Amsterdam	4.0
16	Korea Advanced Institute of Science and Technology	4.0
16	Technical University of Munich	4.0
16	Universidad Popular Autónoma del Estado de Puebla	4.0
16	Adolfo Ibanez University	4.0

Yield Rankings

Of course, the number of participating authors on a single work can inflate the visibility score, which, as noted by Gorman et al. (2020), has been happening on an increasing basis on major works such as Edelman Award articles. Illustrations of the inflation effect are demonstrated by the University of Alabama, which jumped from 16th to 2nd in visibility, and Rensselaer Polytechnic, which is ranked third and previously not ranked, both due exclusively to a single, many-authored article in the most recent period. The yield rankings avoid the noise accompanying articles with a large number of authors.

The North American yield rankings are given in Table 6. Yield scores paint a slightly different picture, with the University of Dayton ranking number one from 2015–2021 and the Colorado School of Mines

Table 6. The U.S. Yield Rankings

Rank	Institution	Yield
North American Rothkopf Yield Ranking 2015–2021		
1	University of Dayton	4.50
2	Georgia Institute of Technology	4.17
3	Massachusetts Institute of Technology	3.92
4	Naval Postgraduate School	3.75
5	University of Tennessee	3.73
6	Colorado School of Mines	3.28
7	University of South Carolina	3.00
8	Pennsylvania State University	2.82
9	University of Michigan	2.18
10	University of Illinois	2.17
11	University of Cincinnati	2.00
12	Carnegie-Mellon University	1.50
12	Walden University	1.50
12	University of Alabama	1.50
12	Clarkson University	1.46
16	Stanford University	1.36
17	U.S. Air Force Academy	1.33
18	Cornell University	1.31
19	Columbia University	1.07
20	Northwestern University	1.05
North American Rothkopf Yield Ranking 2018–2024		
1	Colorado School of Mines	5.20
2	Massachusetts Institute of Technology	4.04
3	University of Tennessee	3.99
4	Georgia Institute of Technology	3.28
5	University of Alabama	3.08
6	University of Dayton	2.92
7	University of Michigan	2.83
8	University of South Carolina	2.50
9	Cornell University	2.25
10	Columbia University	2.07
11	University of Illinois	2.00
12	Naval Postgraduate School	1.63
13	University of Cincinnati	1.33
13	U.S. Air Force Academy	1.33
13	Oklahoma State University	1.33
16	Stanford University	1.28
17	The Ohio State University	1.17
18	Northwestern University	1.10
19	Lehigh University	1.06
20	Clemson University	1.05

Table 7. The International Yield Rankings

Rank	Institution	Yield
International Rothkopf Yield Ranking 2015–2021		
1	Indian Institute of Technology, Bombay	2.10
2	Korea Advanced Institute of Science and Technology	1.50
3	National University of Singapore	1.33
3	University of Groningen	1.33
5	University of Chile	1.29
6	University of Modena and Reggio Emilia	1.10
7	Universidad Popular Autónoma del Estado de Puebla	1.00
7	Adolfo Ibanez University	1.00
7	Polytechnic University of Madrid	1.00
7	Goethe University Frankfurt	1.00
7	Technion - Israel Institute of Technology	1.00
7	Bahir Dar University	1.00
7	Indian Institute of Technology, Bombay Roorkee	1.00
7	Indian Institute of Technology, Bombay Kharagpur	1.00
7	Defense Acquisition Program Administration	1.00
7	Lingnan College	1.00
7	Polytechnic of Turin	1.00
18	Tsinghua University	0.97
19	Institut d'Economie Scientifique et de Gestion	0.83
19	University of Florence	0.83
International Rothkopf Yield Ranking 2018–2024		
1	Eindhoven University of Technology	2.9
2	Indian Institute of Technology, Bombay	2.7
3	Technische Universität Braunschweig	1.8
4	Ghent University	1.5
5	Shanghai University	1.4
6	National University of Singapore	1.2
7	Technical University of Munich	1.2
8	Universidad de Buenos Aires	1.2
9	University of Augsburg	1.1
10	Erasmus University Rotterdam	1.1
11	Tel Aviv University	1.0
11	Indian Institute of Technology, Bombay Kharagpur	1.0
11	Universität Hamburg	1.0
11	Goethe University Frankfurt	1.0
11	Indian Institute of Technology, Bombay Roorkee	1.0
11	Polytechnic University of Madrid	1.0
11	The American College of Greece	1.0
11	Julius-Maximilians-Universität Würzburg	1.0
11	Universidad Popular Autónoma del Estado de Puebla	1.0
11	Korea Advanced Institute of Science and Technology	1.0
11	Adolfo Ibanez University	1.0
11	Lingnan College	1.0
11	Polytechnic of Turin	1.0

ranking number one more recently. Generally, these smaller schools have far fewer authors per article, creating a higher yield per article. Or, stated another way, some articles out of MIT had 9 or 10 authors across a number of academic and nonacademic institutions, where none out of the University of Dayton had more than three. Still, Georgia Tech and MIT rank in the top 4 in both periods with this measure. The University of South Carolina, the University of Michigan, and the University of Tennessee all rank in the top 10 by this measure in both periods.

The international yield scores are presented in Table 7. Consistent with the visibility ratings, the Indian Institute of Technology–Bombay (IIT Bombay) and the Eindhoven Institute of Technology rank in the top spot in the two periods. The National University of Singapore was the only other institution to rank in the top 10 in both periods.

Academic Yield Rankings

As discussed in the introduction, the yield rankings are "penalized" by the presence of nonacademics on the author list; the academic authors only get credit for the academic portion of the article. As noted in the last ranking, yield scores have fallen in each year they have been measured, which may speak to a falloff in applied academic research, as noted in Gorman (2021), or it could be due to the participation of practitioners in the research

process—a desirable situation. The academic yield measure seeks to erase that penalty; in a loose sense, academic yield scores are yield scores inflated by the rate at which an institution tends to work with practitioners.

The U.S. academic yield results are given in Table 8. Georgia Tech and MIT rise to the top ranks again, owing to the fact that in those papers in which there may have been many authors, often, there is strong practitioner representation, which hindered the yield score for both institutions. The other schools that rank in the top 10 are unchanged from the yield score, except one notable exception: Cornell University ranks in the top 10 in both periods when adjusted for practitioner participation, implying that the Cornell work had a high degree of practitioner involvement.

The international academic yield scores are given in Table 9. The top rankings are very much the same as the yield measure, with Eindhoven ranking first in the early periods and IIT Bombay first in the second period. Tsinghua University ranked fourth in both periods, which is a different result from the yield measure in which the institution did not make the top 10.

Table 8. The U.S. Academic Yield Rankings

Rank	Institution	Acad. yield
North American Rothkopf Academic Yield Ranking 2015–2021		
1	Georgia Institute of Technology	7.30
2	Massachusetts Institute of Technology	6.03
3	University of Dayton	5.92
4	Naval Postgraduate School	5.50
5	University of Tennessee	5.33
6	Colorado School of Mines	3.67
7	Pennsylvania State University	3.08
8	University of South Carolina	3.00
9	University of Michigan	3.00
10	Cornell University	2.92
11	University of Illinois	2.75
12	Stanford University	2.17
13	University of Cincinnati	2.00
14	Clarkson University	1.83
15	University of Alabama	1.75
16	University of Texas	1.60
17	Carnegie-Mellon University	1.50
17	Wayne State University	1.50
17	University of Washington	1.50
17	University of Houston	1.50
17	Arizona State University	1.50
17	U.S. Air Force Academy	1.50
17	Rutgers University	1.50
17	Walden University	1.50
North American Rothkopf Academic Yield Ranking 2018–2024		
1	Massachusetts Institute of Technology	8.05
2	University of Tennessee	6.17
3	Colorado School of Mines	5.42
4	Georgia Institute of Technology	5.33
5	University of Dayton	4.08
6	Cornell University	3.80
7	University of Alabama	3.50
8	Naval Postgraduate School	3.00
9	University of Michigan	2.83
10	Northwestern University	2.50
11	University of South Carolina	2.50
11	The Ohio State University	2.50
13	Columbia University	2.07
14	Lehigh University	2.00
15	University of Washington	2.00
15	University of Illinois	2.00
17	Oklahoma State University	1.83
18	Stanford University	1.80
19	U.S. Air Force Academy	1.50
20	University of Cincinnati	1.50

Table 9. The International Academic Yield Rankings

Rank	Institution	Acad. yield
International Rothkopf Academic Yield Ranking 2015–2021		
1	Indian Institute of Technology, Bombay	2.10
2	University of Groningen	2.00
2	Korea Advanced Institute of Science and Technology	2.00
4	Tsinghua University	1.75
5	University of Modena and Reggio Emilia	1.75
6	National University of Singapore	1.50
7	University of Chile	1.43
8	Eindhoven University of Technology	1.25
8	Vlerick Business School	1.25
10	Adolfo Ibanez University	1.25
11	Erasmus University Rotterdam	1.00
11	Goethe University Frankfurt	1.00
11	Forestry Research Institute of Sweden	1.00
11	Indian Institute of Technology, Bombay Kharagpur	1.00
11	Technion - Israel Institute of Technology	1.00
11	Indian Institute of Technology, Bombay Roorkee	1.00
11	Universidad Popular Autónoma del Estado de Puebla	1.00
11	Bahir Dar University	1.00
11	University of London	1.00
11	Korea University	1.00
11	Ecole Superieure des Sciences Economiques et Commerciales	1.00
11	RMIT University	1.00
11	Lingnan College	1.00
11	Tokyo Institute of Technology	1.00
11	Erasmus University	1.00
11	UAE University	1.00
11	University of Porto	1.00
11	University of Auckland	1.00
11	Ozyegin University	1.00
11	Freie Universität Berlin	1.00
11	Polytechnic of Turin	1.00
11	University of Maribor	1.00
11	Vrije Universiteit Amsterdam	1.00
11	Hang Seng University of Hong Kong	1.00
11	Zurich Institute of Technology	1.00
11	Nyenrode Business University	1.00
11	Polytechnic University of Madrid	1.00
International Rothkopf Academic Yield Ranking 2018–2024		
1	Eindhoven University of Technology	4.25
2	Indian Institute of Technology, Bombay	3.00

Table 9. (Continued)

Rank	Institution	Acad. yield
3	Technische Universität Braunschweig	2.08
4	Tsinghua University	1.75
5	Shanghai University	1.75
6	Ghent University	1.50
6	Shanghai Jiao Tong University	1.50
8	The University of Hong Kong	1.50
9	Universidad de Buenos Aires	1.40
10	Erasmus University Rotterdam	1.33
10	Technical University of Munich	1.33
12	Adolfo Ibanez University	1.25
13	National University of Singapore	1.20
14	University of Augsburg	1.13
15	University of Cambridge	1.00
16	Indian Institute of Technology, Bombay Kharagpur	1.00
16	Indian Institute of Technology, Bombay Roorkee	1.00
16	Julius-Maximilians-Universität Würzburg	1.00
16	Nyenrode Business University	1.00
16	Tokyo Institute of Technology	1.00
16	Pohang University of Science and Technology	1.00
16	Universität Hamburg	1.00
16	Polytechnic of Turin	1.00
16	IDG Capital	1.00
16	Polytechnic University of Madrid	1.00
16	The American College of Greece	1.00
16	Renmin University of China	1.00
16	Goethe University Frankfurt	1.00
16	Zurich Institute of Technology	1.00
16	Universidad Popular Autónoma del Estado de Puebla	1.00
16	Universitat Oberta de Catalunya	1.00
16	Korea Advanced Institute of Science and Technology	1.00
16	Lingnan College	1.00
16	Freie Universität Berlin	1.00
16	Vlerick Business School	1.00
16	Vrije Universiteit Amsterdam	1.00
16	Zhejiang University	1.00
16	Hang Seng University of Hong Kong	1.00
16	Tel Aviv University	1.00

Blended Rankings

The blended rankings summarize the three rankings, giving an overall look at how institutions compare across all three measures. The North American rankings are given in Table 10. MIT reestablishes its consistent contribution to applied research, unseating Georgia Tech as the most prolific institution. The Colorado School of Mines and the University of Tennessee both move up in the rankings to spots 2 and 3, respectively, with the Colorado School of Mines moving up over four spots, on average, from the last ranking. Cornell and Columbia University have the most impressive improvements in rankings, with improvements of 7.0 and 12.67 in average rank, respectively. The Naval Postgraduate School and the University of Cincinnati fall 6.67 and 5 spots in average rank, respectively.

The international blended rankings are in Table 11. At rank 1, and then 2, IIT Bombay has proven to be a consistent contributor to applied research for the past decade. Eindhoven jumped nearly 14 spots in average rank in the most recent period to earn the top blended ranking most recently. In this highly volatile list, less than half of the schools are on both lists, lending to the inconsistent presence of applied research at these institutions.

Discussion

This set of two Rothkopf Rankings reveals some very familiar patterns, demonstrating both common threads and extreme volatility. It is clear to me after a decade of conducting these rankings and serving as Editor-in-Chief of the journal that applied research is often both random and opportunistic—based on nearly random opportunities that come before an individual researcher—and systemic—a part of the infrastructure and culture of an organization. Although policy changes, funding opportunities, and turnover may contribute to an institution's ongoing contribution to applied research, it seems that some have cultivated and supported a continued interest, and others are sporadic at best.

Let me make my point empirically. There are 29 U.S. institutions in the most recent seven-year period listed in visibility rankings from Table 4 (the ranking metric with the longest history). By my inspection, over the 13 prior Rothkopf rating periods (including 2015–2022 of this study), about 14 institutions have previously appeared only one or zero times in the rankings. These are the institutions whose researchers likely came across a research project by happenstance and, driven by curiosity, professional pride, ego, or a desire to see their applied research in print, pursued its publication, whatever their home institution deemed its value.

On the other hand, of those same institutions, approximately the other half have appeared 50% or more of the time in prior rankings. Table 12 lists those institutions, the rank they achieved in each ranking in which they appeared, the number of times they have appeared, and their average rank when they appeared. Clearly, appearing is preferred, so lexicographically, consider the number of appearances first (Ranking Count) and the average rank second (Avg. Rank). The schools achieving a number one rank in each period are in bold. These schools should be lauded for placing an emphasis on seeing research being put into practice in a sustained and systematic way.

For applied research to thrive consistently, it is incumbent upon the institutions themselves to create an environment in which applied research can thrive, not entrepreneurial researchers who serendipitously chance upon an interesting application. Sustained records like those exhibited in Table 12 do not come by chance.

Table 10. The U.S. Blended Rankings

Institution	Visibility rank	Yield rank	Academic yield rank	Average rank
North American Blended Ranking 2015–2021				
Georgia Institute of Technology	1	2	1	1.33
Massachusetts Institute of Technology	3	3	2	2.67
Naval Postgraduate School	3	4	4	3.67
University of Dayton	9	1	3	4.33
University of Tennessee	7	5	5	5.67
Colorado School of Mines	8	6	6	6.67
Pennsylvania State University	6	8	7	7.00
University of Michigan	5	9	9	7.67
University of South Carolina	10	7	8	8.33
University of Illinois	10	10	11	10.33
University of Cincinnati	13	11	13	12.33
University of Alabama	16	12	15	14.33
Stanford University	16	16	12	14.67
Cornell University	16	18	10	14.67
U.S. Air Force Academy	10	17	18	15.00
Carnegie-Mellon University	16	12	18	15.33
Clarkson University	24	15	14	17.67
Northwestern University	13	20	25	19.33
Emory University	16	25	27	22.67
Walden University	40	12	18	23.33
Columbia University	21	19	30	23.33
University of Texas	24	30	17	23.67
Loyola Marymount University	21	21	31	24.33
University of Wisconsin	21	24	28	24.33
Lehigh University	13	26	34	24.33
North American Blended Ranking 2018–2024				
Massachusetts Institute of Technology	1	2	1	1.33
Colorado School of Mines	3	1	3	2.33
University of Tennessee	6	3	2	3.67
Georgia Institute of Technology	5	4	4	4.33
University of Alabama	2	5	7	4.67
Cornell University	8	9	6	7.67
University of Michigan	7	7	9	7.67
University of Dayton	13	6	5	8.00
Naval Postgraduate School	13	12	8	11.00
Columbia University	13	10	13	12.00
Northwestern University	9	18	10	12.33
University of South Carolina	19	8	11	12.67
University of Illinois	13	11	15	13.00
U.S. Air Force Academy	9	13	19	13.67
Lehigh University	9	19	14	14.00
The Ohio State University	19	17	11	15.67
Stanford University	13	16	18	15.67
Clemson University	9	20	22	17.00
University of Cincinnati	19	13	20	17.33
Oklahoma State University	27	13	17	19.00
University of Northern Iowa	19	21	21	20.33
Loyola Marymount University	19	21	23	21.00
Furman University	19	21	23	21.00
West Virginia University	19	21	23	21.00
Carnegie-Mellon University	27	21	23	23.67
South Dakota School of Mines and Technology	19	29	23	23.67
Rensselaer Polytechnic Institute	3	35	31	23.00

Looking at the performance of those schools with no gaps in the rankings, the Naval Postgraduate School holds the highest average rank of all schools, followed closely by the Massachusetts Institute of Technology, the Georgia Institute of Technology, and the Colorado School of Mines. Tennessee rounds out the schools to appear in every ranking. Worthy of note: the Georgia Institute of Technology, with its recent surge in contributions to practice, has ranked first five times in total, whereas the Naval Postgraduate School and the Massachusetts Institute of Technology have each ranked first three times in this

Table 11. The International Blended Rankings

Institution	Visibility rank	Yield rank	Academic yield rank	Average rank
International Blended Ranking 2015–2021				
Indian Institute of Technology, Bombay	2	1	1	1.33
Korea Advanced Institute of Science and Technology	4	2	2	2.67
University of Groningen	7	3	2	4.00
University of Chile	1	5	7	4.33
University of Modena and Reggio Emilia	4	6	5	5.00
National University of Singapore	12	3	6	7.00
Polytechnic of Turin	7	7	12	8.67
Adolfo Ibanez University	12	7	11	10.00
Tsinghua University	7	20	4	10.33
Universidad Popular Autónoma del Estado de Puebla	12	7	12	10.33
Polytechnic University of Madrid	12	7	12	10.33
Goethe University Frankfurt	27	7	12	15.33
Lingnan College	27	7	12	15.33
Erasmus University Rotterdam	12	23	12	15.67
University of Maribor	12	23	12	15.67
Vrije Universiteit Amsterdam	12	23	12	15.67
Eindhoven University of Technology	12	28	8	16.00
Forestry Research Institute of Sweden	22	26	12	20.00
University of Florence	7	21	34	20.67
University of Porto	7	44	12	21.00
Instituto de Investigaciones Eléctricas	2	28	33	21.00
Leiden University	4	30	35	23.00
RMIT University	27	31	12	23.33
Tokyo Institute of Technology	27	31	12	23.33
University of Auckland	27	31	12	23.33
Hang Seng University of Hong Kong	27	31	12	23.33
Nyenrode Business University	27	31	12	23.33
International Blended Ranking 2018–2024				
Eindhoven University of Technology	3	2	2	2.33
Indian Institute of Technology, Bombay	2	3	3	2.67
Technische Universität Braunschweig	6	4	4	4.67
Shanghai University	7	6	6	6.33
Ghent University	7	5	7	6.33
Universidad de Buenos Aires	11	9	10	10.00
Erasmus University Rotterdam	11	11	11	11.00
Technical University of Munich	17	8	11	12.00
University of Augsburg	11	10	16	12.33
National University of Singapore	17	7	15	13.00
Polytechnic of Turin	11	12	18	13.67
Adolfo Ibanez University	17	12	14	14.33
Polytechnic University of Madrid	17	12	18	15.67
Universidad Popular Autónoma del Estado de Puebla	17	12	18	15.67
Korea Advanced Institute of Science and Technology	17	12	18	15.67
University of Cambridge	5	29	17	17.00
Julius-Maximilians-Universität Würzburg	32	12	18	20.67
Universität Hamburg	32	12	18	20.67
The American College of Greece	32	12	18	20.67
Tel Aviv University	32	12	18	20.67
Universitat Oberta de Catalunya	17	30	18	21.67
Vrije Universiteit Amsterdam	17	30	18	21.67
Tsinghua University	7	60	5	24.00
The University of Hong Kong	17	48	9	24.67
Goethe University Frankfurt	46	12	18	25.33
Lingnan College	46	12	18	25.33
Pohang University of Science and Technology	32	32	18	27.33
University of Florence	11	27	45	27.67

measure. The University of Tennessee and has shown dramatic improvement in rank the last decade. Despite not appearing in the first few rankings, the University of Michigan and Cornell have appeared in all rankings since the late 1990s, and South Carolina and Dayton have appeared in all rankings since the early 2000s, showing consistency in applied research in more recent years.

Table 12. Rank in Visibility Rankings Since its Inception (Seven or Greater Rankings)

	Visibility rankings in all 13 seven-year spans covered in Rothkopf Rankings (schools with seven or more rankings)														
	Year of ranking														
Institution	1996	1997	1999	2002	2004	2005	2007	2009	2011	2013	2016	2019	2022	2025	Ranking count	Avg rank
Naval Postgraduate School	10	5	5	5	**1**	3	4	**1**	**1**	2	3	6	3	13	14	4.4
Massachusetts Institute of Technology	**1**	**1**	2	7	9	9	5	6	4	10	5	3	3	**1**	14	4.7
Georgia Institute of Technology	10	12	12	21	6	3	**1**	3	3	**1**	**1**	**1**	**1**	5	14	5.7
Colorado School of Mines	9	12	5	10	15	9	3	2	2	3	4	5	7	3	14	6.4
University of Tennessee	34	24	21	16	36	34	20	15	27	27	9	21	6	6	14	21.1
Stanford University	2	8	3	7	6	5	16	36		14	14	15	9	13	13	11.4
University of Michigan		22	15	16	17	22	20	24	37	27	9	7	5	7	13	17.5
Cornell University			31	16	6	5	8	4	10	22	23	30	16	8	12	14.9
University of Cincinnati	14	24	17	25	34				20	7	7	29	13	19	11	19.0
Rensselaer Polytechnic Institute		16	16	29	24	22	20	36				2	2	3	10	17.0
Northwestern University			12	12	24	34			37		15	23	13	9	9	19.9
University of Dayton							36	36	14	14	9	12	8	13	8	17.8
University of South Carolina								24	27	27	15	8	9	19	7	18.4

There is a counter-story to be told by what is *missing*—there are many, many schools that were regularly ranked in the early rankings but no longer appear. Whether there was a change in faculty, institutional focus, budgets, policy, or incentives is a story to be told by the individual institutions. However, such a shift of focus away from application is something I believe our profession can ill afford, yet I sense is the current trend.

Internationally, there is far less consistency in applied research, but an even more impressive, yet concentrated, commitment to it. Three schools—the University of Chile 11 times ranked with an average rank of 1.4, Erasmus University Rotterdam 10 times ranked (average rank: 5.5), and the University of British Columbia 9 times ranked (average rank: 4.55)—have appeared with any regularity. Unfortunately, all are appearing now well below their normal rank, and the University of Chile, with its seven consecutive first-place rankings leading up to this ranking, including 2022, faces its first ranking below 3 in history. The University of British Columbia has three first-place rankings, and Erasmus has two; thus, the three intuitions combine for 12 of the 14 all-time first-place rankings. However, despite their long and proud history in this area, all show a decided downward trend in applied research in recent history.

Conclusions

The Rothkopf Rankings provide important information and an important service to our discipline. The application of our science is, at its core, what give us purpose. Although institutions and business school deans perhaps value journal rankings and those that appear on "certain lists," which invariably reduces faculty contribution to practice, it is the opinion of the author that those who put our discipline's methods to work in practice prove our value more than appearing.

It is my hope that prospective graduate students will consider these rankings when choosing a graduate program, as will graduate programs when hiring faculty. Certainly, firms hiring employees to apply the craft would want to hire from institutions that have emphasized the art of putting theory into practice. Finally, I hope some of those schools that have been leaders in applied research in the past and have led the way will notice the absence of their intuitions on this ranking and do rejoin the fray in applied research.

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