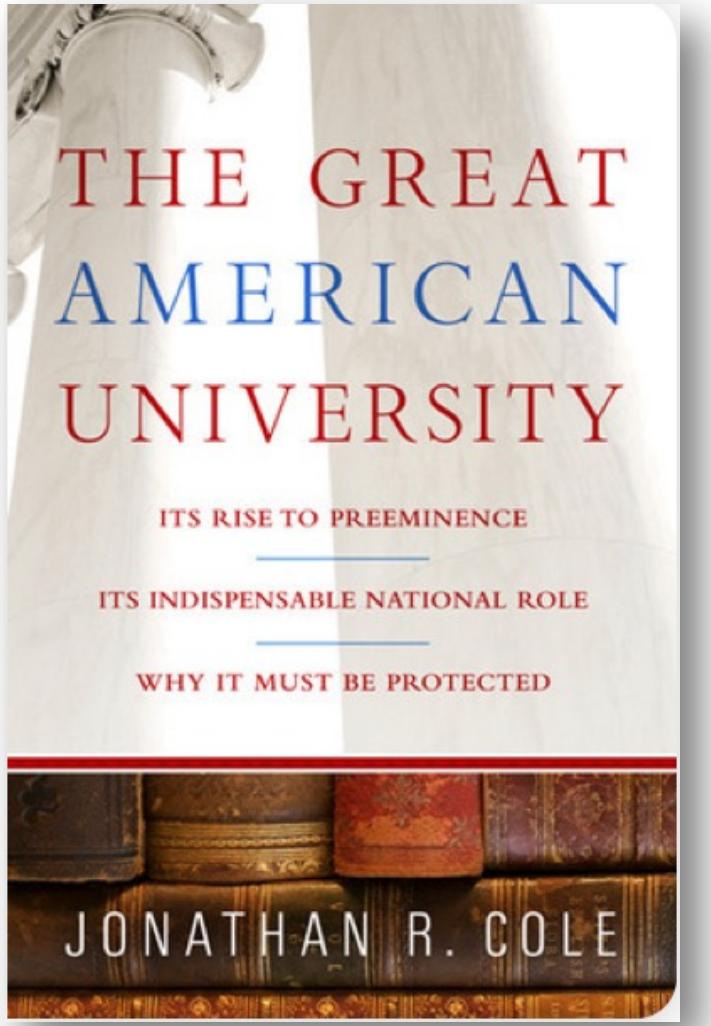
WHAT IS A GREAT PUBLIC RESEARCH UNIVERSITY?

The UTSA Journey

JoAnn Browning, Interim Vice President for Research
Heather Shipley, Interim Provost and Senior Vice President for Academic Affairs
Steve Wilkerson, Associate Vice Provost for Institutional Research and Analysis
Taylor Eighmy, President

August 16, 2023



The Great American University

Jonathan R. Cole

1956th Stated Meeting, held in collaboration with Boston University on September 16, 2010, at Boston University

Jonathan R. Cole

Jonathan R. Cole is the John Mitchell Mason Professor of the University at Columbia University and was Provost and Dean of Faculties from 1989 to 2003. He has been a Fellow of the American Academy since 1992.

Presentation

When most educated Americans think about our great universities, they probably don't think about the origins of lasers, FM radio, magnetic resonance imaging, global positioning systems, barcodes, the Google algorithm, the fetal monitor, the nicotine patch, antibiotics, the Richter scale, buckyballs and nanotechnology, the discovery of the insulin gene, the invention of the computer, or the development of bioengineering through the discovery of recombinant DNA. Nor do they think about improved weather forecasting, cures for childhood leukemia, the pap smear, scientific agriculture, surveying and measuring public opinion, or the concepts of congestion pricing, human capital, and the self-fulfilling prophecy. They almost certainly don't think about the electric toothbrush, Gatorade, the Heimlich maneuver, or Viagra. Yet all these discoveries and innovations have their origins at American research universities.

Most people think of universities in terms of undergraduate and professional education – of teaching and the transmission of knowledge – rather than in terms of the creation of knowledge. This point of view is understandable: Americans are concerned about the education of their children and grandchildren, and they base their understanding of universities on their own experiences in education. Certainly, teaching undergraduate and graduate students is critically important and an integral part of the university's mission. But what has made our universities the greatest in the world is not the quality of our undergraduate education – as important as that is – but our ability to fulfill one of the other central missions of leading universities: the production of new knowledge through the discoveries that change our lives and the world.

In *The Great American University*, I tell the story of how American universities became the greatest engine of innovation and discovery the world has perhaps ever known, how that success was achieved in a relatively short period of time, and how our universities are under threat today. On what evidence do I base the claim that our universities are the best in the world? During the past century, the United States has produced an abundance of creative scientists – more than any other nation.

In numerous surveys and rankings, 80 percent of the top 20 universities in the world are in the United States; American universities make up 75 percent of the top 50 and roughly 60 percent of the top 100. Economist Henry Rosovsky approximated these basic ratios years ago, and the numbers still hold today. There is not one German university in the top 50, nor one Russian university in the top 75 (unless they do their own rankings). By China's own accounting, there are no Chinese universities in the top 200. Furthermore, 60 percent of all Nobel Prize winners in science since World War II have been Americans or foreign nationals working at American universities. The most widely cited scientific literature is dominated by American scientists and scholars. Indeed, American universities have become the envy of the world. Because many of the brightest and most able young people throughout the world want to attend and work at them, our universities may collectively represent the only American industry that currently has a favorable balance of trade.

What has made our universities the greatest in the world is not the quality of our undergraduate education but the production of new knowledge through the discoveries that change our lives and the world.

Contrary to what most people think, the American research university is amazingly young, and it is highly embedded in the dynamics of the larger American society. It did not originate in 1636, when Harvard University opened its doors, or with the founding of Yale University or Columbia University, though we tend to think of these institutions as old, great universities. In reality, the American research university dates to one hundred years after the signing of the Declaration of Independence, when Johns

"But what has made our universities the greatest in the world is not the quality of our undergraduate education– as important as that is– but our ability to fulfill one of the central missions of leading universities: the production of new knowledge through discoveries that change our lives and the world."

DESIGNATIONS OF EXCELLENCE

1 of 5 institutions with all **4**

Tier One Research Classification

Recognizes UTSA as one of USA's top 4% research institutions

Excelencia in Education Seal of Excelencia

Recognizes UTSA's leadership in advancing Latino student success

Community Engagement Classification

Highlights UTSA's commitment to serving the San Antonio region

Innovation & Economic Prosperity University

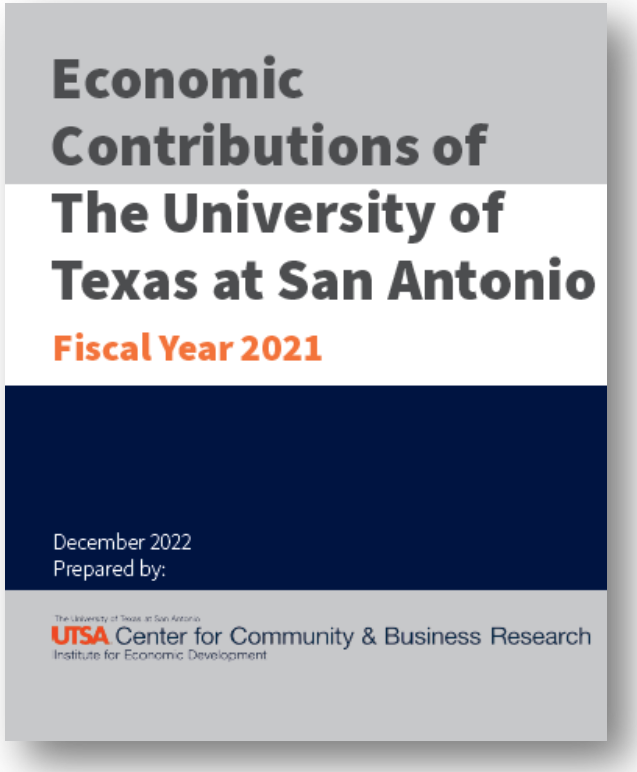
Recognizes UTSA's leadership in fostering economic growth, prosperity and innovation.

HISPANIC SERVING & CARNEGIE R1

ALLIANCE MEMBER UNIVERSITIES

ALLIANCE OF HISPANIC SERVING RESEARCH UNIVERSITIES

ECONOMIC & COMMUNITY IMPACT



$2.5 Billion
Direct Economic Impact FY 2021
(Total revenues or output)

$1.3 Billion Gross Regional Product	**17,620** Jobs Supported in the Area
$814.3 Million Salaries and Wages to Workers	**$33.2 Million** State Government Revenues
$33.7 Million Local Government Revenues	

7 NATIONAL ACADEMY MEMBERS

NATIONAL ACADEMY OF ENGINEERING

Rena Bizios

Sergio Alcocer

Randall Poston

NATIONAL ACADEMY OF MEDICINE

Leadership • Innovation • Impact | *for a healthier future*

Michael Yaszemski

Rena Bizios

AMERICAN ACADEMY OF ARTS & SCIENCES

Rena Bizios

Coming 2023

6 NATIONAL ACADEMY OF INVENTORS

NATIONAL ACADEMY OF INVENTORS

Taylor Eighmy

Ravi Sandhu

Anson Ong

Rena Bizios

David Akopian

Michael Yaszemski

AAAS

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Taylor Eighmy

Audrey Lamb

Rena Bizios

A.T. Chronopoulos

Aimin Liu

Angela Speck

Ravi Sandhu

James Chambers

Banglin Chen

Howard Grimes

George Perry

NSF CAREER AWARDS

2023

David Restrepo

Chris Combs

Itamar Lerner

2022

Chris Rathbone

Anthony Rios

2021

Gabriela Romero Uribe

Amir Jafari

Yanmin (Emily) Gong

Wei Gao

Ahmad Taha

2020

Murtuza Jadliwala

2019

Alexis Godet

Niko Gatsis

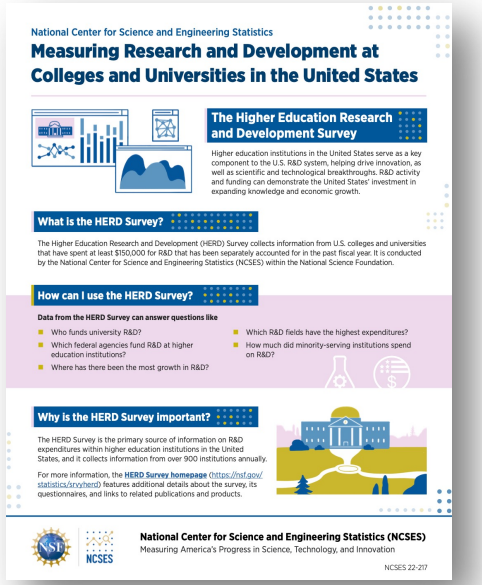
Teja Guda

Xiaoyin Wang

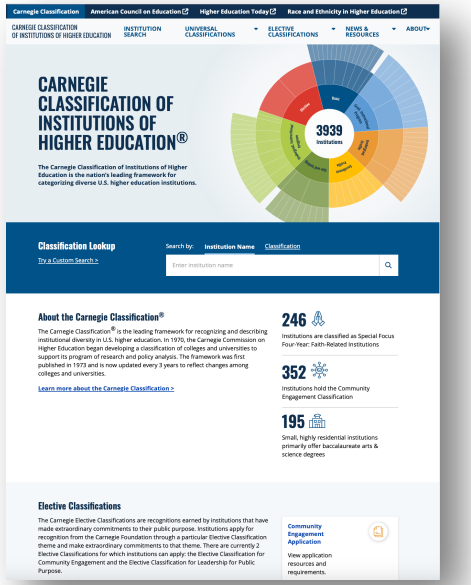
Bing Dong

Various Measures For Research Quality

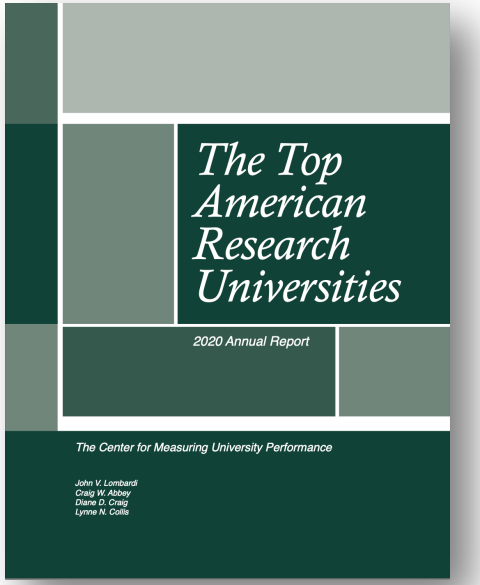
NSF HERD



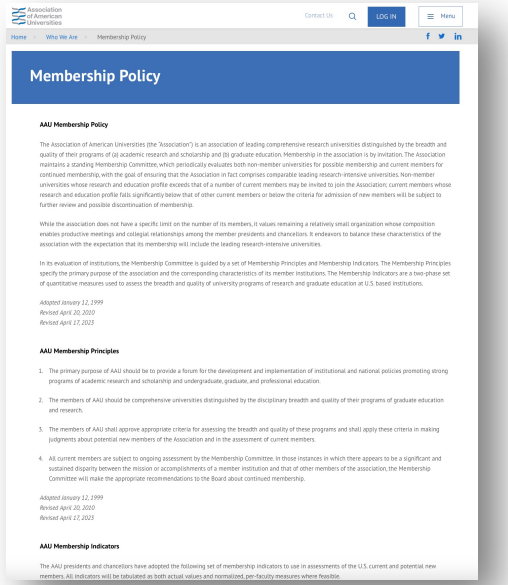
CARNEGIE R1



CMUP



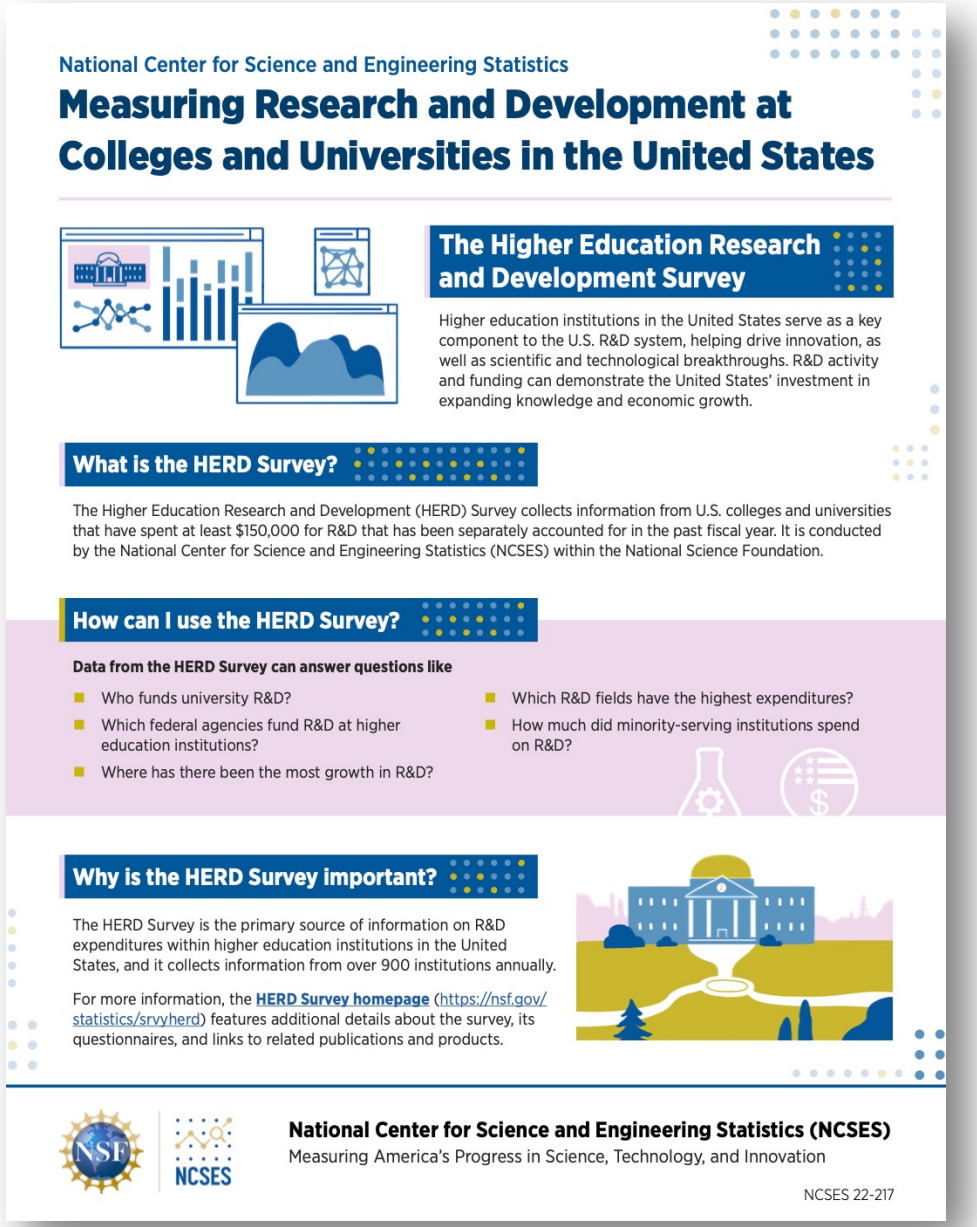
AAU



NSF HERD

METRICS:

- Total Research Expenditures
- Federal Research Expenditures
- By Major Agency (NSF, NIH, DOD, DOE, etc.)
- State and Local Expenditures
- Institutional Expenditures
- Business Expenditures
- Non-Profit Expenditures
- All Other Sources



National Center for Science and Engineering Statistics

Measuring Research and Development at Colleges and Universities in the United States

The Higher Education Research and Development Survey

Higher education institutions in the United States serve as a key component to the U.S. R&D system, helping drive innovation, as well as scientific and technological breakthroughs. R&D activity and funding can demonstrate the United States' investment in expanding knowledge and economic growth.

What is the HERD Survey?

The Higher Education Research and Development (HERD) Survey collects information from U.S. colleges and universities that have spent at least $150,000 for R&D that has been separately accounted for in the past fiscal year. It is conducted by the National Center for Science and Engineering Statistics (NCSES) within the National Science Foundation.

How can I use the HERD Survey?

Data from the HERD Survey can answer questions like

- Who funds university R&D?
- Which federal agencies fund R&D at higher education institutions?
- Where has there been the most growth in R&D?
- Which R&D fields have the highest expenditures?
- How much did minority-serving institutions spend on R&D?

Why is the HERD Survey important?

The HERD Survey is the primary source of information on R&D expenditures within higher education institutions in the United States, and it collects information from over 900 institutions annually.

For more information, the **HERD Survey homepage** (https://nsf.gov/statistics/srvyherd) features additional details about the survey, its questionnaires, and links to related publications and products.

National Center for Science and Engineering Statistics (NCSES)

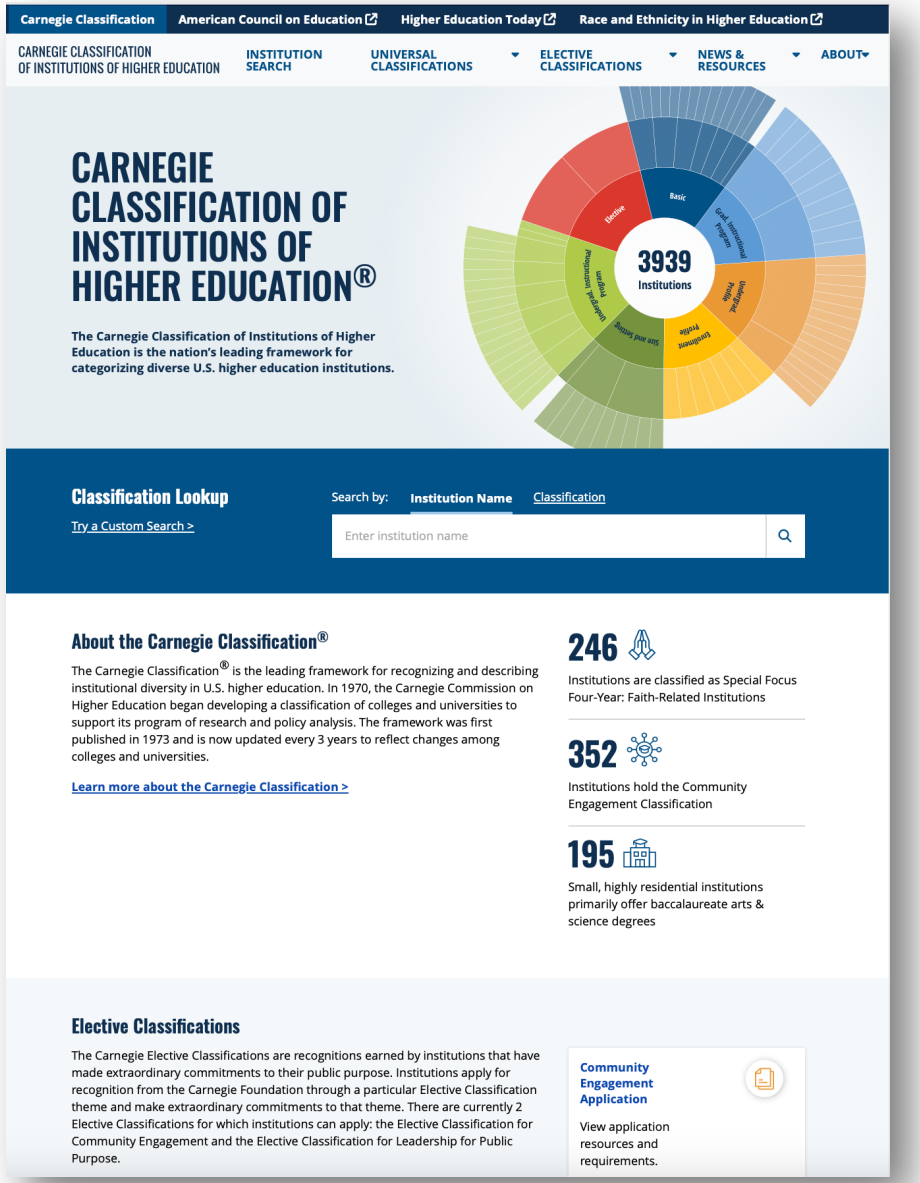
Measuring America's Progress in Science, Technology, and Innovation

NCSES 22-217

CARNEGIE R1

METRICS:

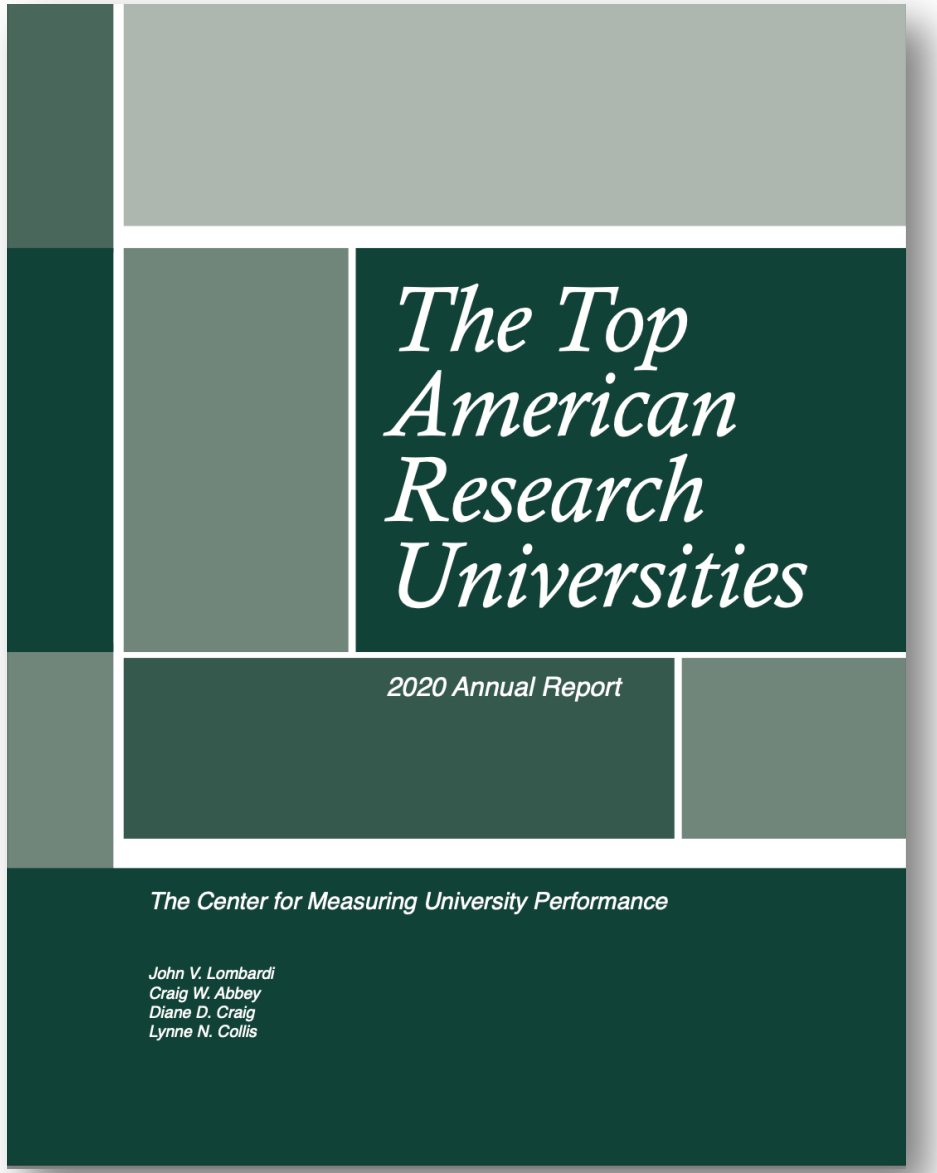
- Total Research Expenditures
- STEM Research Expenditures
  - By Major Agency (NSF, NIH, DOD, DOE, etc.)
- Non-STEM Expenditures
- Research Staff (Post-docs)
- Number of Faculty
- Total PhDs
- STEM PhDs
- Humanities PhDs
- Social Sciences PhDs
- Other PhDs



CMUP

METRICS:

- Total Research Expenditures
- Federal Research Expenditures
  - By Major Agency (NSF, NIH, DOD, DOE, etc.)
- Research by Major Discipline
- Endowment Assets
- Annual Giving
- National Academy Memberships
- Faculty Awards
- Doctorates Awarded
- Postdoctoral Appointees
- SAT Scores
- National Merit Scholars



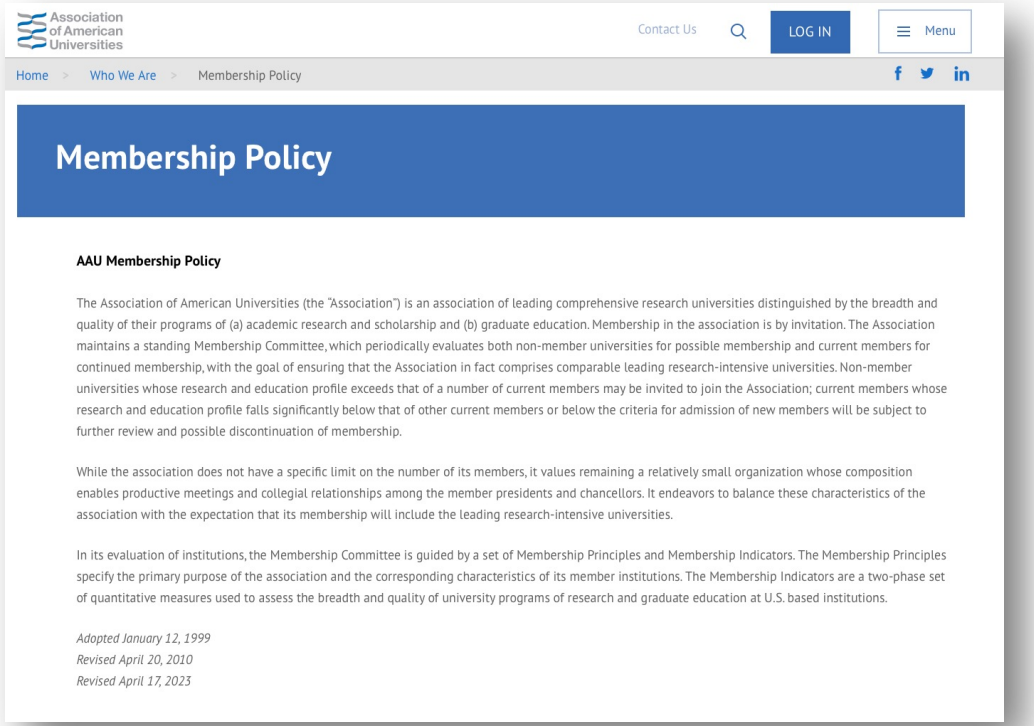
AAU

PHASE 1 METRICS:

- Federal Research Expenditures
  - By Major Agency (NSF, NIH, DOD, DOE, etc.)
- Faculty Awards, Fellowships, Memberships including National Academies
- Thomas Reuters InCites Citations
- Books (esp Arts, Humanities, Social Sciences)

PHASE 2 METRICS:

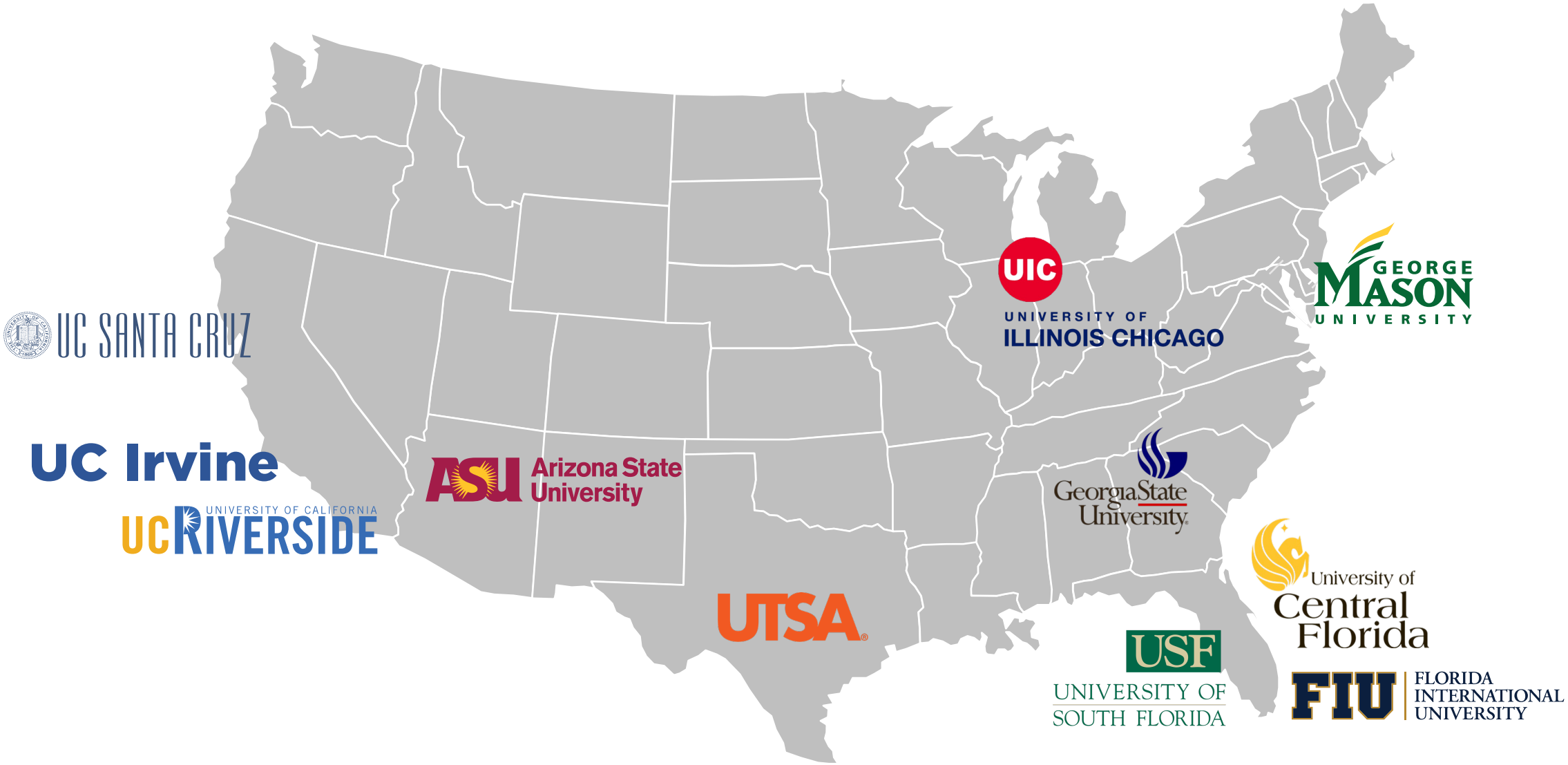
- USDA, State, Industrial Expenditures
- Doctorates graduated
- Postdoctoral Appointees



OTHER CONSIDERATIONS:

- Pell
- Undergraduate Graduation Rates
- Pell Recipient Graduation Rates
- Graduation Rate Gap

NATIONAL ASPIRANTS



NATIONAL ASPIRANTS

Institution	Age	Total Enrollment	Grants a Medical Degree	Land Grant Institution	Carnegie Classification	Association of American Universities	Carnegie Community Engaged	APLU Innovation & Economic Prosperity	*Seal* of Excelencia	Athletic Conference **not football*
Arizona State University	138	77,881	N	N	R1	Y	Y	Y	Y	Pacific-12
Florida International University	58	56,664	Y	N	R1	N	Y	Y	Y	Conference USA
George Mason University	74	38,628	N	N	R1	N	N	N	N	Atlantic 10 Conference*
Georgia State University	110	36,973	N	N	R1	N	N	N	N	Sunbelt
University of California, Irvine	59	36,505	Y	N	R1	Y	N	N	N	Big West Conference*
University of California, Santa Cruz	58	19,841	N	N	R1	Y	N	N	Y	Big West Conference*
University of California, Riverside	69	26,847	Y	N	R1	Y	N	N	Y	Big West Conference*
University of Central Florida	60	70,310	Y	N	R1	N	Y	Y	Y	Big 12
University of Illinois, Chicago	164	34,199	Y	N	R1	N	N	N	Y	Horizon League*
University of South Florida	67	49,708	Y	N	R1	Y	Y	Y	N	American Athletic Conference
University of Texas at San Antonio	54	34,734	N	N	R1	N	Y	Y	Y	American Athletic Conference

TEXAS PEER INSTITUTIONS

TEXAS PEERS

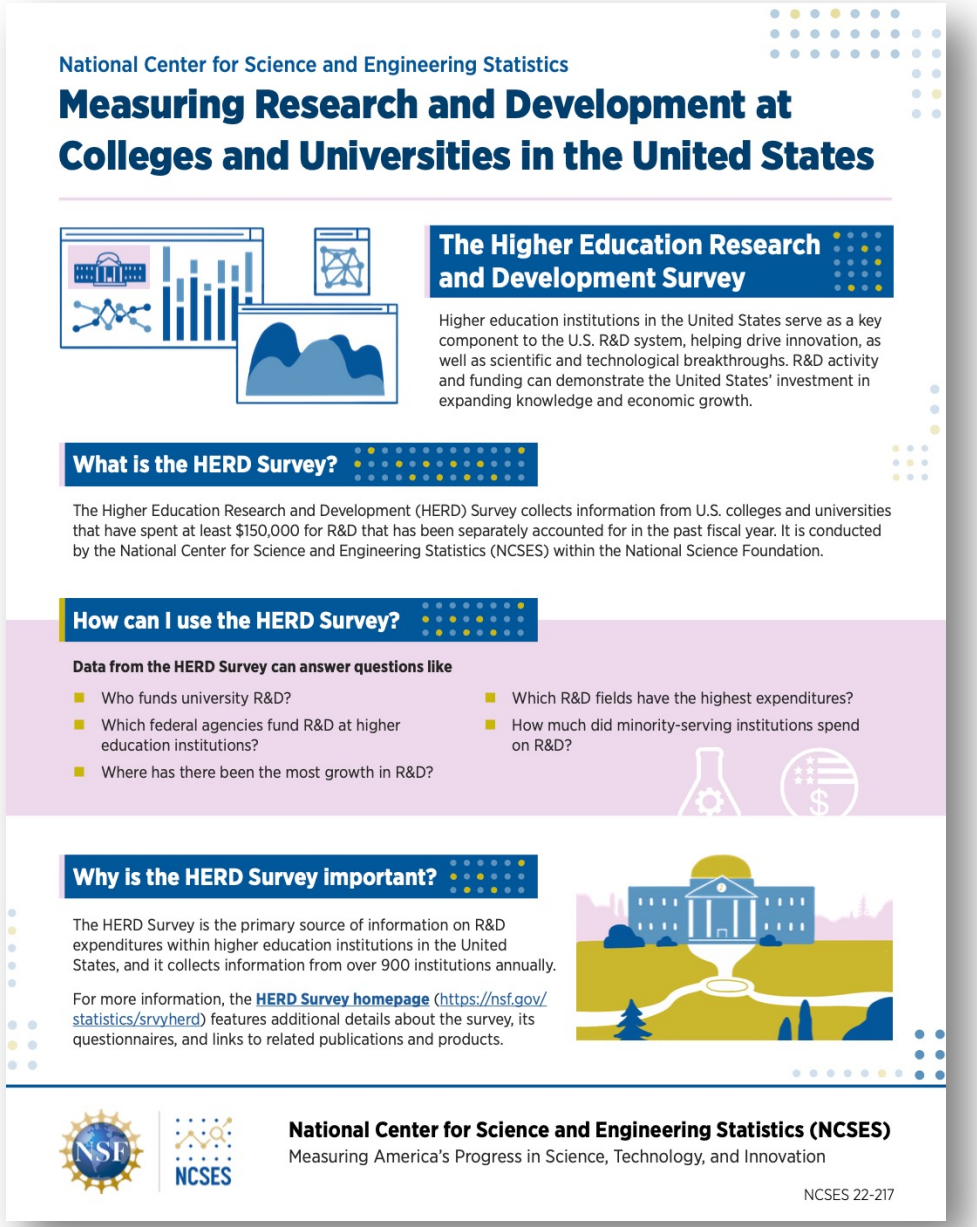
Institution	Age	Total Enrollment	Grants a Medical Degree	Land Grant Institution	Carnegie Classification	Association of American Universities	Carnegie Community Engaged	APLU Innovation & Economic Prosperity	*Seal* of Excelencia	Athletic Conference **not football*
Texas A&M University	147	72,530	Y	Y	R1	Y	N	N	N	Southeastern Conference
Texas State University	124	37,864	N	N	R2	N	N	N	Y	Sun Belt Conference
Texas Tech University	100	40,542	N	N	R1	N	Y	Y	N	Big Twelve Conference
University of Houston	89	47,031	N	N	R1	N	Y	Y	N	Big Twelve Conference
University of North Texas	133	42,441	N	N	R1	N	N	N	N	American Athletic Conference
University of Texas at Arlington	128	45,949	N	N	R1	N	N	N	Y	Sun Belt Conference*
University of Texas at Austin	140	51,991	Y	N	R1	Y	Y	N	Y	Big Twelve Conference
University of Texas at Dallas	62	29,696	N	N	R1	N	N	Y	N	American Southwest Conference*
University of Texas at El Paso	109	24,003	N	N	R1	N	Y	Y	Y	Conference USA
University of Texas at San Antonio	54	34,734	N	N	R1	N	Y	Y	Y	American Athletic Conference

NSF HERD: SOME DATA

2022 Higher Education Research and Development (HERD) Report: 2021 Data

METRICS:

- Total Research Expenditures
- Federal Research Expenditures
- NSF Expenditures
- NIH Expenditures



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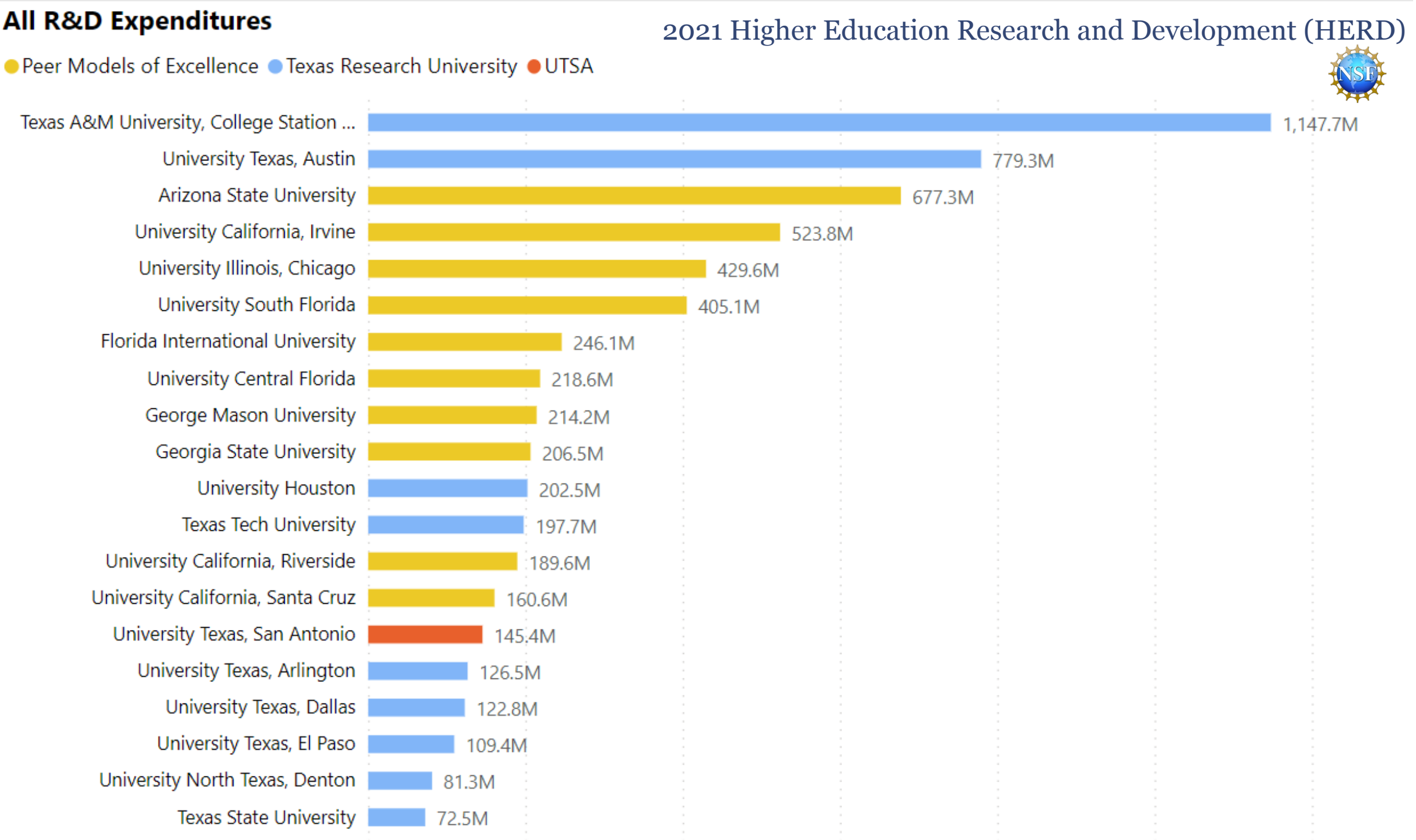
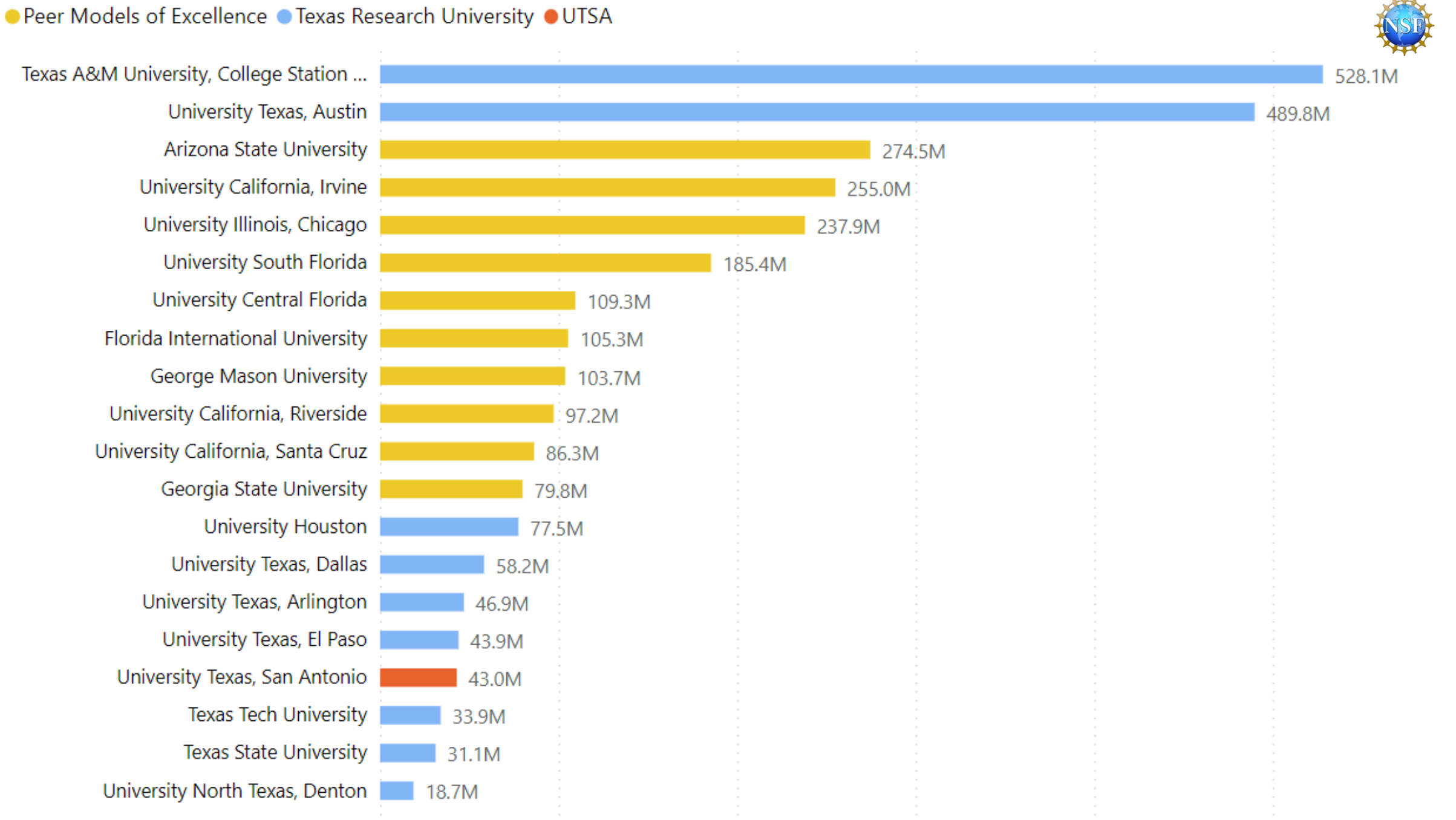
Measuring America's Progress in Science, Technology, and Innovation

NCSES 22-217

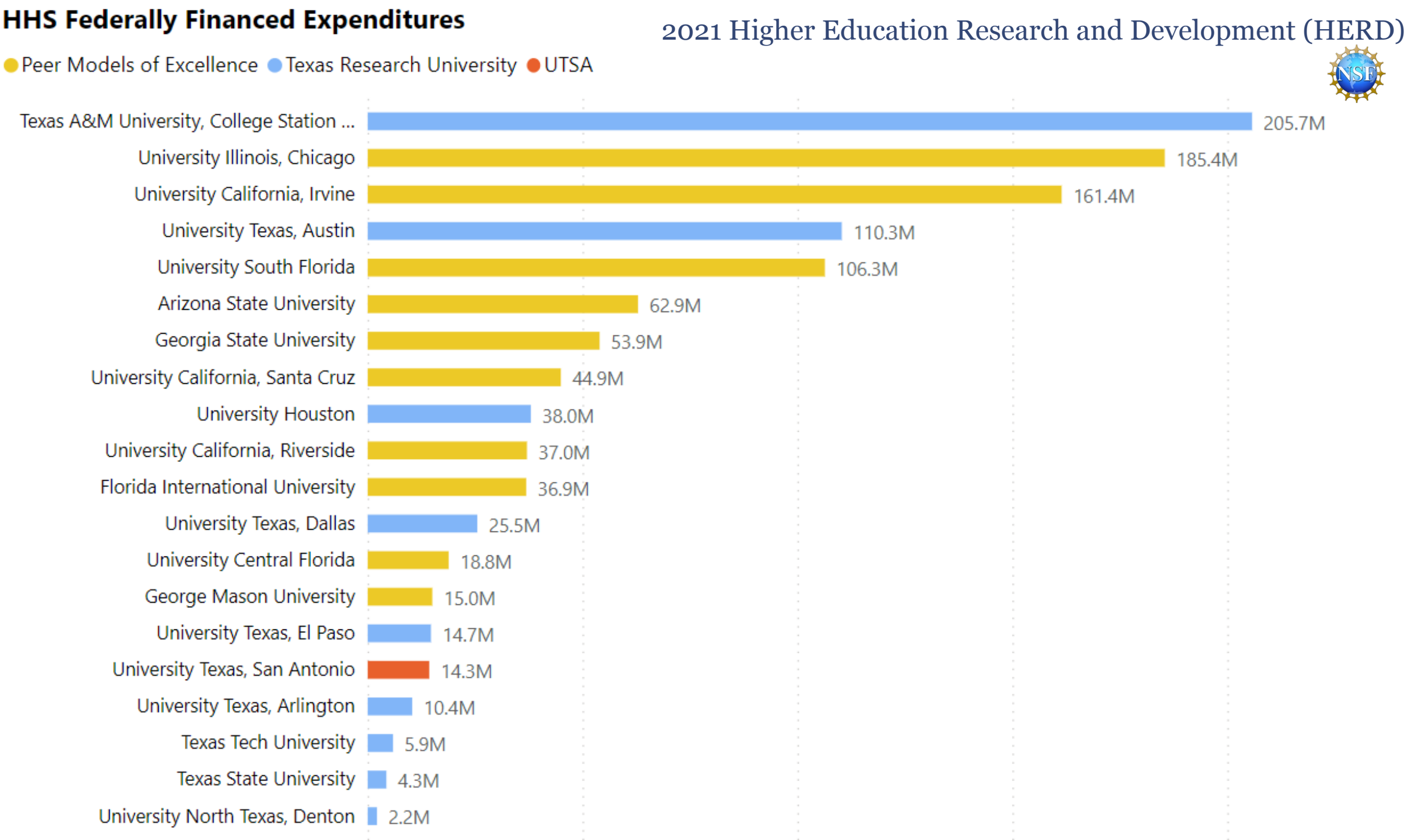
2021 Higher Education Research and Development (HERD)



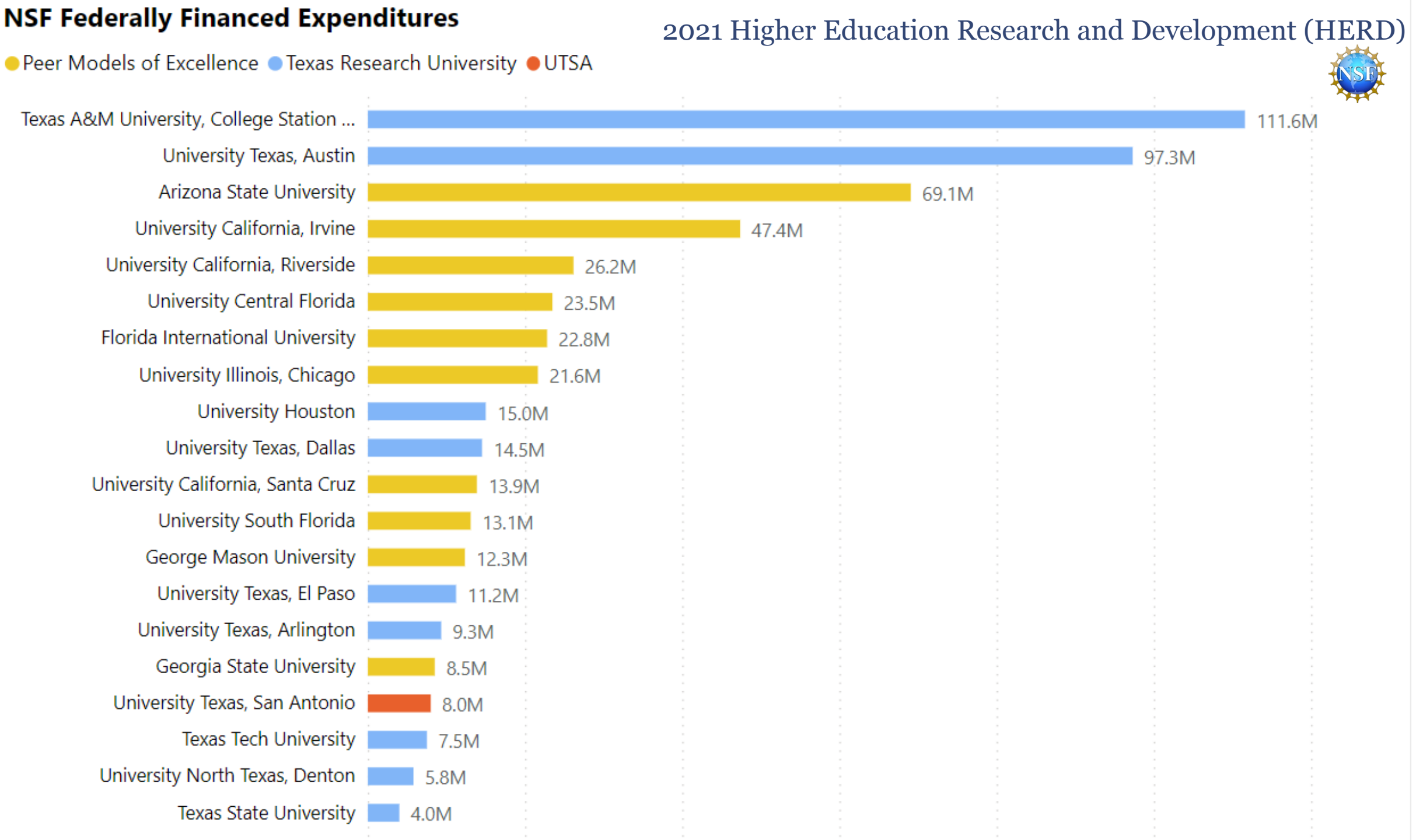
2021 Higher Education Research and Development (HERD)



2021 Higher Education Research and Development (HERD)



2021 Higher Education Research and Development (HERD)



CARNEGIE R1 SOME DATA

2022 Report, Showing 2021 Data

METRICS:

- Total Research Expenditures
- STEM Research Expenditures
  - By Major Agency (NSF, NIH, DOD, DOE, etc.)
- Non-STEM Expenditures
- Research Staff (Post-docs)
- Number of Faculty
- Total PhDs
- STEM PhDs
- Humanities PhDs
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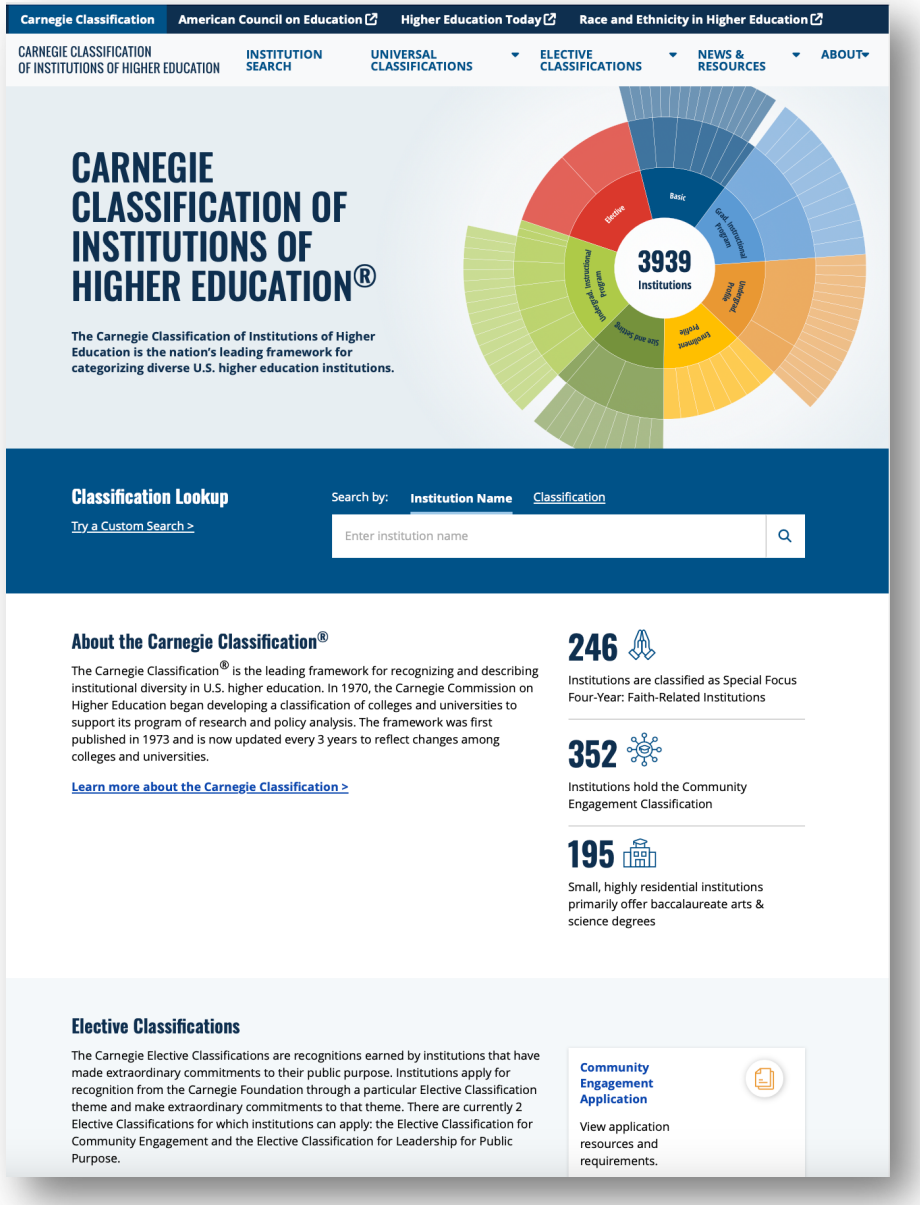
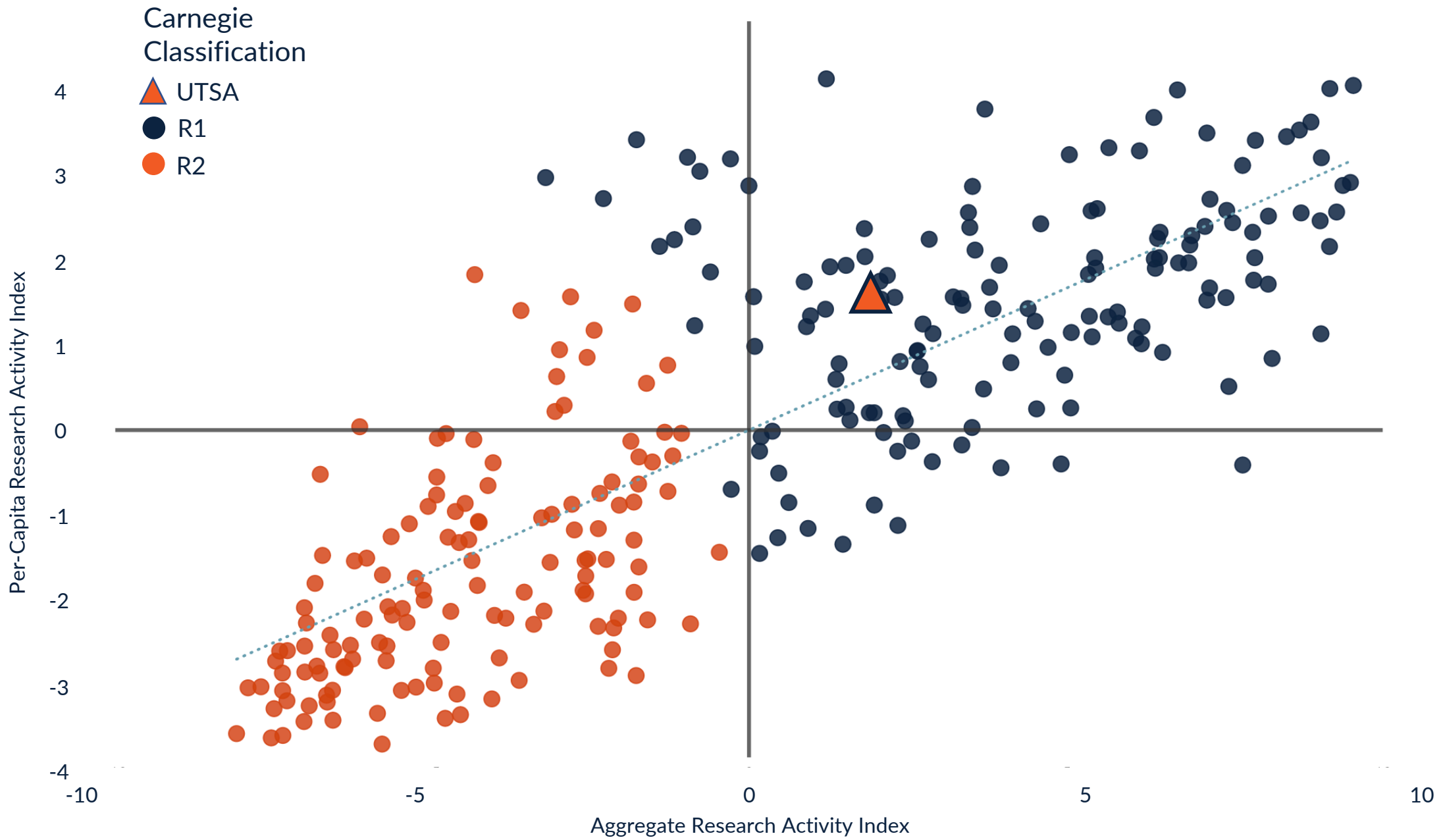
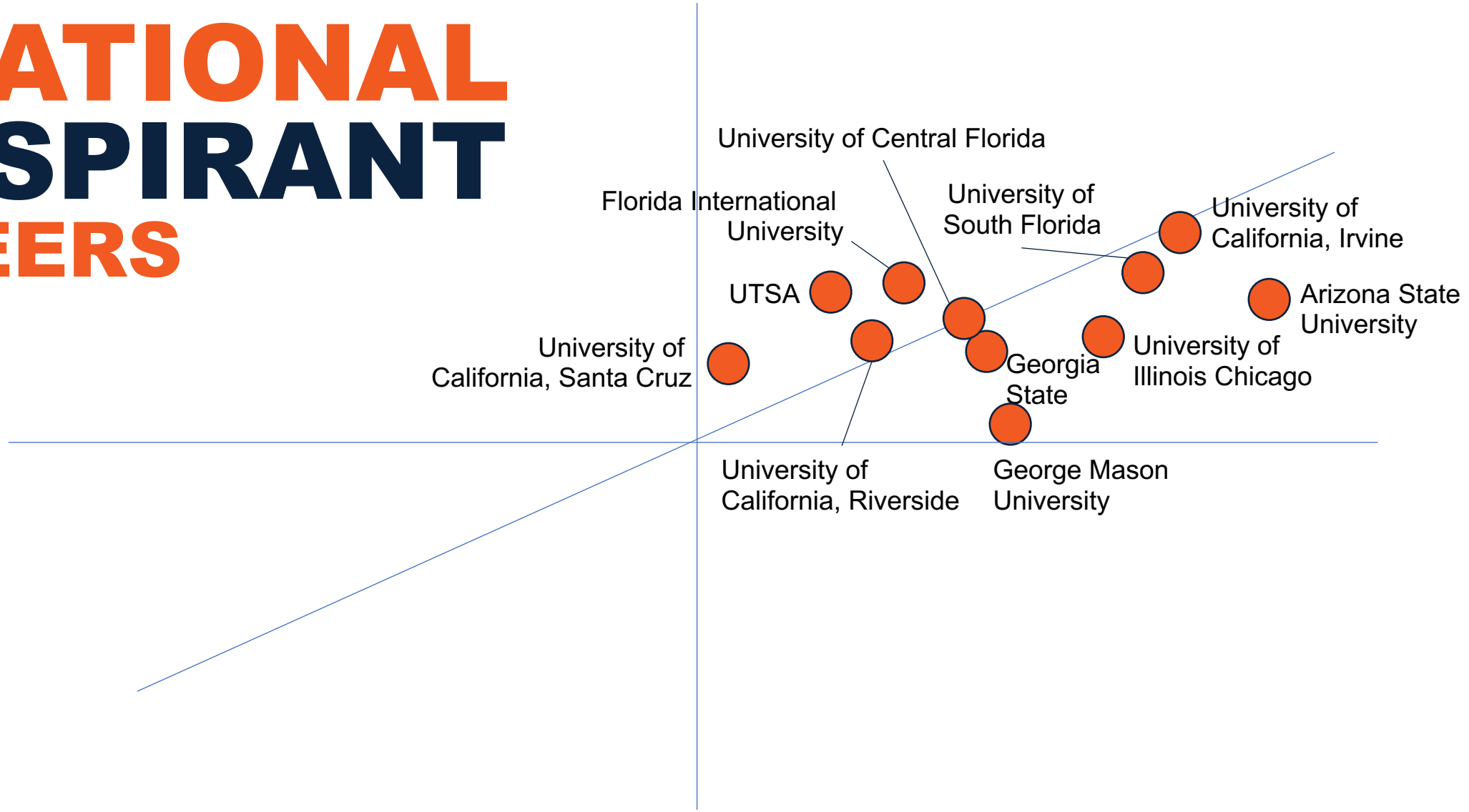
- Other PhDs



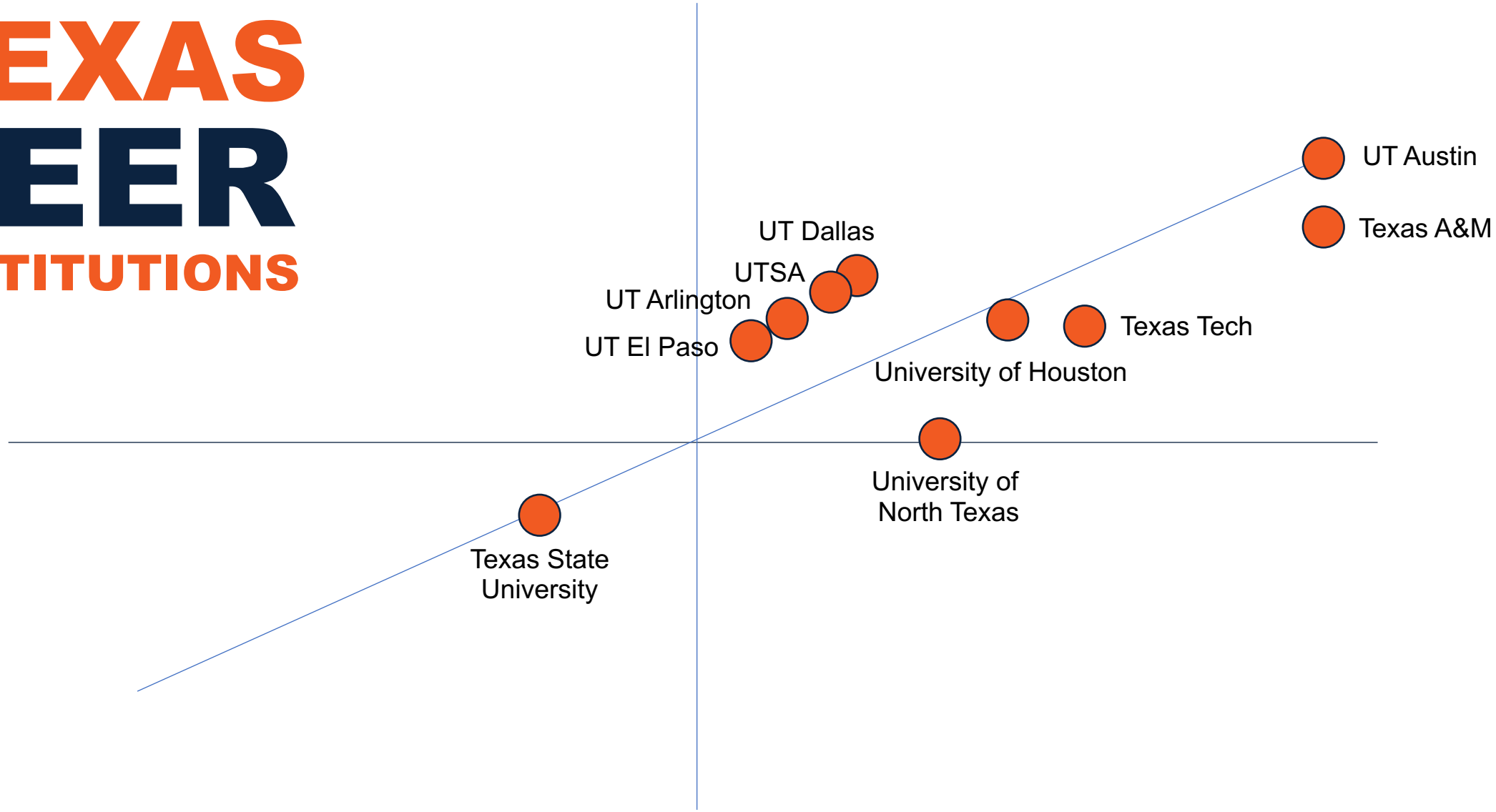
Carnegie R1 Classification



NATIONAL ASPIRANT PEERS

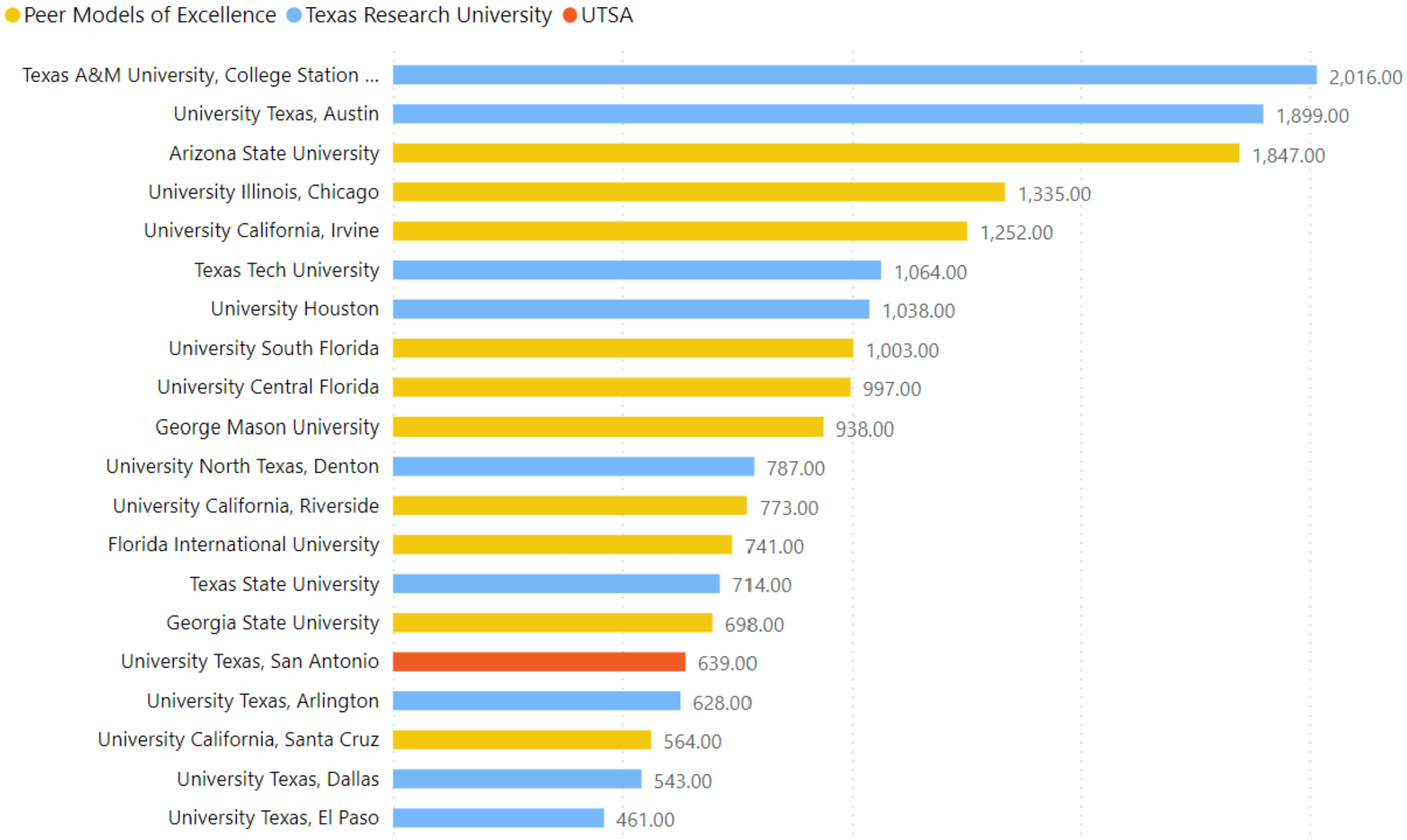


TEXAS PEER INSTITUTIONS



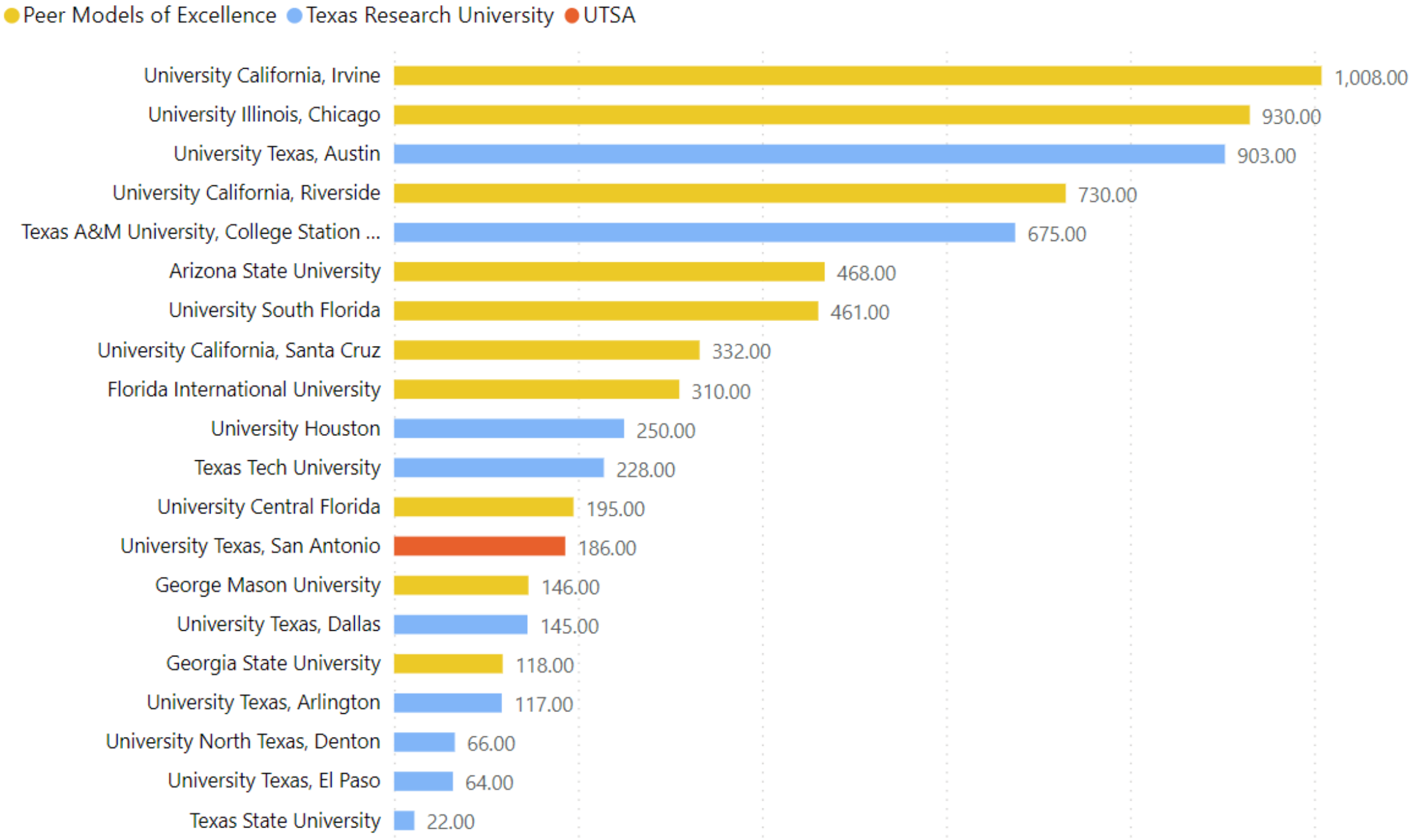
Tenured Tenure-Track Faculty Count

2020 IPEDS



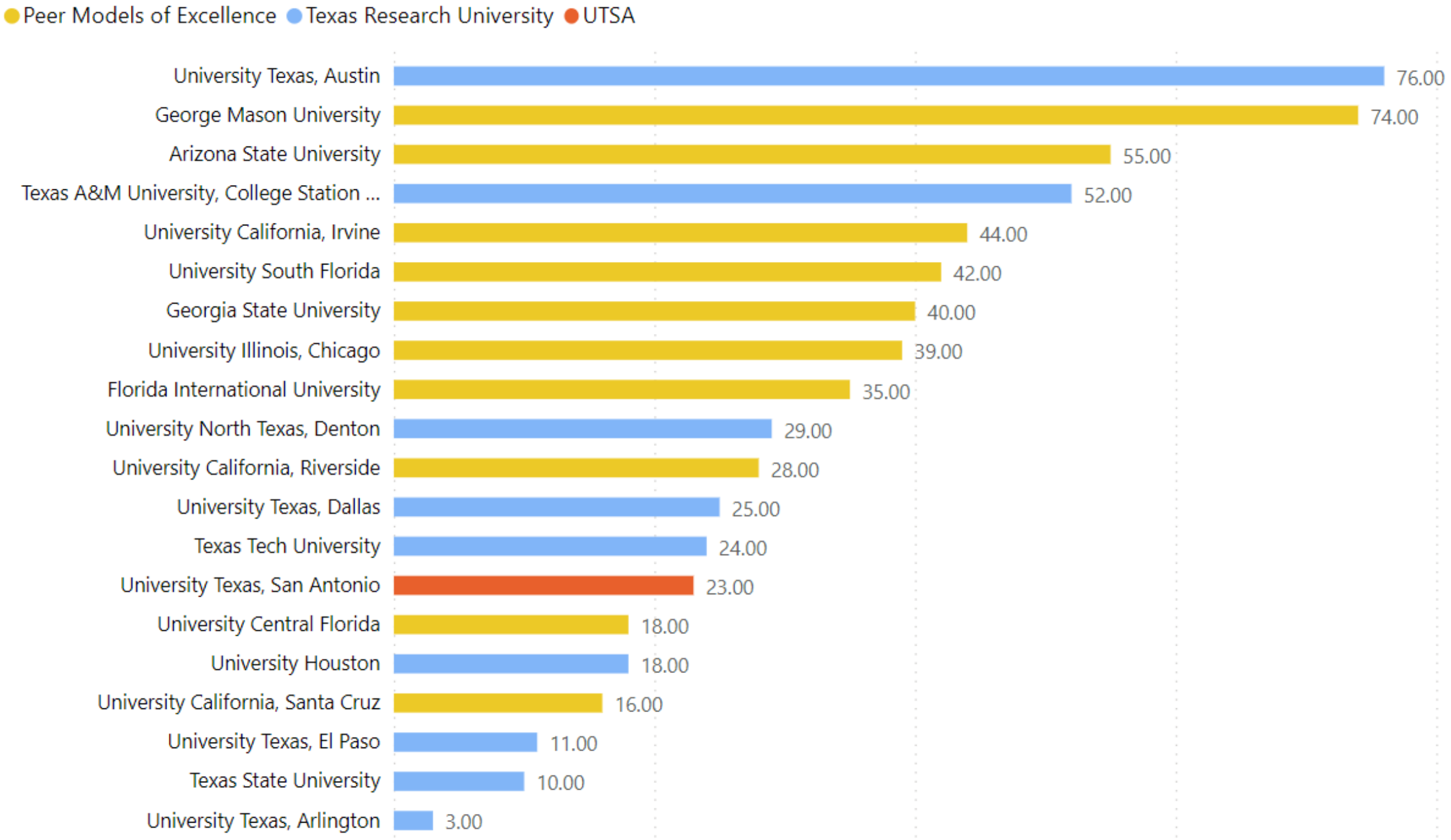
Research Staff

2020 IPEDS



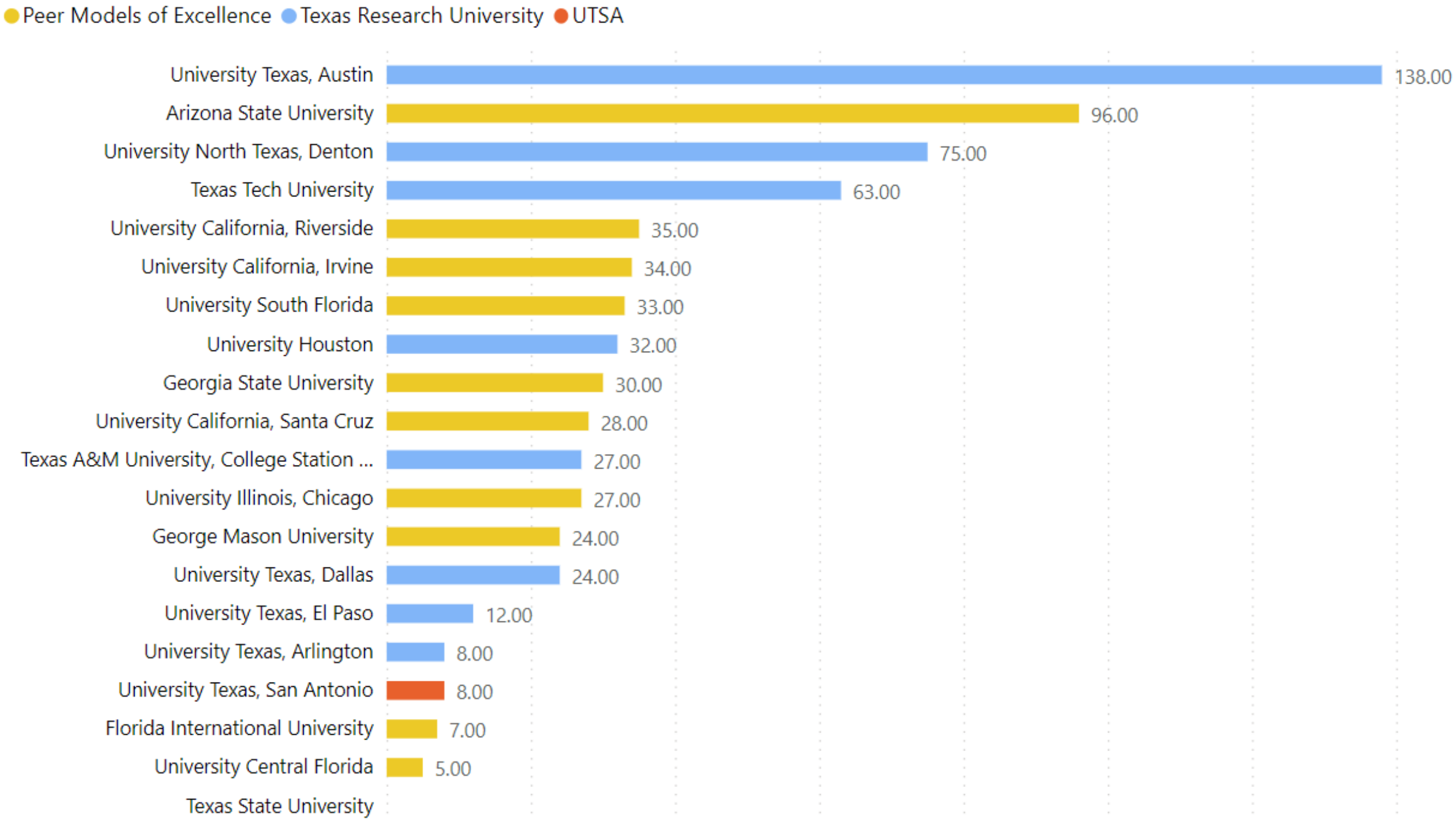
Humanities PhDs

2020 IPEDS



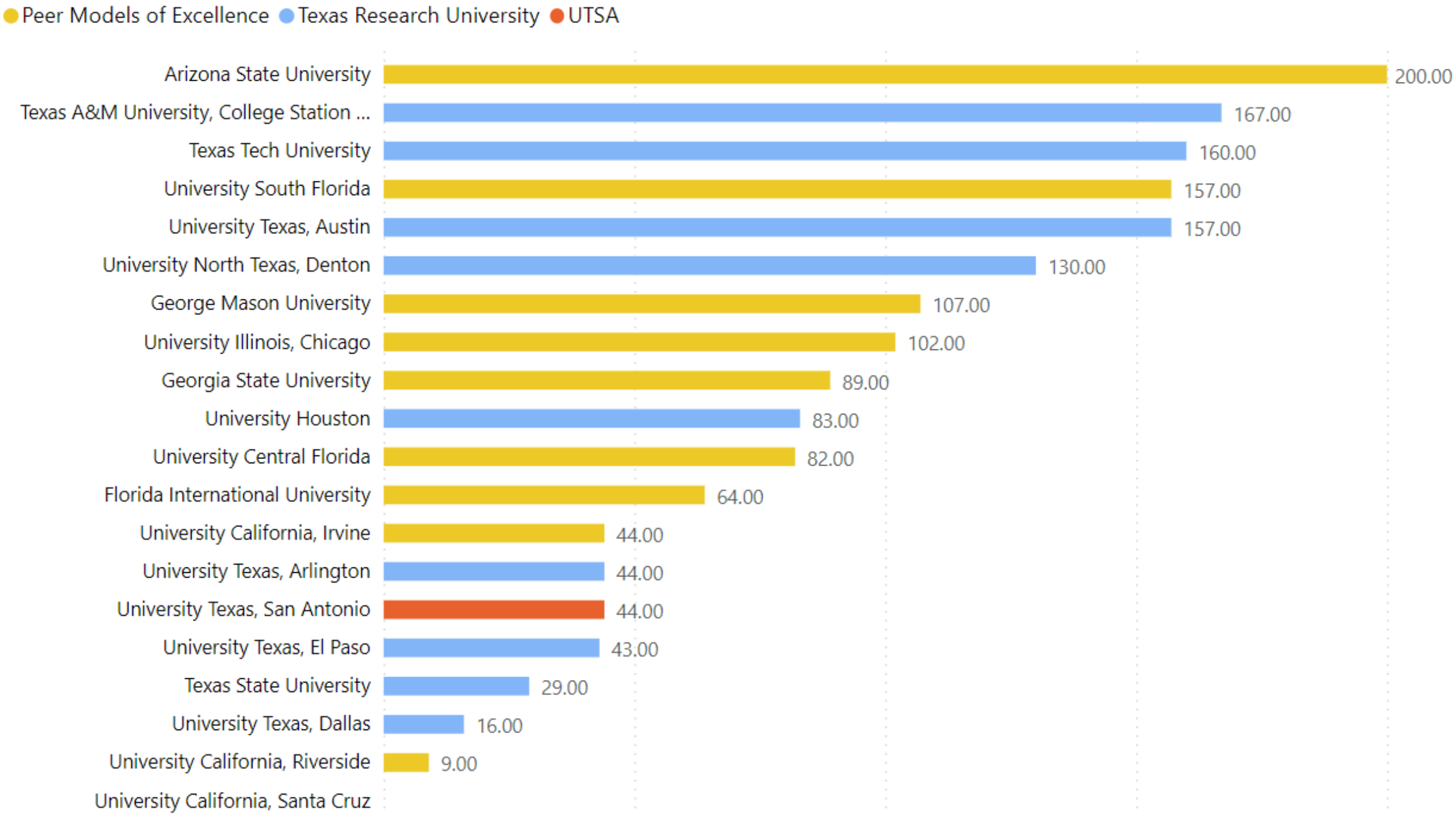
Social Science PhDs

2020 IPEDS



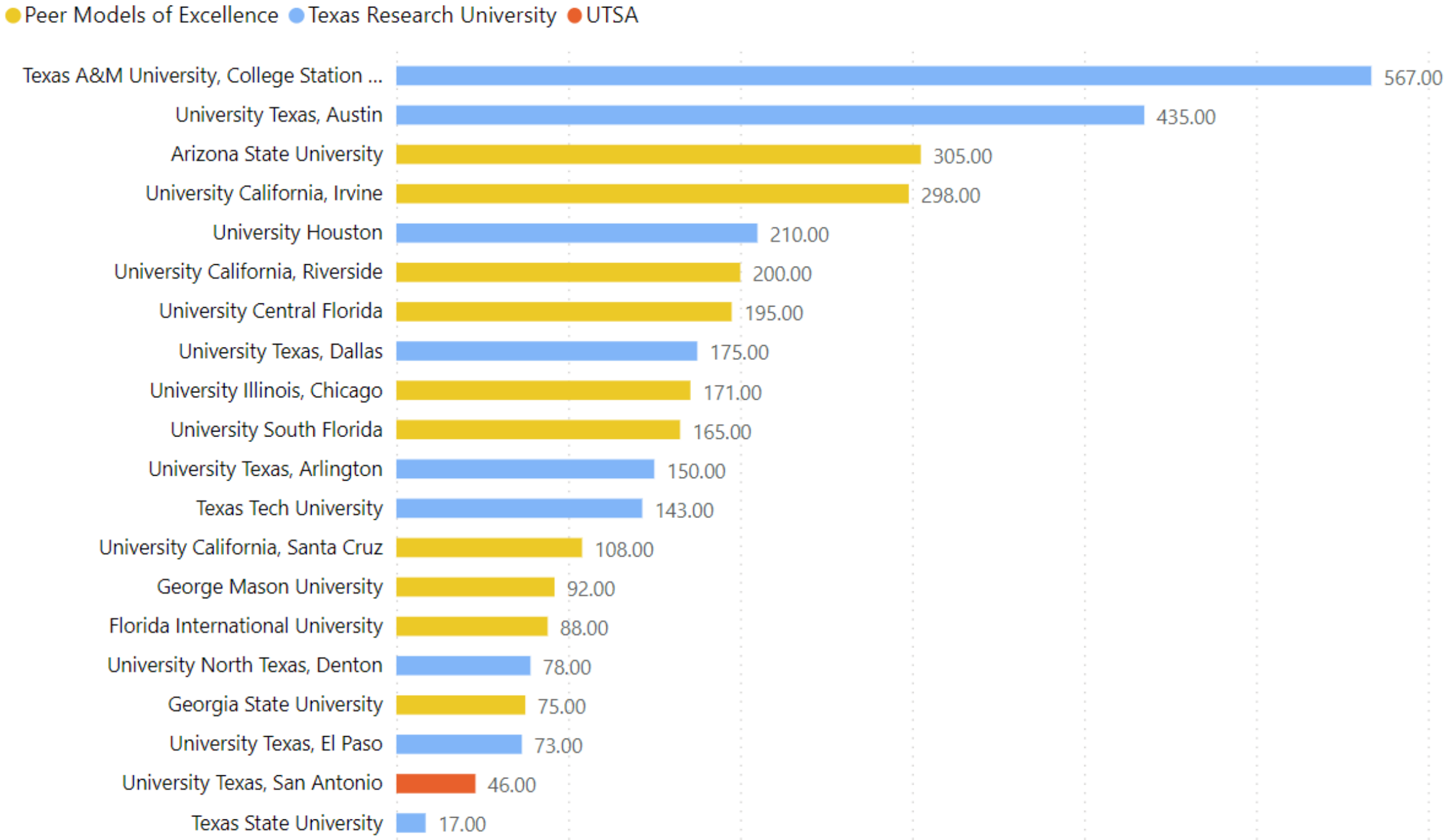
Other PhDs

2020 IPEDS



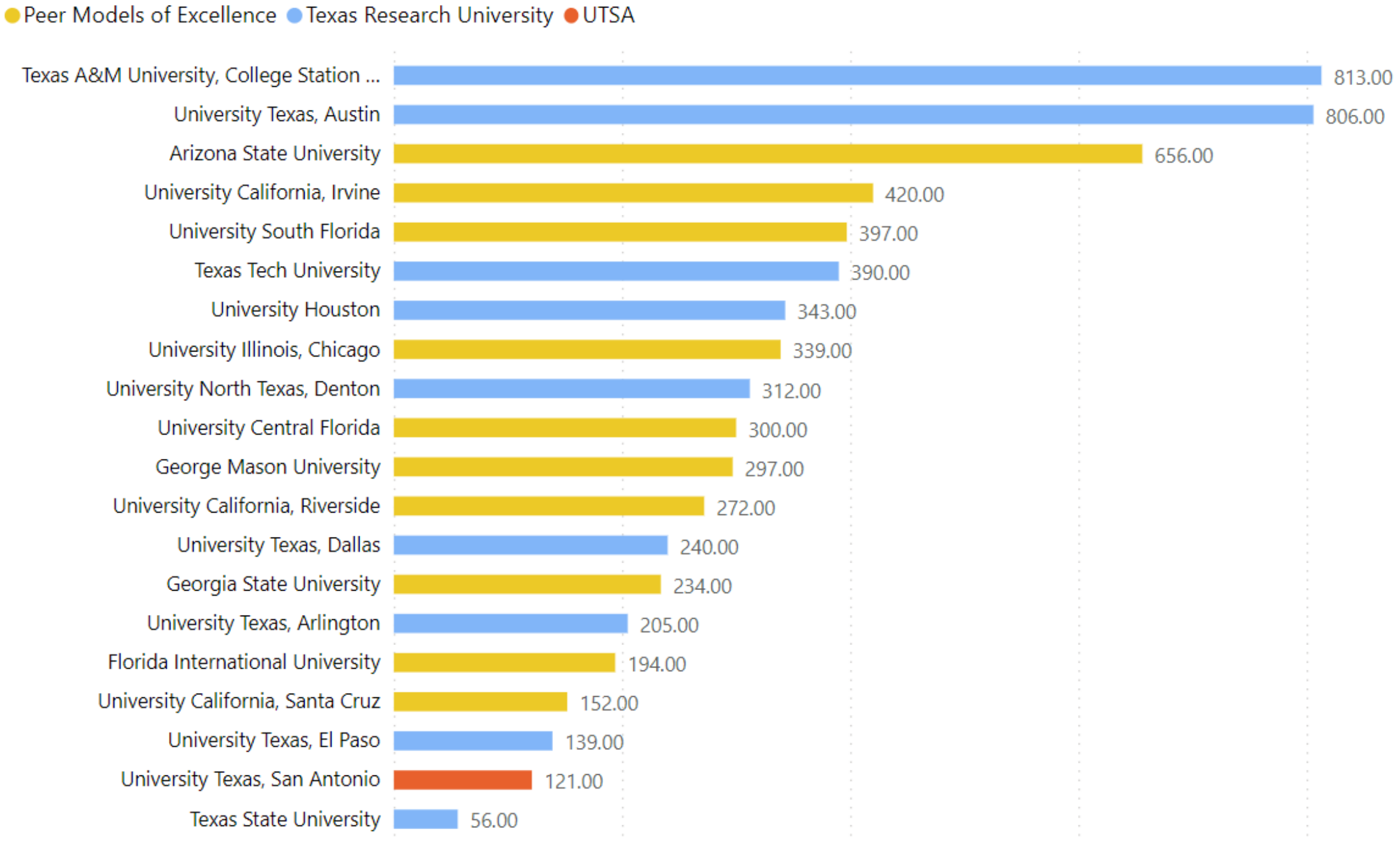
STEM PhDs

2020 IPEDS



Total PhDs

2020 IPEDS

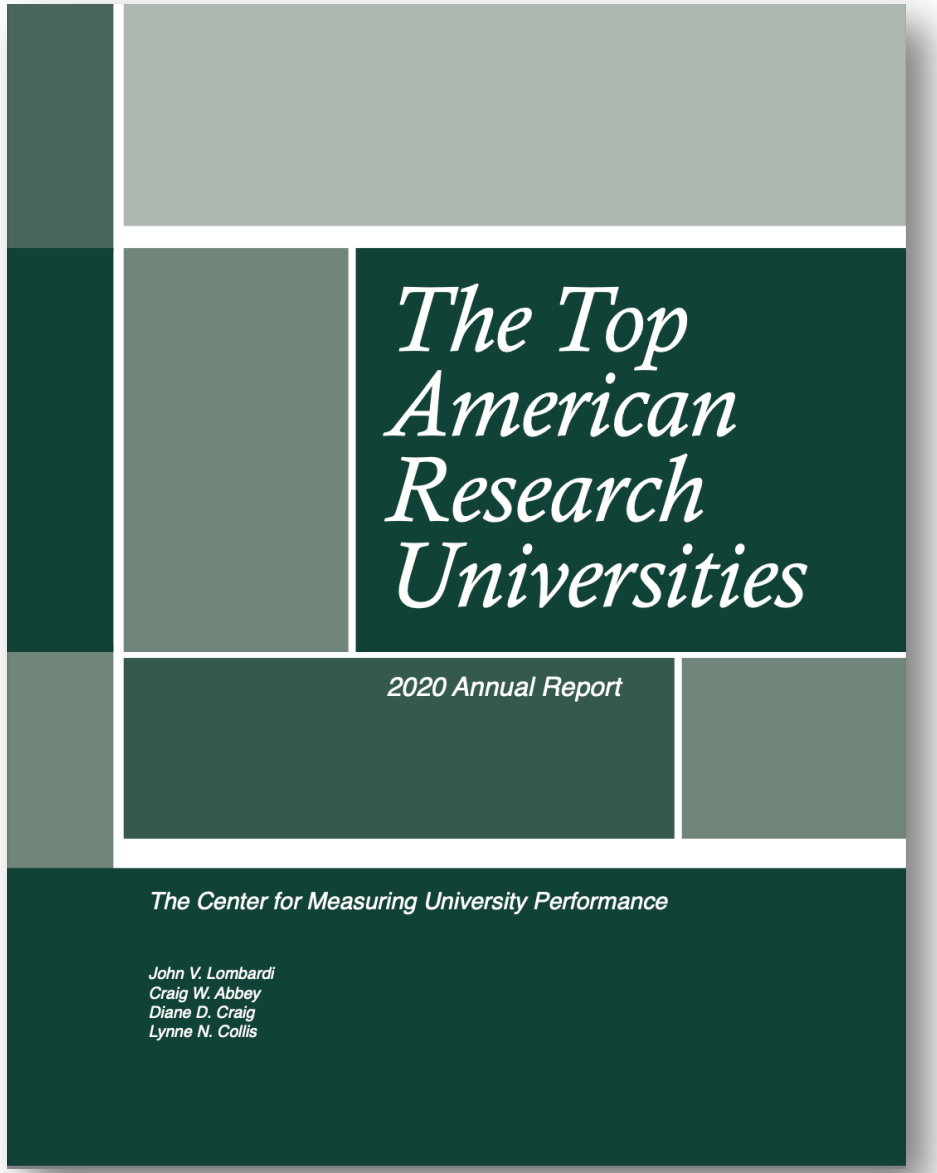


CMUP
SOME DATA

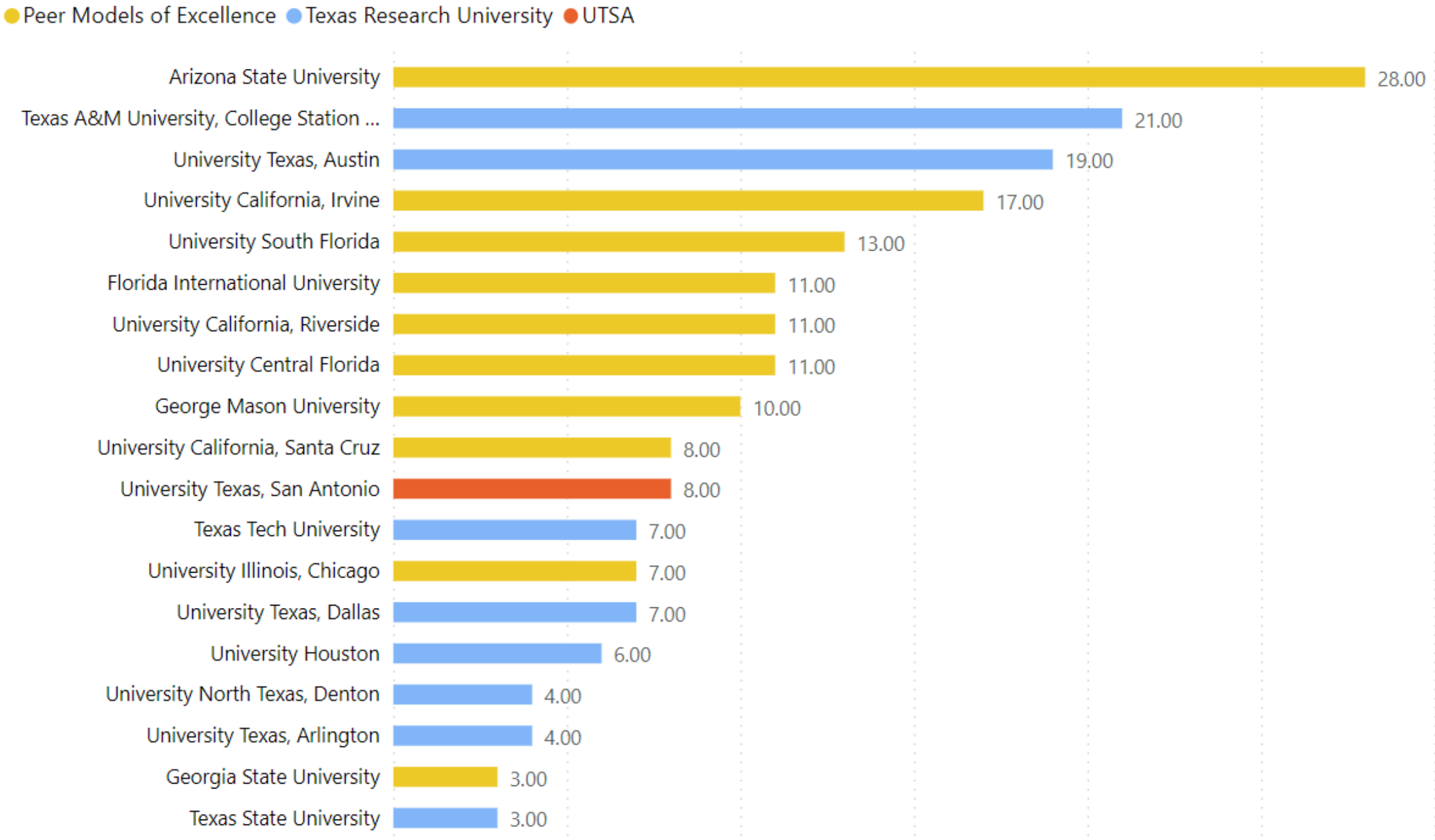
2020 Report, Showing 2019 Data

METRICS:

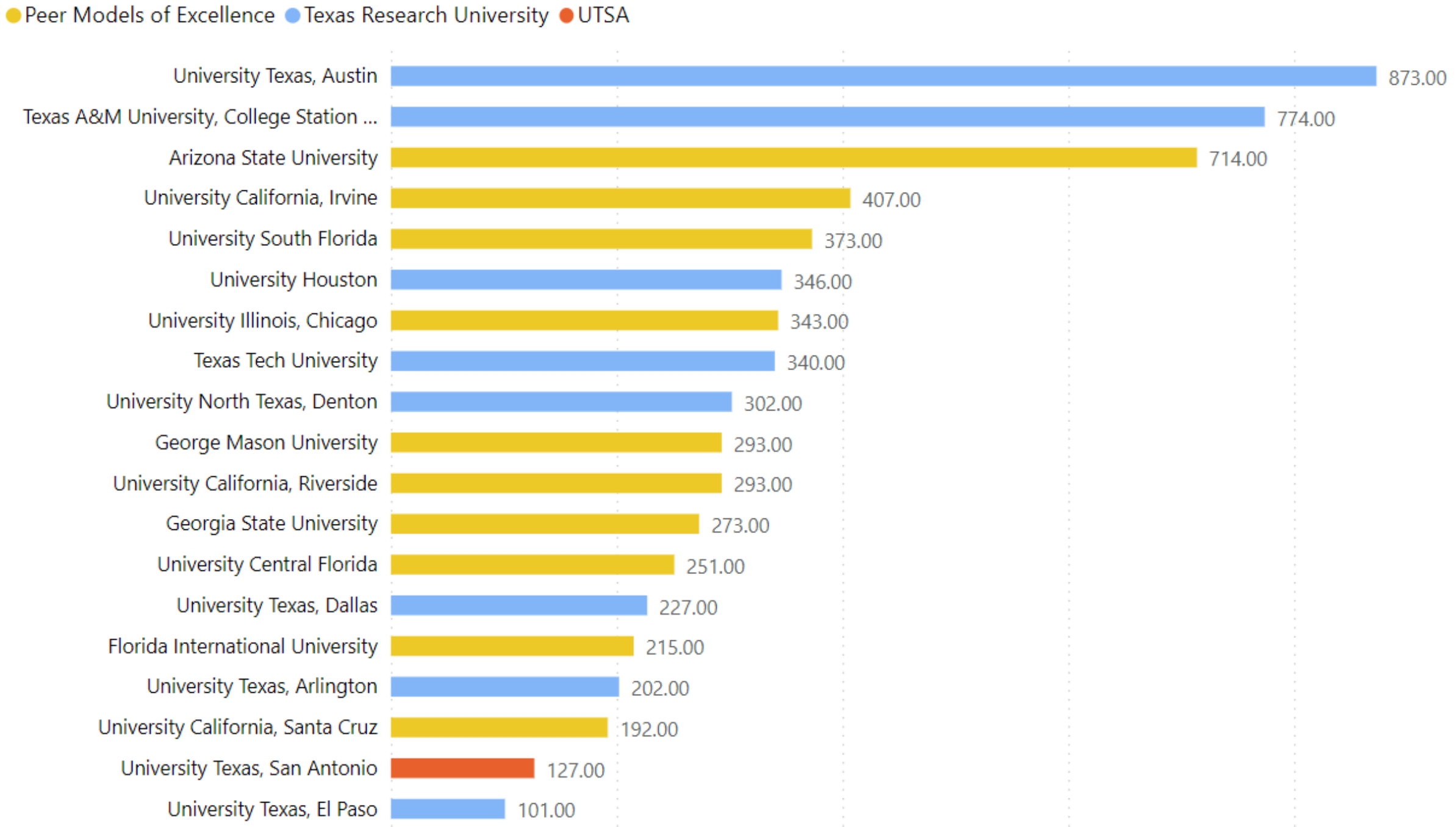
- **Faculty Awards**
- **Doctorates Awarded**



Faculty Awards



Doctorates Awarded



AAU

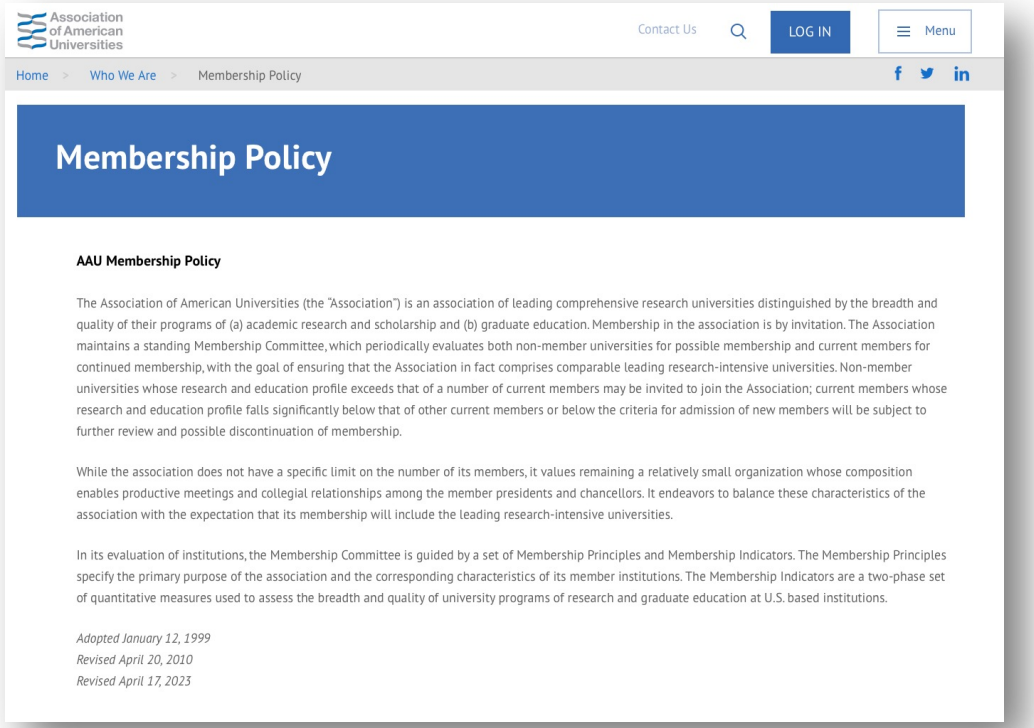
SOME DATA

PHASE 1 METRICS:

- Thompson Reuters InCites Citations
- Books

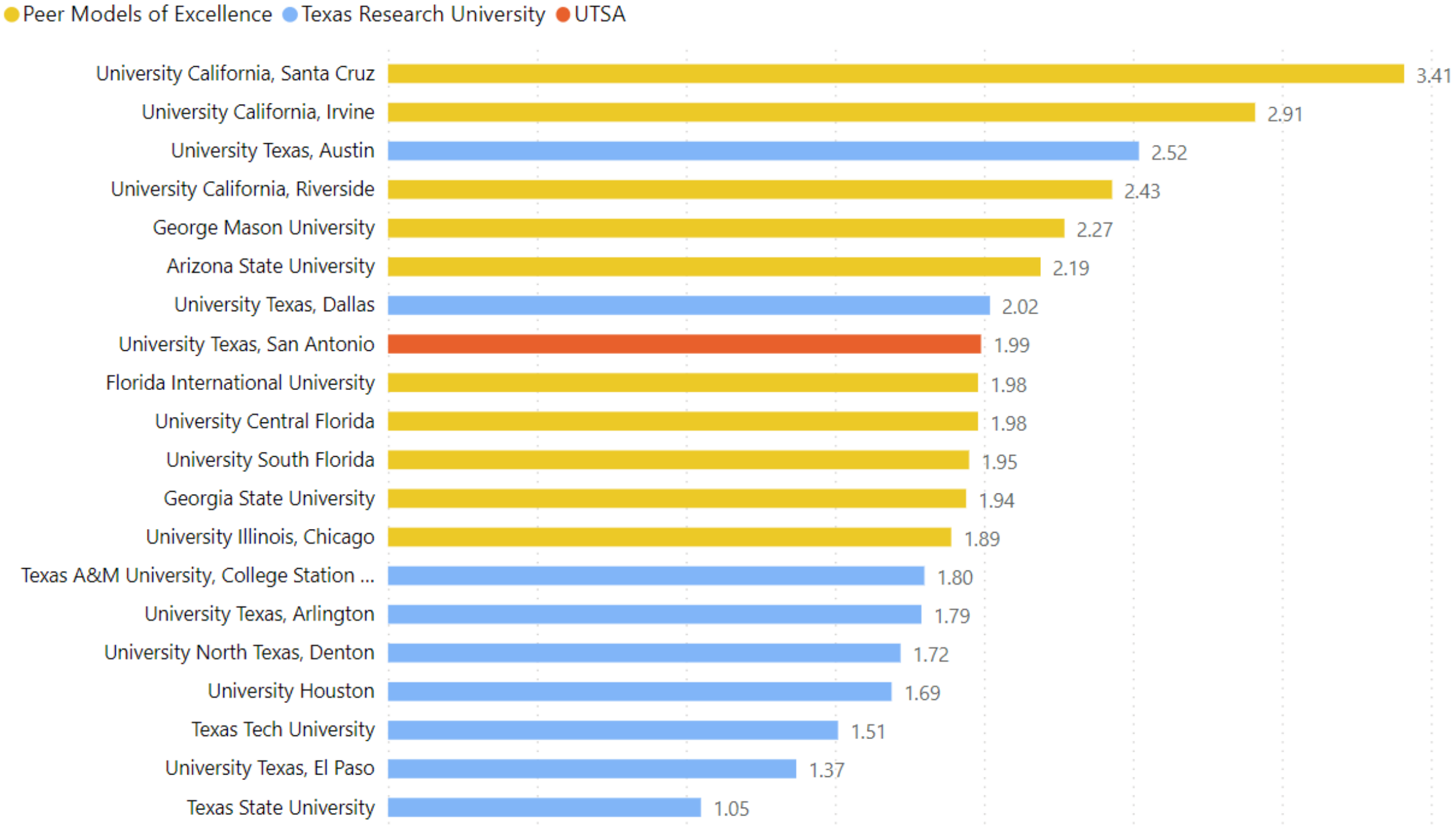
OTHER CONSIDERATIONS:

- Pell
- Undergraduate Graduation Rates
- Pell Recipient Graduation Rates
- Graduation Rate Gap



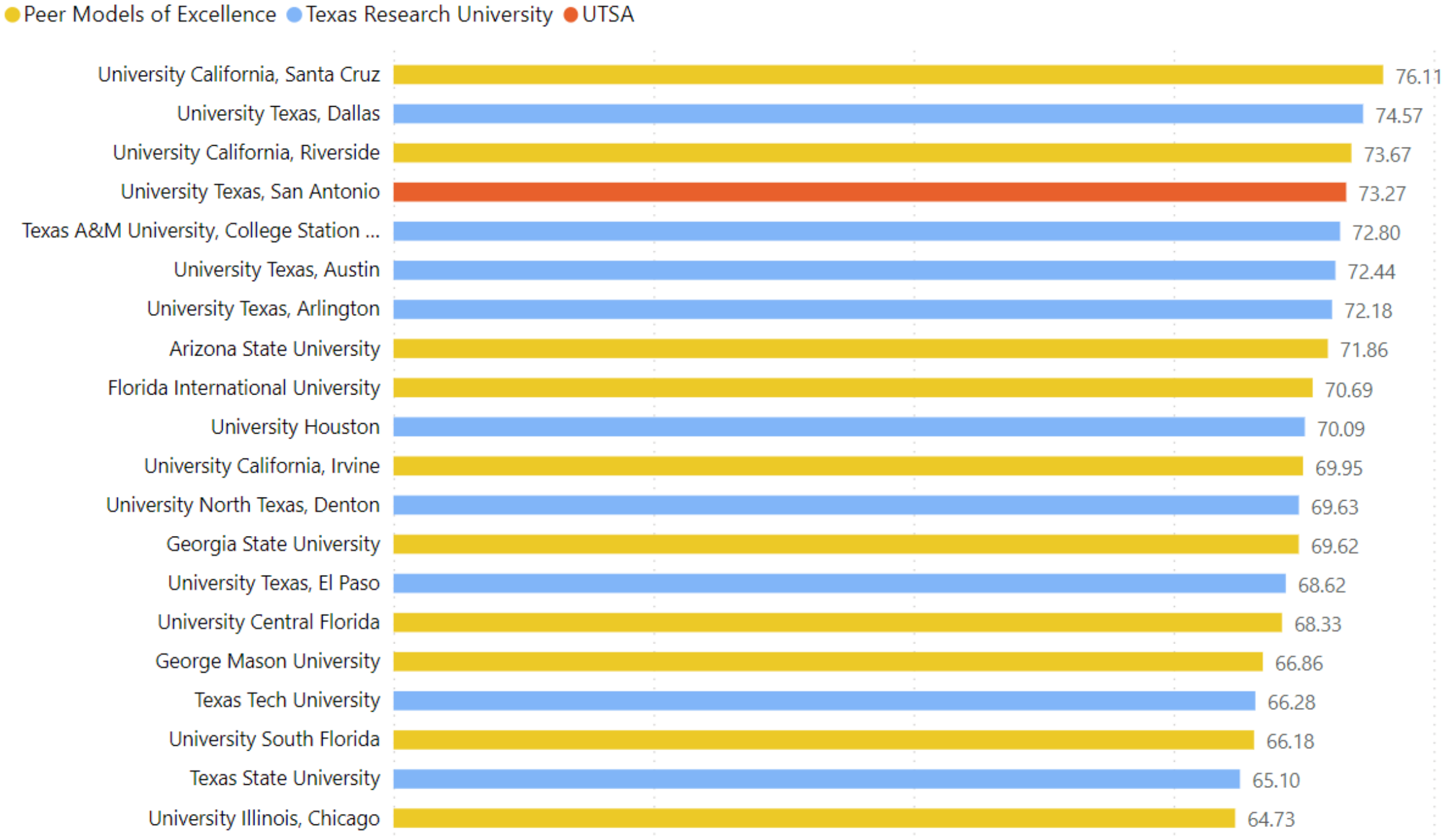
% of Web of Science Documents in the World's Top 1%

2018-2022 Clarivate InCites



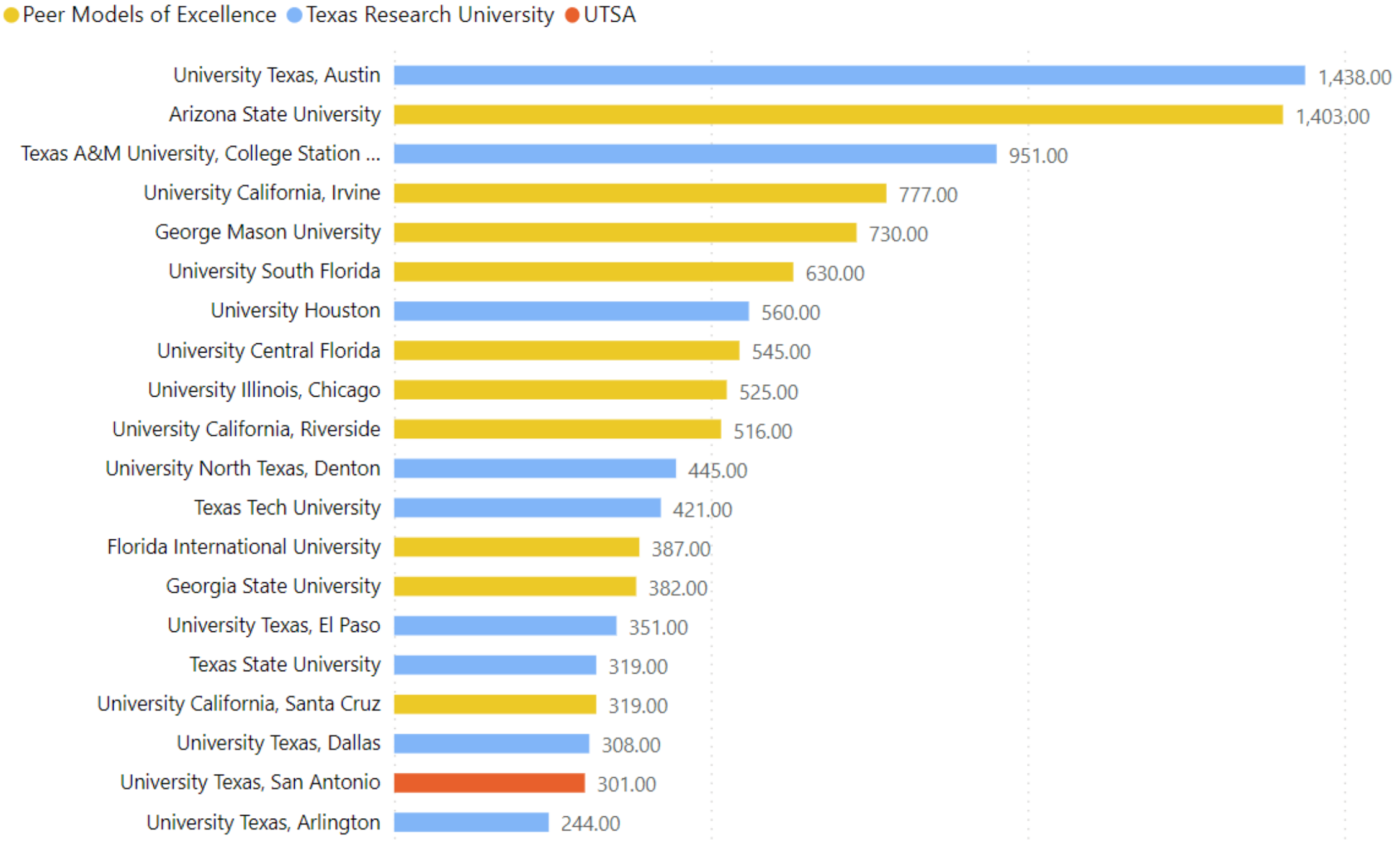
% of Web of Science Documents Cited

2018-2022 Clarivate InCites



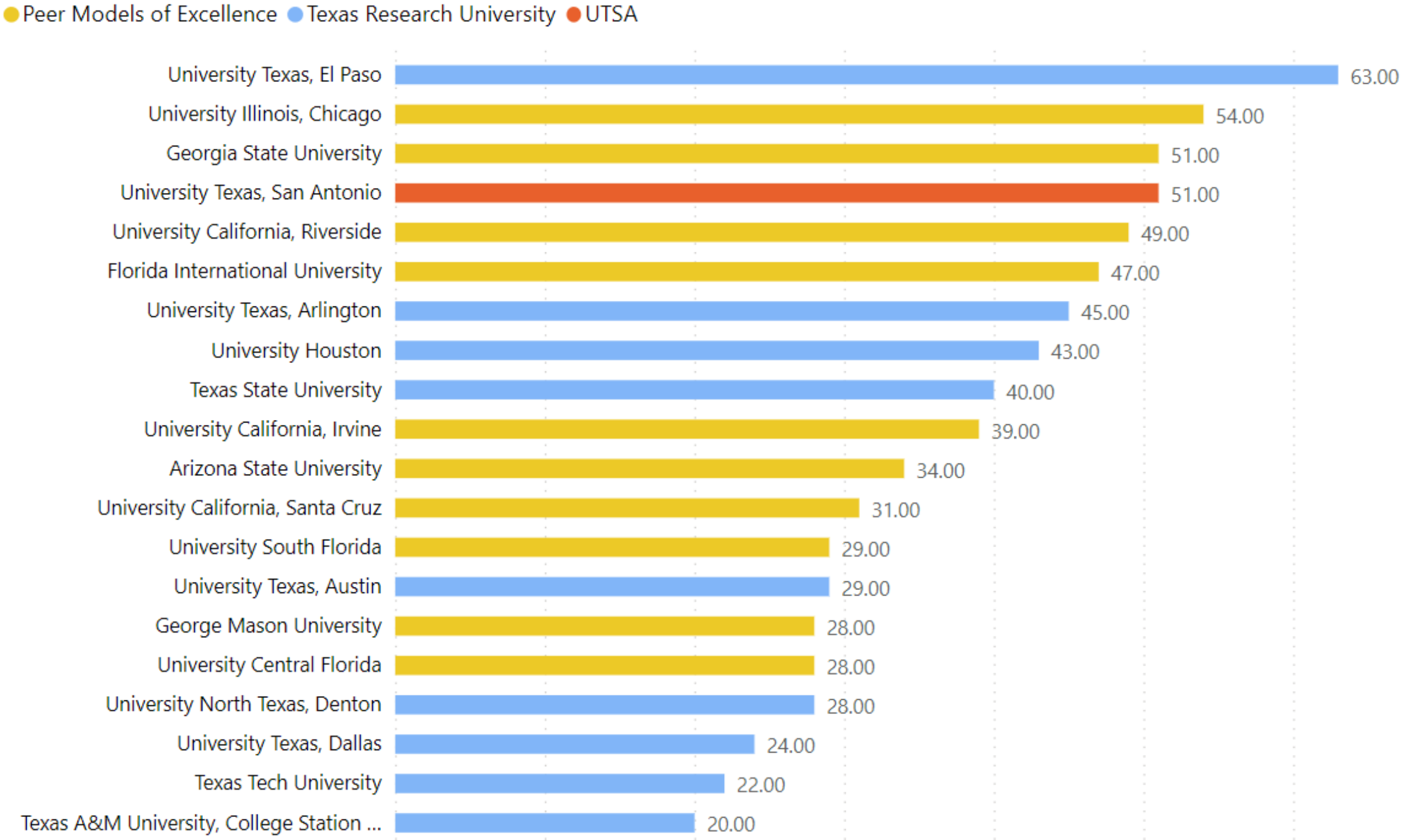
Count of Books Published

2021 Academic Analytics



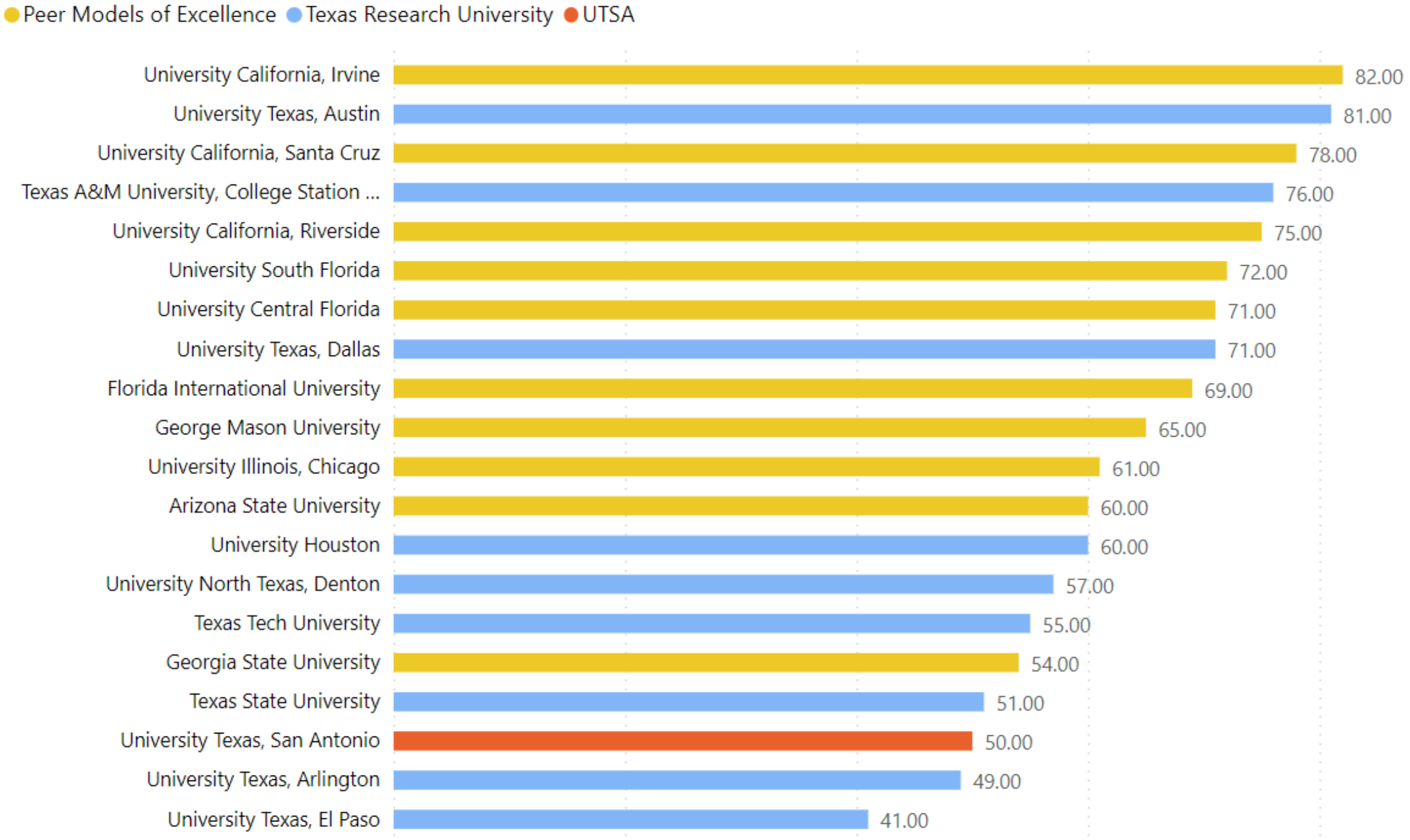
Pell Enrollment

2020 IPEDS



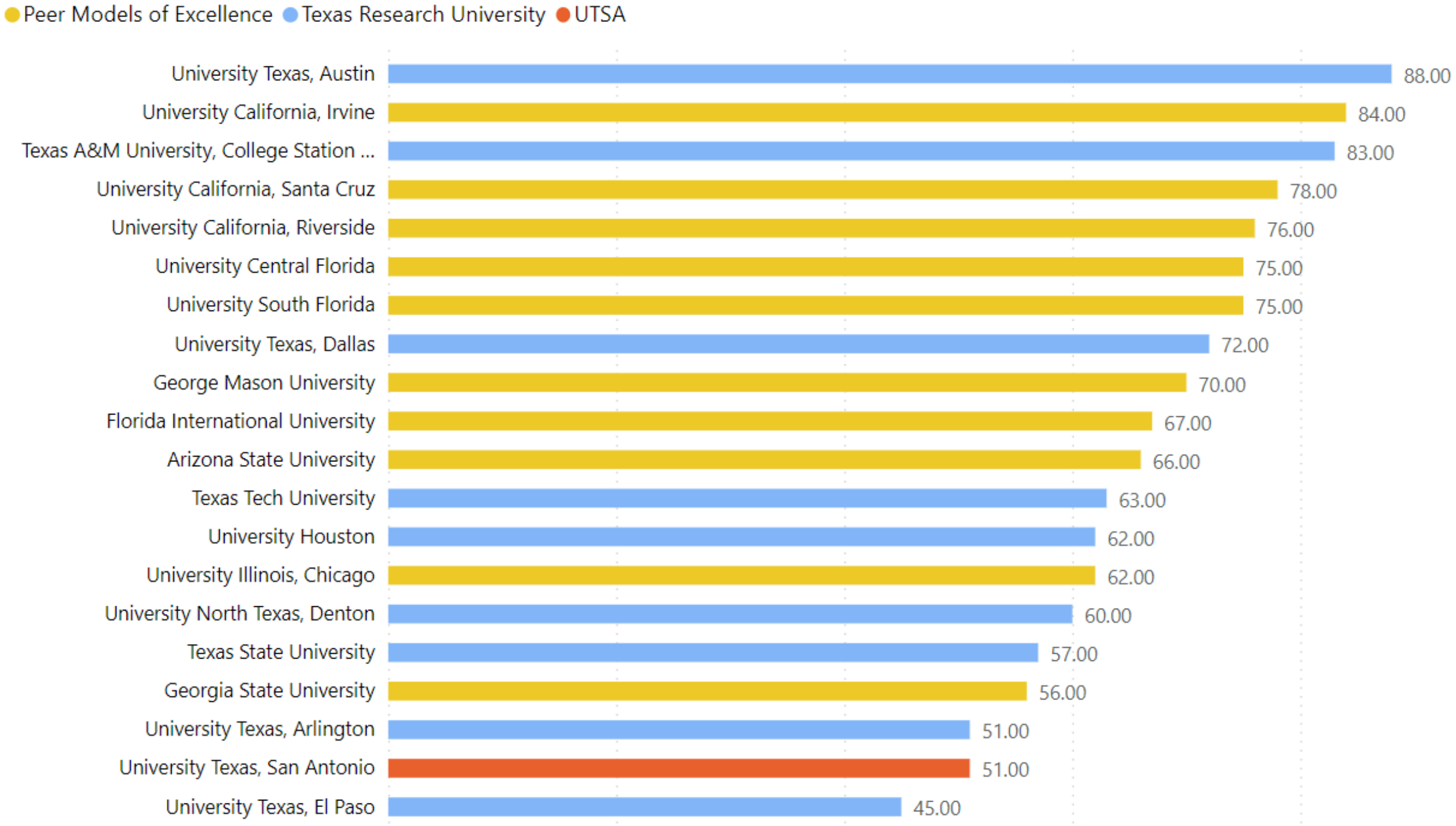
Pell Grant Recipient Graduation Rate

2020 IPEDS



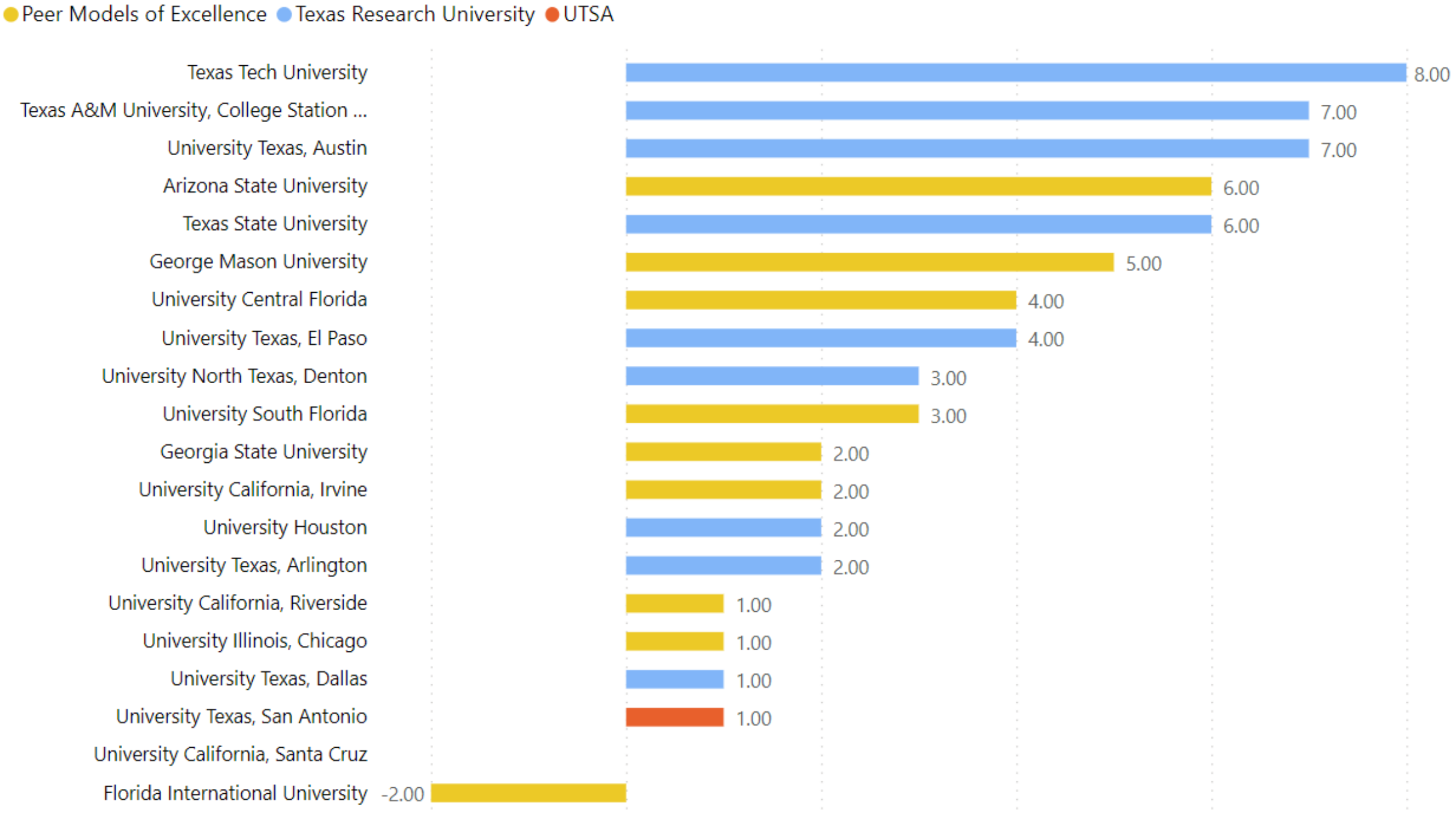
Undergraduate Graduation Rate

2020 IPEDS



Graduation Rate Gap

2020 IPEDS



RESEARCH PILLARS

Digital Economy

AI & Machine Learning

Cloud & Edge Computing

Cyber Security

Data Science & Analytics

NexGen Wireless

Quantum

Fundamental Futures

Environmental Change

Earth & Space Sciences

Energy & Manufacturing

National Security & Defense

Smart Infrastructure

Human Health

Bioregeneration

Brain Health & Neuroengineering

Health Disparities

Human Performance

Infectious Disease

Precision Therapeutics

Culture & Inclusion

Cultural Sustainability

Digital Humanities

Disability Studies

Language & Literacy

Race & Ethnic Studies

Women & Gender Studies

Socio-Economic Transformation

Career-Engaged Education

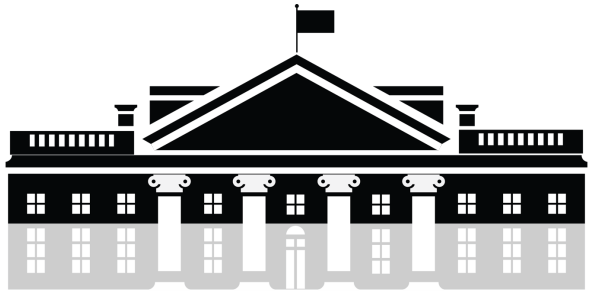
Entrepreneurship

Human Development

Justice

Socioeconomic Equity

FEDERAL AWARDS:
KNOWLEDGE & INFLUENCE

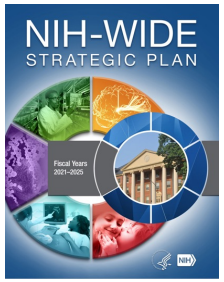


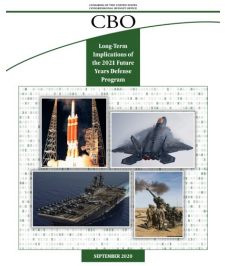
CORNERSTONE

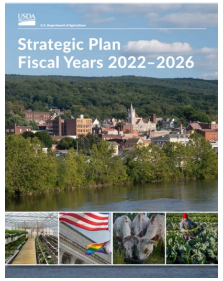
OFFICE OF SCIENCE AND TECHNOLOGY POLICY

NATIONAL SCIENCE AND TECHNOLOGY COUNCIL

PRESIDENT'S COUNCIL OF ADVISORS ON SCIENCE AND TECHNOLOGY







UTSA RESEARCH METABOLISM

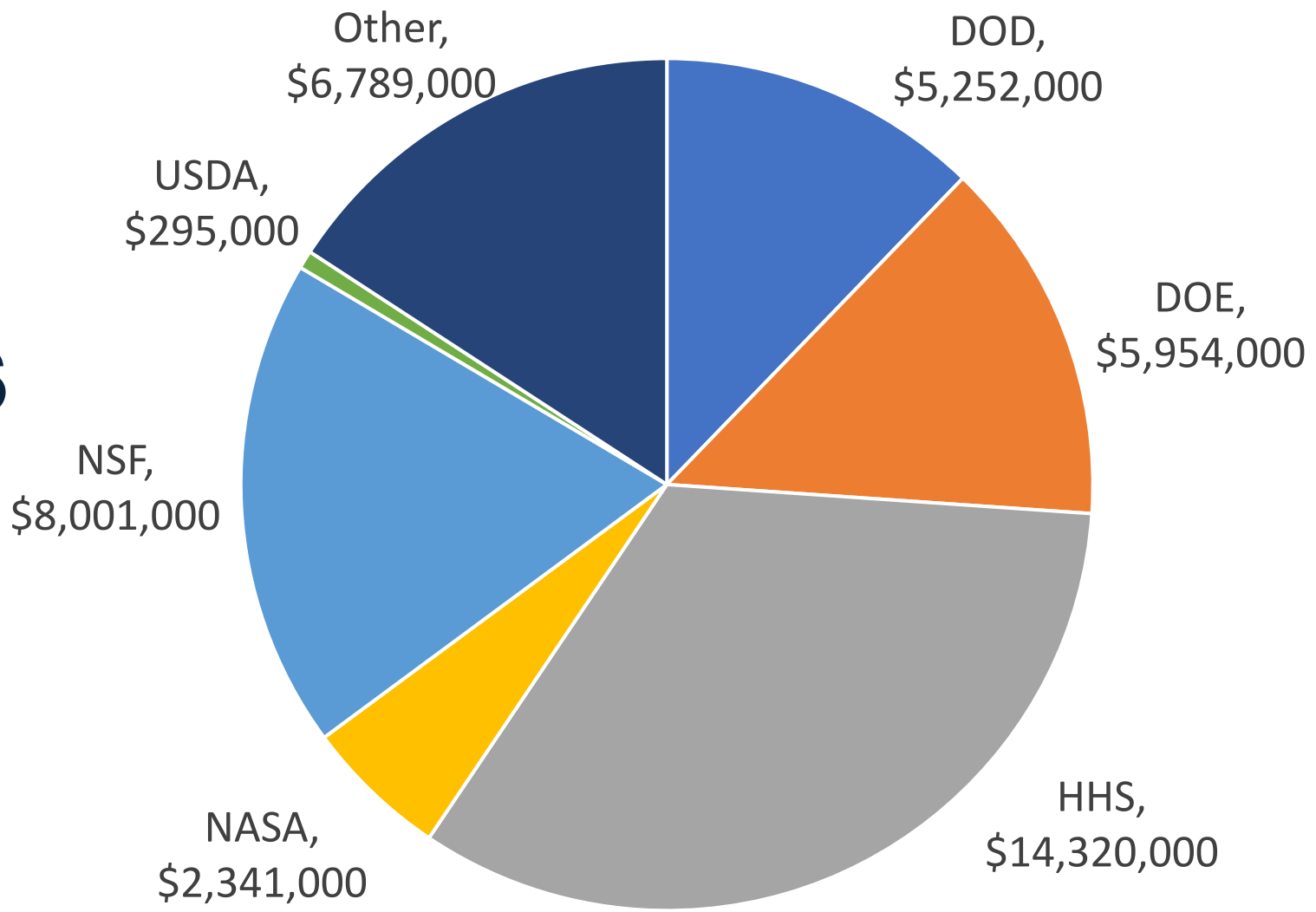
TOTAL RESEARCH DOLLARS
$145 M

FIVE YEAR CHANGE
103%

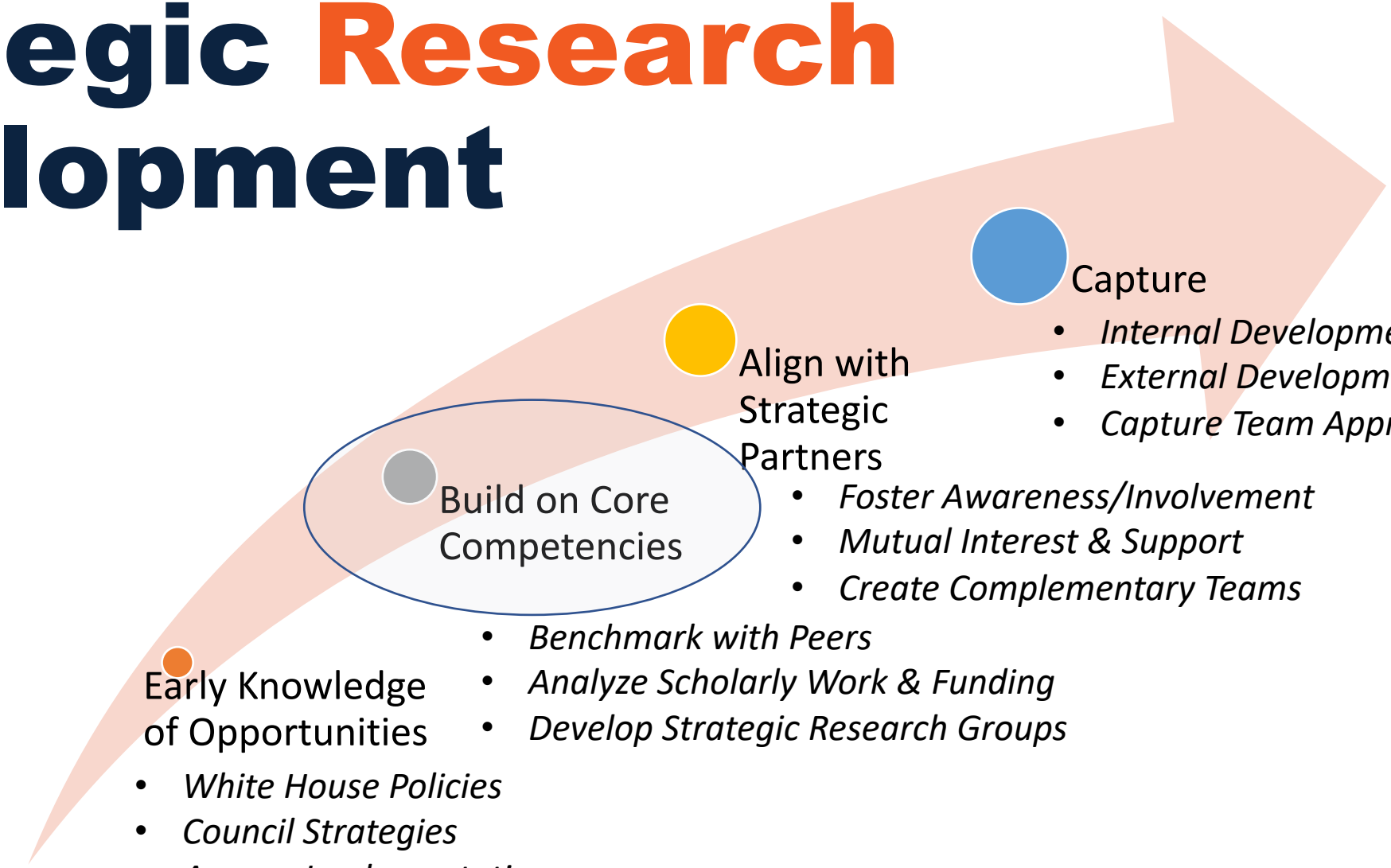
FEDERAL DOLLARS
$43 M

FIVE YEAR CHANGE
80%

2021 UTSA FEDERAL RESEARCH & DEVELOPMENT EXPENDITURES (HERD)



Strategic Research Development



CORE COMPETENCIES

Top 5 Areas by Publication Categories

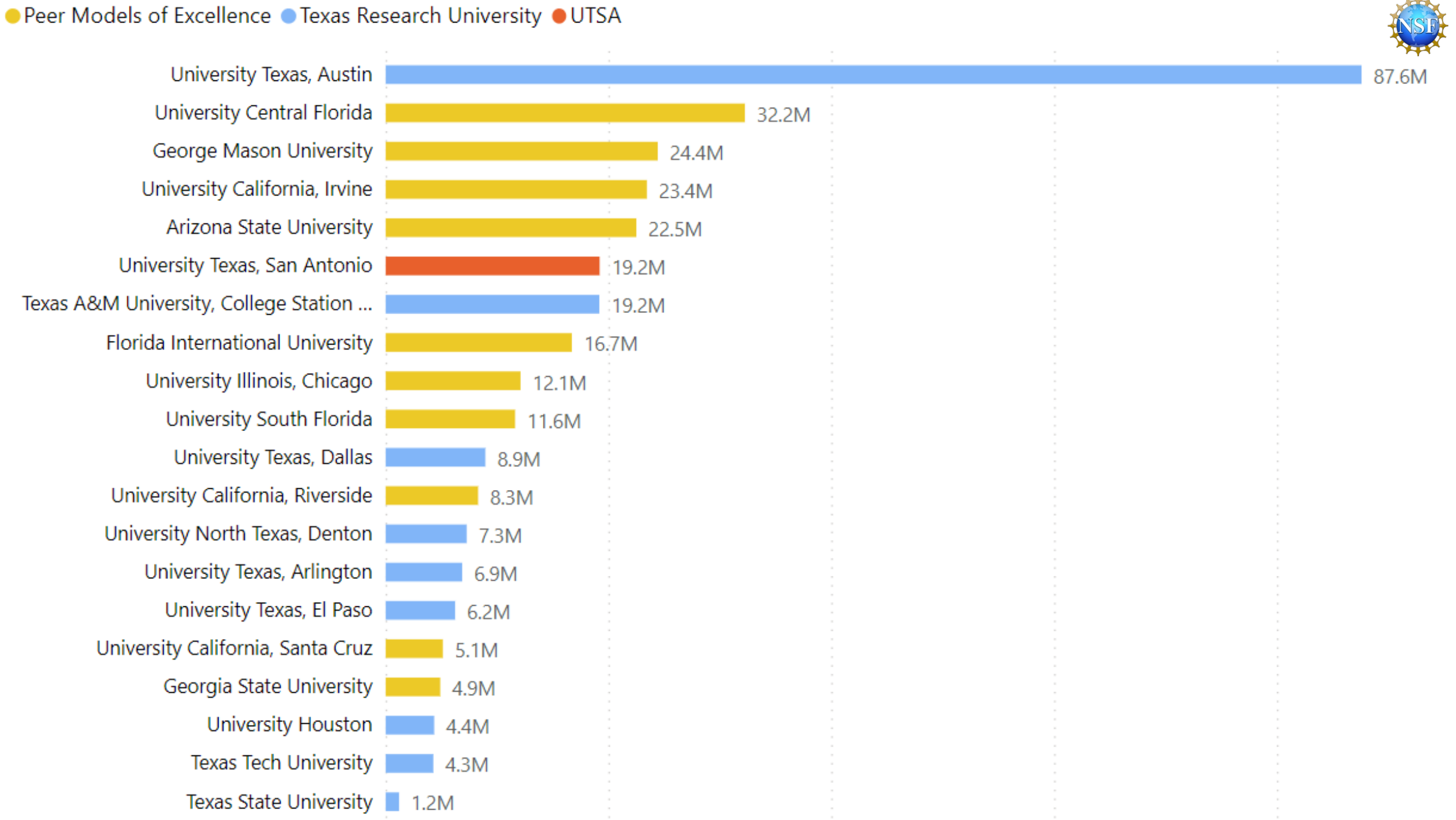
2018-2022 Clarivate InCites Research Area Schema: Citation Topics micro

Measure	1	2	3	4	5
InCites Analysis By Publication Categories					
WOS Documents	Random Oracle Model	Metal-Organic Frameworks	PTSD	Malware	Magnetosphere
Times Cited	Metal-Organic Frameworks	Blockchain	Random Oracle Model	Object Tracking	Deep Learning
Highly Cited Papers	Metal-Organic Frameworks	Blockchain	Random Oracle Model	Radio Astronomy	Unmanned Aerial Vehicles
Corresponding Author	Metal-Organic Frameworks	Malware	Corporate Governance	Crime	Language Policy
Hot Papers	X-Rays: Binaries	Alzheimer's Disease	Metal-Organic Frameworks	Differential Privacy	Radio Astronomy

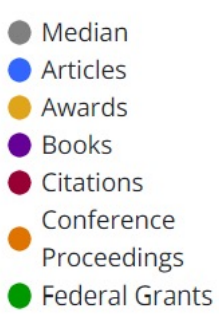
Computer-Data	Energy-Materials	Space-Physics	Health	Other
Random Oracle Model	MOF	Radio Astronomy	Alzheimer's	Corporate Gov
Blockchain		X-Rays: Binaries	PTSD	Crime
Malware		Magnetosphere		Unmanned Aerial Vehicles
Object Tracking				Language Policy
Deep Learning				
Differential Privacy				

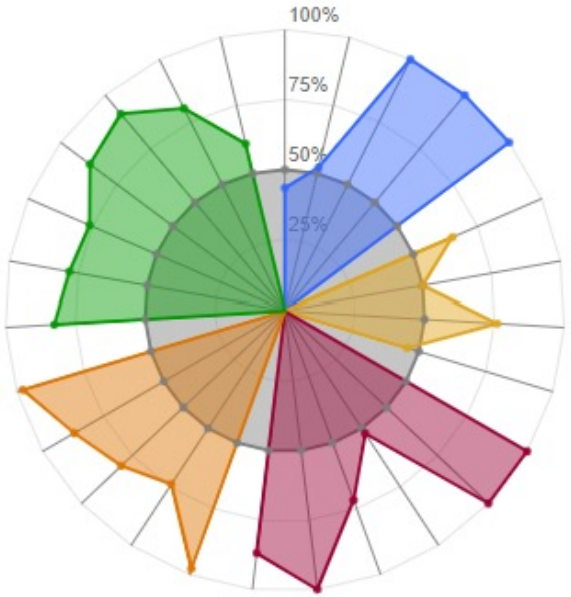
Computer and Information Sciences Expenditures

2021 Higher Education Research and Development (HERD)

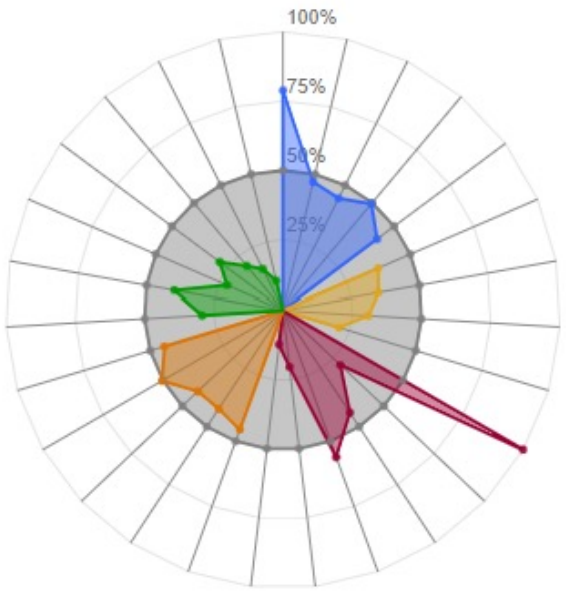


ACADEMIC ANALYTICS:
COMPARE CARNEGIE R1

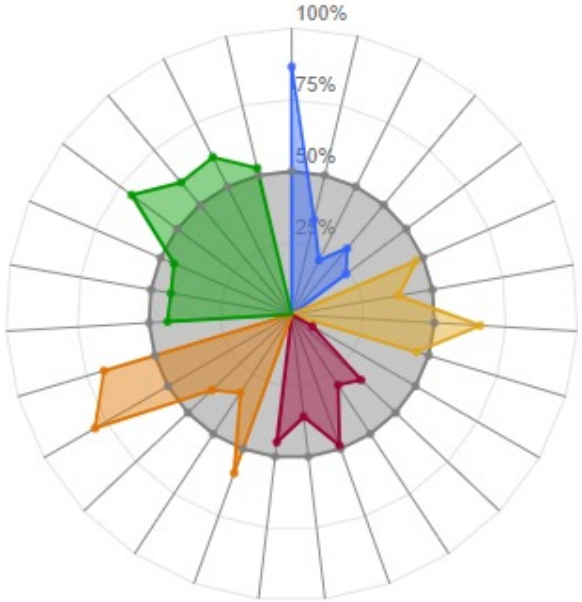




Information Systems & Cyber Security



Electrical & Computer Engineering



Computer Science

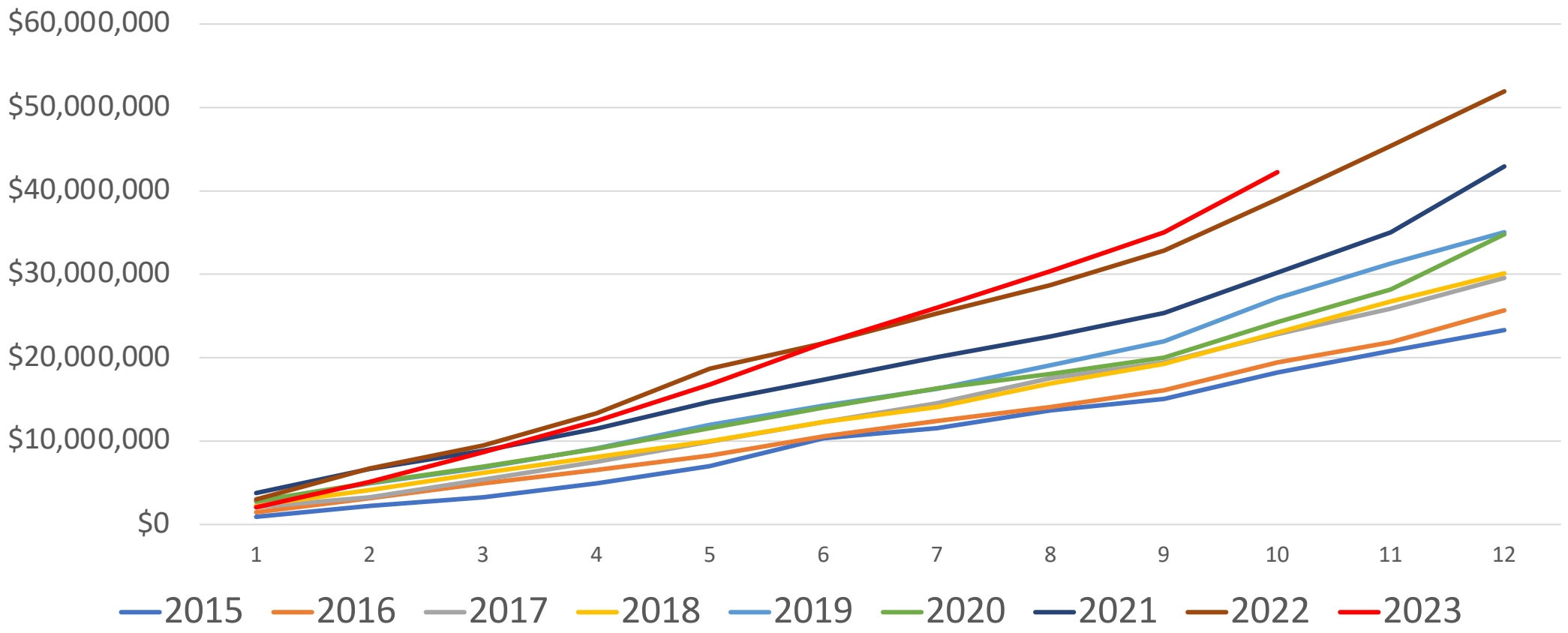
CORE COMPETENCIES BY FEDERALLY-FUNDED LARGE PROJECTS*

Area	Total Funding 2018-2023	Number	Agencies
Security Systems	$108M	9	DoE, DoD, DHS
Internet Of Things	$90M	3	DoE, DoD
Software Engineering	$88M	2	DoE, DoD
Data Structures, Algorithms & Complexity	$70M	1	DoE
Clinical & Life Sciences	$37M	8	NIH
Education	$34M	13	NSF, ED, USDA, DHS
Artificial Intelligence & Machine Learning	$33M	5	DoE, DoD
Distributed & Real Time Computing	$18M	1	DoD
Psychiatry & Psychology	$7M	2	ED and NIH
Space Sciences	$6.5M	3	NASA
Astronomy & Astrophysics	$6.5M	3	NASA
Meteorological & Atmospheric Sciences	$5M	2	NASA
Civil Engineering	$1.3M	1	federal pass through
Unmanned Aerial Vehicles	$1.2M	1	federal pass through
Power Systems & Electric Vehicles	$1.2M	1	federal pass through

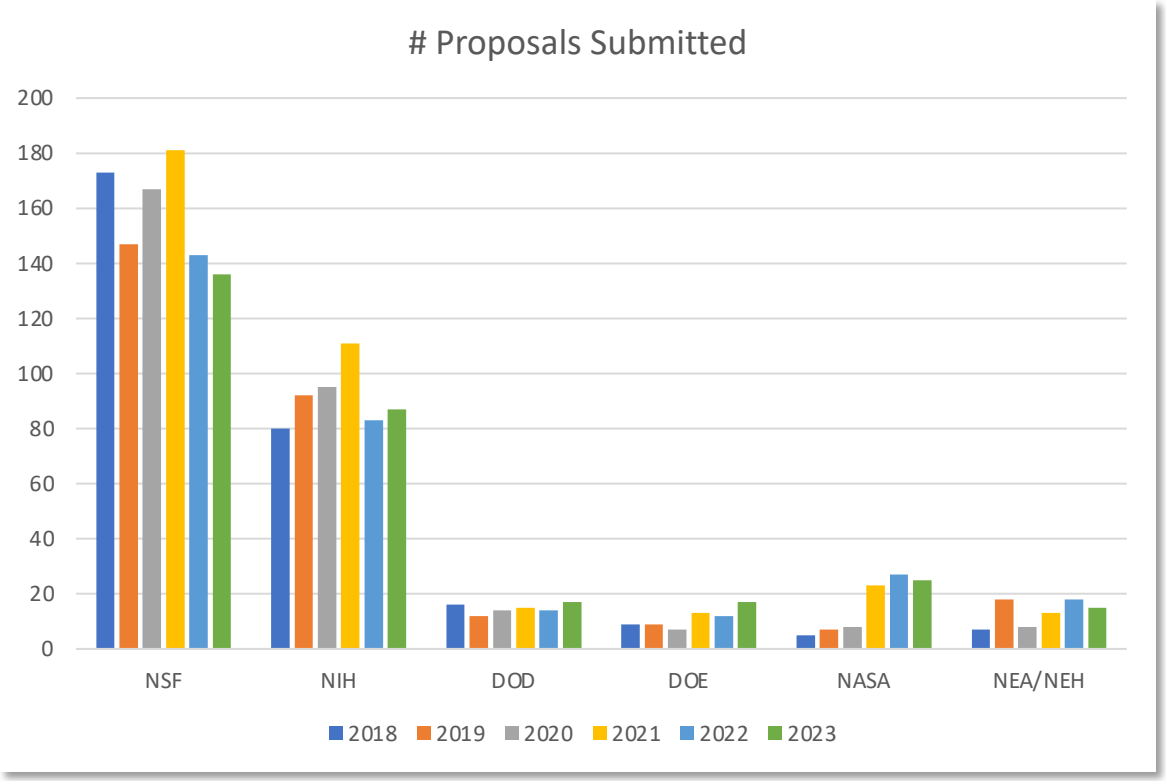
*$2M+ for Federal & $1M+ for Federal pass through from 2018-2023

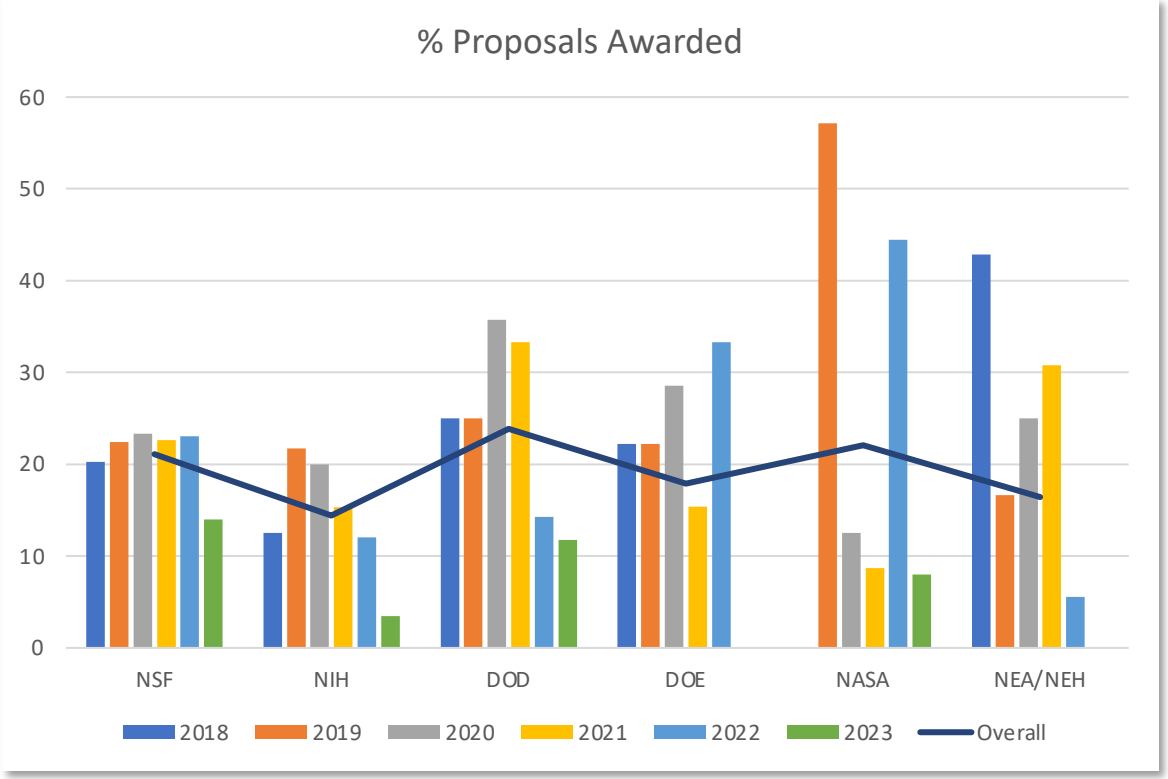
SUCCESS IN FEDERAL FUNDING

UTSA Federal Research Expenditures



SUCCESS IN FEDERAL FUNDING





Key Take-Aways

UTSA R1 Culture – To Reach our Next Goals in our Journey

- Produce new knowledge that changes our lives and the world
- Seek recognition for faculty and bring recognized faculty onto our Teams
- Graduate next generation of experts (PhD)
- Increase position in federally-funded research
- Increase position in NSF and NIH funding

At Your Table: Be a Futurist

Imagine it's 2035 and UTSA has just been named the 85th member of the Association of American Universities (AAU), a designation that is reserved for North America's leading research universities. UTSA achieved this designation for its track record for securing federal grants, interdisciplinary research centers targeting some of society's most pressing challenges, housing some of the nation's top researchers, including a Nobel Laureate. Admission into UTSA's undergraduate and graduate programs is increasingly competitive as students seek to launch their research careers at an institution that is distinguished by its productivity, its location in the bustling "Austintonio" metroplex, and its international reputation for excellence in mentoring. The research infrastructure boasts some of the most unique facilities, equipment, and computing resources in the nation.

Think about all the attributes of this UTSA Future and make two lists (choose a Recorder):

1. **What are 100 things researchers will need help with in this "evolved" UTSA?**
2. **What are 100 ways researchers could help each other in this "evolved" UTSA?**

Report the number of ideas you generated, and the 5 most innovative.

There will be PRIZES for the most complete and innovative responses!


UTSA®
CREATING
BOLD
FUTURES