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EMERITUS

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Challenges ahead after US nuclear fusion breakthrough

Australian scientists have welcomed the news that early this month researchers at the Lawrence Livermore National Laboratories in California carried out the first controlled nuclear fusion reaction that generated more energy than the laser energy needed to power the reaction.

The achievement has been acclaimed internationally and has prompted commentators to foresee the advent of a new age of clean energy, a new tool in the struggle to limit climate change and, incidentally, an opportunity for forward-looking investment and commercial opportunity. However, consensus is that these benefits will take time to secure.

The successful experiment was carried out at LLNL's National Ignition Facility (NIF), and used laser-generated fusion to release 3.15 million joules (MJ) of energy from a pellet containing two hydrogen isotopes. The lasers used 2.05 MJ of energy to deliver the result.

The laser-fusion approach is one of two possible schemes that might be used to generate fusion reactions. The second relies on magnets to contain plasma for relatively long periods, and is being developed in France by the International Thermonuclear Experimental Reactor (ITER) project, in which Australian National University scientists are involved.

The US achievement is 'a breakthrough in that a significant milestone has been reached in the quest to build a fusion reactor', according to Professor Andrew Stuchbery, Head of the ANU's Department of Nuclear Physics and Accelerator Applications.

'The LLNL facility is called the National Ignition Facility, so it has achieved its purpose to "ignite" a plasma of the heavy hydrogen isotopes called deuterium and tritium by use of laser beams to force the nuclei of these isotopes together. For the first time more energy was released than was put in by the laser pulse. This goal has been pursued for decades.'

The NIF's success came on 5 December, and was announced eight days later by the US Department of Energy and its National Nuclear Security Administration (NNSA), which called it 'a major scientific breakthrough decades in the making that will pave the way for advancements in national defense and the future of clean power'.

The event 'will undoubtedly spark even more discovery', the US Secretary of Energy, Jennifer M. Granholm said at that time. The US Administration was committed to supporting America's scientists 'whose work will help us solve humanity's more complex and pressing problems, like providing clean power to combat climate change and maintaining a nuclear deterrent without nuclear testing,' she said.

The achievement prompted Camilla Palladino, writing the Lex column in London's *Financial Times,* to tell readers that although the breakthrough came too late for commercial fusion to feature in the current energy transition, 'it should be viable in time for the next one. Investors need to start thinking through the implications right now'.

'Nuclear fusion is a thrilling concept for a world trying to wean itself off fossil fuels in double-quick time,' she continued. 'Fusion promises abundant low-carbon energy like solar and wind, but without the problem of intermittency. Plants could generate a lot of power in a limited space, as nuclear facilities do, without the pesky side effect of radioactive waste.'

That may not happen in a short time frame. While the NIF achievement was 'an essential step toward building a fusion reactor', Professor Stuchbery said, 'the energy released was from a relatively small pellet and was released in a flash that was over in a fraction of a second. It will be a huge technical challenge to scale up to a power plant.

'An alternative approach to fusion is to confine the heated deuterium and tritium plasma by magnetic fields. It is more obvious how to scale up that process, but that technology is yet to achieve ignition. So we may eventually have an abundant clean source of energy, but is not going to happen on the time scale on which we need to act to address climate change.'

In the long run, he said, the magnetic confinement path might be more promising than laser-induced fusion.

ANU is still actively involved in magnetic confinement. The university had an active plasma physics group working on magnetic confinement for several decades but its major apparatus, a stellarator largely fabricated in the ANU Physics workshop, was shut down in 2017 and recently shipped to China. The ANU is among the Australian research teams that maintain involvement with plasma physics research for materials development for future fusion reactors, and is involved with the European ITER project.

Vice-Chancellor to chair Group of Eight

The Vice-Chancellor of the Australian National University, Professor Brian Schmidt, has been appointed Chair of the Group of Eight (Go8), Australia's leading research-intensive universities.

His term will begin on 1 February 2023. Professor Schmidt, who has previously served as Deputy Chair of the Go8, said he was proud to take on the role.

'Australian universities make a major contribution to the prosperity, wellbeing and security of Australia — none more than the Group of Eight,' he said.

Pay increase from February

Staff covered by the ANU Enterprise Agreement will receive a 3.5 per cent pay increase from 2 February next year, after the Vice-Chancellor, Professor Brian Schmidt, signed off on the increase. It will be paid on the payday of 16 February.

‘I know that everyone has been feeling the increased pressures by the rise in the cost of living and I hope this increase will alleviate some of the stress being felt,’ Professor Schmidt said when announcing the increase.

‘While we continue to negotiate the new ANU Enterprise Agreement, the reality is, the cost of living and those pressures are being felt right now — and so we brought forward this payment to ensure our community is supported.’ More information about the salary changes can be found on the ANU website for academic, professional and casual staff.

Professor Schmidt said he had also approved the annual leave loading payment for the period January to December 2022 being brought forward from the end of January 2023 to be included in the payday on 22 December 2022. In his VC’s Update, he hoped that the early payment would help staff during what can be a financially challenging time.

The official ANU shutdown will be from the close of business Friday, 23 December, until Tuesday, 3 January 2023. During the break, telephone support will be available for staff (1800 808 374) or for students (1300 050 327 or text 0488 884 170), 24 hours a day during the break, including on public holidays.

Collaboration targets eye degeneration

Korean biotech company MDimune and scientists from the ANU’s Clear Vision Research Lab will work together to develop new and more effective treatments for age-related macular degeneration (AMD), the leading cause of blindness in the developed world. It affects one in every seven people over the age of 50.

The partnership aims to develop promising research gains made by MDimune and the Clear Vision teams into potential treatments for AMD, for which there is no cure.

The ANU scientists believe the molecular messages contained inside certain cells could serve as a potential therapy to treat not only AMD but other neurodegenerative disorders such as Alzheimer's and Parkinson's disease.

‘This exciting partnership with MDimune brings us one step closer to developing new drug therapies that could one day cure AMD, a debilitating disease that causes vision loss in about 200 million people worldwide,’ said Associate Professor Riccardo Natoli, Head of the ANU Clear Vision Research Lab.

MDimune's BioDroneTM platform technology is a sophisticated system that uses cell-derived vesicles (CDVs), particles produced by cells that serve as

information carriers, to transport drugs to specific parts of the body. Associate Professor Natoli and his team, which includes Dr Adrian Cioanca and Dr Yvette Wooff, will use the technology to administer new drug therapies that can safely reach our retina.

Preclinical studies using the BioDrone platform technology have so far proven successful. 'This novel class of drug carriers and therapeutics are highly versatile and can be generated from various types of human cells, meaning they can be produced in large quantities,' Associate Professor Natoli said.

Climate report shows weather extremes rising

Changes to weather and climate extremes are occurring at an increased pace across Australia, the Commonwealth Scientific and Industrial Research Organisation and the Bureau of Meteorology have reported in the *State of the Climate 2022* report, released on 23 November.

The biennial report draws on the latest climate monitoring, science and projections to assess Australia's changing climate now and into the future. The 2022 report shows an increase in extreme heat events, intense heavy rainfall, longer fire seasons and rising sea level.

The Director of CSIRO's Climate Science Centre, Dr Jaci Brown, said concentrations of greenhouse gases, such as carbon dioxide, were at the highest levels seen on Earth in at least two million years.

'The concentrations of greenhouse gases in the atmosphere are continuing to rise, and this is causing Australia's climate to warm,' Dr Brown said.

Dr Brown said the report documents the continuing acidification of the oceans around Australia, which have also warmed by more than one degree since 1900.

'The warming of our oceans is contributing to longer and more frequent marine heatwaves, and this trend is expected to continue into the future,' Dr Brown said.

'We're seeing mass coral bleaching events more often, and this year, for the first time, we've seen a mass coral bleaching on the Great Barrier Reef during a La Niña year.

'The rate of sea level rise varies around Australia's coastlines, but the north and south-east have experienced the most significant increases.'

The Bureau of Meteorology's Manager of Climate Environmental Prediction Services, Dr Karl Braganza, said the report projected increases in air temperatures, more heat extremes and fewer cold extremes in coming decades.

'Australia's climate has warmed on average by 1.47 degrees since 1910,' Dr Braganza said.

'We've seen contrasting rainfall trends across the north and the south of the country.

‘There’s been an overall decline in rainfall between April and October across southern Australia in recent decades, but in northern Australia, rainfall has increased across the region since the 1970s.’

During La Niña events in 2021-22, eastern Australia experienced one of its most significant flood periods. The report shows heavy rainfall events are becoming more intense and the number of short-duration heavy rainfall events is expected to increase in the future.

Dr Braganza said the length of fire seasons has increased across the country in recent decades. ‘We’re expecting to see longer fire seasons in the future for the south and east, and an increase in the number of dangerous fire weather days,’ he said.

Dr Michael Robertson, Director of CSIRO Agriculture and Food, said the threats caused by climate change were already having widespread impacts on Australia’s agricultural industry, affecting food production and supply chains.

Obituary

John Godwin Caiger
18 January 1934 – 3 March 2022

John Godwin Caiger was born on 18 January 1934. He was born in Japan where his Australian-born father, George Caiger, an experienced schoolmaster in England, had various teaching positions and, more importantly, was deeply engaged in the study of Japanese culture and language. At the outbreak of World War II the family moved to Australia, where they had many connections. In particular, George had earlier had a short spell teaching at The Armidale School in northern New South Wales and had met his wife in Armidale.

In the panic of war, his parents sent John to The Armidale School for a short period of primary education, but most of his primary education was in Sydney. His secondary education, however, was back at The Armidale School as a boarder. He went on to the University of Sydney but he was unsuccessful his first year of the BA course. He pressed on and was supported by a job at Cranbrook School where he taught by day — in his early twenties with no qualifications — and completed his Arts course by night. He is remembered as a quietly spoken and highly effective history teacher. Employment also provided him with the funds to go on to the School of Oriental and African Studies in London, where he completed a Masters degree in History with an emphasis on Japan.

In 1961 John was awarded a scholarship by the Saionji Memorial Society which enabled him to spend two years at the International Christian University in Tokyo, learning Japanese and collecting materials for further study. Possibly through a connection with Professor Syd Crawcour, who also had contact with the Saionji Memorial Society at this time, in 1963 he came to the Department of Far Eastern History in the Research School of Pacific Studies as a Research Scholar to write his PhD under Crawcour’s supervision. The thesis, titled

‘Education, values and Japan’s national identity: a study of the aims and content of courses in Japanese history, 1872–1963’, is a highly innovative account of the official statements about the aims of teaching national history in Japan and the ways these statements were supported by the actual textbooks and teacher’s manuals. It draws a distinction between the Emperor-centred courses before 1945 and the more open and dispassionate approach after 1945. Work on the thesis also served to provide John with a firm grasp of the whole sweep of Japanese history.

On completion of his PhD in 1966, John was appointed as a Lecturer, and in due course Senior Lecturer, in the Faculty of Oriental Studies, from 1970 Asian Studies. Throughout his career at ANU he was committed to the Faculty’s strategy of supporting a thorough training in an Asian language with background studies in the relevant culture and history; in his case, Japanese history. His teaching was clear, well-informed and undemonstrative. He enjoyed teaching, as he had at Cranbrook. In the 1980s, discussion raged about the relationship of language competence and disciplinary training: that is, between teaching in the Faculty of Asian Studies and teaching about Asia in other faculties. John’s contribution was to offer a first-year course in Japanese history within the History Department in the Faculty of Arts, where he was welcomed both personally and as a fellow historian. It is unfortunate that this initiative could not be sustained.

Several articles deriving from his PhD thesis were published in the early years of his lectureship, but his energies were soon directed to contributing, with his colleague Richard Mason, to a volume in a series of Asian histories for the publisher Cassell Australia. Mason and Caiger’s *A History of Japan* first appeared in 1972 and the revised edition is still in print, though long since published by Tuttle. It has been translated into at least five languages, including Japanese, and remains an excellent one-volume account of Japanese history, wide ranging in its coverage and calm in dealing with controversies.

Apart from a few book reviews, most of John’s later publications were concerned with teaching about Japan or Asia generally, rather than strictly historical and he had limited involvement with postgraduate supervision. In 1975, together with his father, he published a volume of readings intended to stimulate research by school students and he helped to edit a collection of papers on curriculum issues at the time of the introduction of the new secondary colleges in the ACT. A new interest, however, sparked by contact with Bill Steele while in Japan on a Japan Foundation Fellowship in the late 1970s, was the history of Japanese offshore whaling in the nineteenth century. A joint article appeared in 1993.

Within the Faculty of Asian Studies, John was a ‘good citizen’, serving periods as sub-dean and as a regular attender at meetings. In the early 1970s he was deputy warden of Garran Hall, where he lived, and provided academic advice in the establishment of Burgmann College.

In the 1990s John became unhappy with changes in the Faculty and University, so retirement in January 1999 was welcome. He continued living in Canberra, much taken up with family concerns and enjoying the opportunities for considerable travel. In 1971 he had married Janelle and they adopted two

children, one with significant disability. They all survive him, together with three grandsons. He died on 3 March 2022.

John will be remembered as a respected teacher, trusted colleague and a friend to many.

— Campbell Macknight

Diary dates

Feminine power through the ages

Woman as deity or as demon? How female power has been perceived through time is the subject of the exhibition *Feared and Revered: Feminine Power through the Ages*, at the National Museum of Australia. The exhibition, from the British Museum, explores the power and diversity of female spiritual beings in cultural traditions and beliefs around the world and shows how goddesses, demons, witches, spirits and saints have shaped understanding and practices in different cultures. The exhibition features more than 160 objects drawn from the London museum's collections, spanning six continents and 5,000 years, from 2800 BCE to the present. The exhibition closes next August.

Cressida Campbell at the National Gallery

The work of painter and printmaker Cressida Campbell is the subject of the National Gallery of Australia's major exhibition this summer. Combining keen observation with a delicacy of line, Campbell's woodblock paintings and prints capture the sometimes-overlooked beauty of the everyday. Through her views of a working harbour or burnt bushland, an arrangement of nasturtiums or a plate of ripening persimmons, the artist celebrates life's transitory moments. The exhibition aims to show the depth and virtuosity of Campbell's work, from intimate interior views to panoramic coastal landscapes. It runs till 19 February.

National Library's focus on Australian life

How Australia changed is shown in *Viewfinder: Photography from the 1970s to Now,* the National Library's exhibition of documentary photography over the past five decades, from black and white images to vibrant digital colour. The exhibition, curated by Matthew Jones, draws on the library's extensive photography collection to show how Australians' image of themselves and their society has developed in the past 50 years. It also focusses on the evolving nature of photography and highlights the significant technological advances and increasing diversity of styles, approaches and techniques that photographers have used. The exhibition runs until 13 March 2023. Entry is free.

Meet the Author events

February 6/7, 2023, 6pm: Chris Wallace will discuss her new book, *Political Lives: Australian Prime Ministers and their Biographers.* Cinema, Kambri Cultural Centre (date to be confirmed).

February 16, 6pm: Cory Doctorow and Rebecca Giblin in conversation with Andrew Leigh on *Chokepoint Capitalism.* Manning Clark Theatre, Kambri Cultural Centre.

February 22, 6pm: Don Watson will take with Chris Wallace about his new book, *The Passion of Private White,* which describes the meeting of two worlds: that of anthropologist Neville White and the world of hunter-gatherer clans in remote northern Australia with whom he has lived and worked for half a century, mapping their culture and history. As White began to understand this ancient culture struggling between the demands of Western modernity and the equally pressing need to preserve their lands, customs, laws and language, he was also trying to transcend the mental scars inflicted on the battlefields of Vietnam. Cinema, Kambri Cultural Centre.

March 7, 6pm: Maria Thattil will discuss her new book, *Unbounded.* Cinema, Kambri Cultural Centre.

March 18, 6pm: Paul Ferrell will discuss his new book, *Gladys. A Leader's Undoing.* Cinema, Kambri Cultural Centre.

Some dates, times and interlocutors are to be confirmed. Bookings usually open about one month before each event.

ANU/*Canberra Times* Meet the Author events are held in association with Harry Hartog Bookshop. Books are available for purchase before and after each event. Registration is required and can be made at Registrations at anu.edu.au/events. Conforming with ANU's Covid policy, those attending must wear masks. Enquiries to the convenor, Colin Steele, at colin.steele@anu.edu.au.

Australian faces at the National Portrait Gallery

Both traditional and unconventional approaches to creating portraits are on display in *Who Are You: Australian Portraiture* at the National Portrait Gallery, a co-curated exhibition drawn from the collections of the National Gallery of Victoria and the National Portrait Gallery. It features 130 works in a variety of media — painting, film, photography, screen printing and sculpture. It includes work by such artists as Patricia Piccinini, Atong Atem, Howard Arkley, Vincent Namatjira, John Nixon and Tracey Moffatt, with subjects including Albert Namatjira, Cate Blanchett, Queen Elizabeth II, David Gulpilil and Jeff the Wiggle, as well as self-portraits by John Brack, Nora Heysen, William Yang and Shirley Purdie.

Items of note

Cybernetics School looks to transformative future

The Australian National University officially launched the School of Cybernetics on 29 November, under the direction of Distinguished Professor Genevieve Bell.

The School of Cybernetics offers the Master of Applied Cybernetics, a PhD program that recruits students as a cohort, and a series of 'microlearning experiences' for organisations, communities and individuals.

Distinguished Professor Bell said the School aimed to nurture and train a new generation of critical thinkers and practitioners who could navigate the complex modern world and who were committed to ensuring safe, sustainable and responsible technology futures.

'We are working hard, in everything we do, to help transform the way society engages with technology," Distinguished Professor Bell said.

'We want to help ensure that everyone can participate in building our future. And we want to find new ways to think about and talk about the role of technology in our lives. Here at the ANU School of Cybernetics we are dedicated to helping lead and enrich this vital conversation.

'We are drawing on the rich history of cybernetics globally, and reimagining it for our 21st century challenges. We want to make sure we can successfully navigate major societal transformations.'

The School's research program investigates how emerging cyber-physical, technological systems — such as robotics, digital voice assistants, and autonomous systems — operate across settings and sectors including the creative industries, marine sciences, agriculture and climate-change research.

Distinguished Professor Bell said another focus of the School was examining who was building and managing the AI-enabled future. 'We need to develop the ability to respond quickly to changing situations and complex systems and many, diverse voices must be involved in making those decisions and building new knowledge,' she said.

Heat maps tool could support wind, solar plans

A new tool developed by researchers at The Australian National University shows the best locations around Australia that might be used to build new wind or solar farms.

The ANU 'heat maps' project is aimed at farmers and landholders, whom the researchers say are crucial to accelerating Australia's solar and wind uptake and help the nation meet its renewable energy targets.

ANU PhD researcher Cheng Cheng, who was involved in the study, said the project aimed to empower landowners to approach developers directly and negotiate with them to build solar or wind farms on their property.

‘Access to high voltage transmission lines is essential for solar and wind farms, and landholders in windy and sunny areas near existing infrastructure have a valuable economic opportunity,’ he said.

The heat maps use geographic information to identify the best possible locations. However, in a disclaimer, the project notes that land identified in the maps has not been the subject of any other studies, and it is not certain whether any particular area would be suitable. The commercial feasibility of developing any location is unknown. The publicly available datasets used for this work could contain inaccuracies. Consequently, results should be viewed as indications. The project received support from CWP Renewables and Innovation Connections.

Study shows voters abandoning major parties

Almost one in three voters cast their ballot for minor parties or independent candidates in the 2022 federal election, the highest number in almost 100 years, according to Australia's largest and longest-running study on elections. The results were released on 5 December.

The 2022 Australian Election Study (AES), led by The Australian National University with Griffith University, also found that Anthony Albanese was the most popular party leader since Kevin Rudd in 2007.

By contrast, Scott Morrison was found to be the least popular major party leader in the history of the AES, which has been tracking Australians' political opinions since 1987.

Study co-author Professor Ian McAllister, from ANU, said the 2022 federal election saw a ‘large-scale abandonment’ of major political parties.

‘The vote for the two major parties fell to historic lows in the 2022 election. The key beneficiaries of this seismic shift in voting behaviour were the Greens and independent candidates,’ Professor McAllister said.

‘While the 2022 election might be heralded as a “breakthrough” for the independents, the conditions for their election have been building over several decades. Voters are now less rusted-on to the major political parties and becoming more independently minded in their political choices.

‘In 1967, 72 per cent of voters said they always voted for the same party. In 2022, this dropped to a record low of 37 per cent.

‘This trend has been driven by wider societal changes, such as the huge expansion of higher education, the turnover of generations, the rise of social media, and shifting issue priorities.

‘Support for independents and minor parties will only continue to grow.’

Bookshelf

Lilith: A Feminist History Journal: Number 28

ISSN (online): 2652-8436
December 2022
ANU PressDOI: http://doi.org/10.22459/LFHJ.28

New research in this issue of *Lilith* includes studies of feminist vegetarian activism in Victorian England; the lives of Japanese businesswomen in North Queensland before 1941; negotiations of gender amongst women combatants in Tigray, Ethiopia; and the impacts of the Covid-19 pandemic on women.

The issue also contains nine short essay responses from gender scholars — including Ann Curthoys, Sharon Crozier-De Rosa, Catherine Kevin, Ann McGrath, Janet Ramsey, Yves Rees, Madeleine C. Seys, Jordana Silverstein, and Zora Simic — to the question 'What does it mean to do feminism in 2022?' These essays reveal the political power of feminist history-making, since, as Ann Curthoys argues in her essay, feminist history is itself a form of activism.

International Review of Environmental History
Volume 8, Issue 2, 2022

Edited by: James Beattie and Brett Bennett

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ISSN (online): 2205-3212
December 2022
ANU Press
DOI: http://doi.org/10.22459/IREH.08.02.2022

The latest issue of the *International Review of Environmental History* ranges across several topics, periods and continents. The first part contains six articles, on environmental history teaching; ancient populations and plague; European geographical knowledge of India; environment, architecture and design; introduced ship-borne rats and mice; and environmental change on sub-Antarctic islands.

The second part is a special-issue section, edited by Shoko Mizuno (Komazawa University, Tokyo) on the hybridity of colonial and postcolonial forestry in environmental history. Its articles investigate the production and circulation of knowledge in colonial British, postcolonial and international forestry networks, including during the development of the East Pegu Yoma forestry project in Burma (Myanmar) and the spread of invasive lantana in India.

Unsung Land, Aspiring Nation
Journeys in Bougainville

By Gordon Peake

Pacific series
ISBN (print): 9781760465438
ISBN (online): 9781760465445
December 2022
ANU Press
DOI: http://doi.org/10.22459/ULAN.2022

In 2016, Gordon Peake answered a job advertisement for a role with the government of the Autonomous Region of Bougainville, a collection of islands on the eastern fringe of Papua New Guinea looking to strike out as a country of its own. In his job he sees first-hand the challenges of trying to stand up new government systems. Away from the office he travels with former rebels, follows an anthropologist's ghost and visits landmarks from the region's conflict. In 2019, he witnesses euphoria as the people of Bougainville vote in a referendum on their future.

From these encounters emerges a portrait of this nation-in-waiting. Blending narrative history, travelogue and personal reminiscences, *Unsung Land, Aspiring Nation* is an engaging memoir as well as a meditation on the realities of nation-making and international development.

How Government Experts Self-Sabotage
The Language of the Rebuffed

By Christiane Gerblinger

ISBN (print): 9781760465414
ISBN (online): 9781760465421
December 2022
ANU Press
DOI: http://doi.org/10.22459/HGESS.2022

After official policy advice is publicly released, governments are often accused of ignoring or rejecting their experts. Commonly represented as politicisation, the author asks if this depiction is superficial. Is there something about the official advice itself that makes it easy to ignore?

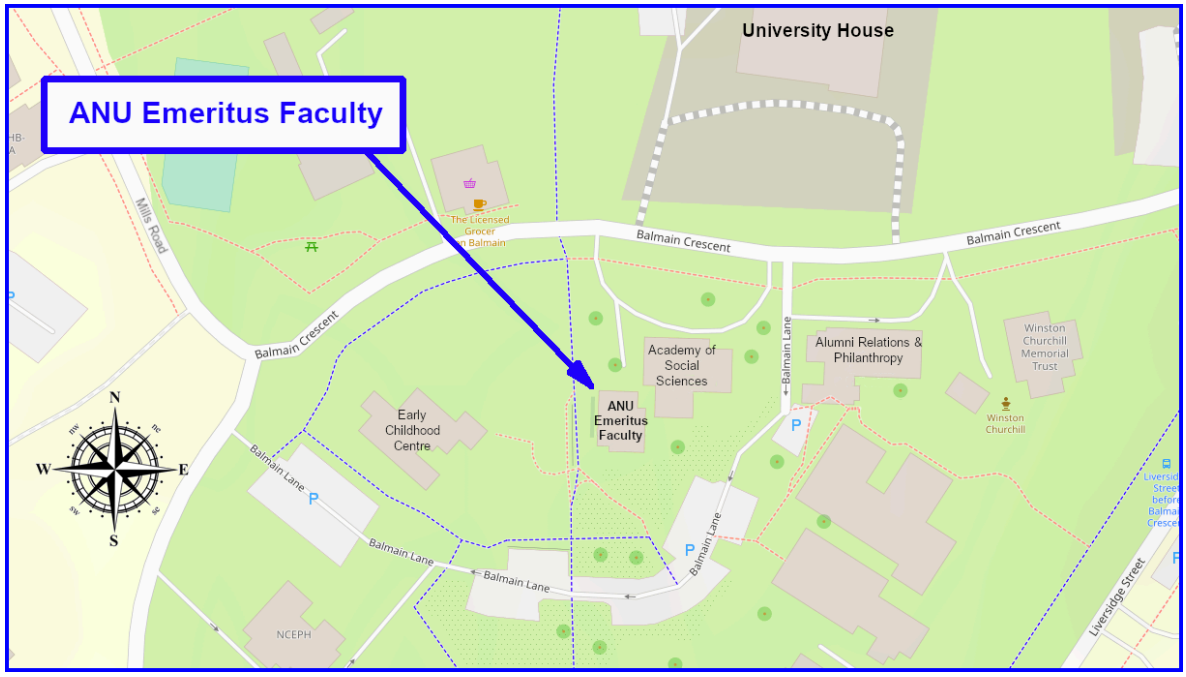
Instead of lamenting a demise of expertise, Christiane Gerblinger asks: does the expert advice of policy officials feature characteristics that invite its government audience to overlook or misread it? To answer this question, Gerblinger critically examines official policy advice and finds the language of the rebuffed: government experts reluctant to disclose what they know so as to accommodate political circumstances. She argues that this language evades stable meaning and diminishes the democratic right of citizens to scrutinise the work of government.

Administration

Arrangements for ANUEF room bookings
Requests to book the Molony Room should be addressed to the Secretary of the ANU Emeritus Faculty, Jan O'Connor, at jantancress@gmail.com or 6247 3341.

Finding the Molony Room
The Molony Room is at 24 Balmain Crescent, on the south side of Balmain Crescent almost opposite University House.

It is Building 1c on **https://tinyurl.com/yckuknbj,** set back between 22 Balmain Crescent (the Acton Early Childhood Centre) and 26 Balmain Crescent (the Academy of the Social Sciences). Four free car parking spaces reserved for ANUEF members visiting the Molony Room in the Balmain Lane Car Park immediately south of the Molony Room. The room is marked on: **https://tinyurl.com/y7gsyqgh**



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