



COMMONWEALTH OF AUSTRALIA

Official Committee Hansard

**HOUSE OF
REPRESENTATIVES**

STANDING COMMITTEE ON INDUSTRY, SCIENCE AND
INNOVATION

Reference: Research training and workforce issues in Australian universities

TUESDAY, 12 AUGUST 2008

PERTH

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HOUSE OF REPRESENTATIVES
STANDING COMMITTEE ON INDUSTRY, SCIENCE AND INNOVATION

Tuesday, 12 August 2008

Members: Ms Vamvakinou (*Chair*), Fran Bailey (*Deputy Chair*), Mr Bidgood, Mr Champion, Mr Cheeseman, Dr Jensen, Mr Johnson, Mr Ramsey, Ms Rishworth, Mr Symon

Members in attendance: Fran Bailey, Mr Cheeseman, Dr Jensen, Mr Johnson, Mr Ramsey, Mr Symon, Ms Vamvakinou

Terms of reference for the inquiry:

To inquire into and report on:

1. The contribution that Australian universities make to research in Australia, including:
 - The contribution of research training programs to Australia's competitiveness in the areas of science, research and innovation;
 - The effectiveness of current Commonwealth research training schemes; and
 - The adequacy of current research training schemes to support Australia's anticipated future requirements for tertiary-qualified professionals in a wide range of disciplines.
2. The challenges Australian universities face in training, recruiting and retaining high quality research graduates and staff, including, but not limited to:
 - Adequacy of training and support (including income support) available to research graduates in Australia;
 - Factors for graduates that determine pursuit of a career in research;
 - Opportunities for career advancement for research graduates and staff;
 - Factors determining pursuit of research opportunities overseas;
 - Australia's ability to compete internationally for high quality researchers; and
 - Whether Australia's academic workforce is ageing, and the impact this may have on Australia's research capacity.

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Committee met at 8.54 am

CHAIR (Ms Vamvakinou)—I declare open this public hearing for the inquiry into research training in Australia, being conducted by the House of Representatives Standing Committee on Industry, Science and Innovation. The inquiry arises from a request to this committee by Senator the Hon. Kim Carr, the federal Minister for Innovation, Industry, Science and Research. Written submissions were called for and 102 have been received to date. The committee is now conducting a program of public hearings and inspections. This hearing is the sixth for the inquiry.

I now call Professor Su Lloyd to give evidence. Although the committee does not require you to give evidence under oath, I should advise you that these hearings are formal proceedings of the parliament. Consequently, they warrant the same respect as proceedings of the House itself. It is customary to remind witnesses that giving false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. We thank you for your submission and now invite you to make a brief opening statement before we proceed to questions.

[8.55 am]

LLOYD, Prof. Susan Catherine (Su), Adjunct Professor, School of Law, Murdoch University, Perth, Western Australia

Prof. Lloyd—Thank you. Firstly, I would like to acknowledge the co-author of the paper ‘Co-mediation for intellectual property rights disputes’, the respected scientist and inventor Dr Joseph Patroni. That paper formed the basis of the submission to this committee. Briefly, I will outline the present situation as I see it, the issues around intellectual property and public universities, with particular reference to the recent Federal Court case *University of Western Australia v Gray*, which is currently on appeal to the full Federal Court, the opportunity that I think that case presents to this committee, and a possible solution to the issues that were exposed in that case.

For the committee’s benefit, I have been an industrial relations practitioner for 19 years and a legal practitioner in the fields of employment, administrative and equal opportunity law; I am an accredited mediator, and I have also undertaken advanced mediation training with the World Intellectual Property Organisation in Geneva. Dispute resolution is a particular passion and interest of mine, and I feel that it may present particularly good opportunities in the field of IP at the present time.

The statistics tell the story: \$15.8 billion of investment in research and development in 2004-05. That is 1.75 per cent of GDP. It is below the OECD average of 2.26 per cent, but it has been increasing by an average of 10 per cent per annum for the last 10 years. Two-thirds of this is focused on economic development and 50 per cent of that represents labour costs, which are about \$7 billion. I have no doubt that the committee will hear submissions from universities seeking increased funding, but I believe this of itself is not the answer to the dilemma: Einstein remarked that problems cannot be solved by the same thinking that created them.

Australia ranks very highly on research publications per capita but lags significantly in its capacity to capitalise on that and commercialise. Investment in research and development is risky for all parties, with no guaranteed return on investment. There is a reluctance by students to undertake careers in science, and I think that there are three reasons for this. The first is that many years of training are undertaken. They receive relatively low wages for substantial portions of their working lives; they suffer uncertainty of tenure, which I note was referred to in the NTEU submission; they may work on a succession of revolving short-term contracts—for example, in Western Australia, that situation is compounded by the impact of the resources boom. By way of an example, an early career scientist might expect an annual salary of \$50,000 to \$60,000; a person presently washing dishes on an oil rig can receive \$150,000 a year. So that puts it in perspective.

I will speak briefly about dispute resolution. A dispute may not be an evident dispute, because a researcher may simply pack their bags and leave. They may take their skills elsewhere, or not invent and not develop their skills to full capacity. So you may not see litigation arise. That does not mean that there is not a dispute in place. A dispute is an issue or a concern between parties. There is strong evidence in the literature that the earlier a dispute resolution process begins the

greater the likelihood of a satisfactory outcome. I can certainly address the committee more fully on issues around dispute resolution, if it wishes.

By way of a local example, events in *University of Western Australia v Gray* spanned 20 years. It was only in the last four years—in 2004—that litigation commenced. One does wonder what happened in the preceding 16 years and whether that matter could have been resolved had there been a dispute resolution process in place earlier.

IP in public universities: I have reviewed the IP policies in four public universities in WA, and they are in my paper at page 11. You will see that they are all completely different. They are mostly very complex. They are a mixture of statute, regulations, policies, employment contract conditions, implied terms, custom and practice and generally understood processes.

In short, I think that they represent a serious and significant impediment to developing and commercialising IP. The issues around those policies for the committee are what you do about cooperative research centres where you have a number of parties engaging, who may have no dispute resolution process or, indeed, different ones; what you do around joint ventures with commercial parties who are certainly in a stronger position to negotiate and benefit from the commercialisation of IP than public universities; state government agreements presently have no dispute resolution mechanisms at all in place, and they simply leave it to the administering body to try and resolve a dispute, if it arises. That is the complexity.

University of Western Australia v Gray is a 400-page decision. I do not propose to analyse it in detail for the committee, but it does provide an interesting window into the complexity of the processes in that particular university. They are not just complex procedures: key personnel did not seem to have an understanding of how those processes were to work. Committees failed to act or did not meet, or were confused themselves about the correct processes to follow, and that led to the situation that was ventilated in that case. Universities have not been able to capitalise on the investment and convert IP to commercially viable, income-producing property.

Scientific endeavour is necessarily labour intensive and it relies on cooperation between the parties. Early career scientists, I believe, are vulnerable for the following reasons: they are employed on successive short-term contracts often; they are low paid; they lack the capacity and skills to negotiate and the confidence to do so; they are reliant often on the public university to pursue their academic goals; there is a significant power imbalance between the early career researcher and the full might of a large publicly funded institution; and they generally lack the capacity to articulate and advocate for themselves.

The costs of litigation I think are well known by members of the committee. The reality is that neither side can afford to litigate. Not only are there financial costs, there are issues around relationships and reputations, the time taken and the diversion of necessary resources from core business to litigating. The costs of alternative dispute resolution compare very favourably and, in the paper, you will see that they are estimated at about 10 per cent of the cost of litigation, so that is a significant benefit.

University of Western Australia v Gray was a 50-day trial; there were 4,500 pages of transcript, a thousand exhibits and, of course, the case is not concluded yet. It is now on appeal. That gives you an example of the scope. I have presented a proposal for a co-mediation model,

and there is a reason for that. Mediation is normally undertaken by what is called a third party neutral. This person does not necessarily require subject expertise in order to mediate successfully. However, given the nature of most disputes around intellectual property, licensing, commercialisation and so on, which can proceed over many years and have uncertain outcomes, I believe that a model that has been previously used in other jurisdictions would be applicable.

What I propose is that a regime be established whereby dispute resolution is carried out by a team of two mediators, one being a science or technical expert with knowledge of the particular field and the other being a mediation process consultant. The co-mediation model has not yet been applied to this jurisdiction, and I am suggesting that this is a very suitable way forward. I can expand on that further, if the committee were interested to do so.

Mediation is different from litigation in many fundamental ways. It is private and confidential, so it secures commercial confidentiality; it is certainly cost effective; it works across jurisdictions. Intellectual property disputes often have to be prosecuted in multiple jurisdictions simultaneously. Mediation can work across those jurisdictions. It focuses on the needs and interests of the parties, which may not be the same as their legal positions; in other words, more flexible and lateral and creative solutions may be possible in a private mediation process than would emerge through the formal litigation structure.

The opportunity that I think is presented to this committee is that *University of Western Australia v Gray* has effectively opened a window on this issue and ventilated it very thoroughly for us all to review. All universities and public research bodies are now conducting thorough reviews of their IP policies and their employment contracts, particularly in respect of the finding that there is no implied duty to invent. This is a very interesting development, although as I stated before it is on appeal presently. Recent advice from law firms to parties is to now include various clauses in the employment contracts that clarify this situation, and also to review their policies and procedures so that they are clearly understood and publicised.

The solution for this committee as I see it: you have cooperative research centres, you have public and private universities and you have commercial parties all wanting to engage in research for the benefit of the country. The opportunity presents itself, I think, for a single national customised dispute resolution model, and this is a very exciting proposition: customised high-level professional development for researchers and administrators; practical skills based training in negotiation and mediation for laboratory managers, project managers, senior research scientists; importantly, standardised dispute resolution clauses for joint ventures, cooperative research centres and the like, but not just a simple clause that states, 'In the event of a dispute, the parties will appoint an arbitrator.' I think we need to be a little more sophisticated than that and clearly articulate the process to be followed so that you do not suffer the unfortunate circumstance of a dispute about who the dispute resolver will be, for example. So there needs to be clarity around that.

I am aware that accreditation of research managers may well be in the offing so that there is a greater level of accountability for research projects, and this could certainly be incorporated quite well into some national framework, I believe. I have summarised the paper as best I can, and I am happy to expand on any points.

CHAIR—Thank you. That was very well put forward, and I am sure there are a number of issues. Most of the submissions that we have looked at are identifying problem areas that inhibit research and so forth. Unless I have missed something, IP has not really come up as a common theme. Your paper, I think, puts it squarely in the middle, and certainly in my thinking, and I think in the committee's thinking, it has given another dimension to this whole area that we are looking at. You indicated earlier that increasing funding to research is not the answer to resolving some of the problems. I am assuming that you are referring to the whole issue of intellectual property and commercialisation.

Prof. Lloyd—Yes.

CHAIR—This commercialisation of ideas is key to what we want to do in terms of the innovation economy. I would like you to expand on that a little bit. Is it just IP that is the issue here, or are there other issues that funding, increasing the stipend, or increasing block grants will not address?

Prof. Lloyd—Probably the issue is the conversion rate. You have to look at the substantial funding that has been invested in research and development and look at what has been returned to the country in commercial benefits. My understanding is that there has not been a great deal of work done on quantifying the return on investment. In other words, the grants go out, certainly they are expended on staffing and so on, but there is not, it seems, a great deal of information on what the return is, so we simply do not know. I guess we can assume that it would be insubstantial, otherwise we would not be reviewing the situation today.

What I am suggesting is that perhaps universities are not best placed, given the commercial marketplace, to be the people who develop and commercialise. I am aware that universities, for example, set up spin-off companies. Some of those have a modest amount of success but many do not. Some of them simply sink without trace, and I think that is unfortunate. So we need to look at how do we get a return, rather than simply taking the view that more money will resolve the problem. I am not convinced that increasing the allocation of funds to those areas will necessarily generate a bigger return to the country, because that is not what seems to have happened in the past. There does not seem to be a mechanism to track the return on investment.

CHAIR—Are you suggesting that the reason for that is because universities, which are the prime source of the research, do not have the expertise or the capacity to provide that kind of tracking and that it does not register in their brief on what their job as a research institution is? Are you suggesting they do not have that capacity?

Prof. Lloyd—In my opinion, they do not have the capacity. It has not been front and centre of their thinking. Universities traditionally have come from a pure research background and the pure research focuses on, of course, research for its own ends. Commercialising is a different technique. I am not satisfied that they have the capacity or that it has had perhaps the emphasis that it might have had, and perhaps that is another matter for the committee.

CHAIR—Who do you think should be initiating the link between the actual research and the commercialisation of it? How do you make that link? From my understanding, you are talking about a totally new entity that is introduced into the research culture of this country that should then be the entity that allows us to profit from our research and our ideas and our innovation.

Who should be responsible for creating that entity and how do you relate it to the actual research, if you were to separate the two but then have them working together from the beginning to the end?

Prof. Lloyd—I do not have a particular view as to what that entity should be. My perspective on it has been that clearly the system is not working as it is, so the expertise is not present where it needs to be. There are some options for the committee to look at: increasing the expertise; making sure that in agreements you have safeguards and provisions that will ensure that the expertise is available; accrediting the research projects or accrediting particular individuals or setting up a national framework with standards and accountabilities. Those are the options that I would see available, but I do not have a particular view as to the preferred model.

CHAIR—Thank you.

FRAN BAILEY—Thank you very much, Professor Lloyd. This is fascinating. You have introduced an element—commercialisation of research—which is critical if we are to get that return, and I will come back to that in a minute. Your concept of this national framework I think is fascinating. I am not quite sure how that could apply to IP, given that in Adelaide we were told quite categorically by one university that the IP belonged to the student, and I am aware that it is exactly the opposite in other cases.

In talking about a national framework for IP, there would have to be an enormous amount of flexibility to that framework to accommodate the various cultures within each of the higher educational institutions that we have. In talking about this national framework, how would you develop a model that was going to incorporate that degree of flexibility?

Prof. Lloyd—The national framework relates to processes for resolving issues. Presently you have employment contracts between the universities—

FRAN BAILEY—Before we get to the processes, wouldn't you have to have some guidelines within the national framework as to who owns the IP? I took note of that in Adelaide, and I have a question mark in my notes about that.

Prof. Lloyd—The recent case of *University of Western Australia v Gray* has suggested that it is not necessarily the case that the university owns the intellectual property. Universities typically start from a premise that they do, but *University of Western Australia v Gray* is suggesting that that may no longer be the case. I believe the public universities in WA will state that ownership of IP by students remains with the students but ownership of IP created by employees remains with the universities. That is the starting point.

If what the Federal Court has said is upheld, then what that means is you need to have some guidelines in place as to how these issues are going to be dealt with. *University of Western Australia v Gray* states that there is now no duty to invent. There is a duty to promote research, a duty to undertake research and a duty to teach but, in the contract that was the subject of that dispute, no duty to invent. Some commentators are suggesting that you therefore need to write into a contract of employment a duty to invent. I can see that as potentially problematic.

So I think a national framework would need to clarify as first principles in accordance with the Federal Court case, subject to appeal, the first point of ownership, from which you then need to develop some guidelines around licensing, benefits, sharing of revenue and sharing of profits. Certainly the universities have very thoroughly created IP policies of various kinds that do clarify those issues for the reader. The difficulty has been the inconsistency among those. You have, for example, inconsistencies between ownership, inconsistencies between revenue sharing and inconsistencies in dispute resolution processes.

For example, Curtin university has 13 different policies and procedures that you need to read together to get the full picture of their treatment of intellectual property matters. It further states that all of those may be overridden by a written agreement. So even though there are very detailed policies and procedures, all of those can be set aside if a different agreement is entered into with a particular employee.

I think it is possible to develop national guidelines that will cover the field, within which you can certainly provide for flexibility by means of those types of written agreements with a particular researcher or a particular entity, if that is desirable. But the situation at present is that there is no consistency, and the difficulty arises when you have joint ventures—you have two or three public universities and some private commercial companies. Whose system prevails if there is an issue arising? How are you going to resolve licensing, sharing of revenue and related matters if there is no consistent approach?

When I speak about dispute resolution clauses, these can be quite detailed. Perhaps do not think of dispute resolution as a dispute but, rather, licensing and commercialisation issues. How are these to be resolved? I strongly believe it is possible to develop a framework within which there will be flexibility for either individual people or individual entities to have what they require in order to proceed with research. All we know is that the present system is very complex, it is not working particularly effectively, and I think an overarching framework would be of great benefit.

FRAN BAILEY—I wanted to clarify one point: you were talking about the lack of tracking a return on the investment for research, and I certainly do not disagree that this lack of a mediation process is contributing to that, but I think we have to be a little bit careful. There is also access to venture capital which prevents a lot of commercialisation of research. In relation to the model that you are putting forward to us, is there anything like this that exists in other countries that we could have a look at?

Prof. Lloyd—I am not aware of anything presently existing. I think this is breaking some new ground. I have reviewed some of the processes in other countries—in European countries—and I have not seen anything that would give us some way forward. However, I think there is sufficient literature available in the alternative dispute resolution sphere and in the intellectual property sphere for us to move forward, and it gives us an opportunity to innovate and it gives us an opportunity to be leading the field rather than following.

CHAIR—The problem that we encounter in this country, would you suggest, is also being encountered in other countries? We have talked about reviewing Europe. A lot of our universities are suggesting partnerships with international universities, and I think all of us would see that

that would just further complicate the whole issue of intellectual property, unless there is some sort of framework. Can you just give me a small assessment on that before I go to Rowan.

Prof. Lloyd—European countries, in my review, emphasise arbitration rather than mediation, and they have very well developed arbitration structures. Arbitration is a kind of private judging. You still have a neutral third party, but arbitration is a more formal, structured process. The giving of evidence, the tabling of written submissions and so on, is a slightly more formal process, but arbitration is very well developed in European countries. My studies at the World Intellectual Property Organisation focused on mediation of IP disputes and, interestingly, lawyers are often involved in the mediation process. Lawyers may not be involved in other kinds of mediation, but they are involved, and that may well be because of the complexities of many intellectual property disputes. You have multiple jurisdictions; you have technical legal issues. They are fully engaged in the dispute resolution process. So that is the model that is promulgated in Geneva and is used widely, as I understand it, in Europe and in North America.

Mr RAMSEY—Thanks very much, Su. It is completely different to much that we have heard up to now and I can think of a hundred questions I could ask you, but I will try and get to one. In particular, because this has not been raised before, we have to take it from you that this is really an issue out there. Other people have not identified it as an impediment, and I notice here at one stage in the ICT industry—I am not very good at acronyms and I am not sure what that is.

Prof. Lloyd—Information communications technology. I apologise for the abbreviations.

Mr RAMSEY—I thought it was ‘information’. Forty-six per cent of contracts surveyed resulted in dispute, but, given that this has not been identified as something that is actually stopping research, how do we check to see that this is really an impediment and not your pet project?

Prof. Lloyd—That is a fair question. I do not believe it is necessarily stopping research. What we may be suffering is leakage. We may find that people are drifting away from the system, moving, abandoning careers in science and so on, because of the inability to capitalise and the inability to make progress. It is a tricky one. What I think is necessary is some further research in this area. Because it has not been identified as an issue does not necessarily mean that it is not an issue. As I said before, I have reviewed briefly the four public university submissions that were presented to this committee, and some of the other university submissions, and I accept that none of them has identified it as an issue, and it may be useful and beneficial to canvass with them more directly whether they do see this as an issue. I know many of them have commercialisation offices. As I say, I am not aware of any gathering of statistics and information on return on investment, and it might be useful to inquire, and there might well be processes in place to do so. I am not aware of any myself.

What I would say is that I have raised this as an issue. I believe it to be a concern, and I believe that, if we have such a substantial figure being invested in research and development and we cannot tell how much is being returned to the country as a benefit, that is an issue. It may well be that we are benefiting enormously from this research. I suggest probably we are not. I would suggest that further research might be desirable in this area, and also perhaps approaching the universities and seeking their input into this. However, I do just believe that it has not been the main focus. Universities were not traditionally established to commercialise inventions. That

is not their core business. They are now required to under the new funding models and I think perhaps training and capacity need to be developed further within the university sector, and also more widely, so that we can benefit.

The short answer is that we do not have sufficient information, but we do know that we cannot retain good, qualified people. We do know that people are not choosing careers in science, we do know that we are spending a significant amount of money each year on research and development, and we do not seem to know or be capable of quantifying the return to the country on that. So I guess it asks some questions.

Mr CHEESEMAN—Thank you. I certainly enjoyed listening to your presentation and the material that you have provided to us. I am curious: you have indicated that we need a mediation model or we ought to look at developing a mediation model to look at intellectual property. However, you have also indicated that in North America and Europe they use an arbitration model rather than a mediation model. Given that probably there is going to be a lot more research undertaken in a collaborative way amongst universities from different countries, and multinationals and all that, I am wondering why we would not perhaps adopt those international models rather than having a stand-alone arrangement here and whether we might look at having a two-stage process: mediation if we were to have our own local innovation in this process but then an arbitral model that is over the top of that if the mediation arrangements fail, that is consistent with what happens elsewhere.

Prof. Lloyd—Thank you for the question. Perhaps I could clarify that dispute resolution processes are a continuum from negotiation directly between the parties through a range of different processes, such as mediation; conciliation, which is a more directive form; early neutral evaluation, which is an independent subject expert coming in to review; all the way through to arbitration, which is the most formal. When I speak about the arbitration model, it is often preceded by a mediation process. Mediation is a slightly different process from arbitration, in that the mediator does not express a view directly about the possible outcome of the proceedings. Mediation arbitration can exist as a hybrid model, a fused model, where you move from one process into another, and they are not necessarily exclusive or separate processes, although they can be.

The mediation work that is being done by the World Intellectual Property Organisation is really at the forefront, and they are emphasising mediation over arbitration. Privacy, confidentiality, speed, free and open discussion of the issues, are all possible in a mediation setting and more difficult to accomplish in an arbitration setting—a public hearing, a formal court structure. So why should we go down the mediation path? I would suggest it is not necessarily mutually exclusive to go down the mediation path as opposed to arbitration, because fused hybrid processes are possible. The trend is towards mediation and away from arbitration as far as professional direction within Europe. Arbitration has gained some currency, particularly because of the dominance of the legal profession, I would suggest. Legal practitioners are more comfortable with an arbitration model, and many arbitrators are in fact legal practitioners themselves, and they are more comfortable with that more formal approach.

However, the benefits of mediation are the early intervention, the fact that you can have a frank and open discussion about the issues confidentially, and whatever is discussed in the mediation is effectively quarantined from the arbitration or litigation process, so cannot be used

in a formal arbitration setting. I think it offers some benefits. It is not necessarily mutually exclusive to use a mediation process as opposed to arbitration. You can have a continuum, and in fact many dispute resolution clauses in agreements are what we call escalating clauses. In other words, as you have suggested, you have a mediation phase. If that is not successful, you can then proceed on to a more formal structure.

Mr CHEESEMAN—I would certainly consider arbitration a lesser process than litigation. I would actually see, as you indicated, mediation, conciliation, arbitration, and then, if all else fails, litigation. But I am certainly very conscious that, if we were to make any recommendations in this area, we would want to be somewhat consistent with what is happening internationally, given the way that research has often taken place across borders.

Mr SYMON—Like others, I had not considered this issue in relation to this inquiry, but I have certainly spent my share of years involved in mediation and arbitration processes in an industrial sense. It springs to my mind that maybe what you are suggesting here is that there should be standard clauses to be included in employment contracts; not necessarily standard for everyone, but published and comparable clauses. In my mind especially, a new PhD research candidate who signs a contract with a university actually does not have that knowledge and does not have that information in front of them, whereas the university, by dint of being the employer, has a much larger resource that they can look upon.

My concern is that a contract like that is not unfair from the outset, and of course a new employee, first day on the job, does not know what other people have done before or what their standard conditions were. I think it is all very well applied to remuneration or even working conditions, but IP is one of these things that just sneaks in from the side. It has happened to me in the past—that I have been offered an employment contract that has had an IP clause in it, which I thought was totally irrelevant to the job that I was doing, but you never know where things lead.

Would something like that, that is publicly available, assist this process down the track—so actually doing something at the start to identify where the rights sit and how they can be divided or passed on, if need be, rather than waiting till we get to the point where, yes, we have done the work, we have the product, and now we will go to court or wherever else and argue about it?

Prof. Lloyd—I think you make a very important point. You should plan for the end at the beginning; in other words, plan for possible developments when you negotiate contracts at the outset and be clear about the expectations. *University of Western Australia v Gray* is on appeal, so we do not yet know what the outcome of that will be. If the outcome is that employees own their intellectual property, or some part of it, that will impact on the drafting of clauses.

I agree that early researchers are not in a strong position to negotiate contracts, and so some guidance and assistance is required there, and some clarity. It is commonplace, as you say, for people to start work, develop something interesting and valuable, and then there is a discussion or a dialogue around, ‘Well, who owns this?’ and, ‘Was that part of what you were engaged to do or not?’ I think some help is needed.

Standard clauses are always helpful and desirable and can be publicised and made available, but in relation to the negotiating aspects, I think there is an educative role also amongst

professionals and they need to be aware at the outset that these are important matters that need to be clarified before work begins rather than after something has developed. It is very difficult to resolve these issues of ownership, licensing and revenue sharing after the event. Events become unclear; people cannot remember; their focus is, of course, on the research rather than on any possible benefits that might accrue later.

So I think standard clauses can be extremely helpful. I think education of the parties is also important. Plan for what might happen. If you do not need those clauses or those provisions, no harm done, but it is critical to have them in place before the employee starts work.

Mr SYMON—Thank you, Professor.

Dr JENSEN—You have a very interesting paper here. One thing that strikes me—and this is bringing it back to early in the piece—is that you highlight an interesting dichotomy in this whole argument, and that is the issue of scientific research as it was. You mentioned public respect, academic career structure et cetera, which traditionally has been something that has attracted people to science. I can say that from my own personal perspective as well.

However, now you have this thing where there are all these IP agreements and all sorts of other legalistic jargon issues associated with scientific research, which people that are attracted to scientific research really do not want to be involved in. How do you see a way through this to actually improve the system, to make science attractive to the sorts of people that it used to be attractive to? You talked about the low rate of commercialisation, given the number of papers that are published. How does it compare at the moment with what it was historically when we did not have all of this legalistic jargon involved?

Prof. Lloyd—To some extent the legalistic jargon has followed the dominance of the commercial sector. I do not think the legalistic elements are self-generated. I think they are a consequence of being in the global marketplace. The question that you raise is: a pure researcher probably has little interest in these matters—they are focused entirely on the subject matter of their work—so how can we engage with them in a practical way? That is a difficult question. For better or for worse, we are now in the global community. We are now needing to get some commercial benefit. I do emphasise professional development and training. I am aware that some universities do run training of this kind for their PhD students and endeavour to educate them about commercial matters, but it is not easy because it is not necessarily their main focus.

When you look at the people who are administering the projects, perhaps there is a role for them there. I am not sure that you can necessarily convert a pure researcher into a commercial negotiator, nor would it necessarily be desirable to do so. I think some framework is required, however, to support and protect, to ensure that they are not disadvantaged, disillusioned and ultimately leave the system. I think it is a mindset difference.

The person who goes into research as pure research is highly motivated, highly focused, and probably not thinking a great deal about commercial benefits to themselves. How you engage with them I think has to be an educative model. There has to be a professional development approach to this, and some encouragement and support, and it may well be that it is not necessarily the individual researcher that has to engage in the commercial negotiations. It may

well be that there are other people better placed to do that, but they must be part of the process. That is vital.

Dr JENSEN—In terms of commercial outcomes now compared with historically, do you have any ideas about that? Historically there was a great deal in the way of IP contractual arrangements and so on. Have we, in effect, killed commercialisation with the IP contracts and so on, when hopefully, I guess, the idea was to facilitate?

Prof. Lloyd—When you are speaking of IP contracts, are you speaking of the processes and procedures that are presently in place in universities?

Dr JENSEN—Correct.

Prof. Lloyd—I think it is fair to say that there would have been no intention to hamper commercialisation. I think what has happened is, as these things often develop and grow like topsy, people have added and built on in response to particular situations that have arisen rather than developed a single coherent framework for how this is to be managed. When I speak about the multiplicity of policies, procedures and regulations, this looks to me like a feature of work that has been done in an incremental way over a period of time, where people have added to or developed a policy in response to an issue piecemeal rather than taking a systemic approach. Unfortunately, the effect might have been that over time it has provided an impediment, but I do not think that ever would have been the intention.

Dr JENSEN—But you do not have any idea on, for instance, the outcomes commercially, say, 30 or 40 years ago compared with now?

Prof. Lloyd—I am not in a position to comment on that, but I am sure data can be provided. I am not personally in a position to give you feedback on that.

Mr JOHNSON—Thank you for a terrific presentation. My electorate in Brisbane has the University of Queensland in it. Being a lawyer, I am also interested in the legal element of this. I have a couple of questions. In relation to successful examples, have you had a chance to look at the examples where the problems and challenges that we are focusing on here have not arisen and, if so, how they have come to a model where they have had a good outcome? I am thinking of the area of medical research: Professor Ian Frazer with Gardasil at the University of Queensland; the outcome that they had with some private companies involved in the funding of that research, the university's resources, and his own skills. Is there a lesson for us in the model that he and his collaboration team were able to put together successfully? There may be other like examples.

Prof. Lloyd—I am sure that there are other examples like that. My focus in the paper had been primarily on dispute resolution processes rather than that, but I would like to do some further work on that and find out more. I think more probably than not there are examples where people have quietly developed a good system for resolving these issues, and perhaps the example that you gave would be a good one to review.

Mr JOHNSON—I wonder if they had a mechanism in place that in a sense goes to the point that my colleague Mike was talking about; that you sort of look to the worst-case scenario and

you prevent that ever getting to that point, because everyone knows what is on paper at the beginning.

Prof. Lloyd—Yes. I think clarification at the outset and having some good advice and some good drafting of agreements at the outset would be most beneficial.

Mr JOHNSON—Another observation that I would like to make is that I notice in the papers here the one- to two-year delay in the UK. Looking at this case of Gray taking 20 years or something like that, there would be tension and frustration. It must be horrendous. How much of the problem with delays, from your own experience, rests with the legal system itself—the timetables of the courts and the legal representatives and those kinds of miscellaneous but significant factors?

Prof. Lloyd—I think it depends on the jurisdiction. Certainly the Federal Court of Australia is a model in the expeditious processing of cases, so I do not think that the delay was particularly related to the litigation process itself. Our Federal Court is an exemplary court as far as dealing with matters swiftly and promptly, and also emphasising mediation.

Mr JOHNSON—Out of the pie of costs, how much rests with the legal system—the toing and froing that goes with that?

Prof. Lloyd—The formal litigation process is necessarily expensive. The process of discovery is probably a significant component, and I would not necessarily attribute time delay to legal practitioners. They are complex matters. They are often interlocutory procedures, as the committee would know. Certainly it is significantly more expensive than any alternative process of dispute resolution, so it would be desirable, I think, to discourage litigation. As I said at the outset, I think the parties can ill afford litigation in any event. It tends to damage or sever relationships, which can be particularly problematic in a research setting where you have ongoing relationships between entities and between individuals. It is certainly costly financially.

As I said, the Federal Court is a very expeditious and efficient court and, I think, a good model. The complexity arises where you might have litigation in a number of different jurisdictions and a number of different countries more or less simultaneously. Clearly then the costs are amplified significantly and the time delays can arise.

Mr JOHNSON—I very much like your comment about the outcome or solution versus the legal rights, and getting to a solution that was in the interests of the parties versus maybe their legal rights. I really like that sort of thinking. In relation to your model, one expert and one consultant, I have been an amateur arbitrator and, as you would know with arbitration, the outcome is binding. In your model, would there be restricted elements of appeal or would it also be, ‘That’s the end of it,’ the conclusion is the end point?

Prof. Lloyd—Successful mediation results in a binding contract signed by the parties. It is enforceable at law, so it concludes a matter in a formal sense. If litigation is on foot, a mediation can still take place during or throughout the litigation and resolve. One of the elements of the contract settling the matter would be discontinuance of the legal proceedings. So a successful mediation can result in a binding contract between the parties which is enforceable.

Mr JOHNSON—Thank you very much.

CHAIR—Thank you, Su. You have certainly introduced an issue in our hearings that we will now all be thinking about and we will possibly ask future witnesses for their remarks on it. You said earlier that globalisation has led to this issue. or it is there and we are not aware of it, so it is a sleeper. I am assuming in that context that what we are responding to is the fear of ideas being stolen by others, especially from younger scientists or thinkers who go in to do the research but there may be another network of people that may be interested in their idea. Is that what we are responding to? Is this what the concept of ‘globalisation’ is? Are we exposed to a growing lack of distrust in others about people’s ideas? You did refer to respect earlier.

Prof. Lloyd—That is right. I think the more pressing issue is that we may discourage people from inventing altogether; they may simply disappear out of the system and we may never see their potential realised.

CHAIR—Is that because they would be concerned about possible litigation?

Prof. Lloyd—Possibly.

CHAIR—Why would they be discouraged?

Prof. Lloyd—Lack of benefit returning to them, significantly. Most early researchers are relatively low paid compared with the commercial sector. It is more that it would perhaps discourage them from engaging in the first place. The difficulty of enforcing a contractual condition that requires you to invent is a real problem. I do not know how you can direct someone to invent. That remains to be seen.

CHAIR—There is another process of invention and commercialisation that takes place outside of academic institutions.

Prof. Lloyd—Yes, that is true.

CHAIR—It is the stuff that happens on the street, with an idea, and people do not need to become PhDs to make lots of money; they create a little gadget. That is happening, and it is happening more and more.

Prof. Lloyd—Yes.

CHAIR—A lot of younger people are being encouraged to commercialise ideas. They are not being told that they need to go through PhD programs and research and endure all of those things; what are now seen to be no-value-for-money processes. That is happening in a big way. That world is impacting, isn’t it, on the academic?

Prof. Lloyd—I believe it is impacting on academic research and leading to a lack of incentive to stay within publicly funded research.

CHAIR—You could go off somewhere else and do it without all the accolades.

Prof. Lloyd—I think that is correct.

CHAIR—If your driver is financial gain as well.

Prof. Lloyd—Exactly.

CHAIR—Thank you.

[9.56 am]

LAING, Prof. Nigel George, Private capacity

CHAIR—I now welcome Professor Nigel Laing. Do you have any comments to make on the capacity in which you appear?

Prof. Laing—I am a National Health and Medical Research Council principal research fellow. I am a professorial fellow within the Centre for Medical Research of the University of Western Australia, based in the Western Australian Institute for Medical Research—WAIMR.

I am also a senior medical scientist in the division of neurosciences at Royal Perth Hospital within the Western Australian Department of Health, but I am here as myself today. I am not representing the UWA, WAIMR, Royal Perth Hospital or the Department of Health. I just wrote a submission to you guys. I heard about your committee and your inquiry very shortly before the close of submissions and I penned one off to you. If I had had longer, it would have been better written and would have more clearly said what I wanted to say.

CHAIR—Although the committee does not require you to give evidence under oath, I should advise you that these hearings are formal proceedings of the parliament. Consequently, they warrant the same respect as the proceedings of the House itself. It is customary to remind witnesses that giving false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. We thank you for your submission and we now invite you to make a brief opening statement before proceeding to questions.

Prof. Laing—I have been doing medical research since July 1976. I have worked in four different countries. That is Scotland, Norway, Australia, the United States, and then back in Australia again. My laboratory here in Perth has identified the genes causing a number of genetic muscle diseases, particularly muscle diseases of newborn children. Our work has helped hundreds of families around the world.

My main concern about Australian medical research currently is that, in all my time since 1976, I have never known things to be so bad for successful grant winners from the major national funding body. To me, the most important parts of my submission are the gaps between National Health and Medical Research Council personnel support packages—NHMRC PSPs—and host institution salary scales, which is point 2 of my submission. The other one is the fact that the DEEWR funding for PhD students comes, largely, three to five years after the PhD student has finished doing their PhD. My other points on the problems in doing medical research in boom states, opportunities for career advancement, international competitors and ageing of the academic workforce are more minor to me.

I would like to mention two relevant aspects of the Gillard-Bradley review discussion paper on higher education. The issue of partial funding of research by the major competitive grant schemes, the Australian Research Council and the National Health and Medical Research Council, is discussed on pages 48 to 49 of this, and on page 62. The issue of ageing in the Australian workforce is mentioned very briefly on page 12 of this.

As far as the delay in funding of PhD students so that the money only comes three to five years after the student has finished, largely, and sometimes does not come to the supervisor at all, I have been discussing this with my colleagues around Australia frequently. The money goes into a pot that never actually comes to the PhD supervisor. You end up taking on the work of supervising a PhD student, with very little reward or incentive for doing it, and you end up asking yourself the question, 'Can I afford to take on a PhD student with the budget that I have available?' This is especially the case if you already have a gap or a hole in your funding because of the gaps between what you receive from the NHMRC to pay yourself and your staff and what you need to pay that person at the appropriate level on your host institution salary scales.

In my submission I say that the gap can easily be 30 per cent of what you receive from the NHMRC in a PSP. I did not put the calculations in there for that, but I have the calculations here if you would like to see those, and I have made enough copies for everyone to have one. Gaps is an Australia-wide issue. Again, talking with my colleagues around Australia, it is affecting a large number of people around Australia, and I know that the Australian Society for Medical Research, the ASMR, has recently surveyed its members who have NHMRC grants on the effects of the gaps on them, and I know that some of the comments back to that survey have been very strong indeed, on the effects of the gaps on morale, the likelihood of a person staying in a research career, and on the quality and quantity of research output. The results of that survey have not been made public yet, but they will shortly.

As far as the gaps are concerned, the biblical expression being asked to 'make bricks without straw', from the Israelites in Egypt, comes to my mind frequently. We are being asked to compete with the world's best, with one hand behind our backs. As far as encouraging young people into a career in medical research is concerned, I find it harder and harder to look a bright young person in the face and encourage them into a career in medical research. We had the UWA expo on Sunday, where school students come to the university to try and decide what they are going to do, what course they are going to take, and a fairly standard response, when walking in to our display on medical research, was the comment, 'What's the starting salary? You don't earn much doing medical research,' and at that point they walked out. I now get to the point where I sometimes feel guilty about the people that I have mentored and encouraged into a career in medical research, because it is just so hard.

As far as the ageing of the workforce is concerned, talking again with my colleagues, one thing that seems to be frequently happening now with the constraints on university budgets is that when someone finally leaves, that position is not filled, and so there is little opportunity for young people to come into the system.

I know that you have had submissions talking about the lost generation of researchers. In 2004 the Director of the European Molecular Biology Laboratory, Fotis Kafatos, came to Western Australia and said something which I found very interesting. He said, 'We have to trust the young.' I found that a very powerful statement. Some of us old people need to get out of the way.

CHAIR—That is a very dramatic way to finish! I am assuming you have finished.

Prof. Laing—I am done.

CHAIR—Well done. Thank you very much for being so frank. Where does the money that universities get for PhD students go, if it is not going to the supervisor? I know the whole system is very complex, and I am trying to understand it, but you said something a little while ago and my response is: where does the money go? What does the university do with the money?

Prof. Laing—I will speak from what I know myself. What actually happens varies in different parts of different universities all around Australia. I do not know the exact sum that comes to a university for a PhD student, but it filters down into the university, down to the faculty, down to the school, down to the department, down to the supervisor, and it gets reduced, each taking a cut.

CHAIR—It is not directly dedicated—bang!—to the student?

Prof. Laing—No, not in all cases. Again, talking with my colleagues around Australia, frequently the money does not actually come right back to that supervisor who has the hassle of trying to support the PhD student.

CHAIR—Even though the intention of the money is for the assistance to that PhD student?

Prof. Laing—It goes into that part of the institution in general.

CHAIR—Interesting. I can see how it could dissipate or disappear or be perhaps used elsewhere in a general way, which may be leading to what appears to be a bit of a crisis. You indicated that you have never known it to be so bad.

Prof. Laing—That is in terms of the gaps with what you receive from the NHMRC. If you put in a grant application in February, you hear in October or November you have got the money. Even if you are successful—one of the one in five or one in four grants that get funded—you then do not get enough money to actually do what you need to do, to pay the people to do the work. The example I give here is what you get on an NHMRC PSP3 for someone who is a junior PhD, so a bright, new, shiny PhD, and basically you cannot afford to pay someone at the starting level for an academic with a PhD in the university system.

Dr JENSEN—What are the on-costs?

Prof. Laing—The on-costs are all those things like superannuation.

Dr JENSEN—Equipment?

Prof. Laing—The costs of employing somebody: leave loading and all those bits and pieces.

CHAIR—You have to bear that burden? That doesn't come in with the grant?

Prof. Laing—No. That is the whole point. The grant does not cover that.

CHAIR—And that is where your gap is.

Prof. Laing—And that is where the gap is, and a lot of the universities are saying that, because their budgets are so tight and because they do not get enough money in the research infrastructure, block grants and things, to cover that, they cannot cover it themselves now. So it is coming down to the individual researchers to somehow manage that gap.

CHAIR—I could see how that could be a problem if it continues in this way. I have got another question, but I will wait until my other colleagues ask their questions.

FRAN BAILEY—Professor Laing, you are in what I would think is a reasonably unique position, having worked in other countries. Can you suggest to us, if we were to take the best out of the models that you have worked under in other countries, how that could apply to the Australian system.

Prof. Laing—I have been in Australia basically since January 1981, with only one year in—

FRAN BAILEY—I am sorry. I thought that you talked about the United States, Sweden and—

Prof. Laing—Yes. I worked in the United States for a year in that time, and I was in Scotland for 3½ years, and I was in Norway for a year. The Australian system used to be really good. When I first came here in 1981—

CHAIR—Why was it good?

Prof. Laing—At that time my perception was that medical researchers in Australia were paid quite well, and it was a pleasure to come here and a good career move. But now the situation is very hard. Even if you are successful in getting a grant, it is very tough.

CHAIR—Is that because there has been a reduction in the money that has been allocated towards our research? Obviously somebody is doing something—and I assume in this instance government would have to be one of those somebodies—or has been doing something that has altered a course of events that used to be favourable so that it has now become unfavourable. I think we would all like to know what it is, if you can tell us.

Prof. Laing—In any other funding system that I get money from, you actually get paid for the person that you need to do the job.

CHAIR—Is that funding that is directly given to you for that purpose?

Prof. Laing—Yes. You get the money for the person that you say you need—the skill level that you say you need—and you get a consumables budget to do the work. What happens with the NHMRC now is you say you need a person who has a PhD, or who has multiple years of experience after a PhD, in order to do that particular piece of research and you are given a personnel support package, which is a system of funding that the NHMRC introduced a number of years ago. The problem with the personnel support packages is that they do not fully fund that position. You get enough money for maybe four days a week of that person at that level. You do not get enough to pay the person the full five days.

What has gradually been happening is that the PSPs have been going up by about two per cent a year since they were introduced, whereas institution salary scales have gone up at a much faster rate. So the gap between what you should be paying your staff and what you are getting from the NHMRC is gradually widening.

FRAN BAILEY—Can I extrapolate that. You have given us an insight into the salary issue. What about access to the latest technology within the research facilities? If we have been falling behind in the salary base, what about in access to equipment and technology?

Prof. Laing—The expensive equipment and technology—the big machines that go ‘ping’—are best housed in research centres. My own opinion is that the best way to get research done is to bring a critical mass of people together in the one place, and then you can feed off each other. Something may come up in the research that you want to do that you may not necessarily have the skill set or equipment to do. In some situations, it may not be possible for you to do that in your state. You may have to get that done in another state or even overseas.

The more you can bring major pieces of equipment and skills together the more you can do things in the one place, which makes things a lot easier and makes things work a lot faster. I am a big believer in bringing researchers together so that they can work together. In our own situation, one thing was something that previously we could not have done in Western Australia. Our group is inside WAIMR and others had those techniques up and running. We did it in five weeks, because that group of people were there close by with the necessary skills set. I believe in bringing people together.

Dr JENSEN—You mentioned getting the funding three to five years after the student completes. We have taken other evidence where they were saying that the money was given to the university on completion, when the thesis was handed in, even prior to examination and passing. I would like to have some comment on that. On this one, the answer might be the ‘No. 42’, but if you could do one thing to best progress health research, in your view what would that one thing be?

Prof. Laing—The one thing is fully funding research positions so that you do not have a gap. When you have a gap, you spend a lot of your time trying to find ways to overcome the gap instead of getting on with the research. It is also a major disincentive to young people, because they feel undervalued. Even the premier funding body for medical research in this country says, ‘We’re only going to pay you for four days a week.’ It is telling you that it is looked on as a part-time job, and it is not. It is a six and a half days a week job.

Dr JENSEN—What about the three to five years after—

Prof. Laing—The three to five years? That is when the money comes. My understanding is that a large part of it is distributed three to five years after the PhD student has finished, and in an expensive field of research it costs you about \$20,000 a year in consumables to have a person in your laboratory. If you are not getting that money, you have got a \$20,000 hole to fill.

Mr RAMSEY—The funding that you are getting three to five years after completion is the RIBG funding. Is that what we are talking about?

Prof. Laing—Yes, wherever that student goes into that—

Mr RAMSEY—Yes, just so I had my hand on the right package.

Prof. Laing—So it is part of the funding that goes to your host institution because you have a PhD student who has completed.

Mr RAMSEY—Yes. I know there is a big lag time.

Prof. Laing—Yes, and that was brought in to try and make people finish, but one of the side effects is that the actual supervisor has got a problem.

Mr RAMSEY—The programs are often finished, in fact, by the time the funding comes in.

Prof. Laing—They're gone! They are over and gone, yes.

Mr RAMSEY—I have had experience with that.

Prof. Laing—You end up getting money for a PhD student eight years after they started.

CHAIR—I do not understand the rationale in that.

Prof. Laing—Neither do I.

CHAIR—I genuinely do not understand it.

Prof. Laing—The idea was to make people complete.

CHAIR—So you deny them the funding in the course of their work. Is that how you make them complete?

Dr JENSEN—This is the supervisor—effectively the institution, not the student.

Prof. Laing—Yes.

CHAIR—I think we will look at that, and you have raised some other issues.

Mr SYMON—I will continue down that path. I am finding it rather interesting that funding comes so many years after completion. How does anyone actually become a supervisor of a PhD student if the funding is that far down the track? Where do they get the funding for a PhD student for the first three to five years if they have not previously done it? Is it blocking a supervisor out from taking on a PhD student because of that lag? How did it get to this, when in the research training scheme the funding comes at completion? Has this always been different coming through on the medical research side? There seems to be a 'one over here and one over there' to this. If you could expand upon that, I would be very interested.

Prof. Laing—I think it makes it hard to get started as a young person. I think it is a disincentive, and it may be one of the reasons that fewer people are doing PhDs. How did this come about? A decision was made that that was the way the funding was going to be changed.

CHAIR—Who made the decision?

Prof. Laing—Presumably it was someone in federal government.

CHAIR—The government made the decision?

Prof. Laing—Yes, that that was how the funding was going to be changed. I cannot remember what year it happened, I am very sorry.

CHAIR—No, that is fine. We can sort that out.

Mr SYMON—Thank you for that. It was most enlightening, and it is something that we will go away and look at.

CHAIR—Does it vary from institution to institution? Is what you have just said standardly applied to all situations?

Prof. Laing—My understanding is that it is the standard way that PhDs are funded now around the country.

FRAN BAILEY—If someone said to you, ‘You have the opportunity to encourage PhD students and ensure that the supervisors are being properly remunerated,’ how would you fund it? What model would you develop to ensure those outcomes? Would you front-end load it to provide an incentive? Would you stagger payments throughout it? Obviously the one that is there is not working terribly well. What would you do?

Prof. Laing—More of the funding has to be there during the time of the PhD student. How that can actually be worked out by the accountants and finance people, I do not know, but from my point of view, as someone who has to get on and do the actual research and have the PhD students in my lab, that is what we need.

Mr JOHNSON—Thanks for the presentation. I must say that I am staggered by the remarks and the submissions that you are making, even if it is only three-quarters accurate. I find it remarkable. As I mentioned earlier, the University of Queensland is in my electorate and I must say that, having been the federal member for Ryan for someone seven years now and having a pretty good relationship with the university in that time—with the leadership of the university and the various deans and departments—I have not had any of those key stakeholders—researchers, PhD students—flag this apparently clear problem that to all of us is quite a major problem.

Does that say anything to you about the general conditions? Does that say anything to you about the thinking of that specific constituency as a reflection of this problem or not? I have had all kinds of different people bringing to me weird and wonderful and bizarre issues, from people who think that they have seen an alien aircraft or a spaceship or a UFO landing in my electorate

to all kinds of substantial problems, and I would have thought that something like this would have been brought to the attention of the local federal member, both as a member of the government of the day and certainly in recent months. I would be keen to hear your observations on that, if there is anything to be read into that at all.

Prof. Laing—First, I would go and ask them if you get the chance; go and specifically ask them. Second, my understanding is that UQ has been one of the most proactive and supportive of the universities around the country.

Mr JOHNSON—I would certainly endorse those remarks. So does that come back to the leadership of the university and that is in isolation or an exception to the general position?

Prof. Laing—Yes, I think so, and to the amount of funding that the individual states are willing to put into these areas and into these problems, in addition to what is coming in through the federal government.

Mr JOHNSON—That is certainly a very important point about the source of funding from the Commonwealth and state. What is the general community perception of the status of medical research and medical researchers?

Prof. Laing—Again, the ASMR has done a survey of its members recently and I think the overall impression is that people are disheartened by the current status.

CHAIR—The general community is disheartened?

Prof. Laing—Yes, and I think that will come out also in the responses of people to this survey about the effects of these gaps on them.

Dr JENSEN—I think they are talking about the general population, not the research population.

Mr JOHNSON—So do you mean that the average Joe Blow does not think much of research, as opposed to—

Prof. Laing—I am sorry, I thought you were talking about the researchers.

Mr JOHNSON—No, the general public.

CHAIR—No, we are talking about the general community.

Mr JOHNSON—As opposed to an airline pilot or a politician or a taxi driver or a used-car salesman.

Prof. Laing—That is a hard thing.

Mr JOHNSON—I understand it is very subjective, but what is your understanding?

CHAIR—I think we are better placed to know that.

Mr JOHNSON—I am interested to hear from someone who is in the—

Prof. Laing—I think Australians are very proud of what their medical researchers have done over the years. I am at the point of feeling that it is getting harder and harder for us to keep bringing home the bacon. A lot of the young people who came into the expo are idealistic. They say, 'We want to do medical research,' and I am thinking, 'Do you really know what that statement means?'

Mr JOHNSON—I ask that question because I have a brother and a sister who are in the medical field: my brother is a neurosurgeon and my sister is a doctor. They are young doctors and very good doctors and they are thinking of going more into the medical research side of things. My brother is one of the top young neurosurgeons in Queensland and in the country. He is completely unmotivated by personal salary or funds that might be available. He is motivated by a different cause. I am wondering whether there is a disconnect between the motivation that you allude to here and the general motivation of someone who wants to find a breakthrough in some area?

Prof. Laing—I do not think we do it for the money.

CHAIR—That is true.

Prof. Laing—In order to do research you have to be obsessed and you have to be obsessed with a particular thing that interests you. You can only keep doing this for a long time if you are completely obsessed with what you are interested in. I have been interested in muscles and genetics since I was at school. Other people in the institute work on kidneys. I am not interested in kidneys at all, but muscle and genetics and nerves, that is what fires me up. You just hope that you find other young people who are similarly fired up who will work with you.

I have working with me an extremely wonderful young researcher, Dr Kristen Nowak, who was the Premier's Western Australian Young Scientist of the Year last year. Those people are around. I would just like to see that their funding into the future was more secure than it is now and that they were actually rewarded for the amount of effort that they put in.

Mr CHEESEMAN—Thank you, Professor. I was very interested in your information and also your observations that you have made to us this morning. Can I ask, at least on a 'back of an envelope' kind of calculation basis, what sort of income might someone who completed a PhD say 10 years ago, who is working as a medical researcher, be able to expect at the moment?

Prof. Laing—I cannot do that for you, I am sorry.

CHAIR—That is fair enough.

Prof. Laing—The starting salary on academic scales for someone with a PhD is about \$63,000.

Mr CHEESEMAN—Okay.

FRAN BAILEY—Thank you very much. Thank you for your passion and for your belief in young people. You were present when Professor Lloyd was making her argument to us in relation to the lack of mediation in IP, leading to a lack of commercialisation of research. I would like to hear your opinion, if you are aware of examples like this in your area of expertise.

Prof. Laing—I am not someone who has ever patented anything that I have done. I work in the area of human disease genes and I have difficulties in patenting genes. I do not think they belong to me. This is my dream before I retire in about 11 years time: I would like to have a treatment for some of the diseases that we have identified the genes for before I retire. If we get to the point of inventing a treatment, then that might be something one might patent.

On the other hand, the diseases that we work on are very rare and the only people who would be left carrying the can for the costs of the patenting are the patients and families who are affected with those diseases. I find the issues of IP very difficult. As far as working out who should get what is concerned, I thought we had agreements there in the background: so much goes to the researcher who makes the discovery or makes the invention, so much goes to the host institution. It should all be laid out.

FRAN BAILEY—Thank you.

CHAIR—Thank you very much. It is certainly a very thought-provoking discussion. I can only say to you that it is almost a bit worrying some of the discussion we have had in the last 30 minutes, but I did wake up this morning to news that Australian scientists were on the verge of dealing with some defect that leads to leukaemia research. So that is always ultimately where Australia's success and pride lies in relation to cutting-edge research.

I am sure that I speak on behalf of all of us when I say that we would be very concerned if that sort of research was jeopardised in any way that we, as members of governments or parties or whatever, had some control over trying to facilitate that process. We would not want to be involved in anything that perpetuated obstruction. Certainly you have raised one in particular that we have had a little bit of a look at, but we will choose to look at in greater detail in the course of our public inquiry—that gap funding. We have now put it on the table as something that we would like to investigate a bit further. Thank you very much.

Prof. Laing—Thank you very much.

CHAIR—I need to ask one of the members of the committee to move to accept the pay scale as an exhibit to the committee. Dennis and Mike. Thank you. We will suspend the hearing while we prepare for our next panel.

Proceedings suspended from 10.32 am to 10.53 am

FELLMAN, Dr Marc, Manager, Research Office, University of Notre Dame Australia

FINLAY-JONES, Prof. John, Deputy Vice-Chancellor, Research, Edith Cowan University

KRISTJANSON, Prof. Linda, Deputy Vice-Chancellor, Research and Development, Curtin University of Technology

O'HARA, Prof. Graham William, Dean of Graduate Studies, Murdoch University

OWENS, Prof. Robyn Anne, Pro Vice-Chancellor, Research and Research Training, University of Western Australia

CHAIR—I now welcome representatives of the following universities: Curtin University of Technology, Edith Cowan University, Murdoch University, University of Notre Dame; and University of Western Australia. Although the committee does not require you to give evidence under oath, I should advise you that these hearings are formal proceedings of the parliament. Consequently, they warrant the same respect as proceedings of the House itself. It is customary to remind witnesses that giving false or misleading evidence is a serious matter and may be regarded as a contempt of parliament.

Thank you for your submissions, and I now invite you to make brief opening statements before we proceed to questions. Perhaps, Dr Fellman, we might start with you.

Dr Fellman—I really came along today for information. Notre Dame is a fringe dweller in terms of research capability but, as an emerging institution with a campus recently starting up in Sydney and with schools of medicine—in both Fremantle and Sydney—we are finding that our research culture is growing almost in spite of itself, I think. As I said, I am really here for information; I am very interested to see what the lay of the land is. I am happy to hand over from here, but also happy to address any questions.

CHAIR—We will get to questions immediately after everyone has had an opportunity to make some opening remarks.

Prof. Owens—The University of Western Australia addressed this inquiry into research training and workforce issues, conceiving research training involving both PhD students and early career researchers, so looking at the whole spectrum of research training. In addressing some of the problems that came up, we divided the world into supply issues and demand issues, issues that affect and are major drivers for universities in doing research and research training, so around the notion of full cost of research and research training, access to research infrastructure, infrastructure block grant, and indexation of academic salaries.

The demand side seems particularly relevant in Western Australia with a booming economy and the attraction of jobs for graduates: the difficulty of maintaining numbers in research students, the shifting demographic of the population, impediments to recruiting graduates from overseas, and incentives for staff to stay on at the university. I am happy to expand on those issues later on.

Prof. Finlay-Jones—Edith Cowan University shares with other universities in Western Australia a concern about some of the special challenges facing the universities here, given the external pressures that are perhaps more focused in Western Australia than elsewhere in the country. But I think that, with universities around the country, we share concerns about the diminution in enrolments by domestic students in our research higher degree programs and finding incentives to get around that for the importance of the nation. We are concerned that some of that might be underpinned by a very inadequate remuneration or stipend for those research higher degree students. We are also concerned about the importance of meeting the full cost of research and research training within the funding arrangements for universities. I think that is probably an appropriate point at which to hand over to my colleague.

Prof. Kristjanson—Thank you, on behalf of Curtin, for the opportunity to speak to the committee. We believe that this inquiry is extremely timely, especially because of the national innovation review under way, as well as the higher education review. We see that these initiatives are very much linked if we are going to go forward as a nation and think in a holistic way about how we are building capacity within the country.

We also think that the committee has a genuine opportunity to bring about some important reforms that are needed if we are going to be competitive. I will not repeat our submission, but I would like to highlight three key points. One is the importance of adequate investment in research education. We are sorely behind other OECD countries and we need to be playing catch-up in a serious way if we are going to make a difference to the future of this nation's economy and the wellbeing of Australians. To that end, we need to examine the scholarship value and how that has not kept pace with the cost of living.

We need to think about the resources that need to be brought to bear in terms of infrastructure, so that we can provide quality education to our students, support for the supervisors so that we do not keep spreading them thinner and the support services that are needed to ensure good-quality research training. We also need to examine the tenure for accomplishing a higher degree, because it is not realistic. Whilst there were some changes six years ago that have in some ways been positive, I think there have been some negative consequences. If we are going to ensure that research training is accessible to a range of people, we have to think seriously about what their shorter tenure does in terms of disadvantaging some.

The second key point is about the need for a critical mass of research students and researchers for the country, and that points to access and equity. Where are we going to build this capacity? Where do we look for increased capacity? It is correct that the domestic market is down, but how do we attract people back into higher education and who do we reach more widely for—people who might not otherwise have chosen this path but, with a little bit of encouragement and opportunity, might be able to contribute? We also need to think about our openness to our international students and think of them not as an export market but as potential new Australians who can enrich the quality of life that we have. We need to think about flexibility and how we offer what we do in terms of research training in more imaginative ways. We have to recognise the global market pressures that we are under so that we are not an island, and we have to think about how we are going to compete.

The third key point is to think about the need for research career pathways for academics. Researchers pursue their research because they are passionate, but we cannot rely on them to

pursue it because it is a priesthood, and really that is almost what it has become. The competition for research grants is so difficult that people get quite discouraged, and good ideas are not funded. Each year good ideas by ARC and NHMRC get turned back because there is not adequate research funding—not because there is not good talent but because the funding is not there to allow those ideas to be supported.

We run the real risk then of people getting discouraged and demoralised. They do not even mind a modest salary if they can get their ideas funded and keep going, but we find that they look across to the United States or to other countries because they can see an opportunity to move their ideas forward more quickly, remain competitive and make a difference, which is ultimately what they want to do.

We need to take care of our early career researchers. The Future Fellowships scheme is an excellent scheme, and we welcome that, but we have to remember about the early careers and how to get them going. When they are a brand-new PhD, how do they find their way in without being drawn into heavy teaching loads that really sacrifice their future in ever being competitive in the research world?

We have to look at full funding for research so that we do not end up with cross-subsidisation and the creation of internal tensions with the academic sector, because people see research as a burden that they need to subsidise from the teaching. Those are the key points. Again, I would be happy to respond to any specific questions.

Prof. O'Hara—On behalf of Murdoch University, I thank the committee for this opportunity and I endorse the comments of my colleagues. This is a very timely inquiry, going on at a very important time. Australia should be justifiably proud of its universities and the research training that it has done in the past, but I think it is very timely that we look at how we can best adapt that for the future. I have been involved in my role through three of the submissions. I noticed there were over 100.

CHAIR—One hundred and two.

Prof. O'Hara—One hundred and two submissions that you have all read, I understand.

CHAIR—I will admit that I have not read all 102, but we are getting a general picture, I can assure you.

Prof. O'Hara—There is a lot in there. But there is a fair bit of repetition, because I think the key issues rise to top, which is natural and good. I will try to cover my points without too much repetition of the key issues. It is clear that as a nation we are not training enough at the higher level and not at the moment attracting the best into that. We need to look at ways in which it can be made more attractive for our best and brightest young people to come into research training areas. I know in the submissions there have been a lot of very good proposals about how to do that.

We need to be take more advantage of our international reputation as a training and education provider. I think for coursework, for international students, Australia is one of the highest in the

world, but we fall a bit below on the research training side. I know there are some schemes that are available, but there are some opportunities there for making that work better.

I think the research training experience needs updating, and it has been alluded to that part of this is the pressure to do with the funding available for people undertaking PhDs and the time available. As you will be aware, in Australia we have a much shorter time frame for undertaking a PhD than in many other places around the world. That is not necessarily a bad thing, but when people are undertaking research training, a key thing is time. People need to have time to develop as researchers, to develop ways of thinking and to take on board ways to develop the intellectual capacity that they have.

In many submissions there has been an argument for a review of the full cost of research funding, and I am sure you have taken that on board. I think that is very important because of the pressures that are put on the research experience, or the training experience.

Finally, to provide training we need to have adequate trainers available. In terms of academic careers and providing places for people to be in positions so that they can provide the training, there need to be opportunities for succession and renewable programs in a much more targeted way in universities across the nation. I know internationally, such as in the UK and Japan, over the past 10 years they have been able to renew their academic institutions by the targeted inputting of funding, but in appropriate ways that use the best resources.

CHAIR—Thank you. It obviously is not often that we get the opportunity to speak to, in this case, five representatives of five major universities in this country, and certainly leading universities at that. In the course of our hearings a number of recommendations and a number of areas of concern have come up. ‘Repetitive’ is to understate it, but I think we have gotten the message on a number of them. But as you try to work your way through this, you think—I certainly do—what is it that has led to the decline in our investment in research? What are the factors and over what period of time? Australia has been lagging behind OECD countries for some time now. This did not happen just five minutes ago: ‘Oops, we have a problem.’ It has obviously been building. The answer to that could possibly be as simple as, ‘Well, the government cut funding to universities to such an extent that that impacted on the manner in which they then administered and ran their businesses,’ not only in research but also in terms of casualisation of academic staff, tenure and a whole set of other things that could have led to the sorts of problems that we appear to be having in our universities which could, if not addressed, seriously hamper our future successes in research and academia. Is anyone able to shed some light on that, just articulating maybe two, three or four points that have led to what appears to be a bit of crisis?

Prof. Owens—To pick up on a point that Linda raised earlier, government investment in education in general—and certainly in research and research training—has declined at the same time as a substantial proportion of it has moved from block funding into competitive funding. That as a principle is not necessarily a bad thing but, as Linda mentioned, the availability of competitive funds is extremely limited, with the major research grant schemes having typically about a 20 per cent success rate. All of us will attest to the fact that not all academic staff or not all research staff compete in the grants scheme anyhow.

The ones that do have put a lot of thought into their grant proposals, and the universities have invested a lot of training and resources into making them as competitive as possible, so you are already working with a competitive lot of applications, of which about 20 per cent win funding, of which all of those budgets are generally cut and underfunded. The result is that there are a lot of research projects that do not get funded at all, and those that do are underfunded and have to be subsidised through other parts of university activity and, typically, that is going to come from whatever other resources you have, so out of teaching or out of whatever else you can spend on doing research. So there is almost a negative feedback loop, in the sense that the more successful you get to be with research, the more it is going to cost you to do it.

CHAIR—Nobody else wants to add to that?

Prof. Kristjanson—I am not sure what the sociological phenomenon is, but other countries seem to have awakened to this issue probably about a decade ago.

CHAIR—That is why I am asking, yes.

Prof. Kristjanson—You might think that is about leadership. You might think about governance.

CHAIR—Does it have anything to do with schooling? That has come up as an issue as well, and what is happening at middle school level in particular—secondary; maybe even primary—because that cannot be isolated and totally unrelated to what might be going on at universities in relation to research, and interest in research, and the decline in the number of domestic students who take up research. Is it always just about the money? Is this lack of interest maybe because kids are not getting any exposure?

Prof. Kristjanson—I think it is a deeper cultural issue, if I can be that direct. I think it is about a culture that values education. There are cultures that have histories that do that and so it is deeply embedded within those societies. Therefore, you will see things like a society embracing tax incentives to encourage industry to invest in research, which is seen as a good thing for the future of the country. I think that we have been a country of sport and we have been a country of recreation. We motivate our students, in the younger years, in different ways, but we have not created heroes of our scientists. We have not made visible what research does for society, and it still seems quite an isolated activity done by a few clever people, but the reality of its integration back into society has not been well articulated.

One study I was reading recently—I think it was by the Go8 universities—identified that 72 per cent of PhDs did not work in academia, so those individuals actually returned to industry and contributed their critical thinking, their problem-solving, their leadership, their analytical abilities to a wide range of industries for the betterment of society. That is not a well-known fact. It is not well embraced. So I think it is a huge cultural attitude that we are wrestling with here. It has very deep roots, but I think we have to start to tackle that. And perhaps there has been a comfort in being a lucky country—we could be a bit relaxed about it—and now it is time to wake up.

Prof. Finlay-Jones—I endorse those comments. As I understand it, the issue is not just Australian. I understand that in the United States, PhD completions overall are increasing with

time, but, if you dissect out the domestic students, the PhD completions are decreasing with time, and so some of those issues I think are common to a number of countries. I think it is in part a matter of culture. At the moment you have to struggle to dismember today's newspaper to get to news other than what is happening in the Olympics, and we are not alone in the world, celebrating outstanding sporting success, but one has to struggle to find any information about Australia's performance in the Science Olympiads, and these are youngsters at secondary school who are performing internationally at their best in biology, in maths, in chemistry and the like, and yet it is not something that our media seems to want to pick up, for whatever reason. So I think it is part of the culture.

There are some good things. With, for example, Medical Research Week, National Science Week and the like, which are being well supported by government, and to some extent by the media, I think we are seeing examples where research activity is making a difference, where people are being celebrated for their achievements, but it is fairly modest. If we can grow that, we might start to develop a more positive attitude in our society. I think also, though, part of the concern relates to the career opportunities, and a number of the submissions that you will have seen will have picked up on that: that people who are in their hearts committed to a full-time research career are daunted by one year, perhaps followed by one year of appointment, and the disappointment of missing out on a research fellowship application or getting their salary funded on a grant. I think that if one can build a better image of the career opportunities for our best and brightest, we will do well.

CHAIR—I wonder how much of the printed media space would be given to the breakthrough in leukaemia research that was announced this morning on television. It may get buried in the Olympics today, but I think that that does illustrate something. But I certainly share your concerns.

Prof. Kristjanson—Could I add one more point in response to your question about earlier education?

CHAIR—Yes.

Prof. Kristjanson—I think we have an interesting tension that needs to be addressed between access and equity and excellence, and I think sometimes, under the guise of excellence and standards, we have actually narrowed opportunities for our young people to pursue science and math.

CHAIR—I agree with you.

Prof. Kristjanson—And we create an elitism in those areas. Schools do not want their TER scores to look bad, so they channel children who might have capability but who may not do justice to the curve, and I think we need to rethink that, because the message we need to give is, 'Yes, there's an opportunity here. You have the capacity. You shouldn't be afraid of math. You can accomplish science. There's a pathway forward,' and that message has to be much more hopeful and more inclusive—not to diminish the standard. We have to keep our standard clear but look at the inputs that we might need to provide to ensure that more people can reach that standard. I think we have underserved that front-end access point.

CHAIR—Last week in Sydney with your peers we had an identical discussion about this, and I want to talk about the gifted school program later and how, in a perverse sort of way, that had a negative impact on classrooms. On the one hand you are trying to encourage the brilliant kids, but you are actually shutting the door on the others, and often the average students can get there as well, although maybe not as quickly. I think that they are some of the issues that are not coming through in the submissions, but they do come through in dialogue.

Dr JENSEN—Just on that point, this is something that I brought up in Sydney as well: the issue of science and maths students at school, and these kids moving out of science and maths and into other subjects to improve their TER ranking. Isn't there a possibility of, say, using a multiplier on those subjects like science and maths, say multiplying their score by 1.1, so that the incentive to move away from what are perceived as tough subjects is reduced so that we can actually retain more of our kids in the sciences and maths right through to year 12 and keep their options open? Also, isn't there a place for universities to reintroduce more in the way of prerequisites with subjects like science and maths before kids are allowed to go into some of these degree courses?

Prof. Owens—First of all, with regard to bonuses for TER scores, that is already under consideration and there are things like the calculus bonus, and the LOTE bonus for languages other than English as well, that will advantage and encourage students to take subjects that we do think are very important for their subsequent education. The interesting thing about prerequisites, though, is something I think you need to think about very carefully. If you take an area like engineering that has traditionally required two maths, physics and chemistry as a prerequisite—at least, at UWA it has for a long time—what we were seeing was, in the surrounding environment with all the competition for schools and all the rest of it, that the pool of eligible students to do engineering was shrinking and becoming increasingly male. Currently there are very few students that take calculus at year 12 and the pool of students who take calculus, physics and two mathematics is minuscule and almost entirely male. So the whole equity issue then becomes really very important.

It is not so much about enforcing prerequisites as providing bridging courses for the appropriate disciplines. Certainly that has been done in our engineering courses. We need to have a much stronger emphasis on mathematics in the basic stem discipline areas because it is not just engineering, physics and maths that are suffering; it is the new areas of biology and geology that used to be the soft options for people who did not want to do maths, who now have to do maths if they want to engage in those areas. I do not think it is as simple as just introducing prerequisites.

Mr RAMSEY—Is that working—that is, allowing for the bridging courses and so consequently you are getting a higher female intake and a rise in your engineering students, to use that as an example?

Prof. Owens—Yes, it is. That has been one of the immediate results of that.

Prof. Kristjanson—Our experiences are similar. We are moving away from prerequisites. Anything that starts closing the door means that you are starting to reinforce the problem, and you also absolutely close the door on any schools that do not have the resources, the public schools who do not have the qualified teacher who can teach the high-level maths. We are

rewarding again the students who actually have those benefits, so we have to think about that. In bridging, you do not change the outcome. The risk with this is that people see bridging or they see these opportunities as softening standards, and they are not. A standard can be the same, but what you are trying to do is to be enabling, to get more people to that standard.

I think we have to move even further back. We talk about TER. That is very late. We mistake testing for education. We spend all of year 12 testing the students till most of them are taking antidepressants, or their parents are, and yet year 11 is exhausting, as they are trying to pack in knowledge, but it is content-bound; it is not up to date. We have to really think about turning children on to learning at age seven, eight, nine so that they keep that going. We may even re-evaluate whether this examination process is the correct way forward or there are other ways of assessing aptitude, potential and opportunity.

CHAIR—We would like to think—because I have been a teacher in a previous life—that that was the whole purpose of education, and it seems to have completely misdirected itself. Private schools in particular, and also those ENTER scores, and the competitiveness for the better students, and the whole push for that year 12 score, have really had a serious impact on teaching, on parents, on kids. At what point do educators—not just in the classroom but people who do research into education at university level—communicate with each other and recognise that we have got a problem in the way in which we define what educating our children is in 2008? I will not include the other years.

Clearly, there is a problem. Education is a commodity, a ‘means by which’, but it has lost the universal value of educating a student, of educating a child, irrespective of what score they may get seven years down the track. I have not picked up any dialogue between universities and schools on this issue. You may, in the papers and things. I am sorry, I may have missed it. Is there a gap? Perhaps there is not.

Prof. Owens—I think there has been a lot of dialogue between universities and the schools, because there has been a complete revision of the curriculum in Western Australia, and universities have been quite engaged in that process and how the change in curriculum at school will impact on choice at university and the requirement for prerequisites. As I mentioned earlier, universities are certainly engaging with the notion of TER bonuses for LOTE and for mathematics as a way of encouraging students to take those subjects as part of a broad education and keeping their options open. Keeping options open is clearly the most important thing in all education, but certainly in school education.

CHAIR—I am from Victoria, but I am heartened.

Mr CHEESEMAN—I have been interested in all of the comments that you have made today. It occurs to me that the difficulties associated with enthusing kids about maths and science and those sorts of things often stem back to who is teaching them in the classroom. Certainly an observation I can make, from a Victorian perspective particularly, is that schools are finding it increasingly difficult to attract people as teachers who do have a background in maths and science. Can you make any recommendations for us as to how we might address that? Very clearly, if you have got a teacher who has strong knowledge in a particular field and is enthusiastic about teaching that subject, that obviously has an impact upon the students, but if

you have got teachers who teach outside of their discipline it makes it more difficult to enthuse students in that field.

Prof. Owens—The key issue is around the value of the career path as a teacher and the value that is paid to them, both in terms of their salary structure and the way in which they are valued within the community. In Western Australia, for example, the average age of teachers is the age of the parents of people that are going to university to study. The average teacher is a 55-year-old female in Western Australia. It is not attractive for an 18-year-old to go to university, saying, ‘I want to be my mum.’ That is one problem.

There has been a lot of negotiation about salaries for teachers in Western Australia and there is a big advertising campaign going on at the moment, trying to make teaching look more attractive. But I think the key thing in Western Australia is a booming economy and the size of the alternative salaries that are available. That impacts not only on student choice in terms of the things that they will study at school and at the undergraduate level but very much so on the whole research training side of things.

I am sure my colleagues will attest to our experience here. For example, last year we had no domestic applicants for PhDs in the earth sciences in Western Australia, at our university—none. Not one student decided to stay on and do a PhD in the earth sciences, which is driving the national economy. On the other hand, the demand from international students to come and study earth sciences for PhDs is very high. It is the same for engineering. Domestic interest in research training in engineering is low, low, low; they have all got jobs. Year 2, year 3, they have all got guaranteed jobs before they finish their undergraduate work. But the interest from international applicants is very high.

CHAIR—The state of play for teachers is the same in Victoria even though we do not have a mining boom. Did you want to add to this before I go to the difficulties—

Prof. Finlay-Jones—I was just going to reflect on a set of experiences in South Australia when I was at Flinders University. We had a number of interactions with the SA Science Teachers Association, and I am sorry that this point again is emphasising science. I was struck by the passion that these people had for professional development, in what otherwise might have been their holidays, to expand their understanding of things in science. There was actually good interaction with all the universities in South Australia in adding to that professional development program. I get the impression from colleagues that there are so many demands on teachers’ time that the opportunities to do that—and I think the equivalent in universities, a mini sabbatical or the like, can be a very uplifting and energising experience—for teachers are less. That might be the problem. The solutions could be varied and probably relate a lot to money.

CHAIR—Yes, I would say so.

FRAN BAILEY—I want to change tack for a moment. You represent the major tertiary institutions, charged really with the responsibility of encouraging domestic students to go on to higher study and research, and then hopefully retaining increasing percentages of those to continue a career in research. It is always easy to say, and there is absolutely no doubt, that funding is an issue—and, as you have said, Professor Owens, a lot of these students by their third year have got their jobs lined up and they are very highly paid jobs—so it seems to me that

we have to start being innovative and looking at different funding models to meet some of these competitive needs and make a career in research more attractive. I am really interested to hear your views on how you would be innovative in suggesting different funding models.

Do you front-end some of the funding to provide the incentive for students to begin and continue a career in research? Do you stagger the funding? What do we do, rather than simply saying, 'Well, you know, we need more funding'? I would agree that we do, but I think that we have got to actually deliver the funding into a model that is different, that is perhaps going to give you greater flexibility. I am interested in your views on this.

Prof. Finlay-Jones—Perhaps if I can get the ball rolling. One of the thoughts that has appeared in at least one of the submissions which certainly fell on fertile ground at my university was the notion that if you see the doing of a PhD, for example, as just one part of a continuum in career development, then I speculate that a disincentive to going into that PhD is the answer to the, 'What do I do after that?' question.

If you extrapolate from one or two of the suggestions in the submissions, it might be to look at a PhD scholarship as encompassing not just the period in which a student demonstrates the ability to do original and independent research, but to carry it on for six or 12 months after that, so that the award that would be obtained competitively is one of a stipend to undertake the PhD up to submission and then six or 12 months after that as an additional opportunity to support the student in order to foster publication, perhaps grant application and the like. It is a model that will fit many—not all—of the aims of those people that go into a PhD program.

FRAN BAILEY—With respect, we would probably need to look at more than that, wouldn't we? Would we be looking, for example, at almost like an internship with industry? Would we be looking at overseas placement? This innovative model that we are looking to for the future, the funding is certainly of critical importance, but if I am a PhD student there has got to be some benefits for me. Even if the government were to double the stipend, it is not going to go anywhere near what I could earn out in industry. So there have to be other incentives for me to remain within this career structure of research, especially as a young student. I am wanting to tease out ideas from left field. What are they?

Prof. O'Hara—If I can pick up on a couple of points there, Fran. One definitely is the international opportunity. Researchers thrive on having networks of like-minded people. Very few researchers make significant advances on their own; it is sharing ideas. For our students, the challenge of building networks internationally and opportunities to go overseas are more limited than, for example, Europeans. In my group at the moment we are hosting a Spanish student and a French student, because as part of their training program they have three to six months where they are required to go overseas. They are expected to take the initiative, but they are given the opportunity to make a link with a group where they want to do some research overseas. They get funding from their host nation—France and Spain, or the Union I think. They travel overseas, build up some networks, and then go back and finish off.

I think schemes like that would help, where that was more available and up-front with students—that as part of their training they would have that opportunity—but there needs to be expectations on them to take the initiative and not treat it as a holiday, for example.

FRAN BAILEY—Maybe that leads to the more staggered structure of payment.

Prof. O'Hara—Exactly.

FRAN BAILEY—Payment on delivery.

Prof. O'Hara—One way that we are trying to drive completions is to pay on delivery of the thesis. You need to sometimes have a contract with people to encourage them to do their best, because sometimes they are not aware of how good they are until they are given the challenge.

With the industry linkages, I am aware that, for many of the CRCs, that has been a very good mechanism, having postgraduate training embedded with industries involved in this, but somehow there needs to be a mechanism whereby that becomes much more widely available to the majority of PhD students—and it is important to bear in mind that the majority in the nation are not on APA scholarships and many are not on any scholarships—so it is about finding ways to help self-funded PhD students who are funding their own training because of the passion they have.

Building on John's idea, I like the idea of having an internship at the end where there can be seen to be a pathway into a career rather than, 'I've submitted my PhD. What do I do now?'

FRAN BAILEY—Does anyone else want to comment?

Prof. Owens—I jotted down a few ideas. You mentioned the idea of funding problems. The points that really need to be brought out—and which I am sure have been brought out in all the submissions and by everybody that has spoken to you—are that, whilst I like the idea that the RTS is performance based and you actually have to perform to get the funding, there is a significant time lag in the delivery of the funding. For any group that is in a growth phase, that is a substantial impediment to growth. You take on a student. You get no funding in the first year because the university's funding is based on the previous year's data. So you do not even get any funding in the first year.

By the time the student completes after four years, you still have to submit that data point as part of the university's data for the funding to come in the following year. So the student has already been gone for over a year before you get any of the completion funding. The completion funding is phased in over a three-year window. In reality, for taking on most PhD students, you do not get all of the funding until about 10 years after they started.

FRAN BAILEY—We understand that, but what I am asking you for is innovative ideas to come up with a different model. You are the ones that have to implement the current model. We are charged with the responsibility to make recommendations to government as a result of this inquiry and I am asking you for innovative ideas. If you would like to think about this; it does not have to be today, because I have put you on the spot. I think that is in order, isn't it, Madam Chair?

CHAIR—Yes, it is. The sector that actually is responsible for delivering on the things that governments and politicians fund is better placed to know how it could be done better; where the problems are. We are hoping to get some ideas from you in relation to that.

Prof. Kristjanson—My difficulty in talking about something innovative is that the things that are broken are very straightforward. So to try and come up with an imaginative thing around it seems to be somewhat of a distraction. We know that the level of the scholarships is poverty level. So we need to fix it now.

CHAIR—Yes.

Prof. Kristjanson—If we want to talk about how we are going to fund it, that is a different conversation and we can have that conversation. I would lead immediately to incentives for industry to invest in education. That has got to happen if we are going to move forward on this. We have to look seriously at the funding available for the infrastructure to train these individuals and we have got to recognise and outline some of the examples of problems.

We might look at some loadings for funding to support completions or research support for people in the disadvantaged populations, because right now the tenure of completing a master's is three years. It makes it very difficult for a person who does not have the usual advantages going forward. So there is a disincentive and we become very conservative in who we even select, because we want to get them through, because it is actually a penalty to have people who are not able to complete on time—and we create safer proposals, more conservative research questions that you are sure you can get done. So we are actually shutting down in terms of our imaginative, innovative inquiry from the very beginning. Flexibility will be a pathway.

Opportunities for international exchange are fine, but that is picturing the usual 22-year-old who wants to go on and do a PhD that usually comes from a pretty good family and they can make that happen, and you do not want it to be a holiday, you want them to study.

If we are going to develop a critical mass, we are going to have to look at people who are coming back. We are going to be looking at the 30-year-old, the 40-year-old, people with family obligations that can only come back part time. To ask them to have an international experience in Germany becomes a burden, not an attractive thing, because they still have to keep the farm running. We have a real range of who those people are. We have to get our international students to stay. They want to come. They are high-quality students. They are really lifting the bar in many cases. We have to make the visas attractive enough that they could stay and become ongoing citizens within this community and contribute. To me, those are some of the things that we can point to quite quickly and start to make some differences.

Dr JENSEN—You were talking, though, of conservative research proposals, and that is something that concerns me a little bit, in a way, with ARC type applications versus block funding. With block funding, where you know that you are going to get a certain bucket of money, you can invest in riskier research, whereas with an ARC proposal you are going to put in a proposal where you are relatively sure that you are going to get the defined outcome, because you want to be able to put in a research proposal with the ARC next time with some reasonable probability of actually gaining that funding. Is this the problem with our research: the competitive grants scheme versus the block funding scheme?

Prof. Kristjanson—My colleagues can provide their views. My view is that that is not the major driver of the problem. It is not an either/or. You need both. In actual fact, the block grant scheme is subsidising the ARC and the NHMRC. We are subsidising in all sorts of ways. We are

trying to squeeze it out of the block grants; we are squeezing teaching; our plants are crumbling. So it is not really a competition. What we do not have is long-term grants, program grants that are seriously funded so that people are not scrambling to try and keep the shop running so that they can do this work, and are therefore able to take greater risks within that program of research, rather than delivering on very short-term projects just to try and live hand to mouth.

Dr JENSEN—There is an awful amount of energy put into ARC/NHMRC research proposals. I recall when the 30 percenters were introduced with CSIRO, for example. For those who do not know, CSIRO in the late eighties was changed from appropriation funding to CSIRO having to gain 30 per cent of its funding from outside sources, and a hell of a lot more than 30 per cent of time, effort and work was put into chasing that 30 per cent funding. I wonder if there is a similar problem occurring with ARC/NHMRC type grants, where there is so much effort being put in at the front end in trying to win these grants that the actual research work is not getting done to the extent it was previously, and whether there has been any evidence to demonstrate that the current process is actually obtaining better research outcomes, however you want to measure those, than was the case previously, where there was not so much of a competitive nature with grants.

Prof. Owens—I think it is true to say that the ARC and NHMRC have become relatively risk averse in the research that they fund. Part of this may be around the sorts of assessment mechanisms that are used to evaluate grant applications, and I have noticed in the United States recently that they explicitly now ask assessors to evaluate the innovation in the proposal, so part of the scoring on the grant is substantially on how innovative or, indeed, paradigm-breaking the research is likely to be, or if it is going to be just more research that adds to the pile of knowledge that we already have in this area. We could look at deliberately bringing in a measure of innovation in the proposal itself, because our evaluation of grant proposals is very safe. We look at somebody's past track record; if they have delivered before, we assume they will deliver again; they are doing something we understand; they are proposing something we expect to be true—'Looks pretty good to me,' and they get a tick. The ones that are really out of the box are more difficult to promote in our current environment, which is risk averse.

Prof. Kristjanson—I would be hesitant to blame ARC or NHMRC for the conservatism, though, notwithstanding the comments that are made. What happens when you are living in frugal times is that everybody gets conservative. So we are tightening the belt and doing what we can. We take the best-quality students, not the high-risk students. We do the things that we think we can accomplish. That is the risk of living in this kind of frugal time.

CHAIR—You are living in a frugal time. We are a wealthy society. Isn't that a little bit of a paradox?

Prof. Kristjanson—The nature of good research is to be a risk-taking enterprise and, if we are going to do that and be innovative, we have to make sure that we have the confidence to do that. So it is a real systemic issue that we are addressing.

CHAIR—We also have the money to do it if we chose to, I think—'we' meaning the Australian people.

Dr Fellman—To follow on the point you are making about the wealth that we have as a society—and that feeds back to the value we place on what we are wanting to achieve, so ties in

to Fran's earlier question about innovation around the funding levels that are current—I think it is very difficult to innovate if you are dealing with a very small pie. By way of comparison, look at a country like Japan, where I understand there are over 700 institutions of higher education and they have a very different culture, I think, around R&D. You can see that with the success that they have achieved. Very roughly factoring in the population differential between Japan and Australia, that still leaves them with around 500 higher education institutions—an overservicing, if you like—around which the benefits of incredible investments into R&D can be seen. That sort of comparison places us so far behind countries like Japan, and I would argue it comes back to the sort of value we place on education and R&D. You really need to be prepared to put your money where you want your outcomes to be.

Mr SYMON—My question comes back to the APA stipend. I do not think there is a submission we have seen yet that has not actually said it is way too low, but the area I would like to expand upon is the length of it, its three-year duration and six-month extension. I have asked this in previous hearings and got the answer I suspect I will get today, but what do you think should be the standard length of that? What we have heard in previous hearings is that PhD students get to that three years and six months and then the next day they have no income, they have to go out and get a part-time job to survive and their studies, of course, suffer from that. Is there a greater period of time that you think that should be paid for, and do you have examples that we could hear about of that happening to students in your own universities?

Prof. Owens—I can certainly easily address that. I personally think that a three-year scholarship plus two six-month extensions that is in line with the way that the IPRS scholarships are funded for fees would be a good way to go. If you look at the completion time data across the sector, it is sitting above four years—4.2, 4.3, 4.7—depending on institution and discipline. The significant thing that adds to the total extension of time is the drop-off of scholarships, as you have mentioned. It is the case that students have to find work to stay alive; it is a fact of life. They do get distracted. One of the schemes that we have created, and I am sure all the other universities do similar things, is that at the end of three years, even when they have got their six-month extension, they must put in a completion plan to indicate how they are going to get to completion. Many students can complete in the 3½ years anyhow, but those that do not will significantly go over that.

At our institution we run a small competitive completion scholarship scheme that gives students an additional 20 weeks—so that is about five months—worth of funding to complete. The success rate within that is 100 per cent. So just having an additional block of funding to get completed and managing that completion period well will achieve success.

Mr SYMON—That 20 weeks is obviously funded from other sources in the university.

Prof. Owens—Yes. It is funded directly from our central research allocation budget, but the way in which it is funded is that, first of all, it is competitive, so students have to apply for the scholarship. They have to submit a plan about what they are going to do over the next 20 weeks to complete. It has to be signed off by both the students and the supervisors, because the supervisors are engaged with the completion as much as the students are—so what each person is doing and committing to a time frame.

That scholarship is funded in the first instance by the students department or school, and it is reimbursed to them from the central funds when the completion comes in on time. It is a strong 'stick and carrot' kind of incentive role but it leads to success, and it certainly provides evidence that just that little bit of extra time will get them over the line.

Prof. Finlay-Jones—I was going to endorse that position. If I took a hat out of my back pocket from my former employer, it would be the Telethon Institute for Child Health Research. Through its collaboration with UWA, we saw exactly that completion support being so important in bridging the gap from what I think is an inadequate period of funding from the scholarship and what is needed to get the job done.

I thought that the submission from the Australian Universities Quality Agency, reporting on their experience over the cycle 1 audits and identifying, I thought, a very impressive list of commendations to universities in the sector for the way in which they are enhancing the research training environment for our students, is evidence of the way in which the sector is organising the environment for students right from day one, and the sorts of checks and balances that Robyn referred to, I think, are evidence of that at UWA.

Dr JENSEN—Do any of the other universities have similar extension programs with scholarships?

Prof. O'Hara—We have a very similar scheme to the one Professor Owens described. Ours is both for the extension and for the completion scholarships. The payments are made in instalments, with the final payment being on submission of the thesis, so there is a strong incentive for the student. Similarly, with our completion scholarship scheme, we have a 99.99 per cent success rate. There is strong evidence that the three-year time frame is too short. All the evidence is saying that within four years we could expect the majority of the students to complete, given all the circumstances in the person's life within the three- or four-year program.

Prof. Finlay-Jones—There is perhaps a more hidden source of thesis completion funding that is available for some students. If they happen to be working in a research environment, where the chief investigators are well funded from outside sources, they are able to divert some of those funds to support the student in what might be seen as a research assistant type mode. Whilst I think in a number of institutions the institutionally funded support is obvious, worthwhile and working, there is a broader source of support that might be worth looking at. It may also be somewhat problematic if you are cross-subsidising one part of the sector from another.

Prof. Kristjanson—That is the issue. We are very good and we do similar things, and it works in small dosages. It is not a correction.

CHAIR—A solution.

Prof. Kristjanson—Exactly right, because you are subsidising it from somewhere. So you are squeezing it out of grants that are already too small, to try and get your students some help so that they do not have to work at McDonald's, and you are also squeezing it out of departments who are taking it out of their teaching, and that creates internal tensions and anxieties about

quality being delivered on the teaching program. Whilst we can see it as a model, we cannot continue this way.

Prof. O'Hara—In my role I meet on a weekly basis with students who are in exactly the situation we are talking about. At Murdoch we have a program where I meet with students who have scholarships at the 2½-year stage to get them to map out their process to completion. Necessarily, because of the time required to do the research to make a significant contribution and advance knowledge, that three-year window is just about what is required to do that, and it is the writing up stage, putting together and putting down their ideas—that final completion stage—where they run out of money and they run into these problems. That has a big impact, because that is the time when they need to have the thinking to be able to sit down and write the quality document that will enable them to get their PhD.

Mr RAMSEY—Being devil's advocate on that, if you give them a four-year period, what is the chance of them taking four years to do the research and then looking for another half-year to write it up?

Prof. O'Hara—Somehow the contract would have to be given where it was not to just change this situation, as you are saying, from a three-year to a four-year period, but where there would still be an expectation, as Professor Owens described, of three years with six months plus six months, so really trying to get to the finish within 3½ years. Then there is still that insurance policy of having the final few months, because often in research programs there will have been delays for all sorts of reasons that are not the responsibility of the student—more necessarily the supervisor sometimes—from field based studies, where a cyclone has blown away one year of their trial, to lab based molecular studies or humanity studies, where you cannot get access to the material from the international libraries or whatever.

I think there needs to be that little bit of insurance in there, but I am sure the scheme could be developed in such a way that it did not enable it to become just an extension to four years and then to five years.

Prof. Owens—Adding to that, it is not as if the scholarship is so lucrative that anyone would want to carry on forever. The majority of students very quickly find jobs and are keen to move into jobs. But I can add one other piece of anecdotal evidence to support the fact that it takes longer than three years to do a PhD: a few years ago UWA developed a small scheme to offer up to 10 six-month postdoctoral fellowships, as John was suggesting, to students who, if they completed within a three-year period, we would support for six months to write up publications while they were getting ready for their next job. I could not give away those 10 six-month fellowships to students who completed within three years out of a cohort of 2,000 enrolled PhD students.

Even with a strong enticement to try and complete within three years, that is a very big ask. Three and a half years, you are getting close to it; four years, you are definitely going to cover the majority of students.

Mr SYMON—This brings me back to a question I asked at the Sydney hearings. Do any of your students ever complete within three years?

Prof. Owens—Yes.

Prof. O’Hara—Yes.

Mr SYMON—But not many, I take it.

Prof. O’Hara—Less than two per cent, or maybe less than one per cent. It is very rare, and it is a special combination of the student, the supervisor and the project all just coming together, like someone winning a gold medal or something.

CHAIR—It is a bit about the luck of the draw.

FRAN BAILEY—They do it seven days a week.

Prof. O’Hara—Not necessarily.

CHAIR—Circumstances come in—

Prof. O’Hara—Circumstances—serendipity comes into play. It happens.

Mr JOHNSON—I have very much enjoyed the conversation so far, and I am sure I will continue to do so. I have a few observations and a couple of questions. To me, the common thread that seems to be coming through the submissions and the comments today is obviously a question of funds: how much and where it is allocated. How much of the challenge in this area is funding versus the structural make-up of where current funds go to? I want to tease that out a little bit more.

If we gave every university in the country and every student doing a PhD and every dean of a graduate school an extra \$1 million, that would obviously help. But in the years ahead, would we be having a similar conversation again, saying, ‘Jeez, we could do with more dollars because every individual in the country, every lobby group, says that the bottom line is that we need more dollars’? I can do with an extra staff member. The previous government said to me, ‘We have no money for this because it’s not a priority.’ I am trying to get the flavour of how much of our challenges are structural, institutional, and do we really need more dollars? Is it a genuine case? I would be interested in your thoughts.

Prof. Kristjanson—If there were any structural corrections needed, they would have to do with access, equity, and flexibility. If those points could be corrected, we could increase the critical mass of students or probably address our workforce issues. That is where I would say we could do some useful reform to improve upon that. I think it is attractive to try and say that it is a structural problem instead of a funding investment problem, but it is a funding investment problem. If you look at Scandinavian countries, if you look at Canada, the truth is that we are behind. I do not think there is a great deal of error in doing what we do; we do it well. We do it imaginatively, we do it on the whiff of an oil rag and we still produce remarkable people, and we do it with dedicated people who are there because they really are committed to knowledge development and transferring that. We need a few adjustments to make us more flexible, more open, more inclusive, and make sure that we are capturing all the talent in this country. We have

a lot of people who do not know how to get to this pathway. We are underutilising their capability.

CHAIR—They may not even have opportunities. It is not just about not knowing how to get there; access and equity is really about social justice.

Prof. Kristjanson—It begins at a very young age. Exactly right.

CHAIR—And back to that other area of school.

Prof. Kristjanson—So those would be the structural corrections I would point to.

CHAIR—Yes.

Prof. Kristjanson—In terms of funding, I think the answer is that, ‘Yes, we really have underfunded this and it’s time to make those corrections.’

Mr JOHNSON—I would like to respond to a point from Professor Kristjanson. You made a very interesting point about an enabling mechanism that will be more inclusive and keep options open longer for students. That would not have helped me with my capacity to do a science and a maths subject at school or university. I think it would help a lot of students; I agree with that. But at what point do you say, ‘Okay, you really are a student that cannot do maths 1, 2, physics, chemistry, even though your heart is set on becoming a rocket scientist’? I am interested in that point because this comes to the testing issue. I am not persuaded yet, but I certainly have an open mind about this issue. The bottom line is that some students do not have that ability.

Prof. Kristjanson—Sure.

Mr JOHNSON—It is hard being honest and hard to be truthful to say to those students—

CHAIR—‘You’ve got ability elsewhere.’

Mr JOHNSON—Yes. ‘You might be a great agriculturalist or sociologist.’

CHAIR—‘You might be a great sociologist or a great literature person.’

Prof. Kristjanson—No, do not mistake my comments about enabling capacity as softening standards. That is not what I am saying at all. I come from a health science discipline. I would never want to say, ‘Well, you’re not a very good surgeon but we’ll let you give it a try.’ We are pretty good at knowing what standards are actually across most of these kinds of areas, so I think we can hold that firm, and at the appropriate time give people a test to say, ‘This pathway is not for you.’ What concerns me is that those messages are given very young, so when students are in years 6, 7, 8, 9, they say, ‘I’m not very good at math,’ or ‘I’m not very good at science.’ That message happens at a very young age and therefore they start to rule themselves out, or they do not have exposure in some of the more disadvantaged communities to role models that could encourage those pathways. So I think we have to pay attention, and that is a broader issue.

When I talk about ‘enabling’, I go back to an example of living in Canada and looking at the indigenous community there and how there was an opportunity for people to go back for university education. These people had to meet a certain level of entry but there was also an understanding that there probably were some gaps in some of their earlier education and therefore they would need more time in order to get to that standard. The standard did not change, but they needed more help to get there. So for a degree that might have taken three years, they were allowed five years to take it. Those people became indigenous leaders that really made a difference to the health and welfare of those communities. That is an example.

When I look at the role of education in research, what is it about? It is about a better society. So if we think about some of the problems that we are facing within the nation, I think we need to be very proactive and use this opportunity to say, ‘How do we create those leaders? How do we make sure that those people who could really offer some important leadership in these areas have an opportunity to do that?’ Those are the enabling things that I would be reaching for and where I think we have a chance to be creative and proactive and follow on in those directions.

CHAIR—We had this discussion yesterday at the Batchelor institute in Darwin, precisely on those issues that you have raised. I am interested in the proposal that Curtin university has made about making the APAs accessible to second-class honours students. I would like you to talk to us a little bit about that. It is the only time that it has been raised and it is certainly an issue that I can relate to, especially in the classroom, and what distinguishes the capacity of someone who gets 95 out of 100 from someone who gets 91, or even someone who gets 85. They are dubious sorts of lines of division; they do not necessarily mean that the ninety-fiver is brilliant and the eighty-fiver is not, and yet we have got cut-off points.

Mr JOHNSON—You need some sort of unofficial—

CHAIR—You do. I was never going to be a mathematician, and I knew that when I got to year 10. But it did not stop me from doing other things, and I think it is broader issue. We talk about maths and science quite a bit, it comes up, but languages has a similar problem and, dare I say, even English is facing similar problems—literature, and all those areas. This is about all disciplines, even though maths and science tend to come up quite a lot more. Kids challenge the relevance of maths and science in a more ferocious way than we used to challenge it when I was at school. There are reasons for that, too. They are plugged in to other networks; it is not necessarily a classroom. That is a challenge in itself.

Prof. Kristjanson—To answer your question, we see that the pool of first-class honours domestic students is diminishing, so from a pragmatic perspective, if we are going to increase—or maintain even—the number of students, we are going to have to think more openly about who we are able to receive. I think we also have to be candid about the imperfections of those measurements. So, as you say, what is judged as a first-class 2A, 2B? I think there is room for discussion there and we have all been there.

Mr JOHNSON—Maybe at the end of the day you need some line in the sand somewhere.

Prof. Kristjanson—You do.

Mr JOHNSON—Whatever that might be.

Prof. Kristjanson—But I think there is a threshold that you might expect. The other thing is that the honours pathway to a PhD is an Australian story. There are lots of ways to get a PhD on this planet, and I think we have become very narrow in our thinking about that pathway. There are many worthy students who might have a 2A who would be very capable of going forward. This returns to the point that Professor Owens made earlier about bridging; not to say that these students need bridging, but it is the same notion. We are putting all the onus on the student to come ready-made, instead of saying, ‘What’s our responsibility as educators to take them to that standard and make sure that they get there?’

When we take international students, we often have trouble because they do not have the honours qualification. They have a masters by research from a university in the United States and we have to get our heads around what that is. They will be a stellar student but they do not exactly fit our language and our criteria and, if we get too rigid about that, we are missing the opportunity to give these people a good education. I think that we overestimate the accuracy of our measurement greatly.

Mr JOHNSON—Professor Owens, I think you were going to comment.

Prof. Owens—Yes. I will make four points: one is in response to the honours H1. I agree with the issue. Across the country we talk about honours H1 as if we know what we are talking about but, in fact, in any single university between disciplines there could be differences in the way that they measure honours H1, and to get honours H1 in history can be quite different from getting it, say, in engineering; even in terms of the required grade point average. That is one thing.

Within some disciplines, there are also nationally agreed upon behaviours about how many honours H1s you hand out; in particular, law. All agree to hand out not more than five per cent honours H1s to their law graduates, almost regardless of what marks they get. So you can find that you have very few law graduates that qualify for honours H1, whereas you will have lots of mathematicians or physicists. So defining what honours H1 or its equivalent is can be a difficult task for universities and since APAs are given out on the basis of an institution’s success in completing PhDs, I would be opening it up for the university to allocate them, since their future allocation depends on their successful use of them. That is one point.

Getting back to your point about what are some structural impediments: briefly, visas pose impediments to research training in Australia and there is a lot that could be done to make it more attractive to international students to come. I would include things like the possibility to do it part time, to have some time part time, to have the availability to take leave within that period. All domestic students can have up to 12 months suspension as part of their candidature: if they get sick, if they have babies, whatever. International students cannot. That creates problems for us and we can go on about that.

The second structural impediment is that it is difficult in Australia to create teaching assistantship positions for our research training students because of the impediments around how many hours a week they are allowed to work whilst holding a scholarship and because of all the tax implications about the salary that they earn and how much they can earn, particularly compared with the North American sector, so that makes it difficult to provide that academic training as part of their research training because TA positions are difficult to set up.

The third is around a point that Linda brought up with regard to getting the right students into doing research and how to get them out if they are not the right students, so most of us have brought in a situation of monitoring candidature during first year and confirming it at the end of first year, subject to satisfactory performance. But what we do not have is anything like the North American system of qualifying exams or comprehensive exams or any sort of substantial confirmation of candidature at the end of first year.

What is the structural impediment? The structural impediment is that if students are doing coursework or some sort of exams and they take their qualifying exams and they do not make it, and they are going to then gracefully exit, the thing that they would gracefully exit with, in the Australian sector, would be a coursework master's of some sort or other, which is not under the RTS. So they would gracefully exit with a great big bill to pay for their coursework master's that they got when they had been originally enrolled in an RTS. That is a bit of a structural impediment in getting people gracefully out of the sector. The only way they can get out is to quit, at the moment.

Prof. Finlay-Jones—I was going to address the issue of why would we put money into this particular proposal or set of proposals rather than into something else like an extra staff member for hardworking MPs. Ultimately it came down to a word that you used, and that was 'priorities'. For me, the concern is that, especially in this state, you see a lot of what people do by way of career planning driven by a resources boom. But that is ultimately finite and we need to take urgent action now to make sure that the future is going to be, in the words of another person, devoted to mining the mind rather than mining the ground. For me, the priority is acting now to ensure that in the decades to come we do not leave ourselves in a declining type of environment because of an overzealous reliance on a resources boom.

Mr JOHNSON—One of my pet topics is what has been flagged here and I would like to get the thoughts of some significant heavyweights in the education sector. A couple of you mentioned the cultural point about our country in terms of the value of education. I endorse that. It is a big challenge for us. Can we explore that, briefly at this point and perhaps more down the track, especially compared to the Asian countries. I spent a brief time at Harvard, a couple of years at Cambridge and did my law degree at the University of Queensland. At all of those places, you could just tell that the DNA of the Asians around me was to get honours, to study full time, overtime, and to do really well compared to the other kids in the class. I am wondering how we address that if it is as sizeable a problem as we think it might be.

Prof. Owens—It is a big problem. There is a significant cultural difference in the approach that we take to the value of education and the value of an intellectual life and the approach taken in many other countries. One of the ways in which we experience it quite substantially at University of Western Australia is that we had a Nobel prizewinner a couple of years ago. He travels with the vice-chancellor to China on a number of occasions. While he is in China, he is a pop star. There are thousands of screaming schoolchildren and university students who want his autograph and want to talk to him.

It is completely different in Australia. In Australia, the word 'academic' means 'useless'. Academics and scientists are portrayed in the press as boffins. Indeed, before coming here this morning I had a call from the press who were looking for unusual PhD topics taken at our university so that they could make fun of them in the press.

Mr JOHNSON—Like ufology?

Prof. Owens—Indeed. So how do we address that? We have to begin a culture of celebrating our successes. We have begun that with, for example, Professor Frazer's work in Queensland on Gardasil. Medicine is probably one of the areas where people are quicker to acknowledge the benefits.

Mr JOHNSON—They can see the connection with their own life.

Prof. Owens—Yes, they can see it. And lawyers they will appreciate as being occasionally useful. But enriching the quality of our intellectual life is not something that is celebrated enough in Australia, and it is possible to do that.

FRAN BAILEY—That provides a good segue into the question that I want to ask you, which is another way of my jumping ahead of my colleagues! One of the ways in which pursuit of research is acknowledged and celebrated is when we get a commercialisation of research and there is an application that is talked about and celebrated. That raises the issue of intellectual property and I want to ask you who owns it. The institutions? The student? If there is dispute about this, are we going about it now in the right way or are there better ways? I should say that we have had Professor Lloyd appear before us this morning. This is the first time that this issue has been raised before the committee but it is an important issue and I would like to hear your views on it. Perhaps as an addendum, do you consider that difficulties with IP ownership or disputes are acting as a disincentive to commercialisation of research?

CHAIR—We should let you speak.

Prof. Owens—It should be prefaced by the fact that UWA is clearly—and everybody knows—involved in a court case over this particular issue at the moment.

FRAN BAILEY—We are aware of that.

Prof. Owens—It is worthwhile saying that officially—and I am sure this is the same with the other universities—all research students own their own intellectual property, unless it is otherwise assigned as part of their research training. So the default position is that a PhD student owns his or her own intellectual property. They are a student. They are not being paid as a salaried member. They are effectively buying or contributing to their education anyhow. Where it would change is if the student engages in a research project that is specifically sponsored by industry or some other organisation that wishes to own part of or all of the intellectual property and is paying the student to do the research.

There are a variety of ways in which that can happen. Some of them are simple; some of them are difficult. Generally, we would agree that dealing with certain government agencies can be difficult, but usually they are fairly well sorted out. There can be some delay in research training through ARC linkage grants in sorting out intellectual property—I would say not dramatic.

With regard to staff intellectual property, most universities would say that they own the intellectual property of their staff but that the universities would have agreed upon regimes for sharing any benefits that arise from that intellectual property. So at UWA, if anything is

commercialised the staff member personally gets back 50 per cent of it, but the intellectual property is owned by the university itself.

FRAN BAILEY—Would you support Professor Lloyd's suggestion or recommendation about mediation as the model rather than litigation? Mediation may still end up in litigation, of course.

Prof. Kristjanson—We do not know the context in which it was said. Our experience is very similar to how Professor Owens has described it. We are a very commercially active university. We have 20 spin-off companies and that many in the pipeline and we work quite actively with our students. We have not seen any impediments in terms of students owning their IP to progressing the ideas forward in terms of commercialisation.

We see this area as important because it is about knowledge transfer. We know what our core business is and we will move that idea forward in a way that makes sense if there is a commercial opportunity so that that innovation is able to penetrate the market or to make a difference to a business or to improve some sort of organisation's practices in some way. What was the question?

Prof. Owens—The question we are meant to be answering is: is mediation better than litigation?

Prof. Kristjanson—We have gotten into situations where we mediate.

FRAN BAILEY—No, I just want your ideas on it.

Prof. Kristjanson—If there is a dispute, we mediate, and that is always preferred—always.

CHAIR—Can I just clarify? It is in the context of the discussion that we had with Professor Lloyd today that seemed to be leading into a direction where you may consider the establishment of a new entity that actually oversaw issues with intellectual property. Okay, there would have been mediation rather than litigation, but that is what the discussion that we were having this morning was about, and it is a first for us. We have not had that discussion before, and we are road-testing it now with the universities that are at the heart and centre of intellectual property. Is it a problem for you, and do you see the need for consideration to be given to developing an overall entity, not within the university necessarily but elsewhere, that oversees these issues as they arise—uniform standards and all sorts of other things? That is as clear as I can get in terms of the dialogue.

Prof. Kristjanson—Without knowing the background of the proposal, that is not a major impediment. We need funding to move our commercialisation forward. The axing of the Commercial Ready grant hurt us more than anything, because we dilute earlier, we have to go to the venture capitalists. That is what changes that story. But to create another structure—we can always get mediators. That is easy to do, if we need to. We need to be educated about the processes and move it forward.

FRAN BAILEY—I would have personally thought that not being able to access venture capital was a greater impediment to commercialising research than an IP fund.

Mr CHEESEMAN—This is on a slightly different track to the discussions that we have held up until now. Very clearly a lot of the submissions that we have heard, including from the WA universities, have gone to the question of funding and lack of funding around some of these areas. I am curious to know what role the private sector should play in research, whether they are playing that role and whether there are any incentives that might be created by government to assist with that. I know that is a fairly broad question.

Prof. Owens—Yes, it is fair to say that private industry is playing already a role in research and research training in the universities. It could be a lot bigger, but certainly the universities do engage with private industry, through schemes like the linkage grants scheme, through direct research contracts with various private industries and through incentives that are provided from both the state and the federal governments for delivering outcomes and working with industry and driving the economy.

So I think it is done. It is certainly the case that it could be more encouraged within industries and incentivised through various tax regimes and the rest of it. Given the statistic that Linda quoted, that I was going to quote myself anyhow, that 72 per cent of PhD graduates are not working in universities, they are going out and working elsewhere, it is very clear that research training is not about training simply the next generation of academics. It is about training researchers, certainly, but it is about training our future contributors to our economy.

The point was made that we are in a boom time and we are digging up the land and selling it and we are shearing our sheep and farming and all the rest of it. You could look at Australia as being very much driven by primary products, but increasingly the reason why we have the edge in those areas is because we are not simply digging up the land and shearing the sheep; we are doing intelligent natural resource development. The reason we have a lead in mining is not simply because we have got big trucks and big shovels; it is because we have got very sophisticated technology targeting exploration and developing mineral production. So it is not really about a mining boom or an agricultural boom. It is about Australia being the solution provider to the planet in primary resources. When ours are gone, other countries will be coming to us for the solutions for the future.

Mr RAMSEY—This comes back to some of the nuts and bolts of how you are funded now, in light of Fran's comments before about new funding models. We have heard earlier from Professor Laing about deficiency in the block grants and the delays in it coming through the system. Professor Owen, you spoke in your submission on the Commercialisation Training Scheme. It is not the first time it has come up in the submissions. I am wondering if you can identify what is actually wrong with that program in particular?

Prof. Owens—It has not been a raging success in terms of applications amongst the students to do it. It has been variously instantiated across the country. In some universities students do it part time; in some they do it full time. The technological universities have got their act completely together and run an online version of the course. Others do face to face.

We have found particular difficulty in just attracting enough students into it in order to really get the benefits out of that scheme. I suppose it is because a lot of the students that might in the first instance be very interested in these sorts of things are already embedded in CRC programs

or are working in groups that would have a certain amount of this training embedded directly into their research training environment anyhow.

Mr CHEESEMAN—So it is not much of a program, full stop, in your mind?

Prof. Owens—In my mind it has not been a success, and there are other aspects of the whole research training environment that could be encapsulated in a certificate or diploma if you wanted to have that sort of thing concurrently, rather than just commercialisation. Commercialisation would deal with some areas of project management, but there is a lot more project management outside the commercialised sector. There is a lot of work that needs to be done on ethics and the legislative requirements around being a professional researcher, whether it be in industry, in a university or in a government agency. If you are really thinking about training future research professionals, commercialisation is one aspect of that. There has not been a big demand.

Prof. Kristjanson—We have developed the online approach and we have had good registrations for it. It is very early days to evaluate it. I would agree with Professor Owens that we need probably a menu of these sorts of things that might enrich the postgraduate training and not think of that as the only additional aspect to include. It has been our experience that the groups that are affiliated with CRCs have been very grateful to have this, because they have not had the same degree of systematic approach to developing the commercial expertise of the students who are affiliated with them. So we are adding value, I think, for those who want to do it.

I think the other reason that there has been some perhaps hesitancy amongst some is that they are adding in something else to do while they are already stretched and living on a very modest stipend. I think it goes back to the heart of their ability to be flexible, or to even take up this option or any other option that might be offered, because they are rather limited.

I would like to make one more comment in relation to the industry incentives. We are subsidising industry's research right now. They are getting very good deals out of the work that we are doing, which is why we need to seriously look at what the true cost of research funding should be, because then we know what we are really charging industry. But when we think about the in-kind support and all of the infrastructure that is there, it is time to get industry to engage and assist and value what they are accessing as their R&D sector, and we need to incentivise them. We have put that in our paper on national innovation. When you look at other countries that have made changes, that is how they have done it.

Mr SYMON—My question is to Professor Owens. In your submission to the inquiry you touch on the subject of a training maintenance fund for research. I suppose it dovetails in a way with the questions I have asked previously at other hearings as to whether there should be a minimum provided for that. We have heard of students who happen to have their own desks or computers whilst trying to complete a PhD. I think you are talking about something similar there, in that there should be a basic level of infrastructure provided for each PhD student as they go through. It would seem to be very patchy and over all the place. At some universities it does not seem to be a problem, maybe because they have a different perspective or priority on funding, and at others the students have said it is not provided as a matter of course. Would you like to comment a bit further on that?

Prof. Owens—Yes. I think across the sector as a whole it is problematic. Whilst universities do try and define a minimum level of resources for students, as soon as you have a very large number of students, even being able to consistently provide desk space for them is difficult. The way in which the funding formulas go—and I think particularly the notion of the differential between high-cost and low-cost funding—may make sense if research training is fully funded but, when it is not fully funded, what the high-cost and low-cost regimes are really funding is the basic infrastructure that all students need, which is the salary for the supervisors and then basic IT support, desks and all the rest of it.

In the high-cost areas, all of their research training is subsequently subsidised by additional grants. If you are going to provide research training in an area where the project itself is \$70,000 a year, you have to get a grant to do it. In many parts of our universities, staff are not supervising unless they have a grant to support the research training that is going on. Whilst we have a policy on minimum provision of resources, it is very difficult to implement in some areas, particularly in the humanities and social science areas, where the numbers are large and the resources available are small.

The idea that I presented was to expand the research training that is provided through the grants scheme. At the moment you can apply for a scholarship to support the stipend of a student but there is no provision for basic maintenance of research training. The best of our researchers and the ones that win lots of grants are still scrambling around for very small amounts of money that consistently crop up in research training; things that really are so tiny that the time that they take to solve costs more than the actual problem itself, such as trying to support an airfare to get a student to present an international paper—we will have people scrambling around to six different sources of funds to put together \$2,500 to enable a student to go overseas—or trying to support back-up of their data or subscriptions to journals and things like that. It is the same theme that we have had throughout the day. The amount of time that is expended on scrambling around for very small amounts of money undermines our capacity to do innovative research.

Dr JENSEN—I have one last question, but first a comment on ARC funding. You mentioned Barry Marshall. I think it is rather interesting that, looking at the way NHMRC and ARC funding is granted at the moment, Warren and Marshall probably would not have been granted a research proposal for their work. I think that is a comment on the nature of that sort of funding.

I was wanting to get onto the issue of career structure, and there are two parts to my question. In politics we have the saying, ‘Perception is reality.’ You mentioned that 72 per cent of people who complete PhDs do not work in academia. However, where you have young people that are in the process of completing their bachelor degrees and perhaps honours degrees and are thinking about research and PhDs, the perception would be that the career structure is either academia or somewhere like CSIRO or DSTO.

That is one aspect: how much of the career structure that we have in academia is a problem, where you go from a PhD to a postdoc and then to a three-year grant and another three-year grant and students, looking back to their bachelor degree days, are thinking, ‘Hang on a second, what sort of career structure is this for me?’

The second part of the question is: given that 72 per cent of people with PhDs are out of the university sector, what is the best way to let people know during their undergraduate years that

that is the reality and that they do not have to look just at the academic structure to see their career structure?

Prof. Kristjanson—I have lived and worked as a researcher in three countries, and what we do not have here is a career path for a researcher. It is very hard to create: you cobble it together, and it is not clear. So it might actually be an artefact that we have 72 per cent in industry because they cannot get jobs in academia, or they do not want to live hand to mouth for that long, as much as they care about their research question and their passion about it.

I think we have to seriously look at a career structure that says, ‘This is how we want to fund PhDs, and we want the best to come, and we do not want them to go other places because they can get more money, and this is a pathway.’ Then we need the postgrad path, because that is the incubation period where they are really productive and they can get their research going. What happens very often is that they get sidetracked into a lecturer B teaching load, they go under for about three years, and they will never surface back as a researcher. That is the time when you are most competitive. We have to look for some serious career research funding that will protect their time to do that and value that. And this is not a usual path.

It is an unusual path for a lucky few who find their way forward, and it is becoming increasingly difficult. I am remembering the person that Professor Laing was talking about who won the award. To get this person forward and to make sure that we do not lose her energy and her talents and that we find a doorway that is not so frustrating is a problem. It is not incorrect to also market PhD education as a pathway to good industry career development but I think that, very often, people who are choosing that are looking for a salary that is worthwhile and perhaps a less frustrating course to follow. But we should be taking some lessons and really looking at creating those pathways so that we can retain those people and make the most of the investments that we have had in their early education.

Prof. Finlay-Jones—I was going to pick up on a couple of the individuals that we have looked at and asked questions about their career development. We mentioned the rather remarkable Barry Marshall and his approach to getting a Nobel prize. We also have Peter Doherty who with Rolf Zinkernagel, based on their work at ANU in the seventies, won the Nobel prize.

I remember listening to some of their early presentations to scientific societies at the time and was impressed by the calibre of the work and the like. But now I can also reflect on the environment in which they were doing that work, which was in a well-supported institution from national funding.

Mention was also made of a cancer breakthrough in today’s media and I think it refers to the work of Professor Michael Parker in Victoria and Angel Lopez in Adelaide. If I have got it right, Professor Parker is a federation fellow, which I think is a very good scheme designed to bring back to Australia high-achieving Australians or bring to Australia other high-achieving scientists or retain such people in Australia.

My general point would be, if you are going to be allocating resources to various parts of the scheme, to give a good priority to those that will help identify and support the good researchers, and in particular make sure that you pick up the early career researchers and give them—rather

than that hand-to-mouth existence that you talked about—a more substantial start to research as a career.

Prof. Owens—The career pathways situation is critically requiring solutions at the moment. People who choose to have a research-only career, particularly within the university sector or within medical research institutes and some other agencies, have a very hand-to-mouth existence. Within universities they are competing with people on teaching and research or teaching-only contracts that tend to have a rather safe continued contract. There needs to be maybe less safeness in that and more safety so that these career pathways have equal opportunity for continuing appointments, subject to satisfactory performance in what they are doing. That is one point.

CHAIR—Are you talking about tenure here?

Prof. Owens—That is not a word that we use any more.

CHAIR—Obviously I am a bit behind the eight ball, but I wanted to roll my question into Dennis's because it does go to the issue of the ageing academic population.

Prof. Owens—It does, absolutely.

CHAIR—There is this idea perhaps that on one hand you have had people—and rightfully so—that have had a career pathway into academia, it has been permanent tenure and it will be such until retirement, but as a result an entire generation of other aspiring academics do not get a go because of the way the system is now.

Prof. Owens—Absolutely.

CHAIR—How are you addressing that?

Prof. Owens—We are addressing it by trying to look at restructuring the way that we do staff at UWA, but it is an issue. You can have somebody that is appointed at a level A or a level B position to do some teaching, usually to fill an immediate teaching gap. They may or may not even have a PhD. They might enrol and do a PhD part-way through. They can get tenure relatively easily on a teaching and research position.

Somebody else might win an ARC postdoctoral fellowship and at the end of three years if they do not get another grant they are out. They could have published 20 papers in the meantime and be fantastic. The difference is that one has guaranteed continuing performance, unless you do something diabolically wrong, and the other one has a 20 per cent success rate in being able to continue, even if you do extremely well. So there is a big inequity between those two things.

To follow up, another thing that we need to focus on more explicitly is the value of the generic skill training that comes through our research training in our PhDs. I do not think it is such a bad thing that a lot of our PhD graduates work in industry and elsewhere. Indeed, many of them become politicians and a lot of them become university administrators. A lot of that is on the basis of the quality of the research training and the generic skills that they develop. This is the value of the PhD. That is a good thing, but we need to explicitly value that a lot more.

Addressing your point about what we are doing about letting current students know about the career structures, we do run career workshops. In fact, just last week I did a career breakfast, probably with the student that Nigel Laing was talking about, I imagine, talking about the sorts of career pathways that students can expect to meet at the end of graduation and what is involved in that and how they can best prepare themselves for that. So some work is being done there. I do not think all students expect they are going to get a tenured academic job at the end of their PhD.

CHAIR—We have gone over time but it has been very interesting; certainly a very enlightening discussion and one that helps us in our understanding of not only issues that need to be addressed but the manner in which we can address them in a meaningful way, not in a superficial or inadequate way. So thank you on behalf of the committee for your thoughts. Naturally, in the course of these dialogues, all sorts of other things come up and you never get a chance to answer them. So in our next round in Queensland I am going to pursue the issue of generic skills and whether research scientists need to be able to communicate successfully with people and whether it is relevant to their research or not. That is another issue altogether. At this point I declare the hearing suspended and I thank you for your involvement today.

Proceedings suspended from 12.46 pm to 1.14 pm

NASSAR, Dr Natasha, Research Fellow, Institute Postdoctoral Researchers' Association, Telethon Institute for Child Health Research

WIKSTROM, Dr Matthew Erik, Research Fellow, Institute Postdoctoral Researchers' Association, Telethon Institute for Child Health Research

CHAIR—I now call representatives of the Institute Postdoctoral Researchers Association, Telethon Institute for Child Health Research in Western Australia to give evidence. Welcome and thank you. Although the committee does not require you to give evidence under oath, I should advise you that these hearings are formal proceedings of the parliament. Consequently, they warrant the same respect as proceedings of the house itself. It is customary to remind witnesses that giving false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. We thank you for your submission and now invite you to make a brief opening statement before we proceed to questions.

Dr Wikstrom—We do not have an opening statement. We are happy to move on to questions.

FRAN BAILEY—We have heard throughout the inquiry, as you would not be surprised, of the need for greater funding but in particular the gap in funding in what you are provided with. I would be interested to know how you, as a facility, make up that gap in the funding.

Dr Wikstrom—They do not. Our salaries are that much lower than the current market rate. For us it is of considerable concern. It is something that the institute in total has been aware of for some time. When I was first employed there, almost six years ago, there was a small gap but it was something that they were able to overcome by introducing a salary packaging arrangement so that the tax saved did make up that difference. But over the ensuing years, with enterprise bargaining and that sort of thing going on down at the university, which is what we are using as our market rate, they have seen their salary levels increase whereas all we have been able to manage is to match the CPI increases from year to year.

Admittedly, the institute is quite concerned about the size of that gap and have to find funds in order to address that. What Fiona Stanley and the chief financial controller have told us is that the only way they meet that gap is to develop a considerable capital fund. At the beginning of this year, that fund was sitting at about \$25 million and that still was not going to be sufficient to ensure that they could meet all of the running costs of the building plus provide that gap for the researchers. They want to double that to \$50 million before they can subsidise that gap.

FRAN BAILEY—How has that affected your ability to retain your good researchers?

Dr Wikstrom—The chief investigators running the different divisions are frustrated because, when it comes time to advertise even for a position of a research assistant, they cannot match the market rate, so what they are seeing is a poor number of applicants for a given job and perhaps a poorer quality. Higher up, in terms of recruiting decent postdocs, it is the same sort of effect. But at a postdoc's career development stage, then you perhaps have your eye on issues other than the bottom line of how much money you are getting each week. You are going to be targeting

particular people or particular institutes to develop interests or facets of your career. It would be fair to say that the postdocs that are there are there more for love than money.

FRAN BAILEY—Would it, in some cases, be a particular line of research that is providing the attraction to continue with the research?

Dr Wikstrom—Yes.

FRAN BAILEY—Or is it just research in general?

Dr Wikstrom—You could probably talk about your experience, coming from Sydney.

Dr Nassar—I think it depends on your own individual area of interest and what facility is providing areas and opportunities where you could pursue that line, but when it comes down to that level then usually salary is not the first priority. It is usually somewhere that is going to provide you with the resources, the interest groups and the expertise. Really, you are going after an area or an institute that has the expertise that you can pursue and then get your training and increase your knowledge and skills to develop your career and research in a particular area. So I have come from Sydney, for example, to do a postdoc here in WA because that was one of the criteria: that you have to change institutions. After doing a PhD, you have to change institutions.

I am on an NHMRC fellowship, so their criteria included changing institutions and the next best place for me to come to pursue my area of work is here in WA. That is one of the things that a lot of us are bound by. A lot of our salaries are based on the NHMRC salary scales. So that is the real limiting factor: there is no room for us to move; those levels of salary now are no longer competitive with the university levels. They are probably 30 per cent lower than what the universities are paying and in the private sector it is even half the rate or two times less than the rate that you could get out in the real world. But, first of all, I came here for my training and development, but longer term I think it really starts to impinge on your future career. What happens after my four years of fellowship run out? That is the real issue now.

CHAIR—What do you think may happen to you? You must have some thoughts on it. We would not mind you sharing them with us because I think you are an example of the anxiety and concerns that are coming out in this inquiry, and we cannot resist the temptation to ask you.

FRAN BAILEY—Also, what exactly is the area that you are working in?

CHAIR—Tell us a little bit about what you are doing.

Dr Nassar—I will tell you first of all what I do. I am a perinatal epidemiologist, so I am interested in research relating to pregnancy and factors and exposures that occur during pregnancy, and the impact that they have on infants and later on in childhood. An example would be alcohol during pregnancy: what are the impacts on foetal growth and at birth, and then the longer term outcomes in behavioural development and motor skills in children. That is one line of work. I am looking at lots of environmental exposures in pregnancy and the impact on infants and then later on in life.

There is lots of evidence now showing that what happens in pregnancy does not just impact at birth but also impacts on the child and then into adulthood. Cardiovascular disease has been related right back to what happens with the maternal exposures and how a baby develops in utero, and it can lead to long-term outcomes in adulthood. So I am looking at that whole area: foetal origins and development of disease. That is my area of work, and a lot of that is not necessarily lab based work. An epidemiologist looks at lots of existing data, a lot of research that is already out there. So I use a lot of health data that is existing, that is collected at birth: a lot of maternal characteristics are recorded; statutory declarations that are done by health departments. Then we sort of contract down using data linkage.

I do not know if you know about data linkage. Health departments are able to link different data health collections and then we can trace a person's trajectory from infancy, all the way through their hospitalisations and into teenage years and adulthood. I can trace someone's history. I can look at what happens with the mother's exposure, what happens to the child at birth, and then what happens subsequently in the child's health in later years. That is my background.

WA has an existing data linkage service that has been operating for the last 20 years, and they have been leading Australia in that resource. A lot of the other states are now following. New South Wales is developing a data linkage service, using the WA model. The idea was to come out here, get trained up in using this resource, and then take it back.

How does the whole funding issue impinge on me? I have a postdoc for four years. I am in my third year at the moment; I have one more year. The idea is that you apply for funding early in your final year, and you usually find out at the end of the year. That then starts off the following year. It is really competitive. When I applied for a postdoc, there were 300 applicants and there were seven population health postdocs. It is really difficult. What happens to the others? It is the same for the next award that I go for. It is called a 'career development award'. I have just spoken to someone who has been on the panel assessing this year's applicants and there are again 300 to 350 applicants and there are only 70 awards. Of those, there are maybe seven again in my area of population health. That is across Australia. It is really difficult for us when we apply, because if you do not get one of these fellowships the issue is: where do you get your backup source of funding?

The only other source of funding is to apply for NHMRC project grants, but it depends on your track record, your expertise and your knowledge of the area. For someone at my level, only three years postdoc, I am only considered an early career researcher and so me competing with very well established people is more difficult. I applied for my first one this year and it is a difficult process, and it is going to take a lot more goes at it. People say it takes two to three goes before you can even get a project grant, so these early career fellowships are the only way to really get us that leg-up to get our track record established so that we can then apply for the grants. But with so few of them, I think there is going to be a real gap.

You were talking about a 'missing generation'. I think there is going to be this missing generation of postdocs because it is so competitive and there are so few opportunities out there. I think we will find that people will leave the workforce or leave research because there are just no opportunities out there.

CHAIR—Where would they go? And I want to ask you: what is going to be your fallback position in the event that you can't pursue what you are clearly quite committed to doing?

Dr Nassar—What would happen? One fallback position is that you go and work on someone else's project, so it is not necessarily in your area. So, although I work in maternal factors, I might have to go and work on a project that is cancer related, for example. So I can still do research but it is in a completely different area. I have spent four years trying to build up a little research area, my own niche, and get that going, but as soon as my funding runs out, it goes. When you start working on someone else's project, you have to devote your time to that. I might be able to keep on with my little area on the side, but it is very difficult with all the time constraints and those kinds of things.

If I do not work on someone else's research, then I guess there is the private sector, so I could go and work at a pharmaceutical company, which is kind of considered selling your soul in some ways. But to be feasible and to be viable and as a means to an end, you have to take up the options that you have.

CHAIR—Have you thought about how this situation could be redressed? You have talked about seven scholarships.

Dr Nassar—Yes.

CHAIR—Is there room here for an increase in the number of scholarships that are handed out, and on what basis does that increase happen? Have you thought about how that could be corrected?

Dr Nassar—Our funding is very much based on the National Health and Medical Research Council. We have approached them about those issues and they say that they are really stuck: they have no more money. There is a fixed pot of money and that is it. In some ways, I think we have to lobby them, and we have tried through our director Fiona Stanley. We are trying different avenues of lobbying people and getting our issues across and out there in terms of just how limited the opportunities are and then what this means for the future, because this is just one research that I do. There are hundreds of researchers across Australia all in a similar position every year, and they all digress, and people are falling off the bandwagon.

In terms of opportunities, we are doing something for the public good, so really I think it goes back to the government. There are some private institutes that do offer some opportunities, but you have to be working in special interest areas and the 'sexy' areas, which are obesity, cancer. That seems to be where there is some money out there.

CHAIR—Because they are attracting the funds.

Dr Nassar—That is right. The only other fallback we have is really government funding and, at the moment, they say that there is no extra money to provide additional fellowships. This is not only about lack of fellowships; it is also about providing fellowships which are competitive and have a salary that provides a means of living as well.

Mr SYMON—I will continue on that line of questioning. I would like to concentrate on what happens to those postdoctoral researchers that do not get a grant, that go out into private industry? Do many of them ever come back into the system and do further research, with a salary cut in front of them and various other impediments in terms of having to go into a competitive bidding system for grants et cetera? How many come back from the pharmaceutical companies?

Dr Nassar—From my experience with my colleagues and people I have seen leave and go into the pharmaceutical industry, for example, there are a number that I know of and none of them have come back, once they experience the real world, or whatever it is. We do this for love, but it is quite a competitive business. It is quite a demoralising business because you are always applying for things; you are always getting rejected. So you do set yourself up for a lot of rejection, whereas in the pharmaceutical industry you can do your work, although I am sure there is rejection in everything you do. The other thing is our job security. We are applying for fellowships every two to three years. Grants are only for three to five years, so there is that element of insecurity as well. So not only are you trying to do your work and you are trying—

FRAN BAILEY—We share that with you.

Mr SYMON—So it is a one-way street pretty much for that.

Dr Nassar—It is, yes.

Mr SYMON—Once someone with those qualifications goes out to the other side, as it were, they have then got job security and career advancement.

Dr Nassar—Yes.

Mr SYMON—So there is a whole package of things that I would see that would stop them coming back.

Dr Nassar—Definitely.

Mr SYMON—Because you may do the job for love but you have still got to pay the bills at the end of the week.

Dr Nassar—Definitely. I think that is why we are not attracting people and we are losing people now, because the inequity and that differential is increasing and the standard of living is going up. All these factors are overriding the love, and it is becoming an increasing problem.

FRAN BAILEY—What is the difference between you having the opportunity to take your research to the pharmaceuticals and sell out, as you said in your comments, and being able to do it at a university? I want to know the difference there, because that is important in terms of who should be really responsible for providing the best environment for researchers, because I am guessing pharmaceuticals come up with a compromise.

Dr Nassar—Sure.

Dr Wikstrom—From what I have heard, there are two disadvantages for selling your soul. The first is that you have got to be working on a product. That is not necessarily a bad thing, but it is a compromise. You are no longer driven by the quest for knowledge and understanding of the system; it is just to satisfy the production of a product.

That is all well and good for research areas and diseases which are advanced in terms of our understanding of them. Nothing is going to be lost, compared to other areas where fundamental research is still driving the future development of those products. In my field in immunology you can fairly well say that, even though we have an advanced understanding of the immune system and that you could sell your soul to work on vaccines, the fundamental immunology is still in a largely undeveloped state.

There is no better example than the recent HIV trials in America which failed, because we just do not understand how the immune system works. The fundamental research needs to be done to actually characterise how the system works. If you are happy with working on a product, then going and getting a secure job and not fighting for your livelihood is a great option.

The second thing that you lose when you sell your soul is that companies are actually making decisions on what is a worthwhile product to develop and what is not. So you can have researchers who are very interested in developing a particular area, and are then told at the end of the year, ‘We’re not doing that any more. The accountants have crunched the numbers and there’s not going to be any return.’

I am in respiratory immunology and I have heard stories about the development of different kinds of treatments for asthma. In what is quite a demoralising situation, the drug companies are not particularly interested in treating childhood asthma because it is in their interest to develop drugs to sustain a chronic illness, rather than drugs that will cure a disease in its early state. If my boss has got it right, then in fact he may have a very effective way of curing childhood asthma. Your adult chronic asthma disappears and the rising incidence that we are experiencing is, for the first time, perhaps going to go into decline. But a drug company is not going to give you the freedom to do that sort of work and you have to work on the fundamental immunology outside of that area.

If you are passionate about the work that you are doing, then you have got this big trade-off to make: ‘Do I sell my soul and work in a secure environment on things that will make a difference?’ versus perhaps what is going to be, in the longer term, more rewarding and actually solving really big problems in the most effective way. You cannot judge which is going to be the better of the two, but I can understand, having fought for a living, going through the grants and fellowship system is the survival of the fittest. It brings out perhaps, on occasion, the best work, but it also allows political forces to favour one avenue of work over another. You leave that system where really two years is your maximum comfort period.

I guess in the case of elected office you know what I am talking about, but to be an individual where you only get two years to relax—in fact, if you want to grow and develop the research, then you have got maybe 12 months where you are not worrying about where the next dollar is coming from—that is what is ahead of you as an established career researcher. As an early career researcher, then you are scrabbling just to find opportunities. If you are really lucky then you are

going to get a period of good support to work on a great project where you can see that what you are doing is making a difference.

Mr RAMSEY—You have just been talking about the three-year, five-year funding cycle in the NHMRC, but you also point out in your submission that most of your postdoctoral researchers at the moment are actually employed on one-year contracts. Can you explain to me why that is? Why would anyone employ anyone, for research purposes, on a one-year contract? Where does that even start?

Dr Wikstrom—There are advantages to offering a 12-month contract that I can see. The first is that the universities like UWA have a rule in place that, if you are employed for two years or longer, you get a better superannuation package. So, in order to be able to stretch the research funding dollar further, you only put your staff on for 12 months and therefore you only have to offer the minimum superannuation package. The costs cut considerably into the size of the pot of money that you have to do the work so, to save a bit of money, that way is an advantage for a viable project.

There is the aspect of work relations. Maybe it has a lot to do with the kinds of people that are researchers. Whatever the reason, at the end of 12 months—and perhaps by the letter of the law if the funds are available you do have to appoint that person, but you do not necessarily have to make that decision—you can let the person go if you have not been happy with their work without getting into the whole ‘I think you’re crap’ kind of stuff. Those are two advantages I have seen that people use.

The other one, which is perhaps a little less common, is that when you reappoint a person on a rolling contract, you do not necessarily have to move them up to the next step and salary. So, again, you can continue putting in a research assistant at a level 4 as the minimum that they need to be paid, and when you reappoint them there is no automatic step up to the next one. So you can sort of save money that way.

What is frustrating about that is getting good information on what is allowed by the letter of the law in terms of administering research funds and what you can actually get away with. The climate is changing a bit and, where previously there was a lot more room to save money on staff costs and they were being exploited, it is getting harder and harder to do that and we are becoming more and more aware of what we are entitled to and what we are not. Have you seen any others?

Dr Nassar—No, they are the main ones.

Dr JENSEN—Simple question; very difficult to answer. If you could change one area—one policy I guess you could say—to improve things to maximum benefit for early-stage researchers such as yourselves, particularly in something like where you have to use NHMRC funding, what would it be?

Dr Wikstrom—The idea I like best is an old idea where, once upon a time, the NHMRC used to administer essentially building grants. An organisation was given a pot of money and it was up to them how they actually allocated it. In that case, rather than the early career researcher having to compete nationwide against the number of people who could do the work or come up

with a project, they are applying to the institute when they get the grant and saying, 'We're going to be putting on three new postdocs and these are the areas we're looking to have people put in.'

All they have to do then is compete at that local level for a position in the institute. If you make the pot big enough and the funding levels attractive enough, the institute can then potentially attract applicants from around the country. The important thing, though, is that they have got that five years. That is the key: that they are given five years to actually develop in a research project. It is a little bit different going the other way around, where you have to demonstrate that you have got a viable project up and running at the beginning and you only get three years in the current project funding. So those are probably the two key points.

FRAN BAILEY—Can I ask a question on that very issue. Is that more likely to mean that the institute will be having more say in the area of research rather than individual researchers or a group of individual researchers?

Dr Wikstrom—Yes, potentially. In the end the institute is the sum total of the people that are working there and they are going to have their specialties and areas of expertise. They have all gone through that system. So the two have probably developed together. It is hard to communicate the distinction.

Graham Mitchell said to me in a phone conversation that the thing that was missing for the early career researchers was a five-year uninterrupted period of creativity in the lab. He feels it works well and, for me, to be given five years to work in a particular area has immediate attraction. You would not be sitting down and saying, 'I'm going to solve chronic heart disease and its relationship to alcohol ingestion during pregnancy'—nothing so specific as that—but you could go into an area and be able to pick up questions and look at them and develop avenues of research. That is normally happening on a yearly basis, but in order to—

Dr JENSEN—With the current system you need to get too specific too early about what you are doing. Is that what you are saying?

Dr Wikstrom—Yes, definitely. Yes, that is it. Natasha touched on the idea of developing a niche expertise. It is about developing a good project and coming up with a good question. Developing as a researcher means learning how to ask really good questions. If you get lucky, you come up with a question that is immediately relevant to the funding body and then you are away.

Maybe the current 'survival of the fittest' system still encourages that, but there is more pressure on an early career researcher to come up with a viable project at a period where, honestly, they do not have the expertise, the experience, the real-world knowledge to know if they have got it right or not. They have got to be able to fail a few times and the system needs to be able to tolerate that. At the moment it does not seem to so well, I would suggest.

Dr JENSEN—So research applications and projects and so on will inherently be somewhat conservative in their scope, rather than a broader-ranging, more risky sort of project?

Dr Wikstrom—Yes.

Dr Nassar—Definitely. That tends to be what gets funded. Even with grants it is only a less than 20 per cent success rate. The ones that are successful tend to be in those obvious areas, whereas the much less developed or much more cutting edge ones do not get a shoo-in or a look because they are not considered relevant or sexy or whatever it is.

Dr JENSEN—For the more risky ones the outcome is not as clearly defined.

Dr Nassar—That is right, yes. Or it is not an interest area. Maybe it is not an area that people are particularly drawn to, such as aged care, which is ‘interesting but’.

Dr JENSEN—To get a little bit into the guts of your submission, you mention the issue of the disparity between NHMRC funding and what, for instance, postdocs at university get. We had earlier evidence on the gap between the two. In the Telethon Institute how is that made up, or isn't it?

Dr Nassar—It is not, no. At the moment with my fellowship, for example, 30 per cent is considered on-costs and is taken out of my salary, out of my fellowship, whereas a university would pay that 30 per cent, as well as the superannuation. That is the discrepancy. Then there is the superannuation in amongst that. The NHMRC salaries are all like that. It is not just my fellowship: it is anyone employed on a grant, which is pretty much most of us. So that 30 per cent level is where that gap is really happening, whereas universities, I guess, have ways of absorbing that. They are big institutions and they can do that, whereas at our institute there are maybe 300, 400 researchers.

Dr JENSEN—What is the argument that is used for NHMRC funding whereby those on-costs are not included?

Dr Nassar—They do not have an argument. The most recent argument is that those salaries are actually only supposed to pay you at a 0.8 level. That is employing you maybe four out of five days a week. Firstly, the institution is supposed to absorb those 30 per cent costs, and our institute cannot. They do not have the money to do that. Secondly, now we are supposed to be working only 0.8, so they have tried to justify that poorer level of funding that they provide by saying, ‘It's only a 0.8 level.’ The other day a week we are supposed to get a real job and make up the difference, which is just not realistic.

Dr JENSEN—Research does not work that way.

Dr Nassar—Exactly.

Dr JENSEN—You cannot research something for four days and then go and—

Dr Nassar—But that is NHMRC's kind of response to that. I do not know if Matt has anything else to add. At this stage they cannot justify it.

Dr JENSEN—I would like to say on record that that is ludicrous.

Dr Nassar—Thank you.

Dr Wikstrom—It is not something that is specific for the institute. For research groups working within the University of Western Australia, even though there is an academic pay scale for the research-only staff that are employed off grants, all they can hope for is school support to actually appoint someone to full time. If they cannot get the funds out of the school then they have to appoint someone for just four days out of the week rather than the full five, because the person who is administering the grant does not have the money to pay for it.

I agree: it is ludicrous that you have tendered, if you like, for a research project and said, 'This is how many people I need in order to complete the work,' and that is based on an ordinary working week, and then the money comes back and, in order to satisfy a reasonable market rate, you are told, 'Well, in fact you can't afford to have someone working five days a week. You can only have them for four.' You have the situation then where, if it is the postdoc who could not get a fellowship but has been successful in getting a research grant, they are going to be effectively working that one day free because, in order to be productive enough in that three years—or let's say it is actually two years before it is time to reapply—they are actually having to do that extra day out of love. And in an environment where the living costs have been increasing beyond what perhaps the NHMRC anticipated, it is going to create at the very least anxiety, and considerable stress.

Mr CHEESEMAN—Have we created a culture by which research organisations and universities are perhaps asking for more than they need to do a project, knowing that it is going to be cut back by the grants process, so that they actually do end up getting what they want? Do you think some institutions are doing that?

Dr Nassar—Some people are doing it, but at the review process your budget is assessed and most of the time that will get cut, so even if you wanted to add in an extra bit of fat it usually gets cut anyway. You are asking for extra, but they are supposed to be peer reviewed, so they tend to have a sense of what can be done within a project and, with the limited funding, I think you get the bare minimum. In the past you may have been able to do that with some sort of juggling, but you have to itemise all the associated costs and account for so much now that I do not know if you can do that.

Dr Wikstrom—I think the sorts of numbers floating around suggest that in terms of the research effort then funding bodies like NHMRC are only actually coming up with 50 per cent of the cost of the project. That is if you were to put that project out into the private sector as the benchmark of what it would cost to do the research. So the people that are bearing the cost, that other half potentially, are the universities that are supporting the research groups and then the researchers themselves. I think it is sad that it is a point of pride almost when the director of the Institute for Child Health Research is saying, 'We are running a very lean machine in terms of the cost of research and what we are able to achieve.' To a certain extent let's be efficient, but I do not know if you want Australia's research effort to be a lean machine really. If you are identifying crucial health issues—and, for us anyway, crucial health issues need to be worked on by the best and most well equipped individuals—then why are you insisting that it has to be done for the smallest amount of money?

Dr JENSEN—If you get too lean, I guess you have the problem where you end up with everything being directed and nothing out of left field. I mean, no-one told Einstein to discover relativity.

Dr Wikstrom—I could not agree more. That is what I am afraid of. I am driven by the fundamental questions, the fundamental research issues, rather than perhaps the applications. For me as an individual it is far more satisfying to be able to provide the starting material for what people will then work on in years to come. The Group of Eight universities have identified that fundamental research is something that universities should do really well, because where are our students going but to the universities? If you cannot teach them the fundamentals and have them travelling on that edge of research, then who else is going to do it? There are no other bodies that are going to say, ‘We think it’s a really good idea to learn more about how the maternal-foetal interface works because we think it’s going to pay off in 20 years time.’ No, they are not. So we are going to have a world full of products with a poor understanding of how to use them, really.

CHAIR—This is a very good discussion. Unfortunately, a number of us have to leave for the airport. On behalf of the committee, I thank you for sharing your experiences with us. They were very frank and honest, and that is very important to us as we try to work our way through some of the issues, (a) to understand them and (b) to make recommendations that could be useful to you all. Thank you, and thank you for your submission. I am not going to ask if there are any more questions, because there will be, and we have to leave!

Resolved (on motion by **Mr Cheeseman**, seconded by **Mr Ramsey**):

That this committee authorises publication of the transcript of the evidence given before it at public hearing this day.

Committee adjourned at 1.54 pm