

Pathways past the precipice: Flourishing in a mega-threatened world

**HOW WILL ANU AND THE AUSTRALIAN UNIVERSITY SECTOR
CONTRIBUTE TO THE MITIGATION OF EXISTENTIAL RISK?**

**REPORT OF A CROSS-DISCIPLINARY,
ROUNDTABLE DISCUSSION AT ANU**

Editor Bob Douglas



Australian
National
University



This is the report of a three-hour roundtable discussion, held at the Australian National University among a group of 37 academic leaders and students of the university on 27 June 2017. The discussion was hosted by a group from the Emeritus Faculty, which had been stimulated by the arguments in a book by Emeritus Faculty member, Julian Cribb, entitled "Surviving the 21st-Century." The discussion was chaired by Australia21 Director, Emeritus Professor Bob Douglas using approaches developed by Australia21 and the publication has been supported by this body.

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Australia21 is an independent public policy think tank that is committed to the development of new frameworks for understanding complex problems that are important to Australia's future. For 15 years the group has been bringing together multidisciplinary groups of leading thinkers, researchers and policymakers to consider issues about Australia's future ranging from climate and landscape, our society and our economy, to the nation's place in the world.

Pathways past the precipice: Flourishing in a threatened world.

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Published July 2017
ISBN 978-0-9953842-2-4

Designed by Paper Monkey

papermonkey.com.au

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EXECUTIVE SUMMARY

Humans are facing our greatest test in the million-year ascent of our kind. But this isn't a single challenge, like a famine or disease outbreak. It is a constellation of ten huge man-made threats, which are now coming together to imperil our stability and future existence. Society often regards these ten risks — ecological collapse, resource depletion, weapons of mass destruction, global warming, global poisoning, food insecurity, population and urban expansion, pandemic disease, dangerous new technologies and self-delusion — as separate issues. In reality, they are deeply intertwined: each affects the others. This means they cannot be dealt with one at a time, but must be addressed in conjunction — and at species level.

A three-hour dialogue among a group of 37 academic leaders and students of the ANU took place on 27 June 2017. The roundtable discussion was hosted by a group from the Emeritus Faculty, which had been considering the arguments in a recent book by Emeritus Faculty member Julian Cribb, entitled "Surviving the 21st-Century". An Emeritus Faculty working group had prepared a discussion paper, which was titled "Humans for Survival In the Face of Existential Mega-Threats," which argued that ANU could and should play a coherent national role in helping the Australian population to respond positively to these threats.

Participants in the roundtable came from many parts of the ANU and from the academic fields of Sociology, Philosophy, General Medical Practice, Geoscience, Social and Cultural Anthropology, Science Communication, Astronomy and Astrophysics, Ecology, Resilience, Economics, Engineering, Literary and Cultural studies, Chemistry, Biology, Climate Science, Music and Art. There was a mix of early and late career researchers, students and Emeritus Faculty

The three questions considered by the Roundtable were: 1: What needs to happen to place the Human species on a survivable course? 2: What role could ANU play in contributing to this? 3: Where are the levers for change?

Twenty-three participants circulated their own dot-point responses to the discussion paper before the meeting. And brief papers were contributed by three experts in the fields of Ecology, Climate Science and Human Ethics before the discussion began. This report draws on issues in the discussion paper, the submissions prepared for the discussion and a transcript of the discussion.

The discussion ranged widely over the nature of the existential threats and the fact that they are urgent and not being adequately addressed anywhere, least of all in Australia. There was agreement about the need for co-ordinated global action on all of them, and recognition that universities have a key responsibility to their societies in the fields of research, education and policy advocacy. Several leading international universities including Oxford and Cambridge Universities have been active in this field, along with several international agencies that have been developed outside universities. These agencies are capable of welding together, academic, business and other skills in the task of developing societal understanding on existential risk.

While ANU has been active on several fronts that are pertinent to this challenge there are significant barriers to developing within the university, the essential structure and resources to do the topic justice. Activities are needed that will generate positive policy proposals for consideration by an informed national leadership on these threats. It was also agreed that the Australian political system will not seriously address these issues without pressure from a better informed community about them.

There is considerable expertise in the Australian University sector that could be harnessed to this challenge. At the ANU, there is an imminent scheme for funds for Grand Interdisciplinary Challenges and there is at least one well-developed proposal under way for a major Synthesis Centre on the Sustainability of Socio-Ecological Systems. The group that is developing that proposal also publishes the journal "Solutions" which is an important mechanism for wide outreach on positive ways to address the ecological challenge.

It was recognised that serious efforts to ameliorate the interacting existential risks are everywhere fragmented and poorly co-ordinated, and that is true particularly in our own university.

The University has invested in coursework that is pertinent to this area but at a relatively low level. It has also been a modest supporter of the "Future Earth Australia" initiative, that involves a number of Australian universities but the initiative is still poorly resourced and has an uncertain future.

The group agreed that the University could play a valuable facilitative role in developing the case for a national agency that might be called an "Australian Future Change Commission." This could be the coordinating body to develop and oversee implementation of coherent action to reduce existential risk across Australia. Such a Commission would need to be supported by governments, business, philanthropy and civil society and could provide a mechanism for engagement of the university sector across Australia in this endeavour.

It could play this role in much the same way as international agencies such as The Bayer Foundations, The Potsdam Institute for Climate Impact Research and The Stockholm Resilience Centre do in Europe. They operate outside universities but have a two way communication with outstanding people and skill bases within Universities, government agencies and the corporate world

This conversation preceded the publication of specific details about The University's forthcoming Grand Challenge Scheme. A series of activities were discussed, some of which might feed into this scheme, and be pertinent to the evolving process. They included:

1. Appointment of an ANU working group to develop the case for an Australian Future Change Commission.
2. An audit across the ANU of education and research activities, that are pertinent to existential threats.
3. Development of proposals for cross-disciplinary "Synthesis Facilities" around existential challenges
4. Development of undergraduate and postgraduate courses that cross disciplinary areas and build competencies to deal with Existential Threats.
5. Expansion of the university's role in the Future Earth Australia Initiative.

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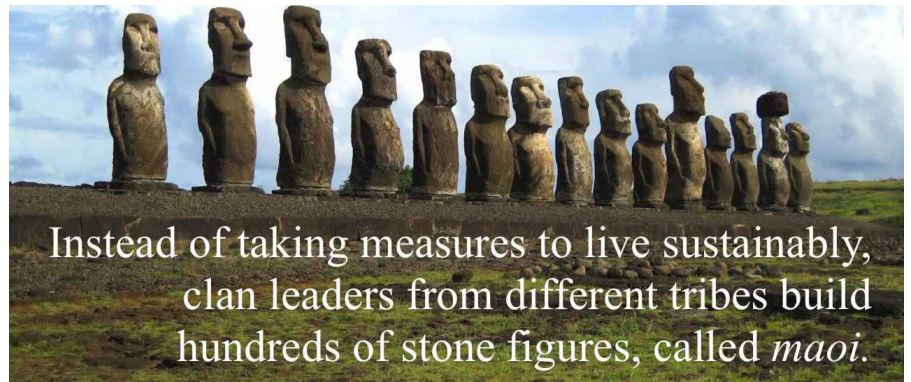
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A constellation of inter-related existential mega-threats

The end of civilisation and human extinction are distasteful topics. Nobody likes discussing them and many people prefer to ignore them as they go about their daily lives. But ignoring them does not banish the risk — inevitably, it only renders humanity less prepared, our future more perilous. There is no other way to deal with such a complex problem than to face up to it, to understand it thoroughly, and to then take resolute and agreed species-wide action to prevent it. A brief overview of some of these interconnected existential risks follows.

ECO-COLLAPSE

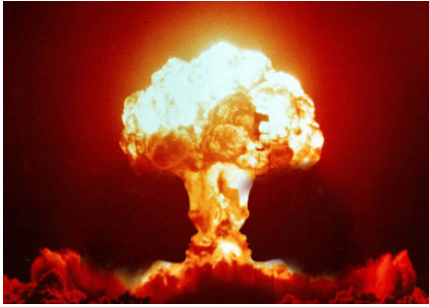


Instead of taking measures to live sustainably, clan leaders from different tribes build hundreds of stone figures, called *maoi*.

Humans have eliminated more than half the world's large animals in the last 40 years, on land and at sea. Dozens of species are thought to go extinct every day due to human activity. As the world's greatest biologist, E. O. Wilson, warns "We are tearing down the biosphere" — the very thing that supports life on this Planet. Or as young environmentalist Bindi Irwin succinctly puts it "If you keep on pulling one brick after another out of your house, eventually the house falls down."

An approach that is being discussed is to move half the world's food production into cities and recycle both nutrients and water, and then 're-wild' 24 million sq kms (an area the size of North America) under the management of indigenous people and farmers. It is to gradually replace mining with mineral recycling, and cease releasing toxins. Yet answers like these are not yet even being discussed in our social and political discourse.

WEAPONS OF MASS DESTRUCTION



The latest models indicate it would only require 50–100 Hiroshima-sized (i.e. small) nuclear bombs to end civilisation in a nuclear winter. World stockpiles currently hold around 15,000 such devices, and the risk of their falling into terrorist hands is growing as nuclear materials are stolen, on average, every ten days (IAEA). A new technology-based arms race is underway among the major powers featuring things like pilotless nuclear drones and artificial intelligence. Nuclear conflict remains the most likely route by which civilization may be destabilized and terminated. We have already seen conflict spiral out of famines, quarrels over resources, people displacement, and mass migration. Conflict also arises from collective delusions, such as political, religious, monetary and nationalistic ideals. The United Nations has initiated a process to ban all nuclear weapons and their materials, and this is supported by over 100 countries. Regrettably, 35 governments — including Australia's — and the nuclear industry remain opposed.

RESOURCE SCARCITY

Not only has the human population quadrupled in the last 100 years, but our personal consumption of resources has grown tenfold. In our lifetime, the average person uses 100,000 tonnes of fresh water, 750 tonnes of soil, 720 tonnes of metals, 5 billion energy units and emits 300 tonnes of greenhouse gas. Key resources are becoming scarce and landscapes worldwide are being ruined to obtain them.

The self-evident answer is to re-use resources on a continual basis. Thanks to technology the 'circular economy' is already feasible and becoming cost effective, while green energy is rapidly replacing fossil fuels. However resistance — by political and vested interests — continues to block innovation.

CLIMATE'S HIDDEN RISK



The release of 2.9 trillion tonnes of carbon dioxide into the atmosphere and oceans is predicted to drive the planet into a hot phase of +4–5 degrees Celsius above present temperatures. We have already released 1.9 trillion tonnes of carbon dioxide and are adding 50 billion tonnes a year by burning fossil fuels and clearing land. However, the greatest risk is that, as the planet warms, much of the 5 trillion tonnes of methane that is estimated to be locked in the tundra and seabed will be vented, causing unstoppable 'runaway' warming to 10 degrees or more. Scientists fear this may render the Earth uninhabitable to large life forms.

The only foreseeable way to avert this is to dramatically reduce use of fossil fuels and to revegetate a substantial part of the world's land mass. This can be accelerated by a switch to urban agriculture, carbon farming and landscape restoration — the same approach as has been discussed for ecological collapse. Renewable energy is advancing by leaps and bounds and will soon be in a position to take over from fossils. Governments, however, supported by the 90 big companies who make up the bulk of the fossil fuel industry, are hampering this transition.

FOOD SECURITY



World food security is on a knife-edge — for the simple reason that population and economic growth between them will drive a doubling in global food demand by the 2060s — while the world is running out of everything needed to satisfy it by traditional methods: topsoil, freshwater, wild fish, oil and mineral fertiliser. We have already extinguished the climate in which agriculture was born.

Food perfectly illustrates the dilemma humanity faces: to solve the problem using modern high intensity agriculture will only (a) worsen climate change, (b) destroy more land and water, (c) accelerate extinctions, (d) displace a billion small farmers, and (e) undermine human health. In other words, it's a response that makes almost everything far worse.

On the other hand, producing half the world's food in cities, using recycled water and nutrients, by converting agriculture outside the cities to low-intensity carbon eco-agriculture, and rewilding the abandoned lands could be a win-win-win which addresses several of the mega threats.

THE POISONED PLANET

Man-made toxins are now ubiquitous across land and ocean ecosystems. The whole of humanity and indeed, all life on Earth, is exposed to 250 billion tonnes of annual chemical emissions from human activity. Toxins are in our food, our water, the air we breathe, the furnishings and materials of our homes, vehicles, schools and workplaces, in wildlife, the oceans, in our bodies and even, now, in our genes. Humanity's chemical emissions are four times larger even than our carbon dioxide emissions. Medical evidence that toxins are damaging human intelligence, gender, reproduction and health is mounting.

There is a logical approach, though not an easy one. It is for consumers worldwide to stop buying toxic goods and foods, and to start rewarding companies, which produce clean, safe products. This requires an act of co-operation and knowledge sharing on a global scale, to cleanse our poisoned planet. Concerned citizens, parents, cancer societies, doctors, environmentalists and others are already uniting, worldwide, to start this process. There must be a new human right: not to be poisoned.

POPULATION GROWTH



On present indications, growth in the human population is expected to continue until at least the late 2060s before reaching a peak, and then commencing a slow decline. The current mid-range forecast is for 9bn in the 2050s, 10bn in the 2060s and 11bn in the 2090s, if the upward curve is extended. While many people assume growth is all about the number of babies born, in fact growth nowadays is substantially driven by people living longer lives; this makes it all the harder to control through family planning alone. A number of eminent scientists and defence specialists have argued the world — particularly a hot world of +2–3 degrees — cannot support so many people, especially at the elevated levels of material demand driven by economic growth, without risking serial catastrophes of various kinds.

To avoid this, finding creative ways to restrain population growth and ultimately return the world to a sustainable population is one of the key imperatives of global policy.

TECHNO-RISK



Uncontrolled new technologies like artificial intelligence, robotics, biotechnology and universal surveillance also harbour unanticipated threats, as people like Stephen Hawking, Elon Musk and Bill Gates have warned.

The safe control of these ultra-powerful new technologies demands oversight and control by civil society — little of which is yet in place. We must demand that control. The tools to control them do not yet exist. As with fossil fuels and the modern food supply, we are infatuated with the promise of new technologies, rather than cautious about the dangers they bring.

A development to be feared is the universal surveillance of every individual in the whole of society, every day of their life. This has not yet arrived, but within a decade or so quantum computers will deliver the memory and search power to do it. At this point every individual person could be spied upon life-long. Warning voices will be suppressed. Humanity may lose its collective ability to foresee danger and avoid it.

PANDEMIC DISEASE

The World Health Organisation identifies fourteen major pandemic disease threats to the global population: avian influenza, cholera, emerging diseases (e.g. nodding disease), Hendra virus, pandemic influenza, leptospirosis, meningitis, Nipah virus, plague, Rift Valley fever, SARS, smallpox, tularaemia, haemorrhagic fevers (like the Ebola and Marburg viruses), hepatitis and yellow fever. To these it adds the worldwide emergence of a new wave of drug-resistant organisms, such as tuberculosis, golden staph, streptococcus, salmonella and malaria, which pose a rising hazard to human health not only from the diseases they cause that resist treatment, but also from the accompanying loss of antibiotic protection for surgical procedures, cancer therapies etc. WHO estimates that a quarter of world deaths are now due to infectious disease. In addition to having the potential to extinguish the entire human population on their own, pandemic diseases are expected to exacerbate other existential risks including famines, water shortages, climate change, conflicts and refugee crises and augment the toll caused by these. However new pathogens are constantly arising as a result of human interactions with the environment (land clearing eg hantaviruses, Ebola) and other animals (eg HIV, Nipah, MERS, SARS, Avian influenza).

The need for worldwide early warning systems is paramount. So is ongoing attention to infectious disease prevention.

HUMAN DENIAL OF REALITY



However the greatest challenge may lie, not in the physical threats we face, but in our own minds. Our belief in non-material things like money, politics, religion and the dominant narrative often diverts and weakens our efforts to work together for survival. This has to change. Pope Francis, in his encyclical *Laudato Si*, demonstrated how religion and science can together be re-dedicated to human survival and it would be helpful if money, politics and the human narrative are similarly realigned. Otherwise they will sabotage the very actions essential to our continuance.

CROSS-CUTTING SOLUTIONS ARE NEEDED

This brief summary of inter-related man made existential threats, illustrates the compound challenges humanity faces during the coming decades and the necessity for cross-cutting solutions. The scientific evidence for them cannot be denied by rational people — only ignored. To address these issues will require wisdom, co-operation and technology at a global scale. The opportunity is to devise and test the cross-cutting approaches to the combined risks.

ROUNDTABLE

This is the report of a three-hour roundtable discussion, held at the ANU among a group of 37 academic leaders and students of the University that took place on 27 June 2017.

The discussion was hosted by a group from the Emeritus Faculty, which had been stimulated by the arguments in a book by Emeritus Faculty member Julian Cribb, entitled "Surviving the 21st-Century" The Emeritus working group had prepared a discussion paper, which was titled "Humans for Survival In the Face of Existential Mega-Threats," which argued that the University could play an important national role in helping the Australian population to respond positively to these threats. Invitees to the roundtable were invited to prepare their own dot-point responses to the discussion paper.

Participants in the roundtable came from many parts of the ANU and from the academic fields of Sociology, Philosophy, General Medical Practice, Geoscience, Social and Cultural Anthropology, Science Communication, Astronomy and Astrophysics, Ecology, Resilience, Economics, Engineering, Literary and Cultural studies, Chemistry, Biology, Climate Science, Music and Art. There was a mix of career academics at various levels in their career, undergraduate and postgraduate students and Emeritus Faculty members.

The three questions considered by the Roundtable were: 1: What needs to happen to place the Human species on a survivable course? 2: What role could ANU play in contributing to this? 3: Where are the levers for change?

Twenty-three participants circulated their own dot-point responses to the discussion paper before the meeting. And brief papers were contributed by three experts in the fields of Ecology, Climate Science and Human Ethics, before the discussion began.

MITIGATING EXISTENTIAL MEGA-THREATS. HOW CAN ANU ASSIST?

In the first hour of the Roundtable, discussion centred on the kinds of research, education and advocacy that will be needed to place humans on a survivable path.

It was evident from the participant submissions that there was considerable consensus in the group about the seriousness and urgency of the challenges and the belief that the University has a significant role to play in meeting them. There was also broad agreement that a primary concern is to enhance understanding in society of the nature of these challenges. The group also broadly agreed that treating these threats in isolation from each other, would be an inadequate approach. Speakers repeatedly pointed to the fact that many of the solutions are broadly understood, but that the issues are not being discussed or apparently being seriously considered by our political leaders.

There was also broad agreement that the approach should be interdisciplinary. Environmental psychologists are playing an important role in understanding how to change people's behaviour in relation to the environment. At present, these issues are not part of the national dialogue or the narrative that drives culture. One participant expressed the view that universities have a responsibility to be the critics and consciences of the community around them.

A mechanism for establishing communities of practice around issues of broad national concern is being developed in several parts of the world in what are called "Synthesis Centres." Communities of practice include academics, communicators, civil society, business, and political leaders. It seemed that a "Synthesis Facility" would be ideal for addressing the combination of man-made existential risks. There was also a clear recognition that this is a global issue and that while Australia needs to become much more actively engaged in the task ahead, it also needs to engage with countries in the region and with international agencies that are considering these matters. There is also a need for greater integration and cooperation in research into sustainability.

Historically, there have been a number of examples of civilisations that have collapsed. Understanding collapse is necessary to understand sustainability. A number of participants wondered whether the University needs to change the way it does research, education and advocacy. ANU has a distinctive profile around public policy but advocacy for public policy innovation is handicapped by the nature of the 18 month political cycle.

Another central issue, identified by a number of speakers was the nature of the economic system that currently drives the world. The safety of the world depends both on stocks and flows. But the current economic system values only flows. The stocks are being seriously depleted and policy is not being developed towards maintaining them.

An issue to which multiple speakers referred, was the need for a new domestic narrative that is both hopeful and promotes understanding of the difficulties ahead. It was suggested that there is an urgent need to create a shared vision of the world that is not only about surviving but flourishing. To enable this to happen, engagement and communication needs to be supplemented by listening actively to the concerns, aspirations and fears of the whole community.

The facts about climate change are broadly accepted at least within the scientific community. But the issue has become a political one. There has got to be greater focus on crafting policy solutions that have little political cost. Solutions that can be sold to politicians and that politicians can sell to the electorate. Policies that threaten re-election prospects are not going to be accepted by politicians.

A number of participants expressed concern about cloaking existential threats in a doom and gloom blanket of pessimism. They emphasised the need for hope and optimism. Others pointed out that until the seriousness of the threat is understood, people will be unwilling to change direction to avoid it. It was recognised that some people are motivated by bad news while others are activated by hope and the possibility of contributing to a better world.

A number of the speakers in this session kept returning to the current state of politics, which leads to trivialisation of many of these problems in the face of party competition and populism.

The meeting took note of activities already taking place in leading research universities like Oxford and Cambridge around the questions of existential risk and the creation of an international movement called Future Earth, in which ANU, and other universities in Australia have invested (modestly), recently. A number of people in the group saw Future Earth as a vehicle that could bring together communities of practice and engage early mid and late career academics in the challenge if it were properly resourced. While there was a clear recognition that existential risk presented specific challenges to the ANU, it was again underlined that this is a shared challenge to universities and other organisations around the world.

The way the University system manages research does not by itself promote inter-disciplinarity. There may be a need to consider a different structure for the kind of interdisciplinary work that will be needed around implementing solutions to existential risk. The conversation underlined the need to bring together, creative arts, social analysis, scientific thinking and effective structures.

New ways of doing things in the University are going to require passionate advocacy as well of clarity of purpose. Some discussion focussed on one particularly successful innovation that had come about around the University Energy Change Institute. There was some discussion about the cultural shift that needs to take place in universities to address these issues. The culture has been reinforced by the need for super specialisation, citations, and a degree of short termism that is endemic to academic advancement.

Attention was drawn to the important role being played in Europe by a group of institutions outside universities that nevertheless have close links to them. They include The Bayer Institute, The Stockholm Resilience Centre, The National Institute for Applied Systems Analysis and The Potsdam Institute. These Institutions permit a free flow of people and skills from universities, business, government and the community.

The question of probability was raised. All of these threats are connected but some are more probable than others, and should hence be given higher priority. There is a case for developing a clear understanding of the level of probability of various combinations of existential threats and their threat to the future viability of civilisation, in order to both inform further research and to ensure that the actions we take are reducing the risk of catastrophe as effectively as possible.

An insight was contributed from business. When faced with a complex problem in business, the tendency there is to develop a plan, which needs to include objectives, deliverables, strategy, and actions. This process was seen to have merit in considering how ANU will respond to the issue of existential threats.

A number of creative suggestions emerged when the discussion turned to the question "How should ANU respond to this challenge?" Several were aimed at increasing the ease and effectiveness of interdisciplinary collaboration. One suggestion was an interdisciplinary project on the impact of modern technology on Australian culture.

The development of new style Centres, such as Synthesis Centres, would require some change in funding incentives. But it was recognised that the idea behind a Synthesis Centre could foster collaboration across disciplines and across groups of young career academics, Ph.D.'s, and undergraduate students. They also bring in community, and act from the bottom up.

The point was repeatedly made that there are pockets of activity at the University that are highly pertinent to existential risks but they are not being brought to bear together on them.

Attention was also drawn to the idea that ANU Enterprise is an appropriate route to engagement of the business sector on this topic. There was also a strong push for research into the "how" of implementation.

The discussion turned to ways of generating an appropriate structure for this activity as well as to generate the essential resources.

A proposal that engendered considerable enthusiasm was the notion that the ANU might play a facilitating role in the development of a National Commission that could be jointly funded by governments, business and philanthropy and which would provide the opportunities for multidisciplinary research, education and action on existential threats. ANU would be well placed to promote the concept and to participate actively in it when it is developed. Insurance companies and banks would have potential interest in such development.

The Belmont Forum is a partnership of funding organizations, international science councils, and regional consortia committed to International transdisciplinary research providing knowledge for understanding, mitigating and adapting to global environmental change. It has links to Future Earth and discussions are planned for Australian engagement with the forum.

There was discussion of the relationship between the challenge of existential threats and the university's forthcoming Grand Challenges Scheme. At the time of the discussion, the details of the scheme were not yet published. The notion of working in an interdisciplinary fashion on these grand global challenges seemed to be clearly pertinent to what the scheme was seeking. One possibility that was discussed was that it might be possible under the scheme to underwrite the cost of preparing a proposal for a national commission. Such a commission might serve multiple needs in this area.

It was agreed that there needs to be a coherent approach across the University, that could build on the strengths that the university already has, and that this in turn would require an audit of what is already happening in both the educational and research fields that is pertinent to the existential risk challenge.

Considerable discussion ensued around an appropriate name for this development. The Emeritus Faculty had called it "Humans for Survival." There was some reluctance about this term and also the term "Commission for Future Change". Another suggestion was "A Global Change Institute"

it was agreed that the University Executive should be encouraged to appoint a working group to build on the various initiatives that were suggested during the discussion. This would need to be an interdisciplinary group and it should consult with other universities in Australia about their approaches to these issues.

A number of speakers also supported developments in undergraduate teaching in this field and the need to address concerns like artificial intelligence and the societal implications of automation.

In the final session, participants were invited to summarise their conclusions from the discussion and to identify specific points for action and further development.

One concern expressed was the possibility of not focusing on all existential risks but those on which we have particular expertise and which could be amenable to funding under the grand challenge scheme, eg the food challenge now facing the nation.

Attention was also drawn to the forthcoming Public Policy And Society Transformation Hub that is developing at ANU that could help to provide a structure and funding for this initiative.

Another comment related to the likelihood that a focus on existential threat could generate substantial numbers of doctoral projects that could help to build momentum and expertise in this area for the institution.

Attention was drawn to the fact that the ANU is a signatory to the Talloires Declaration with its 10 point action on sustainability in the education sector along with 500 other universities around the world. ANU has been acting on the Talloires Declaration but is not reporting this well and could do more.

Although there was considerable debate about its name, there was general strong support for the case that was progressively refined during the discussion for a National Synthesis Centre or Commission that might be jointly funded by governments business and philanthropy, and in which the university could play a significant developmental and academic role.

CONCLUSIONS

The University has an important role to play in this field, not only in research but also in education and public policy advocacy. There is already substantial expertise within the University and an audit should be made to ensure that it is being maximally brought to bear on this urgent set of global problems.

To do justice to this complex domain, ANU needs to appoint a high-level working group that should be charged with the task of preparing a proposal for a National Synthesis Centre or Commission that could operate outside the University, but in which, the University and other universities could play a significant role.

This working group should also interact with other universities in Australia and especially those that are now committed to the Future Earth Australia initiative, to better explore ways in which the university sector can collaborate across the nation on urgent efforts to mitigate existential risk.

The forthcoming Grand Challenge Scheme offers the possibility of substantial research development in this domain. Because it is the first time this initiative has been introduced, it is not entirely clear, whether these funds could be utilised for the development of non-research (ie developmental, educational and advocacy activities) including the development of the proposal for an outside development such as the National Synthesis Centre or Commission.

This complex set of challenges should stimulate innovation, education, public policy advocacy and community engagement across the entire institution.

It would be helpful for the University Council to make public its commitment to acting to meet this challenge.

APPENDIX: THREE EXPERT PERSPECTIVES ON THE MEGA-THREATS CONFRONTING HUMANITY



Ian Dunlop

*Ian was an international oil, gas and coal industry executive, chairman of the Australian Coal Association and chief executive of the Australian Institute of Company Directors. From 1998–2000 he chaired the Australian Greenhouse Office Experts Group on Emissions Trading. He is a member of the Club of Rome and a Director of Australia21. This is an extract from his report with David Spratt, *Disaster alley: climate change, conflict and risk*, released on 22 June 2017.*

A government's first responsibility is to safeguard the people and their future well-being. The ability to do this is threatened by human-induced climate change, the accelerating effects of which are driving political instability and conflict globally. Climate change poses an existential risk to humanity that, unless addressed as an emergency, will have catastrophic consequences.

In military terms, Australia and the adjacent Asia-Pacific region is considered to be "disaster alley", where the most extreme effects are being experienced. Australia's leaders either misunderstand or wilfully ignore these risks, which is a profound failure of imagination, far worse than that which triggered the global financial crisis in 2008. Existential risk cannot be managed with conventional, reactive, learn-from-failure techniques. We only play this game once, so we must get it right first time.

This should mean an honest, objective look at the real risks to which we are exposed, guarding especially against more extreme possibilities that would have consequences damaging beyond quantification, and which human civilisation as we know it would be lucky to survive.

Instead, the climate and energy policies that successive Australian governments adopted over the last 20 years, driven largely by ideology and corporate fossil-fuel interests, deliberately refused to acknowledge this existential threat, as the shouting match over the wholly inadequate reforms the Finkel review proposes demonstrates too well. There is overwhelming evidence that we have badly underestimated both the speed and extent of climate change's effects. In such circumstances, to ignore this threat is a fundamental breach of the responsibility that the community entrusts to political, bureaucratic and corporate leaders.

A hotter planet has already taken us perilously close to, and in some cases over, tipping points that will profoundly change major climate systems: at the polar ice caps, in the oceans, and the large permafrost carbon stores. Global warming's physical effects include a hotter and more extreme climate, more frequent and severe droughts, desertification, increasing insecurity of food and water supplies, stronger storms and cyclones, and coastal inundation.

Climate change was a significant factor in triggering the war in Syria, the Mediterranean migrant crisis and the "Arab spring", albeit this aspect is rarely discussed. Our global carbon emission trajectory, if left unchecked, will drive increasingly severe humanitarian crises, forced migrations, political instability and conflicts.

Australia is not immune. We already have extended heatwaves with temperatures above 40 degrees, catastrophic bushfires, and intense storms and floods. The regional effects do not receive much attention but are striking hard at vulnerable communities in Asia and the Pacific, forcing them into a spiral of dislocation and migration. The effects on China and South Asia will have profound consequences for employment and financial stability in Australia.

In the absence of emergency action to reduce Australian and global emissions far faster than currently proposed, the level of disruption and conflict will escalate to the point that outright regional chaos is likely. Militarised solutions will be ineffective. Australia is failing in its duty to its people, and as a world citizen, by playing down these implications and shirking its responsibility to act.

Nonetheless, people understand climate risks, even as their political leaders underplay or ignore them. About 84 per cent of 8000 people in eight countries surveyed recently for the Global Challenges Foundation consider climate change a "global catastrophic risk". The result for Australia was 75 per cent. Many people see climate change as a bigger threat than epidemics, weapons of mass destruction and the rise of artificial intelligence.

What is to be done if our leaders are incapable of rising to the task?

First, establish a high-level climate and conflict taskforce in Australia to urgently assess the existential risks, and develop risk-management techniques and policies appropriate to that challenge.

Second, recognise that climate change is a global emergency that threatens civilisation, and push for a global, coordinated, practical, emergency response.

Third, launch an emergency initiative to decarbonise Australia's economy no later than 2030 and build the capacity to remove carbon dioxide from the atmosphere.

Fourth, help to build more resilient communities domestically and in the most vulnerable nations regionally; build a flexible capacity to support communities in likely hot spots of instability and conflict; and rethink refugee policies accordingly.

Fifth, ensure that Australia's military and government agencies are fully aware of and prepared for this changed environment; and improve their ability to provide aid and disaster relief.

Sixth, establish a national leadership group, outside conventional politics and drawn from across society, to implement the climate emergency program.

A pious hope in today's circumstances? Our leaders clearly do not want the responsibility to secure our future. So "everything becomes possible, particularly when it is unavoidable".



Clive Hamilton

*Clive Hamilton is an Australian author and academic. His books include *The Freedom Paradox: Towards a post-secular ethics* (Allen & Unwin, 2008), *Requiem for a Species: Why we resist the truth about climate change* (Earthscan, 2011) and *Defiant Earth: The fate of humans in the Anthropocene* (Polity Press, 2017). He is Professor of Public Ethics at Charles Sturt University in Canberra and has held visiting academic positions at Sciences Po (Paris), Yale University and the University of Oxford. He was unable to attend the Roundtable.*

The Shock of the Anthropocene

- Earth System scientists have recently been pointing out something with implications almost too hard to grasp. Human intervention in nature, they write, is now so large and active that we have come to rival some of the great forces of nature in our impact on the functioning of the Earth System as a whole. So powerful have we become that we have shifted the geological evolution of the planet, taking it into a new geological epoch, the Anthropocene.
- Think about that. A new division is to be added to the Geological Time Scale that divides up the Earth's 4.5 billion year history, so that human history has now entered into deep history. We have become planet-shapers.

- This shift is not a continuation of past destructive trends but a *rupture*, one that the Earth System scientists say began no more than 50–60 years ago. (I expand on this highly compressed argument in my just-published *Defiant Earth: The fate of humans in the Anthropocene*.) It is also an ontological rupture in the being of the Earth and of the human. The Earth's course is no longer determined solely by the blind forces of nature, but has been infused with a conscious, willing force.
- Once we absorb the fact of the Anthropocene, and it takes a lot of absorbing, we must accept that humans are the exceptional creature. We are special. No other creature holds the fate of the Earth in its hands. Whatever their appeal as counters to anthropocentrism, we must abandon all notions of human beings as just another animal and resist the deflationary intent of factoids like "we are made up of billions of nonhuman cells" and "we share 97% of our DNA with chimps".
- It is an irony that post-humanist and new materialist theories aimed at diminishing the power and agency of humans arrive at precisely the time that the scientists are telling us that our technological power now rivals the great forces of nature. Admirable as their intentions are, these deflationary theories try to cut us down to size just as the science is revealing how our actual power has crossed a threshold.
- But here is the trouble and the danger. The Anthropocene materializes (in a form previously unimaginable) the way we are actually networked into nature; yet we are not subordinated by it, but the opposite! The question that screams out at us is this: How can we own up to the truth of this power and take ownership of it without succumbing to the narcissism and Promethean delusions of grandeur that got us into such an impossible imbroglio in the first place?



Stephen Boyden

Emeritus Professor Stephen Boyden was unable to participate in the Roundtable but has a long history of leadership in the world of ecology and has written here on the role of Universities in helping to create a bio-sensitive society

Universities and the future of humankind

In these notes I would like to emphasise three points from the standpoint of human ecology.

1. Ecological background

- Human history has been marked by four distinct ecological Phases: Ecological Phase 1. The Hunter-gatherer Phase. This phase lasted some 300,000 years.
- Ecological Phase 2. The Early Farming Phase. This phase began about 12000 years ago.
- Ecological Phase 3. The Early Urban Phase. This phase began around 8000 to 9000 years ago, but it really got under way about 5000 years ago. The ecology of urban dwellers was very different from that of hunter-gatherers or early farmers.
- Ecological Phase 4. The Exponential Phase.¹ This ecological phase, which began after the so-called Enlightenment around 250 years ago, is now in full swing. It has been characterised by massive growth of the human population and an explosive and continuing increase in resource and energy use and waste production by humankind, with ever-increasing impacts on the ecosystems of our planet. The most critical issue at present

is global warming due to the enhanced greenhouse effect — but there many other signs of ecologically unsustainable changes in the ecosystems of the biosphere (Box 1). There is no doubt that human civilisation will collapse if the present trends in population growth and in resource and energy use and waste production continue unabated. The days of the Exponential Phase of human history are numbered. The fourth ecological phase has also seen the invention and manufacture of weapons of mass destruction which pose an horrendous threat to the human species. Broadly speaking, there are two possibilities for the future. First, business as usual — leading inevitably to the ecological collapse of civilisation. Second, an effective transition to a fifth ecological phase of human history in which human society is truly sensitive to, in harmony with and respectful of the processes of life in and around us. We have been calling this a biosensitive society.² A biosensitive society will promote health and wellbeing in all sections of the human population and in the ecosystems of the biosphere (Figure 1). Healthy people on a healthy planet.

¹ This ecological phase is now popularly referred to as the Anthropocene.

² The use of this term is discussed in the document *Notes on biosensitivity*. It is based on recognition of the fundamental and extremely important principle that human wellbeing and ultimately the survival of civilisation will be dependent on human activities being sensitive to, in harmony with, and respectful of the processes of life that underpin our existence. We must aim for a society that is not only sustainable, but that also positively promotes health and wellbeing in all sections of the human population and in the ecosystems of the biosphere. Biosensitivity is a broader and richer concept than sustainability. Some people are not happy with this word; but we will continue to use it until someone comes up with a better term. The concept is an important one, and it needs a name.

2. Human culture as a powerful new force in biological systems

Cultural evolution has, of course, led to very many changes in human society which most people would regard as positive. However, culture can also get things wrong and can lead to behaviours that are nonsensical and sometimes very much against the interests of humanity. We refer to these as cultural maladaptations. There are countless examples of cultural maladaptation in human history.

Cultural maladaptations in the modern world are manifold. They range from activities adversely affecting human health, like the practice of smoking tobacco, to activities that threaten the future of civilisation, such as the use of fossil fuels as an energy source, the manufacture of weapons of mass destruction and economic systems that demand ever-increasing growth in the use of material resources and energy.

In fact, the prevailing cultures across the world today incorporate powerful delusions that are completely incompatible with the achievement of ecological sustainability and therefore the survival of civilisation. These cultures have lost sight of our total dependence on the processes of life, and they have no grasp of the nature, magnitude and seriousness of current human impacts on the ecosystems of our planet. They are blocking any effective move towards a biosensitive and sustainable ecological Phase 5 society. In other words, there is little hope for humanity unless there come about radical changes in the worldviews and priorities of the prevailing cultures across the world.

In a biosensitive society the prevailing culture will be characterised by profound respect for the processes of life that gave rise to us, of which we are a part and on which we are totally dependent for our existence. Unlike today, the goal of achieving biosensitivity will be seen as supremely important. It will be given highest priority on the political and social agenda.

This change in the world views and priorities of the prevailing cultures of the world will be the most essential and significant difference between biosensitive and ecologically sustainable societies of the future and the bioinsensitive societies we live in today. The necessary changes in human activities (e.g. energy use, deforestation) and societal arrangements (e.g. the economic system, population policies) will not take place without this cultural transformation.

However, this radical cultural shift will only come about if a wave of new understanding sweeps across the cultures of the world — understanding of the story of life and the human place in nature. This new understanding will be the pivotal factor in the transition to biosensitivity.

3. Universities

I am strongly of the opinion that universities have the potential, indeed the obligation, to play a key role in facilitating this cultural transformation. As I see it, new programs will be introduced with two main objectives:

1. To bring about basic understanding throughout academic institutions, and also in the community at large

- of the human place in nature
- of the inescapable fact that the survival of civilisation will require big changes in the scale and kind of human activities on Earth
- of the basic principle that the achievement of harmony with the processes of life that underpin our existence is a precondition for the survival of civilisation and the wellbeing of humankind (the principle of biosensitivity).

2. To promote intellectual effort and cross-disciplinary dialogue dedicated to

- creating a vision of a new society that is truly sensitive to, in harmony with and respectful of the processes of life, and that promotes health and wellbeing in all sections of the human population and in the ecosystems of our planet (see, for example, Box 2).
- determining how the necessary changes in society can be brought about.

- Universities could achieve these objectives in various ways:
- By disseminating, across all disciplines within the university and also in the community at large, scientific information about the human place in nature and the current anthropogenic threats to human survival and wellbeing; and by mounting integrative undergraduate courses available to students in all faculties on the human situation in the biohistorical perspective.³
- By developing and applying integrative conceptual frameworks that facilitate thinking and communicating about the interplay between different cultural and physical components of the total system — in the context of the transition to a sustainable and biosensitive society (for example — see Figure 2).
- By arranging multi-occupational and multidisciplinary workshops involving staff and students as well as invited representatives of governmental agencies, the private sector and community organisations, focusing on the social changes necessary for the achievement of biosensitivity.
- By inviting leaders from different fields of human endeavour and specialisation to respond to the scientific information and to present their views on its implications for society as a whole, or for a particular aspect of society.
- By publicising the outcomes of these activities as widely publicised in the academic literature, the social media and the daily press.

³ Somewhat akin the Human Sciences Program which I introduced in ANU in 1972. It was a 3 year course. The first year consisted of a first year unit in any discipline (e.g. biology, anthropology, economics). The second year unit was called Human Ecology. It was concerned with the principles of human ecology, the ecological history of humankind and with the unsustainability of current patterns of human activity on Earth. The third year unit was called Human Adaptability and was concerned with the principles of adaptation in the human species and it focused especially on processes of adaption to anthropogenic threats to human wellbeing. I was in charge of the Program for the first three years, and gave the third year unit. However, I then had to step aside due to other heavy commitments in the Institute of Advanced Studies. The Human Sciences Program survived for about 25 years, when some of its courses were taken over by the Department of Human Geography. I imagine similar courses exist on the Fenner School today. I do not know whether they are available for students from other disciplines.

Box 1: Some serious signs of cultural maladaptation in the modern world

- *A steady and continuing increase in the concentration in the atmosphere of the greenhouse gas carbon dioxide, from the preindustrial level of 280 parts per million by volume to 409 parts per million in 2017.* This is due mainly to the use of fossil fuels as a source of energy by humankind and to widespread deforestation. There is strong evidence that this change is leading to increase in temperatures across the globe and to other climatic disturbances. If allowed to continue it could lead to a massive drop in the global population later in this century.
- *Destruction of 80 per cent of the world's original forests.* At present trees are felled in the Amazonian forests at the rate of 2000 a minute. Deforestation is contributing to climate change and is resulting in great loss of biodiversity.
- *Severe land degradation.* This is due mainly to loss of organic matter, disruption of natural nutrient cycles, soil erosion and salinisation resulting from deforestation and unsatisfactory farming practices. According to the Food and Agriculture Organisation of the United Nations, a quarter of farming land is highly degraded. Another 8 per cent is moderately degraded and 36 per cent is classed as stable or slightly degraded. Ten per cent is described as 'improving'. *Worldwide loss of biodiversity on land and in the oceans.* According to some estimates 25 per cent of all mammal species will be extinct in 20 years' time.
- *Persistent organic pollutants (POPs) are synthetic compounds used as pesticides and for other purposes.* They can cause ill health or death and they interfere with reproductive processes. POPs are now found in the tissues of humans and other animals all over the world, including the Arctic and Antarctic.
- *Acidification of the oceans resulting from an increased uptake of carbon dioxide from the atmosphere.*
- *Thousands of weapons of mass destruction stored in the arsenals of the world.* This is many times more than necessary to bring an end to the human species.
- *Violent conflicts across the world between people holding different beliefs about the supernatural.*
- *Extreme disparities in health and material wealth among human populations.* This was not the case for the first three hundred thousand years of *Homo sapiens*.

Box 2: Physical characteristics of a biosensitive society

- Human activities*
- Minimal use of fossil fuels. Energy used will be from clean sources⁴
 - Extensive forestation and reforestation and other measures worldwide to sequester atmospheric carbon
 - Stable consumption of materials and energy at a sustainable level
 - Maximisation of local food production
 - Maintaining a supply of clean water for human consumption, free of pathogenic organisms or harmful chemicals and drugs
 - Farming practices that protect the biological integrity and health of soils
 - Keeping natural nutrient cycles intact by returning organic waste to farmland
 - Effective protection of biodiversity in all regional ecosystems and in the oceans
- No release into the atmosphere, waterways or soil of pollutants that interfere with the health of humans and other forms of life — directly (e.g. PM2.5 and SO₂ in the atmosphere, POPs in the soil), or indirectly (e.g. CFCs in the atmosphere that cause destruction of ozone in the atmosphere and hence increasing UV radiation at the surface of the Earth)
 - No discharge of plastic bags into the natural environment
 - Peoples lifestyles will:
 - > Satisfy the physical and psychosocial health needs of the human species (e.g. clean air and water, healthy diet, plenty of physical exercise, sense of purpose and the experience of conviviality)
 - > Be consistent with satisfaction of the health needs of the living environment. There will be much less emphasis than at present on consumerism and fossil fuel dependent activities, and more emphasis on such activities as growing food, making music, dancing, art, cycling, and convivial social interaction.
- Human population*
- A healthy human population with no major disparities in health and wellbeing in different sections of the population
 - Eventual adjustment of global and regional populations to levels that do not cause progressive damage to the planet's ecosystems.⁵
- Artefacts*
- Human settlements will be designed to
 - Minimise use of fossil fuels and increase the use of energy from clean sources
 - Minimise pollution of air, water and soil with harmful products of industrialism
 - Encourage health-promoting activities (e.g. walking, cycling, convivial social interaction)
 - Provide much green space to encourage local biodiversity and promote human wellbeing
 - Provide plenty of space for local food production
 - A biosensitive society will be free of weapons of mass destruction

⁴ There are those who advocate replacing fossil fuels with nuclear power. It is indeed a sad situation if we have become so addicted to high levels of use of extrasomatic energy that we are forced to replace one polluting source of energy with another — and one that undoubtedly holds extremely high risks for humankind.

⁵ Serious estimates for the maximum sustainable human population globally range from less than 100 million to 1500 million (see www.evfit.com/population_max.htm.)

Figure 1. Biosensitivity triangle

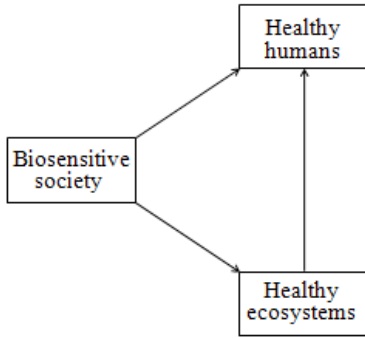
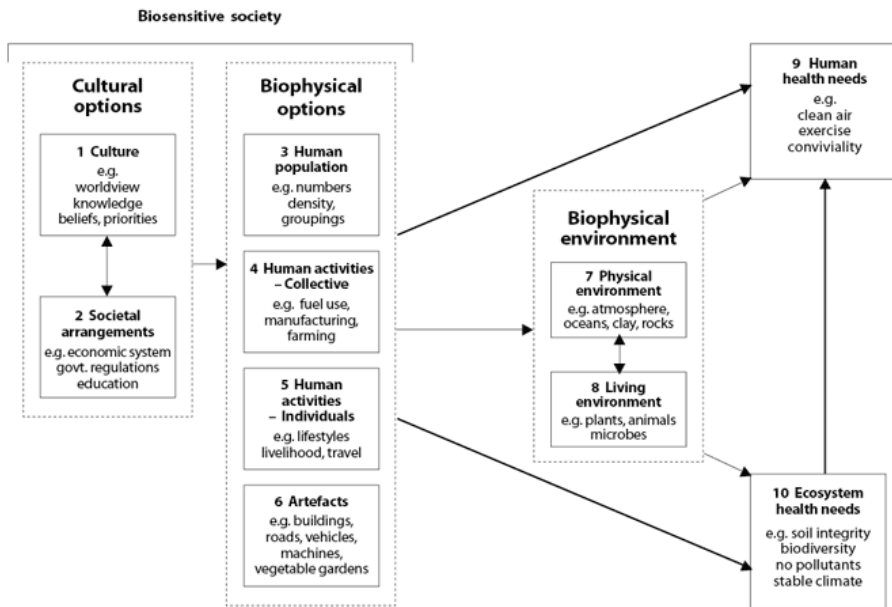


Figure 2. Transition framework



Readers can access two roundtable documents below

1. Discussion paper

<https://dl.dropboxusercontent.com/u/11559830/ANU%20Roundtable/HUMANS%20for%20SURVIVAL%20FINAL%20.pdf.pdf>

2. Transcript of the discussion at the Roundtable

<https://dl.dropboxusercontent.com/u/11559830/ANU%20Roundtable/Transcript%20of%20Roundtable%20on.pdf>

Pathways past the precipice: Flourishing in a mega-threatened world



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