Focus on the frontrunners

In the age of the internet, we can now drill deep beneath university rankings to pinpoint Australia’s areas of research excellence in far greater detail

By Tim Dodd

Hello big data! In academic research, as in many fields of endeavour, the ability to glean large quantities of data from the internet is changing the way critical information is gathered and disseminated. The metrics that matter in the world of research – such as how many peer reviewed papers are published, the quality of the journals they are published in, the number of citations they receive, and the time period in which this happens – can now be calculated from information that is publicly available online.

Using data analysis we now have a much more up-to-date perspective on the recent performance and future potential of individual researchers and for the universities and research institutions where they work.

In this special issue of The Australian’s Research magazine, we pick up and run with the new opportunities offered by big data, and use them to analyse the research specialties of Australian academics, universities and research institutes in fine detail.

Using publicly available information processed by our partner, data analytics firm League of Scholars, we have produced a leaderboard of star Australian researchers in eight major disciplines. These are the academics whose lifetime output places them ahead of their peers.

We have also made a leaderboard of up-and-coming research stars, the early career researchers who are in the first seven years of their research careers and whose output so far puts them ahead.

Aside from these big calls, we have also used the power of big data to delve deeply into more than 250 highly granular research fields, and identified a leading researcher and a leading university (or other research institution) in each one.

These 250 research fields are far too numerous for each researcher’s work to be described in any detail, but we give you a flavour of the quality being produced by profiling 16 of the research scholars who are leading in their fields.

Do our approach add useful information to the sea of data that already exists about research in Australia? We believe the answer is yes, but that needs some explanation.

Bear in mind that we are already awash with university rankings. Seemingly every other week there is a new ranking of universities, or a new variant of one that is already published, that reports on universities’ research performance.

But something is missing in the information offered by many of these rankings. While they give us headline results about each university’s overall research performance, and also show how well universities do in broader research fields, there’s a lack of fine granularity.

For example, try asking this question: exactly how well do researchers at University X rate in some highly focused areas, say game theory and decision science, or medical informatics, or ethnic and cultural studies?

In the past it has not been a simple task to compile such detailed information about research performance. Traditionally, data about the number of publications and citations associated with each researcher’s work was only available from large global scientific and technical publishers who collect, index and sell this information, such as
From page 8

Clarivate and Elsevier. But now bibliometric data on academic research papers and citations is openly available on the web through sites such as Google Scholar, Microsoft Academic and Semantic Scholar. It enables more timely analysis and more finely detailed insights than offered by major university rankings. For our analysis we have used Google Scholar.

In an age in which research advances are made in highly specialised fields, granular detail is important. And the granularity of the analysis also throws up interesting results, identifying some universities and research bodies with excellent research records that are not often recognised. Because the results reflect current performance, they also give a fresh and up-to-date picture of where university research strengths lie.

As we would expect the research-intensive Group of Eight universities lead in a majority of fields, but the granularity of our analysis allows other universities that shine in particular disciplines to also be recognised. Just to name some examples, the Australian Catholic University is the research leader in educational psychology and counselling; Charles Darwin University is the research leader in visual arts; La Trobe University leads in the three related fields of child and adolescent psychology, development disabilities and special education; Central Queensland University is tops in architecture; the University of New England shines in two very different areas, animal husbandry and mathematical analysis; the University of Newcastle leads in organic chemistry; and the University of Wollongong excels in an amazing array of diverse fields – algebra, archaeology, fuzzy systems, marketing and strategic management.

It is true that our approach is not the only one that offers detailed information about institutional research performance. The Australian Research Council’s Excellence in Research in Australia project, conducted every three years, produces fine-grained detail about each university’s research record, benchmarked against world norms. But it is a long process, with each outcome decided after extensive consideration by a committee.

The big data approach is different. It uses metrics that can be quickly calculated by employing algorithms based on available online data showing how many papers researchers have published, which journals they publish in and how many citations they get.

It has the advantage of speed, it’s fully objective, and different algorithms can be experimented with. The same advantages apply to recognising the excellence of individual researchers in this way. With big data we can also give public acknowledgement to many top performers who are currently little known except among their peers. Sometimes they don’t know themselves that they play a starring role.

We don’t claim that our way of identifying leading researchers is perfect. Clearly, who the leaders are depends on the data used and the algorithm employed to analyse it. In the accompanying Q&A, League of Scholars CEO Paul McCarthy explains why we made the choices we did.

We acknowledge this is a new approach, but we believe it has value and are very open to feedback.

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