He Kaupapa Hononga Symposium

Wednesday 25 November 2020: Dunedin, Wellington & Zoom

Programme

Time	Title	Presenter
8.30	Opening Address	Teanau Tuiono
9.15	Session 1: The Changing World	Cristina Cleghorn
9.20	Seeking the transport sweet spot: health, equity and zero carbon	Caroline Shaw
9.35	Aviation Exceptionalism in the Age of COVID-19	Lisa Ellis
9.50	Reconciling past and future: developing long-term hydroclimate observations to enable future climate change resilience	Chris Moy
10.05	Property Purgatory	Ben Tombs (PG)
10.30	Morning tea	
11.00	Session 2: Urgent Issues and Research Gaps	Inga Smith & Sara Walton
12.00	Session 2 Feedback	
12.15	Lunch	
1.15	Introduction to He Kaupapa Hononga	Sara Walton
1.30	Introduction to te reo Māori Session 3: Scientific Borders	Julia Wilson
1.50	*Haumātakataka:* Massive phytoplankton bloom in the wake of Cyclone Oma, South Pacific, 21 February 2019	Pete Russell
2.05	Fifty Years of Independence: Indigenous Perceptions on Sustainable Land Development in Fiji	Jekope Ramala Maiono (PG)
2.20	Introduction to the Climate Action Project	Hannah Heynderickx (PG)
2.45	Afternoon tea	
3.15	Session 4: "Listen to the Scientists"	Linn Hoffmann
3.20	Wetland restoration and native tree planting in rural communities: an overview of the policy	Janice Lord & Viktoria Kahui
3.35	Wetland restoration and native tree planting in rural communities: results from a qualitative study of rural landowners	Aleisha Lord & Sara Walton
3.50	Is +2°C too warm for Antarctica? Lessons from a 400 ppm CO_2 world	Christina Riesselman
4.15	Postgraduate Prize, and Summary of Day	Lisa Ellis

Session 1. The Changing World
Visions for a carbon neutral future, climate change adaptation and how COVID-19 has altered our approach.

Seeking the transport sweet spot: health, equity and zero carbon

Author: **Caroline Shaw**
Department of Public Health, UOW

The NZ transport system contributes to adverse health outcomes, social inequalities and environmental damage. These impacts occur as a result of injury, physical inactivity, air pollution and greenhouse gas emissions (GHGe). NZ is embarking on a transition to net zero GHGe by 2050 and the reduction GHGe from the transport sector offers an opportunity to improve population health and reduce social inequalities.
There are a number of different approaches to reducing GHGe in the transport sector, e.g. replacing current fossil fuelled vehicles with electric vehicles, or large increases in the use of cycling, walking and public transport. These approaches have different implications for health and health equity.
This three year Health Research Council funded project will determine a range of plausible visions of different low carbon transport systems for NZ, determine the policies needed to implement each vision and quantify the health, GHGe and equity impacts as well as changes in costs to the health and transport sector for each vision. This talk will outline the overall project and the work so far. This research is a timely opportunity to inform policy that can achieve benefits across health, transport, and environment sectors.

Aviation Exceptionalism in the Age of Covid-19

Authors: **Lisa Ellis**, James Higham, and James Maclaurin
Department of Philosophy

The world has not appreciated the climate risk, political injustice, and threat to fragile international norms of aviation exceptionalism. Having committed to an already very weak carbon mitigation effort before the pandemic struck, international aviation has used the Covid-19 crisis to ratchet its emission reduction effort down even further. We set out why the emissions behaviour of the aviation sector is risky and unfair. Using standard scenarios, we demonstrate the scale of the burdens transferred and anticipated to be transferred to every other sector by aviation exceptionalism. We note that every other sector has committed to emission reduction under the Paris Agreement; even marine transport is at least in principle committed to emission reduction in line with global climate goals. We argue that the aviation sector is free riding on the other parts of the global economy, operating outside international norms. Finally, we consider how such behaviour has been possible, highlighting the sector's history, the unusually opaque structure of the ICAO, and the cognitive incentives and biases mediating people's perceptions of aviation exceptionalism. Though it is too early to say conclusively, the path selected by marine transport demonstrates that it is at least possible to bring free riders on international agreements into compliance by self-organisation, visibility, and informal pressure rather than legal subordination.

Reconciling past and future: developing long-term hydroclimate observations to enable future climate change resilience

Author: **Chris Moy**
Geology Department

In New Zealand we lack a comprehensive understanding of the drivers, magnitude, and frequency of pre-instrumental drought, however this is essential information needed by decision makers to develop adaptation and mitigation strategies for future climate change. Understanding the timing and severity of past drought provides essential perspective. Yet, the instrumental record of precipitation – less than a century long – is far too short to capture the full range of climate conditions likely to produce major droughts in the future. Here, I will present the results of ongoing collaborative research towards understanding how the strength and position of the southern westerly winds, a key climate mechanism for delivering rainfall to many parts of New Zealand, has changed during the last 12,000 years. Global climate models predict that southward displacement of the winds will be a key feature of late 21st century circulation and will likely drive rainfall deficits as storm tracks shift southward. In the early Holocene (~12 – 9 ka), warming drove the SWW into a weaker and/or more southerly configuration, similar to future predictions. During this interval, our hydrologic reconstructions from South Island lakes find evidence for multiple episodes of low lake level, extreme water column stratification and anoxia, and even complete desiccation. I will discuss the climate mechanisms responsible for these changes and how paleoclimate observations can be used to inform future planning strategies.

Property Purgatory

Authors: **Benjamin Dudley Tombs,** Janet Stephenson, Ben France-Hudson, Elisabeth Ellis
Faculty of Law, Centre for Sustainability, and Philosophy

Climate change will place increasing numbers of homeowners in 'property purgatory' – a state of financial insecurity arising from the foreseeability of eventual damage and uncertainty about means to recover their losses. The impacts of climate change induced sea-level rise and storm events are now certain, and exposed properties will likely incur insurance, mortgage, and value loss. These effects could occur prior to physical damage, and existing inequities will be magnified. Current legal and institutional arrangements offer no clear pathway for those affected to recover funds in order to relocate themselves. We position property purgatory as an immediate practical challenge for those affected seeking to recover their losses, and as a legal question regarding undefined responsibilities of state and local government.

Session 2: Urgent issues and research gaps.
A workshop to develop ideas for future research direction/funding applications and putting theory into practice.

For Session 2 you will be working in small, multidisciplinary groups to discuss a key climate change topic that you think needs further research.

Once in groups, ensure you begin with a round of introductions, including your research background and why you chose that topic. Then, as a group, you may want to consider the following questions for your chosen topic:

What are the key climate change questions for your chosen topic?

What emerging areas do you see (that need research)?

What approaches could be used to address these questions? (For example, multidisciplinary research, citizen science, outcome driven research, etc.)

What funding organisations may support research into this topic?

Session 3. Scientific Borders
Research using approaches that go beyond 'Western science', such as indigenous methods and perspectives.

Haumatakataka - Massive phytoplankton bloom in the wake of Cyclone Oma, South Pacific, 21 February 2019

Author: **Pete Russell**
Department of Physics

A tropical cyclone can generate upwelling of nutrient rich deep water through Ekman pumping. Previous studies have shown that Ekman pumped phytoplankton blooms are dependent on storm size, strength, translation speed and thermocline depth. This study investigates a massive chlorophyll-a ocean colour response in the wake of Cyclone Oma, South Pacific, February 2019. Comparisons made with other storms over the past two decades in the region show that chlorophyll-a response is highly correlated with time over location, r = 0.90. The locations of these Ekman pumped phytoplankton blooms suggests thermocline depth is a factor on a regional scale. Based on observations of storms with relatively cloud free days the phytoplankton bloom reaches a maximum 1 day after the passage of a storm and then decays over the following week to be 10 % of its maximum strength. Little else is known about what happens to the biomass of these primary productivity events. Further research into marine food webs and carbon sequestration is recommended to determine the significance of these large scale phytoplankton blooms. If some of the biomass is being sequestered into the seabed then core samples may provide more accurate information about the levels of past cyclone activity and how this relates to mean global temperature, in particular during warmer interglacial periods.

Fifty Years of Independence - Indigenous Perceptions on Sustainable Land Development in Fiji

Author: **Jekope Ramala Maiono**
Te Tumu School of Māori, Pacific and Indigenous Studies

Land ownership is a very sensitive issue amongst the iTaukei (indigenous Fijian). The land is limited and therefore a very valuable resources that need to be managed in an efficient system with the clear legal framework on how it is to be owned, shared, transferred and used (TLTB, 2020).
The key aspect of this research is to investigate all the different types of land management frameworks for an example ALTA, in Fiji and how they are understood by the iTaukei. Over the years, landowners have voiced their concern on various government policy regarding selling and leasing of the land to an overseas investor without listening to their concerns and their perspective on a sustainable method of land development. The research will endeavour to investigate some of these sustainable methods of land development or what is called Indigenous Knowledge System (IKS2) (Thaman, 2006) and why the iTaukei are not fully engaged in current government policy of economic land development in Fiji.

Introduction to the Climate Action Project

Author: **Hannah Heynderickx**
Department of Botany

The Climate Action Project focusses on educating young students about climate change and environmental threats our world is facing today. Through this project teachers and students across all continents are able to connect and interact with each other and share their knowledge and experiences. Changing students' mindsets, having them share stories with peers from all over the world, work on solving local climate change issues and take action is a very powerful and valuable way of learning. After all, it is young people that will inherit the Earth and face the long-term impacts of climate change.

Session 4. "Listen to the Scientists"
How do we, as researchers, encourage change and are our targets good enough?

Wetland restoration and native tree planting in rural communities: an overview of the policy
And
Wetland restoration and native tree planting in rural communities: results from a qualitative study of rural landowners

Authors: **Aleisha Lord, Janice Lord, Viktoria Kahui, Sara Walton** & Nicolas Cullen
Department of Botany

Wetland restoration and tree planting on farms has the potential to mitigate a significant proportion of agricultural greenhouse gas emissions (Burrows et al. 2018). Such on-farm activities can also contribute to local and regional efforts to mitigate the impacts of climate change by providing ecosystem services such as, erosion control, water quality enhancement, flood mitigation and microclimatic regulation (MEA, 2005). However, current resource use legislation may potentially act as a disincentive for landholders to plant or restore native vegetation within a productive landscape. The accumulation of significant native biodiversity in a forest, for example, can bring into effect regulatory controls on resource use under the proposed National Policy Statement on Indigenous Biodiversity (NPS-IB), as well as under District Council plans. Likewise, under the NPS-IB the restoration of a wetland comes with regulatory controls over the immediate surrounding area, which may affect landholders' use of the land for agricultural production, harvesting and recreation. This research explores the perceptions of impacts of increased regulatory control and compliance costs associated with native vegetation from land owners in the Otago region. The broad aim of our project to understand the drivers of rural decision-making around issues of reforestation, revegetation and restoration, and identify the regional and national cost of lost opportunities for natural resource regeneration, utilisation and carbon sequestration. This presentation will outline some of the initial findings from interviews with land owners and contextualise those findings with current policy statements.

References:
Burrows, L., Easdale, T., Wakelin, S., Quinn, J., Graham, E. & Mackay, A. (2018). *Carbon sequestration potential of non-ETS land on farms*. Contract Report LC3161 for Ministry for Primary Industries. Manaaki Whenua.

MEA (Millennium Ecosystem Assessment). (2005). *Ecosystems and Human Well-being*. Island Press. Washington DC

Is +2°C too warm for Antarctica? Lessons from a 400 ppm CO_2 world

Authors: **Christina Riesselman,** Briar Taylor-Silva, Grace Duke and Josie Frazer
Department of Marine Science

When the Paris Agreement was adopted in late 2015, it represented a multi-national commitment to adopt carbon policies that would keep the global average temperature in the year 2100 "well below" 2° C relative to pre-industrial levels, while pursuing efforts to limit warming to 1.5° C. The Late Pliocene is the most recent interval in Earth's history to sustain global temperatures within the range of warming anticipated under Paris Agreement commitments. Published global reconstructions and climate models find an average +2° C summer sea surface temperature anomaly relative to modern during an interval from ~3.3 to 3.0 million years ago, when atmospheric CO_2 concentrations last reached 400 ppm, providing a natural analog to test the impact of the maximum warming permissible under the Paris Agreement.

Here, we present the view from the Southern Ocean and Antarctic margin, compiling marine diatom fossil records and geochemical signatures from sediment cores collected by multiple Antarctic drilling initiatives to reconstruct climate and cryosphere during the interglacial periods of the late Pliocene. We use these reconstructions to demonstrate that late Pliocene Antarctic ice sheets and ocean circulation responded sensitively to comparatively modest forcing in the late Pliocene, suggesting that overshooting the Paris Agreement's more ambitious target of +1.5° C risks nudging the Antarctic / Southern Ocean system across a tipping point.