

David Glanz: When we talk about precarious work, we usually think of people working in cafes or delivering pizza, but many researchers also find themselves part of the precariat, their projects, their plans depending on scoring that next grant. Getting a grant isn't easy. Researchers can spend hundreds of valuable hours preparing applications for worthwhile projects and still miss out. Leave aside for the moment how many dollars are available. Is the process for allocating grants really fair? Is the current system the smartest way of allocating funding? Some now are arguing for allocating grants by lottery. It's an audacious idea and certainly not everyone agrees. Today we discuss the pros and cons.

David Glanz: Hello and welcome to this podcast, brought to you by the Australian Academy of Technology and Engineering. I'm David Glanz, and today I'm talking to two fellows of the Academy, both highly experienced researchers to get their views on the lottery proposal. Professor Bronwyn Fox is Director of Swinburne University's Manufacturing Futures Research Institute, and Professor Simon Biggs is Senior Deputy Vice Chancellor at the University of Western Australia.

David Glanz: Bronwyn, can you give listeners a quick idea about how the current grant allocation system works?

Bronwyn Fox: The current grant allocation system is merit based and it's peer reviewed, and it does take a long time to actually prepare a grant proposal. It takes a long time to refine your ideas and a long time to write, but I think the result is that, particularly in Australia, because it's so competitive we are really good at writing research proposals. I've recently just served on two European schemes for assessing grant proposals, and when I reflect on this I'm really impressed at the standard at which the Australian grants that I've reviewed are written. They are incredibly well-written, incredibly well-argued. They have big, bold, audacious ideas and I think this is because in part to the refinement of thinking that's involved in that grant writing process.

David Glanz: That's good to know. But, how do you decide between projects which are very similar in terms of their quality? How do you put a cigarette paper between projects which are going to deliver very similar value?

Bronwyn Fox: Each proposal when it's received by the Australian Research Council is sent out to a number of expert reviewers. And each of those expert reviewers write the report on their thoughts on the proposal and the novelty of the proposal. That then gets translated into a score system and then a panel will come together and assess all of the proposals for that particular scheme in one sitting. So that way you have expert review and consistency across the process. I think that makes it a very fair and transparent and equitable process.

David Glanz: Well over to you now Simon, because you've indicated sympathy for a lottery system for allocating grants.

- David Glanz: I suppose the first question is: does anybody use this system anywhere in the world? Is there actually an evidence-base that this would work?
- Simon Biggs: There are a few small examples. I wouldn't say there's a clear evidence base currently. I think still the majority of grants, particularly in systems that we would understand here in Australia, still typically rely on the similar peer-review process that Bronwyn discussed.
- David Glanz: Do you think that with a lottery system there's a risk that somehow it will bring research into disrepute? That some people might think it's a bit of a joke?
- Simon Biggs: I think the issue is very much the balance between how much peer review you do versus how you take the final decisions about which grants should be funded. So, I don't think anyone sensibly arguing in this space would say, "let's take every single grant that's put in and have a lottery on all of them." I think it's very much about post some form of peer review, how do you then decide? And I think you already mentioned, how do you decide between grants for which the scores are very very similar and for which if you really think about the error involved in any scoring system, any grading system, you couldn't really say that there was a significant difference between the scores allocated to grant A and the scores allocated to grant B. So, we end up with a significant number of grants sitting well within the margin of error around any scoring system. How do we decide between them?
- David Glanz: Well, I don't know. You tell me. In your experience how do people decide between them?
- Simon Biggs: Well, I think people do legitimately through any peer review process and through... I've sat on a number of panels here in the UK and here in Australia. I think people legitimately are making significant and serious efforts to decide between them. The question is whether that work is actually really valuable and really able to make those kinds of decision or would be better handled by a random allocation process.
- David Glanz: Well, Bronwyn, you mentioned earlier that there's a very high quality of grant writing in Australia. I've heard it said that researchers, for instance in the medical field, can spend 600 hours preparing one of those applications with just a 16% chance of success. Isn't this just a horrible waste of the time of smart minds?
- Bronwyn Fox: I think in that process if you really refine and hone your ideas then you come up with much better quality ideas. If I can speak to my own personal failings, I remember I submitted a [inaudible 00:05:53] grant a couple of years ago and it actually was deemed to be ineligible because of a technicality. And had that got funded, I probably would have created some infrastructure that would have been out of date. And so, actually, in not being successful for that grant, I was able to really refine the idea, get together with colleagues, get some additional

feedback, really think it through and the whole idea has really stepped up and extra notch. And we've been able to find other sources of funding for this particular piece of infrastructure.

Bronwyn Fox: So I think it's too much emphasis on grants take how long to write, yes they do, but the thinking and the refinement of thinking that goes into that process is absolutely invaluable and it makes Australians better scientists.

David Glanz: Yeah, I hear what you're saying. But it's also been argued that the problem with the current system is that it does encourage a degree of conscious or subconscious discrimination, sometimes on the basis of gender, perhaps more often on the basis of cronyism of who knows who. And, at a time when there's quite rightly a great deal of focus on gender diversity in STEM, or rather the lack of it, wouldn't the lottery system increase diversity in terms of gender, in terms of ethnicity, perhaps in terms of age, and even in terms of ideas?

Bronwyn Fox: I'm a really strong believer and I have a very close friend who works in public transport and in measuring public transport efficiency. And he really taught me that whatever you incentivize, you create. And so if we create a lottery, it might flatten out some of those particular biases that you mentioned in that particular grant system, but it doesn't address the behavior. And where I've seen this really successfully applied is in Germany, in their excellence cluster initiative. What they're doing there is just phenomenal and one of the scoring criteria is actually the diversity of the team. And when they talk about the diversity of the team, they don't just mean gender, they don't mean education and training and actual technical background, they also mean internationalization, cultural background, cognitive style, and age and experience, which means that you have experienced staff mentoring younger staff. And if you make that a metric, then you incentivize that and you change behavior. And that's the critical thing for encouraging more diversity in STEM.

Simon Biggs: So, I should say, I don't dispute, in fact, I have no disagreement with anything Bronwyn is saying. I think when I'm thinking about the use of a lottery, it's very much where you post a review process which is, if you like, rejected all those grants which are flawed in some way or nonsensical in some way. It's same really how you decide between the rest where they're all excellent pieces of potential work. How do you make those decisions when the errors on the grading are greater than the gradient of differentiation between things? And I think that's where the lottery comes in. So it's not to remove all of those other aspects, it's really about how you make the decision between things which are differentially very hard to discern any meaningful difference.

David Glanz: Well Simon, you're now in a very senior role at the University of Western Australia and while you can't obviously single-handedly change national processes, are you planning to trial some of the lottery system when it comes to the allocation of internal resources amongst researchers at your university?

Simon Biggs: Yeah, that's a good question. I'm not sure yet what schemes we have where you might apply that, if that makes sense, maybe. You might think about that in terms of allocating scarce resource for scholarships for example. I haven't really given it a lot of thought in terms of internal schemes. I mean, of course, like any organization, we have to be careful about how we allocate our resources and how we understand how to not, if you like, entrench our own biases in our own system. It's an interesting question you ask and certainly something I may be thinking about a bit more.

David Glanz: Well obviously we'll follow this debate with interest. It's one that's bubbling away within academia and it will be fascinating to see how the debate is resolved over time.

David Glanz: Finally, have either of you in the last 15 minutes or so, heard anything from the other that has made you reconsider all or part of your position?

Bronwyn Fox: I really take Simon's point that he would like to apply the lottery system to the middle of the range. The ones where the grants are difficult to decide between them. And there's two things I've thought of that I think are really important. One of them is that, if you know that your grant is going to be in that middle band, it might mean that you take your foot off the accelerator somewhat, so it might mean that you have some researchers who are not pushing the boundaries as much because they are consistently in that middle band and they know it's going to be a process of chance, a process of luck so they might take their foot off the accelerator.

Bronwyn Fox: The other thing is that, I think that even though the grant proposals might be similar and all really high quality, that we need to back winners. I think that it's something culturally we don't tend to do here very well in Australia is actually make strategic decisions and say, "we're a small nation, we have limited resources, we are going to be excellent at this particular thing. And we are going to focus our time and energy on this area." And I think we have great leadership here in terms of science with Alan Finkel as the Chief Scientist and Cathy Foley as the Chief Scientist for CSIRO who have the ability to set those sort of strategic directions. And I think that's where it's really important that we actually commit to doing something and doing it well. And again, coming back to Germany, they have done this with Industry 4.0, they said, "as a nation we are great at manufacturing and we are going to commit to, and focus on, the digitalization of manufacturing and that's what we're going to be known for" and have done it exceptionally well. We should be doing something similar here in Australia.

David Glanz: Well Simon, you have the last word.

Simon Biggs: Well yes, so I would definitely agree with the second point that Bronwyn made there. I think Australia has struggled because it's been unwilling or incapable of deciding on its industrial and other research strategies and saying, we as a nation are going to focus on these areas.

Simon Biggs: I suppose the first point Bronwyn made, I understand. I suppose anyone that's been through an ARC or equivalent grant process might argue that it's already a bit of a lottery. Therefore, the taking the foot of the pedal you could argue if you're in the mid-range you could do already because it's not as though we know for sure after we've been through a process that this grant is better than that grant. So, I'm already in some form of random process. I'm simply proposing that we make that process formally random rather than notionally random.

David Glanz: Well, it's been a fascinating discussion and I'd like to thank you both very much. It's not a discussion we've resolved here and we'll obviously see how the academic community, the research community, deals with the question in the time ahead. But thank you once again for your time and I look forward perhaps to discussing this question once again. Thank you.

Simon Biggs: Thank you.

Bronwyn Fox: Thank you, David.