Heather Wilson

Statement for the Record

House Committee on Science, Space, and Technology

February 5, 2025

More than at any time since World War II, the United States is being challenged scientifically on the global stage. Unfortunately, the nation is not meeting the moment.

Despite a substantial increase in privately and publicly funded research over the past 30 years, Western democracies are losing the technology competition. In 2023, the Australian Strategic Policy Institute began tracking the pace of scientific advancement and found that China leads in 37 of 44 critical technologies – from advanced materials and quantum physics to robotics, biotechnology, and artificial intelligence.[i] This reversal demonstrates that the United States and Western countries are losing scientific leadership. If this trend continues, risks to prosperity and national security will grow.

To meet this challenge, we need to understand it. And then, we need strategies to drive action.

For ten years, with each annual release of the National Science Board's *Science and Engineering Indicators* report, U.S. leadership on more global science and engineering metrics has eroded. China has surpassed us in talent production, research publications, patents, and knowledge and technology intensive manufacturing.[ii]

It's hard to explain the impact of scientific research on people's lives and on the security of our nation until it is too late. And there are no natural constituencies for science. You will have dozens of meeting requests each year from constituents wanting you to support more research on juvenile diabetes, Alzheimer's, heart disease, and lung cancer – all worthy subjects. You will have none – or nearly none -- for basic and early stage applied research in biology, materials science, physics, optics, chemistry, geology or even dry-land agriculture.

And yet, the funnel of innovation starts with curiosity driven and early-stage use-inspired research, and the development of talent through engagement in research.

It's hard to believe that the pace of technological change that we are currently experiencing in our daily lives will get even faster, but it will. It was a little over 24 months ago that ChatGPT was released. Chances are, most people in this room have used some artificial intelligence tool this week, and many of us use these tools daily now.

In the last 24 months we have gone beyond playing with the new tool and we are starting to see how specific applications will change the way work is done. That is nowhere more significant than in scientific advancement itself.

Artificial intelligence will accelerate hypothesis formulation, experimental design, and data analysis, driving scientific advancement even faster than before.

There's an unusual thing about us, as humans. We are very adaptable creatures – which helps to account for our survival as a species. But, when we project into the future, we generally expect tomorrow to look largely like today. Even though we know, by reflecting on history – even recent history – that disruption is highly likely.

This is particularly true in science and technology. Disruption will happen, and we want to drive it. If we don't, some other country, which does not share our interests or values, will have the upper hand for national security and economic opportunity.

What then, can be done? And how can this committee play an important leadership role in guiding the country forward?

Monitoring for Scientific and Technical Surprise

The United States has 18 intelligence agencies to collect and analyze information to protect and advance our vital national interests. But we have been technologically and scientifically superior for so long that none of our intelligence agencies systematically monitor for scientific surprise.

Some of them – particularly those under the defense umbrella -- will monitor adversary developments in particular weapons systems, like better jet engines or advances in hypersonic missiles or the silence of submarines.

But those efforts are like looking at things with a flashlight. The risk isn't what is in the beam of light, but what might come from the darkness.

The best analogy to understand this, I think, is America's ballistic missile early warning system. Radars and sensors from space and the sea systematically scan the horizon for threats and then, when one is detected, we focus intensely on what is happening.

There are roughly 7000 scientific and technical papers published in dozens of languages every day. There are hundreds of thousands of grants for research by governments and non-governmental entities at any time worldwide, and there are over 3 million patent applications worldwide every year for new techniques and devices.

None of the nation's intelligence agencies is tasked with systematically scanning the scientific and technical horizon to determine where innovation might pose a threat to our national interests. Although most in the intelligence community and military agree that this is important, no one thinks it's their problem to fix. Congressional action is needed to set a solution in motion.

The best approach is probably not going to look like the rest of our intelligence agencies with large numbers of government employee analysts. There aren't enough scientists and engineers as it is and the best scientists in the world -- the ones on the cutting edge in any of

hundreds of sub-disciplines -- don't want to spend their lives analyzing the work of others. They want to do the research.

Rather, done well, an intelligence entity focused on science and technology will have exceptional analysts who will develop and use AI tools and visualization techniques and then convene the best experts in the free world for short, intense stints to understand and explain what they think is happening and what the implications are for America's vital national interests.

In this way, a scientific and technical intelligence agency would constantly be connected to and leveraging the living web of scientific talent and analyzing the direction of innovation so that we can avoid surprise.

Advancing Discovery and Its Application

In his landmark recommendation to President Truman at the end of World War II, Vannevar Bush wrote, "…basic research is the pacemaker of technological progress."

That is still true today.

In that report, Bush also recommended training a new generation of scientific talent with "no ceilings, other than ability itself, to intellectual ambition. . . every boy and girl shall know that, if he shows that he has what it takes, the sky is the limit."

Since the late 1940s, basic research has been part of the mission of multiple federal agencies – including those under the jurisdiction of this committee. The Department of Commerce with its responsibility for atmospheric science and standards and the census, the Department of Energy with its network of 17 National Laboratories. The Department of Defense, including the Office of Naval Research and the Air Force Research Lab and DARPA. NASA, Interior, Agriculture, the National Institutes of Health and, of course, the National Science Foundation. In everything from exploring the depths of the ocean to exploring other galaxies, the federal government has played and continues to play an important role.

And while the amount of research being done in the private sector has increased substantially over the past few decades, private sector research leans much more toward applied research with short term returns, leverages earlier research sponsored by the federal government, and tends to be largely concentrated in a few fields, like biotech, pharmaceuticals and computing. That leaves areas like advanced materials science, quantum physics, public health, weather prediction, or exploring other galaxies largely to the public sector. If the market is too small for a reasonable return on investment or the research is too long term, it won't be done by the private sector.

While federal support for basic and early stage applied research is vital to the continued prosperity and security of the country and must be continued and strengthened, it doesn't have to be done the same way we have always done it.

The largest funder of cancer research in the U.S. is the National Institutes of Health. The second largest is the State of Texas, which has sponsored more than $6 billion of cancer research since 2007. Two years ago, Texas funded a Space Commission that is advancing space-related research and development and mission support for commercial, manned and unmanned space exploration.

It's time for more federal entities to deepen collaboration with states as part of a nationwide strategy to advance discovery.

Inspiring the Next Generation

As we seek to reestablish American preeminence in science, there is no substitute for inspiring the next generation of scientists and engineers. We need more of our children to choose to study engineering and science.

Enthusiasm for a subject is generally caught, it's not taught. Inspiring teachers and professors who provoke curiosity and the desire and confidence to explore are invaluable.

Each one of you likely remembers someone who touched your life, or the life of one of your children, in some moment, some experience, that caused you postulate. . . and then experiment or explore. . . and gather data. . . and figure out why.

All of you have examples in your districts of great science education programs, some of them likely federally funded. The question is, what can scale? What is replicable? And maybe it is not the exact program that is replicated, but the strategy toward the development of programs that is the most important. Those programs will likely be best if they are closely connected to the communities they serve.

But it's not just about <u>our</u> kids. It's about reaching every child in America, no matter where they are, or what neighborhood they live in, and planting more seeds, more broadly.

In the wake of Sputnik, the National Defense Education Act had a significant component focused on teachers in science and math. It may be time for a version 2.0 of that act to guide us forward.

Supporting Students

In addition to strengthening K-12 education, there are a variety of initiatives that could cause more young people to choose engineering and science, including enhancing Pell grants for in demand Bachelor of Science degrees, automatically adding funding for undergraduate research stipends to any federally funded research, and increasing the number of NSF Graduate Research Fellowships. In the case of the GRFP, there were about 16,000 applicants last year for only about 2500 scholarships from the National Science Foundation. So, when someone says that there are not enough American students who want to go to graduate school in science and engineering, you could multiply by five the number funded by the NSF and not meet the current demand.

And sadly, there are still not enough students who know that these programs exist – that there might be a way to afford go to graduate school. Our experience at UTEP has shown that outreach and mentoring encourages highly qualified first generation, low-income college students to participate and apply at much higher levels. They don't know these opportunities exist, and it is up to us to show them the path so that they will further develop their gifts in ways that benefit all of us.

For those of you who are new to the Congress, you are here, on this committee, at an important time for the future of American leadership in science.

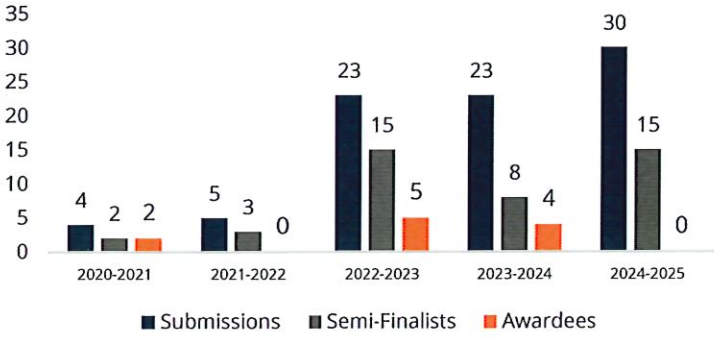
I look forward to your questions.

Dr. Heather Wilson is President of The University of Texas at El Paso and the former President of the South Dakota School of Mines and Technology. She is also a member of the National Science Board that oversees the National Science Foundation, was the inaugural chair of the Alliance of Hispanic Serving Research Universities and serves on the Board of Directors of the Texas Space Commission. She was Secretary of the Air Force from 2017-2019 and a Member of Congress (NM-01) from 1998-2009. She is a graduate of the US Air Force Academy and earned her Masters and Doctoral degrees as a Rhodes Scholar at Oxford University.

[i] https://www.aspi.org.au/report/aspis-two-decade-critical-technology-tracker
[ii] https://www.nsf.gov/nsb/publications/2024/NSB_Connected_Horizons.pdf

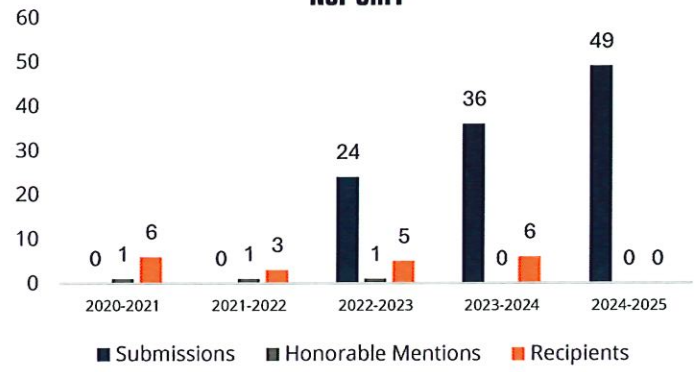
OFFICE OF STUDENT FELLOWSHIPS AND AWARDS

FULBRIGHT



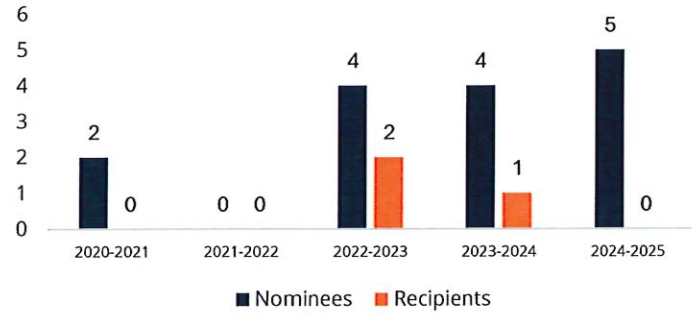
UTEP had more Fulbright recipients in 2022-2023 than in its history as an institution. *Final data for 2024-2025 is not yet available.*

NSF GRFP



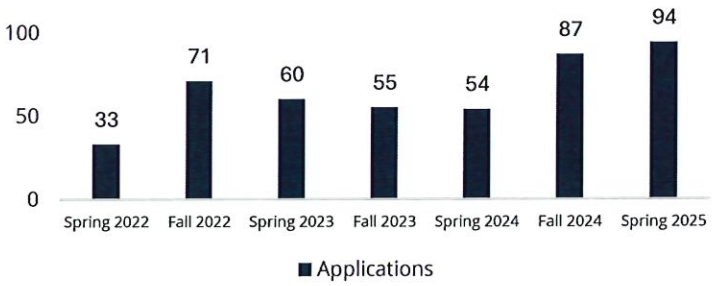
In 2022-2023 UTEP implemented a system to track total submissions, NSF is unable to provide this data. *Final data for 2024-2025 is not yet available.*

GOLDWATER SCHOLARSHIP



The 2022-23 recipients were UTEP's first. Institutions may nominate four students each year, five if one is a transfer student or veteran. *Final data for 2024-2025 is not yet available.*

UTEP UNDERGRADUATE FELLOWS PROGRAM



This program identifies first-year students and sophomores of exceptional promise and prepares them to apply for nationally competitive awards as juniors and seniors. A cohort of 20 is selected each semester.

NOTABLE MILESTONES:

- In 2022-2023 UTEP had its first Truman Scholarship recipient since 2006.
- 2023-2024 UTEP had its first two finalists for the Rhodes Scholarship and its first finalist for the Marshall Scholarship. In 2024-25, a UTEP advanced to alternate in the Marshall competition.
- In recognition if its engagement with the program, UTEP was named a Fulbright HSI Leader in both 2022 and 2024.

THE UNIVERSITY OF TEXAS AT EL PASO

AT A GLANCE

25,039
Students (Fall 2024)

84%
Hispanic

49%
First-generation college students

171
Degree Programs
In 9 colleges and schools

75 **Bachelor's**

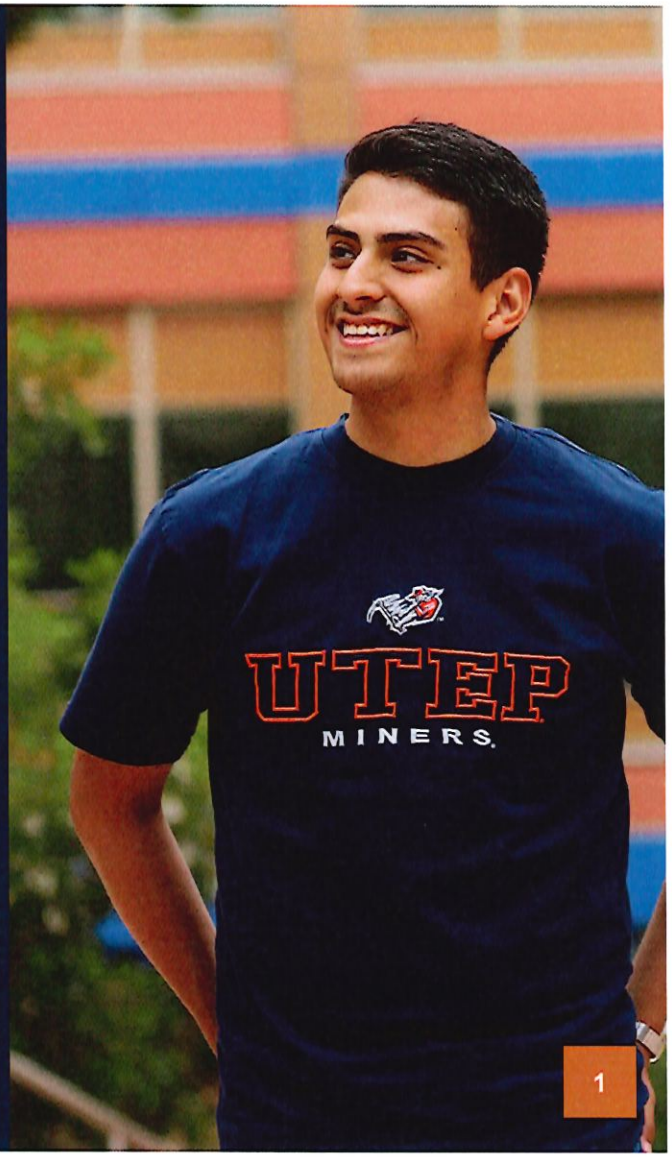
70 **Master's**

26 **Doctoral**
In 9 colleges and schools

$157.6M
Annual Research (FY 24)

No. 4 in Texas
For federal research at public universities

$1.4 Billion
UTEP's annual contribution to the El Paso County economy



MEETING FINANCIAL NEED

79% Received Scholarships or Grants

66% Received Pell Grants

28% Coming from families with household incomes of $20K or less

51% of undergraduates graduate debt free

RESEARCH

No. 4 in Texas

For federal research expenditures at public universities

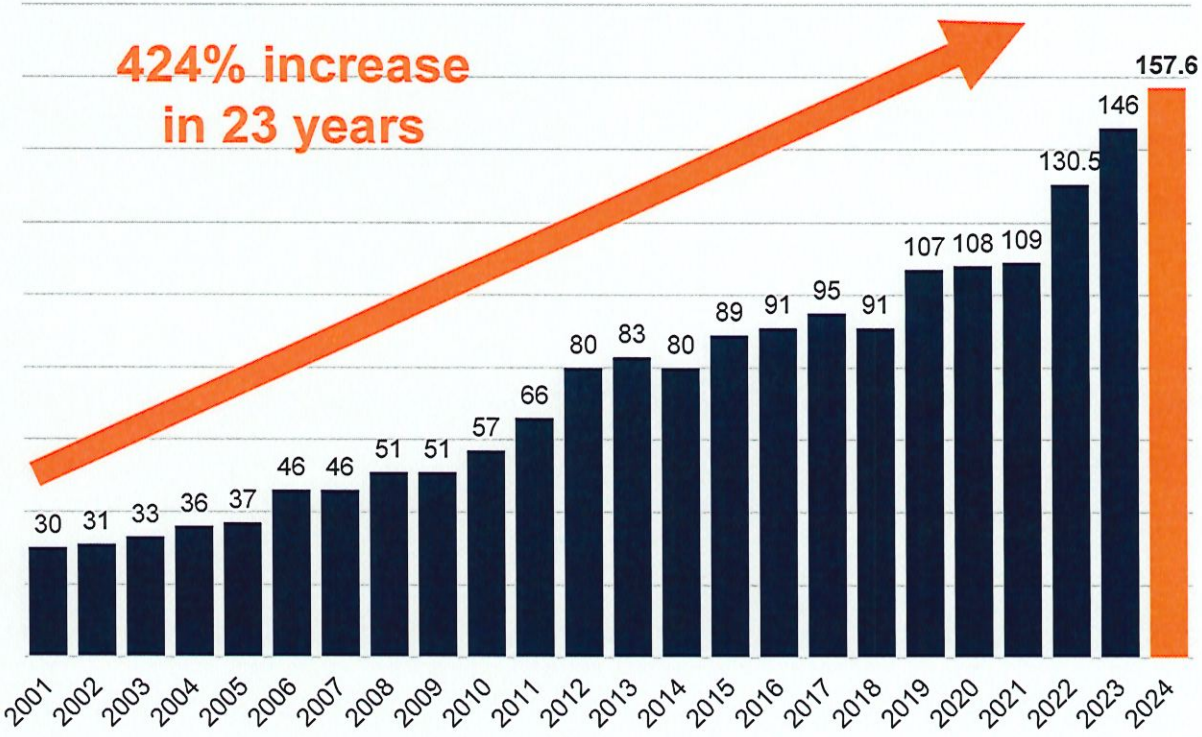
TEXAS

A&M

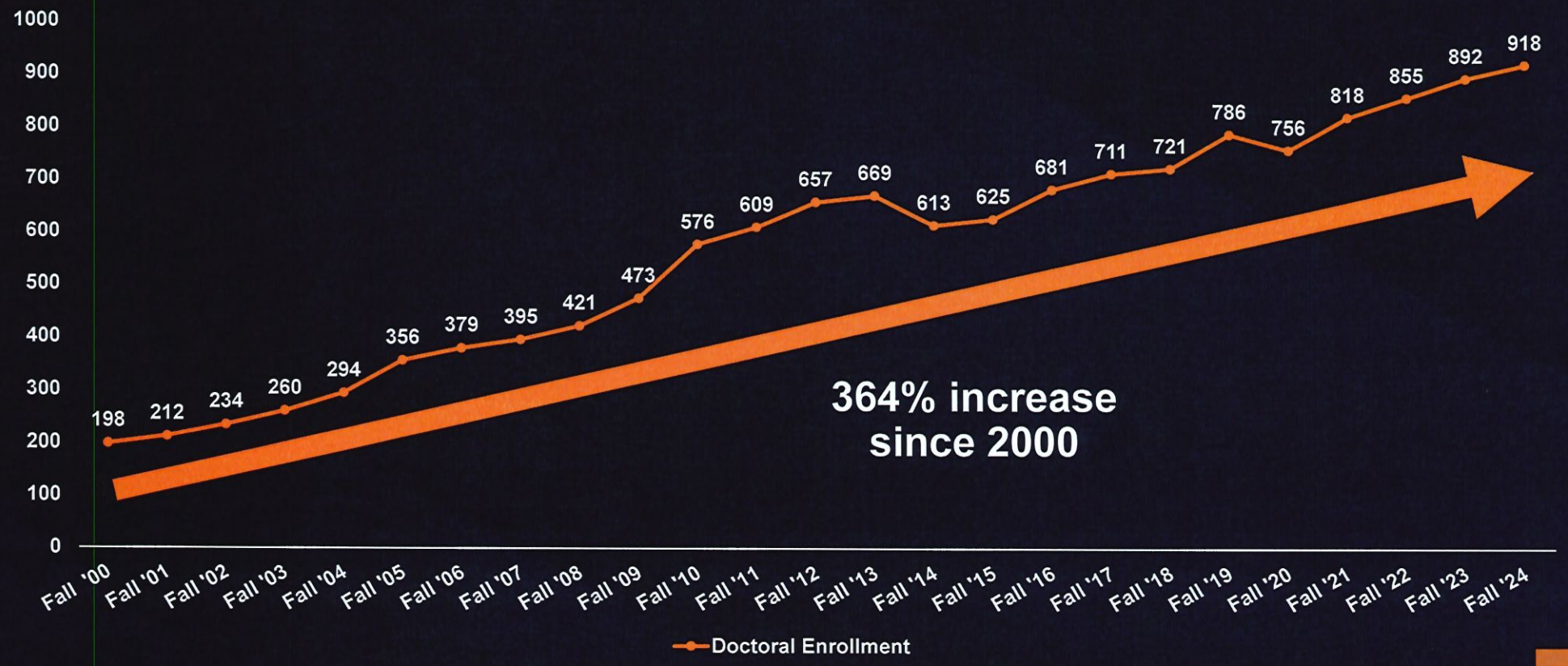
UH

$157.6 million in annual research expenditures

(FY24)

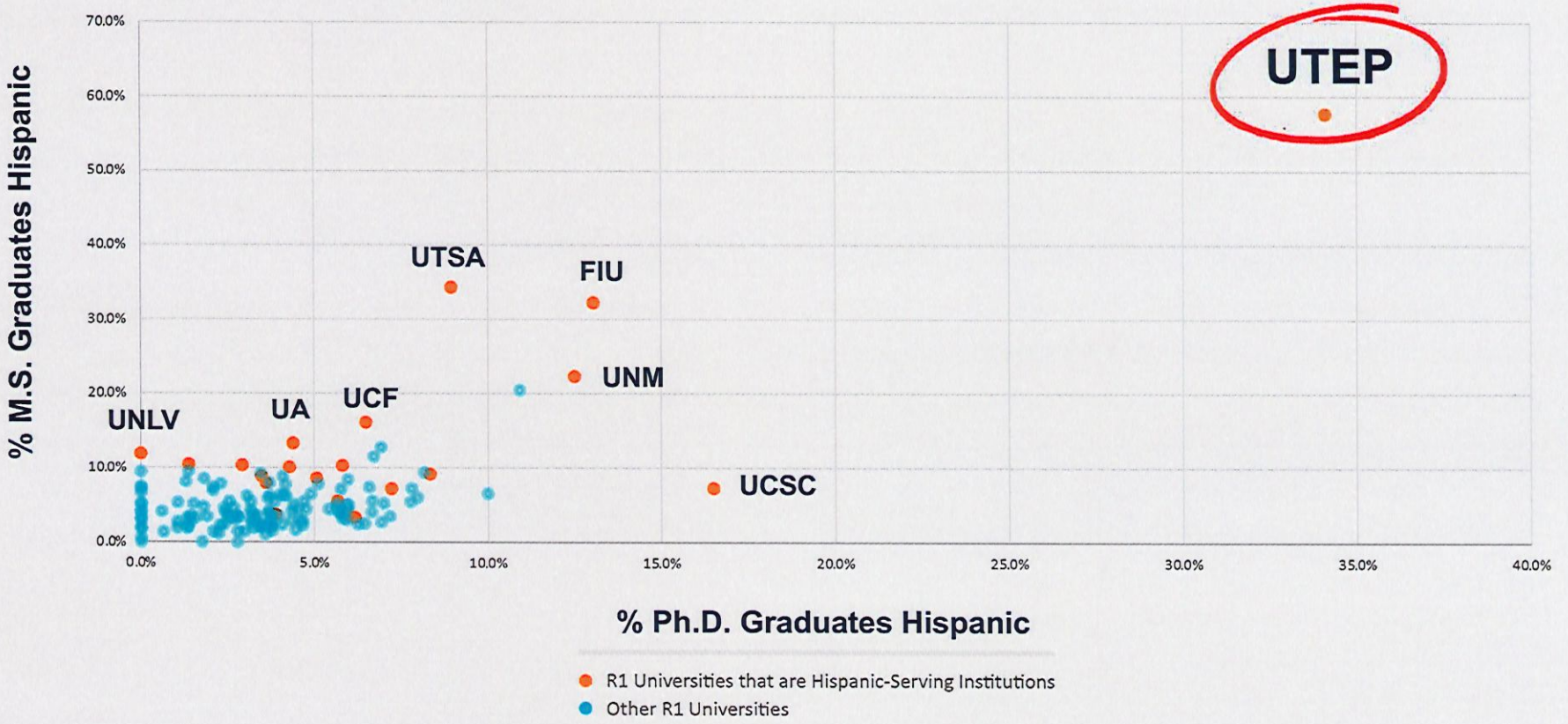


TOTAL DOCTORAL ENROLLMENT



HISPANIC STUDENT SUCCESS

STEM Graduate Degrees



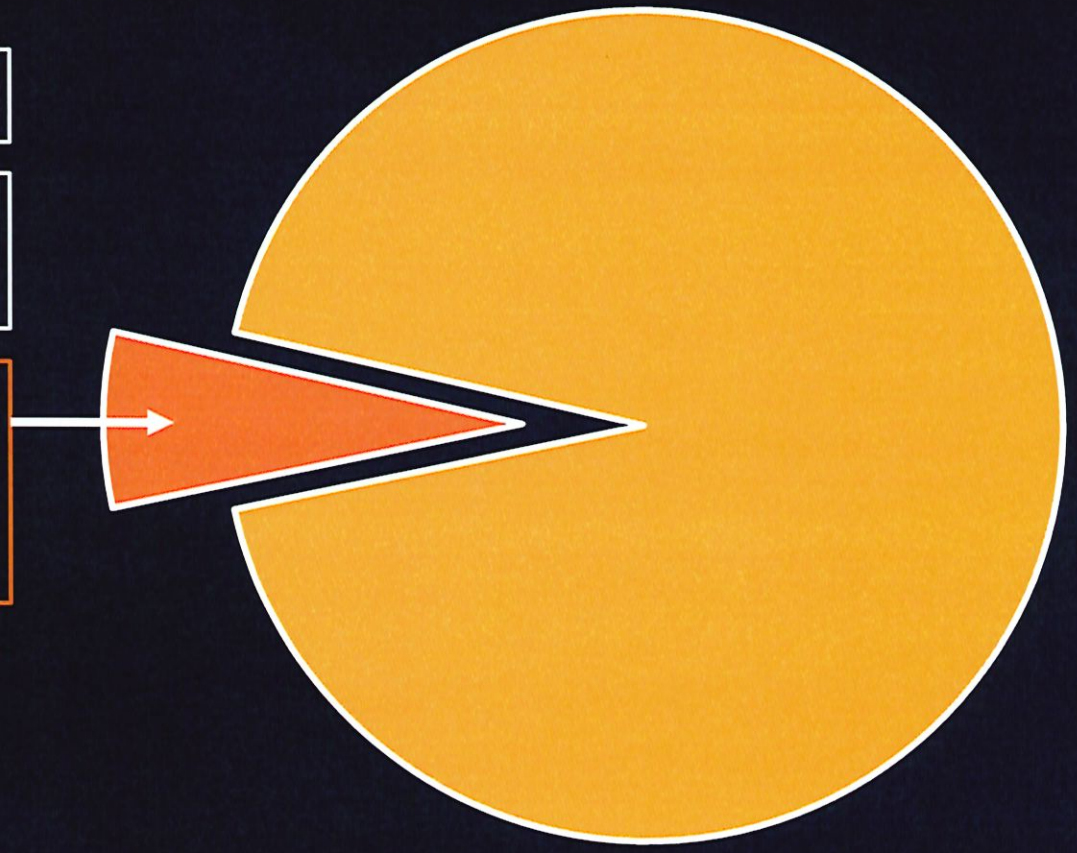
AFFORDABLE: FULL-TIME UNDERGRADUATES FALL 2024

Avg. tuition and fees $9,155

79% of students received a grant or scholarship

Avg. out-of-pocket cost:

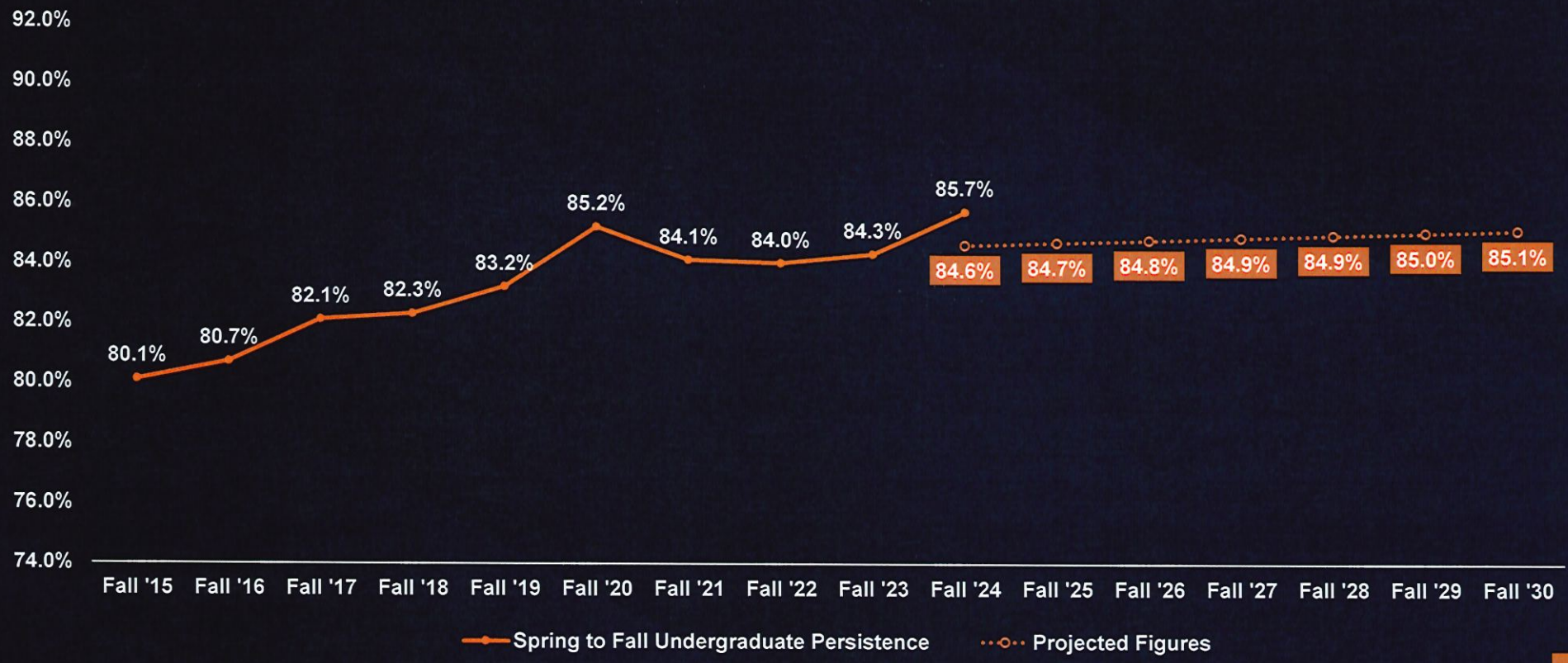
$1,098



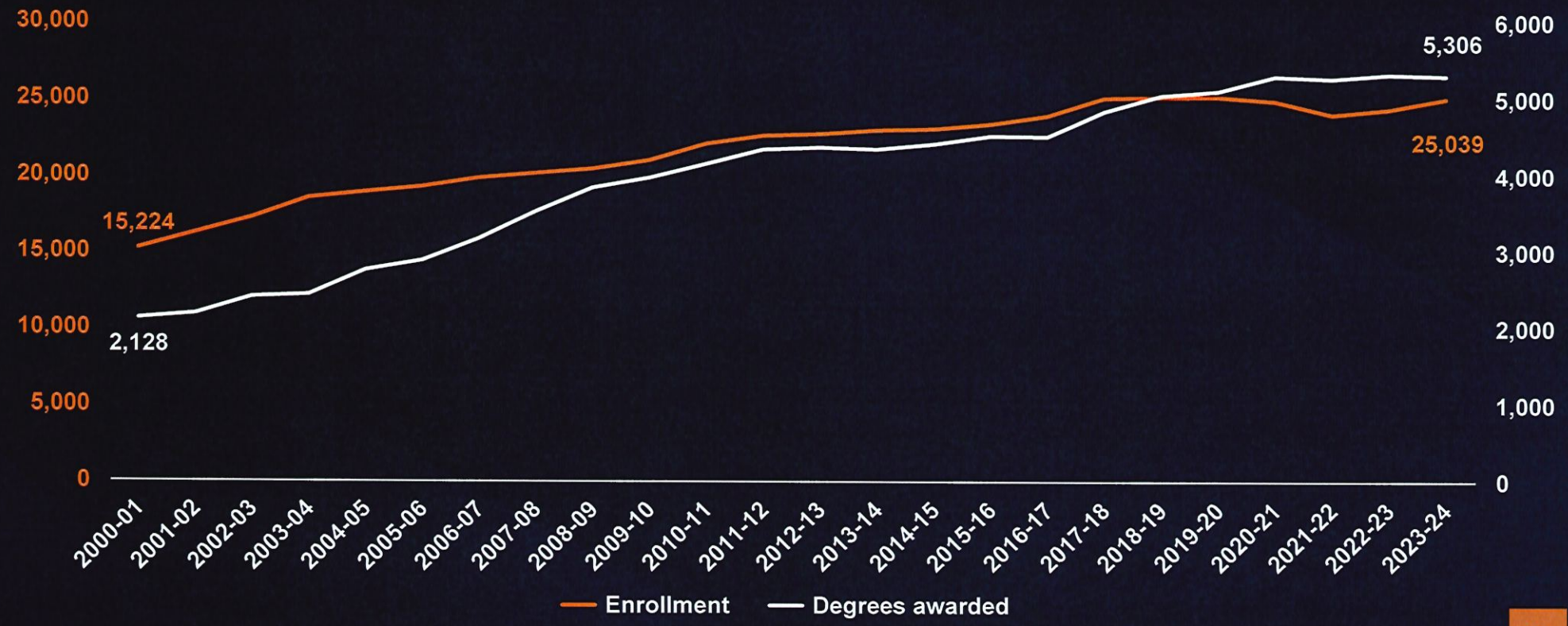
AFFORDABILITY

UTEP was named to Forbes list of America's top 500 colleges and number one in Texas for graduating students without debt.

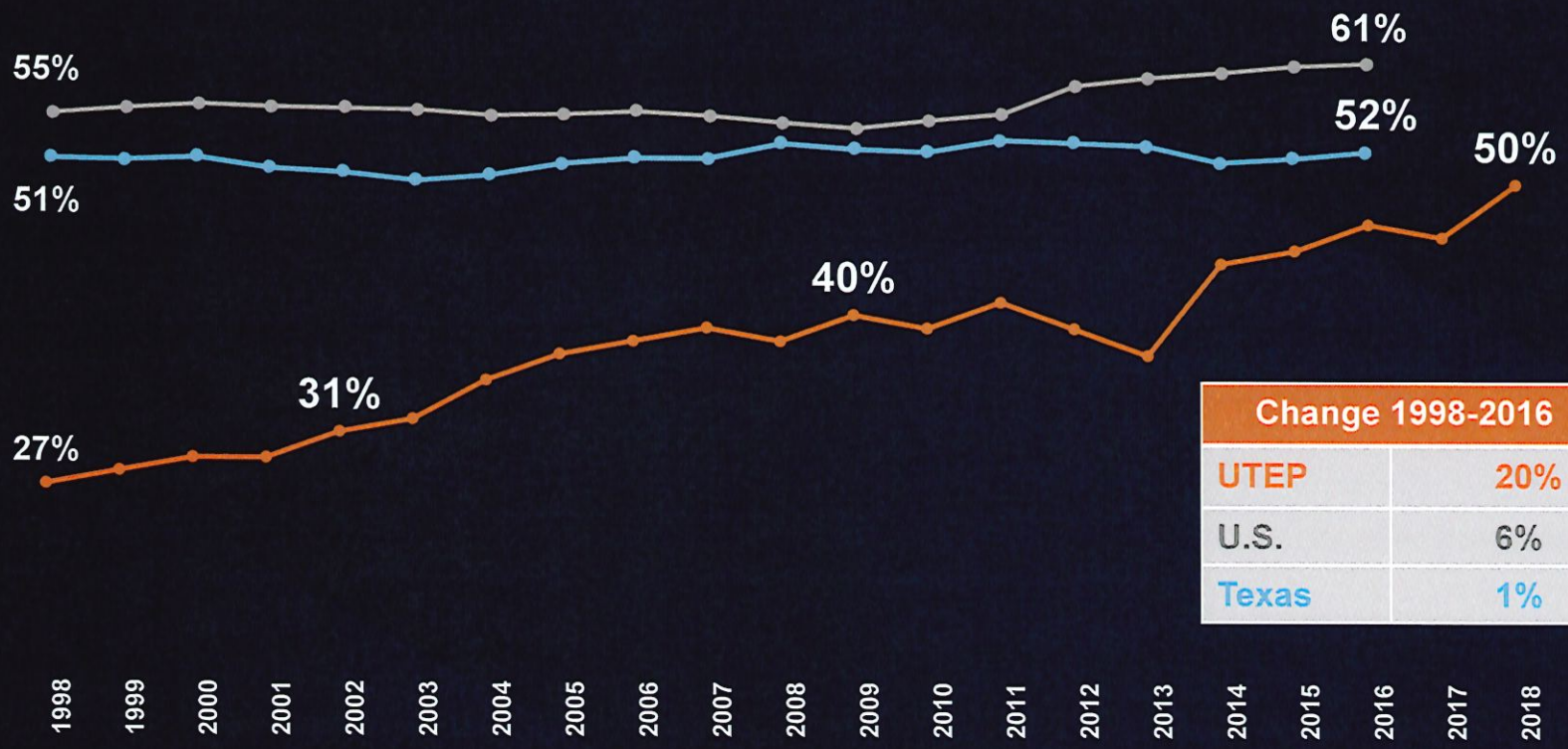
PERSISTENCE



TOTAL GRADUATES AND TOTAL ENROLLMENT



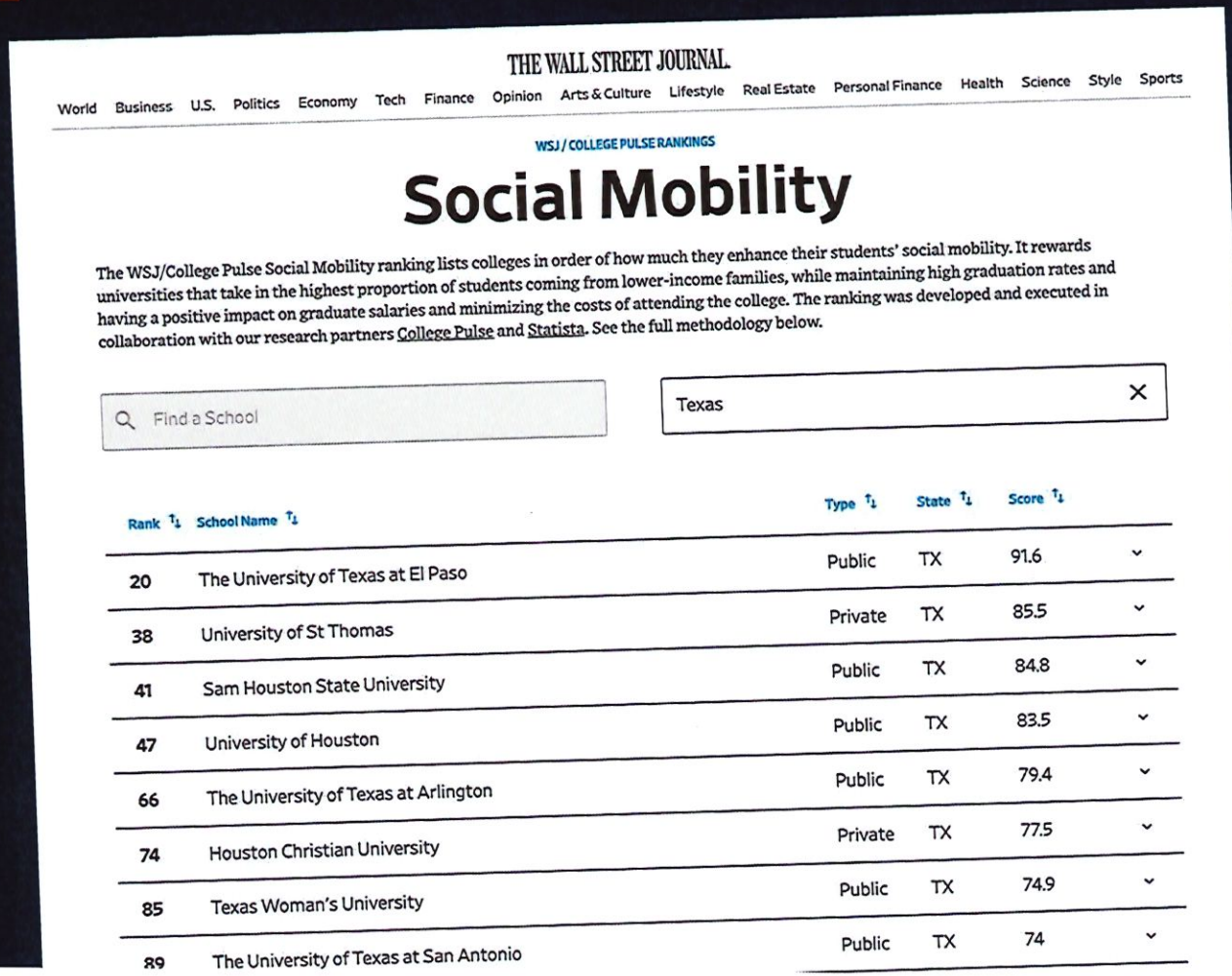
6 YEAR GRADUATION RATES



Change 1998-2016	
UTEP	20%
U.S.	6%
Texas	1%

First-Time, Full Time Undergraduates

#1 IN TEXAS AND #20 IN THE US OF 400 UNIVERSITIES



THE WALL STREET JOURNAL.

World Business U.S. Politics Economy Tech Finance Opinion Arts & Culture Lifestyle Real Estate Personal Finance Health Science Style Sports

WSJ / COLLEGE PULSE RANKINGS

Social Mobility

The WSJ/College Pulse Social Mobility ranking lists colleges in order of how much they enhance their students' social mobility. It rewards universities that take in the highest proportion of students coming from lower-income families, while maintaining high graduation rates and having a positive impact on graduate salaries and minimizing the costs of attending the college. The ranking was developed and executed in collaboration with our research partners College Pulse and Statista. See the full methodology below.

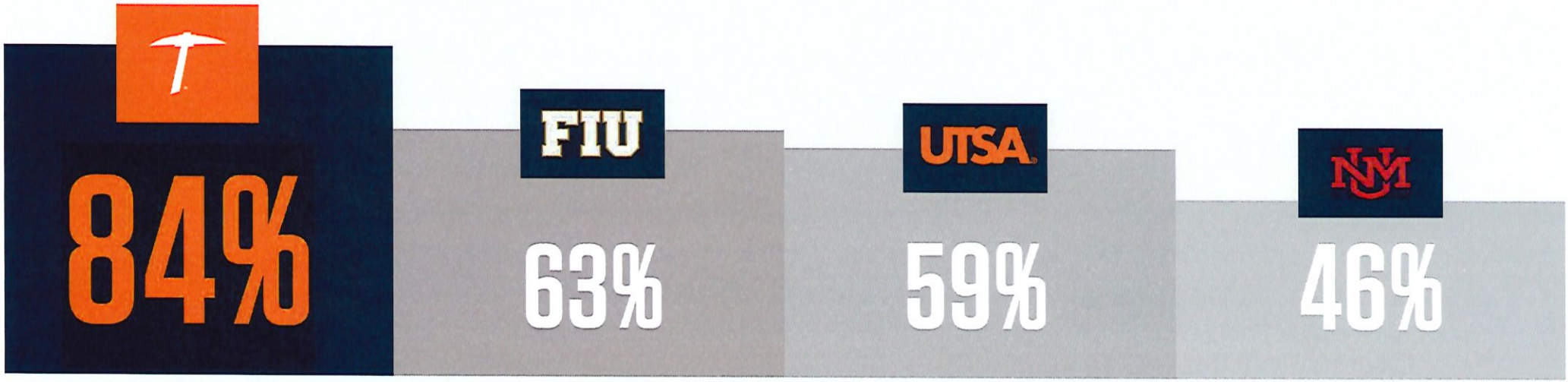
Find a School

Texas ×

Rank	School Name	Type	State	Score
20	The University of Texas at El Paso	Public	TX	91.6
38	University of St Thomas	Private	TX	85.5
41	Sam Houston State University	Public	TX	84.8
47	University of Houston	Public	TX	83.5
66	The University of Texas at Arlington	Public	TX	79.4
74	Houston Christian University	Private	TX	77.5
85	Texas Woman's University	Public	TX	74.9
89	The University of Texas at San Antonio	Public	TX	74

HISPANIC STUDENT SUCCESS

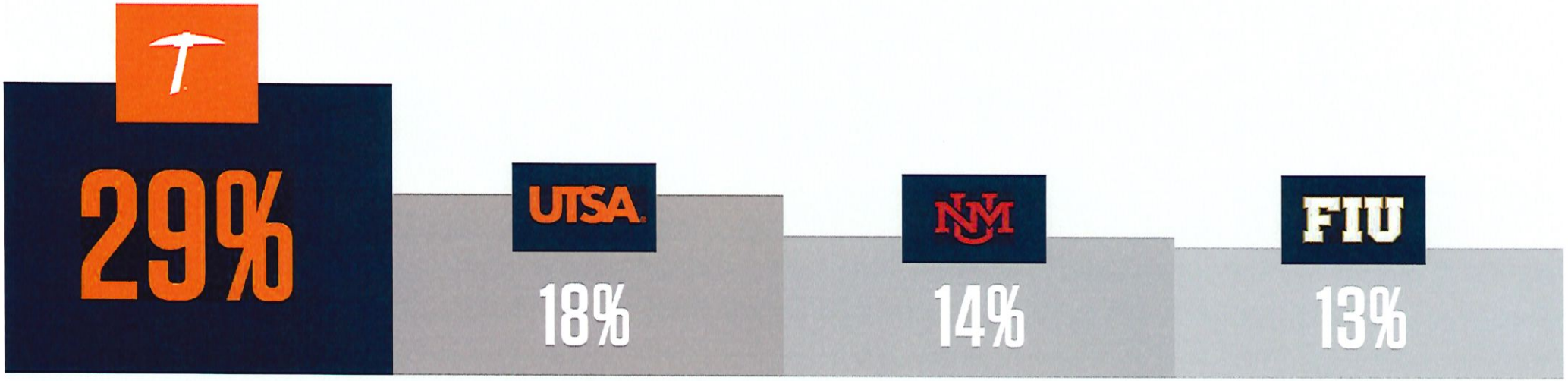
UTEP has the highest Hispanic student enrollment rate among the 146 top U.S. research (R1) universities.



Hispanic Student Enrollment Rate Fall 2022

HISPANIC FACULTY

UTEP has the highest percentage of Hispanic tenure and tenure-track faculty among the 146 top U.S. research (R1) universities.



IPEDS (Fall 2022)