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# THE ONE HUNDRED UNDER FIFTY

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Times Higher Education 100 Under 50 2015  
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## Housing and Living Costs

All international students have priority in applying for dormitory space. The cost is around £140.00 per semester. Eating at university dorm cafeterias costs around £120.00 per month.

## How to Apply

Taiwan Tech runs 2 semesters in each academic year. Fall semester is from September to January of the following year, while spring semester is scheduled from February to June. The application deadline for admission in the fall/spring semester is Mar. 31/Oct. 31 in each year. All applications must apply online via the Admissions webpage on the university's English website. There is no application fee charge.

## Correspondence and Information

OFFICE OF ACADEMIC AFFAIRS

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# But to be young is very heaven

The 100 Under 50 universities are agile, dynamic and free from the burden of history, writes Phil Baty

An illustrious past can confer great contemporary advantages on traditional universities and signal a great future: such august institutions have had many centuries to accumulate wealth and property; they are often the custodians of national treasures and sit at the social and cultural heart of great cities; they have had time to build deep networks of loyal alumni ambassadors, sustained over the generations; and they enjoy rich traditions of teaching

and scholarship – with enduring reputations to match.

So it is little wonder that the institutions that top the *Times Higher Education* World University Rankings tend to be at least a century or two old, with the University of Oxford (founded 1096) and the University of Cambridge (1209) always near the top of the list.

But many ancient seats of learning have crumbled into dust, and it is clear that a long history can hamper progress. Old infrastruc-

ture can be ill-equipped to house the latest technology and expensive to maintain. Older institutions may be obliged to sustain wide and potentially cumbersome portfolios of teaching and research; they often have a diverse and powerful range of stakeholders to keep happy; and they can be burdened by deeply embedded governance and management traditions that can stifle innovation.

So while the new kids on the academic block may lack the advantages bestowed by history and have yet to reach the upper echelons of the traditional world university rankings, perhaps it is their youth that offers them their greatest opportunity.

As Brian MacCraith, president of Dublin City University (established as recently as 1989 and the host of the 2015 *Times Higher Education* Young Universities Summit), writes in this supplement (page 32): “Young universities are unhampered by tradition and outdated modes of operation. They tend to be agile, dynamic and keen to adopt modern organisational practices.”

Such institutions can be more responsive to societal and economic developments, he believes, keeping their research and teaching portfolios fresh, relevant and highly focused. They can afford to take more risks and engage more with industrial and civic society.

As MacCraith points out, they are also able to attract the most dynamic, driven and disruptive leadership: “Such institutions attract leaders who wish to make a difference rather than simply maintain the status quo.” Indeed, young universities’ “entrepreneurial culture infuses all their activities, an energy and excitement that spreads to students and staff”.

It is this energy and infectious excitement that the annual *THE* 100 Under 50, now in its fourth edition, seeks to reflect and celebrate. ●



**Phil Baty**  
Editor, *Times Higher Education* Rankings

Country	Number of institutions in top 100	Top institution	Rank
Australia	16	University of Technology, Sydney	21
United Kingdom	15	University of Warwick	9
Germany	7	Ulm University	15
United States	7	University of California, Irvine	7
Spain	6	Pompeu Fabra University	12
France	5	Paris-Sud University	10
Canada	4	University of Calgary	22
Finland	3	Lappeenranta University of Technology	=31
Hong Kong	3	Hong Kong University of Science and Technology	4
Portugal	3	University of Minho	64
South Korea	3	Pohang University of Science and Technology	2
Sweden	3	Swedish University of Agricultural Sciences	34
Taiwan	3	National Taiwan University of Science and Technology	41
Turkey	3	Sabancı University	13
Austria	2	Medical University of Vienna	=37
Denmark	2	University of Southern Denmark	44
Iran	2	Sharif University of Technology	40
Italy	2	University of Milan-Bicocca	24
Republic of Ireland	2	Dublin City University	=75
Brazil	1	State University of Campinas	=42
Greece	1	University of Crete	=51
Japan	1	University of Tsukuba	50
Macau	1	University of Macau	39
Morocco	1	University of Marrakech Cadi Ayyad	=59
Netherlands	1	Maastricht University	6
Norway	1	UiT The Arctic University of Norway	=73
Singapore	1	Nanyang Technological University	5
Switzerland	1	École Polytechnique Fédérale de Lausanne	1

“Perhaps it is their youth that offers the new kids on the block their greatest opportunity”

# Dynamic characters

The 100 Under 50 universities are marked by their energy, innovation and fearless approach to the future, write Phil Baty and Katie Duncan

Australia has overtaken the UK to become the number one nation in the *Times Higher Education* 100 Under 50 2015.

The two countries shared top spot last year with 14 institutions each, but Australia has pulled ahead with 16 representatives in the list of the world's best universities under 50 years of age.

It's not all bad news for the UK, however: it comes second with 15 universities, itself an improvement on the 2014 figure.

So what is the secret of Antipodean success?

"A feature of the Australian system is the number of universities placed in global rankings relative to total system size," says Simon Marginson, professor of international higher education at the UCL Institute of Education.

"This is because there is a large group of rising 'middle-class' institutions – in the middle in terms of resources, research intensity and student demand."

These young, upwardly mobile institutions may sit below Australia's traditional research-led elite, as represented by the Group of Eight coalition, but their future looks bright nevertheless, argues Marginson, thanks in large part to the strong foundations laid in the 1980s by John Dawkins, the former Labor minister for employment, education and training.

His reforms, sometimes labelled

the "Dawkins Revolution", were designed to improve the international competitiveness of Australia's academy. They included converting the country's Colleges of Advanced Education (originally designed to provide vocational postsecondary qualifications) into universities and introducing market forces into the system.

The Dawkins reforms were the "key moment", says Marginson, as they rebuilt the Australian academy on competitive and entrepreneurial lines.

He continues: "Institutional leaders were freed to form their own missions and strategies, supported by income earned through international student fees, vocational postgraduate programmes and industry consultancy. It has been a struggle as the Group of Eight has maintained control over two-thirds of the research dollars, but over time the middle institutions, which vary markedly in size, have developed a range of localised strategies, such as Curtin University's large-scale offshore doctoral programme. Some of their vocational programmes are in very high demand with school-leavers, especially in niche areas of applied sciences, health and engineering, and fields such as design."

Marginson adds: "Some of the 100 Under 50 institutions have also been notable innovators in curriculum terms, such as the

Queensland University of Technology in postgraduate law and Newcastle and Flinders universities in medicine. As their research has developed, the under 50s have also developed their role in the international market, especially in relation to China and Southeast Asia: Curtin, RMIT University, the University of Technology, Sydney and Swinburne University all earn more than 20 per cent of their income from international student fees."

Renee Hindmarsh is chief executive of the Australian Technology Network, a group of five institutions that all make the 100 Under 50 list, including the country's top-ranked institution, the University of Technology, Sydney (21st).

Hindmarsh says that although youth does not confer the reputational and financial benefits enjoyed by ancient institutions, it has its advantages in a fast-moving global higher education sector, not least in ensuring a focused and applied approach to research and a willingness to innovate in teaching.

She adds: "The ATN's research and teaching strengths are directly related to our strong links with industry to deliver practical results. Over the past five years, more than 70 per cent of our research funding has come from industry.

"Although our institutions are young, we have already carved out a reputation for producing world-class research in applied areas and translating it into tangible results. Some examples include developing a flotation model that has increased the recovery and quality of minerals from fine and coarse particles, estimated as adding almost A\$1 billion [£520 million] in total industry benefit, and using biofortification to increase the nutritional content of bananas to improve the health of East African nations."

On teaching, Hindmarsh says:

“ Youth has its advantages in a fast-moving global sector ”





“Young universities such as ours also tend to be early adopters of technology and are willing to embrace new ways of teaching to cultivate well-rounded graduates who have the necessary skills for the modern workforce.

“The ATN universities champion the principles of access and equity in everything we do. As well as providing industry with tailored and responsive research solutions, our practical approach to learning and engagement with industry has delivered the highest graduate employment rates in Australia. As our society embraces the concept of lifelong learning, our institutions are well placed to continue to thrive.”

**A**ustralia is not the only nation to shine in this year’s 100 Under 50. Overall, 28 countries make the list, down from 29 last year: India, New Zealand

and Saudi Arabia drop out, passed by Macau and Morocco on the way in.

The US, utterly dominant in the traditional rankings, has seven top 100 representatives, a performance matched by Germany. Their top-ranked institutions are the University of California, Irvine (seventh) and Ulm University (15th), respectively.

Spain, in contrast to its poor showing in the *THE* World University Rankings, is also a strong performer in the 100 Under 50 list, with six representatives led by Barcelona-based Pompeu Fabra University (12th).

“Our youth and small size are distinguishing features compared with the other universities around us,” says its rector, Jaume Casals.

He boasts that the institution produces more research, gains more citations and has won more European Research Council

grants than any of its domestic competitors.

“That’s quite remarkable because we have existed for only 25 years and we’re one of the smallest universities in Spain,” Casals says.

Small is effective, he argues. It allows Pompeu Fabra to focus on the following highly specialised





“Although we’re young, that creates a sense of optimism and empowerment”

areas: social sciences and humanities; health and life sciences; and communication and information technology. It also facilitates a flat management structure: “We have a simple organisation that we are working to simplify even further,” he adds.

The Autonomous University of Barcelona (29th), Pompeu Fabra’s neighbour in the Catalanian capital, also boasts a flexible management approach.

“The youth of the university allows for more vibrant risk-taking,” says its rector, Ferran Sancho Pifarré. “Flexibility is at the centre of the decision-making process.”

Next in the national honour roll is Spain’s neighbour France, which has five top 100 institutions, led by Paris-Sud University (10th) (Pierre and Marie Curie University is hot on its heels in 11th position).

But the best-represented European country is the UK, led by the University of Warwick (ninth).

Sir Nigel Thrift, Warwick’s vice-chancellor, believes that the

50-year-old university’s “habit of being innovative” has helped it reach extraordinary heights in mere decades.

Thrift points to a host of eye-catching internationally focused innovations that have helped Warwick to stay one step ahead of many competitors: it set up a pioneering strategic alliance with Australia’s Monash University in 2011, which offers joint research appointments, joint PhD programmes and joint bids for international research grants; in 2012 it became one of six partners that collaborated to establish the Center for Urban Science and Progress in Brooklyn, New York; it made a bold statement in 2014 when it established a base in London, 100 or so miles from its Coventry home, in Europe’s tallest building, the Shard; and earlier this year, Warwick announced its intention to set up a campus in California as part of its “successful strategy to develop as a globally networked university”.

“There is no such thing as a

university that can stand still,” Thrift argues. “We hope that we are moving ahead in a way that is interesting and keeps to the values of academic excellence and relevance to the economy and the nation.”

This sense of dynamism, a refusal to stand still, pervades the culture of many 100 Under 50 institutions.

Bernd Scholz-Reiter is rector of the University of Bremen (26th), one of only 11 German institutions that receive additional funding under the country’s Excellence Initiative. He says that being successful while young – “no easy task” – requires teamwork.

“Above all, it’s about communication and collaboration,” he says. “It means focusing on our strong points sooner and more intensively than larger traditional universities, establishing a clear research profile and allocating limited resources to develop it. It means paying careful attention to each new appointment and flexibility in the designation of faculty chairs. It means moving quickly when we see a chance to develop – a new funding initiative, an offer from a partner institute, a talented young researcher.”

These sentiments are echoed by Elizabeth Cannon, vice-chancellor of Canada’s University of Calgary (22nd, the country’s top-ranked representative).

“When people set foot on our campus, the first thing they talk about is the energy and the passion,” she says. “It’s not just a vision, it’s a call to action: when people know that this is the institution that can get things done, that’s very inspiring. I think although we’re young, that creates a sense of optimism and a sense of empowerment that nothing can hold us back, that it’s up to us to deliver.”

As the *THE* 100 Under 50 2015 testifies, these young universities are delivering in spades. ●

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2015 rank	2014 rank	2014-15 WUR position	Institution	Country	Year founded	Teaching	Research	Citations	Industry income	International outlook	Overall score
1	2	=34	École Polytechnique Fédérale de Lausanne	Switzerland	1969	58.1	59.3	95.0	61.9	98.8	72.7
2	1	66	Pohang University of Science and Technology	South Korea	1986	63.4	65.5	84.4	100.0	36.0	69.2
3	3	=52	Korea Advanced Institute of Science and Technology (KAIST)	South Korea	1971	69.2	70.0	71.4	100.0	34.9	68.3
4	4	51	Hong Kong University of Science and Technology	Hong Kong	1991	53.6	76.2	72.9	57.6	77.8	68.1
5	5	=61	Nanyang Technological University	Singapore	1991	47.7	68.6	75.9	100.0	92.5	67.1
6	6	101	Maastricht University	Netherlands	1976	39.3	65.2	70.1	96.1	89.7	61.5
7	7	=88	University of California, Irvine	United States	1965	46.8	50.9	89.5	40.0	56.1	61.4
8	11	=109	University of California, Santa Cruz	United States	1965	36.8	42.7	100.0	33.8	54.6	58.8
9	12	=103	University of Warwick	United Kingdom	1965	45.6	54.4	68.2	35.6	85.7	57.8
10	8	120	Paris-Sud University	France	1971	45.6	40.5	87.7	28.9	62.7	57.5
11	9	=103	Pierre and Marie Curie University	France	1971	54.4	29.6	83.3	33.4	64.7	55.9
12	=13	=165	Pompeu Fabra University	Spain	1990	30.4	37.6	88.3	35.9	63.2	52.5
13	-	=182	Sabanci University	Turkey	1996	31.9	37.0	88.5	42.9	44.6	51.6
14	=17	192	City University of Hong Kong	Hong Kong	1984	36.3	43.2	68.6	49.8	71.3	51.0
15	16	201-225	Ulm University	Germany	1967	46.0	31.7	73.0	56.7	54.1	50.7
16	15	201-225	University of Texas at Dallas	United States	1969	33.4	40.3	77.8	41.6	55.4	50.6
17	=17	=180	Paris Diderot University - Paris 7	France	1970	31.5	25.3	92.2	29.1	67.4	50.5
18	=13	201-225	University of Illinois at Chicago	United States	1965	51.9	42.6	55.1	40.7	53.4	49.9
=19	-	201-225	University of Dundee	United Kingdom	1967	30.2	30.1	84.4	47.7	64.5	49.4
=19	20	226-250	University of Konstanz	Germany	1966	38.9	47.7	59.4	52.5	57.0	49.4
21	47	226-250	University of Technology, Sydney	Australia	1988	34.6	45.3	58.7	40.1	86.9	49.1
22	19	226-250	University of Calgary	Canada	1966	42.0	41.5	59.4	41.5	63.1	48.6
23	30	201-225	Hong Kong Polytechnic University	Hong Kong	1994	37.9	45.7	56.5	42.6	69.9	48.4
24	21	226-250	University of Milan-Bicocca	Italy	1998	35.8	33.4	76.6	45.0	40.6	47.9
25	29	226-250	Brunel University London	United Kingdom	1966	28.6	30.6	75.3	31.9	88.8	47.8
26	-	251-275	University of Bremen	Germany	1971	43.9	39.5	55.7	46.3	53.0	46.8
27	=24	226-250	Simon Fraser University	Canada	1965	29.3	39.6	67.6	41.8	61.4	46.6
28	=31	201-225	Bilkent University	Turkey	1984	30.3	32.1	76.0	46.4	44.6	46.0
29	23	226-250	Autonomous University of Barcelona	Spain	1968	35.1	36.0	67.0	34.6	46.4	45.8
30	28	251-275	University of Newcastle	Australia	1965	30.9	39.9	57.5	75.6	70.6	45.7
=31	-	276-300	Lappeenranta University of Technology	Finland	1969	33.3	37.6	59.9	73.8	59.1	45.5
=31	33	276-300	University of Wollongong	Australia	1975	32.4	40.2	55.1	44.7	80.4	45.5
33	=31	276-300	Queensland University of Technology	Australia	1989	36.7	47.9	42.9	71.9	69.8	45.3
34	=24	251-275	Swedish University of Agricultural Sciences	Sweden	1977	35.1	34.8	59.9	99.8	49.6	45.1
35	=49	276-300	University of South Australia	Australia	1991	33.7	34.9	52.7	83.9	80.8	44.5
36	26	276-300	Montpellier University*	France	1970	30.8	32.1	67.4	33.6	56.6	44.2
=37	36	251-275	Medical University of Vienna	Austria	2004	33.6	20.0	71.1	33.7	73.1	43.7
=37	=42	276-300	Plymouth University	United Kingdom	1992	23.9	25.8	80.5	28.8	51.3	43.7
39	-	276-300	University of Macau	Macau	1981	22.4	30.2	68.1	33.6	73.3	42.6
40	27	301-350	Sharif University of Technology	Iran	1966	32.8	46.1	50.4	86.2	19.4	42.4
41	=42	351-400	National Taiwan University of Science and Technology	Taiwan	1974	35.3	61.0	30.9	82.0	26.7	42.2
=42	=34	301-350	University of Bath	United Kingdom	1966	36.0	34.5	47.5	36.7	76.1	42.0
=42	=37	301-350	State University of Campinas	Brazil	1966	52.3	50.9	28.0	44.5	20.7	42.0
44	=37	301-350	University of Southern Denmark	Denmark	1966	24.8	28.8	61.2	72.6	67.1	41.3
45	59	301-350	Deakin University	Australia	1974	25.9	29.4	57.5	30.6	71.8	40.0
46	58	301-350	Autonomous University of Madrid	Spain	1968	34.5	24.0	59.7	32.2	48.8	39.9
47	56	301-350	University of Stirling	United Kingdom	1967	27.2	36.1	49.9	30.7	66.9	39.7
48	69	301-350	Charles Darwin University	Australia	1989	27.0	26.0	64.5	32.7	45.5	39.5
49	40	351-400	National Sun Yat-Sen University	Taiwan	1980	34.2	48.1	39.0	47.0	24.2	39.4
50	=44	301-350	University of Tsukuba	Japan	1973	40.3	27.6	51.1	36.9	36.1	39.3

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2015 rank	2014 rank	2014-15 WUR position	Institution	Country	Year founded	Teaching	Research	Citations	Industry income	International outlook	Overall score
=51	48	301-350	University of Crete	Greece	1973	24.9	24.1	67.0	36.0	47.0	39.2
=51	41	301-350	Koç University	Turkey	1993	25.1	30.5	58.5	50.6	49.8	39.2
=51	39	351-400	Umeå University	Sweden	1965	27.0	35.8	52.7	31.3	50.3	39.2
54	=60	351-400	Ruhr University Bochum	Germany	1965	39.6	30.8	42.0	47.4	53.6	38.9
55	53	351-400	University of Eastern Finland	Finland	1969	31.4	30.5	53.8	32.8	44.1	38.8
56	=87	351-400	University of Western Sydney	Australia	1989	22.9	32.2	58.7	30.4	50.1	38.7
=57	55	351-400	Aalborg University	Denmark	1974	29.8	38.8	39.9	43.9	65.8	38.6
=57	51	351-400	Bielefeld University	Germany	1969	35.2	26.1	52.0	37.4	48.6	38.6
=59	=67	301-350	University of Duisburg-Essen	Germany	2003	28.6	19.5	64.1	44.2	49.2	38.5
=59	57	351-400	George Mason University	United States	1972	34.2	28.9	53.9	28.7	35.8	38.5
=59	46	351-400	Linköping University	Sweden	1975	24.8	37.1	51.5	-	50.9	38.5
=59	-	301-350	University of Marrakech Cadi Ayyad	Morocco	1978	21.9	9.7	83.0	28.6	45.1	38.5
63	=92	351-400	Isfahan University of Technology	Iran	1977	26.6	40.1	48.9	84.1	20.0	38.3
64	75	351-400	University of Minho	Portugal	1973	26.0	23.3	60.6	44.5	49.7	37.8
=65	54	351-400	Claude Bernard University Lyon 1	France	1971	23.9	22.8	62.6	33.6	52.1	37.6
=65	=60	351-400	Murdoch University	Australia	1973	27.9	26.1	46.5	40.5	85.3	37.6
=65	63	-	University of Surrey	United Kingdom	1966	36.2	31.2	33.7	35.4	84.6	37.6
=65	-	351-400	Swinburne University of Technology	Australia	1992	26.6	23.7	50.2	38.8	86.9	37.6
69	79	-	Aveiro University	Portugal	1973	30.4	33.9	46.1	41.9	42.5	37.4
70	81	351-400	Aston University	United Kingdom	1966	24.8	30.9	45.1	35.7	79.7	37.1
71	=60	351-400	University of Hertfordshire	United Kingdom	1992	21.3	15.9	65.0	29.6	74.9	37.0
72	=49	351-400	Bayreuth University	Germany	1975	27.3	17.6	61.8	34.8	53.9	36.9
=73	65	-	University of Maryland, Baltimore County	United States	1966	28.7	24.1	57.5	33.2	36.0	36.6
=73	64	351-400	UiT The Arctic University of Norway	Norway	1968	26.9	23.7	53.2	38.8	60.0	36.6
=75	=92	-	Dublin City University	Republic of Ireland	1989	35.0	31.6	31.9	49.6	77.1	36.5
=75	=100	-	La Trobe University	Australia	1967	30.3	38.4	31.4	42.8	71.6	36.5
=77	=82	-	Flinders University	Australia	1966	28.2	34.4	41.7	39.4	55.4	36.4
=77	52	-	Heriot-Watt University	United Kingdom	1966	32.8	28.9	34.8	46.1	84.0	36.4
79	=73	-	Florida International University	United States	1972	35.1	26.2	46.6	32.4	38.8	36.1
80	66	-	University of Rovira i Virgili	Spain	1991	25.5	21.0	62.2	31.6	35.1	36.0
81	=82	351-400	Curtin University	Australia	1987	25.0	23.5	45.3	36.1	91.3	35.9
82	=84	-	Griffith University	Australia	1971	25.7	30.3	41.7	34.6	75.1	35.8
83	=71	-	Loughborough University	United Kingdom	1966	36.5	37.4	25.5	44.3	63.8	35.7
84	=100	351-400	University of Rome III	Italy	1992	24.7	16.8	62.1	37.7	48.0	35.6
=85	-	351-400	University of Portsmouth	United Kingdom	1992	20.9	14.9	61.6	29.2	73.3	35.4
=85	=84	-	Université du Québec à Montréal	Canada	1969	28.3	31.4	47.0	30.3	35.4	35.4
87	70	-	Johannes Kepler University of Linz	Austria	1966	27.0	26.3	42.9	39.3	60.9	34.4
88	76	-	University of Vigo	Spain	1989	27.0	13.9	60.9	35.6	27.8	33.5
89	=87	-	New University of Lisbon	Portugal	1973	25.3	25.0	46.1	37.8	46.9	33.4
=90	-	-	Edith Cowan University	Australia	1991	23.4	20.5	45.3	33.8	69.1	32.8
=90	98	-	Tampere University of Technology	Finland	1965	30.6	27.0	32.3	63.1	56.0	32.8
=90	-	-	University of Ulsan	South Korea	1970	24.6	36.8	38.5	62.6	17.1	32.8
93	80	-	University of Kent	United Kingdom	1965	25.4	24.6	37.0	29.2	76.4	32.6
94	94	-	Dublin Institute of Technology	Republic of Ireland	1992	20.7	11.5	56.9	-	62.2	31.9
95	-	-	Ulster University	United Kingdom	1984	23.4	24.7	37.0	30.2	73.9	31.8
96	=96	-	Concordia University	Canada	1974	26.4	31.1	28.3	31.3	67.9	31.6
=97	-	-	City University London	United Kingdom	1966	29.5	28.1	23.6	30.1	80.2	31.1
=97	-	-	RMIT University	Australia	1992	27.7	20.0	33.6	36.2	77.7	31.1
=97	77	-	Polytechnic University of Valencia	Spain	1968	26.0	16.6	50.7	38.2	28.1	31.1
100	=96	-	National Yang-Ming University	Taiwan	1975	36.0	29.4	30.9	31.3	17.3	31.0

Note \* Data refer to Montpellier 2 University, which merged with Montpellier 1 University to become Montpellier University in January 2015

# Red shift favours the East

The 100 Under 50 is the only *Times Higher Education* global ranking where the Asia-Pacific region outperforms the traditionally dominant Western powerhouses of North America and Europe, a fact that suggests a bright future for the rising Eastern powers. This spider graph shows the collective performance of the East (red) against the West (blue) in all five of our assessment categories: teaching (the learning environment); research (volume, income and reputation); citations (research influence); international outlook (staff, students and research); and industry income (innovation). Top performers are highlighted in each category.

## ASIA AND ASIA-PACIFIC

Universities from Australia, Hong Kong, Japan, Macau, Singapore, South Korea, Taiwan

The graph demonstrates that the East outperforms the West across four of the five assessment categories, with a collective overall score of **44** compared with the West's **42.2**. The Korea Advanced Institute of Science and Technology (KAIST), ranked third in the overall 100 Under 50 table, comes top for its teaching environment and shares pole position for knowledge transfer, as judged by the amount of income it attracts from industry.

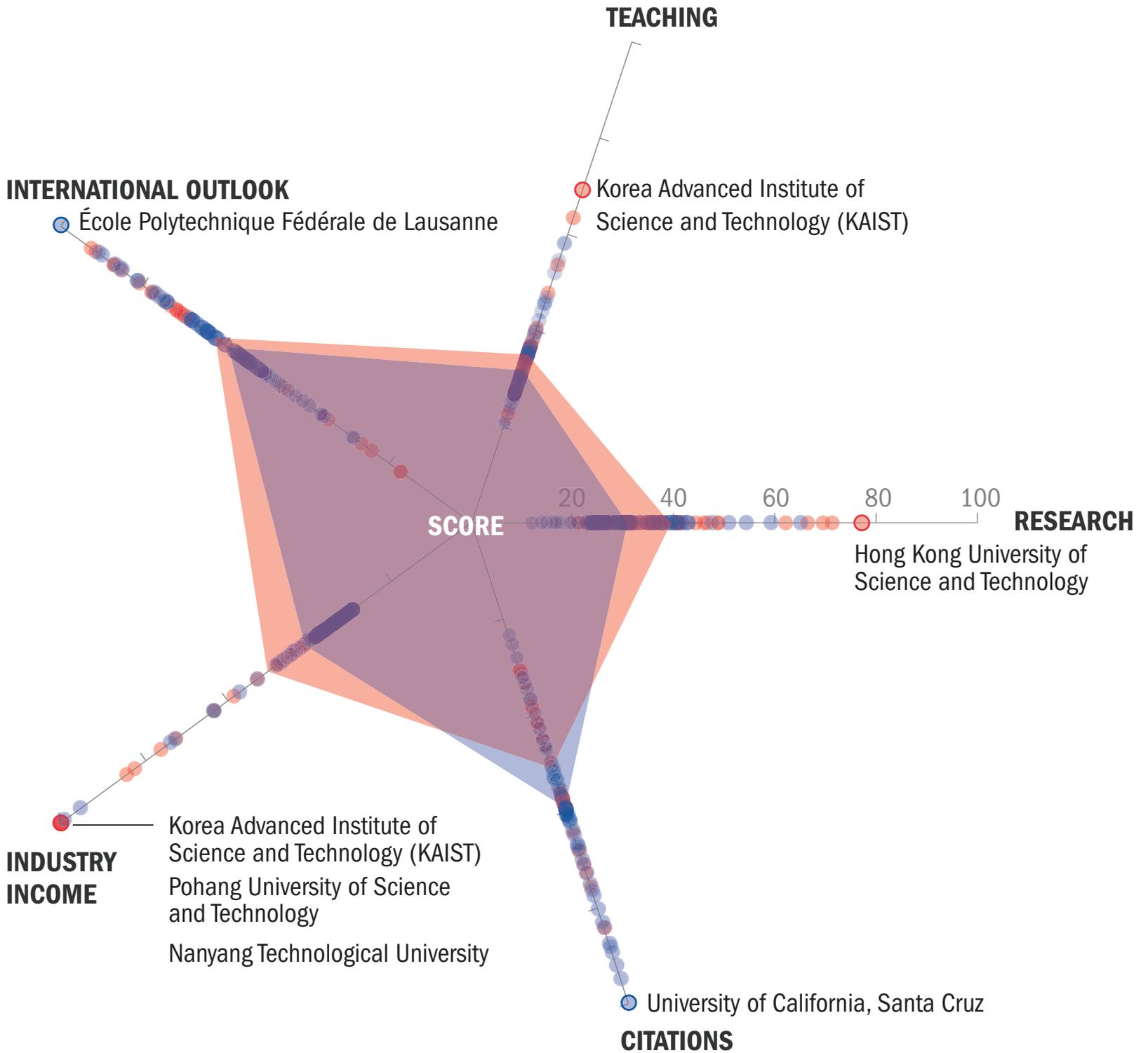
OVERALL SCORE: 44

## WESTERN EUROPE AND NORTH AMERICA

Universities from North America (Canada, United States) and Europe (Austria, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Portugal, Republic of Ireland, Spain, Sweden, Switzerland and United Kingdom)

While the East dominates the ranking, there remains one key area where Western institutions stand out: research impact. This category is judged by analysing research paper citations, an area where the prevalence of English language journals gives the anglophone world an advantage. The University of California, Santa Cruz takes top spot in this category.

OVERALL SCORE: 42.2



In 1970 Graeme Clark joined the University of Melbourne with a research vision.



1970

**Graeme Clark joins the University of Melbourne to research a cochlear implant.**

Though creating an implant seemed like an impossibly tall order, Professor Clark dedicated years to its research and development. His colleagues said a cochlear implant wouldn't work because the inner ear was just too complicated.

1978

**In 1978, the first cochlear implant surgery took place.**

Professor Clark and his dedicated team discovered how speech could be coded with multi-channel electrical stimulation.

*"It was the moment I had been waiting for. I went into the adjoining room and cried for joy."*

1981

**From his success, Cochlear Limited was formed.**

Its purpose: to make Professor Clark's innovative multi-channel cochlear implant commercially available all over the world.

1985

**The Bionic Ear Institute was born.**

In 1985 Clark founded The Bionic Ear Institute – an independent, non-profit, medical research organisation that partnered with the University of Melbourne and Cochlear.



Today

Today, hundreds of thousands of severely or profoundly deaf children and adults worldwide have received a cochlear implant. Thanks to his relentless dedication, they've all been given the opportunity to interact more fully with their world.

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# Methodology

The 100 Under 50 tables give less weight to reputation, a measure often associated with past glories

The *Times Higher Education* 100 Under 50 ranking applies the same 13 performance indicators as the *THE* World University Rankings to provide the most comprehensive and balanced comparisons, which are trusted by students, academics, university leaders, industry and even 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** (innovation). However, to fit the 100 Under 50's focus, reputation counts for less, as befits a study of more recent arrivals on the academic scene.

## Exclusions

Universities are excluded from the 100 Under 50 if they do not teach undergraduates or if their research output amounted to fewer than 1,000 articles between 2008 and 2012 (200 a year).

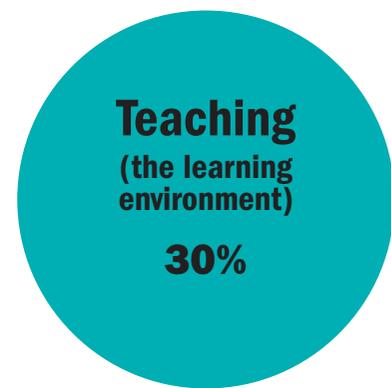
## Data collection

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 – which affects only low-weighted indicators such as industrial income – we enter a low estimate between the average value of the indicators and the lowest value reported: the 25th percentile of the other indicators. 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.

## Scores

To calculate the overall rankings, “Z-scores” were created for all datasets except for the results of the academic reputation survey. The calculation of Z-scores standardises the different data types on a common scale and allows fair comparisons between different types of data – essential when combining diverse information into a single ranking. Each data point is given a score based on its distance from the mean average of the entire dataset, where the scale is the standard deviation of the dataset.

The Z-score is then turned into a “cumulative probability score” to arrive at the final totals. If University X has a cumulative probability score of 98, for example, then a random institution from the same data distribution will fall below University X 98 per cent of the time. For the results of the reputation survey, the data are highly skewed in favour of a small number of institutions at the top of the rankings, so in 2011-12 we added an exponential component to increase differentiation between institutions lower down the scale, a method we have retained.



Reputation survey  
10%

This category includes the results of the Academic Reputation Survey carried out in spring 2014. It examined the perceived prestige of institutions in teaching. The responses were statistically representative of the global academy's geographical and subject mix.

Staff-to-student ratio  
6%

Doctorate-to-bachelor's ratio  
3%

Doctorates awarded to academic staff ratio  
8%

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  
3%

This measure of income is scaled against staff numbers and normalised for purchasing-power parity. 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)

**30%**

### Reputation survey **12%**

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.

### Research income **9%**

Research income is scaled against staff numbers and normalised for purchasing-power parity. 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.

### Research productivity **9%**

We count the number of papers published in the academic journals indexed by Thomson Reuters per academic, scaled for a university's total size and also normalised for subject. This gives an idea of an institution's ability to get papers published in quality peer-reviewed journals.

## 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 number of times a university's published work is cited by scholars globally. Thomson Reuters examined more than 50 million citations to 6 million journal articles, published over five years. The data are drawn from the 12,000 academic journals indexed by Thomson Reuters' Web of Science database and include all indexed journals published between 2008 and 2012. Citations to these papers made in the six years from 2008 to 2013 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 collective understanding, irrespective of discipline.

The data are fully 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 exclude from the rankings any institution that publishes fewer than 200 papers a year to ensure that we have enough data to make statistically valid comparisons.

## International outlook (staff, students, research)

**7.5%**

### International-to- domestic-student ratio **2.5%**

### International-to- domestic-staff ratio **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.

### Research **2.5%**

In the third international indicator, we calculate the proportion of a university's total research journal 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 (innovation)

**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, 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.

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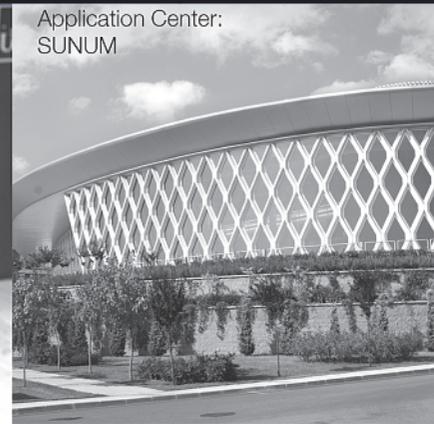


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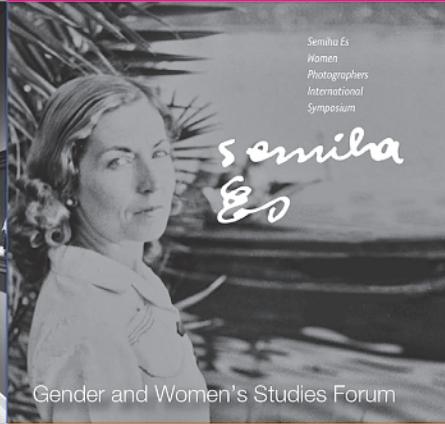
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# Swiss precision

EPFL is the world's leading 100 Under 50 university: its president, Patrick Aebischer, explains why the institution has risen so high, so fast



**Patrick Aebischer**  
President, École Polytechnique Fédérale de Lausanne

In the not-so-distant past, competition for university funds and talent, as well as performance benchmarking, was limited to national borders. Today, however, the academic landscape is global and increasingly competitive: some would even say it is a battlefield.

In 1969, our institution, then known as École Polytechnique de l'Université de Lausanne, became an independent federal body under its current name, École Polytechnique Fédérale de Lausanne, or EPFL. Financed by the Swiss federal government, it initially had a remit to train engineers for domestic industry. By the turn of the millennium, however, 27 per cent of EPFL's 5,000 students and 37 per cent of its 198 academics came from overseas. Today, with 50 per cent of its 10,000 students and close to 70 per cent of its 390 faculty members hailing from abroad, EPFL is considered one of the world's most international academic environments – and justifiably so.

In less than a decade, the university has reinvented itself by changing its structure and developing a new corporate culture. Strongly positioned in the world rankings, EPFL has carved out a reputation as a high-quality teach-



ALAMY

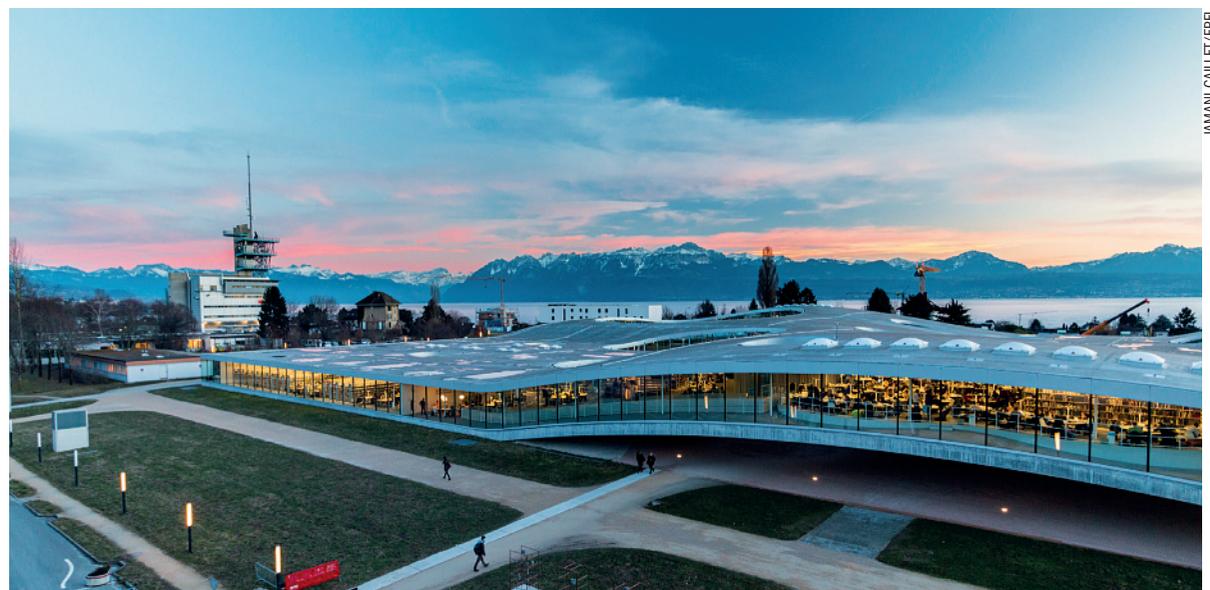
ing and research hub in the heart of Europe. Equally importantly, it is a linchpin in the learning and economic ecosystem that makes up the Lake Geneva area, collaborating closely with other educational establishments, teaching hospitals, local industry and multinationals to ensure continued development and economic growth.

EPFL's senior management took a proactive approach to positioning the school on the global stage by reinterpreting its three core missions: education, research and technology transfer. From the academic point of view, the university's 13 departments were

reorganised into five schools and two colleges, each managed by an executive dean. This was important as it broke down established departmental boundaries, creating opportunities for scientific cross-fertilisation and the emergence of transdisciplinary research centres and programmes.

At the beginning of the millennium, not all the ingredients and academic expertise necessary for realising our ambitions were in place. But by creating new schools such as Life Sciences, Basic Sciences and Humanities, we were able to achieve critical mass in many key research domains. Integrating external research centres such as

“  
We have achieved critical mass in many key research domains”



JAMANI CHILLET/EPFL

# A Unique learning experience at a Caring university



- A publicly funded university founded in 1956
- Undergraduate and postgraduate programmes in Arts, Business, Chinese Medicine, Communication, Science, Social Sciences and Visual Arts
- Internationally experienced and caring faculty and staff members
- English as medium of instruction
- Full scholarships for academically outstanding students
- City campus located in transport hub



corporate video

“EPFL is internationally acclaimed but more rooted to the local economy”



the Swiss Institute for Experimental Cancer Research and the Institute of Microengineering at the University of Neuchâtel further contributed to this consolidation of the regional academic landscape.

Our reorganisation opened the door for collaboration and was essential to EPFL's increased success in attracting research funding, renowned scientists and outstanding students.

As Donald Kennedy, a former president of Stanford University, put it, “a university is its faculty”. EPFL's transformation could not have occurred without an aggressive hiring policy that targets world-class senior academics and promising newcomers. Offering competitive packages in terms of salaries, start-up deals and baseline budgetary support, world-class facilities and technical infrastructure in a highly stimulating and open environment has proved to be a blueprint for success.

In parallel to this, EPFL introduced the position of “tenure-track assistant professor” – a rather bold concept in continental Europe – in an effort to attract the world's best

young researchers. In addition to benefiting from excellent salaries, start-up money and facilities, young professors are not left to fend for themselves, but are regularly assessed and coached by senior scholars.

Both programmes have proved to be extremely successful: over the past decade, 70 per cent of EPFL's academic positions have been renewed; in 2014, of our 390 academics, 60 were tenure-track. The benefits of having a body of young and highly motivated scientists on board is shown by our outstanding success rate in obtaining prestigious European Research Council funding: since 2007, EPFL has attracted 94 ERC grants with a total value of more than €220 million (£159 million). Competitive researchers attract competitive funding.

EPFL's third mission consists of helping to create jobs and companies by transferring the ideas and technologies generated in its laboratories to the industrial and economic sectors. Innovation and technology transfer are strategically positioned under a dedicated vice-president and the institution has developed several tools to close the innovation gap: for example, we have put in place liaison officers and innovation coaches to act as a bridge between industry's technological needs and our scientific research potential; we have created schemes for the management of intellectual property; we have established Innogrants, an internal seed-funding programme for EPFL researchers with entrepreneurial flair; and we have secured better access to the local small-business

network. It is no accident that in 2014, EPFL start-ups raised a record €220 million and 24 fledgling companies left our labs.

Various strategic partnership models have been developed to attract leading companies to the EPFL Innovation Park. The goal is to establish relationships that foster sustainable innovation, technology transfer and knowledge exchange.

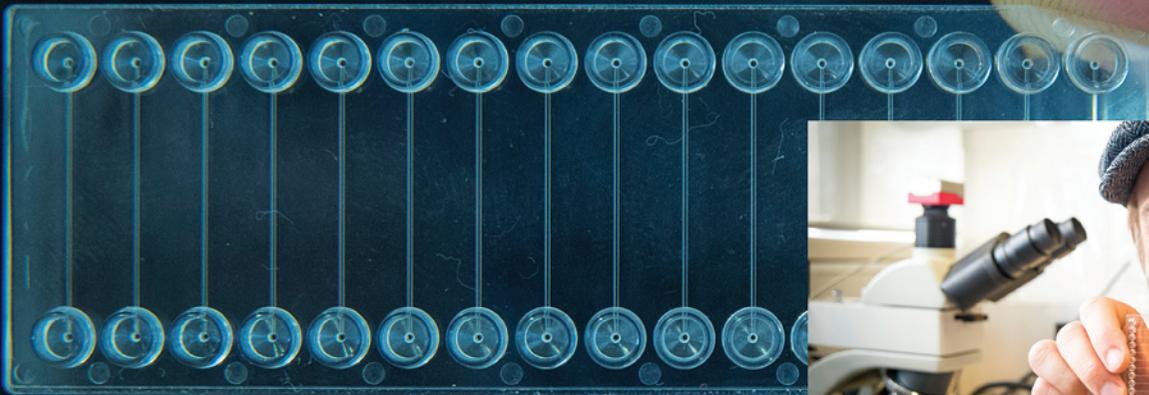
Such models can take the form of multidisciplinary research initiatives, technology incubators or sponsored centres of expertise. More than 20 global companies including Nestlé, Crédit Suisse, Logitech, Cisco, Intel, Siemens and PSA Peugeot Citroën are currently located on campus.

On the educational front, EPFL is a European leader in the development of massive open online courses and other web tools. We believe that Moocs will play an important role in the future of higher education, but we also see them as tools for lifelong learning programmes and for higher education capacity building in Africa and other developing parts of the world today.

EPFL has come a long way in less than 50 years and since 2000 has embarked on an ambitious programme for development. If we were to choose two keywords to describe us, they would be “competitive” and “innovative”. The school is now larger but less dependent on state funding; internationally acclaimed but more strongly rooted to the local economy; and on the right track to meet the challenges facing global higher education. ●



# RESEARCH WITH GLOBAL IMPACT



**Deakin University, Australia, takes pride in creating a supportive research environment for our faculty and students. And as a young, dynamic university we are willing to dare to be innovators in the lab and in the classroom.**

With an international outlook and a commitment to research driven by the needs of communities and the global marketplace, Deakin is forging research partnerships with institutions and industry players throughout the world.

The results speak for themselves: International publications by Deakin researchers nearly tripled between 2009 and 2013, and we continue to rapidly climb in global research rankings.

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A discovery at Deakin University is set to launch a new era of disease diagnostics that could transform healthcare in developing countries.

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# Spring in their step

New universities' flexibility, chutzpah and willingness to innovate offer many advantages over older competitors, argues **Brian MacCraith**



**Brian MacCraith**  
President, Dublin City University

*“Youth is nimble, Age is lame;  
Youth is hot and bold, Age is weak  
and cold;  
Youth is wild and Age is tame”*  
**William Shakespeare (attributed)**

There are many challenges facing university leaders today. These include the increasing cost of higher education; technology's manifold effects on learning; globalisation; the pressure to prepare graduates for a rapidly changing, knowledge-based society; and greater student mobility. Of course, many of these issues overlap, but perhaps the overriding challenge is maintaining quality in a globally competitive market while simultaneously achieving budgetary sustainability. Such challenges exist to varying degrees for all universities, public and private, but they are all the more acute for young ones.

The number of higher education institutions worldwide is growing rapidly. In 2012, the *International Handbook of Universities*, published by the International Association of Universities (an official partner of Unesco), listed more than 15,000 of them; the 2014 edition identified more than 18,000 in 180 countries. Young universities have to address the same challenges as their older counter-

parts but without many of the advantages, such as generous endowments, established alumni networks and international brands developed (in many cases) over the centuries. Moreover, global rankings provide further benefits for veteran universities by placing substantial emphasis on “reputation”, where youth is clearly at a disadvantage (after all, it takes time to accrue esteem).

But youth confers many advantages, too. Young universities are unhampered by tradition and outdated modes of operation. They tend to be agile, dynamic and keen to adopt modern organisational practices. This makes them more responsive to societal and economic developments nationally and globally, ensuring the relevance of their teaching and research to students, scholars and partners. Moreover, such institutions attract leaders who wish to make a difference rather than simply maintain the status quo.

Successful young universities share many characteristics – unsurprising, given their degree of alignment with global needs. They tend to be innovative and more willing to engage with enterprise and civic society. This entrepreneurial

culture infuses all their activities with an energy and excitement that spreads to students and staff. Typically, young universities are not comprehensive in terms of their disciplinary offerings, but this enables them to focus on and prioritise their niche strengths.

Dublin City University, established in 1989, is one of the Republic of Ireland's young universities. We are pleased to have made the *Times Higher Education* 100 Under 50 every year since it was first published in 2012. Our current strategy is encapsulated in one distinctive vision: to be a research-intensive, globally engaged “University of Enterprise” distinguished by the quality and impact of its graduates and its focus on translating knowledge into societal and economic benefit.

The “University of Enterprise” branding refers not only to the innovative mindsets we seek to foster in our students, but also to our deep engagement with various forms of enterprise – social, cultural, commercial and so on. Through strong commitment to the excellence of our students' learning experience, we aim to produce graduates who can flourish in a dynamic, challenging 21st-century world.

Of course, youth in itself is not a recipe for success in the global academy. Although it confers certain advantages, these must be leveraged in a strategic fashion. Successful young universities are brave; they take risks; they try out new ideas regularly; and they embed a culture of innovation across their communities. They make a positive impact by translating the knowledge that they create through research into benefits for all.

The *THE* 100 Under 50 has played an important role in shining a light on this new breed of universities and encouraging their behaviour. I am reminded of the old Irish proverb: “*Mol an óige agus tiocfaidh sí*” – “Praise youth and it will prosper”. ●



“Successful young universities are brave; they take risks”



## Major Fields of Study

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# Bilkent University

Ankara, Turkey

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# 100% future-proof

One Australian institution is producing a generation of graduates fully prepared for the workplaces of today and tomorrow, writes Attila Brungs



**Attila Brungs**  
Vice-chancellor and president,  
University of Technology, Sydney

The University of Technology, Sydney seeks to apply creativity and innovation to all its endeavours. Although not yet 30 years old, it has a bold vision: to become a world-leading university of technology.

UTS has a distinct model of learning, a strong research record and a reputation for engagement with industry and the professions. We have a culturally diverse campus and international exchange programmes designed to prepare graduates for the workplaces of today and tomorrow.

Located at the southern gateway to Sydney's business district, the university sits at the heart of Australia's creative sector, surrounded by 40 per cent of its head offices and 80 per cent of the country's major international IT companies.

UTS has developed a reputation for quality: for example, the most recent Excellence in Research for Australia assessment exercise identified it as one of the few national universities rated world class or

higher across all areas of work.

Having come so far in less than three decades, we now have the ideal platform to take our ambitions to the next level. We have invested A\$1.2 billion (£620 million) in our campus, including the new Faculty of Engineering and Information Technology and the Faculty of Science and Graduate School of Health buildings. And then there's the Dr Chau Chak Wing Building, designed by Canadian architect Frank Gehry for the UTS Business School.

The entire campus is designed to enable collaboration, innovation and the exchange of ideas between academics, students and industry partners, as well as providing access to world-class facilities: these include the UTS Data Arena, an immersive and interactive 3D visualisation facility; and the Super Lab, one of only two in the country, which can accommodate up to 200 students and run a number of classes from different

disciplines simultaneously.

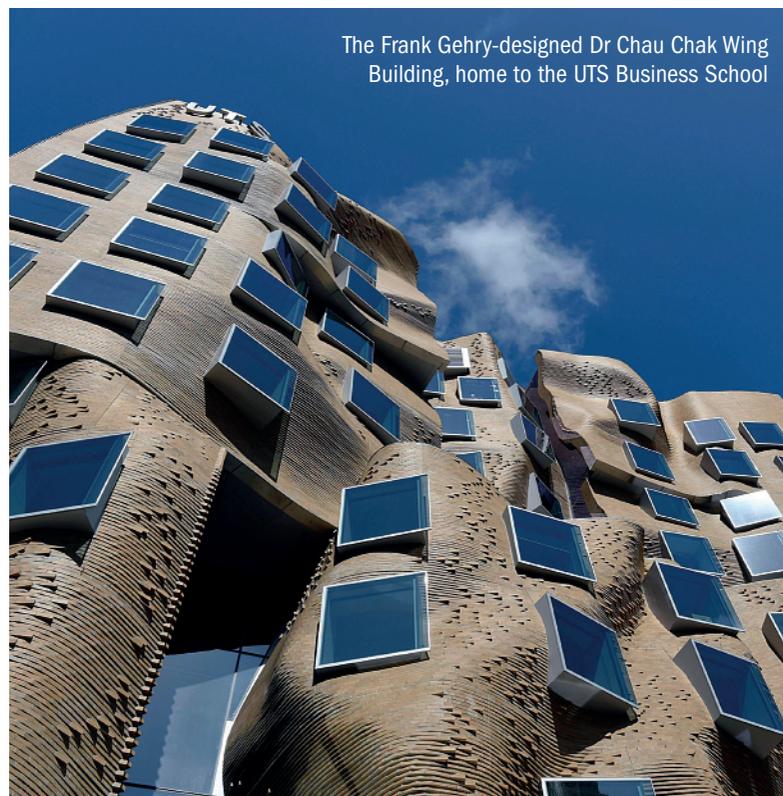
The campus and facilities support our distinctive teaching and research approach. We seek to ensure that our graduates are both work-ready and recognised as such, equipped with discipline-specific knowledge, critical thinking and professional skills. We blend face-to-face and group learning with technology to equip students with essential professional attributes such as communication skills within specific, business-related contexts. Our cutting-edge campus helps to provide a learning experience that ensures that UTS alumni are well prepared for the jobs of the future.

Our research is driven by a desire to deliver solutions for real-world problems at all levels, from national organisations to small- and medium-sized enterprises. UTS' research centres span a range of disciplines, including applied economics, environmental sciences, nursing and quantum computing.

Our outlook is international, too: our Key Technology Partnerships programme has led to the establishment of research relationships with overseas institutions including Huazhong University of Science and Technology, the Indian Institute of Science, Bangalore and the University of Dundee. These partnerships underpin joint research centres, research programmes and staff and student exchanges.

Our international outlook is complemented by our student and staff mix: we take pride in being a global university, attracting and retaining staff from across the world.

Education is fundamental to prosperity: it can transform lives and forge a better future. We are doing just that through our research and the graduates whom we produce. We work to ensure that they have the skills and attributes needed to succeed in a dynamic and rapidly changing world. Above all, we enable them to give back to society and the community through the education they receive. ●



The Frank Gehry-designed Dr Chau Chak Wing Building, home to the UTS Business School

“ Education has the power to transform lives and deliver a better future ”

# LAPPEENRANTA UNIVERSITY OF TECHNOLOGY

WE ARE THE TRAILBLAZERS.  
SHOWING THE WAY, NEVER FOLLOWING.

## WE ARE COMMITTED TO AN ALTERNATIVE PATH

- » Energy solutions that favour renewables
- » Sustainable and smart business models
- » A waste-free world, where we recycle everything
- » Clean water for all
- » The promotion of new green-collar entrepreneurship to boost growth in Europe

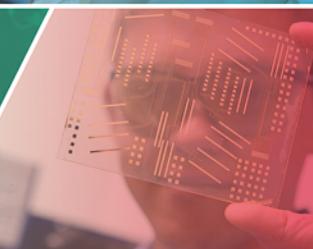
**~3,000,000**  
new or renovated sq. ft. and  
**\$1,000,000,000**  
in development added to  
campus in the last decade



Enrollment increase of  
**111%**  
since the year 2000



**130+** programs



Research dollars amounting to  
**\$99.7m**  
in 2014



**D**ynamic growth and unbridled innovation are only a few of the reasons that *Times Higher Education* ranks The University of Texas at Dallas #1 in Texas and #16 in the world among universities under 50 years of age. Our internationally renowned faculty—including several members of the National Academy of Sciences and the National Academy of Engineering—collaborate with students who come from more than 100 countries.

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[utdallas.edu](http://utdallas.edu)

