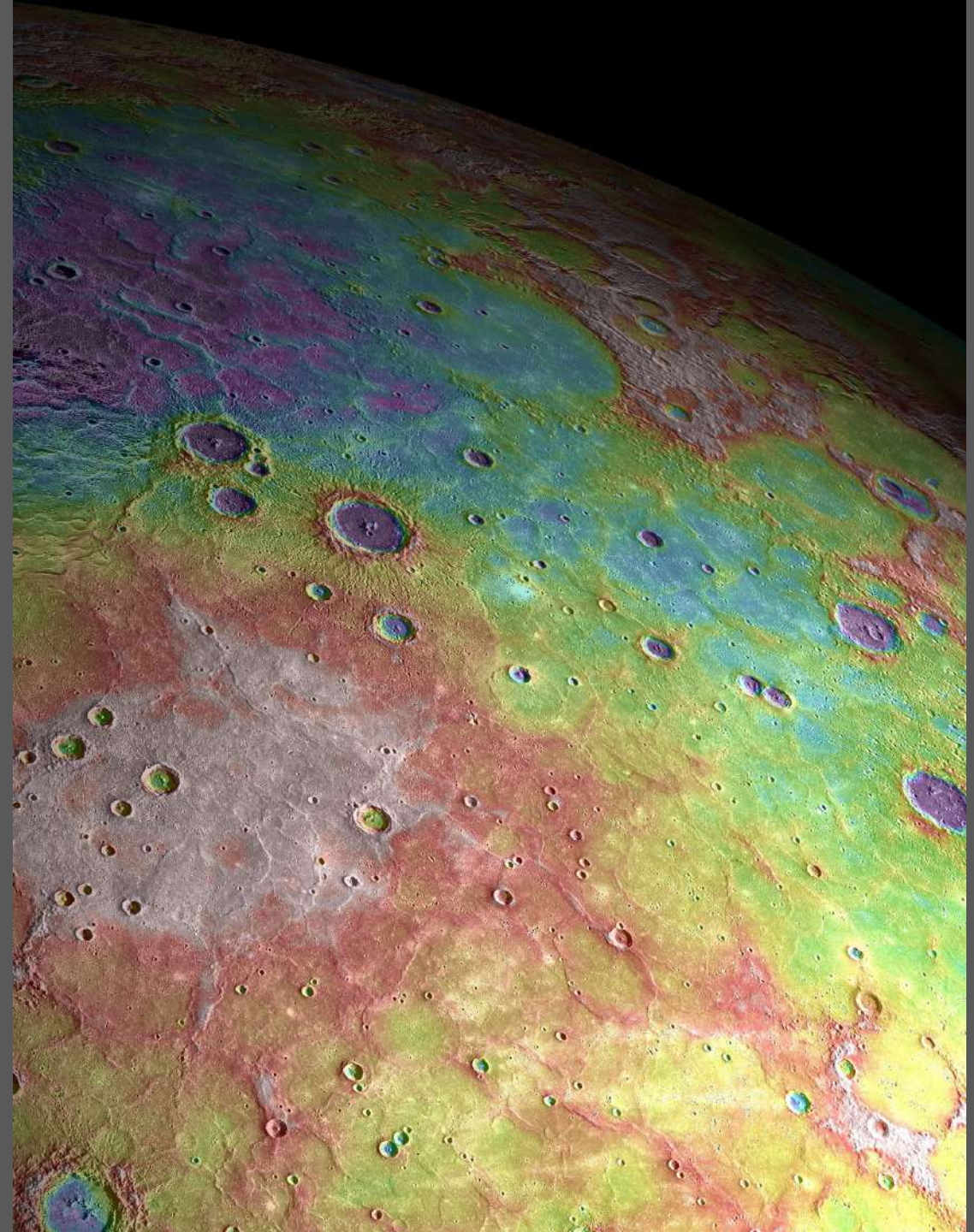


GLOBAL TRENDS IN HIGHER EDUCATION

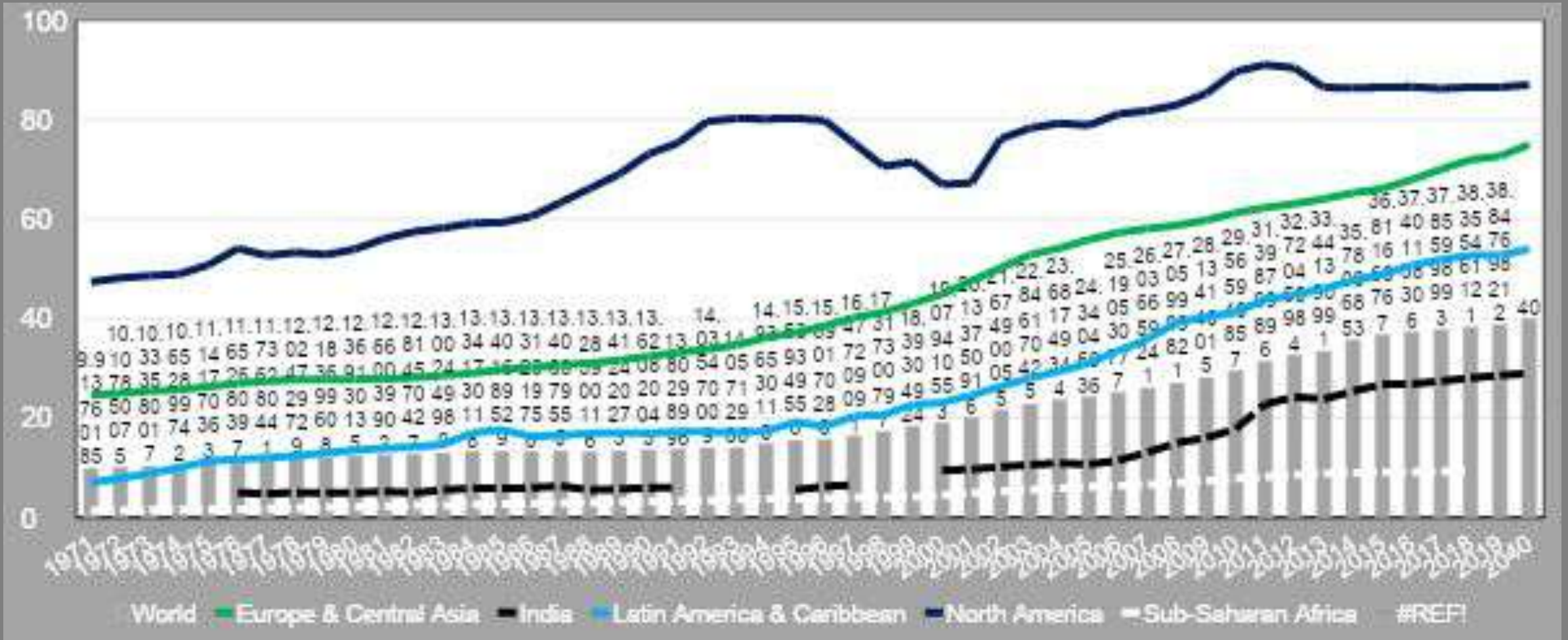
U GLASGOW MASTER CLASS 26 MAY 2022
SIMON MARGINSON, U OXFORD

'Hey, hey Woody Guthrie, I wrote you a song
Bout a funny ol' world that's a-comin' along
Seems sick an' it's hungry, it's tired an' it's torn
It looks like it's a-dyin' an' it's hardly been born'

~ *Song to Woody*, Bob Dylan, 1962



PARTICIPATION (%) BY SELECTED WORLD REGION 1971-2020

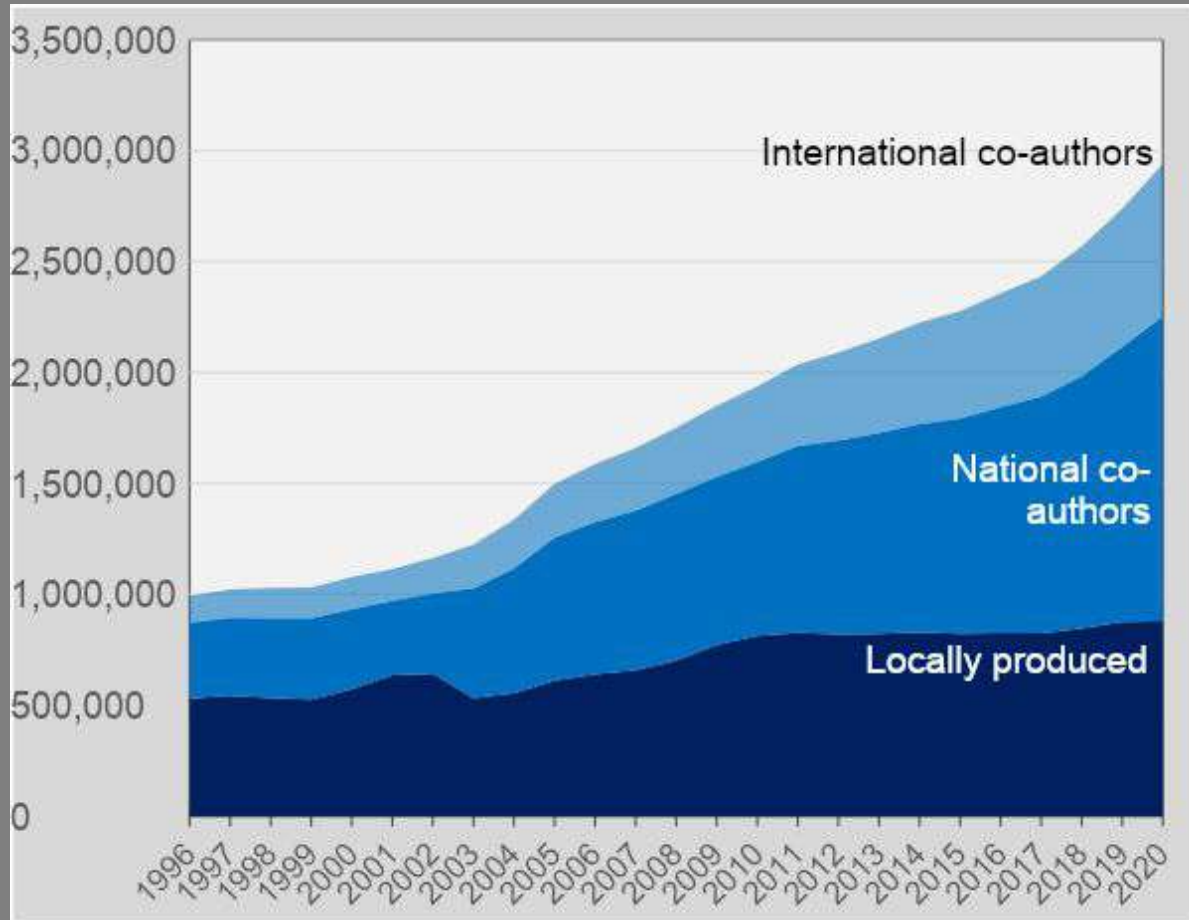


GROWTH OF GLOBAL HIGHER EDUCATION SINCE 1990

- Formation of a global science system (though with many exclusions). Global science papers grew 5.15% a year from 2000-2020 . One quarter of papers had international co-authors in 2020
- Internationally mobile students rose from 1 million to more than 6 million; immense growth in mobility of researchers and faculty
- University partnerships and consortia, hubs, branch campuses
- World-spanning role of online education and MOOCs
- Global university rankings regulate



NUMBER OF SCIENCE PAPERS IN SCOPUS (NSF 2022), BY TYPE OF COLLABORATION, WORLD: 1996-2020



GROWTH IN NUMBER AND PROPORTION OF INTERNATIONALLY CO-AUTHORED PAPERS, WORLD: 1996-2020



INTERNATIONALLY COLLABORATIVE PAPERS: 2016-2019

| university | country | Cross-border papers | Cross-border % 2006-09 | Cross-border % 2016-19 |
|--------------------------------|-----------|---------------------|------------------------|------------------------|
| Harvard U | USA | 44,071 | 36.0 | 53.4 |
| U Oxford | UK | 28,903 | 54.6 | 70.2 |
| U Toronto | CANADA | 27,583 | 43.7 | 58.2 |
| U College London | UK | 27,194 | 50.4 | 67.5 |
| U Cambridge | UK | 24,954 | 50.7 | 70.9 |
| Imperial College London | UK | 22,749 | 53.9 | 70.6 |
| Sorbonne U | FRANCE | 20,970 | 54.0 | 68.3 |
| U Copenhagen | DENMARK | 20,427 | 55.5 | 66.6 |
| Johns Hopkins U | USA | 19,835 | 33.3 | 46.2 |
| National U Singapore | SINGAPORE | 19,575 | 46.6 | 69.0 |
| U Melbourne | AUSTRALIA | 19,143 | 40.9 | 58.2 |
| Stanford U | USA | 18,714 | 31.8 | 46.9 |
| U Sao Paulo | BRAZIL | 18,638 | 31.0 | 48.2 |
| U Glasgow | UK | 9,769 | 47.8 | 65.0 |

GLOBAL STRATIFICATION OF HIGHER EDUCATION

Papers in the top 5% of the field by citation rate, 2016-19 papers, Leiden ranking 2021 using WoS data

| university | country | Top 5% papers | all papers | % of all papers in top 5% |
|-------------------------------|---------|---------------|------------|---------------------------|
| Harvard U | USA | 4230 | 34,234 | 12.4% |
| Stanford U | USA | 2117 | 16,454 | 12.9% |
| U Oxford | UK | 1696 | 16,088 | 10.5% |
| U Toronto | CANADA | 1691 | 23,454 | 7.2% |
| MIT | USA | 1586 | 10,507 | 15.1% |
| Tsinghua U | CHINA | 1574 | 21,225 | 7.4% |
| U Michigan | USA | 1490 | 18,756 | 7.9% |
| U Cambridge | UK | 1440 | 14,080 | 10.2% |
| Johns Hopkins U | USA | 1439 | 17,337 | 8.3% |
| U College London | UK | 1430 | 14,923 | 9.6% |
| Zhejiang U | CHINA | 1427 | 25,964 | 5.5% |
| U Pennsylvania | USA | 1290 | 13,568 | 9.5% |
| U Washington , Seattle | USA | 1288 | 14,807 | 8.7% |
| Columbia U | USA | 1234 | 12,558 | 9.8% |
| U California, Berkeley | USA | 1225 | 10,006 | 12.2% |





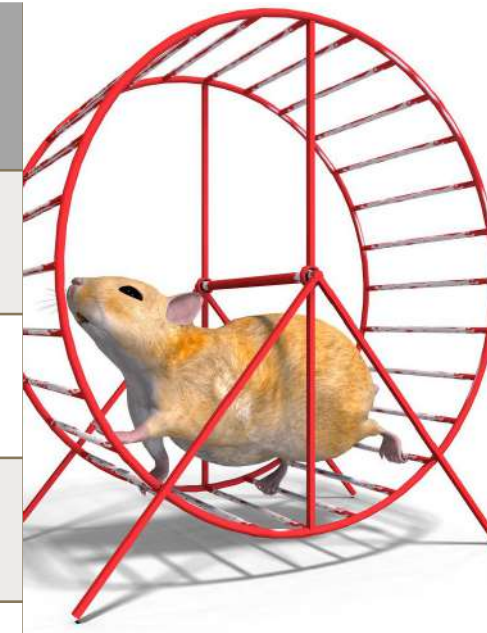
TOP UNIVERSITIES IN STEM RESEARCH, LEIDEN RANKING

(1) physical sciences & engineering, (2) mathematics & computing: papers in top 5% by citation rate: 2016-2019

| University | System | Physical sciences & engineering | | University | System | Maths & computing |
|---------------------------|-----------|---------------------------------|--|-----------------------------|-----------|-------------------|
| Tsinghua U | CHINA | 909 | | Tsinghua U | CHINA | 292 |
| MIT | USA | 683 | | U Electronic S&T | CHINA | 275 |
| Zhejiang U | CHINA | 622 | | Harbin IT | CHINA | 269 |
| Nanyang TU | SINGAPORE | 566 | | Huazhong U S&T | CHINA | 231 |
| U Science & T. | CHINA | 556 | | Xidian U | CHINA | 221 |
| Harbin IT | CHINA | 545 | | Beihang U | CHINA | 215 |
| Stanford U | USA | 541 | | MIT | USA | 205 |
| Shanghai JT U | CHINA | 513 | | Zhejiang U | CHINA | 194 |
| Xi'an Jiaotong U | CHINA | 512 | | Southeastern U | CHINA | 193 |
| Huazhong U S&T | CHINA | 502 | | Nanyang TU | SINGAPORE | 187 |
| Harvard U | USA | 487 | | Shanghai JT U | CHINA | 178 |
| National U | SINGAPORE | 455 | | Northwestern P. U | CHINA | 164 |
| U Calif., Berkeley | USA | 449 | | Wuhan U | CHINA | 161 |
| Peking U | CHINA | 444 | | Beijing IT | CHINA | 159 |

SCIENCE BIBLIOMETRICS IN GLOBAL RANKINGS




| Rankings | Publication-related indicators as proportion % | Databases |
|---|--|-------------------------------------|
| Shanghai Jiaotong Academic Rankings of World Universities (China) |  70.0 | Clarivate Analytics' Web of Science |
| Times Higher Education World University Rankings (UK) |  38.5* | Elsevier's Scopus |
| QS World University Rankings (UK) |  20.0* | Elsevier's Scopus |
| Leiden Ranking (Netherlands) | 100.0 | Clarivate Analytics' Web of Science |
| Best Global Universities (US) | 72.5 | Clarivate Analytics' Web of Science |



Source: The methodology pages on above rankings' websites, updated on 21-January-2021.

* Research performance has a further, indirect but important, effect through its impact on the surveys used by THE and QS, and in THE data on postgraduate studies and income – in total research is more than two thirds of the THE index

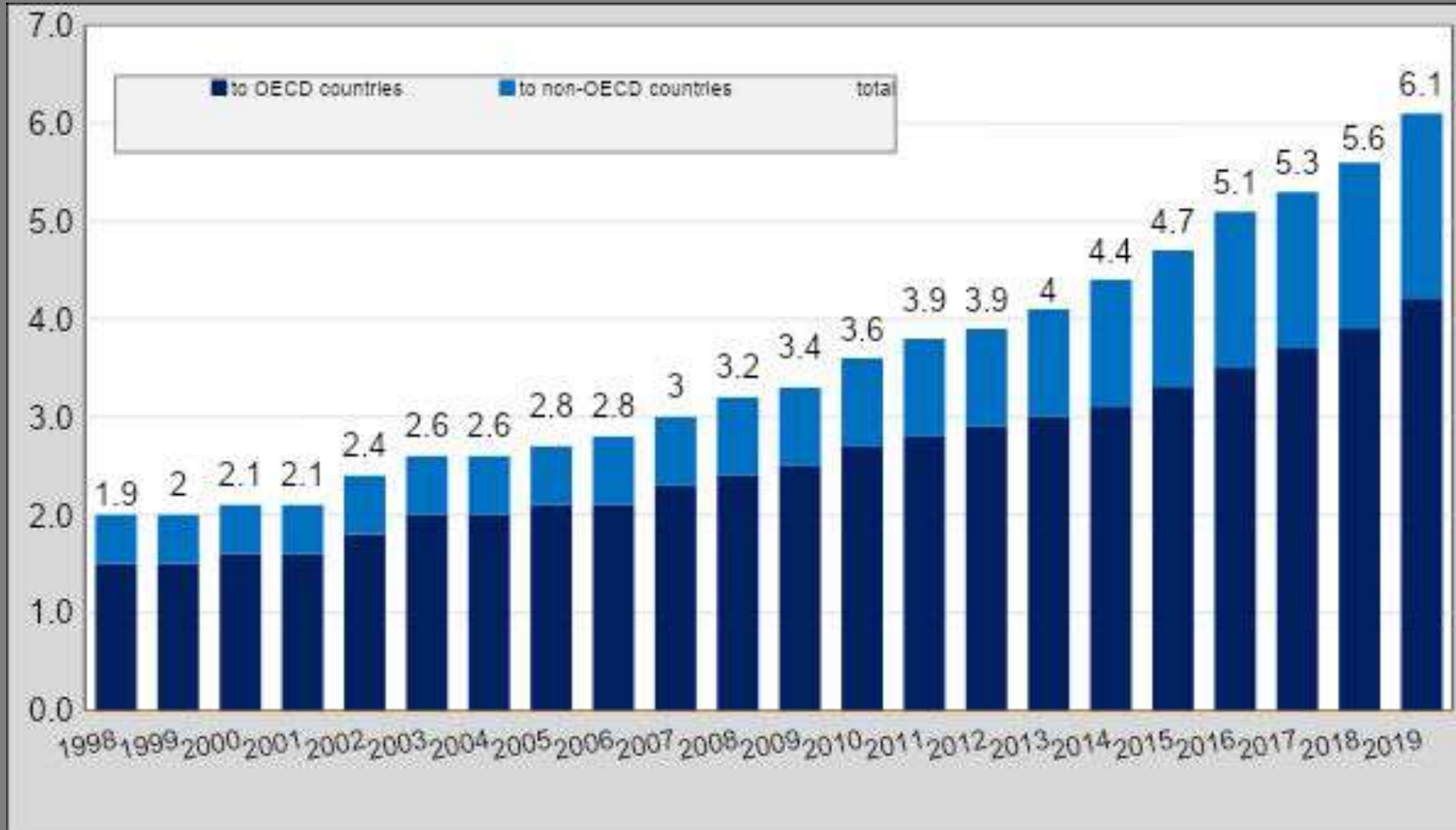
UNIVERSITY OF GLASGOW IN GLOBAL RANKINGS 2021/2

| Rankings | Position in ranking | |
|---|---------------------|---|
| Shanghai Jiaotong Academic Rankings of World Universities (China) 2021  | 151-200 | Whole institution |
| Times Higher Education World University Rankings (UK) 2022  | equal 86 | Whole institution |
| QS World University Rankings (UK) 2022  | 73 | Whole institution |
| Leiden Ranking (Netherlands) Top 5% papers (2016-19) 2021 | 116 | Medical & Health 81 Life & Earth Sci 164 Maths & Comp 188 Phys Sci & Eng 224 Hum & Soc Sci 85 |



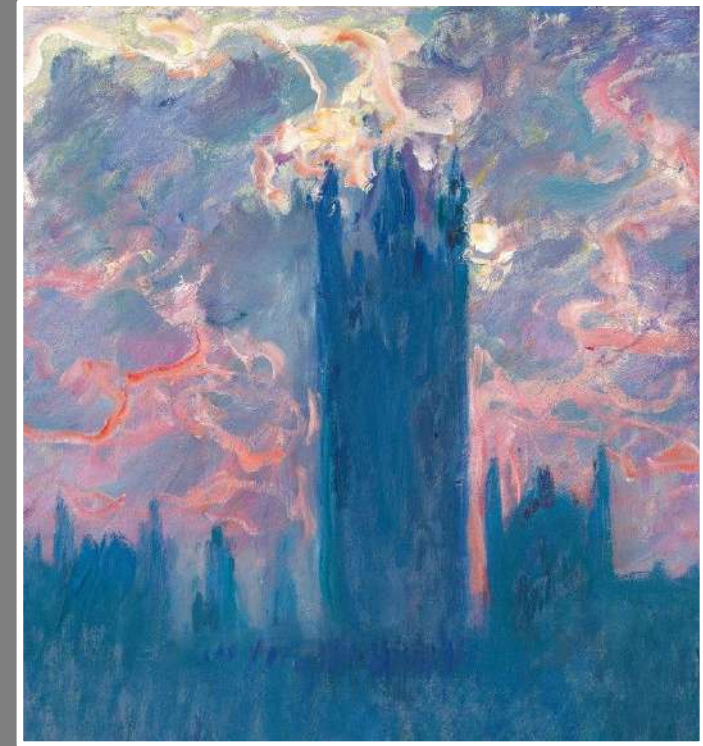
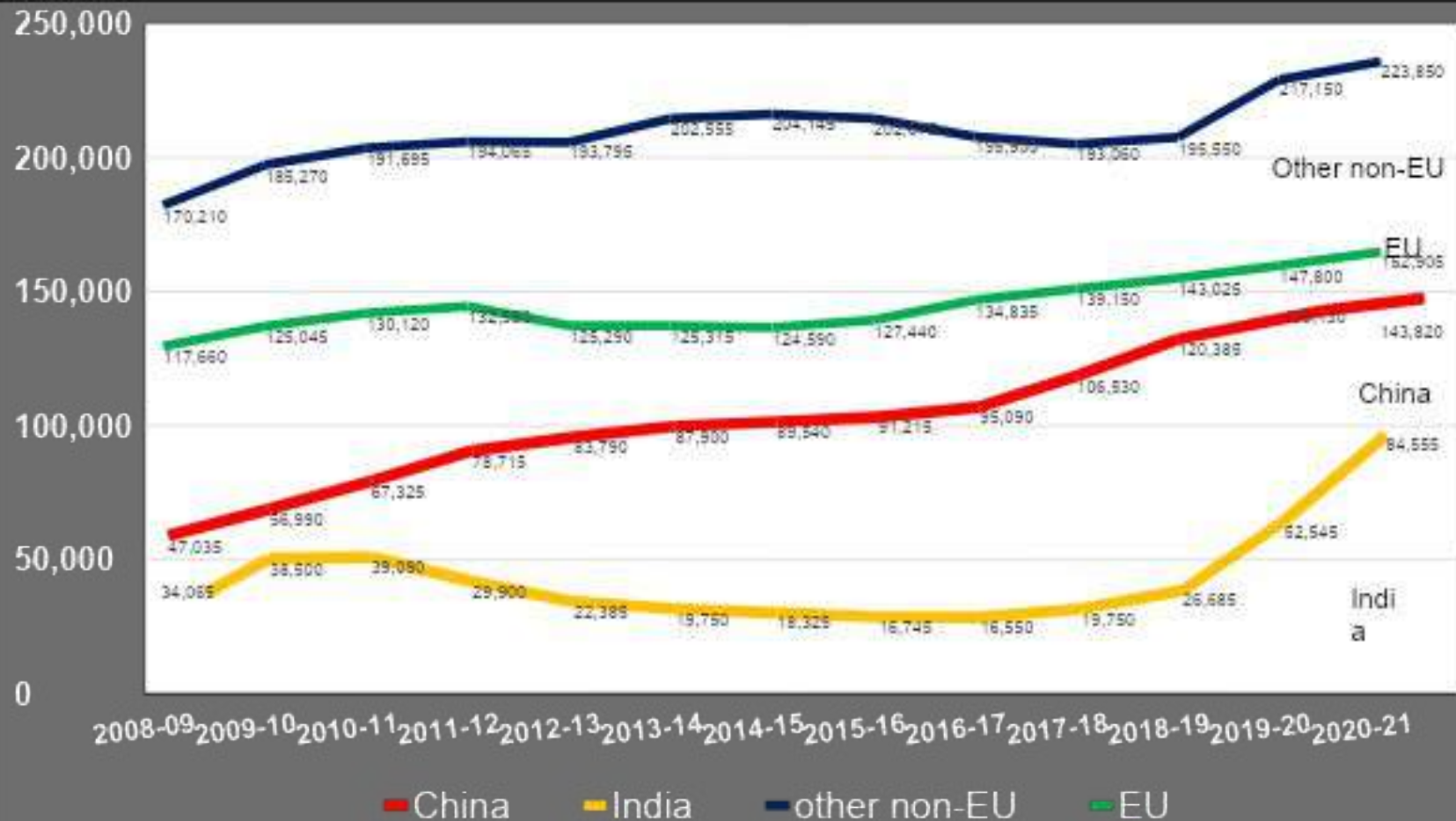
MOBILE STUDENTS INCREASED BY 5.5% PER ANNUM 1998-2019

International or foreign students in tertiary education, world (millions) – UNESCO data



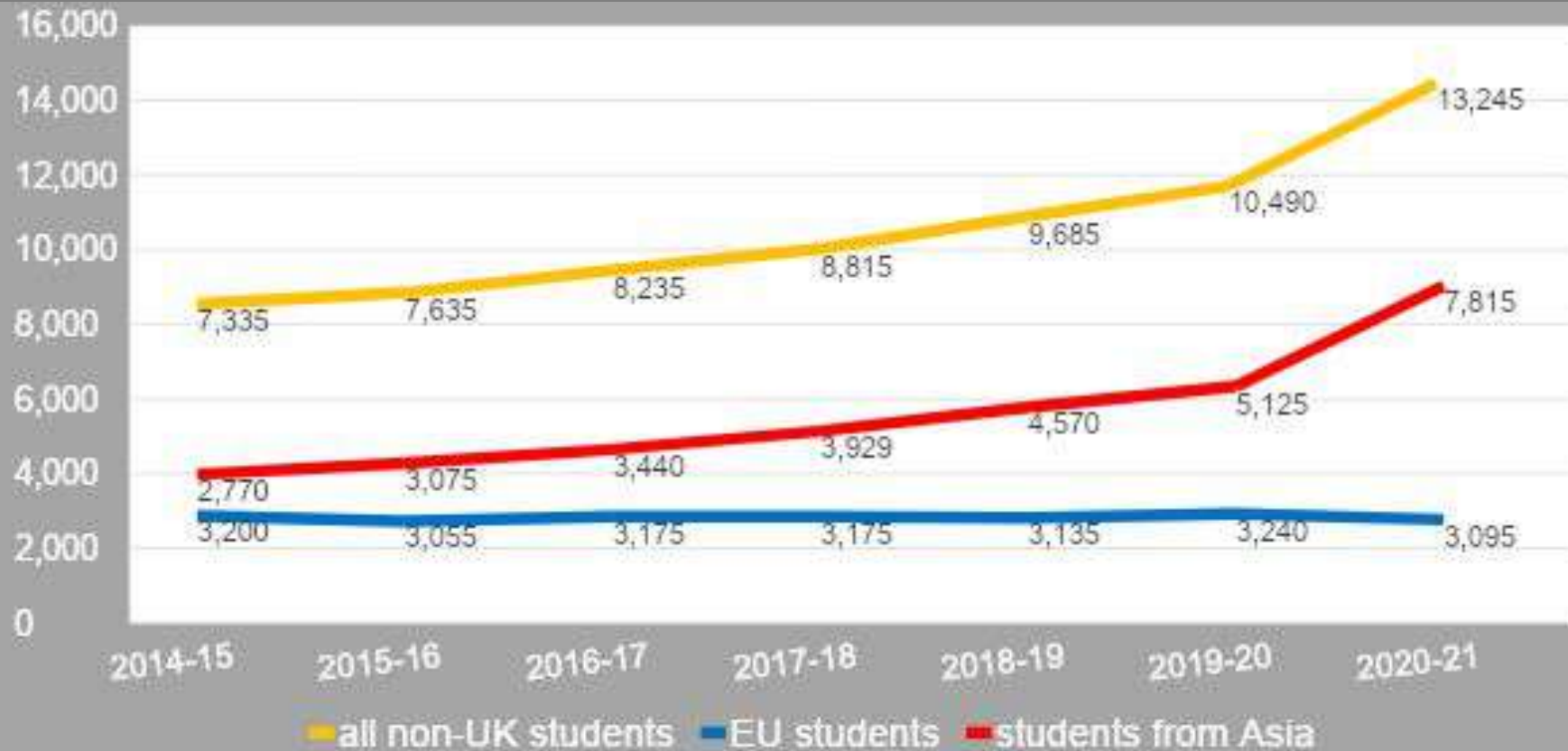
INTERNATIONAL STUDENTS IN UK

China, India, other non-EU, EU students: 2008-09 to 2020-21



In 2020-21 the number of first year students from China was 99,160, down from 104,240 in 2019-20. A pandemic effect, or a geo-political effect? Note that first year Indian students rose by more than 11,000

NON-UK STUDENTS AT THE UNIVERSITY OF GLASGOW 2014-15 TO 2020-21



Non UK students increased from 27.4% of all students in 2014-15 to 35.7% in 2020-21. There was a sharp increase in 2020-21 as the graph shows

GROWING IMPACT OF POPULISM AND GEO-POLITICS

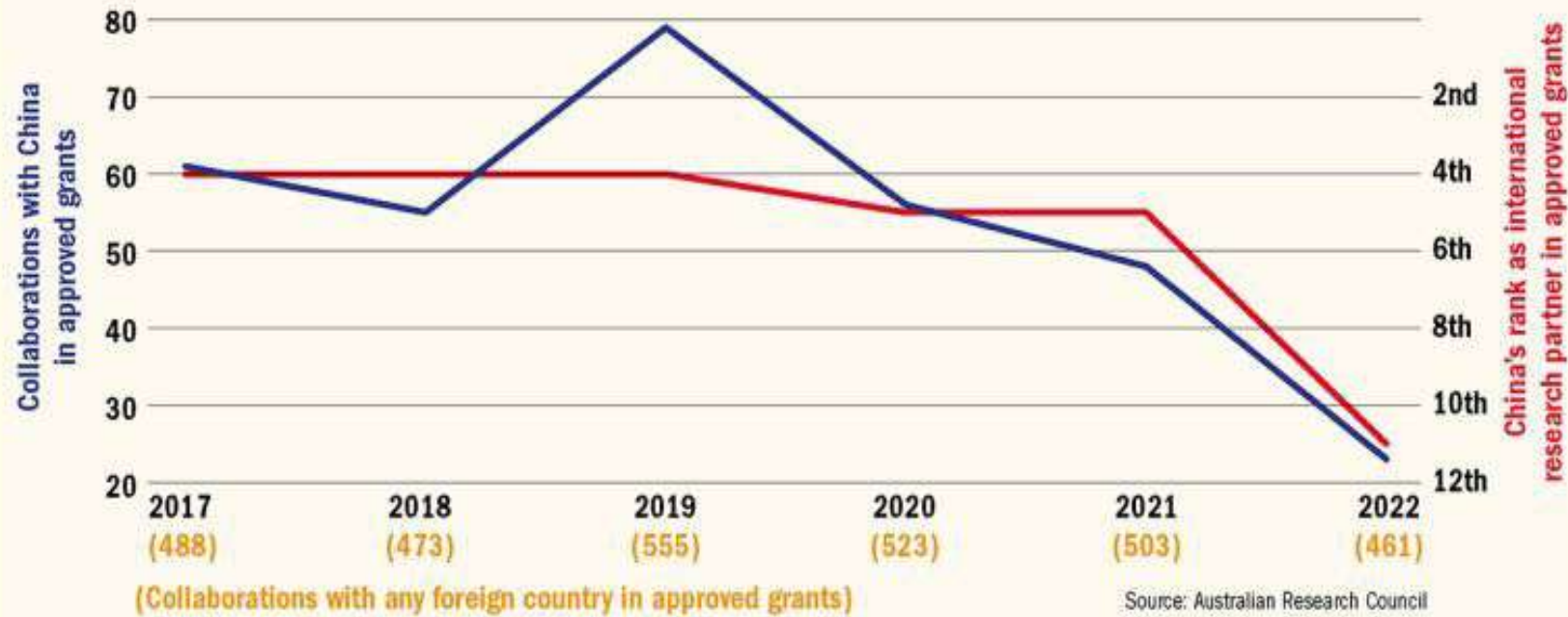
- Nativist politics: pushback against 'globalism' and in some countries, international students
- Artificially fostered culture wars
- Brexit takes UK out of Erasmus and Horizon, weakens academic mobility
- US-China decoupling in science
- 'Securitisation' in science takes priority over collaboration, university autonomy and academic freedom
- Ukraine universities decimated
- Russia closes up internally and breaks with international university networks



'Scientific discovery, which is fundamentally borderless, is being politically bordered. Geopolitical tensions between the United States and China have spilled over into academic science, creating challenges for many scientists' ability to fully engage in research and innovation' – Jenny Lee and Xiaojie Li, *Racial profiling among scientists of Chinese descent*, 2022

FALL IN AUSTRALIA-CHINA RESEARCH COLLABORATION

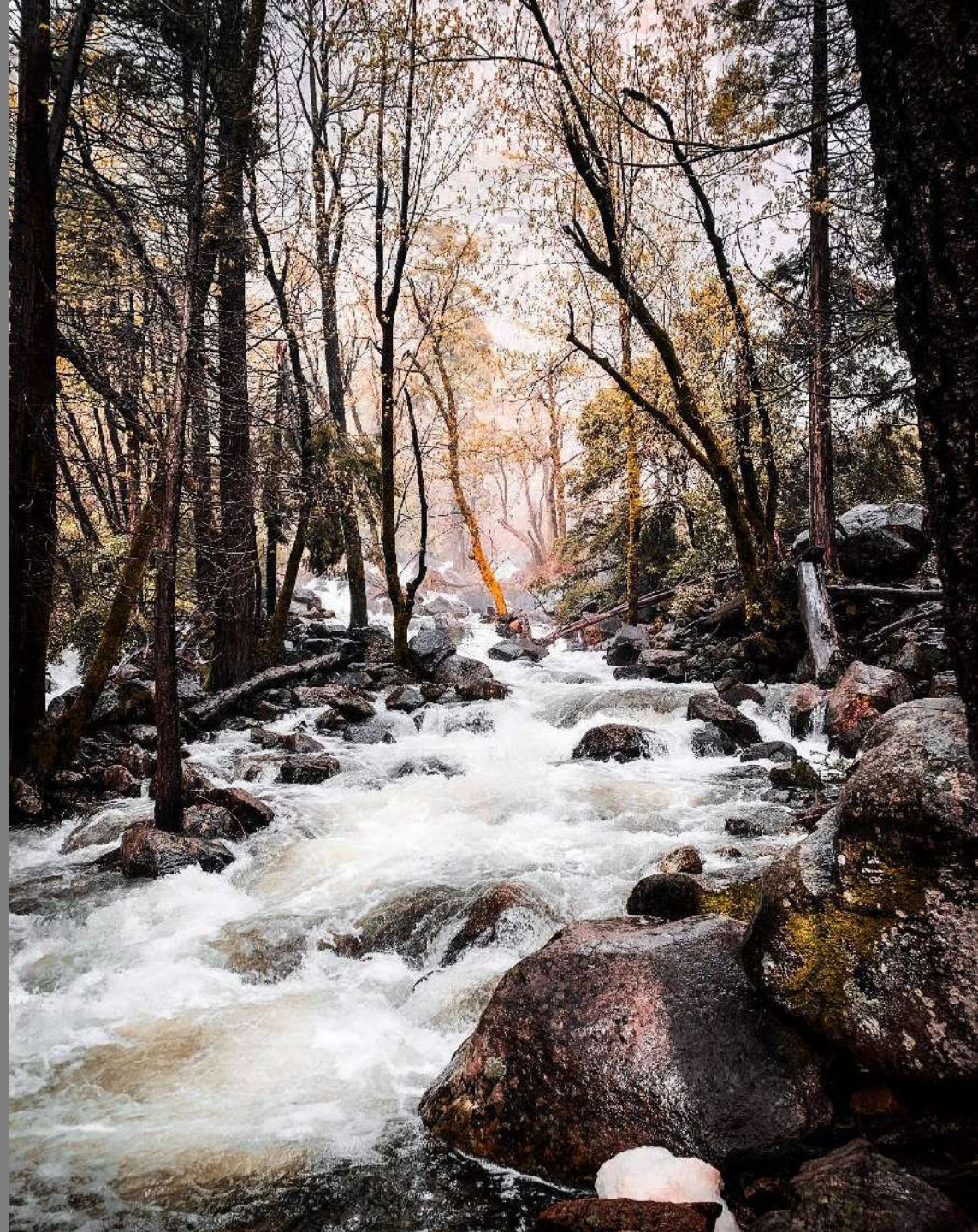
NOSEDIVE: AUSTRALIA-CHINA RESEARCH COLLABORATION IN ARC'S DISCOVERY PROJECTS PROGRAMME



‘ALL THINGS ARE IN FLUX, LIKE
A RIVER ...
EVERYTHING FLOWS’

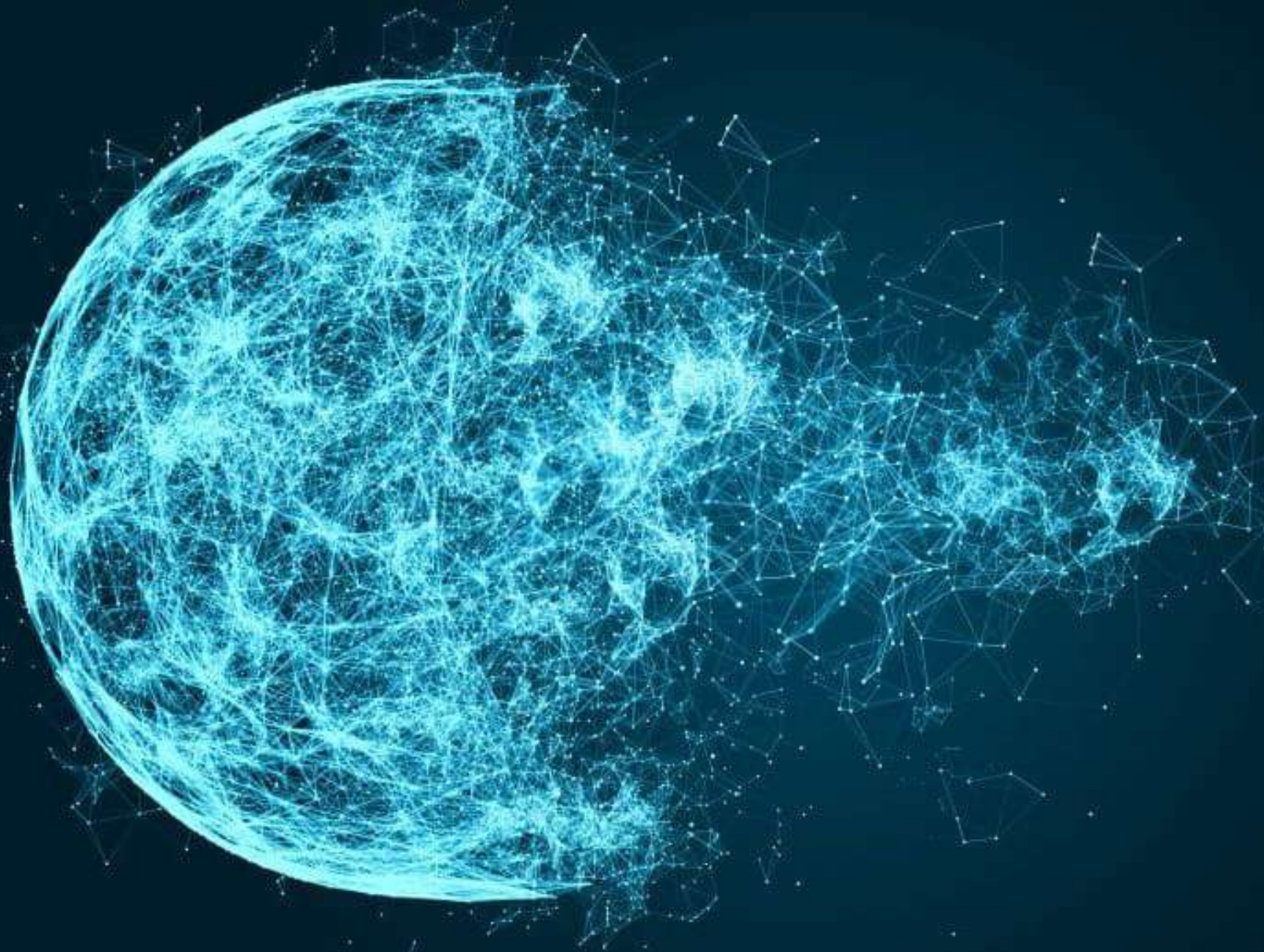
‘WHOEVER CANNOT SEEK THE
UNFORESEEN, SEES NOTHING.
THE KNOWN WAY IS AN
IMPASSE’

~ Heraclitus of Ephesus (544-484 BCE)



PATTERNS AND
PREDICTIONS
WORK WITHIN
CLOSED
SYSTEMS

THE WORLD IS
AN OPEN
SYSTEM



NOT PREDICTIONS, GUT FEELINGS

- The worldwide tertiary participation rate will keep growing though the percentage may fall in USA
- India will lead shift to online forms in emerging South Asia and Africa but won't happen in Euro-America and East Asia
- Growing cost of tuition loans (RPI link) may drive temporary fall in participation rate in UK
- Declining resources per student will put squeeze on UK universities unless/until there's a change of government
- Before that expect culture wars drama in UK
- Growing attacks on climate science in some nations
- 'Employability' will be an increasingly dominant theme everywhere
- Science in China will partly decouple from global system
- The number off Chinese students going abroad will fall

