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University



ANU CLIMATE HIGHLIGHTS 2019

Contributing to climate change solutions

In 2019, evidence of climate change has become increasingly hard to ignore throughout Australia. 2019 was by far the hottest year on record (1.52°C above the 1961-1990 baseline), with the hottest summer (2.14°C above), hottest December (3.21°C above) and the hottest day (41.9°C) to name just a few of the records broken.

We have just experienced unprecedented fires all over the country with tragic consequences. Many of our capital cities are now shrouded in toxic smoke, and this alone is causing and will continue to cause health problems.

But it's not just our summers that are becoming harsher – Spring 2019 was Australia's driest ever, much of Australia is in the grip of a devastating drought and problematic fires are occurring throughout the year and in parts of the country that have not historically experienced these conditions. Australians are increasingly recognising the danger that climate change poses. Climate change was ranked at the top of a list of ten possible threats to Australia's vital interests for the first time with 64% of Australians seeing it as 'a critical threat'*.

Our goal at the Climate Change Institute (CCI) is to contribute to climate change solutions – never has this mission felt more vital and urgent.

One way we do this is by bringing together researchers from throughout ANU, helping facilitate research that crosses disciplinary boundaries. This year, we've worked with academics to help progress research on climate change and health. We're also focused on developing research that will help build society's capacity to adapt to our changing climate and facilitating research on greenhouse gas removal (known as negative emissions).

With over 300 ANU researchers working on the multiple dimensions of climate change, I continue to be impressed by the depth and breadth of climate expertise, research and teaching across the whole university.

Connecting this research with government, business, the media and the community is a core part of our mission. Eight ANU researchers have leadership roles with the Intergovernmental Panel on Climate Change (IPCC), which informs 195 governments around the world. CCI members have been active in briefing parliamentarians, policymakers, industry and the community throughout the year. Media coverage by CCI members has reached over 37 million people and the CCI have hosted 25 events on a diverse range of climate related issues, attended by over 3,000 people. The following pages cover a fraction of what we're working on – please visit climate.anu.edu.au/about/climate-highlights/2019 to find out more.


Prof Mark Howden, Director, ANU Climate Change Institute, December 2019
* Lowy Institute Poll, 2019

ANU Climate Change Institute


Image: New Year's Eve, Batemans Bay. Credit: Kirsty Blake

BUILDING A COMMUNITY OF CLIMATE RESEARCHERS & TEACHERS

 **316**
Climate Change
Institute members

 **7**
out of 7 ANU Colleges

 **25**
out of 27 ANU schools

 **256**
academic staff members and
60 PhD student members

CCI Member Profile – Ngaio Fitzpatrick



Ngaio Fitzpatrick at the launch of *Requiem for a Reef*

Ngaio Fitzpatrick is an artist and Visiting Fellow with the ANU Climate Change Institute. Her work has been exhibited nationally and internationally. “Working with the CCI, I’ve been inspired to communicate the urgency of climate change and the need to act using my work and that of other artists. Art can connect the viewer to science and environmental issues in ways that research reports, graphs and data do not. It can also offer different experiences that may stay with the viewer for an extended period of time.”

Ngaio’s most recent work, *Requiem for a Reef* was created in collaboration with composer Dr Alexander Hunter (ANU School of Music) and gave people an immersive experience in which to see, hear and feel the effects of climate change.

CCI Advisory Committee welcomes four new members representing government, business and non-government organisations.

In 2019, the CCI Advisory Committee was expanded to include four external members representing the Federal and ACT Governments, the business community and non-government organisations (NGOs). Thank you to Jo Evans (Department of the Environment and Energy), Emma Herd (Investor Group on Climate Change), Gene McGlynn (ACT Government) and Richie Merzian (The Australia Institute) for taking on these roles.

The Committee already includes representatives from 10 ANU Schools: Prof Sharon Friel (School of Regulation and Global Governance), Prof Frank Jotzo (Crawford School of Public Policy), Prof Andrew McIntosh (College of Law), Dr Aparna Lal (Research School of Population Health), Rachel England (PhD rep), Prof Nerilie Abram (Research School of Earth Sciences), Prof Justin Borevitz (Research School of Biology), Dr Roslyn Prinsley (Office of Deputy Vice



New CCI Advisory Committee members, Emma Herd (left) and Jo Evans (right) gave a seminar to CCI members outlining government and the investment industry’s priorities for climate research.

Chancellor, Research & Innovation), Prof Jamie Pittock (Fenner School of Environment & Society), Dr Will Grant (National Centre for Public Awareness of Science) and Assoc Prof Katherine Daniell (College of Engineering and Computer Science).

RESEARCH HIGHLIGHTS

The CCI brings together cutting-edge climate research – from climate science and its effects on our environment to societal, economic, political, legal and technological impacts and responses.

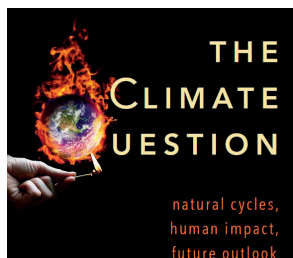
A selection of the research themes that CCI members are working on.

Just Transition Asia & the Pacific Art-Science **Water**
Carbon Dioxide Removal Infectious Diseases Biodiversity
Gender **Climate change** Agriculture
Heatwaves Threat multiplier Mental health Food security Security
Sustainable cities Policy Engagement Adaptation
Economics Land-based emissions Oceans

RESEARCH HIGHLIGHTS

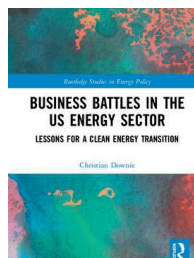
Below is a small sample (far from comprehensive) which demonstrates the breadth of climate change research by CCI members in 2019, and you can read more at climate.anu.edu.au/research/highlights/2019

New books in 2019



The Climate Question – Natural Cycles, Human Impact, Future Outlook

by Prof Eelco Rohling, Research School of Earth Sciences



Business Battles in the US Energy Sector: Lessons for a clean energy transition

by Dr Christian Downie, ANU School of Regulation and Global Governance (REGNET)

Why we're in a water emergency and what we can do about it



The Darling River in drought. Credit: Spelio/Flickr

In October 2019, leading ANU water economist, Prof Quentin Grafton, called on the government to declare a water emergency to focus attention on Australia's dire water situation. Prof Grafton's research highlights that this is not just a natural phenomenon. It's also a manmade crisis, caused by failure to heed research on our changing climate and to effectively manage our water resources.

"Simply saying that it's a drought so we can't do anything about it, apart from drought relief, is absolute nonsense'," said Prof Grafton.

"Whilst Australia has a history of droughts, climate modelling has warned us that evaporation will increase as temperatures rise, yet we've taken management decisions that have made the situation worse."

"I'm calling it an emergency because it's across a wide area and it's across all sorts of dimensions - the environment, culture, communities and farming - and that requires action".

Prof Grafton is keen to open up the options for responding by putting a range of management strategies on the table. He also recommends taking an adaptive management approach as the situation changes.

"My argument is not to scrap the Murray-Darling Basin Plan - it's to adapt it to the changing situation. We have a water emergency right here, right now."

What's driving youth participation in the school climate strikes?

In September 2019, hundreds of thousands of school students and their families rallied across Australia, kicking off a day of protest that brought together millions around the world. While youth rebellion has a long history, the School Strike 4 Climate (SS4C) has become one of the largest protest events ever held in Australia.

Hannah Feldman is doing a PhD with the Australian Centre for the Public Awareness of Science (CPAS) exploring what's motivating this enormous mobilisation.

"Climate change is an issue that is massively relevant to youth – arguably it represents the greatest challenge facing this generation" she said. "The way that youth have led this protest is completely different from anything we've seen before."

"Teens have a lot of power in many ways. But this power collapses when we get to politics and their ability to influence society's response to issues such as climate change."

"This case study of young people taking to the streets is very hopeful. It's very pro-science and it also signals a refreshing change in the way that individuals think about big problems."

Hannah expects that the findings of her research will have practical value for policymakers and educators.



The school climate strikes have mobilised millions of young people around the world.

Read more about this research and much more at climate.anu.edu.au/research/highlights/2019

RESEARCH HIGHLIGHTS

Encouraging the uptake of climate smart farming

While farmers in Australia are accustomed to having both good and bad years, these fluctuations are intensifying as climate impacts increase. At the same time, farming is in a unique situation as land has the ability to both absorb and release greenhouse gases, making it both part of the problem and potentially part of the solution with regards to climate change.

In early 2019, ANU was commissioned by a government agency to provide a report on how to assist farmers in adopting climate smart farming (CSF) practices and technologies using loans.

The concept of climate smart agriculture has been promoted all over the world, but it varies widely depending on the context. The ANU team's first task was to define what climate smart farming involved. Australian farmers are known for being incredibly innovative and the challenges they face are highly context specific, so rather than including a list of practices that might limit farmers' innovation, the team identified the principles that make up CSF.

The team then compared different types of loans and designed a revenue contingent loan, allowing farmers to pay back the debt in good years and postpone repayments in tough years.

"These loans would support farmers in transitioning their farms to respond and adapt to future climatic conditions," said lead researcher Dr Anna Lukasiewicz.



Farmers can use loans to reduce their overheads, for example by installing solar panels.

Exploring the impacts of a changing climate on public health



No swimming today. Sustained high temperature and stagnant water come together to create an algal bloom that persists for days.

Growing up in India, Dr Aparna Lal had access to running water for only two hours a day, and it wasn't always clean. She says she didn't even question this until she moved to New Zealand and found that clean drinking water was on tap 24 hours a day.

Dr Lal is now based at the Research School of Population Health and her interest in clean, safe drinking water stems from her own experiences. Her research explores the impacts of our changing climate on public health.

"Climate change will make some populations much more vulnerable to contaminated water, particularly people living in rural areas" said Dr Lal. "Increasing climate variability is also making water treatment more challenging for water utilities."

She's investigating how extended periods of dry weather or intense rainfall (both of which are increasingly common as our climate changes) affect water-related health risks. These include parasitic diseases (which can cause gastro), vector-borne diseases such as Ross River virus and bacterial contamination of water sources as indicated by *E.coli* levels.

"Early results suggest that there is a relationship between extended dry periods and outbreaks of parasitic diseases," she said. "We already know that intense rainfall and flooding can lead to disease, and that a little bit of rainfall can also flush out significant concentrations of pathogens after a dry period. But there is limited evidence on the relationship of water-related diseases and dry periods.

"For Australia, considering the public health consequences of droughts is very important."

How can we have better conversations about solving climate change?

Unfortunately, discourse on climate change in Australia has become very polarised and this is challenging our ability to develop and implement solutions. But as a new area of climate action emerges in the form of carbon dioxide removal, known as negative emissions, what can we learn from this conflicted space?

Dr Bec Colvin (Crawford School of Public Policy) has been exploring this question. "Issues of ideology, identity and framing have all fed into the fact that we've ended up with this binary context in discussions around climate change with people either pro or anti climate action," said Dr Colvin.

"We need more listening", she said. "The more people can talk to each other and get past the predictable and repetitive scripts that reinforce these distinctions, the better."

A key finding of her research, developed with a team of researchers across the ANU and beyond, is that it's important to avoid ideological bundling around negative emissions, in the form of association with a left or right political agenda.

To achieve this, we need to choose messengers who are not aligned with any particular ideological position. It's also vital to understand how different negative emissions technologies vary and bring vastly different benefits and risks.

"This research could potentially be useful in reminding us to look for signs of polarisation, and also in not closing off different policy areas," said Dr Colvin.

Read more about this research and much more at climate.anu.edu.au/research/highlights/2019

EDUCATION HIGHLIGHTS



117

climate courses
across ANU



58

undergraduate
climate courses



77

postgraduate
climate courses



3

professional short
courses run by the CCI

Studying climate change at ANU

As the impacts of climate change become increasingly apparent, people who understand its multiple dimensions and can contribute to developing, communicating and implementing innovative solutions are in increasingly high demand.

Student profile - Master of Climate Change

“For me, the Master of Climate Change is all about policy application. When I get back home, I’ll be well placed to develop solutions and apply them. I’m getting real world experience, which will give me a much better career path when I return to Sri Lanka.”

Master of Climate Change student, Chinthaka Jayasooriya, is a research officer with an Agrarian Research and Training institute in Colombo, Sri Lanka.



Climate Essentials professional short courses

In 2019, the CCI ran two one-day professional short courses on recent advances in climate science and the social, policy and economic aspects of climate change. The courses were attended by policymakers, consultants and NGO staff and featured leading climate experts from across ANU.

What people said:

“Probably the best short course I have attended to date.”

“All the presenters were at the top of their game, highly professional and the topics fully engaging.”

“The range of speakers and different parts of the talks provided good insight into how to build this into my work in policy and stakeholder engagement.”



Climate Change Adaptation short course for professionals from Africa

The CCI and the Fenner School of Environment & Society co-ordinated an intensive 8-week course to provide an understanding of climate change adaptation. Scholars came from government, NGOs and the private sector and had been identified as emerging leaders. The course is part of the Australia Awards - Africa Program and received the largest number of applications for any course of this type.

What people said:

“The opportunity to be at ANU opened me up to a world of advanced concepts, skills and technologies from leaders in climate change and birthed professional networks that have motivated me to be an agent of change.”

“This course should be organised annually to further strengthen the technical capacities of African countries.”



25 attendees from 14 Sub-Saharan African countries were selected from over 900 applicants and attended the course in Canberra and South Africa.

Read more at climate.anu.edu/study/education-highlights/2019

PUBLIC POLICY ENGAGEMENT & OUTREACH

Climate Change Institute members are engaged with policymakers at international, national and state / territory levels on an ongoing basis. We regularly conduct private briefings for parliamentarians and government departments on a wide range of climate related topics. Our members also have numerous state, national and international advisory roles.

In 2019, the CCI Director alone gave 83 briefings and lectures, reaching an estimated 11,000 people.

Here are some examples of policy engagement and outreach:

UN Climate talks in Madrid

ANU climate researchers and students were well represented at the annual UN Conference of the Parties, COP25. Prof Frank Jotzo, Hon Prof Howard Bamsey, Dr Siobhan McDonnell (negotiating on behalf of Vanuatu), Dr Ian Fry (negotiating on behalf of Tuvalu), students Aaron Tang and Ewelina Przybyszewski all attended the talks. Subsequently, the CCI ran a public lecture “Deciphering the UN Climate Talks in Madrid” outlining perspectives from ANU experts and business and NGO representatives.



PhD student, Aaron Tang, gave the official Researchers and Independent NGOs statement at the COP25 high level segment expressing concerns about climate inaction.

ACT Climate Change Council

The ACT Climate Change Council plays a key role in advising the ACT Minister for Climate Change and Sustainability on climate related issues. In 2019, two more ANU researchers were appointed as new members. Prof Mark Howden and Assoc Prof Cris Brack joined Hon Prof Penny Sackett who is now the Chair. These appointments build on the great work of ANU researcher Prof Frank Jotzo and ANU affiliates Prof Barbara Norman and Emeritus Prof Will Steffen, who have come to the end of their term at the Council.



Members of the ACT Climate Change Council. From left: Karen Jesson, Paul Bannister, Prof Penny Sackett (Chair), Assoc Prof Cris Brack, Shane Rattenbury MLA, Prof Mark Howden, Absent: Sophia Hamblin Wang

Policy engagement in the Pacific

CCI members are engaged with policymakers across the entire Pacific region on a range of climate related issues. Here are a few examples: Assoc Prof Katherine Daniell is working on water governance, risk management, sustainable urban development and climate adaptation in Tonga.



Dr Steven Crimp is working with the PNG government on disaster response, food security and the development of early warning systems.

Dr Siobhan McDonnell is working on issues related to gender and climate change as well as displacement and resettlement in the context of disaster in Vanuatu and Oceania.

Dr Ian Fry has facilitated training workshops in multiple Pacific countries on developing a robust negotiating position at the UN climate talks.

Dr Rebecca Monson is working on climate change, displacement and property rights in the Solomon Islands.

ANU joins Global Alliance of Universities on Climate (GAUC).

In January 2019, the Vice Chancellor signed ANU up to GAUC. GAUC aims to facilitate greater levels of collaboration on climate issues, greater engagement with climate stakeholders and the promotion of environmental practices by universities in line with Sustainable Development Goals. CCI members have hosted and attended various GAUC meetings in 2019 and will continue to pursue these goals, particularly around shared research agendas and campus climate action.



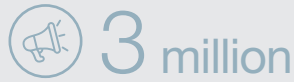
ANU staff and students were well represented at a GAUC meeting at COP25

Read more at climate.anu.edu.au/public-policy/2019

ANU CONTRIBUTIONS TO THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)



CCI members have leadership roles with IPCC



ANU expert commentary reached between 3-8 million people



briefings, roundtables and lectures on IPCC reports



CCI won ANU Vice-Chancellor's award for Impact and Engagement 2019

The IPCC is tasked with providing policymakers with regular scientific assessments on climate change, its implications and potential future risks, as well as putting forward adaptation and mitigation options. It has 195 member countries.

Leadership roles with the IPCC

In 2019, three ANU researchers were heavily involved in two IPCC Special Reports (see below) and the CCI was honoured with a Vice Chancellor's award for our work communicating their findings. Five other ANU researchers have leadership roles with the IPCC, namely Prof Frank Jotzo, Prof Xuemei Bai, Dr Kathryn Bowen, Dr Joelle Gergis and Dr Steve Crimp, with numerous other ANU researchers acting as report reviewers. Prof Mark Howden plays a particularly strong role as a Vice-Chair of the IPCC Working Group on impacts, adaptation and vulnerability.

IPCC Special Report on Climate Change and Land – released August 2019



A full house for the CCI public lecture on climate change and land with Prof Mark Howden, who steered the Special Report as an IPCC Vice Chair. Emeritus Prof Ian Noble contributed to the report as a Review Editor.

Unprecedented land exploitation is contributing to climate change, whilst at the same time land potentially offers solutions to reducing greenhouse gas emissions, including reforestation and storing carbon in soil. “We ignore the interactions between climate change and the land at our peril,” said Prof Howden.

IPCC Special Report on the Ocean and Cryosphere in a Changing Climate – released September 2019



Prof Nerilie Abram (right of photo) was a Coordinating Lead Author for the IPCC Special Report on the Ocean and Cryosphere in a Changing Climate

The earth's ocean and ice are under threat from climate change, but there's still time to avoid the worst scenarios if we act urgently. “Australia's coastal cities and communities can expect to experience what was previously a once-in-a-century extreme coastal flooding event at least once every year by the middle of this century – in many cases much more frequently”, said Prof Abram.



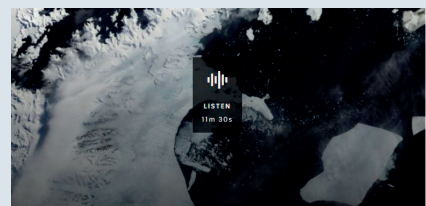
World food crisis looms if carbon emissions go unchecked, UN says

National Geographic, 8 Aug 2019
Commentary by Prof Mark Howden



Girt by sea, Australia faces serious climate challenge

The Canberra Times, 30 Sept 2019
Opinion piece by Prof Nerilie Abram and Prof Mark Howden



Wherever we look, climate change is altering the planet: IPCC

ABC Radio National Breakfast
26 Sept 2019
Interview with Prof Nerilie Abram

Read more at climate.anu.edu.au/public-policy/2019

EVENTS



25

CCI public lectures, seminars, roundtable discussions & Climate Cafés



3,700

Over 3,700 audience members at CCI events



4.3

Overall rating of 4.3 out of 5 stars



93%

of those surveyed will talk to others about the event

In 2019 we started livestreaming events to facilitate access by a wider audience. Here are some examples showing the diversity of events held in 2019:



Climate Updates in Adelaide, Canberra and Sydney

An overview of how our climate is changing and how we're responding to these changes.

What people said:

"A well-run informative event of great political and social value."

"These events are always informative, useful and very important. Lately I've been bringing someone who needs convincing and is slowly coming round. Our discussions afterward are animated and these sessions really help!"



Climate Café: How can we cut the carbon footprint of our food?

How do we motivate people to make low-carbon choices that suit them? With writer Jo Clay.



Climate Change Adaptation in Asia and the Pacific: Is Gender Relevant?

The role and impact of gender on climate adaptation using presentations, performances, video & art.

"Very clear and erudite summary of a large, complex report, presenting thoroughly researched and peer-reviewed facts in a straightforward, unexaggerated manner."

Read more at climate.anu.edu.au/news-events/events – See Past events 2019

IN THE MEDIA

The media is a vital channel for communicating ANU climate research to the Australian and international community. Climate researchers engage with media on a daily basis. In 2019:



4,024

media articles / programs featuring just a few of CCI's key contributors



37m

We reached an audience of more than 37 million people



\$27m

Advertising value of over \$27 million

Here are some examples of 2019 media coverage:



Four Corners: Climate of Change

Featuring Prof John Hewson and Prof Frank Jotzo, ABC TV, 1 April 2019



NASA satellite data reveals depths of Australia's drought

Featuring Dr Paul Tregonning and Rebecca McGirr, The Australian, 14 June 2019



Action on climate change, one person at a time

Dr Arnagretta Hunter, The Canberra Times, 24 July 2019



Smoke haze has long-term health impacts, experts warn

Prof Sotiris Vardoulakis, Daily Telegraph, 16 Dec 2019

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