Australian astronomy punches well above its weight, in terms of the research it leads and the facilities it houses.

We have made remarkable discoveries in the past year alone. Our scientists have recently narrowed down the time frame for the first light in the universe . We have established that the black hole in the Milky Way had a massive explosion just 3.5 million years ago.

Our facilities – from the Murchison Widefield Array in Western Australia to the Anglo-Australian Telescope in New South Wales – are important parts of the world's astronomical ecosystem.

But to make the most of the next wave of stargazing technology, we will need true diversity in our astronomical community.

As I argue in a paper published this week in *Nature Astronomy*, Australia's astronomers have made great strides in improving diversity in recent years – and the way we have achieved this offers lessons for other scientific communities.

Read more: ***Science prizes are still a boys' club. Here's how we can change that***

Why we need diversity

Very soon, however, even more impressive stargazing hardware is due to start operating. The Australian segment of the Square Kilometre Array , and the Extremely Large Telescope in Chile will be part of a new generation of mega-telescopes.

These new super-tools will be capable of revealing the universe in unprecedented detail, and gathering data in unprecedented bulk. As a discipline, we must be prepared to extract maximum benefit from them.

Sifting maximum signal from this fresh collection of noise will not simply require more astronomical hands on deck. It will require *different types of hands*, and different ways of seeing.

There is ample evidence from other fields – particularly business – to show the benefits of diversity within organisations, at all levels. It results in higher productivity, more profits, and more robust outcomes.

And it's not just in social work or education. Even in number-crunching science, personal history and lived experience influence decisions, how questions are framed, and how networks are built.

Gender equity and the Australian example

In recent years, Australian astronomy has made striking progress towards gender equity, in large part because of a system known as the Pleiades Awards operated by the Astronomical Society of Australia.

There are about 500 working astronomers in this country. The 2016-25 Australian Astronomy Decadal Plan, commissioned by the Australian Academy of Science, sets a target of 33% of positions at all levels to be filled by women within the next six years.

The Pleiades provide a structured approach to improving equity. Given the enthusiastic participation of almost all the 14 universities, two Centres of Excellence and three organisations that house Australia's astronomical communities, I have little doubt that this marker will be achieved.

However, we need to broaden our thinking, and our ideas of what constitutes a fair and empathetic workplace, beyond simple questions of binary gender.

Read more: ***Why I joined #500queerscientists***

Astronomers from across the spectrum

The next generation of telescopes will be huge international collaborations with intense competition between partner countries. To extract the maximum benefit from the extraordinary power of these telescopes, we need to look beyond traditionally conservative hiring practices.

We will need to draw on people from every possible background and experience, and inject new ideas. We need to draw from the academic talent and insight to be found among LGBTIQA+ astronomers, Indigenous astronomers, disabled astronomers, chronically ill astronomers, and astronomers who hail from non-Western cultures.

There are skilled and highly gifted scientists who fall within these categories, yet for some the prospect of a stable long-term career with steady support and funding seems faint. Science research organisations and institutions are as guilty as those in any other field of not building proper structures around understanding, inclusion and empathy.

As female astronomers not too many years ago would often testify, sometimes the welcome and support inside the Australian faculties and organisations could have been a bit warmer.

Thanks to the schemes such as the Pleiades, women in my field can reasonably expect to be recognised for their skills, and to be promoted according to their merits. The same cannot yet be said for people in other, more heterogeneous categories, and that must now start to change. Fairness demands it, but just as importantly the science requires it.

Lisa Kewley receives funding from The Australian Research Council for the ASTRO 3D Centre of Excellence.

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