

# WORLD **2022**

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## ENRICHING THE WORLD

As one of the world's most rapidly developing universities, City University of Hong Kong (CityU) endeavours to create a better world.

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Universities' pandemic responses showed them at their best. Despite continuing disruption, they are now moving out of crisis mode, embedding useful innovations and resetting strategies. Here, global sector leaders discuss the challenges ahead, while our tables and analyses detail the qualities necessary to thrive





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Times Higher Education World University Rankings

Rankings editor: Ellie Bothwell

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UNIVERSITY
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# Canada's most research-intensive university

McMaster is ranked among the top 100 universities globally\*. Through our cutting-edge research, world-class teaching and network of global partnerships, we are advancing human and societal health and well-being — in our community and around the world.

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Recognized for four straight years as Canada's most research-intensive university<sup>†</sup>, we continue work across disciplines to find creative solutions to complex problems, helping to improve people's lives and build a brighter future for all.



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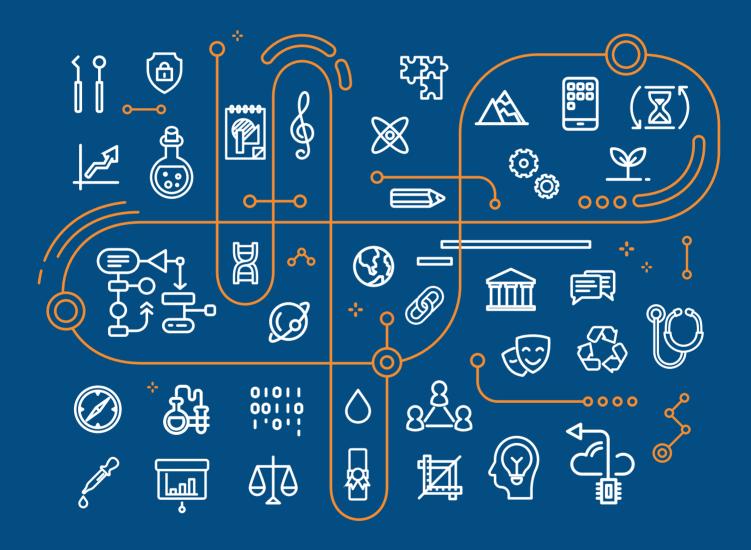
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At the National University of Singapore, people are the bedrock upon which a better world is built.

We believe in investing in our students, faculty and researchers, supporting them to bridge the gap between innovation and reality. Our goal: to nurture change-makers who dare to take on complex global challenges and create a positive societal impact.

We are driven by a shared resolve: to shape the future, for a better world.



## Keep on the sunny side

High-rising regions have reason to be heartened, but even in areas facing grave threats leaders keep their spirits up and carry on, says Ellie Bothwell

If I asked you to name the fastestrising higher education system in the world, the chances are you would say "China". And the results of the latest *Times Higher Education* World University Rankings would provide compelling evidence.

The country now has two universities in the top 20 for the first time, with Peking and Tsinghua sharing 16th place, and a remarkable 10 institutions in the top 200, up from seven last year and just three 10 years ago.

But when looking at the full list of more than 1,600 institutions in

this year's table, and comparing this alongside data from four years ago, you might be pushed to give a different response. On that basis, Saudi Arabia and Egypt would both be valid answers, suggesting that these nations might be most likely to emulate China's success at the top of the ranking in future years.

But at a time when countries and universities are still reeling from the shock of the Covid-19 pandemic, progress for any system is not guaranteed. In our analysis on page 30, Sir Hilary Beckles, vice-chancellor of the University of the West Indies,

warns that coronavirus' impact on lower-income countries presents "an existential threat", while World Bank expert Roberta Malee Bassett says "getting back to normal operations" in these nations "will be delayed in a way that will not be experienced in wealthier countries".

Challenges are not confined to the poorer higher education systems, although funding does appear to be a sticking point in many cases. Brian Schmidt, vice-chancellor of the Australian National University, says on page 10 that if his country does not recover its pre-Covid market share of international students, "the reality is there is no other source of money on the [same] scale, and we're going to do less research and teach our students with less resources".

But despite the rough terrain ahead, university leaders also tend to be eternal optimists, with presidents often implying that it would be impossible to do their job without an overabundant sense of hope. It is this faith – particularly in the people who make up universities – that will see them through the coming years.

As outgoing Northwestern University president Morton Schapiro writes: "I will miss so much of my job, especially the intellectual stimulation that comes from engaging with brilliant and committed students inside and outside the classroom, the thrill of learning from my faculty colleagues about fields other than my own, and the privilege of working alongside staff members who move the institution onwards every single day, often without fanfare."





**Ellie Bothwell**Rankings editor, *Times Higher Education* 

Presidents imply that it would be impossible to do their job without an overabundant sense of hope. It is this faith that will see them through the

#### **COUNTRIES/REGIONS REPRESENTED IN THE TOP 200**

Country/ region	Number of institutions in top 200	Top institution	Rank
United States	57	California Institute of Technology	=2
		Harvard University	=2
United Kingdom	28	University of Oxford	1
Germany	22	LMU Munich	32
Australia	12	University of Melbourne	33
China	10	Peking University,	=16
		Tsinghua University	=16
Netherlands	10	Wageningen University & Research	53
Canada	7	University of Toronto	=18
Switzerland	7	ETH Zurich	15
South Korea	6	Seoul National University	=54
France	5	Paris Sciences et Lettres - PSL Research University Paris	=40
Hong Kong	5	University of Hong Kong	=30
Sweden	5	Karolinska Institute	39
Belgium	4	KU Leuven	=42
Denmark	3	University of Copenhagen	=96
Italy	3	University of Bologna	=172
Spain	3	Pompeu Fabra University	156
Austria	2	University of Vienna	=137
Japan	2	The University of Tokyo	=35
Singapore	2	National University of Singapore	21
Finland	1	University of Helsinki	=101
New Zealand	1	University of Auckland	=137
Norway	1	University of Oslo	=119
Republic of Ireland	1	Trinity College Dublin	=146
Russian Federation	1	Lomonosov Moscow State University	=158
Saudi Arabia	1	King Abdulaziz University	=190
South Africa	1	University of Cape Town	=183
Taiwan	1	National Taiwan University (NTU)	=113

coming years

# THE HOLY GRAIL OF RENEWABLE ENERGY

As countries around the world commit to ambitious emission reduction targets, there's a phrase which is becoming more and more common from world leaders – green hydrogen.

Edith Cowan University's Professor Hongqi Sun and his team are developing photocatalysts that can accelerate the process of producing green hydrogen, whilst improving energy efficiency.

"This process mimics natural photosynthesis, where plants turn sunlight, water and carbon dioxide into oxygen and biomass," he said. These chemical catalysts are the key to unlocking hydrogen and are precisely manufactured to convert as much water to hydrogen and oxygen as quickly and efficiently as possible.

"If we're successful these tiny catalysts could unlock incredible new ways of producing vital chemicals in a far more sustainable and environmentally friendly way," he said.

Edith Cowan University in Western Australia is emerging as a leader across a diverse range of research areas.

ECUWORLDCLASS.COM/HYDROGEN





#### University leaders say the crisis has made clear the most vital aspects of higher education, but concerns over the future remain, writes Ellie Bothwell

f anyone is in doubt that higher education is at a pivotal moment, Brian Schmidt is here to set the record straight.

"We will see institutions make very poor long-term decisions in the heat of this short-term crisis. And we will see, on the other side, people make really profound long-term decisions which will reward them greatly in the future," the Australian National University vice-chancellor says about how leaders will continue to navigate their institutions during and after the Covid-19 pandemic.

"I wish I knew exactly what were the really profoundly smart things to do right now, but some institutions will do those and they will emerge at the end of this much better off than they were beforehand," he adds.

One of the poor decisions he is most concerned about is universities separating teaching from research and then cross-subsidising research with the profits from teaching or other income – a trend he has long worried about but fears will become even more common as a result of the coronavirus crisis.

"People are stressed; they're trying to figure out ways to save money and fixes that are quick and not long term," he says. "We have to be very careful not to chase a shortterm thing for financial reasons that in the long term, when you think about it, makes no sense at all." Schmidt paints the separation of teaching and research as an existential threat, saying that as soon as universities "go down the path of subsidising one activity with another, someone else is going to cut your grass eventually and do it without that extra tax in the middle and probably do it better than you".

"We're going to be very careful about how we keep the research university going" at ANU, which is ranked joint 54th in the 2022 *Times Higher Education* World University Rankings, up from 59th last year.

"If you're a university that only focuses on teaching, that's fine. But when you pretend to be both [a



teaching and research university] and be neither, that's very dangerous territory. I could easily see many universities getting themselves into a world of hurt there... I see that as a place where they could easily be disintermediated by other players coming in and doing either better."

Another big risk for universities, particularly those in Australia, that also relates to cross-subsidisation is the future of the international student market. Australia's international borders have been closed for 18 months, although small numbers of overseas students have gained entry.

For Schmidt, the jury is still out on whether the number of international students in Australia will ever return to pre-pandemic levels. But either way, he thinks the recovery process will be "harder than people want it to be" because there is more competition from other nations as well as geopolitical tensions and financial challenges that mean some prospective students are no longer able to fund international study.

"I could see things going anywhere from a complete bust-up of the international market to going back to close to normal to any-



where in between. It is completely open right now," he says.

"I think everyone wants the old way of doing things because we all were comfortable and most of the public policy problems in Australia were fixed by international students. So I think there's a naive hope, and almost praying, we will go back to normal."

Schmidt says ANU's international student recruitment strategy is focused on providing an excellent student and learning experience rather than providing the institution with a lucrative income stream.

"If I know I do something and it's excellent for students, I'm betting that's going to work better for me long term right now, because it's very uncertain going forward, than just trying to maximise revenue," he says.

However, there is no question that the money factor is an issue given that education and research in Australia are heavily financed from international student fees.

Is there a potential model where there could be a sustained decline in international student numbers but not a decline in research?

"No, I do not think there is a model for that to occur unless the Australian government invests more money in research and development," Schmidt concedes.

"The government is very keen for us to do more research with industry, and I'm keen. But around the world, you can see how much that is, and it's all driven by government expenditure and...it just doesn't add up.

"If we lose international students, the reality is there is no other source of money on the [same] scale, and we're going to do less research and we're going to teach our students with less resources."

But while there has been a lot of change, uncertainty and anxiety in the sector since the start of the pandemic, several leaders say the crisis has also helped to provide clarity about the aspects of higher education that were working well before Covid and on which they should now double down.

"In some sense, the crisis showed the red line between what can be digitised and what cannot," says Martin Vetterli, president of École Polytechnique Fédérale de Lausanne (EPFL), which is joint 40th in the *THE* World University Rankings, up from 43rd last year.

"This red line is not totally clear

We have to be very careful not to chase a short-term thing for financial reasons that in the long term makes no sense at all



for everything right now; but before it was very fuzzy because we had no idea, and now it has been sharpened by this experiment" of remote working.

ir Anton Muscatelli, vicechancellor of the University of Glasgow, joint 86th in the global league table, up from joint 92nd, says the pandemic has made it clear that active learning – which focuses on students interacting with their teachers and peers - must be "even more central" to education at the institution.

Glasgow had begun to accelerate this style of teaching in 2016 by developing spaces on campus to encourage and enhance interaction, in some cases through the use of technology, but Muscatelli says the past 18 months have shown that active learning "cannot be replaced by an online experience".

Schmidt agrees, saying undergraduate education at ANU will remain centred around on-campus learning.

"We surveyed our students, and 97.5 per cent of them want to be back on campus. So it would be foolish to throw that away," he says.

However, he sees more opportunity to shake up postgraduate education. While there will continue to be a campus-based programme, "there is real appetite for a largely digital programme", particularly for those who are already in the workforce and may want to study part-time to "add to their skill set".

"For us, it's not about getting rid of humans, it's about making humans superhuman. Use digital not for efficiency - that is, lowering the cost – but rather increasing the output, making things much, much better than they could otherwise be," Schmidt says.

Other leaders say the crisis has emphasised the importance of social interactions.

"The campus is a social space, and that we cannot do online, says Vetterli, highlighting social isolation among students and staff as one of the main issues over the past year and a half.

"If I look at the management level, for example, online meetings are OK for run-of-the-mill stuff, but it doesn't work for brainstorming, it doesn't work for open-ended

serendipity. These natural interactions - I'm certainly missing them."

Dukgeun Ahn, dean of international affairs at South Korea's Seoul National University, ranked joint 54th, up from 60th, says social interaction is particularly important for university students in East Asia because there is little opportunity

to learn social skills during school.

However, Ahn continues, there have been some positive changes at the institution as a result of the switch to online learning. For example, moving international summer programmes online allowed the institution to invite foreign faculty to teach some of the courses - something that would have been impossible in previous vears when the six-week courses were all face-to-face in Korea. Looking ahead, the plan is for international academics to teach remotely for four to five weeks and then come to campus for the remaining week or two. International students would also be able to join the programme remotely or in-person.

"This current situation caused a lot of trouble for us. But on the other hand, we could come up with this kind of alternative teaching opportunity, and I believe this is a good chance for us to broaden our international education opportunities," Ahn says.

Meanwhile, in Glasgow, Muscatelli says the university has been able to accelerate and improve the adoption of virtual reality (VR) technology. Previously, each individual student required VR equipment to use in the classroom, but the move to online learning led the institution to partner with a company to develop a way to use VR by proxy. This means that only the teacher has a VR headset and the 3D environment is shared with students via a videoconferencing platform.

"It democratises VR because it means you don't need lots and lots of equipment," Muscatelli says. "In many respects, [the crisis has] allowed us to accelerate and adapt new technologies in teaching that previously had a higher entry barrier."

But EPFL's Vetterli believes that the move to online working has led to an even more fundamen-

tal benefit: it has allowed universities to truly fulfil their role as publicserving institutions.

"When Moocs [massive open online courses] were introduced, people said: 'We're finally going to do good for humanity.

We have these glitzy campuses that are well funded, with star professors, and now we are finally going to do what we always promised as academics - share this knowledge with the world.' It didn't quite happen," he says.

However, he believes that this shift will now occur thanks to the prevalence of online and hybrid lectures, which can be made available to anyone in the world.

"At EPFL, we are a public university; people are essentially studying for free, I'm paid by taxpayers' money - I should put this knowledge and know-how out not just to people in the room but to the world," Vetterli says. "And I think this will happen, thanks to digitalisation, but also because of experiments we have been doing in the last 18 months."

The campus is a social space, and that we cannot do online



**American University Of The Middle East** 

# REINVENTING STUDENT LEARNING EXPERIENCE





## A tougher job than ever

#### After two decades leading US institutions, Morton Schapiro reflects on the changing landscape and offers a word of advice to young leaders



**Morton Schapiro**President and professor of economics,
Northwestern University

This time next year, I'll be concluding 22 years as a university president. This job has never been easy, not even during the relatively tranquil days of two decades ago, and now it is even harder.

I served for half a dozen years as the dean of the College of Letters, Arts and Sciences at the University of Southern California (USC) before becoming president of Williams College in 2000, a position I held before assuming my current one at Northwestern University in 2009. Despite having lots of experience with fundraising, strategic planning, budgeting and being on the public stage while at USC,

I found it disconcertingly difficult to move into the president's office. As a faculty member, department chair and even as a dean, I had a grudging respect for college presidents, while being quick to criticise their leadership and never doubting that I could do a better job. Careful what you wish for. When it was my turn, I ran out of folks to blame. Fortunately, with a supportive board of trustees and the goodwill and patience of our faculty, staff, students and alumni, I eventually started to get the hang of it.

But then the world changed, making a college presidency much more complex. While global problems have long crossed the threshold of our campus gates – think the Vietnam War or South African apartheid – what was once only an occasional event is now the norm. Decades of ignoring climate change, rising wealth inequality, systemic racism and the like have led to a level of anger that, while understandable, nonetheless makes the job of a president challenging.

In 2001, my presidential colleague Mike McPherson (then president of Macalester College) and I wrote a column titled "When protests proceed at internet speed", arguing that activists were starting to employ different methods of



communication and consensus building, and that instant and private ways of communicating would surely put pressure on colleges to respond at a speed that was previously unimaginable and - given the valuable yet cumbersome system of shared governance ("Let's create another committee") - impossible. Our prediction that presidents would one day receive hundreds of angry emails per week seems positively quaint in this time of massive protest. "In the new environment, ideas move fast, and issues become urgent almost overnight," we wrote, adding that "when passions erupt at internet speed, facts and evidence often lag far behind", dividing a college's constituencies and creating an atmosphere of confusion and mistrust. If we had been able to envisage the emergence of social media, we would have been even more anxious.

In our book, Minds Wide Shut: How the New Fundamentalisms Divide Us, my co-author, Gary Saul



Morson, and I examine how fundamentalist thinking has taken root far beyond the confines of the religious world. We argue that the election of Donald Trump in 2016 and the Brexit vote that same year were part of a broader movement, one fuelled by uncompromising ideologies and a belief in life-or-death stakes. It is a world where people shout louder and louder at each other, but nobody is listening. And colleges and universities are often at the forefront of all this.

It is therefore not at all surprising that many college presidents, who cannot possibly make everyone happy but who are in constant touch with those who are most unhappy, have been abandoning their role as public voices. We are very far from the days when the president of Harvard supposedly called the White House and asked the operator to "tell Mr Roosevelt that the president is on the line". Now, while presidents still write op-eds and give talks, they tend to stick to such non-controversial matters as growing governmentsupported research and increasing federal student aid, avoiding difficult topics that might create con-



troversy. After all, why risk alienating donors and elected officials by "taking sides" on the real issues of the day?

o, what does all this mean for freshly minted administrative leaders? Being tough skinned is certainly more critical than ever. Remember that you are mostly a symbol to many who will never know you personally, and that you are therefore a convenient target for their outrage. One very wise former president once told me that when things were particularly trying for him, he would take out his business card, which had his name followed by the word "president". He would remind himself that what people hated came after the comma, not before.

As for me, I am looking forward to opening my daily emails and not having to answer messages that begin: "I am outraged..." But I will miss so much of my job, especially the intellectual stimulation that comes from engaging with brilliant and committed students inside and outside the classroom, the thrill of learning from my faculty colleagues about fields other than my own, and the privilege of working alongside staff members who move the institution onwards every single day, often without fanfare.

As my presidential years come to an end, I suggest to those who are starting out that they recall the old saying that "there are many more people who want to be a college president than there are who want to do the job of a college president". That was true in the past; it is truer today. Recognise what you are getting into, and figure out a way that you will thrive personally together with the institution you lead.

Remember that you are mostly a symbol to many who will never know you personally, and that you are therefore a convenient target for their outrage |



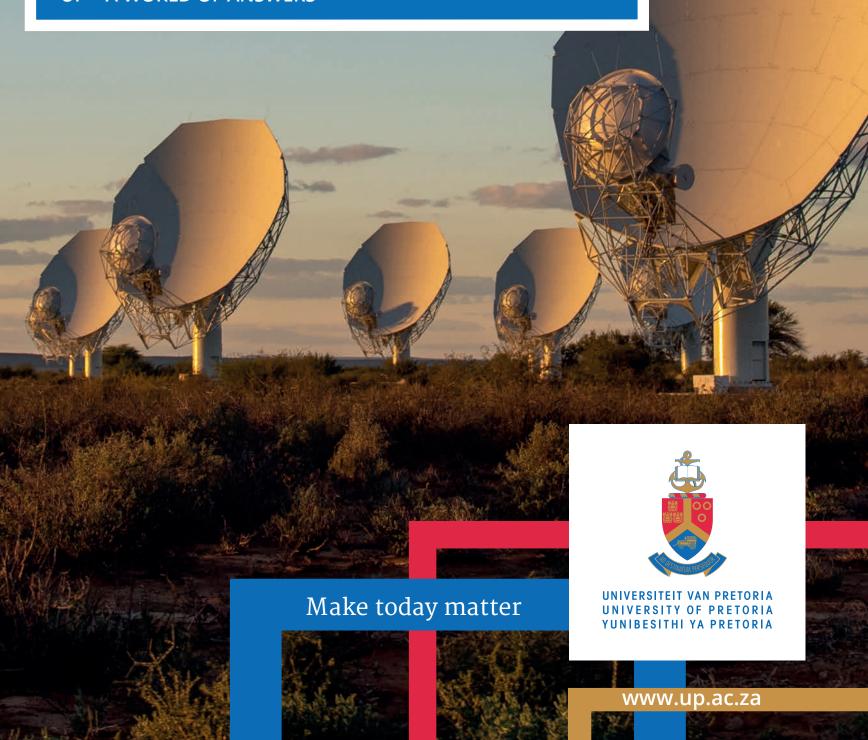
OUR QUEST TO ASK QUESTIONS





UP-led study results in discovery of gas-rich galaxy group with the help of MeerKAT.

**UP - A WORLD OF ANSWERS** 



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Rank 2022	Rank 2021	Institution	Country/region	Teaching	Research	Citations	Industry income	International outlook	Overall score
1		University of Oxford	United Kingdom	91.0	99.6	98.0	74.4	96.3	95.7
=2		California Institute of Technology	United States	93.6	96.9	97.8	90.4	83.8	95.0
=2		Harvard University	United States	94.5	98.9	99.2	48.9	79.8	95.0
4		Stanford University	United States	92.3	96.8	99.9	91.0	79.7	94.9
=5		University of Cambridge	United Kingdom	90.9	99.5	96.2	56.7	95.8	94.6
=5		Massachusetts Institute of Technology	United States	90.9	94.4	99.7	93.7	89.9	94.6
7		Princeton University	United States	89.5	96.0	99.0	88.8	80.7	93.6
8		University of California, Berkeley	United States	85.7	96.0	99.1	84.7	77.6	92.2
9		Yale University	United States	90.7	93.0	97.0	56.2	69.9	90.8
10		The University of Chicago	United States	87.2	90.6	98.3	56.3	74.4	89.8
11	17	Columbia University	United States	87.8	89.6	97.3	48.0	79.8	89.6
12	11	Imperial College London	United Kingdom	80.8	88.4	97.6	70.8	97.5	89.1
=13		Johns Hopkins University	United States	80.0	90.8	97.2	93.7	74.6	88.4
=13		University of Pennsylvania	United States	84.5	89.2	97.1	77.6	69.7	88.4
15		ETH Zurich	Switzerland	81.3	92.4	90.7	62.5	97.9	88.2
=16		Peking University	China	91.4	94.6	81.7	93.1	65.1	87.5
=16		Tsinghua University	China	88.1	95.7	86.8	100.0	50.6	87.5
=18		University of Toronto	Canada	77.6	93.0	92.6	61.2	89.1	87.2
=18		UCL	United Kingdom	76.8	88.9	96.9	44.7	96.7	87.2
20		University of California, Los Angeles	United States	82.1	89.8	96.0	56.5	65.1	86.7
21		National University of Singapore	Singapore	76.3	90.6	87.3	75.4	94.4	85.2
22	19	Cornell University	United States	78.6	85.4	97.2	38.3	75.4	85.0
23	=20	Duke University	United States	79.2	78.6	95.6	99.0	66.6	83.5
=24	22	University of Michigan-Ann Arbor	United States	78.6	85.4	94.0	48.9	59.5	83.1
=24	24	Northwestern University	United States	74.3	82.1	97.6	81.6	65.3	83.1
26	26	New York University	United States	75.4	83.1	94.7	41.4	72.3	82.4
27	27	London School of Economics and Political Science	United Kingdom	68.0	80.8	94.4	35.8	92.7	80.8
28	28	Carnegie Mellon University	United States	64.7	80.0	99.0	59.0	80.8	80.6
29	29	University of Washington	United States	68.8	78.8	99.0	46.3	61.7	79.8
=30	30	University of Edinburgh	United Kingdom	66.1	74.2	95.6	40.2	95.2	78.9
=30	39	University of Hong Kong	Hong Kong	66.2	72.2	95.0	58.5	98.8	78.9
32	32	LMU Munich	Germany	68.1	77.9	90.3	100.0	69.1	78.6
33	31	University of Melbourne	Australia	67.5	73.8	88.4	74.9	94.0	77.8
34	33	University of California, San Diego	United States	60.5	75.6	97.9	96.6	68.1	77.7
=35	35	King's College London	United Kingdom	57.6	71.2	96.9	43.7	95.9	76.0
=35	=36	The University of Tokyo	Japan	86.9	90.3	58.2	88.1	42.0	76.0
37	34	University of British Columbia	Canada	61.6	74.0	89.4	47.4	94.9	75.8
38	41	Technical University of Munich	Germany	64.5	74.8	85.5	100.0	76.1	75.6
39	=36	Karolinska Institute	Sweden	55.1	71.0	94.2	70.5	86.2	74.3
=40	43	École Polytechnique Fédérale de Lausanne	Switzerland	63.8	67.0	85.5	74.9	98.3	74.1
=40	46	Paris Sciences et Lettres - PSL Research University Paris	France	69.1	71.2	80.1	78.7	80.5	74.1
=42	42	Heidelberg University	Germany	67.9	59.9	95.5	54.2	69.6	73.6
=42	45	KU Leuven	Belgium	59.1	73.2	86.2	99.2	74.2	73.6
44	40	McGill University	Canada	63.3	70.9	83.9	45.3	91.5	73.4
45	38	Georgia Institute of Technology	United States	58.2	69.4	91.4	71.4	77.7	73.3
46	47	Nanyang Technological University, Singapore	Singapore	57.2	70.3	85.1	87.0	93.9	73.0
47	44	University of Texas at Austin	United States	67.9	71.5	89.4	50.1	39.8	72.9
48	48	University of Illinois at Urbana-Champaign	United States	65.7	77.3	80.9	50.0	55.4	72.6
49	=56	Chinese University of Hong Kong	Hong Kong	55.1	58.6	95.0	60.2	95.0	71.3
50	=51	University of Manchester	United Kingdom	56.4	65.0	89.1	45.6	92.4	71.2



#### Research for a brighter future

As one of Australia's leading research universities, we're driven by the pursuit of a better world in everything we do.

We're working towards a world where we can defeat malaria, where paralysed people have the hope of walking again, where we're better prepared for pandemics, and where we understand the past enough to create a brighter future one of justice, inclusion and equality for all.

Guided by our strong values, our research has innovation in mind, tomorrow in its sights, and societal impact at heart. That's why, through our researchers' inspired scientific thinking and natural curiosity, we're making a difference where it matters.

griffith.edu.au/research





World University Rankings 2021: 201-250th

Young University Rankings 2021: 29th

Impact Rankings 2021 (UN Sustainable Development Goals): 38th

76th









The Color of Color	32.1 70. 41.1 70. 66.4 70. 66.5 70. 66.9 70. 66.9 70. 61.0 69. 60.4 69.	62.1 41.1 86.4 96.5 93.4	44.9	Citations	earch	ing	/region	_	_	2
51         50         Washington University in St Louis         United States         60.5         57.5         98.5         44.9         62.1           52         -56         University of North Carolina at Chapel Hill         United States         62.2         63.4         95.6         45.0         41.1           53         -62         Wageningen University & Research         Netherlands         50.1         58.1         95.6         100.0         86.4           -54         -69         Australian National University         Australia         49.8         67.7         87.8         47.8         96.5           -54         -62         The University of Queensland         Australia         55.0         62.0         85.8         86.2         93.4           -54         -60         Seoul National University         Australia         54.3         61.7         87.7         79.2         91.0           -58         -51         University of Sydney         Australia         51.8         62.2         90.5         66.1         99.9           -58         -51         University of Wisconsin-Madison         United States         67.4         69.5         79.2         47.5         50.4          60         -70         Fudan Univ	32.1 70. 41.1 70. 66.4 70. 66.5 70. 66.9 70. 66.9 70. 61.0 69. 60.4 69.	62.1 41.1 86.4 96.5 93.4	44.9	Citations	earch	ing	/region	_	-	2
51         50         Washington University in St Louis         United States         60.5         57.5         98.5         44.9         62.1           52         -56         University of North Carolina at Chapel Hill         United States         62.2         63.4         95.6         45.0         41.1           53         -62         Wageningen University & Research         Netherlands         50.1         58.1         95.6         100.0         86.4           -54         -59         Australian National University         Australia         49.8         67.7         87.8         47.8         96.5           -54         -62         The University of Queensland         Australia         55.0         62.0         85.8         86.2         93.4           -54         -60         Seoul National University         Australia         54.3         61.7         87.7         79.2         91.0           -58         -51         University of Sydney         Australia         51.8         62.2         90.5         66.1         99.9           -58         -51         University of Wisconsin-Madison         United States         67.4         69.5         79.2         47.5         50.4          60         -70         Fudan Univ	32.1 70. 41.1 70. 66.4 70. 66.5 70. 66.9 70. 66.9 70. 61.0 69. 60.4 69.	62.1 41.1 86.4 96.5 93.4	44.9	Citations	earch	ing	/region	_		~
51         50         Washington University in St Louis         United States         60.5         57.5         98.5         44.9         62.1           52         -56         University of North Carolina at Chapel Hill         United States         62.2         63.4         95.6         45.0         41.1           53         -62         Wageningen University & Research         Netherlands         50.1         58.1         95.6         100.0         86.4           -54         -59         Australian National University         Australia         55.0         62.0         85.8         86.2         93.4           -54         -60         Seoul National University         Australia         55.0         62.0         85.8         86.2         93.4           -54         -60         Seoul National University         Australia         54.3         61.7         87.7         79.2         91.0           -57         -64         Monash University         Australia         54.8         62.2         90.5         66.1         99.9           -57         -64         Monash University         Australia         54.8         62.2         90.5         66.1         99.9           -58         -51         University of Visconsin-	32.1 70. 41.1 70. 66.4 70. 66.5 70. 66.9 70. 66.9 70. 61.0 69. 60.4 69.	62.1 41.1 86.4 96.5 93.4	44.9	Citations	earch	ii B		_	$\leftarrow$	N N
51         50         Washington University in St Louis         United States         60.5         57.5         98.5         44.9         62.1           52         —56         University of North Carolina at Chapel Hill         United States         62.2         63.4         95.6         45.0         41.1           53         —62         Wageningen University & Research         Netherlands         50.1         58.1         95.6         100.0         86.4           —54         —59         Australia         Australia         55.0         62.0         85.8         86.2         93.4           —54         —60         Seoul National University         Australia         54.3         61.7         87.7         79.2         91.0           —57         —64         Monash University         Australia         54.3         61.7         87.7         79.2         91.0           —58         —51         University of Sydney         Australia         54.8         62.2         90.5         66.1         99.9           —58         —51         University of Wisconsin-Madison         United States         67.4         69.5         79.2         47.5         50.4           60         —70         Fudan University <td< td=""><td>32.1 70. 41.1 70. 66.4 70. 66.5 70. 66.9 70. 66.9 70. 61.0 69. 60.4 69.</td><td>62.1 41.1 86.4 96.5 93.4</td><td>44.9</td><td>Citation</td><td>earo</td><td>.<u>.</u></td><td></td><td><u>  5</u></td><td>2</td><td>2</td></td<>	32.1 70. 41.1 70. 66.4 70. 66.5 70. 66.9 70. 66.9 70. 61.0 69. 60.4 69.	62.1 41.1 86.4 96.5 93.4	44.9	Citation	earo	. <u>.</u>		<u>  5</u>	2	2
51         50         Washington University in St Louis         United States         60.5         57.5         98.5         44.9         62.1           52         —56         University of North Carolina at Chapel Hill         United States         62.2         63.4         95.6         45.0         41.1           53         —62         Wageningen University & Research         Netherlands         50.1         58.1         95.6         100.0         86.4           —54         —59         Australia         Australia         55.0         62.0         85.8         86.2         93.4           —54         —60         Seoul National University         Australia         54.3         61.7         87.7         79.2         91.0           —57         —64         Monash University         Australia         54.3         61.7         87.7         79.2         91.0           —58         —51         University of Sydney         Australia         54.8         62.2         90.5         66.1         99.9           —58         —51         University of Wisconsin-Madison         United States         67.4         69.5         79.2         47.5         50.4           60         —70         Fudan University <td< td=""><td>32.1 70. 41.1 70. 66.4 70. 66.5 70. 66.9 70. 66.9 70. 61.0 69. 60.4 69.</td><td>62.1 41.1 86.4 96.5 93.4</td><td>44.9</td><td>Cita</td><td></td><td>- 등</td><td>ntry</td><td></td><td>k 2(</td><td>k 2(</td></td<>	32.1 70. 41.1 70. 66.4 70. 66.5 70. 66.9 70. 66.9 70. 61.0 69. 60.4 69.	62.1 41.1 86.4 96.5 93.4	44.9	Cita		- 등	ntry		k 2(	k 2(
51         50         Washington University in St Louis         United States         60.5         57.5         98.5         44.9         62.1           52         —56         University of North Carolina at Chapel Hill         United States         62.2         63.4         95.6         45.0         41.1           53         —62         Wageningen University & Research         Netherlands         50.1         58.1         95.6         100.0         86.4           —54         —59         Australia         Australia         55.0         62.0         85.8         86.2         93.4           —54         —60         Seoul National University         Australia         54.3         61.7         87.7         79.2         91.0           —57         —64         Monash University         Australia         54.3         61.7         87.7         79.2         91.0           —58         —51         University of Sydney         Australia         54.8         62.2         90.5         66.1         99.9           —58         —51         University of Wisconsin-Madison         United States         67.4         69.5         79.2         47.5         50.4           60         —70         Fudan University <td< td=""><td>32.1 70. 41.1 70. 66.4 70. 66.5 70. 66.9 70. 66.9 70. 61.0 69. 60.4 69.</td><td>62.1 41.1 86.4 96.5 93.4</td><td>44.9</td><td></td><td>Res</td><td>leac</td><td></td><td>usti</td><td>Ran</td><td>Ran</td></td<>	32.1 70. 41.1 70. 66.4 70. 66.5 70. 66.9 70. 66.9 70. 61.0 69. 60.4 69.	62.1 41.1 86.4 96.5 93.4	44.9		Res	leac		usti	Ran	Ran
52         -56         University of North Carolina at Chapel Hill         United States         62.2         63.4         95.6         45.0         41.1           53         -62         Wageningen University & Research         Netherlands         50.1         58.1         95.6         100.0         86.4           -54         59         Australian National University         Australia         49.8         67.7         87.8         47.8         96.5           -54         -62         The University of Queensland         Australia         55.0         62.0         85.8         86.2         93.4           -54         60         Seoul National University         South Korea         73.8         73.8         68.5         98.2         36.9           57         -64         Monash University         Australia         51.8         62.2         90.5         66.1         90.9           -58         49         University of Wisconsin-Madison         United States         67.4         69.5         79.2         47.5         50.4           60         -70         Fudau University         China         66.8         68.4         79.0         70.7         48.6           61         -54         Roston University	11.1 70. 16.4 70. 16.5 70. 13.4 70. 16.9 70. 11.0 69. 10.9 69. 10.04 69.	41.1 86.4 96.5 93.4		02.5						
53         -62         Wageningen University & Research         Netherlands         50.1         58.1         95.6         100.0         86.4           -54         -59         Australian National University         Australia         49.8         67.7         87.8         47.8         95.5           -54         -62         The University of Queensland         Australia         55.0         62.0         85.8         86.2         93.4           -54         -60         Seoul National University         South Korea         73.8         73.8         68.5         99.2         36.9           57         -64         Monash University         Australia         51.8         62.2         90.5         66.1         90.9           -58         -51         University of Sydney         Australia         51.8         62.2         90.5         66.1         90.9           -58         49         University of Sydney         Australia         51.8         62.2         90.5         66.1         90.9           -58         49         University of Sydney         Australia         51.8         62.2         90.5         66.1         90.9         47.5         50.4           60         -70         Fudan University<	66.4 70. 66.5 70. 63.4 70. 66.9 70. 66.9 69. 60.9 69.	86.4 96.5 93.4	45.0					,		
-54 59 Australian National University Australia 49.8 67.7 87.8 47.8 96.5 -54 -62 The University of Queensland Australia 55.0 62.0 85.8 86.2 93.4 -54 60 Seoul National University South Korea 73.8 73.8 68.5 98.2 36.9 57 -64 Monash University Australia 54.3 61.7 87.7 79.2 91.0 1.5	70.0 10.0	96.5 93.4	100.0							
-54 -62 The University of Queensland Australia 55.0 62.0 85.8 86.2 93.4 -54 60 Seoul National University South Korea 73.8 73.8 68.5 98.2 36.9 57 -64 Monash University Australia 54.3 61.7 87.7 79.2 91.0 -55 -51 University of Sydney Australia 51.8 62.2 90.5 66.1 90.9 -55 49 University of Wisconsin-Madison United States 67.4 69.5 79.2 47.5 50.4 60 -70 Fudan University China 66.8 68.4 79.0 70.7 48.6 61 -54 Kyoto University Japan 78.5 78.9 58.3 80.8 38.2 62 -54 Boston University United States 57.3 60.2 93.8 46.5 65.5 63 53 University Southern California United States 62.1 55.8 90.3 41.2 65.5 64 61 Brown University United States 62.1 55.8 90.3 41.2 65.5 66 61 Brown University United States 62.1 56.6 92.9 37.4 61.9 65.6 66 University of Masterdam Netherlands 49.0 63.3 91.6 41.6 89.8 66 -56 The Hong Kong University of Science and Technology Hong Kong 50.9 62.1 86.6 65.1 97.6 67 -64 University of California, Davis United States 58.8 64.6 81.5 50.7 68.9 68 68 University of California, Santa Barbara United States 45.2 58.9 96.6 79.8 73.6 69 -75 Utrecht University Netherlands 46.6 63.1 90.1 77.0 76.3 70 67 UNSW Sydney Australia 50.4 60.4 84.1 72.7 95.2 71 -70 Leiden University Netherlands 49.0 50.6 98.7 92.2 68.1 74 -80 Humboldt University of Berlin Germany 48.6 50.6 98.7 92.2 68.1 74 -80 Humboldt University of Berlin Germany 59.9 66.7 73.5 41.6 70.1 -75 -73 University of Derlin Germany 59.9 56.6 70.9 58.0 50.6 100.0 61.6 -75 -73 University of Technology Netherlands 52.2 49.6 89.4 61.9 92.5 -75 -73 University of Technology Netherlands 52.2 49.6 89.4 61.9 92.5 -75 -73 University of Technology Netherlands 52.2 49.6 89.4 61.9 92.5 -75 -73 University of Technology Netherlands 52.2 49.6 89.4 61.9 92.5 -75 -73 University of Technology Netherlands 52.2 49.6 89.4 61.9 92.5 -75 -73 University of Technology Netherlands 52.2 49.6 89.4 61.9 92.5 -75 -73 University of Technology Netherlands 52.2 49.6 89.4 61.9 92.5 -75 -78 10 University of Technology Netherlands 52.2 49.6 89.4 61.9 92.5 -75 -73 University of Technology Netherlands 52.2	70.0 16.9 70.0 11.0 69.0 10.9 69.0 160.4 69.0	93.4								
=54         60         Seoul National University         South Korea         73.8         73.8         68.5         98.2         36.9           57         -64         Monash University         Australia         54.3         61.7         87.7         79.2         91.0           -58         -51         University of Wisconsin-Madison         United States         67.4         69.5         79.2         47.5         50.4           60         -70         Fudan University         China         66.8         68.4         79.0         70.7         48.6           61         -54         Kyoto University         Japan         78.5         78.9         58.3         80.8         38.2           62         -54         Boston University         United States         57.3         60.2         93.8         46.5         65.5           63         53         University of Southern California         United States         62.1         58.8         90.3         41.2         66.5           64         61         Brown University         United States         62.2         56.6         92.9         37.4         61.9           65         66         University of Austerdam         Netherlands         49.0	36.9 70.0 91.0 69.9 90.9 69.0 50.4 69.0									
57         -64 Monash University         Australia         54.3         61.7         87.7         79.2         91.0           -58         -51 University of Sydney         Australia         51.8         62.2         90.5         66.1         90.9           -58         49 University of Wisconsin-Madison         United States         67.4         69.5         79.2         47.5         50.4           60         -70 Fudan University         China         66.8         68.4         79.0         70.7         48.6           61         -54 Kyoto University         Japan         78.5         77.8         58.3         80.8         38.2           62         -54 Boston University         United States         62.1         58.8         90.3         41.2         65.5           63         53 University of Southern California         United States         62.1         58.8         90.3         41.2         65.5           64         61 Brown University         United States         62.2         56.6         92.9         37.4         61.9           65         66 University of Amsterdam         Netherlands         49.0         63.3         91.6         41.6         89.8           68         68         10 U	01.0 69.0 00.9 69.0 60.4 69.0									
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-58         49         University of Wisconsin-Madison         United States         67.4         69.5         79.2         47.5         50.4           60         -70         Fudan University         China         66.8         68.4         79.0         70.7         48.6           61         -54         Kyoto University         Japan         78.5         78.9         58.3         80.8         38.2           62         -54         Boston University         United States         57.3         60.2         93.8         46.5         65.5           63         53         University of Southern California         United States         62.1         58.8         90.3         41.2         65.5           64         61         Brown University         United States         62.2         56.6         92.9         37.4         61.9           65         66         University of Amsterdam         Netherlands         49.0         63.3         91.6         41.6         89.8           66         -56         The Hong Kong University of Science and Technology         Hong Kong         50.9         62.1         86.6         65.1         97.6           67         -64         University of California, Davis         Unit	69.8									
60         -70         Fudan University         China         66.8         68.4         79.0         70.7         48.6           61         -54         Kyoto University         Japan         78.5         78.9         58.3         80.8         38.2           62         -54         Boston University         United States         57.3         60.2         93.8         46.5         65.5           63         53         University of Southern California         United States         62.1         58.8         90.3         41.2         65.5           64         61         Brown University         United States         62.2         56.6         92.9         37.4         61.9           65         66         University of Amsterdam         Netherlands         49.0         63.3         91.6         41.6         89.8           66         -56         The Hong Kong University of Socience and Technology         Hong Kong         50.9         62.1         86.6         65.1         97.6           67         -64         University of California, Santa Barbara         United States         58.8         64.6         81.5         50.7         68.9           68         University of California, Santa Barbara         United S										
61 =54 Kyoto University Japan 78.5 78.9 58.3 80.8 38.2 62 =54 Boston University United States 57.3 60.2 93.8 46.5 65.5 63 53 University of Southern California United States 62.1 58.8 90.3 41.2 65.5 64 61 Brown University United States 62.2 56.6 92.9 37.4 61.9 65.5 66 University of Amsterdam Netherlands 49.0 63.3 91.6 41.6 89.8 66 =56 The Hong Kong University of Science and Technology Hong Kong 50.9 62.1 86.6 65.1 97.6 67 =64 University of California, Davis United States 58.8 64.6 81.5 50.7 68.9 68 68 University of California, Santa Barbara United States 58.8 64.6 81.5 50.7 68.9 69 =75 Utrecht University Netherlands 46.6 63.1 90.1 77.0 76.3 70 67 UNSW Sydney Australia 50.4 60.4 84.1 72.7 95.2 71 =70 Leiden University Rotterdam Netherlands 40.2 57.8 97.0 76.5 88.5 73 =75 Charité - University Rotterdam Netherlands 40.2 57.8 97.0 76.5 88.5 73 =75 Charité - University of Berlin Germany 59.9 66.7 73.5 41.6 70.1 =75 =78 Delft University of Technology Netherlands 50.2 49.6 89.4 61.9 92.5 =78 University of Tübingen Germany 53.3 58.7 82.9 82.7 65.2 =78 University of Tübingen Germany 53.3 58.7 82.9 82.7 65.2 =78 University of Warwick United Kingdom 46.9 53.0 90.7 44.8 94.5										
Columbia								,		
63         53         University of Southern California         United States         62.1         58.8         90.3         41.2         65.5           64         61         Brown University         United States         62.2         56.6         92.9         37.4         61.9           65         66         University of Amsterdam         Netherlands         49.0         63.3         91.6         41.6         89.8           66         -56         The Hong Kong University of Science and Technology         Hong Kong         50.9         62.1         86.6         65.1         97.6           67         -64         University of California, Davis         United States         58.8         64.6         81.5         50.7         68.9           68         68         University of California, Santa Barbara         United States         45.2         58.9         96.6         79.8         73.6           69         -75         Utrecht University         Netherlands         46.6         63.1         90.1         77.0         76.3           70         67         UNSW Sydney         Australia         50.4         60.4         84.1         72.7         95.2           71         -70         Leiden University of Rotte										
64 61 Brown University United States 62.2 56.6 92.9 37.4 61.9 65 66 University of Amsterdam Netherlands 49.0 63.3 91.6 41.6 89.8 66 =56 The Hong Kong University of Science and Technology Hong Kong 50.9 62.1 86.6 65.1 97.6 67 =64 University of California, Davis United States 58.8 64.6 81.5 50.7 68.9 68 68 University of California, Santa Barbara United States 45.2 58.9 96.6 79.8 73.6 69 =75 Utrecht University Netherlands 46.6 63.1 90.1 77.0 76.3 70 67 UNSW Sydney Australia 50.4 60.4 84.1 72.7 95.2 71 =70 Leiden University Netherlands 44.8 65.1 86.8 71.8 84.1 72 72 Erasmus University Rotterdam Netherlands 40.2 57.8 97.0 76.5 88.5 73 =75 Charité - Universitis Berlin Germany 48.6 50.6 98.7 92.2 68.1 74 =80 Humboldt University of Berlin Germany 59.9 66.7 73.5 41.6 70.1 =75 =78 Delft University China 67.2 69.9 58.6 100.0 61.6 =75 =73 University of Zurich Switzerland 52.2 49.6 89.4 61.9 92.5 =78 =78 University of Warwick United Kingdom 46.9 53.0 90.7 44.8 94.5										
65         66         University of Amsterdam         Netherlands         49.0         63.3         91.6         41.6         89.8           66         =56         The Hong Kong University of Science and Technology         Hong Kong         50.9         62.1         86.6         65.1         97.6           67         =64         University of California, Davis         United States         58.8         64.6         81.5         50.7         68.9           68         68         University of California, Santa Barbara         United States         45.2         58.9         96.6         79.8         73.6           69         =75         Utrecht University         Netherlands         46.6         63.1         90.1         77.0         76.3           70         67         UNSW Sydney         Australia         50.4         60.4         84.1         72.7         95.2           71         =70         Leiden University         Netherlands         44.8         65.1         86.8         71.8         84.1           72         72         Erasmus University Rotterdam         Netherlands         40.2         57.8         97.0         76.5         88.5           73         =75         Charité - University of Berlin <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>53</td> <td></td>									53	
66         -56         The Hong Kong University of Science and Technology         Hong Kong         50.9         62.1         86.6         65.1         97.6           67         -64         University of California, Davis         United States         58.8         64.6         81.5         50.7         68.9           68         68         University of California, Santa Barbara         United States         45.2         58.9         96.6         79.8         73.6           69         -75         Utrecht University         Netherlands         46.6         63.1         90.1         77.0         76.3           70         67         UNSW Sydney         Australia         50.4         60.4         84.1         72.7         95.2           71         -70         Leiden University         Netherlands         44.8         65.1         86.8         71.8         84.1           72         Zerasmus University Rotterdam         Netherlands         40.2         57.8         97.0         76.5         88.5           73         -75         Charité - University Rotterdam         Netherlands         40.2         57.8         97.0         76.5         88.5           74         -80         Humboldt University of Berlin         <								•	61	
67 =64 University of California, Davis United States 58.8 64.6 81.5 50.7 68.9 68 68 University of California, Santa Barbara United States 45.2 58.9 96.6 79.8 73.6 69 =75 Utrecht University Netherlands 46.6 63.1 90.1 77.0 76.3 70 67 UNSW Sydney Australia 50.4 60.4 84.1 72.7 95.2 71 =70 Leiden University Netherlands 44.8 65.1 86.8 71.8 84.1 72 72 Erasmus University Rotterdam Netherlands 40.2 57.8 97.0 76.5 88.5 73 =75 Charité - Universitätsmedizin Berlin Germany 48.6 50.6 98.7 92.2 68.1 74 =80 Humboldt University of Berlin Germany 59.9 66.7 73.5 41.6 70.1 =75 =78 Delft University of Technology Netherlands 57.1 71.1 59.4 97.7 93.6 =75 =94 Zhejiang University China 67.2 69.9 58.6 100.0 61.6 =75 =73 University of Zurich Switzerland 52.2 49.6 89.4 61.9 92.5 =78 =78 University of Tübingen Germany 53.3 58.7 82.9 82.7 65.2 =78 77 University of Warwick United Kingdom 46.9 53.0 90.7 44.8 94.5							Netherlands		66	
68       68       University of California, Santa Barbara       United States       45.2       58.9       96.6       79.8       73.6         69       =75       Utrecht University       Netherlands       46.6       63.1       90.1       77.0       76.3         70       67       UNSW Sydney       Australia       50.4       60.4       84.1       72.7       95.2         71       =70       Leiden University       Netherlands       44.8       65.1       86.8       71.8       84.1         72       72       Erasmus University Rotterdam       Netherlands       40.2       57.8       97.0       76.5       88.5         73       =75       Charité - University Rotterdam       Germany       48.6       50.6       98.7       92.2       68.1         74       =80       Humboldt University of Berlin       Germany       59.9       66.7       73.5       41.6       70.1         =75       =78       Delft University of Technology       Netherlands       57.1       71.1       59.4       97.7       93.6         =75       =94       Zhejiang University       China       67.2       69.9       58.6       100.0       61.6         =75 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>Hong Kong</td><td></td><td>=56</td><td>66</td></t<>							Hong Kong		=56	66
69       =75       Utrecht University       Netherlands       46.6       63.1       90.1       77.0       76.3         70       67       UNSW Sydney       Australia       50.4       60.4       84.1       72.7       95.2         71       =70       Leiden University       Netherlands       44.8       65.1       86.8       71.8       84.1         72       72       Erasmus University Rotterdam       Netherlands       40.2       57.8       97.0       76.5       88.5         73       =75       Charité - Universitätsmedizin Berlin       Germany       48.6       50.6       98.7       92.2       68.1         74       =80       Humboldt University of Berlin       Germany       59.9       66.7       73.5       41.6       70.1         =75       =78       Delft University of Technology       Netherlands       57.1       71.1       59.4       97.7       93.6         =75       =94       Zhejjang University       China       67.2       69.9       58.6       100.0       61.6         =75       =73       University of Zurich       Switzerland       52.2       49.6       89.4       61.9       92.5         =78       =78	67.5	68.9	50.7	81.5	64.6	58.8	United States	University of California, Davis	=64	67
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71       =70       Leiden University       Netherlands       44.8       65.1       86.8       71.8       84.1         72       72       Erasmus University Rotterdam       Netherlands       40.2       57.8       97.0       76.5       88.5         73       =75       Charité - Universitätsmedizin Berlin       Germany       48.6       50.6       98.7       92.2       68.1         74       =80       Humboldt University of Berlin       Germany       59.9       66.7       73.5       41.6       70.1         =75       =78       Delft University of Technology       Netherlands       57.1       71.1       59.4       97.7       93.6         =75       =94       Zhejiang University       China       67.2       69.9       58.6       100.0       61.6         =75       =73       University of Zurich       Switzerland       52.2       49.6       89.4       61.9       92.5         =78       =78       University of Tübingen       Germany       53.3       58.7       82.9       82.7       65.2         =78       77       University of Warwick       United Kingdom       46.9       53.0       90.7       44.8       94.5	67.0	76.3	77.0	90.1	63.1	46.6	Netherlands	Utrecht University	=75	69
72       72       Erasmus University Rotterdam       Netherlands       40.2       57.8       97.0       76.5       88.5         73       =75       Charité - Universitätsmedizin Berlin       Germany       48.6       50.6       98.7       92.2       68.1         74       =80       Humboldt University of Berlin       Germany       59.9       66.7       73.5       41.6       70.1         =75       =78       Delft University of Technology       Netherlands       57.1       71.1       59.4       97.7       93.6         =75       =94       Zhejiang University       China       67.2       69.9       58.6       100.0       61.6         =75       =73       University of Zurich       Switzerland       52.2       49.6       89.4       61.9       92.5         =78       =78       University of Tübingen       Germany       53.3       58.7       82.9       82.7       65.2         =78       77       University of Warwick       United Kingdom       46.9       53.0       90.7       44.8       94.5	5.2 67.	95.2	72.7	84.1	60.4	50.4	Australia	UNSW Sydney	67	70
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74       =80       Humboldt University of Berlin       Germany       59.9       66.7       73.5       41.6       70.1         =75       =78       Delft University of Technology       Netherlands       57.1       71.1       59.4       97.7       93.6         =75       =94       Zhejiang University       China       67.2       69.9       58.6       100.0       61.6         =75       =73       University of Zurich       Switzerland       52.2       49.6       89.4       61.9       92.5         =78       =78       University of Tübingen       Germany       53.3       58.7       82.9       82.7       65.2         =78       77       University of Warwick       United Kingdom       46.9       53.0       90.7       44.8       94.5	88.5 67.0	88.5	76.5	97.0	57.8	40.2	Netherlands	Erasmus University Rotterdam	72	72
=75       =78       Delft University of Technology       Netherlands       57.1       71.1       59.4       97.7       93.6         =75       =94       Zhejiang University       China       67.2       69.9       58.6       100.0       61.6         =75       =73       University of Zurich       Switzerland       52.2       49.6       89.4       61.9       92.5         =78       =78       University of Tübingen       Germany       53.3       58.7       82.9       82.7       65.2         =78       77       University of Warwick       United Kingdom       46.9       53.0       90.7       44.8       94.5	88.1 66.8	68.1	92.2	98.7	50.6	48.6	Germany	Charité – Universitätsmedizin Berlin	=75	73
=75       =94       Zhejiang University       China       67.2       69.9       58.6       100.0       61.6         =75       =73       University of Zurich       Switzerland       52.2       49.6       89.4       61.9       92.5         =78       =78       University of Tübingen       Germany       53.3       58.7       82.9       82.7       65.2         =78       77       University of Warwick       United Kingdom       46.9       53.0       90.7       44.8       94.5	0.1 66.3	70.1	41.6	73.5	66.7	59.9	Germany	Humboldt University of Berlin	=80	74
=75       =73       University of Zurich       Switzerland       52.2       49.6       89.4       61.9       92.5         =78       =78       University of Tübingen       Germany       53.3       58.7       82.9       82.7       65.2         =78       77       University of Warwick       United Kingdom       46.9       53.0       90.7       44.8       94.5	3.6 65.8	93.6	97.7	59.4	71.1	57.1	Netherlands	Delft University of Technology	=78	=75
=78       =78       University of Tübingen       Germany       53.3       58.7       82.9       82.7       65.2         =78       77       University of Warwick       United Kingdom       46.9       53.0       90.7       44.8       94.5	65.8	61.6	100.0	58.6	69.9	67.2	China	Zhejiang University	=94	=75
=78       =78       University of Tübingen       Germany       53.3       58.7       82.9       82.7       65.2         =78       77       University of Warwick       United Kingdom       46.9       53.0       90.7       44.8       94.5	2.5 65.8	92.5	61.9	89.4	49.6	52.2	Switzerland	University of Zurich	=73	=75
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85 =80 Ohio State University (Main campus) United States 54.7 52.2 86.1 53.2 60.6										
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	63.0 63.0 63.0 63.0 63.0 63.0 63.0 63.0	86.8	83.3 52.0	93.8	49.0	42.5	United States	University of California, Irvine	=98	98
=99 =101 Dartmouth College United States 42.5 49.0 93.6 38.9 41.7 =99 96 Korea Advanced Institute of Science and Technology (KAIST) South Korea 64.1 66.5 59.3 100.0 38.0	63.0 63.0 63.0 63.0 63.0 63.0 63.0 63.0	86.8 62.4 73.2 41.7	83.3 52.0 38.9	93.8 93.6	49.0 40.2	42.5 60.1	United States United States	University of California, Irvine Dartmouth College	=98 =101	98 =99



#### Through machine learning, researchers at Alfaisal University can scan tweets in 35 different languages to track Covid-19

oftware engineers at Alfaisal University, have developed artificial intelligence (AI) techniques to pinpoint whether someone has Covid-19 based on their social media stream. With researchers using AI to determine whether someone is infected with the virus based on their tweets.

"There are currently no regulations to do these checks," says Dr Nidal Nasser, founder and director of the university's telecommunications computing research lab. "This is a way that we can screen their tweets and be able to tell if they are infected or have been in contact with someone who has been infected."

The technique uses machine-learning software, which is trained using a given data set and is then able to extract knowledge from other data sets. In the case of their Covid-19 tracker, Nasser and colleagues trained

computer algorithms to identify words, phrases and context that would indicate whether a person has Covid-19 or has had it in the past. "We try to categorise the context of the words," Dr Nasser says. "We're not just interested in the word 'Covid', but also the words around it, such as 'infected' or 'positive'." The researchers' platform allows them to mine tweets in 35 languages, widening their ability to identify travellers who may be infected with the novel corona virus.

The social media Covid-detector is just one of the ways Alfaisal's researchers are harnessing the power of AI. Dr Nasser and his team have also developed a way for drones to disinfect classrooms using a type of ultraviolet light known as UVC, and a smart healthcare framework, which allows healthcare workers to detect Covid patients from lung X-rays and to monitor them remotely in real time.



Alfaisal University

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g g g	5	Teaching	Research	Citations	Industry income	<u>ate</u>	Overall score
	witzerland	45.0	44.9	88.2	90.6	87.3	62.2
	inland	44.3	56.9	88.5	37.8	57.3	62.2
	witzerland	42.9	42.0	89.5	99.9	97.0	62.1
	enmark	39.3	58.4	82.4	74.9	76.9	61.7
·	nited Kingdom	40.3	45.2	93.3	40.6	91.7	61.5
	hina	54.9	54.6	74.0	86.8	56.6	61.5
	nited States	56.7	65.2	59.6	68.9	70.9	61.5
	ermany	47.1	51.8	82.2	97.2	61.4	61.4
·	ermany	55.3	61.6	64.1	98.7	62.0	61.4
·	nited Kingdom	45.5	46.4	86.3	48.8	87.8	61.3
	ustralia	35.6	45.2	94.3	65.5	93.7	61.2
·	ermany	48.4	48.7	85.2	55.5	67.1	61.1
	aiwan	55.8	64.7	64.8	75.4	46.9	61.0
	nited States	48.6	43.8	94.1	56.9	48.7	61.0
	letherlands	39.9	51.5	87.8	59.3	75.4	60.9
	weden	39.6	53.1	83.1	82.0	79.9	60.8
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	orway	40.5	46.5	89.5	44.3	80.4	60.1
` ' '	nited States	49.3	60.3	75.3	40.7	47.5	60.1
	nited Kingdom	38.6	40.9	93.9	36.4	94.6	60.0
	outh Korea	56.9	60.2	60.7	99.4	56.3	60.0
	nited Kingdom	39.9	42.1	90.6	43.4	94.5	59.9
·	anada	48.2	50.7	71.9	64.7	88.9	59.6
·	nited States	47.6	41.7	91.9	41.7	53.8	59.4
	nited Kingdom	43.7	46.5	81.1	39.8	90.3	59.2
·	etherlands	39.8	50.0	76.1	84.6	98.1	59.2
, , , , , ,	nited States	49.4	41.2	90.5	43.1	51.0	59.2
	nited States	55.0	35.3	88.8	70.2	48.9	59.1
	weden	38.5	55.8	78.4	71.8	71.4	59.0
=132 =184 Arizona State University (Tempe) Un	nited States	46.3	49.2	80.9	38.5	62.8	58.6
=132 135 University of Hamburg Ge	ermany	45.4	52.5	74.9	93.8	58.7	58.6
=132 =136 Radboud University Nijmegen Ne	etherlands	35.5	50.4	85.9	44.4	78.6	58.6
	ustralia	34.4	43.6	88.0	65.0	95.5	58.6
136 =124 Rice University Un	nited States	47.3	37.5	87.2	44.2	77.8	58.5
=137 =147 University of Auckland Ne	ew Zealand	34.0	46.3	84.8	69.4	94.6	58.4
=137 =164 University of Vienna Au	ustria	46.9	55.4	65.4	37.8	95.4	58.4
139 =140 Technical University of Berlin Ge	ermany	50.2	55.4	64.1	96.9	66.8	58.3
140 =133 University of Pittsburgh-Pittsburgh campus Un	nited States	45.6	42.3	91.7	42.6	43.6	58.2
141 =158 University of Nottingham Un	nited Kingdom	43.6	44.2	80.1	40.5	89.2	58.1
142 =147 University of Rochester Un	nited States	44.9	39.3	86.4	50.5	73.1	57.9
=143 =170 University of Antwerp Be	elgium	35.4	47.0	85.4	85.7	70.6	57.8
=143 =174 University of Exeter Un	nited Kingdom	33.9	39.3	93.5	37.5	91.6	57.8
	ustralia	36.5	43.7	83.7	55.0	97.2	57.8
	ermany	43.0	50.5	76.6	60.7	67.5	57.6
	nited Kingdom	34.1	39.8	92.8	42.3	87.5	57.6
	epublic of Ireland	40.4	45.0	79.5	42.1	95.0	57.6
	ermany	39.8	38.6	92.4	85.7	56.9	57.6
·	nited States	46.6	48.0	82.4	50.5	41.4	57.5

#### **A Quarter** Century of Success



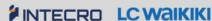
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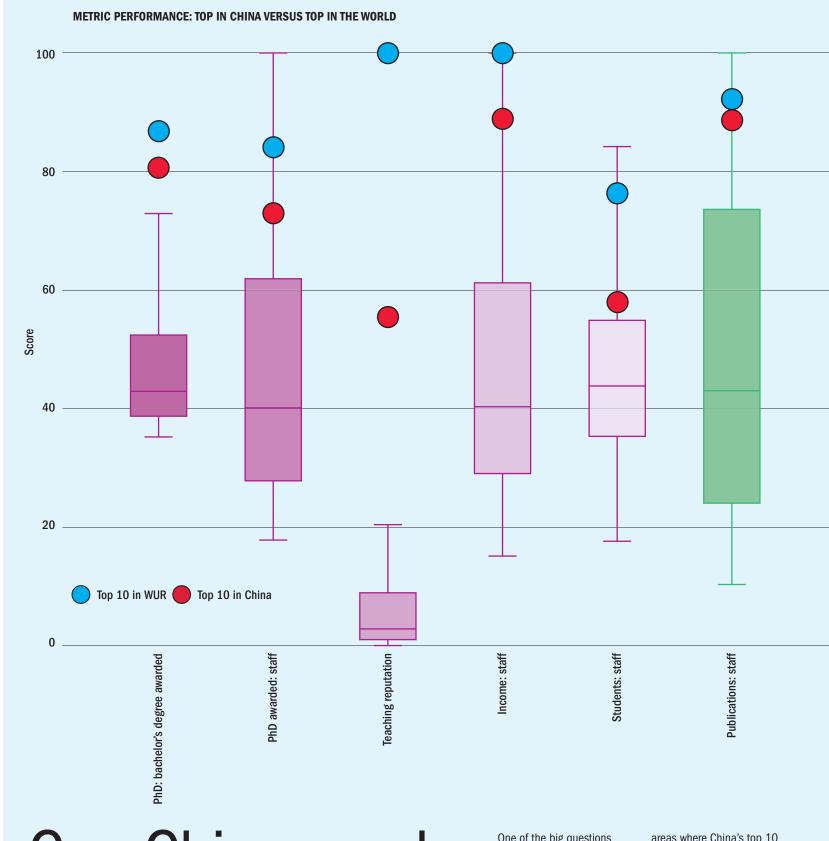
**Education/Accredited Programs** 



Covid-19 Safe Campus



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			Country/region				Industry income	International outlook	9
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7 2	호 2	Institution	intry)	Teaching	Research	Citations	ustr	erna	Lall
Ran	Ran	<u>lust</u>	Con	Tea	Res	Cita	힐	<u> </u>	Overall score
=151	126	City University of Hong Kong	Hong Kong	42.7	44.3	75.4	46.6	99.7	57.4
=151		University of Sussex	United Kingdom	32.2	37.5	95.1	36.2	93.8	57.4
=151	=187	Yonsei University (Seoul campus)	South Korea	54.9	58.2	55.7	96.9	58.6	57.4
154	=152	University of Florida	United States	54.5	58.9	62.0	58.4	42.7	57.3
155	=136	Université de Paris	France	48.8	35.5	86.5	36.3	67.7	57.2
156	=152	Pompeu Fabra University	Spain	36.4	39.2	94.2	47.8	66.8	57.1
157		Wuhan University	China	43.2	37.7	92.3	80.9	39.8	56.9
=158		University of Aberdeen	United Kingdom	32.2	35.2	94.0	47.1	95.8	56.8
=158		University of Colorado Boulder	United States	43.2	42.8	88.1	43.2	47.2	56.8
=158		Lomonosov Moscow State University	Russian Federation	80.3	69.9	12.8	99.3	72.5	56.8
=158		Université Catholique de Louvain	Belgium	38.4	52.1	73.2	62.5	80.9	56.8
=162		Durham University	United Kingdom	44.9	47.8	69.7	37.8	93.8	56.7
=162		University of Ottawa	Canada	40.4	40.6	83.3	50.0	82.1	56.7
=162		Southern University of Science and Technology (SUSTech)	China	29.4	39.4	98.5	78.5	60.4	56.7
165		University of Würzburg	Germany	38.1	43.2	85.6	73.9	62.4	56.6
166		Bielefeld University	Germany	36.4	41.8	94.4	42.4	48.1	56.5
167		Indiana University	United States	48.9	46.4	74.7	52.0	54.0	56.3
168		Northeastern University	United States	38.3	29.1	97.4	37.8	76.2	56.1
169		University of York	United Kingdom	39.0	43.7	79.1	37.1	86.7	56.0
=170		Autonomous University of Barcelona	Spain	36.6	38.9	90.6	42.9	66.9	55.9
=170		University of Canberra	Australia	27.9	33.8	98.6	44.2	89.8	55.9
=172		University of Bologna	Italy	49.8	36.9	82.7	45.3	52.1	55.8
=172		University of Cologne TU Dresden	Germany	42.2	43.7 47.2	77.1	76.9 97.4	66.7	55.8
=172			Germany United States	46.7		69.3		59.3	55.8
=172 =176		Tufts University University of Lausanne	Switzerland	45.6 32.8	33.0 45.4	91.6 77.1	39.5 78.1	50.4 92.0	55.8 55.5
-176 =176		Stockholm University	Sweden	30.5	49.1	84.9	36.5	69.4	55.5
-170 =178		University of Liverpool	United Kingdom	33.1	36.5	88.5	39.1	93.6	55.4
-178 =178		Ulsan National Institute of Science and Technology (UNIST)	South Korea	37.7	41.1	85.4	91.8	51.0	55.4
180		Karlsruhe Institute of Technology	Germany	45.7	51.5	61.3	93.3	71.7	55.3
181		Huazhong University of Science and Technology	China	38.3	38.4	92.7	89.8	27.9	55.2
182		University of East Anglia	United Kingdom	28.3	32.5	97.9	35.9	87.5	55.1
=183		University of Cape Town	South Africa	31.4	41.4	85.5	56.4	80.1	54.9
=183		University of Notre Dame	United States	51.4	43.2	70.7	39.7	59.0	54.9
=185		University of Gothenburg	Sweden	29.6	42.3	90.5	42.7	66.1	54.8
=185		University of Leicester	United Kingdom	30.0	32.3	94.2	39.9	91.0	54.8
=185		Pohang University of Science and Technology (POSTECH)	South Korea	52.3	49.1	65.4	98.0	31.1	54.8
=185		Technical University of Denmark	Denmark	39.6	40.6	72.4	86.0	92.2	54.8
189		Cardiff University	United Kingdom	31.9	36.1	89.1	39.9	87.0	54.7
=190		King Abdulaziz University	Saudi Arabia	36.7	22.9	92.4	74.0	93.6	54.5
=190		Rutgers, the State University of New Jersey	United States	46.6	47.5	70.4	47.2	52.8	54.5
192		Macquarie University	Australia	39.0	43.3	71.4	63.3	89.5	54.4
=193		University of Barcelona	Spain	31.9	40.0	90.4	47.1	59.4	54.3
=193		Queensland University of Technology	Australia	32.2	36.7	86.8	50.0	84.6	54.3
=193		Texas A&M University	United States	47.4	51.1	64.6	46.5	56.1	54.3
196		Medical University of Graz	Austria	30.3	29.1	95.9	66.7	78.0	54.1
=197		University of Erlangen-Nuremberg	Germany	42.2	45.7	71.5	88.7	52.8	54.0
=197		University of Geneva	Switzerland	34.4	33.6	83.1	51.6	98.6	54.0
=197		University of Hohenheim	Germany	34.4	31.2	97.5	48.5	51.4	54.0
=197	201-250	Sapienza University of Rome	Italy	51.5	41.7	70.9	55.9	44.3	54.0
			Italy	56.5	38.6				



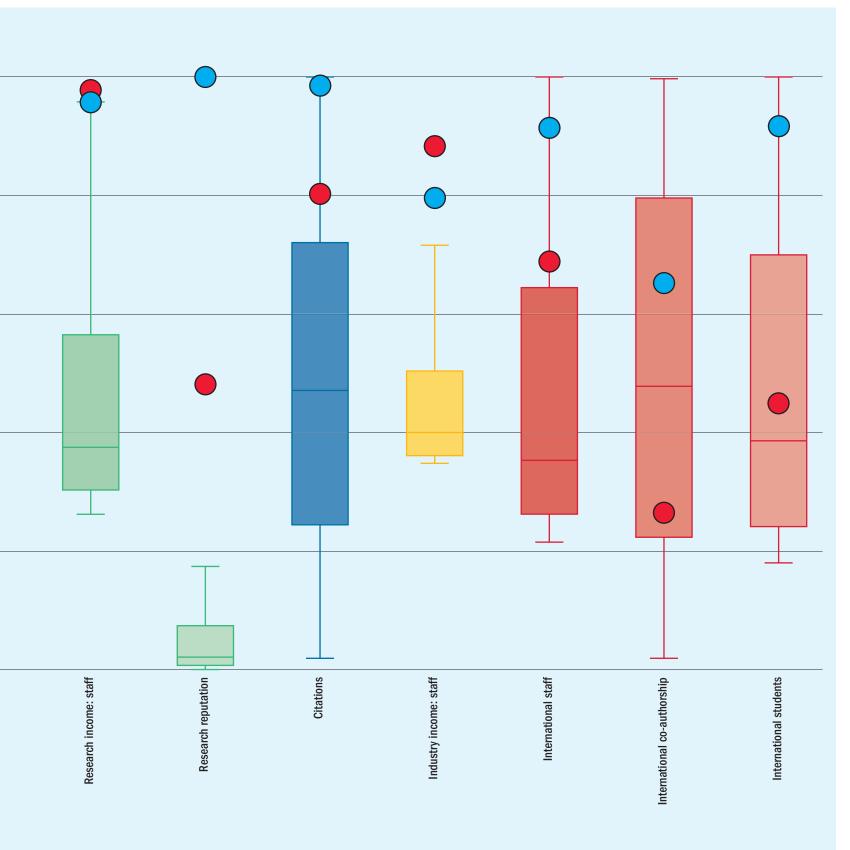
# Can China reach the top 10?

One of the big questions about China's continued rise up the *Times Higher Education* World University Rankings is whether an institution in the country will ever reach the top 10 and, if so, how long it will take.

This boxplot reveals the

areas where China's top 10 universities outperform those in the global top 10, where they are close behind and where they have a long way to go to catch up with the powerhouses in the US and the UK.

The plots show the distribution of scores for all univer-



sities in the 2022 edition of the ranking for each metric, with the middle line in each box representing the median score and the ends of the whiskers showing the maximum and minimum scores (excluding any outliers). The blue dot shows the average score for the top 10 universities in the table, while the red dot shows the average score for China's top 10 institutions (which are ranked between joint 16th and 181st overall).

The data show that China's leading universities are already

ahead on two of the income per staff metrics: industry income and research income. The Chinese institutions are also fast catching up when it comes to research productivity (papers per staff), the share of doctorates awarded, institutional income

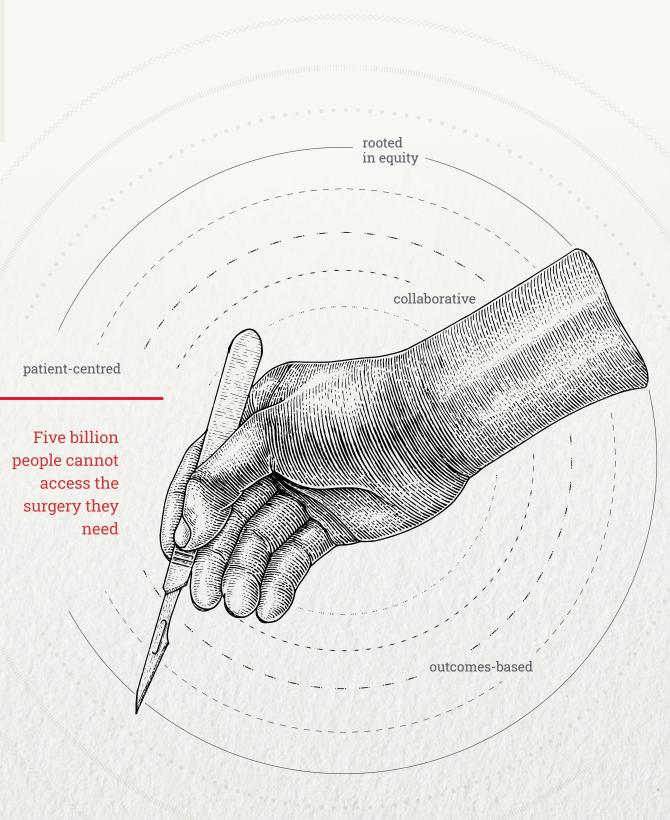
and citation impact.

However, China's top universities are still significantly behind the global elite when it comes to their reputation for teaching and research, their share of international students and, most strikingly, their share of international co-authorship.

This latter measure is the only metric where the Chinese institutions score below the median for all universities in the ranking, suggesting it is an area where China would do well to focus in the coming years.

**Ellie Bothwell** 







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Health Sciences





# Mountains to climb

Universities in low-income regions worry that the Covid crisis could stymie their life-saving research and life-changing teaching. Ellie Bothwell writes

hree months before La Soufrière erupted on the Caribbean island of St Vincent earlier this year, the Seismic Research Centre at the University of the West Indies raised the alarm. Government officials began contacting residents and reviewing evacuation plans. On 8 April, 13,000 residents were removed from a designated red zone. Twenty-four hours later, the volcano exploded in its first major eruption in 42 years. No lives were lost.

"We were able to save thousands of lives by being there for the people," says UWI's vice-chancellor, Sir Hilary Beckles. "We heard it before we saw it, and we had a good lead time to do what we had to do."

But for Beckles, the incident is not only an example of the literally life-saving research at his institution. It also represents how he sees the UWI's role in the region and the world more broadly.

"The kind of research this region will need to shape policy, to shape public opinion, can only come out of the UWI," he says, adding that the university has also carried out "45 years of unbroken research"

on climate change, from rising sea levels and warming ocean temperatures to the destruction of the marine environment and the impact on fisheries.

However, while he believes that the UWI has a leading part to play, Beckles is aware that these kinds of problems cannot be solved by a single institution. In his role as president of Universities Caribbean, he has sought to unite the region's universities around specific, highpriority themes.

"The imperial fragmentation of the Caribbean is still so deep and profound," he says, observing that there are few finance, business and trade links between the Englishand French-speaking parts of the region. "But we are using the higher education system to transcend the barriers of politics, the barriers of colonial legacies, and to pull the Caribbean together."

Funding such a strategy will not be straightforward, especially after the coronavirus outbreak.

"The economy of the region has been devastated because of its reliance on tourism and financial services especially, and the governments have lost over 80 per cent of their public revenue...We have already felt that impact with reduced investment in the higher education system and research," Beckles explains. But the UWI, which is ranked in

But the UWI, which is ranked in the 401-500 band in the *Times Higher Education* World University Rankings 2022 (up from 501-600 last year), has a new funding strategy, centred on attracting investment from international donors, foundations and multilateral organisations and appealing to governments to stabilise their current levels of funding.

Speaking about the pandemic's impact on lower-income countries more broadly, Beckles says it presents "an existential threat", particularly given that these nations had not yet recovered from the global economic crisis just over a decade earlier.

Roberta Malee Bassett, global lead for tertiary education at the World Bank, agrees that Covid-19









will widen the gap between higher education systems in low- and high-income countries. She says there is already some disparity in Western Europe and North America, based on coronavirus rates in different countries and states, and this will be even more pronounced in poorer regions of the world.

"There is no question that the lower income countries, even the lower middle income countries, will have a longer period of adjustment to the pandemic. There are no vaccines in many countries or vaccination rates are extremely low, so getting back to normal operations will be delayed in a way that will not be experienced in wealthier countries," she says.

Bassett adds that the impact on higher education is wide-ranging, from fewer school pupils completing their secondary education to university students struggling to access online learning or even fund higher education at all. At the same time, governments are redistributing funding towards health and away from education.

"All of those things get compounded over time. The longer [the pandemic] lasts, the less likely it is that the at-risk students will return because their whole lives will have pivoted away from their education," she says.

handrika Wijeyaratne, vicechancellor of Sri Lanka's University of Colombo, which is ranked 801-1,000 in the THE World University Rankings (up from the 1,001+ band last year), is also most concerned about the students who might fall through the cracks. Higher education in the country is free for students, but that means that funding is limited and there are not enough university places, she says. And while the shift to online learning has the potential to increase spaces, it is not straightforward.

"There are students who have to go up a tree or climb a hill to access [the internet and therefore online education]," she says.

"If a student needs clarification or has disabilities or special needs, I worry about that very much. We are the only university [in Sri Lanka] that has a formal intake of students with special needs, and it has been very challenging."

Bassett agrees that there will be "an expanded equity problem caused by this digital divide", but she says the pandemic has also "opened people's eyes to the need to invest in those areas, so in the medium and long term I think we'll see the benefit of digital investment".

"That's not something we'll see in the next five years or so. It's still too early and too expensive for most of these countries to make that transition in their funding model and their delivery model," she adds.

But 7,000km north, Timirkhan Alishev, vice-rector of international

It's still too early and too expensive for most of these countries to make that digital transition in their funding model and their delivery model



We're investing in the development of our digital infrastructure, but the university will not change fundamentally | cooperation at Russia's Kazan Federal University, which is also ranked among the 801-1,000 band, sees Covid-19 as only "a short-term problem" for his institution.

"We're investing in the development of our digital infrastructure, but the university will not change fundamentally," he says.

His optimism partly relates to the sustained higher education support from the Russian government, which is now focused on a new programme called Priority 2030. Previously, its most high-profile initiative was Project 5-100, which launched in 2012 and aimed to get at least five Russian universities into the top 100 in international rankings by 2020 (the top Russian institution in the latest World University Rankings is joint 158th).

Priority 2030 is more focused on bringing about substantial change in universities. Many of the key performance indicators align with metrics in global rankings - they include the amount of industry income, the number of publications in top journals, the number of citations - but Alishev says rankings success is "a logical aftermath" of the project rather than the main goal.

As well as a track focused on excellence in research, the initiative

includes a track related to universities helping to develop the regions and cities in which they are based.

Alishev believes the new programme has more scope for success than 5-100, not least because more than 100 universities will be supported through the scheme (compared with 21 in the previous initiative) and regional governments will also be involved.

"Project 5-100 was more oriented towards international rankings and international indicators, which sometimes were not understood by the regional governments, [which thought] there were much more pressing issues here in their territory," he says.

The World Bank's Bassett also favours a local approach, with her top tip to institutions and nations for withstanding the current pandemic-related challenges being to "be realistic about what the conditions are in their local space... instead of looking at big global trends".

"Look at what is genuinely happening to your student community, to your academic community, get as much local data as you can and then focus the interventions there on what is needed in the immediate future," she says.





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Rank 2022	Rank 2021	Institution	Country/region	Teaching	Research	Citations	Industry income	International outlook	Overall score
201-250		Aalborg University	Denmark	27.0	38.0	79.3	49.8	78.5	50.4-53.9
		Aalto University	Finland	38.9	38.6	71.6	54.2	83.7	50.4-53.9
		Alfaisal University	Saudi Arabia	20.2	21.2	99.0	41.7	97.3	50.4-53.9
		Auckland University of Technology	New Zealand	20.8	21.5	98.9	37.0	96.2	50.4-53.9
		University of Bath	United Kingdom	32.2	34.0	78.9	38.7	92.9	50.4-53.9
		University of Bergen	Norway	28.7	30.3	91.6	37.5	78.7	50.4-53.9
	251-300	Brighton and Sussex Medical School	United Kingdom	21.5	24.2	100.0	34.8	80.6	50.4-53.9
		University of Calgary	Canada	34.9	37.2	80.4	65.6	80.4	50.4-53.9
		University of California, Santa Cruz	United States	31.5	31.2	96.7	42.1	65.6	50.4-53.9
		Copenhagen Business School	Denmark	24.1	33.4	86.2	42.4	94.5	50.4-53.9
		University of Dundee	United Kingdom	25.4	30.7	89.1	48.9	83.2	50.4-53.9
		Eindhoven University of Technology	Netherlands	44.4	48.2	56.1	99.9	83.8	50.4-53.9
		Friedrich Schiller University Jena	Germany	41.4	40.7	73.5	57.1	60.5	50.4-53.9
		George Washington University	United States	46.3	31.4	79.0	36.0	57.9	50.4-53.9
		Griffith University	Australia	27.5	35.3	80.4	50.6	82.8	50.4-53.9
		KTH Royal Institute of Technology	Sweden	38.8	44.7	56.0	69.8	90.2	50.4-53.9
		University of Konstanz	Germany	40.5	46.1	59.4	74.8	69.7	50.4-53.9
		Korea University	South Korea	47.4	47.0	63.4	91.9	50.9	50.4-53.9
		La Trobe University	Australia	27.6	34.0	86.3	46.7	89.8	50.4-53.9
		Université Libre de Bruxelles	Belgium	32.5	42.1	78.6	43.8	88.9	50.4-53.9
		University of Macau	Macao	30.2	39.3	71.2	45.7	99.4	50.4-53.9
		University of Massachusetts	United States	36.5	29.4	90.2	52.6	64.4	50.4-53.9
		Medical University of Innsbruck	Austria	31.0	28.6	88.4	91.4	87.2	50.4-53.9
		Medical University of Vienna	Austria	34.6	26.9	92.7	61.9	79.8	50.4-53.9
		University of Miami	United States	45.2	32.1	75.9	47.5	59.5	50.4-53.9
		Moscow Institute of Physics and Technology (MIPT)	Russian Federation	51.6	44.5	51.3	99.9	61.5	50.4-53.9
		University of Münster	Germany	40.3	41.5	80.7	48.1	48.7	50.4-53.9
		University of Otago	New Zealand	31.3	34.7	77.5	39.6	90.1	50.4-53.9
		University of Padua	Italy	41.3	33.8	80.3	40.9	49.4	50.4-53.9
		Queen's University Belfast	United Kingdom	29.3	36.3	80.3	41.3	97.2	50.4-53.9
	201-250	RCSI University of Medicine and Health Sciences	Republic of Ireland	29.2	35.3	84.0	52.6	94.9	50.4-53.9
		University of Reading	United Kingdom	35.9	36.7	78.8	40.4	92.6	50.4-53.9
		St George's, University of London	United Kingdom	21.8	29.0	99.1	39.8	77.4	50.4-53.9
		Sant'Anna School of Advanced Studies - Pisa	Italy	46.4	40.6	70.5	89.2	57.8	50.4-53.9
		University of São Paulo	Brazil	55.8	58.9	43.3	42.3	35.9	50.4-53.9
		Simon Fraser University	Canada	27.7	35.0	81.5	49.0	92.1	50.4-53.9
		University of South Florida	United States	30.2	35.9	85.8	91.2	55.1	50.4-53.9
	201-250	University of St Andrews	United Kingdom	45.2	43.8	60.2	37.7	95.5	50.4-53.9
		University of Surrey	United Kingdom	31.5	34.7	75.0	43.0	94.6	50.4-53.9
	301-350	Taipei Medical University	Taiwan	46.9	33.0	73.4	96.9	42.9	50.4-53.9
		Tel Aviv University	Israel	40.6	51.7	68.4	43.1	56.4	50.4-53.9
	201-250	Tilburg University	Netherlands	36.0	49.4	63.3	51.0	81.9	50.4-53.9
	201-250	Tohoku University	Japan	56.6	58.7	37.8	97.2	49.5	50.4-53.9
		University of Twente	Netherlands	37.9	46.8	57.0	86.9	93.8	50.4-53.9
		University College Dublin	Republic of Ireland	32.2	39.0	71.8	48.7	93.6	50.4-53.9
		Vita-Salute San Raffaele University	Italy	37.6	22.5	98.6	36.0	42.8	50.4-53.9
		University of Waterloo	Canada	35.6	43.2	67.7	47.1	87.1	50.4-53.9
		Western University	Canada	39.9	39.0	72.6	80.2	85.6	50.4-53.9
		Western Sydney University	Australia	26.2	30.5	88.7	42.4	87.9	50.4-53.9
	201-250	University of Wollongong	Australia	30.8	37.6	77.3	55.8	94.7	50.4-53.9
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Ran	Ran	Institution	Cou	Teaching	Res	Citations	Indi	Inte	Ove.
251-300		Australian Catholic University	Australia	19.5	27.5	95.9	36.6	80.2	48.1-50.3
		Beijing Normal University	China	47.2	41.0	56.0	71.1	45.7	48.1-50.3
		Boston College	United States	47.5	34.6	64.4	35.1	46.4	48.1-50.3
		Brandeis University	United States	28.2	21.7	99.0	35.6	57.5	48.1-50.3
		University at Buffalo	United States	37.9	33.4	71.4	47.4	64.8	48.1-50.3
		University of California, Riverside	United States	30.5	29.7	84.1	40.9	65.0	48.1-50.3
		Chalmers University of Technology	Sweden	31.8	42.8	63.3	65.5	77.5	48.1-50.3
		University of Colorado Denver/Anschutz Medical Campus	United States	35.1	19.4	94.8	42.0	31.0	48.1-50.3
		Curtin University	Australia	25.2	32.6	82.5	43.5	95.5	48.1-50.3
		Dalhousie University	Canada	27.6	29.7	77.5	43.3	89.0	48.1-50.3
		Deakin University	Australia	26.5	32.3	79.3	42.8	89.2	48.1-50.3
		University of Duisburg-Essen	Germany	32.9	33.5	80.3	67.2	61.1	48.1-50.3
		University of Dusseldorf	Germany	34.9	32.0	78.6	43.7	59.6	48.1-50.3
		École des Ponts ParisTech	France	31.9	22.2	87.4	59.6	83.8	48.1-50.3
								89.9	48.1-50.3
		Flinders University	Australia	25.5	31.0	83.3	40.7		
		Florida State University	United States	39.0	38.0	70.1	40.8	47.3	48.1-50.3
		George Mason University	United States	32.0	28.5	84.9	36.0	48.5	48.1-50.3
		University of Hawai'i at Mānoa	United States	36.5	39.9	67.1	39.1	66.9	48.1-50.3
		Howard University	United States	43.9	16.1	95.7	34.8	35.4	48.1-50.3
		University of Iowa	United States	40.6	29.6	77.6	48.6	47.4	48.1-50.3
		James Cook University	Australia	25.4	29.9	88.6	45.5	78.7	48.1-50.3
		University of Kiel	Germany	30.3	31.1	85.0	34.8	57.7	48.1-50.3
		Kyung Hee University	South Korea	35.5	40.5	64.6	89.7	63.7	48.1-50.3
		Lappeenranta-Lahti University of Technology LUT	Finland	27.8	31.3	84.1	54.9	61.2	48.1-50.3
		Université Laval	Canada	38.9	34.8	67.7	66.4	71.0	48.1-50.3
		Linköping University	Sweden	24.8	38.4	77.9	60.7	69.0	48.1-50.3
		University of Luxembourg	Luxembourg	33.0	39.2	65.7	47.3	99.5	48.1-50.3
		Macau University of Science and Technology	Macao	30.3	22.8	82.3	46.4	99.9	48.1-50.3
		University of Navarra	Spain	28.7	29.3	85.1	65.9	71.7	48.1-50.3
		University of New Mexico (Main campus)	United States	39.4	29.1	80.1	42.8	34.1	48.1-50.3
		University of Newcastle	Australia	27.1	33.2	78.9	61.4	85.6	48.1-50.3
		Oregon Health and Science University	United States	35.8	17.7	99.1	52.6	28.6	48.1-50.3
	301-350	University of Oulu	Finland	30.6	35.1	76.2	51.6	57.1	48.1-50.3
		University of Potsdam	Germany	38.4	43.0	65.0	66.0	59.3	48.1-50.3
	251-300	Queen's University	Canada	40.0	38.0	60.2	79.1	71.1	48.1-50.3
	251-300	Ruhr University Bochum	Germany	38.2	45.1	61.6	58.1	54.0	48.1-50.3
	301-350	Sejong University	South Korea	26.0	27.8	90.2	48.0	53.2	48.1-50.3
	401-500	Semmelweis University	Hungary	44.5	15.6	81.0	41.4	77.8	48.1-50.3
	251-300	University of Southern Denmark	Denmark	24.1	30.2	80.2	73.9	81.1	48.1-50.3
	251-300	Stellenbosch University	South Africa	30.3	35.7	78.7	79.5	54.3	48.1-50.3
	251-300	Sun Yat-sen University	China	40.7	32.6	77.7	60.6	33.5	48.1-50.3
	251-300	Swansea University	United Kingdom	22.2	26.8	93.8	39.0	83.0	48.1-50.3
	301-350	Tampere University	Finland	27.1	34.2	84.4	59.6	52.5	48.1-50.3
	251-300	University of Tartu	Estonia	25.9	31.0	89.3	43.3	62.6	48.1-50.3
		University College Cork	Republic of Ireland	26.2	27.6	88.1	49.2	83.7	48.1-50.3
		University of Utah	United States	37.2	30.7	81.8	51.2	33.1	48.1-50.3
		Virginia Polytechnic Institute and State University	United States	35.8	36.5	74.3	48.4	56.4	48.1-50.3
		Vrije Universiteit Brussel	Belgium	35.5	42.6	63.9	60.8	76.7	48.1-50.3
		University of the Witwatersrand	South Africa	30.9	43.8	66.2	100.0		48.1-50.3
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Rank 2022	Rank 2021	Institution	Country/region	Teaching	Research	Citations	Industry income	International outlook	Overall score
301-350		Aix-Marseille University	France	39.8	24.2	74.4	39.7	60.9	46.1-48.0
		American University of Beirut	Lebanon	26.9	16.3	89.2	49.7	77.5	46.1-48.0
		Anglia Ruskin University ARU	United Kingdom	16.9	15.6	99.7	35.1	89.9	46.1-48.0
		Autonomous University of Madrid	Spain	31.6	27.7	83.8	38.3	55.1	46.1-48.0
		University of Bordeaux	France	33.1	25.3	79.1	39.0	60.1	46.1-48.0
		University of California, Merced	United States	22.7	23.9	94.9	40.9	44.0	46.1-48.0
		University of Cape Coast	Ghana	17.3	20.1	100.0	66.2	44.7	46.1-48.0
		Central South University	China	34.8	41.6	65.6	96.0	25.0	46.1-48.0
		China Medical University, Taiwan	Taiwan	24.3	32.9	80.8	95.7	44.1	46.1-48.0
		University of Delaware	United States	28.9	38.4	68.8	94.6	49.4	46.1-48.0
		East China Normal University	China	39.8	37.2	59.0	57.2	62.8	46.1-48.0
		École Normale Supérieure de Lyon	France	38.3	45.8	52.6	64.3	64.7	46.1-48.0
		University of Essex	United Kingdom	30.2	34.9	63.5	35.9	96.3	46.1-48.0
		Goethe University Frankfurt	Germany	31.9	33.3	73.7	43.5	61.0	46.1-48.0
		HSE University	Russian Federation	34.9	45.0	61.1	64.8	45.0	46.1-48.0
		Hebrew University of Jerusalem	Israel	43.4	42.8	51.8	42.6	59.6	46.1-48.0
		Hofstra University	United States	37.1	16.4	94.6	34.8	30.2	46.1-48.0
		University of Illinois at Chicago	United States	41.6	31.9	63.5	44.3	51.7	46.1-48.0
		Indian Institute of Science	India	59.1	54.6	31.5	88.1	24.1	46.1-48.0
		Johannes Gutenberg University of Mainz	Germany	35.5	26.4	78.2	56.3	58.6	46.1-48.0
		University of Malaya	Malaysia	37.5	30.8	61.9	47.1	84.0	46.1-48.0
		University of Manitoba	Canada	32.0	30.7	74.4	35.6	55.9	46.1-48.0
		University of Milan	Italy	32.7	29.7	82.6	39.8	43.5	46.1-48.0
		University of Milan-Bicocca	Italy	27.5	24.2	91.8	39.2	45.4	46.1-48.0
		Montpellier University	France	35.0	31.6	70.4	38.7	62.5	46.1-48.0
		Nankai University	China	37.2	25.1	78.7	45.5	41.3	46.1-48.0
		National Yang Ming Chiao Tung University	Taiwan	45.9	46.8	50.0	72.8	40.0	46.1-48.0
		North Carolina State University	United States	39.3	37.0	60.5	46.2		46.1-48.0
		Nova Southeastern University	United States	39.2	10.8	96.5	34.8	29.7	
		Osaka University	Japan	51.9	52.1	33.9	90.2	38.4	46.1-48.0
		Peter the Great St Petersburg Polytechnic University	Russian Federation	27.8	18.4	87.1	77.7	56.9	46.1-48.0
		Qatar University	Qatar	26.0	31.7	69.0	50.7	99.1	46.1-48.0
		RMIT University	Australia	27.6	32.1	69.8	46.0	93.9	46.1-48.0
		Reykjavík University	Iceland	16.8	21.8	100.0	36.7	69.1	46.1-48.0
		University of Rome II – Tor Vergata	Italy	38.2	27.4	68.5	48.4	62.1	46.1-48.0
		Rush University	United States	40.0	15.8	90.9	45.0	21.6	46.1-48.0
		University of St Gallen	Switzerland	28.8	20.5	78.4	49.1	95.6	46.1-48.0
		University of South Australia	Australia	23.5	36.6	68.1	84.3	88.4	46.1-48.0
		Stony Brook University	United States	34.6	25.3	77.2	36.2	70.2	
		University of Stuttgart	Germany	40.9	44.4	49.8	93.8	53.1	46.1-48.0
		Università della Svizzera italiana	Switzerland	23.6	19.6	83.6	58.9	99.5	46.1-48.0
		Swedish University of Agricultural Sciences	Sweden	30.4	29.3	74.1	92.0	51.5	46.1-48.0
		Swinburne University of Technology	Australia	24.8	29.3	76.7	42.2	81.8	46.1-48.0
		University of Tasmania	Australia	27.6	32.3	70.3	47.0	91.3	46.1-48.0
		Technical University of Darmstadt	Germany	43.7	45.0	46.8	88.4	58.5	46.1-48.0
		Temple University	United States	38.4	24.6	79.4	34.8	38.9	46.1-48.0
		The University of Tennessee-Knoxville	United States	32.8	27.5	78.1	42.6	46.8	46.1-48.0
		Tokyo Institute of Technology	Japan	49.7	56.2	33.2	80.7	46.2	46.1-48.0
		Tongji University	China	40.6	47.9	41.7	98.8	60.2	46.1-48.0
		University of Victoria	Canada	22.8	33.5	73.7	45.2	88.6	46.1-48.0
		Wake Forest University	United States	39.1	18.9	85.6	45.4	33.7	46.1-48.0
	251-300	William & Mary	United States	45.8	21.3	78.9	36.2	36.9	46.1-48.0

## The New Era of Education

To confront the challenges of crises such as the one we are currently enduring, we must understand that, historically, **urgent and overwhelming challenges** have been the catalysts pushing us to experiment with methods potentially more beneficial than the ones we employ. Once the pandemic showed us the possibilities of radical innovations in our social structures, we realized that the fundamental investment we must make lies in education.

In education, significant changes have included artificial intelligence implementations, the accelerating growth of technological industries, and the reinvention of learning-for-life models in customized forms. With such advances, it is necessary to make available to all those dedicated to education the tools that will promote successful marches to the future.

In this scenario, the active and coordinated participation of academia, business, government, and civil society is vital to create spaces that promote analyzing the challenges and opportunities in the education sector to arrive at alternative solutions. Because of this, Tecnológico de Monterrey, a leading institution in educational innovation, continuously seeks to improve education through initiatives and alliances promoted by its Institute for the Future of Education (IFE).

One of IFE's initiatives is **the International Conference on Educational Innovation** (CIIE), an international reference and space for dialogue, exchange of experiences, and the generation of disruptive solutions for education, creating platforms connecting interdisciplinary ecosystems to address education problems that the COVID-19 pandemic has accentuated.

From **December 13 to 15, 2021, world-class experts will meet in Monterrey, Mexico,** at the CIIE to analyze the issues that will determine innovation and the future of education.

#### Find out more about CIIE 2021 at www.ciie.mx







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Rank 2022	Rank 2021	Institution	Country/region	Teaching	Research	Citations	Industry income	terr	Overall score
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351-400		Babol Noshirvani University of Technology	Iran	23.3	21.2	99.4	37.2	20.7	44.1-46.0
		University of Bayreuth	Germany	35.8	37.2	55.7	57.3	60.6	44.1-46.0
		Birkbeck, University of London	United Kingdom	30.5	32.6	64.1	35.1	89.9	44.1-46.0
		Bournemouth University	United Kingdom	33.6	21.3	74.6	35.1	82.1	44.1-46.0
		University of Bremen	Germany	33.5	37.6	56.6	53.7	62.0	44.1-46.0
		University of Brescia	Italy	24.6	18.1	93.9	39.6	44.7	44.1-46.0
		Universiti Brunei Darussalam	Brunei Darussalam	24.0	18.7	83.9	36.9	88.2	44.1-46.0
		Brunel University London	United Kingdom	26.1	26.0	69.0	36.3	96.5	44.1-46.0
		Catholic University of Portugal	Portugal	19.0	14.5	98.3	36.6	62.0	44.1-46.0
		City, University of London	United Kingdom	25.0	26.3	70.9	36.2	95.2	44.1-46.0
		Colorado State University, Fort Collins	United States	31.5	26.1	77.3	40.8	39.2	44.1-46.0
		Drexel University	United States	35.2	21.9	76.2	42.5	51.7	44.1-46.0
		University of Georgia	United States	42.2	42.4	53.2	38.2	47.0	44.1-46.0
		University of Greifswald	Germany	31.4	27.6	74.7	42.3	48.7	44.1-46.0
		Université Grenoble Alpes	France	37.4	31.9	58.0	38.7	68.7	44.1-46.0
		University of Hail	Saudi Arabia	18.1	8.7	100.0	40.9	82.0	44.1-46.0
		Hanyang University	South Korea	40.8	40.1	44.0	93.8	64.3	44.1-46.0
		Harokopio University	Greece	18.4	19.3	96.3	37.3	45.2	44.1-46.0
		Hasselt University	Belgium	28.2	39.0	57.5	58.2	69.4	44.1-46.0
		IMT Atlantique	France	37.2	34.3	54.3	95.8	77.2	44.1-46.0
		Illinois Institute of Technology	United States	41.8	20.6	62.9	38.6	74.1	44.1-46.0
		Indian Institute of Technology Ropar	India	26.8	13.9	99.7	37.7	18.9	44.1-46.0
		JSS Academy of Higher Education and Research	India	33.3	9.0	100.0	35.8	32.4	44.1-46.0
		University of Jyväskylä	Finland	25.3	30.5	75.4	36.3	51.5	44.1-46.0
		University of Kent	United Kingdom	27.8	30.6	64.5	35.4	91.5	44.1-46.0
		Khalifa University	United Arab Emirates	31.5	36.9	51.9	100.0	92.1	44.1-46.0
		King Fahd University of Petroleum and Minerals	Saudi Arabia	25.8	22.4	77.9	74.2	77.6	44.1-46.0
		King Saud University	Saudi Arabia	26.1	27.8	70.9	82.6	82.3	44.1-46.0
		University of Klagenfurt	Austria	29.0	17.7	74.6	36.8	90.3	44.1-46.0
		Kurdistan University of Medical Sciences	Iran	34.3	9.9	100.0	36.4	22.3	44.1-46.0
		University of KwaZulu-Natal	South Africa	28.8	34.7	66.7	39.7	53.3	44.1-46.0
		University of Liège	Belgium	26.6	35.4	60.2	99.6	71.6	44.1-46.0
		Loughborough University	United Kingdom	32.0	33.6	61.1	38.6	86.6	44.1-46.0
		Mazandaran University of Medical Sciences	Iran	40.5	11.3	87.6	40.9	19.7	44.1-46.0 44.1-46.0
		Nagoya University	Japan  Popublic of Iroland	44.3 27.6	48.0 31.9	41.4 66.7	97.9 48.8	35.4 81.5	44.1-46.0
		National University of Ireland, Galway National Tsing Hua University	Republic of Ireland	36.2	46.0	50.0	48.8 70.7	42.9	44.1-46.0
		University of Oregon	Taiwan United States	31.0	21.5	85.3	36.4	35.3	44.1-46.0
		University of Passau	Germany	33.9	39.9	56.3	46.5	58.4	44.1-46.0
		University of Pavia	Italy	36.8	28.1	72.4	46.5	46.7	44.1-46.0
		Politecnico di Milano	Italy	34.4	39.2	57.8	80.1	60.8	44.1-46.0
		Royal Holloway, University of London	United Kingdom	30.0	29.0	67.3	37.6	91.8	44.1-46.0
		SUNY University at Albany	United States	25.2	22.7	84.3	43.5	49.9	44.1-46.0
		Shenzhen University	China	22.3	26.0	89.4	53.6	36.7	44.1-46.0
		University of Stirling	United Kingdom	21.4	25.8	80.9	35.5	84.7	44.1-46.0
		Syracuse University	United States	35.4	29.7	69.7	35.8	49.8	44.1-46.0
		University of Texas at Dallas	United States	24.9	28.1	80.6	40.7	56.6	44.1-46.0
		University of Trento	Italy	30.2	32.5	69.5	43.1	56.6	44.1-46.0
		University of Turku	Finland	27.6	31.4	75.3	37.0	54.1	44.1-46.0
		UiT The Arctic University of Norway	Norway	23.5	21.1	87.9	37.8	68.8	44.1-46.0
		Umeå University	Sweden	23.0	29.0	78.2	36.6	64.0	44.1-46.0
		United Arab Emirates University	United Arab Emirates	24.5	21.4	73.3	65.9	88.8	44.1-46.0
		Washington State University	United States	31.5	30.9	71.3	50.3		44.1-46.0
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## Be CREATIVE





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Rank 2022	Rank 2021	Institution	Country/region	Teaching	Research	Citations	Industry income	International outlook	Overall score
401-500		Addis Ababa University	Ethiopia	18.9	11.9	95.2	41.5	47.0	40.9-44.0
	401-500	University of Alaska Fairbanks	United States	27.8	24.0	73.7	46.9	57.9	40.9-44.0
	NR	An-Najah National University	Palestine	13.2	8.6	100.0	36.0	63.7	40.9-44.0
	401-500	Aston University	United Kingdom	21.5	24.5	66.0	36.7	91.6	40.9-44.0
	401-500	Aswan University	Egypt	13.9	9.8	100.0	34.8	47.9	40.9-44.0
	401-500	Bangor University	United Kingdom	25.1	25.2	68.1	35.2	81.9	40.9-44.0
	401-500	University of Campinas	Brazil	47.2	44.9	36.2	47.7	33.0	40.9-44.0
	401-500	Cankaya University	Turkey	17.0	13.6	100.0	36.0	46.0	40.9-44.0
	501-600	Claude Bernard University Lyon 1	France	36.4	25.5	61.2	40.6	58.5	40.9-44.0
	401-500	Colorado School of Mines	United States	29.7	27.2	66.3	46.8	39.0	40.9-44.0
	401-500	University of Connecticut	United States	36.6	29.5	61.4	38.2	54.5	40.9-44.0
	501-600	University of Côte d'Azur	France	26.3	19.9	72.1	35.6	76.2	40.9-44.0
	351-400	University of Crete	Greece	19.3	22.3	87.1	39.5	48.2	40.9-44.0
	501-600	University of Cyprus	Cyprus	26.1	21.3	65.5	49.1	82.1	40.9-44.0
	401-500	University of Denver	United States	39.3	23.8	72.2	35.9	27.9	40.9-44.0
	401-500	Durban University of Technology	South Africa	16.9	11.5	99.9	37.8	39.1	40.9-44.0
	NR	Duy Tan University	Vietnam	13.1	10.8	100.0	35.9	49.4	40.9-44.0
	601-800	École des Mines de Saint-Étienne	France	34.4	27.0	54.2	71.5	71.4	40.9-44.0
	401-500	Edith Cowan University	Australia	19.2	24.4	73.2	38.8	86.5	40.9-44.0
	501-600	University of Ferrara	Italy	31.0	22.3	71.0	41.4	44.6	40.9-44.0
	401-500	University of Florence	Italy	33.3	28.3	66.8	44.7	46.1	40.9-44.0
	401-500	Free University of Bozen-Bolzano	Italy	20.9	16.8	77.8	36.5	76.7	40.9-44.0
	351-400	University of Fribourg	Switzerland	27.5	29.7	59.2	50.3	85.8	40.9-44.0
	401-500	University of Genoa	Italy	35.4	25.5	65.1	45.3	44.8	40.9-44.0
	401-500	Georgia State University	United States	32.9	25.9	65.8	36.0	44.5	40.9-44.0
	401-500	Goldsmiths, University of London	United Kingdom	28.5	27.9	64.7	34.8	81.0	40.9-44.0
	351-400	Hong Kong Baptist University	Hong Kong	30.0	26.5	54.3	37.7	98.7	40.9-44.0
	401-500	Hunan University	China	23.2	22.4	84.9	54.5	25.6	40.9-44.0
	401-500	University of Ibadan	Nigeria	23.4	12.6	91.2	35.3	32.2	40.9-44.0
	401-500	University of Iceland	Iceland	20.7	32.8	66.9	69.5	62.6	40.9-44.0
	401-500	Indian Institute of Technology Indore	India	37.9	24.1	66.7	38.1	22.4	40.9-44.0
	351-400	University of Innsbruck	Austria	31.4	29.5	52.9	53.6	95.9	40.9-44.0
	501-600	University of Insubria	Italy	19.3	21.6	90.7	36.7	41.1	40.9-44.0
		Iowa State University	United States	34.1	33.6	58.9	51.1	56.3	40.9-44.0
		Jordan University of Science and Technology	Jordan	16.5	10.2	99.2	43.3	58.3	40.9-44.0
		Justus Liebig University Giessen	Germany	32.1	35.3	59.1	42.4	52.8	40.9-44.0
		University of Kansas	United States	36.4	25.0	67.3	45.7	48.7	40.9-44.0
		University of Kragujevac	Serbia	18.2	9.4	97.9	35.6	33.9	40.9-44.0
		Leibniz University Hannover	Germany	36.8	33.9	50.1	52.4	54.2	40.9-44.0
		L'institut Agro	France	34.4	24.5	60.9	46.6	60.8	40.9-44.0
		Liverpool John Moores University	United Kingdom	20.9	18.6	78.7	35.3	75.6	40.9-44.0
		University of Marburg	Germany	33.9	28.9	64.3	42.1	55.1	40.9-44.0
		Middlesex University	United Kingdom	21.4	20.1	77.0	35.2	89.5	40.9-44.0
		Missouri University of Science and Technology	United States	26.0	26.3	63.7	59.1	64.1	40.9-44.0
		University of Modena and Reggio Emilia	Italy	30.8	22.8	72.4	49.0	38.9	40.9-44.0
		NOVA University of Lisbon	Portugal	25.3	29.5	70.4	49.7	63.6	40.9-44.0
		University of Naples Federico II	Italy	32.5	26.0	76.7	41.4	32.3	40.9-44.0
	401-500	National Research Nuclear University MEPhI	Russian Federation	42.8	40.5	29.6	100.0	69.7	40.9-44.0

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Rank 2022	Rank 2021	Institution	Country/region	Teaching	Research	Citations	Industry income	International outlook	Overall score
<b>401−500</b>			Greece	22.7	18.1	81.1	68.6	55.2	40.9-44.0
(continued)			United States	30.9	26.9	62.8	38.6	54.9	40.9-44.0
(oontinuou)		Northumbria University	United Kingdom	19.3	20.9	80.7	35.5	77.0	40.9-44.0
		Norwegian University of Science and Technology	Norway	27.2	29.8	62.8	38.8	65.6	40.9-44.0
		University of Occupational and Environmental Health, Japan	Japan	25.3	10.9	97.8	40.5	20.2	40.9-44.0
		Örebro University	Sweden	18.6	21.0	89.0	36.2	58.3	40.9-44.0
		University of Peradeniya	Sri Lanka	17.4	8.4	100.0	35.6	41.3	40.9-44.0
		University of Pisa	Italy	28.1	28.0	70.6	41.8	41.3	40.9-44.0
		University of Plymouth	United Kingdom	20.4	20.8	79.2	35.2	72.4	40.9-44.0
		Pontifical Catholic University of Chile	Chile	24.8	30.3	66.4	73.0	58.2	40.9-44.0
		University of Porto	Portugal	25.1	28.9	64.0	40.8	60.8	40.9-44.0
	NR	Universitat Ramon Llull	Spain	20.0	16.6	82.0	38.1	65.9	40.9-44.0
		Royal Veterinary College	United Kingdom	25.6	18.4	75.8	48.0	90.7	40.9-44.0
	501-600	SOAS University of London	United Kingdom	41.9	41.1	34.7	34.9	79.6	40.9-44.0
	401-500	SRUC (Scotland's Rural College)	United Kingdom	23.6	12.4	81.9	41.8	59.0	40.9-44.0
	401-500	Saint-Petersburg Mining University	Russian Federation	21.7	11.7	90.7	75.9	31.4	40.9-44.0
	401-500	University of Salerno	Italy	17.9	22.4	85.1	37.8	35.2	40.9-44.0
	501-600	Sciences Po	France	33.3	24.0	57.3	36.9	83.7	40.9-44.0
	401-500	Sharif University of Technology	Iran	32.9	37.2	50.7	94.5	29.9	40.9-44.0
	601-800	University of Sharjah	United Arab Emirates	20.2	17.4	80.2	38.8	98.8	40.9-44.0
	601-800	Sichuan University	China	36.9	40.8	47.7	91.7	38.9	40.9-44.0
	401-500	University of South Carolina-Columbia	United States	35.1	27.5	62.5	36.4	46.4	40.9-44.0
	401-500	South China University of Technology	China	26.8	33.1	67.8	82.8	33.8	40.9-44.0
	601-800	Southern Medical University	China	36.6	34.8	60.1	42.6	24.5	40.9-44.0
	501-600	University of Southern Queensland	Australia	21.7	23.8	74.2	38.9	79.3	40.9-44.0
	NR	University of Stavanger	Norway	18.5	14.0	83.4	41.7	76.1	40.9-44.0
	401-500	University of Strathclyde	United Kingdom	30.4	32.1	54.2	49.5	88.2	40.9-44.0
	401-500	TU Dortmund University	Germany	37.3	42.7	49.8	48.5	42.9	40.9-44.0
	401-500	TU Wien	Austria	35.8	36.0	41.2	68.3	87.0	40.9-44.0
	NR	University of Tabuk	Saudi Arabia	15.7	7.8	92.5	35.7	72.9	40.9-44.0
		Technion Israel Institute of Technology	Israel	34.7	30.3	52.7	36.8	70.1	40.9-44.0
		Tianjin University	China	36.2	42.5	46.2	95.4	38.6	40.9-44.0
		Ton Duc Thang University	Vietnam	14.5	13.4	99.3	38.4	62.6	40.9-44.0
		Tulane University	United States	40.4	22.6	68.1	36.8	44.4	40.9-44.0
		University of Turin	Italy	22.3	27.8	76.4	43.8	41.8	40.9-44.0
		University of Vaasa	Finland	24.7	25.6	76.8	37.3	63.7	40.9-44.0
		University of Valencia	Spain	24.1	22.7	75.5	37.5	49.6	40.9-44.0
		Verona University	Italy	29.2	22.7	76.1	45.8	42.4	40.9-44.0
		University of Vic - Central University of Catalonia	Spain	16.2	11.8	90.0	37.0	60.3	40.9-44.0
		Victoria University	Australia	27.0	28.8	63.4	43.9	87.8	40.9-44.0
		University of Waikato	New Zealand	22.1	29.8	64.4	46.7	95.3	40.9-44.0
		Wayne State University	United States	32.5	18.9	73.1	48.2	36.2	40.9-44.0
		University of the West of England	United Kingdom	16.9	14.2	87.3	35.2	70.0	40.9-44.0
		The University of the West Indies	Jamaica	18.9	10.9	91.7	35.5	57.7	40.9-44.0
		Xi'an Jiaotong University	China	38.5 29.1	40.1 23.9	44.8 74.0	75.8 52.0	39.7	40.9-44.0 40.9-44.0
		Xiamen University Yokohama City University	China	26.4	8.9	74.0 93.0	43.2	33.5 22.3	40.9-44.0
		York University	Japan Canada	27.4	33.9	59.3	43.2	73.5	
	401-000	Total Officially	Canada	21.4	33.3	33.3	40.1	13.3	<del>1</del> 0.3-44.0



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			Country/region				Industry income	<u> </u>	Φ.
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Rank 2022	Rank 2021	Institution		Teaching	Research	Citations	ğ	ıter	Overall score
501-600		Aberystwyth University	United Kingdom	24.1	24.9	63.0	38.6	79.0	38.1-40.8
		Alagappa University	India	34.4	9.5	75.2	35.2	31.0	38.1-40.8
		American University	United States	40.2	17.4	65.4	41.4	34.3	38.1-40.8
	501-600	Amirkabir University of Technology	Iran	31.7	32.6	50.4	73.3	34.3	38.1-40.8
	501-600	University of L'Aquila	Italy	31.4	23.5	66.6	43.8	34.8	38.1-40.8
	801-1,000	Asia University, Taiwan	Taiwan	19.4	36.0	52.1	100.0	51.9	38.1-40.8
	501-600	Universidad Autónoma de Chile	Chile	13.4	9.8	96.7	34.8	51.7	38.1-40.8
	401-500	University of Bari Aldo Moro	Italy	18.1	20.5	81.2	35.9	33.2	38.1-40.8
	501-600	Beihang University	China	33.0	38.2	43.5	97.5	32.5	38.1-40.8
	501-600	Beijing University of Chemical Technology	China	21.9	22.5	71.9	58.4	23.1	38.1-40.8
	601-800	Birmingham City University	United Kingdom	17.1	10.8	81.2	34.9	66.9	38.1-40.8
	501-600	Bond University	Australia	21.6	20.5	62.4	36.4	89.1	38.1-40.8
	601-800	Bucharest University of Economic Studies	Romania	17.9	11.4	93.1	35.8	22.6	38.1-40.8
	401-500	CEU Universities	Spain	18.3	9.2	92.7	38.5	50.0	38.1-40.8
		University of Camerino (Unicam)	Italy	21.8	15.6	73.5	46.1	48.9	38.1-40.8
		University of Canterbury	New Zealand	24.5	26.5	55.0	38.8	93.5	38.1-40.8
	801-1,000		China	30.6	17.9	77.3	35.2	23.8	38.1-40.8
	·	Centrale Nantes	France	33.0	29.7	40.7	76.9	85.5	38.1-40.8
		Charles Darwin University	Australia	23.0	30.0	55.9	46.8	79.4	38.1-40.8
	401-500	·	Czech Republic	33.0	28.3	52.0	35.2	63.8	38.1-40.8
	401-500	Clark University	United States	23.2	20.9	68.5	34.8	57.1	38.1-40.8
	501-600	Complutense University of Madrid	Spain	30.0	31.5	53.3	38.1	43.9	38.1-40.8
		University of Costa Rica	Costa Rica	18.3	8.9	91.0	34.8	48.2	38.1-40.8
		Cyprus University of Technology	Cyprus	21.9	17.6	70.0	37.0	78.4	38.1-40.8
		University of Desarrollo	Chile	14.9	10.1	89.4	38.0	50.4	38.1-40.8
		Diego Portales University	Chile	15.6	11.0	86.2	34.8	51.4	38.1-40.8
		Don State Technical University	Russian Federation	17.1	8.2	96.9	36.2	27.4	38.1-40.8
		Dublin City University	Republic of Ireland	23.1	32.7	54.9	41.0	70.7	38.1-40.8
		University of Eastern Finland	Finland	24.0	28.1	65.0	38.8	50.5	38.1-40.8
		Eastern Mediterranean University	Northern Cyprus	21.9	12.6	68.8	39.6	89.2	38.1-40.8
		Edinburgh Napier University	United Kingdom	17.5	15.7	72.3	35.2	85.1	38.1-40.8
		University of Electronic Science and Technology of China	China	27.4	27.7	64.0	76.0	35.8	38.1-40.8
		Federal University of Toulouse Midi-Pyrénées							38.1-40.8
		Ferhat Abbas Sétif University 1	France	26.4 19.5	25.7 8.1	63.8 93.8	36.9 34.8	63.3 40.8	38.1-40.8
			Algeria						
		Florida International University	United States	32.1	27.8	62.4	35.6	40.3	38.1-40.8
		University of Guelph	Canada South Karaa	29.0	31.3	48.7	48.4	60.6	38.1-40.8
		Gwangju Institute of Science and Technology	South Korea	41.4	39.9	33.2	75.9	39.9	38.1-40.8
		Harbin Institute of Technology	China	40.8	37.2	44.4	44.2	33.0	38.1-40.8
		Heriot-Watt University	United Kingdom	27.7	27.7	53.2	45.0	94.2	38.1-40.8
		Hokkaido University	Japan	44.2	38.5	31.3	66.3	41.0	38.1-40.8
		University of International Business and Economics	China	27.1	17.5	66.9	36.7	59.3	38.1-40.8
		Iran University of Medical Sciences	Iran	46.2	15.7	60.8	40.8	24.1	38.1-40.8
		Islamic Azad University, Najafabad Branch (IAUN)	Iran	16.3	11.5	98.3	37.1	22.4	38.1-40.8
		Jacobs University	Germany	28.6	31.5	46.6	53.1	92.4	38.1-40.8
		Jagiellonian University	Poland	30.4	23.8	66.5	35.7	40.6	38.1-40.8
		Kafrelsheikh University	Egypt	14.3	8.0	93.1	37.5	47.6	38.1-40.8
		Keele University	United Kingdom	21.8	24.2	64.2	35.7	71.5	38.1-40.8
		University of Kentucky	United States	36.8	27.5	56.7	39.2	38.8	38.1-40.8
		Koç University	Turkey	30.2	36.1	50.5	70.6	51.0	38.1-40.8
	401-500	Kyushu University	Japan	43.2	37.5	34.0	77.4	42.4	38.1-40.8

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Rank 2022	Rank 2021	Institution	Country/region	Teaching	Research	Citations	Industry income	tern	Overall score
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501-600		University of Lagos	Nigeria	16.1	10.2	90.3	35.9	32.1	38.1-40.8
(continued)		University of Lille	France	31.1	22.1	61.9	41.6	63.3	38.1-40.8
		University of Lincoln	United Kingdom	17.2	16.0	79.9	35.5	73.3	38.1-40.8
		Lincoln University	New Zealand	26.6	22.5	51.6	53.3	96.0	38.1-40.8
		University of Lisbon	Portugal	24.8	32.6	56.2	42.0	60.6	38.1-40.8
		Mansoura University	Egypt	18.5	11.0	88.5	38.8	47.0	38.1-40.8
		Maynooth University	Republic of Ireland	22.2	27.6	61.5	37.7	79.0	38.1-40.8
		University of Messina	Italy	29.1	23.3	68.1	36.6	31.4	38.1-40.8
		Mizzou – University of Missouri	United States	36.3	26.0	56.3	39.4	43.9	38.1-40.8
		University of Mohaghegh Ardabili	Iran	20.8	10.9	87.6	35.6	22.8	38.1-40.8
		University of Montana	United States	35.1	20.6	64.0	35.6	28.6	38.1-40.8
		Murdoch University	Australia	20.9	27.2	58.5	46.2	92.6	38.1-40.8
		University of Nairobi	Kenya	14.1	8.0	96.7	34.8	47.1	38.1-40.8
		University of Nebraska Medical Center	United States	35.3	12.3	71.5	38.7	44.1	38.1-40.8
		New Jersey Institute of Technology	United States	21.4	19.8	61.8	38.5	85.5	38.1-40.8
		North-West University	South Africa	22.6	19.1	75.5	39.1	49.0	38.1-40.8
		Northern Arizona University	United States	22.0	15.1	86.3	35.4	35.1	38.1-40.8
		Northwestern Polytechnical University	China	28.7	34.5	49.6	81.5	37.4	38.1-40.8
		Nottingham Trent University	United Kingdom	20.3	14.9	77.0	35.5	78.2	38.1-40.8
		Oklahoma State University	United States	29.6	20.3	67.5	38.1	45.6	38.1-40.8
		University of Perugia	Italy	21.4	17.9	77.2	43.1	48.3	38.1-40.8
		Plekhanov Russian University of Economics	Russian Federation	23.3	11.0	81.5	37.4	36.0	38.1-40.8
		Polytechnic University of Bari	Italy Colombia	17.3	22.2	79.2	55.5	34.6	38.1-40.8
		Pontifical Javeriana University		16.5 20.0	10.9	88.2	35.1 35.6	44.0 90.0	38.1-40.8 38.1-40.8
		University of Portsmouth  Quaid-i-Azam University	United Kingdom  Pakistan	26.7	17.8 16.4	70.6 73.6	36.1	46.4	38.1-40.8
		Rensselaer Polytechnic Institute	United States	30.2	27.9	52.2	52.0	57.4	38.1-40.8
		Riga Stradiņš University	Latvia	15.7	9.8	82.1	38.9	73.9	38.1-40.8
		Sabanci University	Turkey	26.3	37.1	42.8	99.1	57.5	38.1-40.8
		Saint Louis University	United States	37.8	16.0	61.5	37.3	33.8	38.1-40.8
		University of Sannio	Italy	18.7	17.4	81.1	54.1	29.5	38.1-40.8
		University of Saskatchewan	Canada	35.3	29.9	45.5	75.8	73.7	38.1-40.8
		University of Sassari	Italy	28.4	26.8	65.8	37.9	38.1	38.1-40.8
		Southeast University	China	30.2	35.4	46.8	95.8	37.9	38.1-40.8
		Southwestern University of Finance and Economics	China	20.5	13.3	87.0	37.8	41.8	38.1-40.8
		University of Strasbourg	France	26.7	21.2	60.3	42.0	72.5	38.1-40.8
		Suez Canal University	Egypt	19.0	8.2	90.4	37.2	46.8	38.1-40.8
		Sumy State University	Ukraine	21.0	11.5	79.9	40.7	53.1	38.1-40.8
		Universiti Teknologi Petronas	Malaysia	29.2	31.6	41.8	73.7	73.8	38.1-40.8
		Thapar University	India	23.0	11.3	85.0	35.1	21.5	38.1-40.8
		Tokyo Medical and Dental University (TMDU)	Japan	45.4	28.4	41.3	70.9	29.3	38.1-40.8
		University of Trieste	Italy	30.1	24.2	66.2	36.9	47.8	38.1-40.8
		University of Tsukuba	Japan	43.6	38.3	37.9	48.1	42.5	38.1-40.8
		University of Tuscia	Italy	18.2	17.8	85.2	38.8	37.2	38.1-40.8
		University of Urbino Carlo Bo	Italy	16.0	16.3	78.7	41.3	50.4	38.1-40.8
		Urmia University of Medical Sciences	Iran	34.4	10.4	77.5	43.4	17.6	38.1-40.8
		Victoria University of Wellington	New Zealand	25.5	32.1	51.9	52.5	88.8	38.1-40.8
		University of the West of Scotland	United Kingdom	18.4	14.5	74.5	35.4	79.2	38.1-40.8
		Zhejiang Normal University	China	17.7	14.2	85.0	62.5	32.8	38.1-40.8
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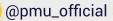




## Creative Minds Transform the world









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Rank 2022	Rank 2021	Institution	Country/region	Teaching	Research	Citations	Industry income	nte	Overall score
601-800		Abdul Wali Khan University Mardan	Pakistan	14.6	10.4	80.9	34.8	45.9	32.0-37.9
002 000		Åbo Akademi University	Finland	23.4	30.5	42.5	37.9	66.8	32.0-37.9
		Ahvaz Jundishapur University of Medical Sciences (AJUMS)	Iran	33.1	10.1	62.9	35.5	16.1	32.0-37.9
		The University of Aizu	Japan	21.7	13.0	52.3	35.9	72.8	32.0-37.9
		Ajou University	South Korea	28.1	36.2	39.3	77.8	38.1	32.0-37.9
		The University of Alabama	United States	27.0	18.8	59.0	36.3	30.1	32.0-37.9
	601-800	University of Alabama in Huntsville	United States	23.2	20.4	53.9	72.0	42.3	32.0-37.9
	801-1,000	University of Alcalá	Spain	20.6	14.5	53.8	40.5	63.1	32.0-37.9
	601-800	Aristotle University of Thessaloniki	Greece	18.6	17.6	63.8	42.7	41.5	32.0-37.9
	601-800	University of Arkansas	United States	28.5	27.6	45.1	38.1	30.1	32.0-37.9
	601-800	Auburn University	United States	31.1	22.7	47.5	41.8	48.1	32.0-37.9
	801-1,000	Azarbaijan Shahid Madani University	Iran	16.7	13.0	76.8	36.7	23.4	32.0-37.9
	601-800	University of the Balearic Islands	Spain	16.8	15.4	62.1	34.9	45.4	32.0-37.9
	601-800	Banaras Hindu University	India	35.4	18.2	58.4	34.9	18.9	32.0-37.9
	501-600	Bar-Ilan University	Israel	30.6	33.3	39.4	46.9	51.7	32.0-37.9
	501-600	Beijing Institute of Technology	China	31.6	32.8	43.2	99.9	25.5	32.0-37.9
	601-800	University of Beira Interior	Portugal	18.6	19.6	52.6	37.5	57.4	32.0-37.9
	601-800	University of Bergamo	Italy	18.8	21.9	55.4	40.3	35.3	32.0-37.9
	601-800	Bilkent University	Turkey	22.6	20.7	45.2	48.1	63.1	32.0-37.9
	601-800	Université Bourgogne Franche-Comté (UBFC)	France	18.3	16.2	70.4	41.0	56.0	32.0-37.9
	601-800	University of Bradford	United Kingdom	21.4	19.6	49.3	37.9	79.8	32.0-37.9
	601-800	University of Brighton	United Kingdom	19.8	15.5	54.4	35.2	76.6	32.0-37.9
	NR	CY Cergy Paris University	France	24.6	24.8	49.2	41.0	88.5	32.0-37.9
	601-800	Ca' Foscari University of Venice	Italy	33.7	27.3	33.5	40.9	58.8	32.0-37.9
		Cairo University	Egypt	23.2	16.7	55.6	35.6	36.9	32.0-37.9
	601-800	University of Calabria	Italy	16.2	17.6	62.3	35.5	38.2	32.0-37.9
		Carleton University	Canada	22.1	29.8	52.3	40.3	71.6	32.0-37.9
		University of Catania	Italy	25.0	19.7	70.4	36.1	31.4	32.0-37.9
		University of Central Florida	United States	27.2	28.6	56.6	45.5	34.5	32.0-37.9
		C.	India	36.5	28.5	36.8	51.0	14.6	32.0-37.9
		China Agricultural University	China	31.3	29.0	52.7	54.5	24.2	32.0-37.9
		Chongqing University	China	25.3	28.7	46.9	86.6	25.8	32.0-37.9
		Chung-Ang University	South Korea	35.5	37.4	27.5	76.9	53.5	32.0-37.9
		University of Coimbra	Portugal	24.5	32.0	45.4	47.0	60.0	32.0-37.9
		Concordia University	Canada	23.5	27.7	42.4	37.1	85.0	32.0-37.9
		Covenant University	Nigeria	19.0	20.5	56.7	44.7	31.0	32.0-37.9
		Coventry University	United Kingdom	20.0	13.9	47.7	35.0	92.7	32.0-37.9
		Dalian University of Technology	China	25.6	25.7	42.1	73.5	31.1	32.0-37.9
		De Montfort University	United Kingdom	17.5	15.0	51.1	34.9	86.5	32.0-37.9
		Delhi Technological University	India	17.0	15.0	78.2	42.2	16.3	32.0-37.9
		University of Derby	United Kingdom	17.2	11.7	59.2	35.2	67.3	32.0-37.9
		University of Deusto	Spain	18.8	19.6	56.9	40.5	45.6	32.0-37.9
		Eötvös Loránd University	Hungary	32.0	16.3	50.4	35.3	53.8	32.0-37.9
		Ewha Womans University	South Korea	33.3	32.9	29.4	79.1	46.1	32.0-37.9
		Federal University of Minas Gerais	Brazil	33.3	18.8	50.0	39.3	29.5	32.0-37.9
		Universidade Federal de Cardina	Brazil	31.5	20.0	49.5	46.7	28.1	32.0-37.9
		Universidade Federal de Sergipe	Brazil	17.7	9.5	87.0	34.8	22.2	32.0-37.9
		Federation University Australia	Australia	17.6	14.8	51.2	39.5	78.8	32.0-37.9
		Gabriele d'Annunzio University	Italy	15.0	16.6	72.7	36.1	38.7	32.0-37.9
	001-800	University of Girona	Spain	19.5	20.1	56.0	37.9	53.0	32.0-37.9



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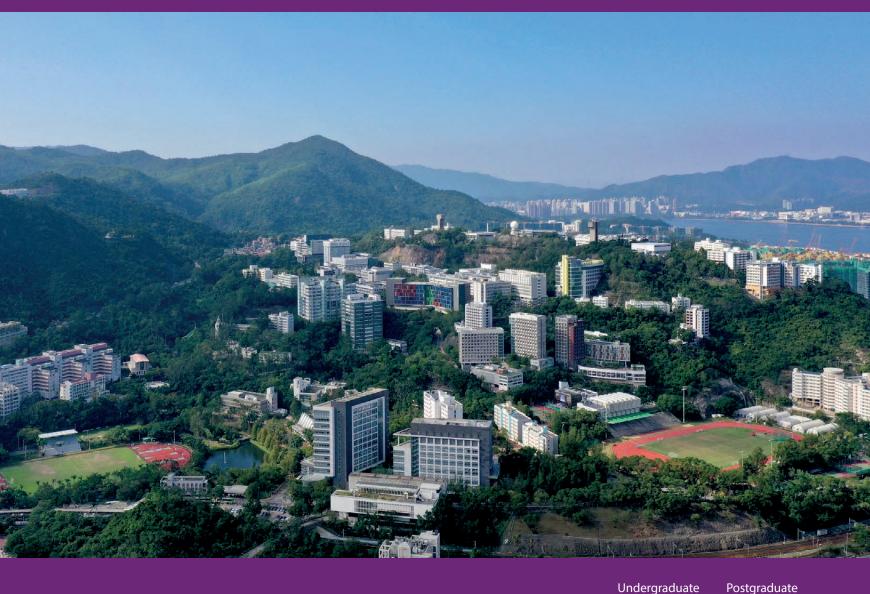


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Rank 2022	Rank 2021	Institution	Country/region	Teaching	Research	Citations	Industry income	International outlook	Overall score
601-800		Glasgow Caledonian University	United Kingdom	19.2	13.8	61.0	35.3	66.0	32.0-37.9
(continued)	801-1,000	Government College University Faisalabad	Pakistan	14.6	12.1	73.9	34.8	43.0	32.0-37.9
	601-800	University of Granada	Spain	21.8	23.2	55.1	35.1	50.1	32.0-37.9
	601-800	University of Graz	Austria	22.3	20.0	53.6	36.8	79.2	32.0-37.9
	501-600	Graz University of Technology	Austria	29.4	18.0	47.2	71.6	81.2	32.0-37.9
	601-800	University of Greenwich	United Kingdom	17.7	15.9	60.3	35.8	93.5	32.0-37.9
	601-800	Guangdong University of Technology	China	16.0	14.5	67.0	42.4	25.9	32.0-37.9
		Guangzhou University	China	16.4	10.1	75.7	38.2	28.8	32.0-37.9
		Hacettepe University	Turkey	26.8	13.5	61.1	37.0	24.3	32.0-37.9
		University of Haifa	Israel	24.0	22.7	64.5	35.7	39.7	32.0-37.9
		Hamburg University of Technology	Germany	34.1	21.2	45.1	95.6	57.5	32.0-37.9
		Hazara University Mansehra	Pakistan	16.3	9.3	74.8	34.8	42.2	32.0-37.9
		University of Hertfordshire	United Kingdom	18.8	12.9	51.1	35.3	84.3	32.0-37.9
		University of Houston	United States	33.1	25.8	50.0	36.6	43.5	32.0-37.9
		Huazhong Agricultural University	China	24.2	16.6	61.7	42.8	25.1	32.0-37.9
		University of Huddersfield	United Kingdom	24.3	23.4	49.9	37.5	81.3	32.0-37.9
		University of Hull	United Kingdom	23.4	23.9	56.6	36.5	77.8	32.0-37.9
		ISCTE-University Institute of Lisbon	Portugal	27.8	28.8	39.6	40.8	53.8	32.0-37.9
		ITMO University	Russian Federation	30.7	32.5	33.0	96.0	64.0	32.0-37.9
		University of Idaho	United States	29.2	21.8	47.1	36.5	48.4	32.0-37.9
		Indian Institute of Technology Gandhinagar	India	29.1	28.4	54.0	55.1	25.0	32.0-37.9
		Indraprastha Institute of Information Technology Delhi	India	17.0	12.9	64.2	63.5	31.9	32.0-37.9
		International Institute of Information Technology, Hyderabad	India	20.5	11.4	63.8	58.8	31.6	32.0-37.9
		International Islamic University, Islamabad	Pakistan	20.3	10.3	68.9	34.8	51.7	32.0-37.9
		Iran University of Science and Technology	Iran	31.3	31.5	47.6	90.7	19.1	32.0-37.9
		Istanbul Technical University	Turkey	28.3	34.8	27.6	100.0		32.0-37.9
		Jamia Millia Islamia	India	31.9	11.9	63.5	36.6	25.8	32.0-37.9
		Jawaharlal Nehru University	India	45.1	25.0	37.2	36.3	19.2	32.0-37.9
		Jinan University	China	23.2	18.6	52.8	41.3	56.8	32.0-37.9
		Johannes Kepler University of Linz	Austria	27.2	20.3	42.8	55.6	71.5	32.0-37.9
		University of Johannesburg	South Africa	24.0	31.0	35.6	42.5		32.0-37.9
		University of Kaiserslautern	Germany	34.9	25.7	33.9	70.8		32.0-37.9
		Kansai Medical University		25.4	8.9	80.2	36.1	17.6	32.0-37.9
		University of Kashan	Japan Iran	23.5	19.4	74.7	36.7	20.7	32.0-37.9
		Kashan University of Medical Sciences and Health Services	Iran	25.0	13.3	73.4	35.3	22.4	32.0-37.9
		Universiti Kebangsaan Malaysia	Malaysia	38.1	22.2	44.6	38.3		32.0-37.9
		Keio University		32.9	25.0	41.6	45.0	34.7	32.0-37.9
		Kerman University of Medical Sciences	Japan Iran	25.6	10.1	62.8	41.7	18.6	32.0-37.9
		Kobe University		32.9	23.1	41.8	46.0	30.9	32.0-37.9
		Konkuk University	Japan South Korea	32.9	37.8	31.1	47.2		32.0-37.9
		University of Kurdistan		15.1	14.8	76.7	38.9	26.8	32.0-37.9
		Kyungpook National University	Iran South Korea	28.9	33.8	27.0	86.5		32.0-37.9
								41.7	32.0-37.9
		University of La Laguna	Spain	17.8	13.0	64.7	36.4 45.0	48.0	32.0-37.9
		University of Latvia	Latvia	19.7	27.1	50.3	45.9	53.7	
		Lehigh University	United States	28.8	21.3	53.4	38.0	65.0	32.0-37.9
		University of Limerick Lithuanian University of Health Sciences	Republic of Ireland	22.9 19.9	26.9	52.8 75.0	38.4 35.1	80.0	32.0-37.9 32.0-37.9
			Lithuania		9.1	75.0 57.5		53.2	
		University of Lorraine	France	20.6	14.8	57.5	38.1	66.3	32.0-37.9
		Louisiana State University	United States	32.6	23.3	49.4	36.1		32.0-37.9
	201-000	Lviv Polytechnic National University	Ukraine	20.0	10.1	69.6	35.8	24.5	32.0-37.9

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Rank 2022	Rank 2021	Institution	Country/region	Teaching	Research	Citations	Industry income	International outlook	Overall score
Rai	Rai	lusi	ပ်	Tea	Res	Cit	틸	堇	Ove
601-800	601-800	Mae Fah Luang University	Thailand	15.0	12.0	63.3	36.0	53.0	32.0-37.9
(continued)	601-800	Mahatma Gandhi University	India	42.0	28.9	35.1	57.0	20.8	32.0-37.9
		Mahidol University	Thailand	33.5	22.4	42.8	76.1	46.1	32.0-37.9
		Makerere University	Uganda	18.4	22.3	48.0	52.3	57.2	32.0-37.9
		University of Malakand	Pakistan	16.1	10.7	67.0	35.4	40.3	32.0-37.9
		Manchester Metropolitan University	United Kingdom	19.0	16.2	64.1	35.3	70.3	32.0-37.9
		Marche Polytechnic University	Italy	20.8	21.4	67.7	43.8	32.8	32.0-37.9
		University of Maryland, Baltimore County	United States	23.5	23.8	61.2	35.7	38.3	32.0-37.9
		Mashhad University of Medical Sciences	Iran	31.0	13.1	60.1	34.8	23.7	32.0-37.9
		Massey University	New Zealand	23.3	23.9	39.9	41.8	93.1	32.0-37.9
		Memorial University of Newfoundland	Canada	23.0	20.6	46.4	59.6	80.7	32.0-37.9 32.0-37.9
		Middle East Technical University	Turkey United States	32.9	32.5	32.9	99.8	41.1	
		University of Missouri-St Louis Montana State University	United States United States	29.6 20.5	18.9 18.3	53.5 66.2	44.9 43.9	39.9 28.3	32.0-37.9 32.0-37.9
		Monterrey Institute of Technology	Mexico	20.8	19.1	46.8	66.5	59.6	32.0-37.9
		Moscow State University of Civil Engineering	Russian Federation	19.9	9.6	71.3	52.2	23.6	32.0-37.9
		Nanjing Medical University	China	38.1	27.8	40.4	36.3	20.6	32.0-37.9
		University of Nantes	France	25.5	22.6	55.1	41.0	52.5	32.0-37.9
		National Cheng Kung University (NCKU)	Taiwan	36.5	42.3	25.2	100.0	39.1	32.0-37.9
		National Institute of Applied Sciences of Lyon (INSA Lyon)	France	29.1	22.5	30.8	84.8	71.0	32.0-37.9
		National University of Science and Technology (MISiS)	Russian Federation	27.7	19.2	39.6	87.6	67.9	32.0-37.9
		National Taiwan Normal University	Taiwan	32.2	36.4	29.3	85.2	54.4	32.0-37.9
		National Taiwan University of Science and Technology (Taiwan Tech)	Taiwan	28.6	38.4	36.9	64.8	50.3	32.0-37.9
	401-500	University of Neuchâtel	Switzerland	26.2	23.9	46.7	37.7	88.1	32.0-37.9
	801-1,000	University of New Brunswick UNB	Canada	21.3	21.0	46.5	50.1	71.6	32.0-37.9
	801-1,000	University of Nicosia	Cyprus	19.1	15.2	58.5	35.7	94.7	32.0-37.9
	601-800	Nippon Medical School	Japan	26.8	9.9	64.7	35.1	18.2	32.0-37.9
	NR	Northern Illinois University	United States	27.0	16.2	50.0	35.6	48.1	32.0-37.9
	601-800	Norwegian University of Life Sciences	Norway	25.9	10.9	62.5	40.5	78.8	32.0-37.9
		Ohio University (Main campus)	United States	30.4	18.7	48.8	36.7	31.2	32.0-37.9
		Ontario Tech University	Canada	18.6	25.7	51.4	37.4	60.8	32.0-37.9
		The Open University	United Kingdom	18.0	15.8	62.8	35.1	57.8	32.0-37.9
		Open University of Catalonia	Spain	20.5	16.3	70.9	35.7	46.6	32.0-37.9
		Oran 1 University	Algeria	30.2	8.8	56.6	35.3	39.5	32.0-37.9
		Oxford Brookes University	United Kingdom	26.1	23.7	49.3	35.3	81.0	32.0-37.9
		University of Palermo	Italy	17.3	20.1	60.1	35.5	31.4	32.0-37.9
		Panjab University	India	32.9	14.8	52.6	35.4	16.5	32.0-37.9
		Panthéon-Sorbonne University – Paris 1	France	43.0	37.5	14.6	35.0	62.5	32.0-37.9
		University of Parma Parthenope University of Naples	Italy	18.7 20.6	21.6 19.0	69.8 69.1	40.9	37.7 26.9	32.0-37.9 32.0-37.9
		Universidad Peruana Cayetano Heredia	Italy Peru	19.4	10.2	78.3	35.7	47.5	32.0-37.9
		University of Peshawar	Pakistan	28.4	10.2	57.2	34.8	38.8	32.0-37.9
		University of the Philippines	Philippines	22.6	17.5	74.3	41.7	33.1	32.0-37.9
		Universitat Politècnica de Catalunya	Spain	24.7	17.4	48.1	42.6	57.7	32.0-37.9
		Polytechnic University of Turin	Italy	24.7	27.2	56.5	52.7	51.2	32.0-37.9
		University of Pretoria	South Africa	25.9	29.0	35.8	42.4	54.9	32.0-37.9
		Prince Sattam Bin Abdulaziz University	Saudi Arabia	17.3	10.5	62.7	35.4	73.2	32.0-37.9
		Universiti Putra Malaysia	Malaysia	33.8	27.2	29.6	64.9	77.3	32.0-37.9
		Université du Québec	Canada	25.5	26.9	35.5	42.5	72.5	32.0-37.9
		RUDN University	Russian Federation	37.6	19.2	33.0	40.4		32.0-37.9
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Continued   S01_000   University of Regienaburg   Cermany   27.8   15.1   65.0   35.1   55.2   32.0-37										
Continues  801-1,000 University of Regins   Cemany   27.8   15.1   65.0   35.1   55.2   32.0-37									송	
Continued   801-100 University of Regensburg   Canada   18.5   17.8   61.0   37.1   67.1   32.0-37								a)	a fi	
Counting   R01-100   NR   University of Regensburg   Canada   18.5   17.8   61.0   37.1   67.1   32.0-37				gio.				E O	<u>a</u> 0	စ္
Continued   NR University of Regensburg   Cemmany   27.8   15.1   65.0   35.1   55.2   32.0-37	022	021	<u>.</u>	/re	ag ag	£	<u> </u>	ji	Ejo .	SCOI
Counting   R01-100   NR   University of Regensburg   Canada   18.5   17.8   61.0   37.1   67.1   32.0-37	k 2(	K 2(		ntry	녍	earc	tion	stry	rna	<u>=</u>
Counting   R01-100   NR   University of Regensburg   Canada   18.5   17.8   61.0   37.1   67.1   32.0-37	Ran	Ran	inst in the second of the seco	Com	leac	Res	Cita	힐	Inte	Overall score
Constituent  801-1,000   University of Regina   Canada   18.5   17.8   61.0   37.1   67.1   32.0-37										32.0-37.9
Soli-600   Remnin University of China   China   China   34.5   21.9   50.5   40.6   40.3   32.0-37										32.0-37.9
601-800   University of Rhode Island   United States   23.3   17.4   66.2   34.9   43.0   32.0-37				China	34.5	21.9	50.5	40.6	40.3	32.0-37.9
601-800   University of Rome III   Naty   23.6   22.4   48.0   40.8   41.5   32.0-37				United States			66.2			32.0-37.9
601-800   Roxikide University   Denmark   20.3   31.6   38.9   41.5   59.5   32.0-37				Italy	23.6	22.4	48.0	40.8	41.5	32.0-37.9
S01-600 SUNY Binghamton University			· · · · · ·		20.3	31.6	38.9	41.5	59.5	32.0-37.9
NR Sahand University of Technology				Spain	21.1	21.4	62.1	38.3	54.9	32.0-37.9
601-800 Universiti Sains Malaysia Malaysia 33.5 23.9 39.9 45.2 57.3 32.0-37 601-800 Saint Petersburg State University Russian Federation 43.7 34.1 16.4 40.1 43.4 32.0-37 1.001+ Saveetha University United States 24.4 11.2 69.5 35.4 34.6 32.0-37 1.001+ Saveetha University India 21.0 9.0 86.9 35.7 26.2 32.0-37 601-800 Shahid Beheshti University of Medical Sciences Iran 41.5 15.1 41.5 50.9 20.0 32.0-37 601-800 Shahid Beheshti University of Medical Sciences Iran 41.5 15.1 41.5 50.9 20.0 32.0-37 601-800 Shiraz University of Technology Iran 24.6 22.5 68.7 40.5 25.9 32.0-37 601-800 University of Siegen Germany 23.3 24.0 44.5 39.7 53.6 32.0-37 401-500 University of Siena Italy 21.6 23.5 62.8 39.3 43.6 32.0-37 501-600 Soochow University China 23.3 22.3 68.3 61.9 28.3 32.0-37 501-600 Soochow University Australia 19.7 23.0 57.0 44.4 71.4 32.0-37 501-600 Southern Cross University United States 22.5 18.2 62.3 37.4 72.6 32.0-37 601-800 University of the Sunshine Coast Australia 22.2 27.1 48.3 43.2 71.9 32.0-37 601-800 University of Technology United States 22.5 18.2 62.3 37.4 72.6 32.0-37 601-800 University of Technology Estonia 28.5 21.3 61.4 40.6 30.3 32.0-37 601-800 University of Technology Estonia 28.5 21.3 61.4 40.6 30.3 32.0-37 601-800 University of Technology Estonia 20.4 19.7 48.2 51.7 72.7 32.0-37 601-800 University of Technology Estonia 20.4 19.7 48.2 51.7 72.7 32.0-37 601-800 University of Medical Sciences Iran 43.0 13.3 55.6 34.9 21.5 32.0-37 601-800 University of Technology Estonia 20.4 19.7 48.2 51.7 72.7 32.0-37 601-800 University of Medical Sciences Iran 48.5 17.7 48.0 42.1 27.2 32.0-37 601-800 University of Technology Estonia 20.4 19.7 48.2 51.7 72.7 32.0-37 601-800 University of Medical Sciences Iran 48.5 17.7 48.0 42.1 27.2 32.0-37 601-800 University of Medical Sciences Iran 48.5 17.7 48.0 42.1 52.0-37 601-800 University of Medical Sciences Iran 48.5 17.7 48.0 42.1 52.0-37 601-800 University of Technology Estonia 48.5 48.5 49.5 47.5 48.6 48.5 49.5 47.5 62.6 32.0-37 601-800 University of Technology Estonia 4		501-600	SUNY Binghamton University	United States	24.6	21.2	59.6	38.5	38.1	32.0-37.9
601-800   Saint Petersburg State University   Russian Federation   43.7   34.1   16.4   40.1   43.4   32.0-37		NR	Sahand University of Technology	Iran	29.3	15.3	56.0	52.4	16.8	32.0-37.9
601-800   Saint Petersburg State University   Russian Federation   43.7   34.1   16.4   40.1   43.4   32.0-37		601-800	Universiti Sains Malaysia	Malaysia	33.5	23.9	39.9	45.2	57.3	32.0-37.9
601-800   San Diego State University   United States   24.4   11.2   69.5   35.4   34.6   32.0-37			·							32.0-37.9
1,001+   Saveetha University   India   21.0   9.0   86.9   35.7   26.2   32.0-37							69.5			32.0-37.9
601-800   Shahid Beheshti University of Medical Sciences   Iran   41.5   15.1   41.5   50.9   20.0   32.0-37			·							32.0-37.9
801-1,000   Shanghai University   China   24.1   29.1   39.5   73.6   34.0   32.0-37			•		41.5		41.5		20.0	32.0-37.9
Fig. 2.5   Fig. 3.2.0-37   F				China						32.0-37.9
401-500 University of Siena Italy 21.6 23.5 62.8 39.3 43.6 32.0-37 501-600 Soochow University China 23.3 22.3 68.3 61.9 28.3 32.0-37 601-800 Southern Cross University Australia 19.7 23.0 57.0 44.4 71.4 32.0-37 501-600 Stevens Institute of Technology United States 22.5 18.2 62.3 37.4 72.6 32.0-37 601-800 University of the Sunshine Coast Australia 22.2 27.1 48.3 43.2 71.9 32.0-37 601-800 University of Technology Germany 25.9 17.8 56.2 44.7 56.5 32.0-37 601-800 University of Tabriz Iran 28.5 21.3 61.4 40.6 30.3 32.0-37 601-800 Tabriz University of Medical Sciences Iran 43.0 13.3 55.6 34.9 21.5 32.0-37 801-1,000 Tallian University of Medical Sciences Iran 48.5 17.7 48.0 42.1 27.2 32.0-37 501-600 Tehran University of Medical Sciences Iran 48.5 17.7 48.0 42.1 27.2 32.0-37 601-800 University of Texas at Arlington United States 21.6 18.9 54.7 41.6 44.5 32.0-37 501-600 The University of Texas at Arlington United States 27.9 19.1 48.0 36.1 52.8 32.0-37 501-600 Texas Tech University Indiversity Ind		601-800	Shiraz University of Technology	Iran	24.6	22.5	68.7	40.5	25.9	32.0-37.9
501-600         Soochow University         China         23.3         22.3         68.3         61.9         28.3         32.0-37           601-800         Southern Cross University         Australia         19.7         23.0         57.0         44.4         71.4         32.0-37           501-600         Stevens Institute of Technology         United States         22.5         18.2         62.3         37.4         72.6         32.0-37           601-800         University of the Sunshine Coast         Australia         22.2         27.1         48.3         43.2         71.9         32.0-37           601-800         University of Tabriz         Iran         28.5         21.3         61.4         40.6         30.3         32.0-37           601-800         University of Technology         Estonia         20.4         19.7         48.2         51.7         72.7         32.0-37           801-1,000         Tallian University of Medical Sciences         Iran         48.5         17.7         48.0         42.1         27.2         32.0-37           601-800         University of Medical Sciences         Iran         48.5         17.7         48.0         42.1         27.2         32.0-37           601-800         Uni				Germany	23.3	24.0	44.5	39.7	53.6	32.0-37.9
501-600         Soochow University         China         23.3         22.3         68.3         61.9         28.3         32.0-37           601-800         Southern Cross University         Australia         19.7         23.0         57.0         44.4         71.4         32.0-37           501-600         Stevens Institute of Technology         United States         22.5         18.2         62.3         37.4         72.6         32.0-37           601-800         University of the Sunshine Coast         Australia         22.2         27.1         48.3         43.2         71.9         32.0-37           601-800         University of Tabriz         Iran         28.5         21.3         61.4         40.6         30.3         32.0-37           601-800         University of Medical Sciences         Iran         43.0         13.3         55.6         34.9         21.5         32.0-37           801-1,000         Tallinn University of Medical Sciences         Iran         43.0         13.3         55.6         34.9         21.5         32.0-37           501-600         Tehran University of Medical Sciences         Iran         48.5         17.7         48.0         42.1         27.2         32.0-37           601-800				Italy	21.6	23.5	62.8	39.3	43.6	32.0-37.9
501-600         Stevens Institute of Technology         United States         22.5         18.2         62.3         37.4         72.6         32.0-37           601-800         University of the Sunshine Coast         Australia         22.2         27.1         48.3         43.2         71.9         32.0-37           601-800         TU Braunschweig         Germany         25.9         17.8         56.2         44.7         56.5         32.0-37           601-800         University of Tabriz         Iran         28.5         21.3         61.4         40.6         30.3         32.0-37           801-1,000         Tabriz University of Medical Sciences         Iran         43.0         13.3         55.6         34.9         21.5         32.0-37           801-1,000         Tallinn University of Medical Sciences         Iran         48.5         17.7         48.0         42.1         27.2         32.0-37           501-600         Tehran University of Medical Sciences         Iran         48.5         17.7         48.0         42.1         27.2         32.0-37           601-800         University of Medical Sciences         Iran         48.5         17.7         48.0         42.1         27.2         32.0-37           601-800 <td></td> <td>501-600</td> <td>Soochow University</td> <td></td> <td>23.3</td> <td>22.3</td> <td>68.3</td> <td>61.9</td> <td>28.3</td> <td>32.0-37.9</td>		501-600	Soochow University		23.3	22.3	68.3	61.9	28.3	32.0-37.9
501-600         Stevens Institute of Technology         United States         22.5         18.2         62.3         37.4         72.6         32.0-37           601-800         University of the Sunshine Coast         Australia         22.2         27.1         48.3         43.2         71.9         32.0-37           601-800         TU Braunschweig         Germany         25.9         17.8         56.2         44.7         56.5         32.0-37           601-800         University of Tabriz         Iran         28.5         21.3         61.4         40.6         30.3         32.0-37           801-1,000         Tabriz University of Medical Sciences         Iran         43.0         13.3         55.6         34.9         21.5         32.0-37           801-1,000         Tallinn University of Technology         Estonia         20.4         19.7         48.2         51.7         72.7         32.0-37           601-800         University of Medical Sciences         Iran         48.5         17.7         48.0         42.1         27.2         32.0-37           601-800         University of Medical Sciences         Iran         48.5         17.7         48.0         42.1         27.2         32.0-37           601-800		601-800	Southern Cross University	Australia	19.7	23.0	57.0	44.4	71.4	32.0-37.9
Germany   Column				United States	22.5	18.2	62.3	37.4	72.6	32.0-37.9
Germany   Columbia   Germany   Columbia   Germany   Columbia   C		601-800	University of the Sunshine Coast	Australia	22.2	27.1	48.3	43.2	71.9	32.0-37.9
Record   Fabriz University of Medical Sciences   Iran   43.0   13.3   55.6   34.9   21.5   32.0-37   801-1,000   Tallinn University of Technology   Estonia   20.4   19.7   48.2   51.7   72.7   32.0-37   501-600   Tehran University of Medical Sciences   Iran   48.5   17.7   48.0   42.1   27.2   32.0-37   601-800   Universiti Teknologi Malaysia   Malaysia   31.3   22.9   39.4   47.5   62.6   32.0-37   601-800   University of Texas at Arlington   United States   21.6   18.9   54.7   41.6   44.5   32.0-37   501-600   The University of Texas at San Antonio   United States   19.8   20.1   70.3   37.1   38.9   32.0-37   801-1,000   Tokyo Metropolitan University   United States   27.9   19.1   48.0   36.1   52.8   32.0-37   801-1,000   Tokyo Metropolitan University   Japan   24.4   14.5   59.4   39.3   27.8   32.0-37   601-800   University of Toledo   United States   32.2   14.0   48.2   40.5   47.0   32.0-37   501-600   Tomsk State University   Russian Federation   40.4   34.9   21.9   59.4   73.6   32.0-37   601-800   University of Udine   Italy   22.3   17.3   69.0   39.4   39.8   32.0-37   601-800   University of Ulsan   South Korea   22.5   26.0   64.7   72.9   24.4   32.0-37   601-800   Ulster University   United Kingdom   24.5   19.6   47.5   37.1   77.7   32.0-37   601-800   Ulster University   United Kingdom   24.5   19.6   47.5   37.1   77.7   32.0-37   601-800   Ulster University   United Kingdom   24.5   19.6   47.5   37.1   77.7   32.0-37   601-800   Ulster University   United Kingdom   24.5   19.6   47.5   37.1   77.7   32.0-37   601-800   University   United Kingdom   24.5   19.6   47.5   37.1   77.7   32.0-37   601-800   University   United Kingdom   24.5   19.6   47.5   37.1   77.7   32.0-37   601-800   University   United Kingdom   24.5   19.6   47.5   37.1   77.7   32.0-37   601-800   University   United Kingdom   24.5   19.6   47.5   37.1   77.7   32.0-37   601-800   University   United Kingdom   24.5   19.6   47.5   37.1   77.7   32.0-37   601-800   University   United Kingdom   24.5   19.6   47.		601-800	TU Braunschweig	Germany	25.9	17.8	56.2	44.7	56.5	32.0-37.9
Solid		601-800	University of Tabriz	Iran	28.5	21.3	61.4	40.6	30.3	32.0-37.9
Tehran University of Medical Sciences   Iran   48.5   17.7   48.0   42.1   27.2   32.0-37		601-800	Tabriz University of Medical Sciences	Iran	43.0	13.3	55.6	34.9	21.5	32.0-37.9
601-800       Universiti Teknologi Malaysia       Malaysia       31.3       22.9       39.4       47.5       62.6       32.0-37         601-800       University of Texas at Arlington       United States       21.6       18.9       54.7       41.6       44.5       32.0-37         501-600       The University of Texas at San Antonio       United States       19.8       20.1       70.3       37.1       38.9       32.0-37         601-800       Texas Tech University       United States       27.9       19.1       48.0       36.1       52.8       32.0-37         801-1,000       Tokyo Metropolitan University       Japan       24.4       14.5       59.4       39.3       27.8       32.0-37         601-800       University of Toledo       United States       32.2       14.0       48.2       40.5       47.0       32.0-37         501-600       Tomsk State University       Russian Federation       40.4       34.9       21.9       59.4       73.6       32.0-37         601-800       University of Uline       Italy       22.3       17.3       69.0       39.4       39.8       32.0-37         601-800       University of Ulsan       South Korea       22.5       26.0       64.7		801-1,000	Tallinn University of Technology	Estonia	20.4	19.7	48.2	51.7	72.7	32.0-37.9
601-800       University of Texas at Arlington       United States       21.6       18.9       54.7       41.6       44.5       32.0-37         501-600       The University of Texas at San Antonio       United States       19.8       20.1       70.3       37.1       38.9       32.0-37         601-800       Texas Tech University       United States       27.9       19.1       48.0       36.1       52.8       32.0-37         801-1,000       Tokyo Metropolitan University       Japan       24.4       14.5       59.4       39.3       27.8       32.0-37         601-800       University of Toledo       United States       32.2       14.0       48.2       40.5       47.0       32.0-37         501-600       Tomsk State University       Russian Federation       40.4       34.9       21.9       59.4       73.6       32.0-37         601-800       University of Udine       Italy       22.3       17.3       69.0       39.4       39.8       32.0-37         601-800       University of Ulsan       South Korea       22.5       26.0       64.7       72.9       24.4       32.0-37         601-800       Ulster University       United Kingdom       24.5       19.6       47.5		501-600	Tehran University of Medical Sciences	Iran	48.5	17.7	48.0	42.1	27.2	32.0-37.9
501-600       The University of Texas at San Antonio       United States       19.8       20.1       70.3       37.1       38.9       32.0-37         601-800       Texas Tech University       United States       27.9       19.1       48.0       36.1       52.8       32.0-37         801-1,000       Tokyo Metropolitan University       Japan       24.4       14.5       59.4       39.3       27.8       32.0-37         601-800       University of Toledo       United States       32.2       14.0       48.2       40.5       47.0       32.0-37         501-600       Tomsk State University       Russian Federation       40.4       34.9       21.9       59.4       73.6       32.0-37         601-800       University of Udine       Italy       22.3       17.3       69.0       39.4       39.8       32.0-37         601-800       University of Ulsan       South Korea       22.5       26.0       64.7       72.9       24.4       32.0-37         601-800       Ulster University       United Kingdom       24.5       19.6       47.5       37.1       77.7       32.0-37		601-800	Universiti Teknologi Malaysia	Malaysia	31.3	22.9	39.4	47.5	62.6	32.0-37.9
601-800       Texas Tech University       United States       27.9       19.1       48.0       36.1       52.8       32.0-37         801-1,000       Tokyo Metropolitan University       Japan       24.4       14.5       59.4       39.3       27.8       32.0-37         601-800       University of Toledo       United States       32.2       14.0       48.2       40.5       47.0       32.0-37         501-600       Tomsk State University       Russian Federation       40.4       34.9       21.9       59.4       73.6       32.0-37         601-800       University of Udine       Italy       22.3       17.3       69.0       39.4       39.8       32.0-37         601-800       University of Ulsan       South Korea       22.5       26.0       64.7       72.9       24.4       32.0-37         601-800       Ulster University       United Kingdom       24.5       19.6       47.5       37.1       77.7       32.0-37		601-800	University of Texas at Arlington	United States	21.6	18.9	54.7	41.6	44.5	32.0-37.9
801-1,000       Tokyo Metropolitan University       Japan       24.4       14.5       59.4       39.3       27.8       32.0-37         601-800       University of Toledo       United States       32.2       14.0       48.2       40.5       47.0       32.0-37         501-600       Tomsk State University       Russian Federation       40.4       34.9       21.9       59.4       73.6       32.0-37         601-800       University of Udine       Italy       22.3       17.3       69.0       39.4       39.8       32.0-37         601-800       University of Ulsan       South Korea       22.5       26.0       64.7       72.9       24.4       32.0-37         601-800       Ulster University       United Kingdom       24.5       19.6       47.5       37.1       77.7       32.0-37		501-600	The University of Texas at San Antonio	United States	19.8	20.1	70.3	37.1	38.9	32.0-37.9
601-800       University of Toledo       United States       32.2       14.0       48.2       40.5       47.0       32.0-37         501-600       Tomsk State University       Russian Federation       40.4       34.9       21.9       59.4       73.6       32.0-37         601-800       University of Udine       Italy       22.3       17.3       69.0       39.4       39.8       32.0-37         601-800       University of Ulsan       South Korea       22.5       26.0       64.7       72.9       24.4       32.0-37         601-800       Ulster University       United Kingdom       24.5       19.6       47.5       37.1       77.7       32.0-37		601-800	Texas Tech University	United States	27.9	19.1	48.0	36.1	52.8	32.0-37.9
501-600       Tomsk State University       Russian Federation       40.4       34.9       21.9       59.4       73.6       32.0-37         601-800       University of Udine       Italy       22.3       17.3       69.0       39.4       39.8       32.0-37         601-800       University of Ulsan       South Korea       22.5       26.0       64.7       72.9       24.4       32.0-37         601-800       Ulster University       United Kingdom       24.5       19.6       47.5       37.1       77.7       32.0-37		801-1,000	Tokyo Metropolitan University	Japan	24.4	14.5	59.4	39.3	27.8	32.0-37.9
601-800 University of Udine     Italy     22.3     17.3     69.0     39.4     39.8     32.0-37       601-800 University of Ulsan     South Korea     22.5     26.0     64.7     72.9     24.4     32.0-37       601-800 Ulster University     United Kingdom     24.5     19.6     47.5     37.1     77.7     32.0-37		601-800	University of Toledo	United States	32.2	14.0	48.2	40.5	47.0	32.0-37.9
601-800       University of Ulsan       South Korea       22.5       26.0       64.7       72.9       24.4       32.0-37         601-800       Ulster University       United Kingdom       24.5       19.6       47.5       37.1       77.7       32.0-37		501-600	Tomsk State University	Russian Federation	40.4	34.9	21.9	59.4	73.6	32.0-37.9
601-800 Ulster University United Kingdom 24.5 19.6 47.5 37.1 77.7 32.0-37		601-800	University of Udine	Italy	22.3	17.3	69.0	39.4	39.8	32.0-37.9
		601-800	University of Ulsan	South Korea	22.5	26.0	64.7	72.9	24.4	32.0-37.9
1,001+ Umm Al-Qura University Saudi Arabia 32.7 13.4 36.0 59.3 81.6 32.0-37			•	United Kingdom	24.5	19.6	47.5	37.1	77.7	32.0-37.9
		1,001+	Umm Al-Qura University	Saudi Arabia	32.7	13.4	36.0	59.3	81.6	32.0-37.9
		601-800	Universiti Utara Malaysia	Malaysia	30.6	24.3	42.4	38.2	70.2	32.0-37.9
		801-1,000	University of Warsaw		29.5	27.3	44.1	35.9	44.1	32.0-37.9
			•	China	16.3		75.7		24.5	32.0-37.9
		1,001+	Wenzhou Medical University	China	17.7	13.6	76.0	36.7	28.7	32.0-37.9
			·	South Africa						32.0-37.9
										32.0-37.9
			· · · · · · · · · · · · · · · · · · ·			22.0		36.9		32.0-37.9
· · · · · · · · · · · · · · · · · · ·										32.0-37.9
										32.0-37.9
				United States						32.0-37.9
										32.0-37.9
801–1,000 Zayed University United Arab Emirates 17.6 16.1 64.9 35.9 74.0 32.0–37		801-1,000	Zayed University	United Arab Emirates	17.6	16.1	64.9	35.9	74.0	32.0-37.9





## PRINCIPLES OF PHYSICS AND DISCOVER MATERIALS OF THE FUTURE

### NANOHETEROSTRUCTURE ELECTRONICS, PHOTONICS AND RADIO-FREQUENCY PHOTONICS

OPTICAL ELECTRONICS AND PHOTONICS

MICROWAVE PHOTONICS

TERAHERTZ ELECTRONICS

EXTREME ELECTRONICS

MAGNONICS AND SPINTRONICS

MICROWAVE MICROELECTRONICS

#### **WE DEVELOP:**

- Components for information, control and navigation systems
- Technologies for preparation and processing of functional nanomaterials
- Basic technologies of power electronics
- Components for artificial neural networks
- Components for intelligent control systems used in new vehicles and autonomous transport
- Access technologies for broadband multimedia services

## Think outer space. Go Russia.



#### **Basic research on space flight mechanics:**

- Promising space missions
- Space debris
- Space tether systems





technology. We have formed a globally

unique academic complex facilitating

education through research in various

fields of science and technology.

We help students to discover their talents and nurture their creativity so that our graduates could become the ones to shed light on the mysteries of the universe and to hasten the high-technology future.

Today, Samara University works to use space science and technology for attaining the sustainable development and tackling the global challenges alongside with promoting international cooperation in space matters.

000't-108	Rank 2021	University of the Aegean	Country/region	Teaching	Research	Citations	53.4	International outlook	Overall score
001-1,000		, ,							27.2-31.9
		University of Agriculture, Faisalabad	Pakistan	19.1	16.1	44.9	48.9	42.8	
		Al-Balqa Applied University University of Algarve	Jordan	13.3 17.4	11.4 16.1	58.2 40.3	44.2 36.1	48.1 68.1	27.2-31.9 27.2-31.9
			Portugal						27.2-31.9
		Aligarh Muslim University  Amedeo Avogadro University of Eastern Piedmont	India	30.2 13.5	12.6 21.1	47.4 57.4	39.3 34.9	25.3 40.8	27.2-31.9
		American University in Cairo	Italy	25.0	29.5	22.5	36.0	63.4	27.2-31.9
		American University in Carlo  American University of Sharjah	Egypt United Arab Emirates	21.0	18.8	35.9	35.5	93.8	27.2-31.9
		Amrita Vishwa Vidyapeetham	India	25.2	17.3	43.5	58.8	40.5	27.2-31.9
		University of the Andes, Colombia	Colombia	21.6	17.3	39.2	39.3	55.5	27.2-31.9
		Anna University	India	21.0	27.2	39.5	44.6	15.4	
		Arts et Métiers	France	26.3	16.8	25.7	65.3	66.2	27.2-31.9
		Athens University of Economics and Business	Greece	19.7	23.8	45.2	38.5	47.9	27.2-31.9
		University of Aveiro		23.3	23.8	42.4	37.5	50.0	27.2-31.9
		Bahçeşehir University	Portugal Turkey	19.3	18.6	45.0	51.6	47.1	27.2-31.9
		University of the Basque Country	Spain	20.7	20.2	50.2	37.8	44.6	27.2-31.9
		Bauman Moscow State Technical University	Russian Federation	40.7	18.0	26.6	78.0	43.4	27.2-31.9
		Baylor University	United States	32.4	18.1	42.4	35.3	34.6	27.2-31.9
		University University University of Bedfordshire	United Kingdom	18.4	14.9	39.6	35.2		27.2-31.9
		University of Belgrade	Serbia	20.1	27.5	40.8	40.9		27.2-31.9
		Ben-Gurion University of the Negev	Israel	28.1	32.1	31.9	50.0	37.3	27.2-31.9
		Benha University	Egypt	15.5	7.9	54.6	35.4	43.7	27.2-31.9
		Beni-Suef University	Egypt	14.9	8.1	68.9	34.8	44.6	27.2-31.9
		Bharathiar University	India	37.1	14.3	33.7	34.9	22.5	27.2-31.9
		Birla Institute of Technology and Science, Pilani	India	20.0	11.1	53.6	36.0	18.8	27.2-31.9
		Boğaziçi University	Turkey	24.3	24.2	34.7	60.8	39.1	27.2-31.9
		COMSATS University Islamabad	Pakistan	16.8	10.3	61.3	34.9	46.1	
		Carlos III University of Madrid	Spain	25.3	18.6	28.4	40.5	62.3	27.2-31.9
		University of Central Lancashire	United Kingdom	18.7	13.6	45.4	35.2	68.1	
		Central Queensland University	Australia	17.1	15.4	52.0	37.9		27.2-31.9
		Chang Gung University	Taiwan	23.0	28.5	30.8	81.4	27.8	27.2-31.9
		Chapman University	United States	38.1	12.9	38.7	35.1	41.3	27.2-31.9
		Charles Sturt University	Australia	16.9	16.9	41.7	35.5	70.3	
		University of Chile	Chile	23.8	18.1	36.7	40.3	50.4	27.2-31.9
		China University of Geosciences, Beijing	China	27.0	17.7	37.2	46.7	25.1	27.2-31.9
		China University of Geosciences, Wuhan	China	21.3	17.3	55.3	51.1	29.0	27.2-31.9
		China University of Mining and Technology	China	20.5	16.4	48.5	60.6	19.5	27.2-31.9
		China University of Petroleum, Beijing	China	25.1	22.9	36.3	99.2	24.3	27.2-31.9
		Chulalongkorn University	Thailand	32.8	20.6	30.9	63.7	37.9	27.2-31.9
		Clarkson University	United States	27.6	17.3	43.0	39.6	50.8	27.2-31.9
		Clemson University	United States	26.5	21.5	41.2	39.9	42.2	
		University of Clermont Auvergne	France	21.4	15.2	51.4	36.4	59.8	27.2-31.9
		University of Colombo	Sri Lanka	27.6	9.3	52.3	34.9	37.6	27.2-31.9
		University of Córdoba	Spain	20.0	17.5	51.4	37.4	46.3	27.2-31.9
		Creighton University	United States	40.5	13.6	34.1	36.1	25.5	27.2-31.9
		University of Debrecen	Hungary	34.3	14.0	32.3	40.6		27.2-31.9
		University of Delhi	India	37.6	22.4	34.7	34.8	17.8	
		University of Dhaka	Bangladesh	16.3	8.4	61.8	35.2	42.6	27.2-31.9
		Donghua University	China	20.6	18.7	49.6	67.2	32.5	27.2-31.9
		East China University of Science and Technology	China	22.7	20.7	38.1	56.9	20.0	27.2-31.9



### A pioneer in agricultural education since 1961

ocated in the city of Mymensingh, just 120 kilometers north of the capital Dhaka, the main focus of Bangladesh Agricultural University (BAU) is to raise the quality and standard of higher agricultural education and to produce first-rate agriculturists, agricultural scientists, and researchers.

Founded in 1961, BAU offers nine undergraduate programs under six faculties, with 44 academic departments witin those six faculties and three institutes. All academic departments offer both undergraduate and graduate courses while our Graduate Training Institute offers life-long education in different disciplines of agriculture. With around 600 faculty members and over 8,000 undergraduate and graduate students (including more than 400 doctoral students), graduates from BAU have a long history of success all over the world, with many eminent alumni becoming national and global leaders in their respective fields.

BAU has gained recognition across Asia for its research in the field of agricultural sciences, and has developed more than 125 crop varieties, several cattle, poultry and fish breeds, vaccines, agricultural machineries and advanced farming technologies. Encouraging its students to become leading agriculturalists, agricultural scientists and researchers so that they can contribute to the rapidly changing needs of the 21st century and the fourth industrial revolution. With its 10 farms, the university works with farmers and agro-entrepreneur organisations to understand how it can help to improve the global farming industry.

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Rank 2022	Rank 2021	Institution	Country/region	Teaching	Research	Citations	Industry income	International outlook	Overall score
801-1,000	801-1,000	University of East London	United Kingdom	23.5	15.1	32.3	35.0	80.9	27.2-31.9
(continued)		École Centrale de Lyon	France	27.8	23.4	21.2	60.5	69.3	27.2-31.9
		Edge Hill University	United Kingdom	16.6	12.7	60.8	34.8	45.6	27.2-31.9
		Estonian University of Life Sciences	Estonia	22.0	9.8	51.3	38.0	66.9	27.2-31.9
		European University of Madrid	Spain	18.7	9.7	56.2	35.0	59.8	27.2-31.9
	601-800	Universidade Federal de Santa Catarina	Brazil	28.1	13.8	47.1	44.4	30.9	27.2-31.9
	601-800	Universidade Federal de São Paulo (UNIFESP)	Brazil	27.4	17.7	46.5	35.3	29.2	27.2-31.9
	801-1,000	Florida Agricultural and Mechanical University	United States	34.9	12.6	33.2	35.4	31.6	27.2-31.9
	801-1,000	Florida Atlantic University	United States	20.1	18.5	43.7	40.4	46.5	27.2-31.9
	801-1,000	Florida Institute of Technology	United States	28.1	16.6	32.9	39.4	54.9	27.2-31.9
	801-1,000	University of Foggia	Italy	16.9	20.9	53.7	38.0	25.7	27.2-31.9
	1,001+	University of Fortaleza (UNIFOR)	Brazil	16.7	8.4	65.2	34.8	35.6	27.2-31.9
	501-600	Fujita Health University	Japan	24.6	10.9	59.2	37.1	22.5	27.2-31.9
	801-1,000	Fuzhou University	China	17.6	13.1	55.0	58.5	28.8	27.2-31.9
	801-1,000	Hiroshima University	Japan	31.1	21.8	30.4	49.5	40.0	27.2-31.9
	601-800	IDC Herzliya	Israel	15.8	9.4	57.0	34.8	65.6	27.2-31.9
	801-1,000	Imam Abdulrahman Bin Faisal University	Saudi Arabia	21.2	8.9	45.0	35.1	70.2	27.2-31.9
	601-800	Indian Institute of Science Education and Research Kolkata	India	26.2	13.2	56.3	38.8	19.6	27.2-31.9
	601-800	Indian Institute of Science Education and Research, Pune	India	38.7	15.7	34.0	36.5	24.3	27.2-31.9
	1,001+	Indian Institute of Technology Patna	India	23.6	18.1	47.5	35.1	16.9	27.2-31.9
	801-1,000	University of Indonesia	Indonesia	38.6	20.7	14.5	80.7	52.9	27.2-31.9
	601-800	Universitat Internacional de Catalunya	Spain	18.1	13.7	54.6	39.7	63.6	27.2-31.9
	601-800	University of Ioannina	Greece	15.6	15.1	60.0	37.7	44.2	27.2-31.9
	801-1,000	Isfahan University of Medical Sciences	Iran	39.7	12.9	31.0	35.9	20.0	27.2-31.9
		Isfahan University of Technology	Iran	25.9	24.4	38.3	79.9	26.3	27.2-31.9
	NR	Istanbul University-Cerrahpaşa	Turkey	20.9	11.7	51.7	51.4	22.3	27.2-31.9
		Istanbul Medeniyet University	Turkey	17.0	9.2	66.0	34.8	21.0	
		Iuliu Haţieganu University of Medicine and Pharmacy Cluj-Napoca	Romania	21.2	9.1	51.8	35.0	52.0	27.2-31.9
		Jadavpur University	India	35.6	24.3	25.0	43.3	16.0	27.2-31.9
		University of Jaén	Spain	17.6	16.1	53.0	35.1	44.0	27.2-31.9
		Jaume I University	Spain	21.3	19.1	49.5	38.1	45.3	27.2-31.9
		Jiangsu University	China	20.8	12.1	56.3	57.8	42.5	27.2-31.9
		Jiangsu Normal University	China	16.3	13.0	62.7	46.9	24.6	27.2-31.9
		Jikei University School of Medicine	Japan	28.1	9.0	61.4	38.5		27.2-31.9
		The University of Jordan	Jordan	27.9	13.0	43.8	39.5	66.9	27.2-31.9
		Juntendo University	Japan	32.7	13.9	38.5	50.4	22.2	27.2-31.9
		Kalasalingam Academy of Research and Education	India	19.0	8.8	58.3	37.2	23.1	27.2-31.9
		Kansas State University	United States	26.6	21.1	43.4	41.4		27.2-31.9
		Karlstad University	Sweden	17.5	14.3	52.5	35.9	39.5	27.2-31.9
		Kazan Federal University	Russian Federation	37.2	18.6	31.4	50.5	60.0	27.2-31.9
		Kent State University	United States	23.6	18.3	41.8	35.6	40.2	
		KIIT University	India	26.4	12.3	45.6	66.2	22.1	27.2-31.9
		Kind Khalid University	Japan Saudi Arabia	19.4	10.8	61.3	40.3	25.1	27.2-31.9 27.2-31.9
		King Mandkut's University of Technology Thanburi	Saudi Arabia	24.1	8.1	46.5	34.8	81.0	
		King Mongkut's University of Technology Thonburi	Thailand	19.7	17.4	47.4	72.9	35.0	27.2-31.9
		King Saud bin Abdulaziz University for Health Sciences	Saudi Arabia	28.3 19.6	10.9 18.0	46.9 39.6	37.5 35.1	67.7 85.7	27.2-31.9 27.2-31.9
		Kingston University	United Kingdom	22.2	11.2	56.7	38.0		27.2-31.9
		Kurume University  Kuwait University	Japan Kuwait	19.9	10.0	45.1	36.1	23.0 69.1	27.2-31.9
		Lahore University of Management Sciences	Pakistan	21.6	16.6	50.9	35.6		27.2-31.9
	001-1,000	Earliers offiversity of management obtolices	i uniotuli	21.0	10.0	50.9	55.0	70.1	21.2-31.3



#### Kalinga Institute of Industrial Technology (KIIT)

Deemed to be University (Established U/S 3 of UGC Act, 1956), Bhubaneswar, Odisha, India

Rank



















KIIT is among India's most sought-after universities, attracting students from all over India and more than 53 countries to pursue professional and technical education. It has built its reputation as the most student-friendly university, anchored on the principles of Compassion and Humanity, and is on its way to ecome an international hub for quality professional and technical education.

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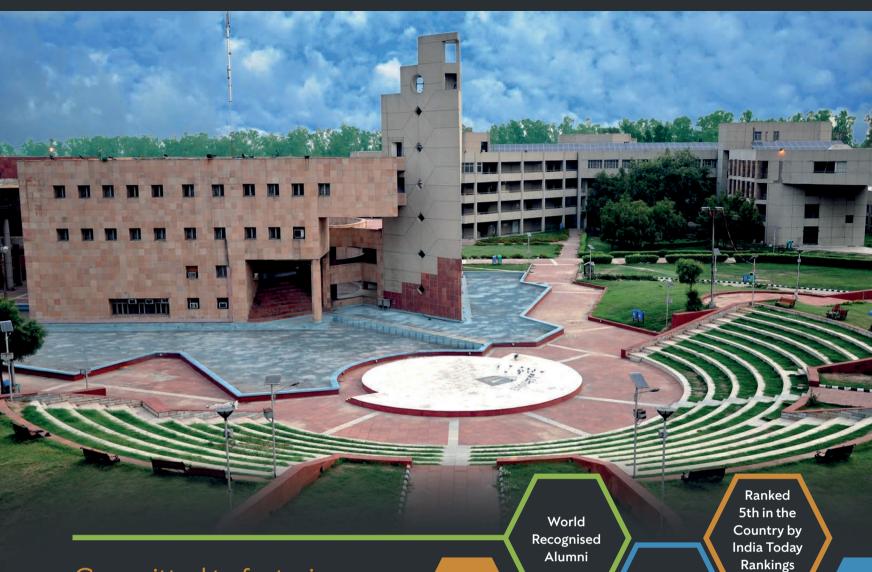
#### **SCHOOLS**

- > School of Civil Engineering
- School of Computer Engineering
- > School of Electrical Engineering
- School of Electronics Engineering
- School of Mechanical Engineering
- > School of Computer Application
- > School of Architecture
- School of Law
- School of Applied Sciences
- > School of Management
- School of Rural Management
- School of Biotechnology
- School of Public Health
- School of Chemical Technology
- > Kalinga Institute of Medical Sciences
- > Kalinga Institute of Dental Sciences
- Kalinga Institute of Nursing Sciences
- School of Fashion Technology
- > School of Film & Media Sciences
- School of Humanities & Commerce
- School of Languages
- School of Yoga

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	Rank 2022 Rank 2021	Institution	Country/region	Teaching	Research	Citations	Industry income	International outlook	Overall score
	Ra Rai		್ರ ಕೃತ್ತಿ	Tea	Res	Cit	필	堇	Ove
801-1,00	<b>0</b> 601-800	Lakehead University	Canada	18.2	23.2	45.2	37.0	55.4	27.2-31.9
(continue		Lebanese American University	Lebanon	30.8	10.9	29.2	34.8	86.0	27.2-31.9
	801-1,000	Leeds Beckett University	United Kingdom	17.4	15.8	54.2	35.4	54.0	27.2-31.9
	801-1,000	University of Leoben	Austria	27.9	12.6	29.1	54.4	69.5	27.2-31.9
	801-1,000	University of Ljubljana	Slovenia	22.5	18.6	50.0	41.0	45.3	27.2-31.9
	601-800	University of Lleida	Spain	20.2	16.5	53.9	38.5	41.5	27.2-31.9
	1,001+	London South Bank University	United Kingdom	17.4	12.1	43.3	35.4	84.2	27.2-31.9
	601-800	University of Malta	Malta	19.4	16.3	52.9	35.2	59.1	27.2-31.9
	NR	University of Maragheh	Iran	14.3	11.9	58.7	34.8	23.2	27.2-31.9
	801-1,000	Marquette University	United States	35.3	16.3	38.3	37.1	27.2	27.2-31.9
	601-800	Masaryk University	Czech Republic	23.5	27.8	31.4	36.2	64.9	27.2-31.9
	801-1,000	University of Memphis	United States	26.2	17.4	45.7	36.3	25.4	27.2-31.9
		Menoufia University	Egypt	16.0	8.3	57.2	36.1	39.7	27.2-31.9
		Metropolitan Autonomous University	Mexico	17.6	16.0	51.4	37.0	25.2	27.2-31.9
		Miguel Hernández University of Elche	Spain	17.2	16.2	49.3	38.9	38.2	27.2-31.9
		University of Minho	Portugal	24.0	22.8	38.6	52.3	57.1	27.2-31.9
		University of Namur	Belgium	19.4	19.3	40.3	40.8	67.9	27.2-31.9
		Nanjing University of Information Science and Technology	China	18.7	15.5	59.4	43.0	33.2	
		Nanjing Normal University	China	20.0	12.5	55.6	52.1	26.9	27.2-31.9
		Nanjing Tech University	China	18.8	13.4	57.0	62.7	28.5	27.2-31.9
		National Autonomous University of Mexico	Mexico	30.6	28.2	20.2	63.1	47.3	27.2-31.9
		National Institute of Technology Rourkela	India	24.1	15.3	44.9	36.3	18.4	27.2-31.9
		National University of Sciences and Technology	Pakistan	21.9	15.6	46.2	38.1	45.7	27.2-31.9
		National Sun Yat-Sen University	Taiwan	25.9	35.4	25.4	62.5	44.5	27.2-31.9
		National Technical University of Athens	Greece	22.6	16.8	41.1	53.5	38.3	27.2-31.9
		National Institute of Technology Silchar	India	27.4	14.4	51.7	35.3	14.9	27.2-31.9
		Near East University	Northern Cyprus	17.3	11.3	44.3	54.2	95.5	
		University of Nevada, Las Vegas	United States	29.8	24.0	40.7	35.4		27.2-31.9
		The New School	United States	25.1	15.9	40.4	39.8	50.7	27.2-31.9
		New Mexico State University (Main campus)	United States	24.1	20.3	43.8	38.9	38.1	27.2-31.9
		Niigata University	Japan	24.4	13.0	52.3	41.2	24.5	27.2-31.9
		Normandy University	France	22.5	15.1	36.7	35.8	55.8	27.2-31.9
		University of North Carolina at Charlotte	United States	19.9	10.0	65.2	34.8	33.5	
		University of North Carolina at Greensboro	United States	24.2	19.3	50.7	35.6		27.2-31.9 27.2-31.9
		Northeast Normal University  Northeastern University	China China	24.7 25.3	14.6 26.2	49.1 28.7	38.4 92.9	24.8 37.6	27.2-31.9
		University of Northern British Columbia (UNBC)	Canada	21.0	20.2	43.5	35.2	40.8	27.2-31.9
		NorthWest A&F University	China	21.0	17.1	51.2	58.6	25.7	27.2-31.9
		Novosibirsk State University	Russian Federation	38.6	32.1	20.2	38.3	43.7	27.2-31.9
		Old Dominion University	United States	23.4	19.2	43.7	34.8	31.1	27.2-31.9
		University of Oviedo	Spain	20.3	17.1	47.0	38.8	34.6	27.2-31.9
		Palacký University Olomouc	Czech Republic	20.3	21.4	41.6	35.9	59.2	27.2-31.9
		University of Patras	Greece	18.1	13.4	47.0	40.3		27.2-31.9
		University of Pécs	Hungary	32.8	11.5	39.1	36.8	56.5	27.2-31.9
		Universiti Pendidikan Sultan Idris	Malaysia	26.2	24.5	29.0	99.9	51.4	
		Polytechnic University of Valencia	Spain	24.5	19.0	39.9	47.4		27.2-31.9
		Pontifical Catholic University of Rio Grande do Sul (PUCRS)	Brazil	22.9	14.3	46.9	61.3		27.2-31.9
		Pontifical Catholic University of Rio de Janeiro (PUC-Rio)	Brazil	29.1	29.1	28.0	100.0		27.2-31.9
		Portland State University	United States	22.9	20.1	38.5	36.1	30.3	27.2-31.9
		Pusan National University	South Korea	31.8	30.4	24.3	45.6		27.2-31.9

								ook	
			_				<u>e</u>	International outlook	
			Country/region				Industry income	<u>a</u>	<u>e</u>
Rank 2022	Rank 2021	<u>uoi</u>	// re	£0	등	န	y in	tion	Overall score
<b>X</b> 2	* 2	<u>[필</u>	ıntrı	Spir	ear	章	ustr	rna	<u>=</u>
Ran	Ran	Institution	Con	Teaching	Research	Citations		Inte	Ove
801-1,000		Qingdao University	China	15.8	14.0	64.0	38.6	20.1	27.2-31.9
(continued)		University of Rennes 1	France	26.2	16.7	46.0	39.7	57.1	
	801-1,000	Rochester Institute of Technology	United States	20.5	19.1	42.4	36.2	41.1	27.2-31.9
		University of Roehampton	United Kingdom	20.6	21.0	38.3	35.0	80.6	27.2-31.9
	601-800	Ryerson University	Canada	20.2	28.9	36.3	37.7	56.4	27.2-31.9
	801-1,000	University of Salamanca	Spain	23.9	19.1	34.7	37.5	55.1	27.2-31.9
		University of Salento	Italy	23.2	19.3	52.1	36.9	28.5	27.2-31.9
		University of Salford	United Kingdom	20.5	16.3	42.1	36.3	71.6	27.2-31.9
		Universidad San Francisco de Quito	Ecuador	18.2	9.2	46.6	35.2	64.8	27.2-31.9
		University of Santiago de Compostela	Spain	23.8	12.0	47.6	39.0	46.0	27.2-31.9
		Savitribai Phule Pune University	India	35.0	26.2	32.8	36.2	16.4	27.2-31.9
		University of Science and Technology Beijing	China	25.2	26.4	35.0	63.7	21.9	27.2-31.9
		Shahid Beheshti University	Iran	25.2	26.4	40.5	50.4	21.6	27.2-31.9
		Shanghai University of Finance and Economics (SUFE)	China	24.3	13.6	38.9	39.0	42.8	27.2-31.9
		Shantou University Sheffield Hallam University	China United Kingdom	20.2 17.9	16.4 13.5	53.9 46.8	38.9 35.2	39.0 54.0	27.2-31.9 27.2-31.9
		Shiraz University	United Kingdom	24.7	23.9	37.1	35.2 44.4	22.1	27.2-31.9
		Shiraz University Shiraz University of Medical Sciences	Iran	37.2	10.9	41.0	34.8	18.9	27.2-31.9
		Sidi Mohamed Ben Abdellah University	Iran Morocco	24.6	9.3	54.9	34.8	23.0	27.2-31.9
		University of South Africa	South Africa	28.6	26.1	28.4	35.6	37.4	27.2-31.9
		University of South Bohemia in České Budějovice	Czech Republic	18.8	15.7	41.4	34.8	49.4	27.2-31.9
		South China Normal University	China	20.0	16.6	48.3	52.2	32.3	27.2-31.9
		University of South Dakota	United States	33.7	16.2	33.9	35.7	25.3	27.2-31.9
		South Valley University	Egypt	21.5	10.6	50.1	35.0	44.6	27.2-31.9
		St Francis Xavier University	Canada	16.8	8.5	48.7	35.7	54.5	27.2-31.9
		Sultan Qaboos University	Oman	23.9	15.0	43.4	39.3	74.4	27.2-31.9
		Symbiosis International University	India	17.4	9.9	53.0	35.1	30.4	27.2-31.9
	801-1,000	University of Szeged	Hungary	23.8	14.4	42.3	37.9	60.1	27.2-31.9
	NR	Technical University of Crete	Greece	13.7	11.0	55.0	39.6	43.6	27.2-31.9
	801-1,000	Technical University of Madrid	Spain	22.9	15.9	40.9	44.2	52.2	27.2-31.9
	1,001+	University of Technology, Iraq	Iraq	21.5	7.9	53.1	35.3	26.3	
		University of Tehran	Iran	32.8	12.0	46.5	34.8	26.6	
		Teikyo University	Japan	16.1	10.8	69.0	35.8	21.6	27.2-31.9
		Universiti Tenaga Nasional (UNITEN)	Malaysia	18.9	14.9	46.9	91.0		27.2-31.9
		University of Texas at El Paso	United States	20.6	24.4	38.5	34.8	42.7	27.2-31.9
		University of Texas Rio Grande Valley	United States	17.3	11.4	53.2	35.2	34.5	27.2-31.9
		University of Thessaly	Greece	16.3	15.6	57.5	38.6	39.8	27.2-31.9
		Tomsk Polytechnic University	Russian Federation	30.1 20.6	20.8	22.4 33.6	65.1 34.8	59.8 43.4	27.2-31.9 27.2-31.9
		University of Trás-os-Montes and Alto Douro Tribhuvan University	Portugal Nepal	12.4	7.9	67.8	34.8	45.6	27.2-31.9
		VIT University	India	22.3	15.0	45.4	36.8	27.0	27.2-31.9
		Veltech University	India	16.4	8.6	59.0	36.2	25.2	
		Vilnius University	Lithuania	21.3	16.9	41.4	44.2	56.1	27.2-31.9
		Waseda University	Japan	31.6	24.3	24.4	39.7	44.1	27.2-31.9
		University of Westminster	United Kingdom	17.9	17.9	38.0	35.4	83.1	
		Wuhan University of Technology	China	20.2	15.2	46.2	54.5	24.6	27.2-31.9
		Xidian University	China	22.6	19.4	36.9	80.1	21.4	27.2-31.9
		Yasouj University	Iran	15.3	14.4	63.8	38.0	17.3	27.2-31.9
	801-1,000	Yeungnam University	South Korea	20.1	14.1	50.6	41.1	39.5	27.2-31.9
	1,001+	Zagazig University	Egypt	14.2	8.2	60.7	34.8	42.1	27.2-31.9
		Zewail City of Science and Technology	Egypt	21.1	15.6	54.7	47.6	28.4	
	NR	Zhejiang University of Finance and Economics	China	14.6	10.6	61.7	35.3		27.2-31.9
		NR = n	ot ranked. The full list o	of more than 1,	600 universi	ties is publis	shed on our	website www	.thewur.com



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### The breakdown

From the information that we are provided by institutions across the globe, we rigorously build up our World University Rankings. This is how we assess data on more than 1,600 institutions to produce the tables

The *Times Higher Education* World University Rankings are the only global performance tables that judge research-intensive universities across all their core missions: teaching, research, knowledge transfer and international outlook. We use 13 carefully calibrated performance indicators to provide the most comprehensive and balanced comparisons, trusted by students, academics, university leaders, industry and governments.

The performance indicators are grouped into five areas: **TEACHING** (the learning environment); **RESEARCH** (volume, income and reputation); **CITATIONS** (research influence); **INTERNATIONAL OUTLOOK** (staff, students and research); and **INDUSTRY INCOME** (knowledge transfer).

#### **Exclusions**

Universities can be excluded from the World University Rankings if they do not teach undergraduates, or if their research output amounted to fewer than 1,000 relevant publications between 2016 and 2020 (with a minimum of 150 a year). Universities can also be excluded if 80 per cent or more of their research output is exclusively in one of our 11 subject areas.

#### **Data collection**

Institutions provide and sign off their institutional data for use in the rankings. On the rare occasions when a particular data point is not provided, we enter a conservative estimate for the affected metric. By doing this, we avoid penalising an institution too harshly with a "zero" value for data that it overlooks or does not provide, but we do not reward it for withholding them.

#### **Getting to the final result**

Moving from a series of specific data points to indicators, and finally to a total score for an institution, requires us to match values that represent fundamentally different data. To do this, we use a standardisation approach for each indicator, and then combine the indicators in the proportions shown to the right.

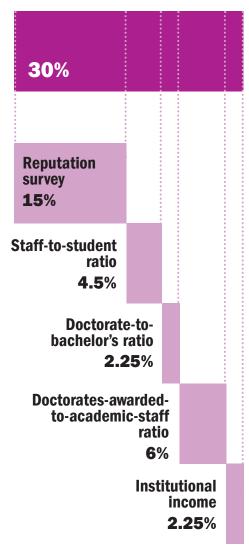
The standardisation approach we use is based on the distribution of data within a particular indicator, where we calculate a cumulative probability function, and evaluate where a particular institution's indicator sits within that function.

For all indicators except for the Academic Reputation Survey, we calculate the cumulative probability function using a version of Z-scoring. The distribution of the data in the Academic Reputation Survey requires us to add an exponential component.



### Teaching

(the learning environment)



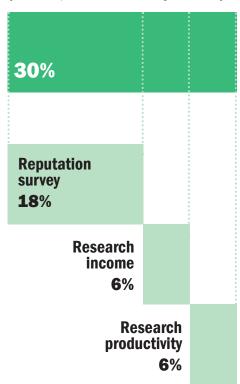
The most recent Academic Reputation Survey (run annually) that underpins this category was carried out between November 2020 and February 2021. It examined the perceived prestige of institutions in teaching and research. The responses were statistically representative of the geographical and subject mix of academics globally. The 2021 data are combined with the results of the 2020 survey, giving almost 22,000 responses.

As well as giving a sense of how committed an institution is to nurturing the next generation of academics, a high proportion of postgraduate research students also suggests the provision of teaching at the highest level that is thus attractive to graduates and effective at developing them. This indicator is normalised to take account of a university's unique subject mix, reflecting that the volume of doctoral awards varies by discipline.

Institutional income is scaled against academic staff numbers and normalised for purchasing-power parity (PPP). It indicates an institution's general status and gives a broad sense of the infrastructure and facilities available to students and staff.

### Research

(volume, income and reputation)



The most prominent indicator in this category looks at a university's reputation for research excellence among its peers, based on the responses to our annual Academic Reputation Survey (see left).

Research income is scaled against academic staff numbers and adjusted for purchasing-power parity (PPP). This is a controversial indicator because it can be influenced by national policy and economic circumstances. But income is crucial to the development of world-class research, and because much of it is subject to competition and judged by peer review, our experts suggested that it was a valid measure. This indicator is fully normalised to take account of each university's distinct subject profile, reflecting the fact that research grants in science subjects are often bigger than those awarded for the highest-quality social science, arts and humanities research.

To measure productivity we count the number of publications published in the academic journals indexed by Elsevier's Scopus database per scholar, scaled for institutional size and normalised for subject. This gives a sense of the university's ability to get papers published in quality peer-reviewed journals. Last year, we devised a method to give credit for papers that are published in subjects where a university declares no staff.

### **Citations**

(research influence)

30%

Our research influence indicator looks at universities' role in spreading new knowledge and ideas

We examine research influence by capturing the average number of times a university's published work is cited by scholars globally. This year, our bibliometric data supplier Elsevier examined more than 108 million citations to 14.4 million journal articles, article reviews, conference proceedings, books and book chapters published over five years. The data include more than 24,600 academic journals indexed by Elsevier's Scopus database and all indexed publications between 2016 and 2020. Citations to these publications made in the six years from 2016 to 2021 are also collected.

The citations help to show us how much each university is contributing to the sum of human knowledge: they tell us whose research has stood out, has been picked up and built on by other scholars and, most importantly, has been shared around the global scholarly community to expand the boundaries of our understanding, irrespective of discipline.

The data are normalised to reflect variations in citation volume between different subject areas. This means that institutions with high levels of research activity in subjects with traditionally high citation counts do not gain an unfair advantage.

We have blended equal measures of a country-adjusted and non-country-adjusted raw measure of citations scores.

In 2015-16, we excluded papers with more than 1,000 authors because they were having a disproportionate impact on the citation scores of a small number of universities. In 2016-17, we designed a method for reincorporating these papers. Working with Elsevier, we developed a fractional counting approach that ensures that all universities where academics are authors of these papers will receive at least 5 per cent of the value of the paper, and where those that provide the most contributors to the paper receive a proportionately larger contribution.

### International outlook

(staff, students, research)

7.5%

Proportion of international students

2.5%

Proportion of international staff

2.5%

International collaboration

2.5%

The ability of a university to attract undergraduates, postgraduates and faculty from all over the planet is key to its success on the world stage.

In the third international indicator, we calculate the proportion of a university's total relevant publications that have at least one international co-author and reward higher volumes. This indicator is normalised to account for a university's subject mix and uses the same five-year window as the "Citations: research influence" category.

### Industry income

(knowledge transfer)

2.5%

A university's ability to help industry with innovations, inventions and consultancy has become a core mission of the contemporary global academy. This category seeks to capture such knowledge-transfer activity by looking at how much research income an institution earns from industry (adjusted for PPP), scaled against the number of academic staff it employs.

The category suggests the extent to which businesses are willing to pay for research and a university's ability to attract funding in the commercial marketplace – useful indicators of institutional quality.

For more information on the methodology, visit www.thewur.com



## **Center of Smart Cities**

- Six-hectare campus
- 180,000 students
- 350,000 trips per day
- Its Center of Smart Cities has:
  - Reduced queues on campus from 50 to 20 minutes
  - Rescheduled classes to help students avoid peak travel periods
  - Developed 3D models to help students navigate KAU's campus

### **Making smart cities a destination**

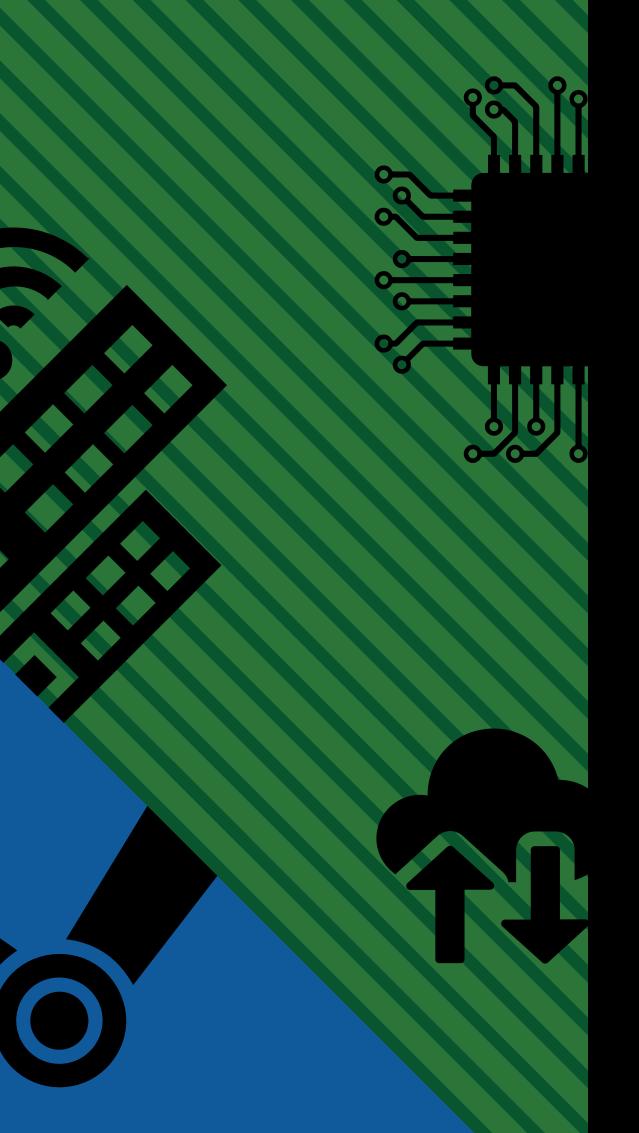
As one of the largest higher education institutions in the Kingdom of Saudi Arabia, King Abdulaziz University is utilising new strategies and technologies to build for the future at its Center of Smart Cities.

Having improved transport, reduced pollution and developed 3D models to enhance the student experience on its six-hectare site in Jeddah, its researchers are pioneering intelligent solutions for university campuses and beyond.









190<sup>TH</sup>

WORLD UNIVERSITY RANKINGS 2022\*

**46**<sup>TH</sup>

OVERALL SDG RANKING 2021\*

**1**ST

OVERALL ARAB RANKINGS 2021\*

**2**ND

SOCIETY PILLAR ARAB RANKINGS 2021\*

3<sup>RD</sup>

REDUCED INEQUALITIES SDG RANKING 2021\*

**28**<sup>TH</sup>

THE GOLDEN AGE RANKINGS 2020\*

 $126-150 \\ \text{ENGINEERING AND}$ 

TECHNOLOGY RANKING 2020\*

101 - 200

SUSTAINABLE CITIES AND COMMUNITIES RANKING 2020\*

\*TIMES HIGHER EDUCATION

The rise of East Asian universities – and particularly those in China – is frequently cited as one of the most significant global higher education trends over the past 10 years. But these charts show that there are several other regions and nations that are making progress and could be ones to watch over the next decade.

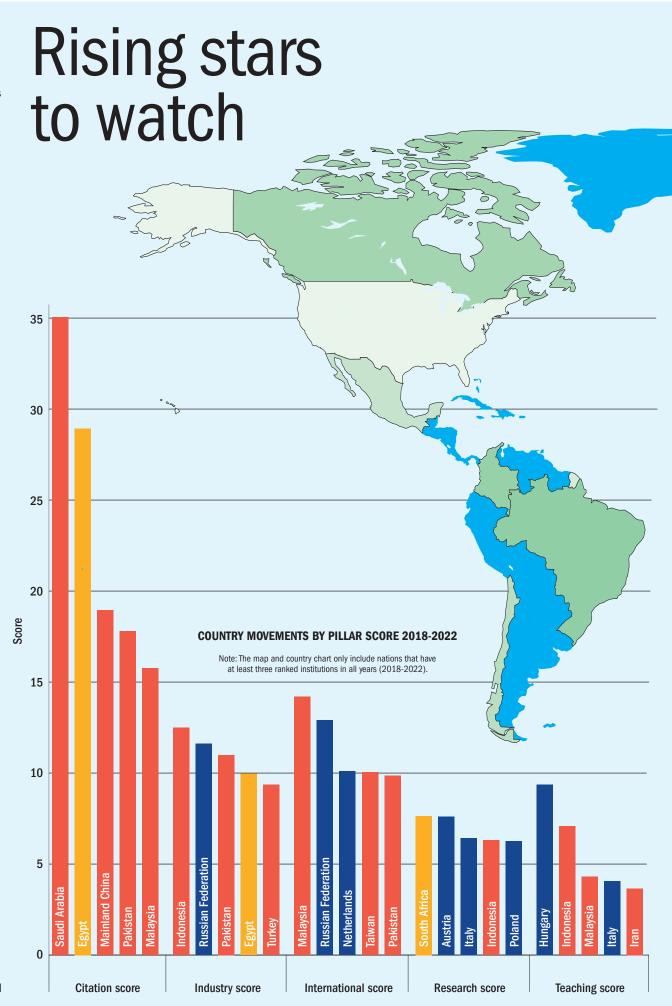
The bar chart on the right shows the average pillar score change for each continent between the 2018 and 2022 editions of the Times Higher **Education World University** Rankings. The data show that universities in Africa have made the most progress overall, largely driven by their significant improvement in citation impact (an area where North America has declined). as well as rises in their scores for research environment and industry income. However, African universities made the least progress of all the continents in international outlook.

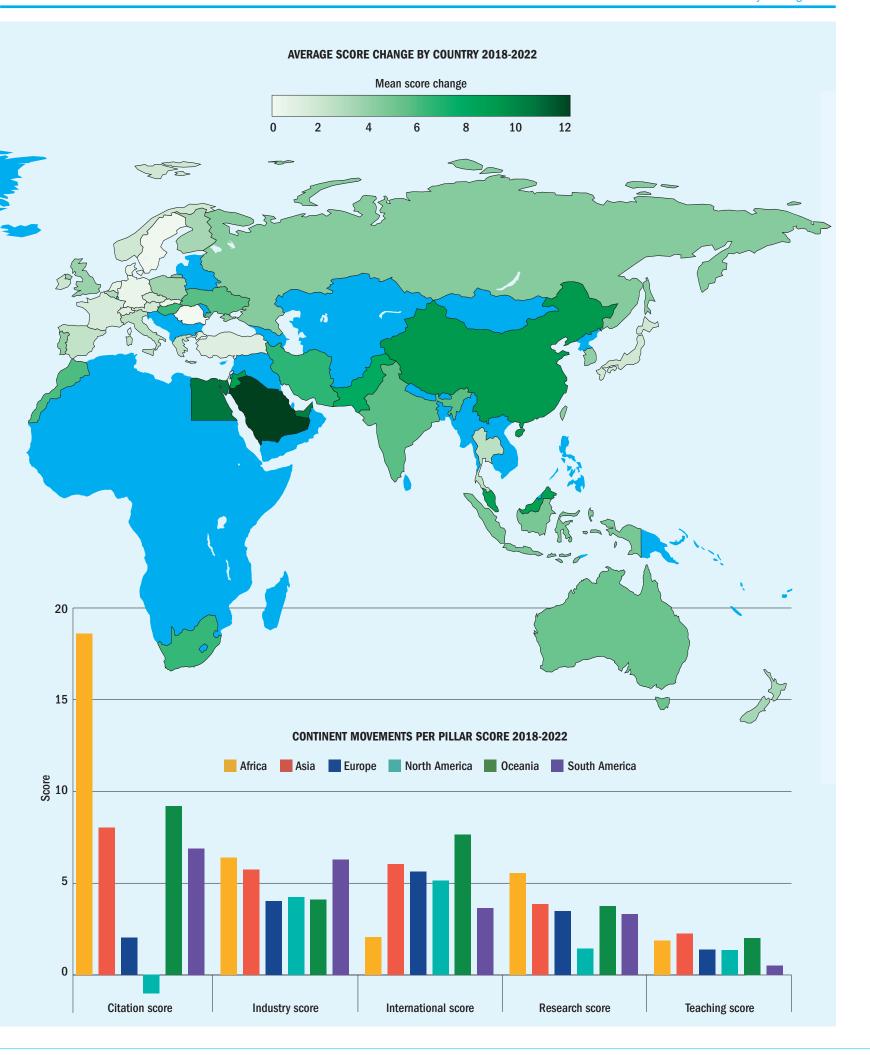
African universities also have a higher average overall score than Asian universities (although there are far more Asian universities in the ranking), suggesting that Africa's progress is not solely attributable to the amount of room for improvement.

The other charts provide more detail, revealing the countries that have improved the most. In the map, which shows the average score change by country between 2018 and 2022, Saudi Arabia and Egypt are the biggest risers overall, with both countries making more progress than mainland China since 2018.

The bar chart on the left, which shows the countries that have risen the most on average in each pillar, reveals that Saudi Arabia's and Egypt's improvements are mainly a result of a large citation impact boost, while Egypt's industry income score has also risen. Pakistan, Malaysia and Indonesia also stand out as countries that are making progress in several areas.

Ellie Bothwell





### Inclusion, diversity and equity: drivers for change during the pandemic

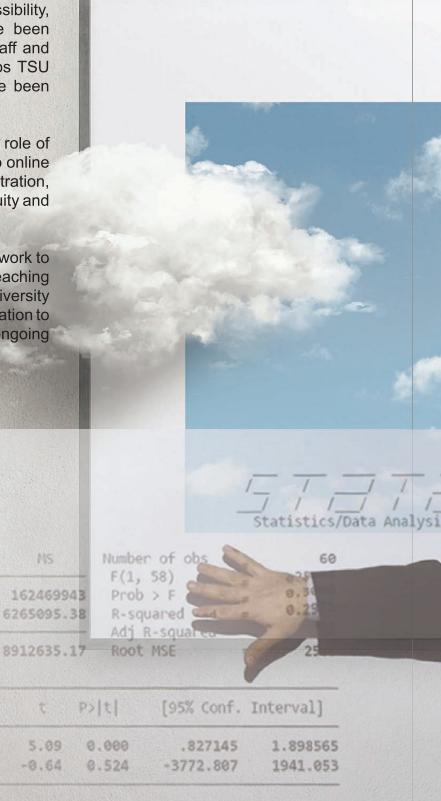


www.tsu.edu.ge

For Tbilisi State University (TSU), the Covid-19 pandemic was an opportunity to create a strategy that prioritises accessibility, equity and inclusion. Areas of particular focus have been curricular changes, inclusive assessment, upskilling staff and students, and financial and material support. The steps TSU took to ensure accessibility, inclusion and equity have been carefully planned, delivered and continuously monitored.

The pandemic has changed the global agenda and the role of academia. During the disruption, TSU quickly pivoted to online delivery for its 238 programmes, supporting administration, research and student services - all while keeping continuity and quality in mind.

TSU also shifted the aim of its community development work to focus on sharing knowledge and best practice in online teaching with other Georgian higher education institutions. The university hosted webinars on subjects ranging from internationalisation to inclusion, with the aim of contributing to Georgia's ongoing development.



## THEunijobs

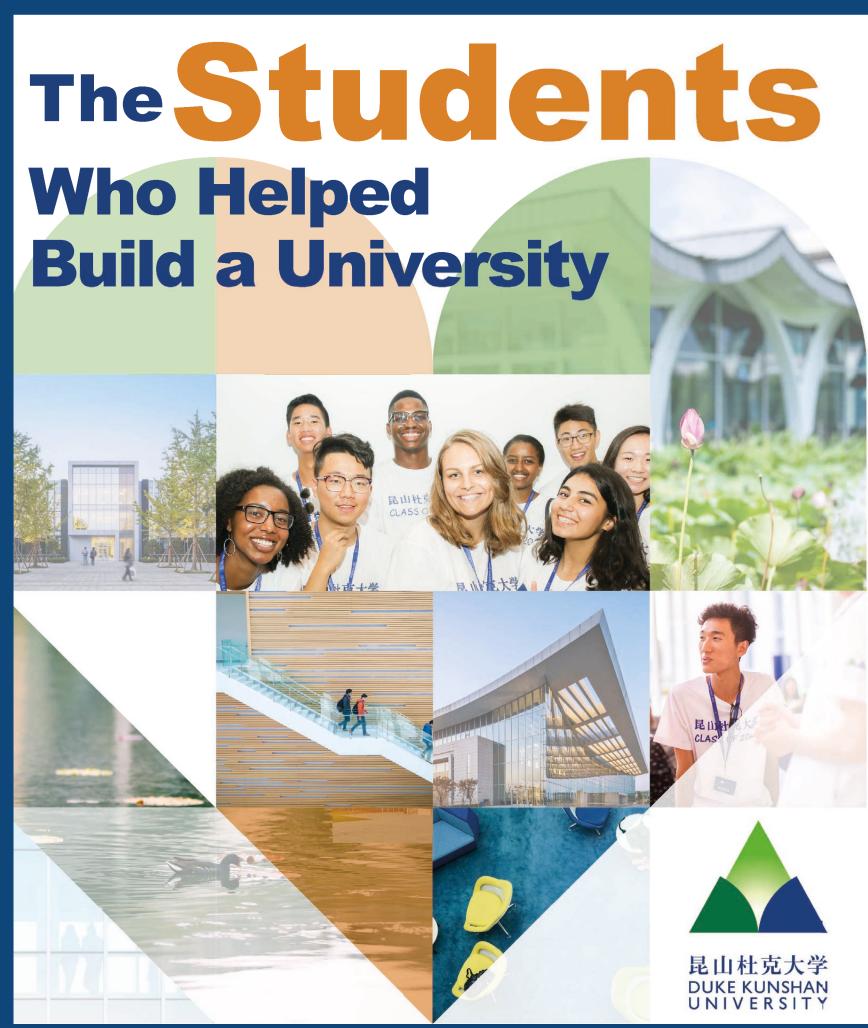
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Scan the QR code to learn more about Duke Kunshan University

Duke Kunshan University – a partnership of Duke University and Wuhan University – provides pioneering students with the rare opportunity to shape the culture and traditions of a young and innovative liberal arts university.

rowing up in El Salvador, Alberto Najarro had dreamed of studying at a US university with a long, illustrious history. When the time came, he opted to make history instead.

Najarro was among the 266 students who, in 2018, formed the inaugural undergraduate class at Duke Kunshan University (DKU), a China-US joint venture located in Kunshan, China.

Co-founded by Duke University and Wuhan University, two globally recognised institutions, DKU provides students with the rare opportunity to shape the culture, practices and traditions at a young and innovative liberal arts university.

"DKU gives me a sense of participation in building the ideal university with my own hands. No other university could challenge me that way," said Najarro, who will graduate next spring in the class of 2022.

DKU accepted its first students in August 2014, initially offering master's programmes along with a study-away programme for undergraduates from Duke University and other top institutions. In 2018, the university launched a four-year bachelor's degree that follows the liberal arts and sciences tradition, with an emphasis on critical thinking, creativity, collaboration and self-exploration. Graduates receive dual degrees from DKU and Duke University.

This year, the bachelor's programme enrolled its largest and most diverse class yet, taking the total number of undergraduates to almost 1,300. Students come from more than 60 countries across six continents.

"DKU is a vibrant intellectual community of scholars from all over the world," said Marcia France, dean of undergraduate studies at the university. "Students learn as much from their peers as from their instructors. They don't just sit in a classroom passively listening to a lecture. They are active participants in their own education, getting out into the surrounding area on class trips, attending talks by guest speakers who are experts in their disciplines,



studying away at Duke, and doing research, internships and experiential learning activities."

DKU's pioneering scholars have redefined what it means to be a global community. In their first year, the inaugural class of 2022 established 40 student clubs and organisations. Through individual efforts, collaboration with classmates, students and faculty at other universities, and work with industry professionals, DKU's undergraduates have supported the university's interdisciplinary mission on campus and beyond. Its students have published research in leading journals, won international competitions and coveted scholarships and internships, and exhibited their creative work on the world stage.

For example, Ege Duman, a molecular bioscience major from Turkey, has co-written academic papers with professors on topics ranging from artificial intelligence to the ethics of compensation for living kidney donors. In 2020, he received a place in the Amgen Scholars programme, allowing him to explore cutting-edge science and biotechnology research alongside experts at Tsinghua University.

Meanwhile, students in the arts and humanities have organised exhibitions on-campus and around Kunshan. They have presented research, documentaries, short films, photography and art at festivals, conferences and other events around the world.

During the Covid-19 pandemic, DKU students have shown agility and resilience in adapting to the challenges of online classes and supporting their local communities. DKU launched a comprehensive online teaching and learning strategy in February 2020 after only three weeks of preparation. "It wasn't an easy transition to make," said Scott MacEachern, vice-chancellor for academic affairs at DKU. "Our faculty worked extremely hard to guarantee that all our online courses are engaging and fruitful." In-person classes

resumed for students on campus in autumn 2021, but most international students had to continue their studies remotely, with some based at the Duke campus in Durham, North Carolina.

Early in the pandemic, a group of students from around China displayed the DKU spirit by raising almost RMB 400,000 (£44,600) to supply essential medical equipment to front-line doctors and nurses in Wuhan. Organisers of the inclusive DKU Arts and Music Festival, first held in 2019, also found innovative solutions to ensure the annual event continued in a hybrid format, with engaging online components for those unable to take part in person. And, although separated by thousands of miles, the class of 2022 has formed the core of winning teams in two high-profile international competitions this year: the Emory Global Health Case Competition and Georgetown University's US-China Student Challenge.

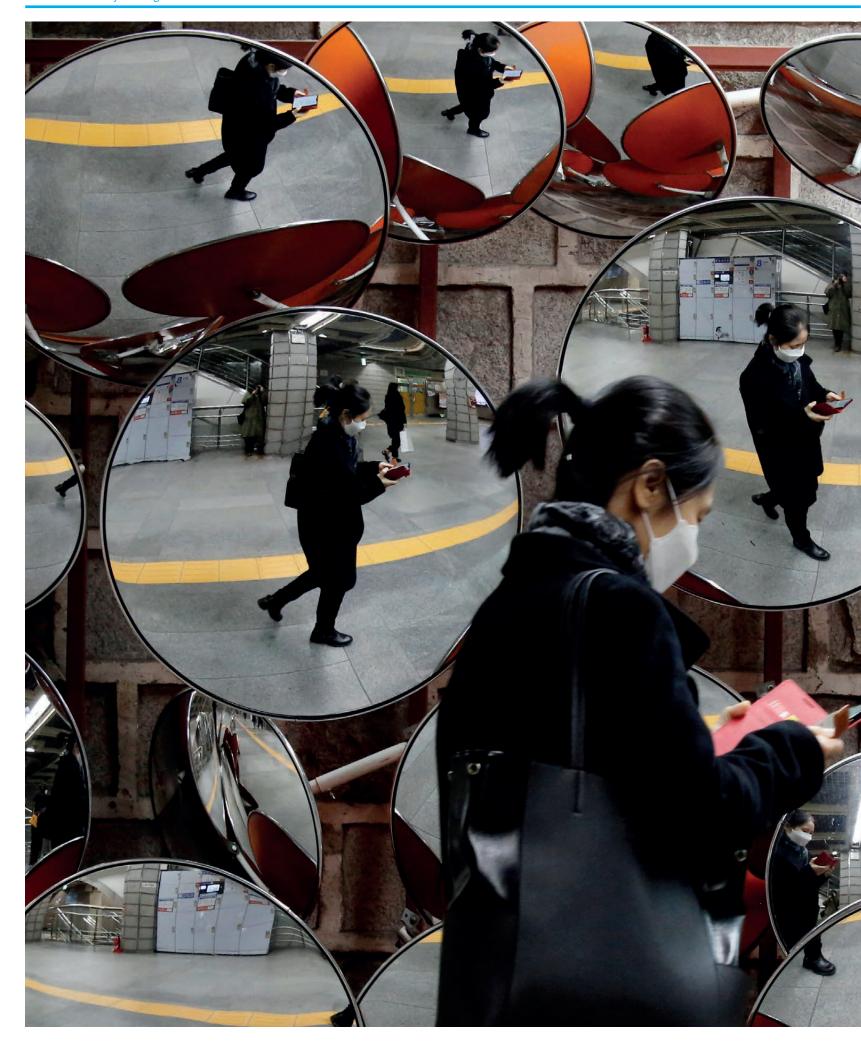
The disruption brought about by the pandemic has even inspired some students to explore new interests, like Zikang Jia from east China, who applied mathematical modelling to gauge Covid-19's impact on air pollution. He presented his research at the European Geosciences Union General Assembly, the most influential conference of its kind, in Vienna. Unable to travel to DKU because of international travel restrictions, Catherine Brenner, from the US, began studying at the Duke University Marine Lab. She went on to earn a spot in the Rachel Carson Scholars Programme, in which students work with leading experts in marine science and conservation.

Wherever they are in the world, the inaugural class of 2022 have made DKU their home.

"They have made this campus their own, a real community," said Vincent Price, president of Duke University, during a visit to the campus in 2019.

"They are united with faculty and university staff as pioneers on a wondrous new educational journey."











### Into the great beyond

We must build education and research on an embrace of others and a regard for diversity that does not stop at the campus gate, says Teruo Fujii



**Teruo Fujii**President, University of Tokyo

hen I assumed the presidency of the University of Tokyo (UTokyo) in April, the Covid-19 pandemic was continuing to rage in Japan and throughout the world. For more than a year, our students, like many others, have had to make the difficult adjustment to online classes and try to pursue their academic endeavours despite restricted access to campus.

The pandemic has revealed more clearly than ever the paradox of globalisation. While the worldwide circulation of people, goods and information has brought us together in some ways, it has also increasingly fragmented human society along the lines of nationality, race, gender, religion and income. Our increasing proximity to others has simultaneously created deeper divisions among us. The rapid global spread of the virus and our immediate need to isolate ourselves is symbolic of our era, when borders and boundaries are easily crossed by some and yet sealed for others.

One important lesson from the pandemic for institutions of higher education is that we must rediscover the value of listening to the voices and feelings not only of those around us but also of those beyond our campuses, regions and national boundaries. The immediate need to distance ourselves from others – from our students, colleagues, friends and even families – has made us acutely realise how

precious they all are. As the president of Japan's leading national university, I am determined to create a campus environment where every member of our university community acknowledges the value of others and becomes fully committed to engaging in dialogue. Our education and research must be premised on this embrace of others and the appreciation of diversity.

These values are particularly resonant for UTokyo. For many years, our institution has struggled to attract talented female students and faculty. And while we have been fortunate to welcome increasing numbers of international students – they now make up 15 per cent of our student body – there is still much more we can do to attract young people from all over the world. We also want to welcome more researchers from abroad to join our numerous cutting-edge research projects.



In terms of gender, UTokyo's campus environment unfortunately still reflects the overall social dynamics of Japanese society, which is ranked 120th out of 156 countries in the World Economic Forum's Global Gender Gap Index. We have already been working to remedy our gender imbalance through various policies, including providing housing subsidies to female undergraduates and allocating special research funds for female faculty. In my first act as president, I appointed new executive vice-presidents so that a majority of UTokyo's nine-member board is female. This reflects my commitment to creating a management team that incorporates diverse ideas and expertise from both inside and outside the university. This move may not seem so special to the rest of the world, but it attracted considerable attention in Japan. It marked the first time that any national university in Japan achieved gender parity in its executive line-up. I am determined to do much more during my tenure.

or my six-year term, I am preparing a vision statement to be called "UTokyo Compass". It will cover a range of issues, from education to research to management, but the unifying theme will be my unwavering commitment to advocating dialogue among people and organisations with different



values and ideas and creating a diverse, inclusive and empathic community.

For example, while continuing to support students' learning experiences on campus, I will also encourage them to engage more closely with the larger society. I want them to leave their comfort zones and confront directly the challenging issues of the day, including gender equity and environmental protection. They can then bring their experiences back to campus to further enrich their study in our classrooms and laboratories. To this end, the university will strengthen our experiential activity programmes in collaboration with partner corporations, NGOs, NPOs and other organisations. Those on-site learning experiences will help to create a pedagogical synergy between our campuses and society.

I will also promote more collaborations with industry. While maintaining our valued traditions of academic independence and integ-

rity, we will reach out more to corporations that share and support our values of dialogue and diversity. We plan to support more young tech entrepreneurs from various backgrounds who are committed to changing the world. There are already about 400 UTokyoaffiliated start-ups, with the top five alone having a combined market value of more than \$12 billion (£8.7 billion). I hope to increase this number to 700 firms, with the goal of raising another \$10 billion in start-up capital over the next 10 years. By strengthening this synergy with industry, I will make our university an essential and responsible contributor to the global economy.

Finally, as an engineer by training, I am deeply committed to using our understanding of the world to enable better and more responsible management of our planet. UTokyo's Center for Global Commons, established last year, has launched discussions about stewardship of internationally shared

resources. This endeavour requires us to commit ourselves not only to other people but to animals, plants and other living things. I will push for continuation of this robust dialogue to advocate for an environment that is more hospitable for every species on our planet.

s I write this article, the pandemic continues to rage in many parts of the world. Here in Japan, we are still keeping socially distant from each other while our borders remain tightly controlled. The on-screen interactions with my colleagues and students inside and outside Japan are convenient, but like many, I also long for more direct encounters. As we emerge from the pandemic, I hope we will remember this strange feeling of both proximity and distance and reflect on the importance of engaging with others in sincere dialogue to create a better university and a healthier earth for all.

I want students
to leave their
comfort zones and
confront directly the
challenging issues
of the day, including
environmental
protection

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## Learning lifelong habits

Universities recognise the need for flexible and continuing education but are still seeking the most appropriate strategy. Anna McKie reports

The pandemic brought disruption and chaos to education around the world, but experts and leaders have sought out silver linings from the switch to online learning, hoping to find positive lessons for the future of education.

Experts say that one benefit is likely to be a greater emphasis on lifelong learning, allowing students access to education throughout their lifetime.

William Locke, director of the Melbourne Centre for the Study of Higher Education at the University of Melbourne, says that "for most universities, lifelong learning – usually described as 'continuing education' – has seldom been a core activity, as their focus has been on full-time undergraduate and taught postgraduate courses".

However, the pandemic, and the switch to online learning and homeworking, "will increase the demand for shorter, work-related courses with clear benefits to learners in employment and those wanting to change their careers", he says.

"There is no doubt it will rise up the agenda," Locke adds. Already "many universities have flirted with developments such as short courses, Moocs [massive open online courses] and microcredentials because they recognise that lifelong learning will become the norm and these are ways to dip their toes in the water. However, whether the quality and volume of current provision is sufficient to meet these needs remains to be proven."

The pandemic has already prompted some universities to focus their efforts into improving their lifelong-learning offerings. Last year, UNSW Sydney announced plans to entrench lifelong learning as a "new chapter" in its history, while allowing staff and students to continue working remotely after

the pandemic passes. The flexible working and study arrangements will free up an estimated 22,000 square metres of lecture theatres and offices and enable community organisations, business and industry to work on campus directly with academics.

Chris Styles, dean of the UNSW Business School, says that even before the pandemic, the world of work was "constantly changing... driven by new technologies as well as social change and increasing customer expectations".

Covid-19 has accelerated the need for businesses to be able "to upskill and reskill at scale and quickly" as well as a desire for employees to have a "range of learning experiences and credentials beyond the traditional degree, and delivered in a flexible and targeted manner", he adds.

Styles says that the university is still working to ensure "we properly understand specific market needs and where the UNSW can best contribute". But he envisages that the institution will "deliver flexible, skill-focused learning experiences of perhaps shorter duration" as part of the plans.

ne institution with a jump on embedding lifelong learning into its education is the National University of Singapore (NUS), which implemented its Lifelong Learners programme, where undergraduates are enrolled for 20 years from the point of admission, in 2018.

Tan Eng Chye, president of NUS, says the programme was a response to the "widespread disruption and job displacement" caused by global "mega trends", such as digitalisation and artificial intelligence, sweeping rapidly across many sectors of the



economy and society.

"We need people to be more agile, nimble and multifaceted in the way they approach things, and in their skills and abilities. The only way they can learn new knowledge, upskill and reskill is to continually learn, as things change, over the span of 45 to 50 years of their working life," he says, adding that lifelong learning is central to future-proofing the NUS education experience.

To achieve this, the institution has implemented flexible ways of teaching and learning, ensuring that students are offered multiple pathways to a wide range of disciplines. NUS students are also taught a common curriculum, meaning they have a grounding in both science and humanities from the outset. Tan says this approach builds students' competencies and interests and helps "develop an enhanced emphasis on interdisciplinarity in teaching and research".

For NUS, a key element of lifelong education is close industry

The pandemic 'will increase the demand for shorter, work-related courses with clear benefits to learners in employment'



alignment. This also supports the Singaporean government's Industry Transformation Programme, which will see the development of road maps for 23 critical industries, such as manufacturing, built environment and healthcare.

However, while industry can be an important partner for lifelong-learning strategies, Locke warns that one of the problems for universities is "that they are competing – and collaborating – with commercial organisations that have very different cultures and ethos".

"Educational institutions can offer the academic and professional credibility, especially in assessment and accreditation. But, given their current financial and logistical constraints, can they invest sufficiently in the expertise and infrastructure required to really make a significant contribution to lifelong education?" he asks.

The recent announcement that 2U, an online education company, has paid \$800 million (£580 mil-

lion) to acquire edX, the non-profit platform founded by Harvard University and the Massachusetts Institute of Technology, has shown the success of online short courses and microcredentials in the commercial space. It also offers an insight into how universities can collaborate with for-profit companies to provide non-traditional offerings that are easier – and often cheaper – to access later in life.

One option, according to Locke, is for universities to draw on their alumni and industrial and professional networks to keep ahead of the changing nature of work and to anticipate future skills needs, although, he adds, that "in order to respond quickly to these changes, they would need to ensure that their curriculum approval processes are fast and efficient".

Jonathan Michie, professor of innovation and knowledge exchange at the University of Oxford and director of the institu-

tion's department for continuing education, agrees that flexibility and agility are key to implementing lifelong learning in university education.

The pandemic has shown that universities must "change their mind-set" and recognise that flexible learning is going to be the future, he says.

In the UK, the Westminster government has signalled it is ready to get on board, launching its Skills and Post-16 Education Bill, which will create a new "lifelong learning entitlement", allowing individuals flexible loan funding for four years of post-18 education, including for shorter, modular segments.

However, Michie says the bill will need amending to make it truly effective. For example, there is a strong emphasis on skills, but it fails to recognise that it is important that adult educators and people in the community should be able to decide for themselves what they want to learn. "Recognising this is good for democracy and good for

We need people to be more agile, nimble and multifaceted in the way they approach things

The optimal mix of online and short, intensive in-person education would need to be found for each target group of learners

TEACHING PILLAR								
Pillar rank	World University Rankings position	Institution	Country/region	Pillar score				
1	=2	Harvard University	United States	94.5				
2	=2		United States	93.6				
3	4		United States	92.3				
5	=16	. 0 )	China	91.4				
=6	1 =5			91.0				
=6	-5 =5	7	United Kingdom	90.9				
8	9	Massachusetts Institute of Technology United States Yale University United States		90.7				
9	7			89.5				
10		Tsinghua University China		88.1				
11	11			87.8				
12	10	The University of Chicago	United States	87.2				
13	=35	The University of Tokyo	Japan	86.9				
14	8	University of California, Berkeley	United States	85.7				
15	=13	University of Pennsylvania	United States	84.5				
16	20	, ,	United States	82.1				
17	15		Switzerland	81.3				
18		Imperial College London	United Kingdom	80.8				
19		Lomonosov Moscow State University Russian Federatio		80.3				
20		Johns Hopkins University United States		80.0				
=22	23	,		79.2 78.6				
=22	=24			78.6				
24	61	,		78.5				
25		University of Toronto	Canada	77.6				
26	=18	UCL United Kingdom		76.8				
27	21			76.3				
28	26	New York University United States		75.4				
29	=24	Northwestern University United States		74.3				
30	=54		South Korea	73.8				
31	=40	Paris Sciences et Lettres - PSL France Research University Paris		69.1				
32	29	University of Washington United States		68.8				
33	32		Germany	68.1				
34	27	and Political Science	United Kingdom	68.0				
=35	=42		Germany	67.9				
=35	47	,	United States	67.9				
37 38	33 =58	,	Australia United States	67.5 67.4				
39	=75	,	China	67.2				
40		Fudan University	China	66.8				
41	=30	·	Hong Kong	66.2				
42	=30	University of Edinburgh	United Kingdom	66.1				
43	48	University of Illinois at Urbana-Champaign	United States	65.7				
44	28	Carnegie Mellon University	United States	64.7				
45	38			64.5				
46	84	·		64.2				
47	=99	3 3 7		64.1				
48	=40	, .,	Switzerland	63.8				
49	=88	, 6,	China	63.4				
50	44	44 McGill University Canada						

communities," he says.

Former universities minister and conservative peer Jo Johnson has also criticised the bill for putting restrictions on the lifelong learning loan on non-STEM subjects and for failing to recognise the "economic value generated by the wider creative industries".

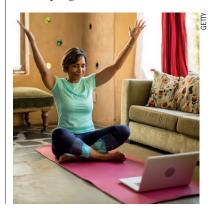
Michie adds that interdisciplinarity is central to upskilling and says that moving towards more bite-sized chunks and accreditation of smaller courses will make it much easier for students to gain a wider range of knowledge and competencies.

"What is needed is for universities to develop lifelong-learning strategies across the whole university. Currently, a lot pay lip service to lifelong learning without having a proper strategy," he says.

Michie says the starting point for universities should be recognising that they will be teaching people of different ages and different experiences.

Locke agrees. "The optimal mix of online and short, intensive inperson education would need to be found for each target group of learners, including a considerable amount of choice to meet individuals' preferences and to suit their circumstances," he says. "This would include opportunities for synchronous (real time) and asynchronous learning, especially when reaching learners in other time zones."

However, ultimately it is "the quality of the teaching staff that will make all the difference" to the success of a university's move to lifelong learning, Locke concludes. "How current their knowledge and experience is, how expert they are in using the new technologies, whether they have reasonable workloads and time to refresh their knowledge and expertise, and if they have access to professional development opportunities and career progress."



### **LPU Makes India Proud!**

It is among the 3 Indian universities, ranked in the top 200 universities globally



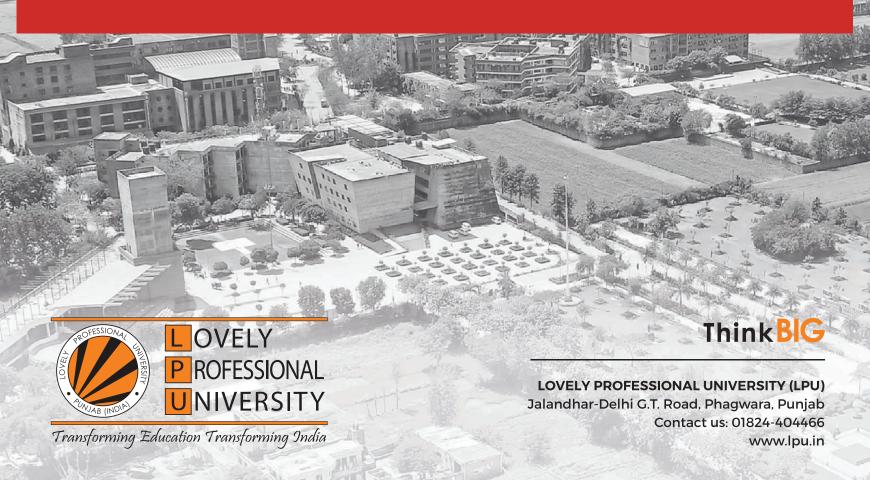
Times Higher Education Impact Rankings 2021

LPU is ahead of all the Participating IITs & NITs in THE Impact Rankings 2021

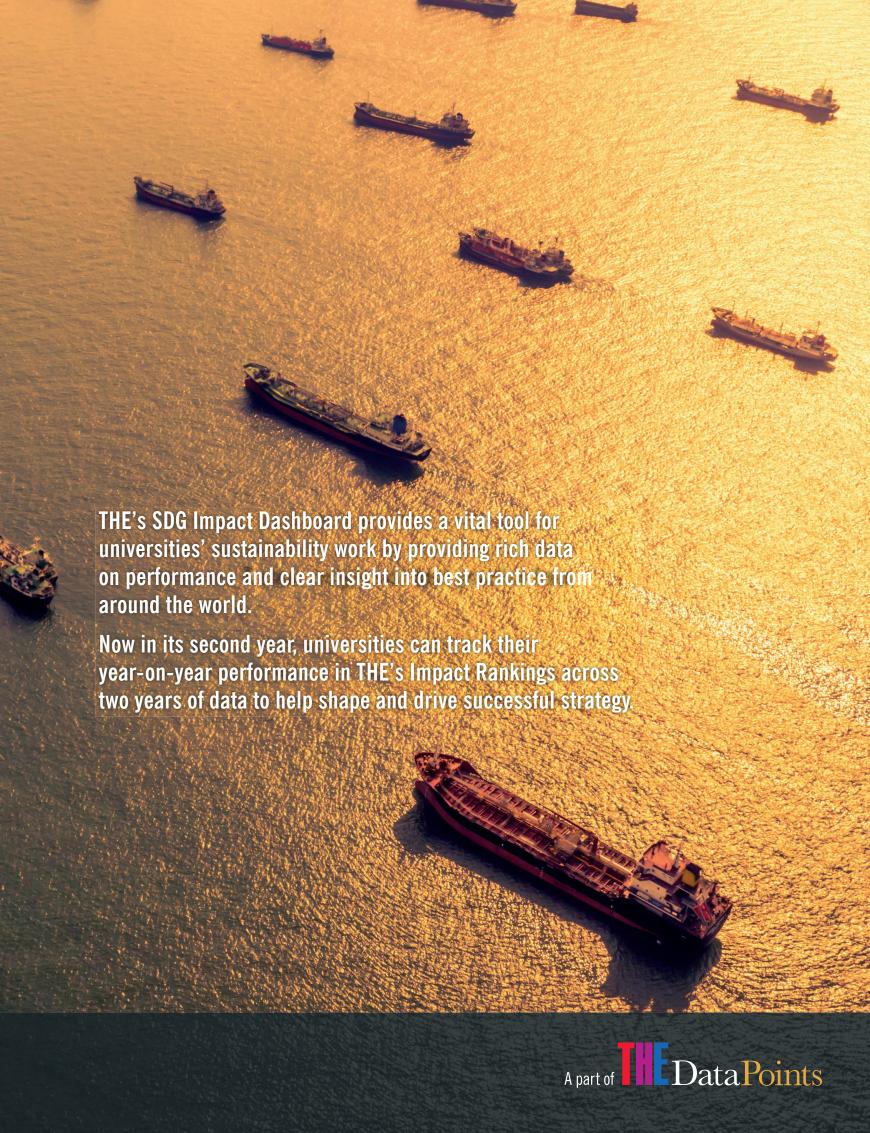
### Nearly 10% of the Indian Olympic participants are LPU students

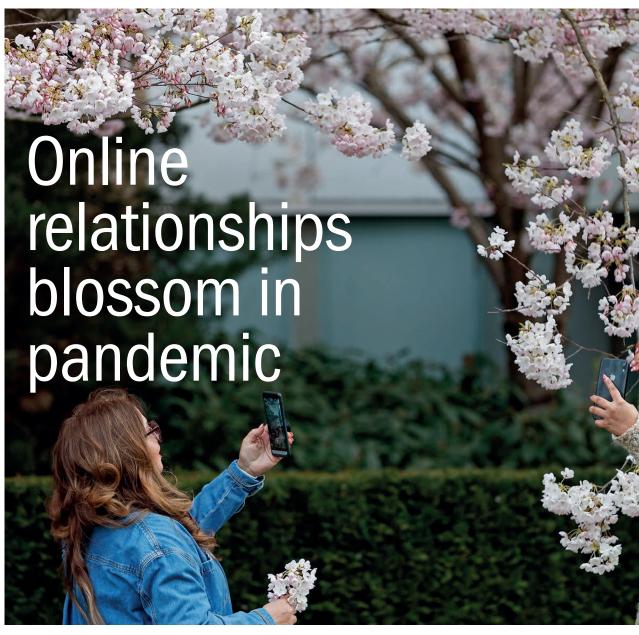
11 LPU students are participating in Tokyo Olympics 2020











### With conferences on hold, novel ways of collaborating took off – from preprints and digital networks to Al-backed matchmaking, writes Jack Grove

A cademic conferences should, in some eyes, have disappeared a long time ago. After all, in a digital age where scholarly papers can be emailed and lectures streamed online, flying hundreds of miles to listen to a series of talks seems like a time-consuming and costly rigmarole.

But the old model of in-person scholarly events has proved surprisingly resilient, perhaps because meeting academic peers in person remains an effective way to discuss, debate and scrutinise unpublished work. As the nuclear scientist Robert Oppenheimer memorably put it: "The best way to send information is to wrap it up in a person."

Then the pandemic hit. Huge conferences were quickly axed as international travel was largely halted, leaving scholars to find new ways to network and collaborate while confined to their homes. Various online meetings have sprung up in their place, but the biggest shift in scholarly communication has been the rise of preprints, with almost 3,900 non peer-reviewed papers posted on the bioRxiv site in May 2020, roughly 10 times the volume submitted four years earlier and almost double the number submitted a year before; overall, some 30,000 Covid-related preprints were shared in 2020 alone.

For many scientists, the opportunity to see emerging research at an early stage has been revelatory, allowing them to compare their own work against similar studies in their field. That was the case for Josh Hardy, research associate at

Monash University's Biomedicine Discovery Institute, who realised that a preprint that pinged into his inbox covered similar ground to his own team's work on the structure of chimeric viruses. Rather than compete to see who could publish their work first, the Monash and the University of Oxford papers – which used different approaches but converged on the same unexpected result – were submitted together, an approach that helped to strengthen the robustness of each team's findings.

"Preprints can establish a dialogue between research groups as well as highlight the uniqueness of their work – some of the research will be very similar, but there may be other findings that are different or unique to one group," reflects

Researchers who develop new tools and methodologies can also post preprints to get the word out early



Hardy on how preprints might lead to enhanced collaboration in future.

He adds that greater use of preprints will allow deeper collaboration at an earlier stage; in his case, without the preprint, the two papers would not have been compared until after publication - a process lasting months, if not years.

"While papers are being submitted and reviewed, their unique elements can be enhanced so the end result is two papers which still have overlap and independent validation but also novel components," he says. "Even without a direct collaboration, each group can review their own paper in light of the other and re-evaluate their findings.

"Researchers who develop new tools and methodologies can also post preprints to get the word out early," says Hardy, who explains that sharp-eyed scientists have ended up collaborating with those behind the new tools to test their



effectiveness. "In some cases, the collaborative paper is published before the initial method paper is published," he adds.

"These trends were already developing prior to Covid-19, but the pandemic certainly acted as a catalyst for the biomedical sciences as researchers have seen the opportunities and possibilities with preprints," says Hardy.

aving this torrent of preprints flooding scientific literature creates problems as well as opportunities, says Emily Gurley, an infectious disease epidemiologist at Johns Hopkins University, who is part of the Novel Coronavirus Research Compendium, an effort by more than 50 scientists, clinicians and students associated with the Baltimore university to sift through the Covid literature to highlight original and high-quality research.

"We would often select a paper for review that was getting a lot of press, or if we saw decisions made around them, to assess the significance of their results," says Gurley.

The short critiques of papers summarising their strengths and weaknesses would not only inform the public about their robustness but also flag whether researchers and clinicians should take them seriously, she adds. "We were able to assess whether this was a really useful method that researchers should keep up with and help clinicians understand the strengths and limitations of a study."

This project, initially funded by billionaire Michael Bloomberg's philanthropy, is now being supported by eLife, the non-profit open access publisher that has introduced a new system of "refereed preprints", in which electronic papers on medRxiv are publicly reviewed by clinicians and academics.

Glowing evaluations of preprints can, however, be easily lost amid the constant stream of new papers, making it hard for researchers to spot the one that might enhance their own work, says Paul Shannon, head of technology at eLife, whose Sciety network aims to surface useful preprints for the scientific community.

"We have been seeing over 100 preprints a day, but only one of those might be important for your work. If someone you respect has highlighted someone's work, it gives you an idea that this could be interesting for you," he says.

"It's happening already with Twitter, but we want to bring it together properly for the scientific community.'

With scholars able to cluster around high-quality preprints, they have met online to discuss a paper's various merits and how they might work together on related topics, says Shannon, adding that 20 different groups of researchers were now connecting in this way.

"At the early meetings, it used to be just a handful of people. But now we're seeing over 100 turning up," he says of the newly formed research communities. "I wonder whether they will feel the need to return to in-person events if this digital option is there."

onnecting with business on research activities has also been tricky for researchers during the pandemic. According to a report by the National Centre for Universities and Business (NCUB), 45 per cent of UK universities stated that their innovation-focused activities with external partners had dropped in lockdown, with alliances with automotive and aerospace sectors hardest hit, down

We were able to help clinicians understand the strengths and limitations of a study

**RESEARCH PILLAR** 

The pandemic has highlighted the need for businesses to move quickly to find the right people – it's not enough to rely on the same people in your contacts book

RESE	ARCH PILI	LAR		
Pillar rank	World University Rankings position	Institution	Country/region	Pillar score
1	1	University of Oxford United Kingdom		99.6
2		•		99.5
3				98.9
4		Harvard University United States California Institute of Technology United States		96.9
5		Stanford University	United States	96.8
=6	7	·		96.0
-0 =6	8			96.0
8		Tsinghua University	China	95.7
9		Peking University	China	94.6
10			•	94.4
=11		Massachusetts Institute of Technology United States Yale University United States		93.0
=11		Yale University University of Toronto	Canada	93.0
13	15	ETH Zurich	Switzerland	92.4
14	=13		United States	90.8
=15		The University of Chicago	United States	90.6
-15 =15	21	·	Singapore	90.6
17		The University of Tokyo	Japan	90.3
18	20	University of California, Los Angeles	United States	89.8
19	11		United States	89.6
20		University of Pennsylvania	United States	89.2
21	=18			88.9
22		ç		88.4
=23	22	Imperial College London United Kingdom		85.4
=23		Cornell University United States University of Michigan-Ann Arbor United States		85.4
25	26		United States	83.1
26	=24	·	United States	82.1
27	27	London School of Economics United Kingdom and Political Science		80.8
28	28			80.0
29	61	Kyoto University Japan		78.9
30	29	University of Washington	United States	78.8
31	23	Duke University	United States	78.6
32	32	LMU Munich	Germany	77.9
33	48	University of Illinois at Urbana-Champaign	United States	77.3
34	34	University of California, San Diego	United States	75.6
35	38	Technical University of Munich	Germany	74.8
36	=30	University of Edinburgh	United Kingdom	74.2
37	37	University of British Columbia	Canada	74.0
=38	=54		South Korea	73.8
=38	33	University of Melbourne	Australia	73.8
40	=42		Belgium	73.2
41	=30	University of Hong Kong	Hong Kong	72.2
42	84		China	71.9
43	47	University of Texas at Austin	United States	71.5
=44	=40	Paris Sciences et Lettres – PSL Research University Paris	France	71.2
=44	=35	King's College London	United Kingdom	71.2
46	=75	Delft University of Technology	Netherlands	71.1
47	39	Karolinska Institute	Sweden	71.0
48	44	McGill University	Canada	70.9
49	46			70.3
=50	=158	,	Russian Federation	69.9
=50	=75	Zhejiang University	China	69.9

30 per cent to 40 per cent in both cases.

With university campus visits and networking lunches proving difficult in recent times, NCUB is hoping that a new system called Konfer will reinvigorate these partnerships. Konfer provides suggestions for links between some 144,000 academics from UK universities and research institutes and more than 46,000 businesses, based on information scanned from 1.5 million research publications, grant-funded projects and case studies.

"The pandemic has highlighted the need for businesses to move quickly to find the right people – it's not enough to rely on the same people in your contacts book," says Joe Marshall, chief executive officer of NCUB's AI-powered smart matching system.

This kind of matching could, in theory, disrupt the traditional model of university-industry partnership, which has often seen businesses turn to their local institution for R&D-related input, he says. "It's about democratising opportunity, but also extending the reach of industry into academia by locating people that they did not know existed," he adds.

The project might even lead to new streams of public or industry funding as novel patterns of university-private funding become more apparent, Marshall suggests.

"It provides a lot of analytics, so you can see emerging technologies appearing. And as those new concepts emerge, we hope to work with public and commercial funders in these areas," he says.

The move to largely online research collaborations has, of course, not been entirely without pain.

"I was unable for a while to see my postdoc or visit workshops in the US, which has slowed my research down", says rocket engineer Mike McCulloch, lecturer in geomatics at the University of Plymouth, who adds that cancelled trips to laboratories in Europe "caused serious misunderstandings" with collaborators.

Overall, however, he is positive about the new ways to communicate online – including Zoom – with colleagues.

"It has given me a much better way to disseminate my work and interact with others," he reflects. "I have also saved stress and 8,000 miles by not travelling."

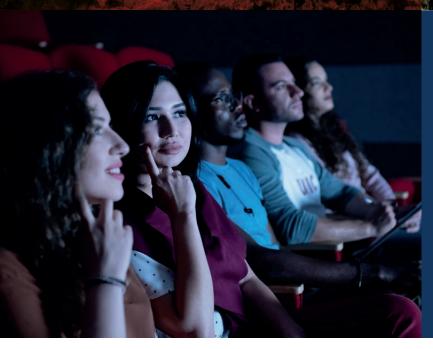


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The 2021 Times Higher Education World
University Rankings reaffirm the University of
Nicosia's (UNIC) global standing, ranking it among
the Top 1000 universities in the world. One of the
core areas in which the University excelled in this
year's expanded edition is International Outlook,
where UNIC ranked 76th worldwide, attesting to
our innovative internationalisation strategy and
especially to our notable success in offering
cross-border education.







### University of Nicosia RANKED =76<sup>th</sup> FOR INTERNATIONAL OUTLOOK















### A space of our own

### An EU 'digital university act' could curb the influence of big tech while enabling the free flow of knowledge throughout the bloc, says Karen Maex



Karen Maex Rector magnificus, University of Amsterdam, and chair, League of European Research Universities

n recent years, urgent global challenges related to issues such as climate change, mass migration and the rapidly evolving digitisation of our societies have been steadily mounting. But as January 2020 dawned, another issue arose that would (temporarily) surpass them all. The crisis precipitated by the rise of the novel coronavirus and its unchecked spread around the world is without precedent in recent decades. Among other things, the havoc wrought by the pandemic demonstrated how a crisis that initially seemed focused in one area – public health – could so rapidly metastasise into inextricably intertwined social, legal, economic and environmental issues.

Research-intensive universities are among the world's most important resources in the struggle to find solutions to these intractably complex global challenges. Although the worst of Covid-19 is, with any luck, behind us, numerous other challenges remain to take its place. While 2020 may have been the year when the world ground to a halt, in truth, the pace of change around the world has not slackened, and

the role of universities remains at the leading edge of these changes. To ensure our readiness to tackle global challenges in the future, we need to focus on building resilient and sustainable societies, and broad-based, research-intensive universities are almost uniquely placed to play a key role in this.

The wide-ranging collaborations necessary to tackle the multifaceted issues our globalised society is producing will need to cross not only disciplinary boundaries but also national borders. Only in this way will we be able to stimulate the



broadest and deepest range of fundamental research, to draw in the necessary private investment, and to disseminate knowledge and ensure that it is applied to society's benefit. The future Europe needs to be one based on the principle of the free flow of data across national borders within the European

Yet opening up our data, placing it in the hands of private companies, allowing them to search, index, repackage and resell the information, comes with risks attached. It raises fundamental questions about our independence.

The issue of how to deal with this exponential increase in digitisation is one of the most pressing facing universities today. The EU has announced that from now until 2030 will be its "Digital Decade". The combination of digitisation with the shift to green policies across the board – the "twin transi-

tions" - represents a moment of near unparalleled change and opportunity. The possibilities for collaboration and the ease of exchange of knowledge that digitisation brings are crystal clear. However, given that the overwhelming majority of the world's key digital infrastructure is in the hands of the big tech companies, it also brings with it the danger of increasing dependence on private businesses, which frequently operate under a very different set of values from those that govern academia. How, operating as individual institutions, can we maintain control over our own educational data? How can we retain freedom of choice in digital platforms? How can we prevent unilateral dependence? The answer is that we can't, and only with pan-European action can the great advantages that this moment offers be fully realised and the dangers successfully mitigated.

mmediate action is required to ensure that the alterations heralded by this digital revolution will work in our favour and the outcomes redound to our benefit. If digitisation in research and education is to be done responsibly, universities must retain ownership of their work when they collaborate with platform and data storage companies. Our independence must always be central. In addition, universities must ensure that they do not fall prey to "lock-in" situations, where large-scale dependence on a commercial partner supplying services or equipment becomes an inescapable trap. If we are to guarantee the independence of our research and education while utilising the digital systems of dominant private players, we need agreements and regulations. European universities should be collaborating with



each other in the drawing-up of conditions governing the purchase of information services, the development of alternative publication platforms and an infrastructure that guarantees the independence of research data and metadata.

Now is the time to act on these intertwined issues. The European Commission is attempting to curb the influence of platforms in the service sector by means of a Digital Services Act, and similar legislation should be designed to protect the position of universities. We need an EU-wide "digital university act", guaranteeing public storage of, and access to, research data; freely available research publications; control over digital learning and research tools; and access to platform data. Such a legislative framework would be an important step towards the final realisation of the ideal of the free flow of knowledge around the EU. And it would also go a long way towards safeguarding the precious independence of universities while allowing for accountability, transparency and open access for everyone involved in the wide-ranging education and research so vital to our interconnected modern world.







### YONSEI: TOWARD TRUTH AND FREEDOM

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### Yonsei, Making History in Medicine

Yonsei University Health System is shaping the future of healthcare by providing high quality care to every patient, developing the most effective treatments and concentrating on cutting-edge research

### YONSEI UNIVERSITY HEALTH SYSTEM





## An injection of enterprise

Universities rethinking industry ties after Oxford's Covid jab success must beware of 'perverse' incentives, says Oxford v-c. David Matthews writes

t's arguably the most significant university-industry collaboration of the 21st century.

By the end of the year, 3 billion doses of the Oxford/AstraZeneca coronavirus vaccine, a joint effort by the University of Oxford and the British-Swedish pharmaceutical giant, should have been delivered globally.

The jab has had its fair share of bad publicity. Missed deliveries enraged the European Union in the spring, while extremely rare blood clots have left it unapproved for younger people in some countries.

But it remains the (still largely unvaccinated) developing world's great hope, being relatively easy to store and costing vastly less per shot than its rivals – partly thanks to an agreement between Oxford and AstraZeneca not to make a profit on the jab until after the pandemic is deemed over.

Yet Louise Richardson, the University of Oxford's vice-chancellor, worries that despite success this time round, come the next pandemic, no pharmaceutical company will be willing to take a similar risk.

"There's no incentives in the

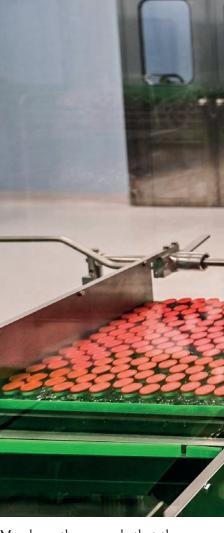
future for a company to do what AstraZeneca has done," she warns *Times Higher Education*. "They've taken a great risk, and they're forgoing profits. They haven't gotten the recognition that I think they deserve."

Meanwhile, other vaccine manufacturers have made a "fortune", she says. "We've created these perverse incentives for the future."

The deal between Oxford and AstraZeneca almost didn't happen. As early as January 2020, scientists at Oxford's Jenner Institute were working on a vaccine platform they thought might tackle the mysterious new disease spreading in China. Operating on a "shoestring", Oxford underwrote their exploratory work with £1 million, recalls Richardson.

"There was huge uncertainty at this stage, but they still felt that there was a real chance they might be on to something," she says. "To be perfectly honest, we didn't have a long queue of companies" willing to collaborate.

Some reports have suggested that Oxford scientists rejected a tieup with US pharmaceutical giant



Merck on the grounds that they wouldn't distribute the vaccine equitably across the world at cost.

"The fact that AstraZeneca was a British company was a plus from our point of view," says Richardson. "Remember that...we had a very erratic and very jingoistic president in the US."

"I had some concern about that. If we were to deal with an American company, did we run the risk that if something worked you might have Trump intervene, which was another plus for AstraZeneca," she adds.

Manuel Martin, innovation and access policy adviser at Médecins Sans Frontières (MSF), is generally complimentary about how Oxford has used its leverage to make sure AstraZeneca committed to not making a profit on the vaccine, at least while it defines the pandemic as ongoing.

"It is undoubtedly the cheapest, or among the cheapest, vaccine," he says.

Not only that, the company has been liberal in allowing "semi-independent production" of the vaccine by other manufacturers in Brazil

There's no incentives in the future for a company to do what AstraZeneca has done



and India to hasten access in poorer countries, he adds.

Martin praises Oxford for shopping around among manufacturers to make sure developing countries would gain access. "Selecting the right partner as a research university is enormously important," he says.

But the exact details of the deal between Oxford and AstraZeneca, covering key terms such as who will profit from royalties and when, are still secret, he notes, making it "very hard" to truly assess how good a deal it was.

A private "commercial document" is "standard practice in business", counters Richardson.

nother university that played an important, if less publicised, role in developing vaccines is Leiden University Medical Center (LUMC) in the Netherlands. For decades it had been a centre of coronavirus research, and it spun out a company that would eventually become Janssen, the firm that would develop a one-shot vaccine under the umbrella of its US-based parent company, Johnson & Johnson.

With LUMC and Janssen close neighbours and already working together on other projects, as the pandemic began to take hold in the spring of 2020, the company approached the university to test several vaccine candidates in LUMC's high-security labs. Unlike Oxford, LUMC didn't design the vaccine itself, but tested whether it created neutralising antibodies against the virus.

LUMC is discussing whether and on what terms to renew its two-year testing contract with Janssen, says Marjolein Kikkert, an associate professor in LUMC's Center for Infectious Diseases.

"It's nice money," she says. However, "the bottom line is that we are more looking for an interaction as Oxford had with Astra-Zeneca," she explains. "So, as an academic group, we would be more interested in being involved more directly in the innovation itself, and help providing the scientific knowledge needed."

After the experience of the pandemic, universities and pharmaceutical companies want to take more of the entire vaccine-creation process in-house, she says. "More and more academic groups at hospitals and universities are looking for ways of expanding their possibilities for really getting into the development of medicine and vaccines."

Research groups want to go "beyond just the ideas", she says, and move into producing the vaccines, and running clinical trials, themselves "in order to make these medicines in much cheaper ways than companies can. That's a development that's going on here at LUMC as well."

For MSF's Martin, the dream is a system where research universities have such well-developed research, early stage manufacturing and testing capabilities that they can create vaccines and medicines that are openly available for any manufacturer in the world to produce and distribute, ending a patent-protected system of monopoly pricing.

"That's a trend that we are beginning to see," he says. "Universities have realised that they can go further, and they are not just limited to the very early stage pre-clinical research."

Because Oxford was able to

More academic groups at hospitals and universities are looking to expand their possibilities for really getting into the development of medicine and vaccines

**INDUSTRY PILLAR** 

53 Wageningen University & Research

38 Technical University of Munich

251-300 University of the Witwatersrand

32 LMU Munich

=16 Tsinghua University

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Germany

Germany

South Africa

South Korea

United Arab Emirates 100.0

Russian Federation

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	=1	=75	Zhejiang University
	=1	501-600	Asia University, Taiwan
	=1	351-400	Khalifa University
	=1	401-500	National Research Nuclear University MEPhl
	=1	801-1,000	Pontifical Catholic University of Rio de Janeiro (PUC-Rio)
	=1	601-800	Istanbul Technical University
	=1	601-800	National Cheng Kung University (NCKU)
=	=15	103	University of Basel
=	=15	201-250	Eindhoven University of Technology
=	=15	201-250	Moscow Institute of Physics and Technology (MIPT)
=	=15	601-800	Beijing Institute of Technology
=	=15	801-1,000	Universiti Pendidikan Sultan Idris
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	21	601-800	Middle East Technical University
	22	351-400	University of Liège
	23	=122	Sungkyunkwan University (SKKU)
	24	=158	Lomonosov Moscow State University
=	=25	=42	KU Leuven
=	=25	801-1,000	China University of Petroleum, Beijing
	27	501-600	Sabancı University
	28	23	Duke University
	29	301-350	Tongji University
	30	=108	RWTH Aachen University
	31	=80	McMaster University
	32	=54	Seoul National University
-	=33	=185	Pohang University of Science and Technology (POSTECH)
=	=33	1,001+	National Taipei University of Technology
	35	351-400	Nagoya University
	36	=75	Delft University of Technology
=	=37	501-600	Beihang University
	=37	1,001+	Bandung Institute of Technology (ITB)
	39	=172	TU Dresden
-	=40	=108	University of Freiburg
-	=40	201-250	Tohoku University
	=42	201-250	Taipei Medical University
-	=42	139	Technical University of Berlin
	=42	=151	Yonsei University (Seoul campus)
	45	34	University of California, San Diego
	-46	301-350	Central South University
	=46	601-800	ITMO University
	40	251 400	IMT Atlantique



conduct so much of the development process – designing the vaccine and jointly conducting clinical trials – it was able to leverage a much better deal in terms of global public health, he says. "Why can't other universities do that themselves?" he asks. "The further downstream [in the vaccine-creation process] you go, the more leverage you have over how vaccines are shared and produced."

"In an ideal world", Oxford "will have bigger trials" and "will have bigger manufacturing facilities", says Richardson.

But she is cautious about trying to capture an even bigger slice of the vaccine-creation process. "We're a university, first and foremost," she says. "We don't want to turn ourselves into a pharma company."

Oxford did contemplate simply giving away the vaccine formula, as advocated by MSF. "We did consider: what if we just put it out there and let anybody who wants to around the world manufacture it?" Richardson recalls.

But the university feared being held liable for any resultant problems. "We wouldn't be able to control who was manufacturing it around the world," she says, and Oxford concluded it was a "safer option" to have a relationship with an established manufacturer.

The deal was struck under "massive uncertainty" and "massive time pressure", she says, and only came together because a "very small, very senior-level team in AstraZeneca and the university... hammered out all the big points" – meaning it is essential that universities build relationships with potential collaborators before a crisis hits.

"I hope it will be an example for others of what can be achieved," Richardson says, "ideally in less pressured circumstances."

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351-400 IMT Atlantique

501–600 Southeast University

301-350 China Medical University, Taiwan

The further

downstream [in the

vaccine-creation

process] you go,

the more leverage

you have over how

vaccines are shared

and produced





# Decoding Chula's Rise to World-Class Caliber Being Crowned **Asia's No. 1 University** in Sustainability

Chula's President reveals four important factors leading Chula to be named Asia's No.1 (No. 23 in the world) university for sustainability by THE (Times Higher Education) Impact Rankings 2021 while stressing the local and global impacts of research and innovation by faculty members and students.

According to Prof. Dr. Bundhit Eua-arporn, President, Chulalongkorn University being ranked Asia's No.1 and No. 23 in the World for Global Impact by THE Impact Rankings 2021 is the highest-ranking any Thai university has ever received. This year's rankings should reflect the quality of Chulalongkorn university from an international perspective.

Apart from the QS World University Rankings, in which Chula has consistently been ranked No. 1 in Thailand, another indicator that the university places much importance to is THE Impact Rankings that assess world universities' global performance against the United Nations' Sustainable Development Goals (SDGs). This year, 1,115 universities worldwide took part in the rankings. Chula earned the best scores in the following SDGs: SDG 3 (Health and Wellbeing), SDG 9 (Infrastructure, Innovation and Industry), and SDG15 (Life on Land).

Prof. Dr. Bundhit further revealed that Chula had set a goal to be among the top 3 universities in ASEAN by 2024, so planning and assignment of workgroups have been ongoing for a long time. The four main reasons behind this year's success are:

#### Strategy:

Building understanding of the 17 SDGs' criteria, THE Impact Rankings' methodology, and the way scores are calculated. THE Impact Rankings are in line with Chula's mission to be the "Leader in Creating Knowledge and Innovation to Promote Sustainable Development for Society". The mission has been carried out through three key strategies: Building Future Leaders, Creating impactful research and innovations for society; and Sustainability.



### **Impactful Content:**

Research and innovations by faculty members and students that have far-reaching consequences on a global scale, widely cited by the international academic communities, and have societal and national applications were submitted to THE Impact Rankings.

#### Power of Cooperation:

Concerted efforts at all levels from the University Council, the President, the university executive board, along with its various departments were harnessed to gather information, analyze Chula's extensive body of research and innovations that constitute truly outstanding work.

#### Storytelling:

Compiling interesting facts about Chula's research and innovations into compelling stories and communicate how the said research and innovations impact society.

Prof. Dr. Bundhit said THE Impact Rankings also brought to light Chula's strength and things that need improvement. Chula needs to compete with the universities in ASEAN and Asia, so, being ranked Asia's No. 1 is very promising. It indicates that the quality of Thai universities is on par with worldwide standards. The faculty members and students are determined to create highly impactful research for society. Apart from publications, a mark of good research should also be measured by its relevance to society, in line with Chula's new slogan,

"Innovations for Society"



# BEFORE THE FUTURE DEFINES US, WE'RE WORKING TO DEFINE IT.

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THE UNIVERSITY OF JOHANNESBURG, SOUTH AFRICA.

Our approach to teaching and learning is founded on both the needs of our students in the African context and on the ubiquity of the technological environment in which they will practise what they learn. We see the future as one brimming with energy and possibility, with untold opportunity for those ready to explore it, for those who are prepared with the right conceptual tools to help shape it.

We prize the value of human imagination, and its ability not only to meet the challenges that face us, but also to prevail, and indeed define, the future world in ways that benefit everyone. Our internationally recognised research and teaching staff and our leading facilities enable our students to derive the full benefit of their studies in an embracing learning environment predicated on the future.

That's because we believe that the future belongs to those who reimagine it.



n most European countries, universities fulfil their missions of generating knowledge through research. In general, the scientific productivity of faculty is very high. However, in many countries, the other two key university activities - the transmission of knowledge to students through teaching, and knowledge transfer to the wider economic and social environment - do not have such favourable results. I believe that this is because the incentive systems for faculty benefit research more than knowledge transfer and teaching.

In many university systems, faculty evaluation is based almost exclusively on the number and quality of scientific articles. These mechanisms are decisive for faculty hiring and promotion. It is the "publish or perish" rule. One consequence of this policy is that when an article is accepted by a journal, the researcher considers that his or her work has been completed.

Therefore, the incentives for good article production are clear. Faculty members know very well that when they finish their doctorate, they must publish strong scientific articles to be hired, and they must continue to publish articles in top journals if they want to be promoted in the future.

However, the effort dedicated to ensuring that the knowledge generated reaches society, such as through dissemination or agreements with companies, has no incentives. Neither do teaching innovation activities to improve student learning. Technology, society and students are changing in a disruptive way, but universities are lagging behind.

It is true that there are faculty who, thanks to their vocation and passion for a job well done, invest a lot of time in activities that are not appreciated. But most have working weeks that by far exceed 40 hours and their time is limited.

We need new solutions and there are three measures that I think could help:

First, faculty incentives must be improved with accreditation systems for teaching innovation and knowledge transfer. In most countries, there are national university quality agencies that periodically evaluate faculty activity and issue accreditations. These evaluations and accreditations focus on research activity and tend to give much less relevance to knowledge transfer and teaching innovation.

Second, these accreditations should have a clear impact on faculty hiring and promotion. If these measures were adopted, three ways of hiring faculty could coexist: one based on research excellence (which should continue to be used for the vast majority of hires), one based on excellence in teaching innovation, and one based on excellence in knowledge transfer. In all cases the candidate must have a good research profile, but in each pathway excellence is focused on one of the three dimensions.

Since it is important that incentives for teaching and knowledge transfer are not detrimental to research, universities must receive more funding. It is necessary to invest more in research and, simultaneously, to incorporate additional resources and incentives to promote excellence in teaching innovation and knowledge transfer.

Finally, there is an additional measure that could contribute greatly to improving the social impact of research: the incorporation of co-funding of research projects. The bodies that fund research projects could require that any grant application be accompanied by a joint-funding commitment from a public or private entity. This would encourage the research to be of interest to the entity co-funding the project. This policy, which is mainly designed for fields in the social sciences, should not be used for basic research, but for applied research. The co-financing requirement has already been used with good results in countries such as Germany and Finland.

These measures are intended not to reduce incentives for research, but to increase incentives for faculty members who are most interested in knowledge transfer and teaching innovation. Co-funding of research can lead to research that has a greater and better impact on society. In short, these types of measures could help universities to generate more knowledge that will have a more favourable impact on students and society. •



**Oriol Amat**Rector, Pompeu Fabra University

The effort dedicated to ensuring that the knowledge generated reaches society has no incentives

## imprint





## Imagine if DNA data could give you more time.

Duchenne muscular dystrophy (DMD) is a genetic disorder characterised by the progressive loss of muscle. It's the most common and serious form of childhood muscle wasting disease, caused by mutations in the dystrophin gene.

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For years, DMD was considered untreatable. But Professors Sue Fletcher and Steve Wilton challenged this.

They have now developed three U.S. Food and Drug Administration approved treatments that have changed the natural progression of the disease for the better. While not a cure, their discoveries are extending lives.

The three drugs manipulate the gene expression machinery within cells to trick them into 'skipping' over the disease-causing error in the gene, acting as genetic 'whiteout'. Each drug is tailored to different mutations in the dystrophin gene, and the goal now is to see as many different patients treated as possible.

This type of precision medicine has the potential to transform healthcare on a scale equivalent to the way antibiotics transformed the fight against infectious diseases.

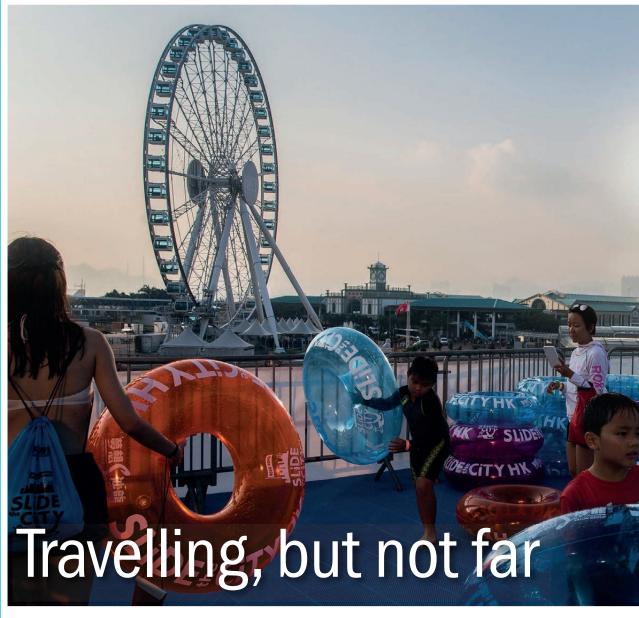
And given that there are over 7000 inherited diseases, this kind of therapy could be applied to many of them, improving the lives of hundreds of thousands of patients across the globe as personalised medicines.

"The reason one gets into medical research is to try and make a difference," said Professor Wilton. "And we believe we are doing that."

These ground-breaking genetic discoveries are changing the life trajectory of patients right now and will for years to come.

Explore more: murdoch.edu.au/imprint

This is free thinking



### Affordable quality education and job opportunities are encouraging more Asian students to internationalise closer to home, reports Joyce Lau

niversities in the Eastern half of the world are quickly internationalising, largely off the backs of students and academics in their own region. While migration to the West has not been dented – yet – as a result of strong interest in overseas education in general, intra-Asian mobility is on the rise as the continent develops its own high-quality education options and work opportunities.

In the *Times Higher Education* World University Rankings 2022, half the top 20 institutions with the most international outlook are in Asia (including the Middle East).

China's two special administrative regions, Hong Kong and Macao, punch far above their weight, taking up five of the top 10 spots. This is due to high levels of student mobility, staff recruitment

and research collaboration around the region, especially as mainland Chinese and Taiwan students are counted as "non-local" in those two cities.

The three Middle Eastern destinations in the top 20 – Qatar, the United Arab Emirates and Saudi Arabia – are also recruiting largely from their own region.

Hugo Horta, associate professor in the social contexts and policies of education at the University of Hong Kong, says that these Arab peninsula countries, alongside Malaysia, have been "making an effort to attract foreign students from neighbouring countries that share the same religion".

In a global context, student movement is still largely from East to West. Before the pandemic, the top hosting countries of overseas students were the US, the UK, China, Canada and Australia, according to the Institute of International Education's Project Atlas.

However, the "relative number" of outbound Asian students to Western countries has decreased and the level of intra-Asian mobility has risen, according to Futao Huang, a professor at the Research Institute for Higher Education at Hiroshima University. For example, figures from China's education ministry show that the country recruited 60 per cent of its foreign students from other parts of Asia in 2018.

Over the past decade, Asian governments have launched initiatives and set ambitious targets to attract hundreds of thousands of foreign students – and they have largely succeeded.

Student exchange programme



Campus Asia was set up to link China, Japan and South Korea. Mainland China also uses its New Silk Road project, or Belt and Road Initiative, to boost ties along an ancient trade route that connects Asia, the Middle East and Africa. Taiwan's New Southbound Policy targets Asia and Australasia.

Meanwhile, Malaysia has built multi-campus higher education hubs such as EduCity.

These five states attracted a total of 1.2 million inbound students in 2018, according to an ICEF Monitor report. Almost all those recruits were from within the region; of the top 15 sending countries, 13 were Asian and two were African. The only Western nation that sent any significant numbers of students to Asia was the US.

"Compared with what happened decades ago, there has been more active mobility of both students and scholars between countries within East and South-east Asian countries," Huang says, citing reasons such as "increased linkage and collaboration in economy and trade".

"The enhancement of the global academic competitiveness of national higher education systems and research – and the presence in global university ranking tables – are important drivers," he adds, especially in China, Japan, South Korea and Malaysia.

Geographic proximity and shared cultural practices are



particularly important in a region where higher education can be seen as a vehicle to long-term settlement in a destination country.

"As the largest number of inbound students in the main East and South-east Asian countries all come from the same region, many stay in their hosting countries after graduation. This has increased the number of international faculty in some hosting countries," Huang says.

Huang's recent research shows that China has eclipsed the US and the UK as the largest sender of researchers into Japan. And, unlike Western academics who may venture into Japan as professionals, 80 per cent of Chinese academics began life in Japan as students.

The affordability of Asian education also makes it appealing for students in the region. Even the most expensive options – elite schools in Hong Kong and Singapore, or a top medical school in mainland China – are on par with the UK but still far under what US colleges cost. Admission and tuition fees in Japan and South Korea are about £5,000 a year, while universities in Malaysia and Taiwan cost a fraction of that.

"There is a realisation that one may have an experience abroad without necessarily having to go to other continents and developed countries, where the costs of education and living are higher," Horta says. "This may be particularly attractive to students from developing countries in Asia, such as Bangladesh or Nepal."

An affordable education at topranked Chinese or Japanese universities that house state-of-the-art labs may sound too good to be true, especially to an Asian student who does not have equivalent facilities or opportunities at home.

However, Covid has dashed many of those dreams, as governments have closed their doors, particularly to poorer neighbours with worse epidemics. Hardly any of the nearly 800,000 foreign students enrolled in Asia's two largest receiving countries – China and Japan – have had in-person access to campuses since the pandemic began in early 2020.

China has allowed in small cohorts – for example, South Koreans or those enrolled in specific US branch campuses or scholarship schemes. But the bulk of students in South Asia, Africa or

There is a realisation that one may have an experience abroad without having to go to other continents

I'm not expecting that intra-Asian student flow will mean a cut to North America, Europe or Oceania

NTERNATIONAL PILLAR				
Rank in pillar	World University Rankings position	nstitution	Country/region	Pillar score
1	251-300	Macau University of Science and Technology	Macao	99.9
2	=151	City University of Hong Kong	Hong Kong	99.7
=3	301-350		Switzerland	99.5
=3		University of Luxembourg	Luxembourg	99.5
5		University of Macau	Macao	99.4
6	301-350	Qatar University	Qatar	99.1
=7	=30	University of Hong Kong	Hong Kong	98.8
=7	401-500	University of Sharjah	United Arab Emirates	98.8
9	401-500	Hong Kong Baptist University	Hong Kong	98.7
10	=197	University of Geneva	Switzerland	98.6
11	=40	École Polytechnique Fédérale de Lausanne	Switzerland	98.3
12	=127	Maastricht University	Netherlands	98.1
13	15	ETH Zurich	Switzerland	97.9
14	66	The Hong Kong University of Science and Technology	Hong Kong	97.6
15	12	1	United Kingdom	97.5
16		Alfaisal University	Saudi Arabia	97.3
=17		University of Technology Sydney	Australia	97.2
=17	201-250	Contract of the Contract of th	United Kingdom	97.2
=19	91	0 0 ,	Hong Kong	97.1
=19	=117	Queen Mary University of London	United Kingdom	97.1
21	103 =18	,	Switzerland	97.0 96.7
=23		Australian National University	United Kingdom Australia	96.5
=23		Brunel University London	United Kingdom	96.5
=25		University of Oxford	United Kingdom	96.3
=25		University of Essex	United Kingdom	96.3
27		Auckland University of Technology	New Zealand	96.2
28		Lincoln University	New Zealand	96.0
=29		University of Innsbruck	Austria	95.9
=29	=35	King's College London	United Kingdom	95.9
=31	=5	University of Cambridge	United Kingdom	95.8
=31	=158	University of Aberdeen	United Kingdom	95.8
33	301-350	University of St Gallen	Switzerland	95.6
=34	=132	The University of Western Australia	Australia	95.5
=34	801-1,000	Near East University	Northern Cyprus	95.5
=34	251-300	Curtin University	Australia	95.5
=34	201–250	University of St Andrews	United Kingdom	95.5
38	=137	University of Vienna	Austria	95.4
39	401-500	University of Waikato	New Zealand	95.3
=40	70	UNSW Sydney	Australia	95.2
=40	=30	University of Edinburgh	United Kingdom	95.2
=40	351-400	City, University of London	United Kingdom	95.2
=43	49 -146	Chinese University of Hong Kong Trinity College Dublin	Hong Kong	95.0
=43 =45	=146 201-250	Trinity College Dublin  PCSI University of Medicine	Republic of Ireland	95.0
		RCSI University of Medicine and Health Sciences	Republic of Ireland	94.9
=45	37	University of British Columbia	Canada	94.9
=47	201-250	University of Wollongong	Australia	94.7
=47 =49	601-800 =127	University of Nicosia	Cyprus New Zealand	94.7
=49 =49	=137 201-250	University of Auckland University of Surrey	United Kingdom	94.6 94.6
-49 =49	=122	Lancaster University	United Kingdom	94.6
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Russia have not been able to enter. To make things worse, poor English communications about future plans, patchy online offerings and a lack of flexibility on graduation requirements mean that many degrees and research projects may be abandoned halfway.

There is a similar situation in Japan, where foreign students have lobbied unsuccessfully for a return of crucial financial aid needed to survive what might be a two-year delay to their education.

For now, Asia's ambitions for high levels of internationalisation have not yet been achieved. For example, among the 10 member states of the Association of Southeast Asian Nations (Asean) only 10 per cent of mobile students decide to stay within the Asean region. Other areas, such as India, have been beset by severe Covid outbreaks and still lack significant pathways to internationalisation.

Horta says that traditional Western receiving nations have "much more experience in receiving and accommodating international students from all over the world". Partly because of that, student mobility will not be an "either/or" situation.

"I am not expecting that intra-Asian student flow will mean a cut of flows to North American, European and Oceanian countries," he says. "The numbers of students and families interested in this mobility abroad for studying purposes is bound to increase. There will be a strong market for both."

However, he adds that the sheen of having a degree that is merely "Western" may be dulling, especially as Asian students exercise greater scrutiny and have more choices.

"Some 20 years ago, studying at some US university that nobody [had] heard of would still be of value," he says. "Nowadays, for one to get the same social and economic recognition, one needs to study at a top US university."









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**Deborah Terry**President and vice-chancellor,
University of Oueensland

### Revamping delivery modes and partnerships will give Australia a more resilient, student-centred sector with regional appeal, says Deborah Terry

s the world starts to contemplate the promise and potential of the post-pandemic era, many of us (myself included) remain fascinated by the impact of differing national policy responses to fighting the virus and how those policies have played out around the world.

While this has been a difficult time for us all, I acknowledge that many of our friends and partners around the world have endured a much more distressing and tragic experience of the Covid-19 pandemic than we have here in Australia.

Our government's response to the threat of Covid has involved adopting an "aggressive suppression" strategy. In simple terms, this means acting decisively to prevent community transmission of the virus wherever it occurs.

As I write this in early August, Australia's various states are again

using lockdowns in an attempt to suppress localised outbreaks of the more infectious Delta variant of the virus.

While this strategy has been disruptive for sectors of our society, it has also enabled most parts of Australia to live Covid-free for long stretches of time throughout the pandemic.

Nonetheless, our relative success at quashing the virus, thus far, has come at a cost. It has meant that Australia's international border has in effect been closed to all non-citizens and non-residents since March 2020 – and it remains closed today.

This has unfortunately prevented international students from travelling to Australia to study at our campuses.

With vaccinations now starting to ramp up here, our government has recently started to chart Australia's pathway out of the pandemic. Based on this plan, we expect that our international border will gradually start to reopen from early 2022.

By that time, a large proportion of the Australian population should be fully vaccinated – and we should be well placed to safely welcome back international students.

#### A pause in growth

Before the pandemic, Australian universities had experienced surging demand for education from overseas students.

In fact, the number of international students enrolled at Australian universities increased by a staggering 77 per cent over just five years – growing from about 250,000 students in 2014 to 442,000 by 2019.

These students were attracted by Australia's reputation as a welcom-

ing and safe multicultural society – as well as by the very high quality of education offered by our universities.

Despite our relatively small population, Australia has six universities among the top 100 in the world (and 16 in the top 250), according to *Times Higher Education*'s World University Rankings 2022.

The US and the UK are the only nations with more universities at the top of the rankings – and, prior to the pandemic, they were also the only two nations with more international students.

Sadly, the flow of international students travelling to study at Australian campuses ceased almost immediately with the closure of our international borders last March.

Their absence is conspicuous, across our universities and Australian society more broadly. We miss the vibrancy they bring to our campuses and the rich cultural diversity they inject into our cities and regions.

Nevertheless, we are continuing to teach the cohort of international students who were already onshore in Australia before the pandemic – as well as tens of thousands of students who are progressing their studies online, from overseas.

Here at the University of Queensland, for instance, about 9,000 of the 55,000 students whom we enrolled in 2020 were studying purely online, from an offshore location.

According to Australian government data, the contraction in total international student enrolments at our universities was surprisingly small in 2020 (down just 5.1 per cent from the 2019 peak). However, the number of international students commencing at an Australian university fell by 23.2 per cent.

That sudden downturn in commencements last year – and again this year – will, of course, flow through to be a more significant fall in total enrolments over the next few years.

While we expect strong demand as soon as international students are permitted to return, it will take several years for the number to climb back to pre-pandemic levels.

#### A new international model

The disruption to Australia's higher education sector created by Covid-19 (both border closures and the mass adoption of online learning) has been an accelerant



of change in our universities.

Most significantly, the pandemic has forced a reconsideration of the most effective model of delivering our programmes to international students in the future. This is a very live strategic debate across our sector right now.

Our government is seeking to develop a new model of international education that is simultaneously more student-centric and more resilient to future shocks.

In March, our federal education minister, Alan Tudge, launched a consultation process with the sector for the development of a new Australian Strategy for International Education 2021-2030.

Ultimately, the government's intent is to develop a model that encourages more students – from a broader range of nations and dispersed more evenly across the disciplines – to consider the benefits of an Australian university education.

One important consideration is striking the right balance between the offshore, online components of the programmes that we offer and the on-campus, in-person components. In 2019, about 80 per cent of international students at our universities were in Australia for the duration of their degree.

While we are conscious that our prospective international students place a high value on having that cross-cultural, rich on-campus experience, we are also mindful that it comes at a high financial cost when extended over several years. And that cost is prohibitive for students from many nations.

In the future, I expect we will see more of a hybrid model emerge for many Australian university programmes. Increasingly, we will see more international students undertaking an initial period of study in their home country (either online or with a partner institution), before travelling to Australia for a shorter, more intensive, on-campus experience.

Certainly, the Australian government is keen for our universities to find new ways of meeting the educational needs of neighbouring nations in our region.

For example, our northern neighbour, Indonesia, has the ambition to educate an additional 58 million skilled workers by 2030. Similarly, under its ambitious National Education Policy, India wants half of all 18- to 21-year-olds enrolled in university by 2030. To meet that goal, India would need to achieve a doubling of enrolments over the coming decade.

Australia can help fulfil this demand for education by offering greater flexibility in how and when international students learn. And in doing so, we can also make a very positive contribution to the development of nations throughout the Asia-Pacific region.

Australian universities are now assessing their options for future delivery models – ranging from purely online programmes through to hybrid or blended models.

At the same time, there is a renewed interest here in developing deeper transnational education partnerships, including revamped articulation pathways as well as establishing international study centres or full-blown campuses in offshore locations.

Suddenly, all options are on the table.

It proves the maxim that every disruption is accompanied by both challenges and opportunities. Over the past 18 months, Australian universities have been mired in the challenges created by the pandemic, but, before too long, I'm confident that our universities will start to seize the opportunities of the postpandemic era.

Australia can help fulfil this demand by offering greater flexibility, and in doing so, can also make a very positive contribution to the development of nations throughout the Asia-Pacific region

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