THE BOB HAWKE PRIME MINISTERIAL CENTRE
23RD ANNUAL LECTURE

THE COMPLEXITIES OF SCIENCE BASED POLICY... LIFE IN THE TIME OF COVID

DELIVERED BY

NOBEL LAUREATE PROFESSOR PETER DOHERTY AC

THE HAWKE CENTRE

University of South Australia

INTRODUCTION

The Bob Hawke Prime Ministerial Centre at the University of South Australia presents the Annual Hawke Lecture as a means of encouraging debate and action on major issues that affect the sustainability of our society, nation and world. Each lecture is presented by a speaker whose experience of human affairs is notable, and lectures delivered since 1998 can be accessed at **www.hawkecentre.unisa.edu.au**

The 23rd Annual Hawke Lecture was delivered by Nobel Laureate Professor Peter Doherty AC on Thursday 2 June 2022 at the Adelaide Town Hall.

The Chancellor of the University of South Australia, Ms Pauline Carr, welcomed guests and introduced Professor Peter Doherty AC. The Vice Chancellor and President, Professor David Lloyd, gave the vote of thanks.

The Complexities of Science Based Policy Life in the Time of COVID

23rd Annual Hawke Lecture

Nobel Laureate Professor Peter Doherty AC

on
Thursday 2 June 2022

Adelaide Town Hall

Adelaide
The Bob Hawke Prime Ministerial Centre
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INTRODUCTION AND WELCOME

Ms Pauline Carr, Chancellor, University of South Australia

I would like to acknowledge Her Excellency The Honourable Frances Adamson AC, Governor of South Australia and Patron-in-Chief of the Hawke Centre, and Mr Rod Bunten. Federal and State members of Parliament who are in attendance tonight. Professor David Lloyd, Vice Chancellor and President of the University of South Australia. The Honourable Sir Eric Neil AC CVO FTSC, former Governor of South Australia and very long time friend of UniSA. Nobel Laureate Professor Peter Doherty AC, tonight's speaker. The Right Honourable the Lord Mayor of Adelaide, Sandy Verschoor and Mr Gregg Mitchell. Emeritus Professor Hugh White AO and his wife Jane White. Ms Blanche d'Alpuget, widow of Bob Hawke, after whom we named The Bob Hawke Hawke Prime Ministerial Centre and thus this evening's lecture. Ms Jill Saunders, Fellow of the University, and Uncle Lewis O'Brien AO, Senior Kaurna Elder. Welcome to all of you and thank you for joining us this evening for what I know is going to be a very fascinating evening.

One of the greatest challenges the world has faced in the 21st century has been COVID-19. For the past two years as the world ground to a halt, as people grappled with the disease, an international band of experts literally dropped everything to concentrate on COVID-19, and finding a way to stop its devastation. Professor Peter Doherty AC, Immunologist, Pathologist, Author and Patron of the Peter Doherty Institute for Infection and Immunity in Melbourne,was one such expert.

In 1996 he shared the Nobel Prize in Medicine for discovering the nature of cellular immune defence, and incidentally one of the six books that he has published for general readership is *The Beginner's Guide to Winning the Nobel Prize*, so that's definitely worth a read if your goal is to join the elite group

of men and women, who according to the Nobel Committee during the preceding year have conferred the greatest benefit to mankind.

In his recent book *An Insider's Plague Year*, Professor Doherty tells us that while citizens and governments around the world face the disaster with varying degrees of competence, the world's scientists stepped up. He provides a deep understanding of the virus and of the numerous areas of knowledge that have been brought together in the fight against it.

Ladies and gentlemen, please join me in giving a very warm welcome to Professor Peter Doherty AC as he gives a snapshot of how health experts and governments worked to control the challenge of COVID-19, and what awaits us in the months and years ahead.

23RD ANNUAL HAWKE LECTURE

Nobel Laureate Professor Peter Doherty AC

An experimentalist looks at policy.

Being invited to deliver the Hawke Lecture is an interesting challenge, but I should make the point that someone who has lived the life of a laboratory-based experimentalist may not be the best person to comment on public policy. And that's even more true for a society like ours that's constrained by the complexities of democratic governance and our federated system. What's the problem? Principally, that biomedical experimentalists inevitably work with simplified systems, using artificial constructs that we control.

My limitations on the policy and economics fronts do not, of course, stop me from commenting on politics, especially on Twitter where my profound ignorance and flaws in character are frequently pointed out. That doesn't bother me. If you're engaging in critique in the public space, you must expect strong feedback from people who disagree, including those who are better informed. And I don't care if the response is from someone who provides their name or who uses a pseudonym that allows them to be frank and specific. Social media can be used in very bad ways, but it can also help get our best truth out there and illuminate understanding. I'm a great fan of 'shortest form' writing, including Haiku.

Though I'm a professional scientist, I'm also part of an academic culture that deliberately makes strong statements as a way of evoking comments that lead to a better understanding of alternative, and perhaps more useful, viewpoints. Max Perutz, one of the great Nobel Prize-winning (1962, for Chemistry) structural biologists – a field pioneered by The University of Adelaide Physics Professor William Bragg and his son Lawrence – called his autobiography *I Wish I'd Made You Angry Earlier.* That title is just the best!

In common with many 'science greats' of his era, Max left Vienna in 1936 and escaped the hell that followed. As we look at the stresses in our contemporary world, many of us are concerned about the emergence of political figures who are prepared to exploit that lowest road of populism, which led, between 1933 and 1945, to mass murder and global mayhem. Driving that dynamic is, of course, one of the very worst uses of social media.

Returning to the idea of the public lecture, it's surely better to challenge than to bore if the intent is to keep people awake. And that's particularly true of Adelaide, where the speaker is likely to confront an informed and critical audience. Incidentally, though the Braggs were no longer in Adelaide when they were jointly awarded the 1915 Nobel Prize for Physics, Lawrence had attended St Peter's College, which can claim the greatest number of Nobel Laureates (also Howard Florey and Robin Warren) for any Australian secondary school.

Much later, as Director of Cambridge University's Cavendish Laboratory, Sir Lawrence built the scientific culture and facilitated the work done there by Jim Watson and Frances Crick, then successfully nominated Watson, Crick and New Zealander Maurice Wilkins for their 1962 Nobel Prize for Medicine. If you want to understand a little of the dynamism and underlying chaos of the discovery culture, read Jim Watson's little book *The Double Helix* or catch the BBC movie *The Race for the Double Helix.*

This was one of the most important breakthroughs in human history. Many of the massive advances in technology that have helped us deal with COVID-19 have their origins there. The Nobel citation reads: 'for their discoveries concerning the molecular structure of nucleic acids and its significance for information transfer in living material'. Sadly, the crystallographer Rosalind Franklin, who should have been included, missed out because of her early death from ovarian cancer. Her story is told by Brenda Maddox in *The Dark Lady of DNA*. That Cavendish program later transitioned to become Cambridge's Laboratory of Molecular Biology, the LMB, which was led for a time by Max Perutz.

If you've seen the Double Helix movie, you will know that Watson and Crick came to their breakthrough discovery by building a model. As we'll discuss in more detail later, politicians have the option of soliciting different models, though they won't be the type of physical structure assembled by Jim and Francis. Apart from models there is, even for the most courageous innovator in the policy space, no equivalent to being able to perform controlled experiments in tissue culture wells containing replicates of the same cell line, or multiple boxes of five (n=5) genetically-identical inbred mice. In fact, legislators may happily repeat the same failed experiment (neoliberalism, for example) over and over, generally because any form of evidence or deeper understanding is anathema to the conviction- or belief-driven politician.

What I'm saying here is that a mind trained to test every idea by measurement, computation and reflection comes at issues from a perspective that is not directly applicable to political life. The job of scientists like me is to tell the truth about the physical world as best we can understand it, then to find possible solutions to real problems. Winston Churchill accurately summarised the nature of the interface between science and politics when he stated that scientists should be, 'always on tap and never on top'. For that to work well when it comes to facing imminent dangers, the requirement is that those both 'on tap and on top' should be of high intellectual quality and integrity, and that both sides should be capable of listening.

The other habit that makes the contemplation of the political landscape difficult for a researcher like me is that, especially when an experiment seems to go wrong or delivers an unfamiliar result, we strip everything back to basics, do our best to get favourite theories (including our own) out of our head, and try to build a new understanding from the data in front of

us. If this involves an element of thinking out loud, or speculating in group discussion, others can get the sense that the person concerned is naïve, or just plain stupid. But, in my long experience, it's this capacity to break out of conceptual boxes that marks the creative scientist or technologist. One way of expressing this is to embrace the idea that: 'we are instructed by nature'.

That is, I think, what many scientists find so frustrating when we look at politics: the lack of any capacity to go back to a problem, lose the nonsense and mind-garbage, and see it with fresh eyes. I expect that's the space where policy 'think tanks' should be functioning but most, likely reflecting their source of funding, seem unduly constrained by other agendas. We might, for example, expect those in government to find some inherent contradiction in the idea that heading for 'net zero emissions by 2050' while at the same time using tax dollars to support fossil fuel exploration and enhanced fossil fuel extraction makes no sense at all. Such 'independent analysis' may require no more than a functioning cerebral cortex. To the naïve mind of the experimental scientist, policy contradictions like this seem inherently corrupt, or insane, or both. From the results of the recent election, it seems that many voters may have indeed come to that conclusion!

Talking about corruption leads us into a whole other area of public confusion. In many cases, what is clearly corrupt in the ethical and moral sense is not legally corrupt. That's one reason that we need a national integrity commission, or ICAC, to draw the line distinguishing what we all know to be ethically dubious from the legal corruption that should ensure removal from office. In New South Wales, we recently saw a Premier resign because of issues around over-riding measured decisions on the merit of different funding applications. Ordinary citizens put a massive effort into preparing such submissions, and it's the ultimate betrayal of public trust and investment of hope when considerations of political advantage, 'mateship' or 'pork-barrelling' over-ride merit and need. It seems that many many of my fellow citizens agree with me that all politicians who make a habit of this should be consigned to the trash can of history!

Ethics is, of course, another area where the lives of politicians and biomedical researchers differ greatly. In order to be funded through the government research programs that support most basic biomedical research, all major institutions – universities, research institutes and affiliated hospitals – must have established committees that ensure the ethical conduct of experiments, whether they involve animals or humans. In Australia, the responsibilities are defined under a Code of Conduct laid out by our National Health and Medical Research Council (NHMRC), the government funder for most of the more basic biomedical research. Currently there are, for example, some two hundred human research ethics committees registered with the NHMRC.

A university will, for example, have separate animal and human ethics

committees, with a membership that includes informed professionals and lay people who come from very different perspectives and backgrounds. The hard-working volunteers who serve on these committees often include retired schoolteachers, pastors and business people, who can dedicate a great deal of effort to ensuring high ethical standards while at the same time enabling the research to move forward. Apart from asking whether these experiments (or trials) can be done in a way that will yield meaningful results, a major concern is the minimisation of pain and suffering.

The scientists also work hard on this front as they do their best to provide all the information that is needed for the different ethics committees to do their job. Though such scrutiny was not in place when I first began my scientific career there is, I think, no doubt in anyone's mind that this review and approval process is central to the integrity of the research enterprise. And it runs all through the biomedical development chain, from discovery to the eventual supply of some life-saving drug or vaccine, including the products we are using to counter the ravages of COVID-19.

Now, before any medicine can be even considered for human use, the agencies that approve drugs and vaccines, like the US FDA (Food and Drug Administration), the EMA (European Medicines Agency) and our TGA (Therapeutic Goods Administration) require a robust paper trail showing that all appropriate ethical approvals have been established and observed at every step through the development process. That extends from early animal studies to Phase III clinical trials. The consequence is that any company anywhere on the planet that wants to sell a drug or vaccine as a global product for human use must observe the FDA/EMA protocols.

It could clearly be only a thought experiment, but what would the consequences for the wellbeing and smooth functioning of society be if: 'the minimisation of pain and suffering' was a required check point in any legislative process? For instance, do we really need to pursue financial mechanisms that ensure there is always a level of unemployment? Is it ethical to demonise and discriminate against the poor for being poor, especially when we think in terms of the complexities of modern life?

And we all understand that legislators are great at making laws for others, but not so good at applying the same principles to their own actions, or to those of powerful friends. Researchers seeking taxpayer-funded grant support are, for example, required to disclose any possible conflict of interest. Looking at our federal parliament, in particular, we may wonder if some legislators have even heard this term!

At least in the United States, scientists go to jail if it's considered that their special knowledge has led to having an unfair advantage when investing. Do insider trading rules apply to legislators who know ahead of time about a particular political decision? Obviously, there are layers of complexity when it comes to probing these issues then deciding what is acceptable. As a nation subject to the rule of law, that seems a reason to establish a

statutory federal ICAC, with strong investigative powers linked to a fully independent, well-funded and empowered national police force. Such an initiative should protect our democracy, along with those politicians who do behave ethically. One way that dubious politicians defeat scrutiny is, of course, to deliberately defund the agencies that do this.

An obvious example of the need to look at how we do things that came to the fore during the most difficult days of the COVID-19 pandemic was the situation of the homeless, when we were hearing commentary that accommodating 'street people' in hotels was, in fact, cheaper than having them sleep rough. I'd long wondered what homelessness costs state budgets for policing, the justice system, mental health support and hospitals. What is the draw-down on federal social support mechanisms?

Can we arrive at a good estimate of the total payout from different 'silos of support'? I found some independent estimates, but why is it that – setting aside any considerations of compassion or public safety – we are unable to go back to basics and rethink the way we handle such issues, especially if the alternative turns out to be more humane, more effective and cheaper to deliver? Is it naïve to think that we could save lives by implementing decent, and less cruel public policies that may just return many to being functioning members of society? Surely that would be economically and socially responsible policy.

And in the field of science, do those who fund the process of scientific discovery understand that it is, at its most basic level, an essentially revolutionary activity? In general, when it comes to biomedical science, overturning past assumptions and practice doesn't come across as threatening, because both an idea of continuing improvement and better health outcomes are built into cultural perceptions. But it does suggest to me that one of the great advantages of democratic systems is that there are no 'thought police' looking into what motivates creative people. Beyond that, the pluralism of our type of society with multiple sources of power, including that wielded by individuals with substantial wealth, facilitates disruptive change that might well be blocked by politicians who are in thrall to toxic, regressive vested interests.

Any research paper or research grant application will carry a full disclosure of funding sources and possible conflicts of interests. Why is that not a clear requirement for individual politicians and political parties? And we should include appointees to powerful government committees in implementing that protocol.

My long – perhaps too long – professional life has largely focused on two things: experimentation, principally in the broad area of virus infections and immunity, and writing. Part of my success as a scientist reflects that I write reasonably well and am evidently able to get ideas across, at least to a reasonably educated audience. Writing about research data is, for me, central to the process of understanding, an insight emphasised by

Australia's earlier immunology Nobelist, Sir MacFarlane Burnet.

Maybe those politicians who write their own speeches, if such people still exist, have a better grasp of both historical context and the implications of their words. The greatest speech by a politician is, to my mind, the six hundred or so words of Abraham Lincoln's Gettysburg Address. It concludes: 'that government of the people, by the people, for the people, shall not perish from the earth'. Lincoln is, of course referring to the American Experiment. Considering what's happened recently, some of us are beginning to fear that this long-running experiment with democracy and pluralism may be coming to an end.

I don't know how many words I've written in scientific papers and reviews, but it must be more than a million. Beyond that, transitioning away from being a laboratory-based researcher to spending more and more of my time as a public science communicator, I've written another 500,000-plus words on various aspects of science and the scientific life. This has included authoring seven full-length books.

For the purpose of this discussion around the insights and world view of the experimentalist, I'll be referring particularly to two broad areas of human endeavour that are, or should be, of interest to all of us: I'll focus mostly on the biomedical enterprise that is front and centre in this time of COVID-19, while also contrasting some of what's happened here with the much more dangerous, long-term challenge of anthropogenic climate change. Both were central to my 2015 book *The Knowledge Wars*, where the aim was to explain the nature and rules of the scientific enterprise to someone who has no formal training in science or may even (as too many are) be immediately turned off by just the word 'science'.

In a futile attempt to counter the intense activity of 'snake oil' salesmen in the climate change denial 'industry' – many have now transitioned seamlessly into 'greenwash' marketers – *The Knowledge Wars* also laid out how anyone could check the credentials of those who claim to speak with authority on particular issues in science, and I also suggested some guidelines on how to find, and read, open access science papers and review articles. The result was a 'warts and all' panorama written from the viewpoint of an 'insider', in biomedical science, and an informed 'outsider', in climate science. These two themes will, from time to time, resurface in this discussion.

My latest effort, *An Insider's Plague Year*, relates some of my professional experience through 2020, and includes 42 essays on the details of infection and immunity, both from the aspect of basic understanding and to illuminate the nature of COVID-19. Those 800–900 word pieces first appeared on the Doherty Institute website. Since the book went to the publishers in February 2021, another 46 have gone online.

The first chapter describes how our six-year-old, unique (for Australia)

Peter Doherty Institute (PDI) of Infection and Immunity, which spans the spectrum of curiosity-driven investigation, diagnostics, epidemiology, clinical medicine and translation, came into being. All these activities have a substantial research component and, bringing them together in the one building under one Director (HIV/AIDS specialist Sharon Lewin), has led to the intended result of achieving major synergies. A prominent feature has been that some of our more 'academic' staff members have been able to switch a significant component of their effort into areas like vaccine design, therapeutic drug evaluation and the development of novel diagnostic tests. In part, this reflects that the old categorisation of 'basic and applied' science has less and less relevance in modern molecular medicine, with the one transitioning seamlessly into the other. And co-location broke down some of the 'silo' walls which were, as it turns out, made of very flimsy stuff. Initially, I'd been a bit concerned that the Institute would be too cumbersome in the administrative sense, as the different groups answered variously to the University of Melbourne and the state and commonwealth governments (via Melbourne Health), but that hasn't been a problem.

Apart from the fact that we have enlightened and very positive people at the top in both the University of Melbourne and Melbourne Health, a basic reason is that the PDI leadership group is young, highly competent and dedicated to making the model work. In that context, my role at age 81 is to be the 'Patron', which means I do what I'm asked but otherwise try to stay out of the way. When you look at the Parkville Precinct, there are four major medical research institutes within a circle that has a radius of about 100 metres. At its centre is the essential clinical hub of Royal Melbourne Hospital (RMH), with the Royal Women's Hospital and Royal Children's Hospital close by. The laboratory-based research enterprises are: The Walter and Eliza Hall Institute (WEHI), the Peter MacCallum Cancer Centre (Peter Mac, which also houses patients), the Florey Institute of Neuroscience and Health (the Florey) and the Peter Doherty Institute for Infection and Immunity (the PDI).

Within the next five years or so, the Burnet Institute (the Burnet) will also move to this campus to become, along with the PDI and new spaces for both human virus challenge studies and biotech company development, part of an Australian Institute for Infectious Disease (AIID). With both operations retaining their own administrations and identity, the AIID will presumably allow some rationalisation of support services and act as an incubator for new initiatives. While there is some overlap with what we do, the Burnet adds a major, internationally established effort in the sociological aspect of infectious disease, particularly from the aspect of harm reduction. Another ambition associated with the AIID model, is that this colocation of talent and focus on the Melbourne front will improve our capacity to network across the nation, and globally, with leading investigators and research groups.

Though our public health systems are divided along state lines, and

COVID-19 did highlight some silo issues re information and reagent exchange, real progress was made on these fronts. After a long experience of working in the USA, which has a federal public health service (USPHS) and a central laboratory, the Centers for Disease Control (CDC) in Atlanta, I'm surprised at how well our system has worked. Some of the credit for that goes to the Hawke Government and the way the country handled the initial phase of the AIDS pandemic in the early 1980s.

Back then, at the federal level, the nation took a bipartisan approach when AIDS hit us. Liberal Health Minister Peter Baume, then ALP Health Minister Neal Blewett (from 1983) and shadow Jim Carlton worked effectively across the aisle to achieve a much better response than, with the tone set by Ronald Reagan, was ever achieved in the US. With COVID-19, there was some element of initial bipartisanship in the federal/state relationship with the formation of a National Cabinet, but there was no obvious attempt to reach across the aisle in Canberra. And, as we all understand, there was soon a return to destructive sniping from the federal sphere that was likely one of the factors leading to this new, and hopeful dawn in our political landscape.

One factor that made the Australian response to COVID-19 work well was the character and the basic values of the Australian people who, in the main still buy in to the idea of collective responsibility and shared fates. Another was the fact that we have very effective national committees with acronyms like ATAGI (the Australian Technical Advisory Group on Immunisation), PHLN (the Public Health Laboratory Network) and so forth, where a spectrum of high quality professionals working in relevant areas were able to network and bring forward good advice to the Chief Medical Officer and Health Minister Greg Hunt. Maybe we need a Chief Climate Scientist to facilitate that link between professional expertise and government

Where we missed out, though, in comparison with the UK National Health Service (NHS) is the fact that we are living to some extent in a 'tower of Babel' when it comes to collecting, linking and curating data, both within states and across the nation. And we have no mechanism for networking hospitals either in-state or between states to do clinical trials. The NHS has been able to do that using carrot and stick mechanisms. So could we. It would likely cost very little in dollar terms.

Interactions between scientists in different institutions in the same, or different, states were, prior to 2019, greatly facilitated by the NHMRC Program Grant mechanism. Unfortunately, these have been a casualty of the progressive, creeping, across the board under-funding of innovative, investigator-initiated research (that includes the Australian Research Council and NHMRC models) in Australia. This is a false economy, especially as we face such major challenges. Over the past 50 years, Australia has had a very good 'bang for the buck' in its publicly-funded research enterprise.

Science thrives in great institutions that hire top-quality, established researchers and smart young trainees, and that provide ready access to supportive infrastructure, from sophisticated instrumentation to informatics and legal specialists. There are operations of this type in all our capital cities, with Adelaide's SAHMRI (the South Australian Health and Medical Research Institute) being an outstanding example. Support from enlightened state governments, which has generally been bipartisan in the political sense, is a major factor here. And local philanthropy has also played a big part, with Brisbane's QIMR Berghofer being an excellent example of how such combinations of public and private support can be transforming.

These foci of research excellence also bring in substantial dollars from outside Australia. Prominent in that list over the past decades have been The Atlantic Philanthropies, and grants from the US National Institutes of Health (NIH) and the Gates Foundation, which add substantially to the strength of our research enterprise. Much of this inflow is a consequence of our established collaborations with researchers on different continents. Collaboration always reflects mutual benefit and, with top laboratories led by outstanding scientists, an ethnically diverse population and an excellent public health system, we have a great deal to offer.

Along with reasonable security of funding, it's enormously important to have a positive, collegial spirit. Ideally, a modern biomedical research institute needs to be associated with, though not necessarily controlled by, a first-class university and a hospital that sees clinical research as central to its mission. Location in, or near to, a university precinct is a major plus: apart from access to students, the diversity of a modern research university brings biomedical scientists into close contact with engineers, physicists, chemists, mathematicians, sociologists, lawyers, business schools that teach entrepreneurism, and the liberal arts that broaden all our horizons.

To return to the themes explored in *An Insider's Plague Year*, infection and immunity is a particularly complex area of science and, until COVID-19 hit, I'd pretty much shied away from writing about it for the broader community. Writing is, at its best, a voyage of exploration for the writer, and it's often more fun to probe unfamiliar areas than to recycle what we deal with day to day. Of course, I'm also aware that what may seem tired and boring to me will be novel and interesting to others.

My bluff was called on this when, in 2012, Tim Bent, my editor at Oxford University Press in New York, insisted that there had to be an explanatory chapter on infection and immunity for Pandemics: what everyone needs to know, a book he'd commissioned via my then agent, Mary Cunnane. Written in a Q&A format, this was part of a series with titles like: *The Catholic Church: what everyone needs to know* and *China in the 21st Century: what everyone needs to know*. For obvious reasons, both of those outsold my little 'disease and death' book, although, looking at it in hindsight, it is basically sound and sensible, though I'd underestimated the social consequences.

I'd been careful not to write one of those 'shock horror, we're all in terrible danger and all going to die' narratives. In retrospect, that would likely have sold much better.

When it came to 2020 and the COVID-19 book, I realised that I did have to go into the science basics if readers were to get their heads around what was happening, understand the nature of the disease better, and be persuaded to accept vaccines and other therapies when available. Some of the chapters in *An Insider's Plague Year* work better than others as 'lay explainers' and, if you have any interest in reading the further essays that can be found on our website, having the book in hand makes it easier to check back to the more detailed explanations of underlying principles.

Back to the life of the experimentalist: just as there are basic laws of Physics, there are two basic laws of experimentation. The first is: 'the law of unintended consequences', which does not require any explanation because we've all lived it. The second, which is related and perhaps equally familiar, is Murphy's Law, generally stated as: 'anything that can go wrong, will go wrong'. Murphy was a US Air Force officer who, after World War II, was given the job of experimenting with rocket-powered sleds, so you can see where he was coming from!

Following on from that, whether our 'experiment' involves public policy or probing the basis of immunity from studies in laboratory mice, it's important 'the experimentalist' keeps in mind that the study in question will likely not give a perfect result. It's also worth recalling what might be described as Rumsfeld's Law, or should we say Rumsfeld's maxims. In his words: 'as we know, there are known knowns; there are things we know we know. ... but there are also unknown unknowns – the ones we don't know we don't know'. That's very familiar to any experimentalist who works at the cutting edge of discovery science.

Having grown up with the King James Bible, the experience is summarised for me in 1 Corinthians 13:12: 'now we see through a glass, darkly; but then face to face: now I know in part; but then shall I know even as also I am known'. We'll come back to the complexity of glass later. But what often 'cleans' that darkened glass (and makes the experimenter widely known) is a discovery made from being able to exploit a novel technology, or a new and more powerful instrument. We can often thank the physicists and the engineers for that.

An example is that, using simple, monocular microscopes, Antonie van Leeuwenhoek and his 16th century colleagues in the Netherlands discovered the red blood cells, but it took another 200 years and the development of more powerful binocular microscopes with apochromatic, compound lenses before Gabriel Andral in France and William Addison in England described the much less prevalent white blood cells and started to do experiments with them. Thinking of COVID-19, the virus-specific immune response is, of course, a property of white blood cells and their secreted products.

Back to those thought leaders: Murphy, Rumsfeld (perhaps not a common designation for Rummy) and both the ancient scholar who wrote that verse in Corinthians and the 16th or 17th century scholar who translated it to such elegant English, we might also take note of two summary statements that, to my mind, are basic to democratic politics. The first is that 'politics is the art of the possible'. The second is that 'the perfect is the enemy of the good'. We've seen that one play out in Australia's recent history of trying to lock-in meaningful action on climate change mitigation.

Achieving the perfect state by the somewhat drastic experiment of guillotining the former oppressive class led, as we know, to the dictatorship of the Napoleonic era and the return of a form of monarchy. Along the way, the revolutionaries topped one of the greatest scientists of the 18th century, the chemist Antoine Lavoisier, who first demonstrated the reactivity of oxygen (O2): O2 availability (or lack of it) is, of course central to whether you live or die from COVID-19. A member of an aristocratic family of 'tax farmers' who collected revenues on behalf of the crown and took a substantial cut along the way, Lavoisier was one of twenty-eight who lost their heads for the same reason. Fortunately, we now have better ways for talented investigators to fund their research. Having a grant renewal declined is certainly less final than what happened to Lavoisier.

When it comes to contemporary politics and policy, we have been doing two very different experiments with regard to the two great science-based challenges facing us. The one that has been front and centre in most of our minds is, of course, the acute threat of the COVID-19 pandemic. The other is the slow-building, cumulative and inexorable progression of anthropogenic climate change.

It's no secret that, at the national level over the past decade, we have, until now, handled these two issues very differently. Here, as in the United States, we've seen the benefits of a federated political system, with enlightened states like South Australia pushing forward in a bipartisan way to implement alternative energy generation and supply strategies. And the performance of the City of Canberra in this regard has been massively different from that of the parliament that sits there.

What has made this even more disturbing is the way our country was represented at COP26 and the regressive part we played there. Now that has changed, and we have a new government that no doubt is very mindful of what 2018 Nobel Economics prize winner William Nordhaus has to say about dealing with the 'free rider' problem as regards greenhouse gas emissions. Beginning in Europe, the Nordhaus model of 'climate clubs' and carbon tariffs is clearly influencing policy discussions that could impact very negatively on us. Thank goodness we are dismounting from that 'free rider' bicycle!

Back on 5 October 2021, Goran Hansson, the Secretary General of the Royal Swedish Academy of Sciences (RSAS), announced that Syukuru

Manabe, Klaus Hasselman and Giorgio Parisi had been selected as the 2021 Nobel Laureates for Physics. Named for their 'ground-breaking contributions to our understanding of complex systems', one half of the Prize went to Manabe and Hasselman 'for the physical modelling of Earth's climate, quantifying variability and reliably predicting global warming' and the other half to Parisi 'for the discovery of the interplay of disorder and fluctuations in physical systems from atomic to planetary scales'.

Goran Hansson then introduced the Chair of the RSAS Physics selection committee Thor Hans Hansson, who pointed out that while many of us might think that Physics is all about simple and ordered systems, like the earth's elliptical orbit around the sun or the flow of electricity to our refrigerator, much of the effort in Physics is concerned with using basic theories of matter to interrogate and explain complex systems. Prominent in this type of analysis is the mathematical ingenuity that we all associate with climate models. Complexity is, of course what our world is about, and it is a continuing source of amazement and despair that too many politicians and some business leaders meet even the mention of complexity with profound hostility.

The next speaker was John Wetlaufer, a member of the selection committee, who summarised how Parisi 'peered inward with mathematics' as he sought to understand the properties of a rapidly cooled liquid (molten glass). It seems that the atoms of the glass we see through, or drink from, are evidently arranged in a disordered or 'amorphous' state that, so far as its 'energy landscape' is concerned, is permanently 'frustrated'. The idea that the glass itself is 'frustrated' (that may be familiar terminology for materials scientists) provides a different perspective on the 'through a glass darkly' description that I cited earlier as a description of science at work. According to Wetlaufer, the mathematical tools developed by Parisi helped others add a micro dimension that informs our understanding of the underlying chaos that influences macro scale systems, like climate.

Nobel selection committees function in absolute secrecy, but one of the things they do like is to put discovery in an historical context. As Wetlaufer explained the contributions of Manabe and Hasselman, he went back almost 200 years to the 1824 contribution of Joseph Fourier, who argued that 'dark heat' warms the atmosphere: his dark heat was soon shown to be infrared radiation. Now, we all understand that the short waves of light energy pass readily through the air to be absorbed by land, water and anything they hit. As we know from sitting in the sun on a hot day, light converts to heat, which is radiated back out as invisible, long wave infrared. Global warming is a consequence of that infrared being trapped by greenhouse gases in the troposphere, the atmospheric layer that extends about twelve kilometres out from the earth.

This light to heat conversion was explained in 1859 by John Tyndal while, in the 1890s, Svant Arrhenius analysed the capacity of various gases,

including carbon dioxide (CO2), to absorb that heat. Water (H2O) vapour is also a powerful greenhouse gas, but it soon falls to earth as rain, while CO2 has a half-life of about 120 years. Wetlaufer then explained that, 70 years after Fourier (1896), Arrhenius also developed the first mathematical models for explaining global warming.

Relating the world of infection and immunity we've all been so aware of through COVID-19 to the 70 years between Fourier and Arrhenius we meet John Snow, the first epidemiologist of modern times who is known to have elicited a public health response. A medical doctor, Snow mapped an 1859 outbreak of cholera in London to identify the source as a local water pump, then persuaded the local officials to remove the pump handle and the problem quickly resolved. Through the next decade, Louis Pasteur established the germ theory of infectious disease and started to make (after Jenner's 1796 use of vaccinia virus from cow's teats) the first laboratory-developed, 'live attenuated' and killed vaccines. Following the 1847 discovery by Ignaz Semmelweis (he was vilified and marginalised by the establishment) that, when doctors first washed their hands in a chloride solution post-partum, women no longer died of puerperal fever (staphylococcal infection), Joseph Lister established the principle of antiseptic surgery (1870) and Robert Koch discovered (1882) that the cause of the TB (consumption) that killed so many in that era is Mycobacterium tuberculosis.

Then, in 1894, Alexandre Yersin isolated Yersinia pestis the causative agent of bubonic plague, the great pandemic infection that reappeared regularly in Europe after the Black Death of the 14th century. If you think COVID-19 is bad, reflect that the plague initially killed from half to a third of the population of cities. Now we just treat it with streptomycin, an antibiotic discovered (1943) by Albert Schatz working in the laboratory of Nobelist Selman Waksman. To emphasise how recent this all is, Yersin died in 1940, the year I was born.

In Wetlaufer's summary of the 2021 Physics award, he related that, 70 years after the work of Arrhenius and 140 years after Fourier, the 1960s saw both the emergence of Chaos Theory (the noise in the climate system) formulated by the late Edward Lorenz, and the beginnings of complex climate modelling in the Princeton group led Syukuru Manabe. In particular, Manabe was the 'first to explore the interaction between radiation balance and the vertical transport of air masses'. Then, building on Einstein's theoretical analysis of Brownian motion, Hasselman moved the modelling field forward to 'link the slowly varying climate and rapidly varying weather' and predicted that 'weather on the time scale of days influences the oceans on the time scale of years'. And, of broad relevance to modelling approaches in general, 'he constructed a systematic statistical way to compare measurements, observations and models to extract the fingerprints of particular physical processes in the climate system'.

Why have I spent so much time on this? Modelling helps greatly when it comes to exploring a spectrum of possibilities for areas that are inherently complex. The modellers themselves move easily between climate science, biomedical science, economics, insurance, banking and even the gambling industry.

Might this country benefit from establishing a highly professional and independent National Strategic Institute to provide government with a clear 'left to right' (not in the political sense) view of where particular policy decisions may take us? A serious modelling capacity would have to be part of that. In different contexts, the nation's intelligence and defence establishments must surely be doing this. Much of that may be in secret, but could extending some measure of numeracy, clarity of mind and independence to broader policy initiatives be of general benefit? Or would that be unacceptable to ideologues who are set on particular goals and inherently uninterested in confronting any rational, evidenced-based analysis?

What is also needed is, of course, a return to the model of an empowered, merit-based public service led by permanent heads who can 'speak truth to power'. This will, I expect, be a primary goal of former University of Melbourne Vice Chancellor Glyn Davis, who is now heading the key office of Prime Minister and Cabinet. We desperately need a top quality higher public service. What we've seen over the past decade is that parliamentary democracy does not work well without the advice of wise, experienced heads.

It is hard to believe that some of the truly stupid statements from our political leaders over the past two years would have been made if there had been any consultation with astute, experienced policy professionals. The one that infuriated me the most was the amplification of Donald Trump's call for an enquiry into the origins of SARS-CoV-2. This was never to our advantage, got us nowhere on the virus origins front, alienated our biggest trading partner and has cost us (particularly our food exporters) billions of dollars. It was also totally unhelpful when it comes to open science communication. How dumb was that?

Returning to medicine, two basic types of modelling have been informing us about COVID-19. Some may have heard of Miles Davenport, a medical doctor from the Kirby Institute at the University of New South Wales, who modelled both the profile and consequences of falling, vaccine-induced antibody levels to the SARS-CoV-2 virus that pretty much predicted what was soon to happen in Israel. Our influenza research group has collaborated with Miles over the years as we've provided the data and he did the modelling to clarify aspects of the virus-specific immune response in ways that suggest further experiments. Like a number of the Australian infectious disease modellers, Miles trained in the 'school' founded by Australian physicist Bob May (later Lord May) who, first at Princeton, then as Professor of Zoology at Oxford, applied his mathematical and statistical

skills to modelling, predator/prey relationships, the epidemiology of infections like bovine foot and mouth disease, and the progression of HIV/AIDS within infected individuals.

But the modellers Australians have all got to know best are, of course, the epidemiologists. When people hear mention of the 'Doherty Modelling', that refers to the PDI group led by Jodie McVernon (a Bob May disciple and a paediatrician in an earlier life), which also includes colleagues from five other universities. What's particularly significant from the present viewpoint is that the term 'Doherty Modelling' describes a continuing process whereby our federal government has commissioned a sequence of self-contained reports to probe SARS-CoV-2 transmission profiles under various scenarios. Apart from that, both the World Health Organization and the Australian Department of Foreign Affairs and Trade have had the McVernon group model likely situations for COVID-19 spread and intervention in different countries, including some of the Pacific Island states.

As Jodie McVernon says, models are 'sophisticated thought experiments'. Is COVID-19 modelling in some way better than climate modelling? I don't think so. Both are influenced by human behaviour and both depend on underlying assumptions that are based in the best available data. While epidemiological models are potentially compromised by unpredicted events, like riots and the random nature of what can happen with an infected individual in a particular situation (for example a 'super-spreader' in a room full of people about to jump on planes going to different destinations), the climate models reduce humanity's role to readily measured parameters, like the level of global greenhouse gas emissions and the rate of forest and land clearing. And, because COVID-19 is a new disease, we have an imperfect, though evolving, understanding of how, say, vaccination modifies the extent of transmission, while the climate change data sets have been accumulating and analysed over decades. True, the measurement systems, particularly with regard to the sophistication of satellite monitoring (for land clearance and deforestation) have been progressively improving, but the modellers can readily correct for that.

Of course, the Miles Davenport type of modelling of the 'disease within' is constrained by the fact that every human being is a homeothermic system: move outside a narrow body temperature range and we are soon dead. That does apply limits. The largest creature left on earth after the End-Permian extinction was a metre-long pig-like reptile. Reptiles and fish are poikilotherms that can widely vary their body temperature to suit different environmental conditions. On the other hand, the climate is 'open': the rocks don't care how hot it is, and the crocodiles and cockroaches are likely to be resilient. In the end though, all plants and animals live within a tolerated climate envelope.

The COVID-19 experience has yet to play out in full, but it seems likely that – with the help of vaccines and drugs – we will bring it to an end (or

a tolerable balance) so that, within a year or two, this disease no longer impacts substantially on how we live. But there are no vaccines or drugs that will stop the inexorable progression of climate change. And it's not a 'war', the 'bad guy out there' drum that some politicians love to bang. We can't shoot it or bomb it, or torpedo it with a submarine, and it won't end with a peace treaty. If there is an enemy, the enemy is us, and our refusal to modify what we value and how we do things. Look at the enormous amounts we've expended to combat COVID-19, look at the world's massive, continuing expenditure on weaponry and compare that with what is being spent to transition our energy systems away from fossil fuels.

As a biomedical experimentalist, the total size for the 'human studies' pool is potentially the number of people on the planet. The epidemiologist can, for example, model the situation for subjects living in high-rise apartments versus individual houses in a particular suburb or city. The 'within' infectious disease modeller can draw on observations made in large numbers of clinical trial volunteers exposed to different treatments under controlled conditions. At basis, the climate change experiment has a group size of n=1, the planet and all the complex life forms that live on it. And the experiment, which has no ethical approval, is a 'one off' that cannot be repeated!

I wish I had a talent for fiction, as that can be a great way to cut through. Thinking about climate change, I've played with the idea of 'God the Experimentalist'. Deep in thought, God is in his laboratory office while a few of his research associates are chatting in the observatory building as they monitor what's happening on our earth. They're speculating, 'When is he going to pull the plug on this one? We've done this experiment so many times across the universe, and the result is always the same. Once some form of 'smart being', evolves and they discover fossil fuels, then nuclear fission, they have, at most, 500 years. And they also take a lot of interesting life forms down with them. He always sends all sorts of warnings and helps them develop better management systems, like satellites, but those in control never get the message. It's getting to be a bit boring: wish he'd think up a better experiment!'

I have been hoping that we will learn a lot from the 'natural' COVID-19 experiment that could cause us to reflect on what we are doing and how we might change that for human benefit. But frankly, having watched how the 'gas led recovery' and the expansion of coal mining had been quietly slipped past us as we were all focused on COVID-19, contributed greatly to my delight in the result of our most recent federal election. We all understand that it is difficult, even dangerous, for politicians to do experiments, but if they can listen to, and act on, the thought experiments done by epidemiologists, why is it so difficult for them to engage with the better validated thought experiments done by climate modellers? We need transition and rapid change, not regressive policy based in dangerous strategies (like expanding fossil fuel extraction) that must ultimately go down and, perhaps, take us with them.

My personal conviction is that the different 'experiments' with the way COVID-19 has been handled in various nation states provide an incredible opportunity for in-depth analysis from sociological, economic, medical and scientific perspectives. Hopefully, that will help us to develop better approaches for handling crisis situations. One very positive development on the pandemics front is that we are seeing the emergence of new drugs (like Paxlovid, but we need more of them) that could be used to treat any new, emerging coronavirus infections. And that approach is also being extended to cover the crossover of novel viruses (likely from bats) that belong to other families of pathogens, like the henipaviruses (Hendra and Nipah) and the filoviruses (Ebola and Marburg), that could threaten us in the future.

To echo the words of the aristocrat Tancredi in Tomasi di Lampedusa's great novel, *The Leopard*: 'If we want things to stay as they are, everything will have to change'. The signs that we can indeed do that for pandemic preparedness are encouraging. But, when it comes to the issue of anthropogenic climate change, a bit of tweaking here and there will not solve the problem.

Everything will have to change, and politicians are neither ethical nor rational when they assure us that such change is possible without disruption and cost to us. We are now used to living through massive disruption that has its roots, particularly, in globalisation, and the internet. It's time to change. To echo Franklin Roosevelt, 'we have nothing to fear but fear itself'.

Business as usual is not an option. Change that ensures the wellbeing and future of complex life on this planet, including that of our own children, grandchildren and their children, is the challenge we must embrace with imagination, fortitude and pride. Whether we like it or not, the physical realities around us and the ecosystems that sustain life are changing in ways that are not conducive to our long-term wellbeing. Our best option is to act with courage and to be the 'experimentalists' who modify the trajectory by developing and implementing solutions. The alternative is to be passive participants in a vast, global, natural experiment that is dictated by the laws of Physics and, as we inevitably hit tipping points, will soon move beyond our control. There is no viable alternative. We must open our thinking out.

We must be: 'instructed by nature'!

VOTE OF THANKS

Professor David Lloyd, Vice Chancellor and President, University of South Australia

Thank you Professor Peter Doherty for allowing us a look behind the scenes as one of the world's greatest catastrophes unfolded.

From the moment the late Dr Li Wenliang took to WeChat to alert his Wuhan University alumni group about an illness that had all the characteristics of SARS, almost 525 million cases have been confirmed according to the World Health Organization's latest count. And more than 6 million people have died. Dr Li himself was an early casualty. He died just over a year after posting his alert. Faced with an almost insuperable problem, it was – who else - scientists who came up with the solution.

I love it when scientists pull off a miracle. As John 'Hannibal' Smith said in the A-Team "I love it when a plan comes together". I find it fascinating that around the world, hundreds of thousands of scientists put their intellectual firepower together, often in the teeth of some of the most inane advice ever offered, and now, after little more than two years, we have vaccines and almost 5 billion people around the world have been fully vaccinated.

Getting that many scientists to agree on anything is almost as noteworthy as the fact that we are slowly, but surely, coming out of the isolated state we've been in for the past two years. I'm sure you'd all agree that we owe our eternal gratitude, not just to these men and women in laboratories, clinics and hospitals all over the world, but to the countless numbers of frontline workers all of whom have, for the past two years, put their own lives and health at risk so that we can begin enjoying life as we know it.

I think you will enjoy reading the book so don't pass up a chance to get a copy. It's a chronicle of perhaps the biggest event to confront us – I certainly hope we never come this close to a catastrophe again

I thank Peter Doherty wholeheartedly for giving us an insider's look.

I would also like to thank the Hawke Centre's Executive Director Jacinta Thompson and her team for bringing us this event tonight. We have tried to bring it to you on a couple of occasions that, in the end, became too risky to consider. So Jacinta's team has had to organise, then reorganise, then organise again. And while it doesn't come close to developing vaccines that have saved the lives of a large proportion of the world, organising an event like this comes with its own challenges.

Thank you all for joining us tonight.

BIOGRAPHY

Professor Peter Doherty AC is an Australian immunologist and pathologist who, with Rolf Zinkernagel of Switzerland, received the Nobel Prize for Physiology or Medicine in 1996 for their discovery of how the body's immune system distinguishes virus-infected cells from normal cells. After leading a research group at the Wistar Institute, Philadelphia, and teaching at the University of Pennsylvania (1975–82), Peter headed the department of experimental pathology at the John Curtin School of Medical Research in Canberra (1982–88) and served as chairman (1988–2001) of the Department of Immunology at St. Jude Children's Research Hospital in Memphis, Tennessee, where he still holds the Michael F Tamer Chair of Biomedical Research. In 2002, he joined the Faculty of Medicine at the University of Melbourne, and from 2014, has been at the Peter Doherty Institute for Infection and Immunity, a joint venture between the university and the Royal Melbourne Hospital.

Peter is the author of many books, including The Beginner's Guide to Winning the Nobel Prize: A Life in Science (2005), Sentinel Chickens: What Birds Tell Us About Our Health and the World (2012) The Knowledge Wars (2015), The Incidental Tourist (2018) and most recently An Insider's Plague Year (2021).

ABOUT THE BOB HAWKE PRIME MINISTERIAL CENTRE

The Bob Hawke Prime Ministerial Centre at the University of South Australia is an internationally recognised public learning facility serving local, national and global audiences. The Hawke Centre links a diverse audience to vital knowledge and to organisations active for the greater good.

Named after the late Bob Hawke AC GCL, a third generation South Australian, one of the 20th century's most notable Prime Ministers (1983-1991) and a great conciliator nationally and abroad, The Bob Hawke Prime Ministerial Centre was established by Memorandum of Understanding in 1997. UniSA developed The Bob Hawke Prime Ministerial Centre believing that Bob Hawke's contribution should be properly recognised through a national facility, not as a memorial, but in a way that helps new generations and furthers his legacy of valuing a cohesive, sustainable and fair Australia.

The Annual Hawke Lecture is the premier national event on the public calendar of the University of South Australia, delivered under the auspices of The Bob Hawke Prime Ministerial Centre. There are relatively few moments when we have the time to consider the larger issues of life, including the future of our nation and our world and how we can shape it. The University of South Australia offers the Annual Hawke Lecture in this spirit, as an opportunity to listen to the views of someone whose experience of human affairs is notable, and whose concerns are truly worthy of consideration.

The Bob Hawke Prime Ministerial Centre is committed to delivering a diverse program of events and exhibitions throughout the year which reflect their fundamental themes: *Strengthening our Democracy, Valuing our Diversity and Building our Future*. These themes are honoured through an accessible and thought provoking program that engages with a diverse Australian and global community. It is supported by a distinguished group of Patrons.

The lecture is recorded for posting on The Bob Hawke Prime Ministerial Centre website. Information of this lecture series is available on line at **www.hawkecentre.unisa.edu.au**

While the views presented by speakers within The Bob Hawke Prime Ministerial Centre public program are their own and are not necessarily those of either the University of South Australia or The Bob Hawke Prime Ministerial Centre, they are presented in the interest of open debate and discussion in the community and reflect our themes of Strengthening our Democracy - Valuing our Diversity - and Building our Future.

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1998 The Hon Bob Hawke AC GCL, former Prime Minister of Australia
A Confident Australia

1999 Hon Sir Zelman Cowen, former Governor General of Australia
The Australian Republic: A guide for the perplexed

2000 Dr Mamphela Ramphele, Managing Director, World Bank (Human Development)
Human Rights and Human Development

2001 Sir Gustav Nossal, distinguished Australian scientist
Medical Science and Human Goals – a Challenge for Australian Research

2002 Mr Noel Pearson, Aboriginal activist
Indigenous Australia: the Social and Cultural Predicament

2003 The Hon Gareth Evans, President of the International Crisis Group
Waging War and Making Peace

2004 Ms Irene Khan, Secretary General of Amnesty International
Security for whom? Redesigning security, reinforcing human rights

2005 Mr Greg Bourne, Chief Executive Officer, WWF-Australia
A sustainable planet – a future for Australia

2006 Mr Greg Combet, Secretary of the ACTU
A new Australian consensus for the 21st Century

2007 The Hon Justice Michael Kirby, High Court of Australia
Consensus and dissent in Australia

2008 Professor Fiona Stanley, Telethon Institute for Child Health Research
The greatest injustice: why we have failed to improve the health of Aboriginal people

2009 Professor Ross Garnaut, Australian National University
Climate Change: The Public Interest and Private Interests in Australian Policy

PAST LECTURERS

2010 Professor Geoff Gallop, Graduate School of Business, University of Sydney
Re-thinking Australian Politics: engaging the disenchanted

2011 The Hon Dame Silvia Cartwright, Former Governor General of New Zealand and now Trial Judge, United Nations Assistance to the Khmer Rouge Trials, Courts of Cambodia
International criminal trials. A promise fulfilled?

2012 Mr Richard Woolcott AC, former Special Envoy and diplomat for Australia
Advance Australia Where? Forging our future in the Asian region

2013 Dr Elizabeth Blackburn - Nobel Laureate, in conversation with Robyn Williams (ABC Science Show)
Living Longer - A Journey into the Bio-Future

2014 Professor Hugh White AO
From the Great War to the Asian Century: what we can learn from 1914 about our place in the world

2015 Air Chief Marshal Sir Angus Houston AK, AFC (Ret'd)
MH370 and MH17 Disaster and Crisis: An Examination of Australia's Response

2016 Reverend Canon Mpho A. Tutu van Furth
Forgiving....The Only Way Forward

2017 The Hon Julia Gillard AC, Chair, *beyondblue*
Learning from the Hawke Legacy in an Age of Anxiety

2018 Mr Stan Grant
The Uluru Statement and the End of History

2019 Mr Bill Kelty AC
Why Bob Hawke Inspired Australia and his Unfinished Business

2022 Nobel Laureate Professor Peter Doherty AC
The Complexities of Science Based Policy...Life in the Time of COVID

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We value their ongoing support of The Bob Hawke Prime Ministerial Centre and the Annual Hawke Lecture.

Jacinta Thompson
Executive Director & Events and Exhibitions Producer
The Bob Hawke Prime Ministerial Centre
University of South Australia

Bottom row left to right: Jacinta Thompson, The Hon Frances Adamson AC, Governor of South Australia, The Hon Sandy Verschoor, Prof Peter Doherty AC, Pauline Carr, The Hon Sir Eric Neal, Blanche d'Alpuget, Uncle Lewis O'Brien, Prof David Lloyd.
Top row left to right: Jill Saunders, Jane White, Prof Hugh White, Rod Bunten, Gregg Mitchell

THE BOB HAWKE PRIME MINISTERIAL CENTRE

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