

Early Career Workshop

23–24 July, 2018

Location:

Manaaki Whenua-
Landcare Research,
Lincoln



bioheritage-earlycareer.weebly.com

For more info, contact: jennifer.pannell@aut.ac.nz

NSC BioHeritage Early Career Workshop

- Date:** 23-24 July 2018
- Time:** Day one: 8:30am-16:30
Day two: 8:30am-3:15pm
- Venue:** Manaaki Whenua Landcare Research, Lincoln
- Organization committee:** Jennifer Pannell, Chloé Mathieu, Sabrina Greening, Tom Moore, Johanna Yletyinen, Rachel Nepia, Stacey Bryan, Amrit Dencer-Brown, Kevin Collins
- Workshop goals:** **Networking and ideas exchange between postgrad students and postdocs** in BioHeritage Challenge Projects, as well as early career researchers with aligned projects. Identify opportunities to **integrate across projects** and **strengthen collaborations**. Work on a **collaborative research output**.

List of Participants

Isabelle Barrett	University of Canterbury
Corinne Bataille	University of Canterbury
Bob Brown	Manaaki Whenua - Landcare Research
Alexa Kate Byers	Bio-Protection Research Centre
Zach Carter	University of Auckland
Levi Collier-Robinson	University of Canterbury
Benjamin Cranston	University of Auckland
Amrit Dencer-Brown	Auckland University of Technology
Bryony Dignam	AgResearch
Andrew Dopheide	Manaaki Whenua - Landcare Research
Eimear Egan	NIWA
Sophie Fern	University of Otago
Laura Francis	University of Waikato
Patrick Garvey	Manaaki Whenua - Landcare Research
Elizabeth Graham	NIWA
Sabrina Greening	Massey University
Syrie Hermans	University of Auckland
Kristy Hogsden	University of Canterbury
Ellen Hume	University of Waikato
Nicholas Kirk	Manaaki Whenua - Landcare Research
Chloé Mathieu	Auckland University of Technology
Tom Moore	University of Waikato
Julie Mugford	University of Canterbury
Rachel Nepia	University of Waikato

Jennifer Pannell	Auckland University of Technology
Anita Pearson	University of Waikato
Aisling Rayne	University of Canterbury
Rogini Runghen	University of Canterbury
Cate Ryan	University of Auckland
Febyana Suryaningrum	Auckland University of Technology
Amanda Valois	NIWA
Helen Warburton	University of Canterbury
Richard White	University of Canterbury
Johanna Yletyinen	University of Canterbury

List of Facilitators

Kevin Collins	Biological Heritage National Science Challenge
Amrit Dencer-Brown	Auckland University of Technology
Stacey Bryan	University of Canterbury
Caroline Fenton	Biological Heritage National Science Challenge
Jennifer Pannell	Auckland University of Technology
Melanie Mark-Shadbolt	Biological Heritage National Science Challenge

Acknowledgements

Thanks to Andrea Byrom, and Caroline Fenton for their encouragement and support. We are grateful to the Biological Heritage National Science Challenge for providing the funding that made this workshop possible. Thanks to Kevin Collins, Melanie Mark-Shadbolt, Stacey Bryan and Amrit Dencer-Brown for giving up their time to facilitate this event.

Social Media

We encourage tweeting during this workshop! If you're a tweep, you can use the hashtag **#BioH_ECW**, and remember to tag the challenge [@BioHeritage_NZ](#) and the presenter if you can, although please respect the wishes of those who do not want pictures of themselves or their slides online. You will find the twitter handles of presenters in the abstracts section.

Agenda

Day One – Monday 23 rd July 2018		
Time	Item	Lead(s)
8:30 – 9:00	Registration & coffee	
9:00 – 9:05	Welcome and introductions – Karakia	Melanie Mark-Shadbolt
9:05 – 9:10	What's this workshop all about, anyway?	Jennifer Pannell
9:10 – 9:15	Plan for the day, housekeeping, explain format	Kevin Collins
	Speed talks session 1 – Molecular tools for conservation	
9:15 – 10:30	5 minute speed talks, followed by Q&A and small group breakout discussion	Andrew Dopheide, Chloé Mathieu, Syrie Hermans, Aisling Rayne, Sabrina Greening
10:30 – 10:45	Morning tea	
10:45 – 11:15	Regroup and report findings from discussion of session 1	Amrit Dencer-Brown, Jennifer Pannell, Kevin Collins
	Mātauranga Māori and research	
11:15 – 12:15	Informal Q&A session – how to engage with Māori as a researcher Submit questions at https://pollev.com/jenniferpan871	Melanie Mark-Shadbolt
12:30 – 13:00	Lunch	
	Speed talks session 2 – The human dimension	
13:00 – 14:30	5 minute speed talks, followed by Q&A and small group breakout discussion, then regroup and report findings	Nicholas Kirk, Amrit Dencer-Brown, Corinne Bataille, Sophie Fern, Julie Mugford, Amanda Valois
	Media communication session	
14:30 – 15:30	Social media and communicating challenge research, followed by tips and tricks for SciComm	Caroline Fenton, Stacey Bryan
15:30 – 15:45	Afternoon tea	
	Summary of outcomes so far	
15:45 – 16:00	Group discussion of themes so far – what is working, what isn't, general trends that are emerging	Amrit Dencer-Brown, Jennifer Pannell, Kevin Collins
16:00 – 16:15	Should we make any changes to our breakout discussion themes in day 2?	Amrit Dencer-Brown, Jennifer Pannell, Kevin Collins
16:15 – 16:30	End of Day One – Closing remarks & Karakia	Kevin Collins, Melanie Mark-Shadbolt

18:00 Dinner: Black Door Eatery, Lincoln (<http://www.blackdoorbar.co.nz/>). If you would like to attend please RSVP on the workshop logistics spreadsheet at <https://docs.google.com/spreadsheets/d/1jBcpmDI78zSJ7BuwwB-S1G6mBPoWA42hYdZF6YfuiU/edit?usp=sharing>

Day Two – Tuesday 24th July 2018

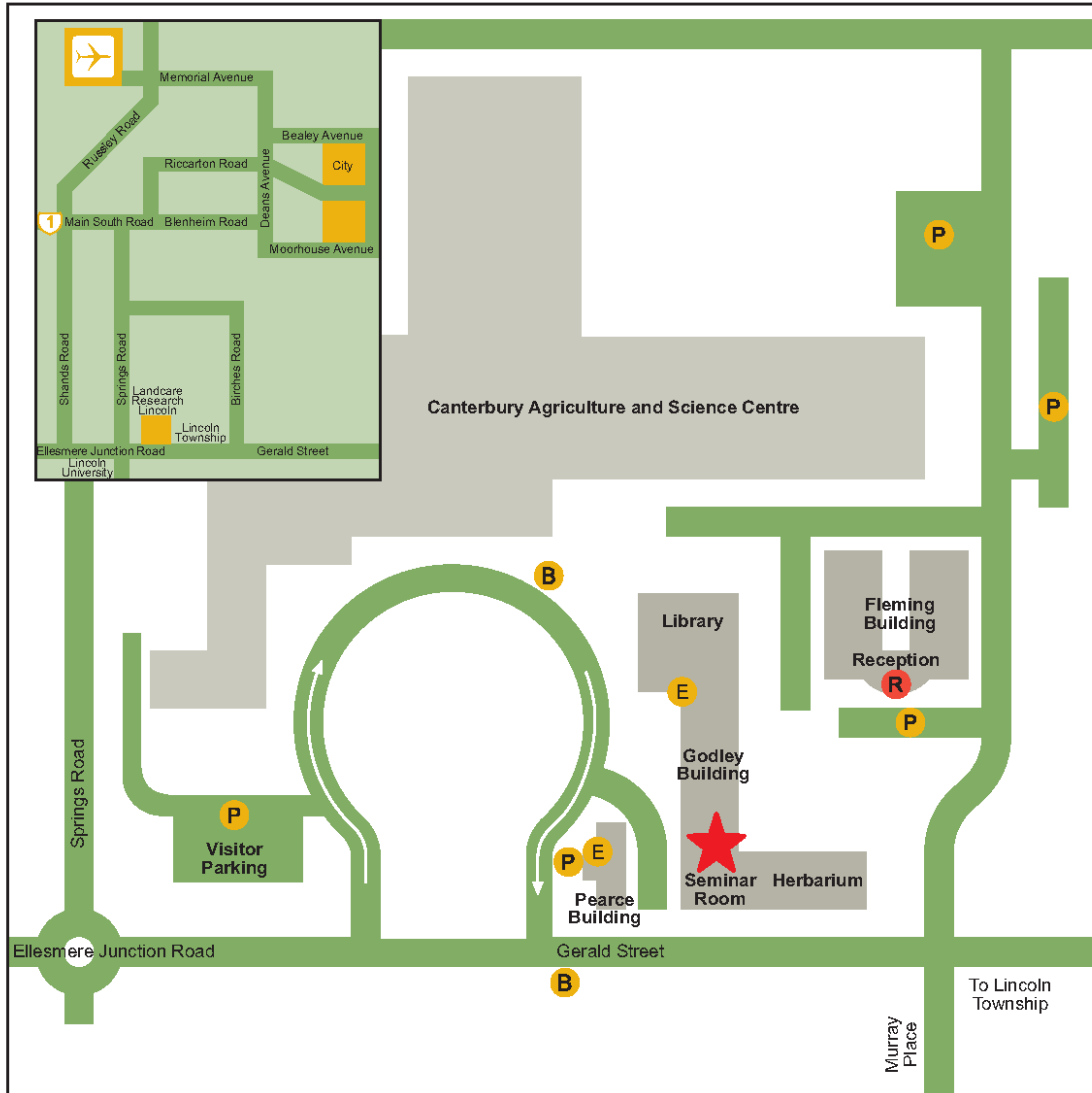
Time	Item	Lead(s)
8:30 – 9:00	Registration & coffee	
9:00 – 9:05	Welcome and introductions	Amrit Dencer-Brown
9:05 – 9:15	Summary of yesterday, overnight reflections	Kevin Collins
	Speed talks session 3 – Threats to NZ's BioHeritage	
9:15 – 10:30	5 minute speed talks, followed by Q&A and small group breakout discussion	Anita Pearson, Tom Moore, Bryony Dignam, Alexa Kate Byers, Zach Carter, Patrick Garvey, Rogini Runghen
10:30 – 10:45	Morning tea	
10:45 – 11:00	Regroup and report findings from discussion of session 3	Amrit Dencer-Brown, Jennifer Pannell, Kevin Collins
	Speed talks session 4 – How resilient are our native ecosystems?	
11:00 – 12:30	5 minute speed talks, followed by Q&A and small group breakout discussion, then regroup and report findings	Laura Francis, Levi Collier-Robinson, Eimear Egan, Cate Ryan, Benjamin Cranston, Rachel Nepia, Richard White
12:30 – 13:00	Lunch	
	Speed talks session 5 – Facilitating positive change	
13:00 – 14:30	5 minute speed talks, followed by Q&A and small group breakout discussion, then regroup and report findings	Helen Warburton, Febyana Suryaningrum, Elizabeth Graham, Jennifer Pannell, Ellen Hume, Johanna Yletyinen, Isabelle Barrett
	Group discussion of workshop outcomes	
14:30 – 15:15	Group discussion of final themes – distil and simplify sticky notes into general findings	Amrit Dencer-Brown, Jennifer Pannell, Kevin Collins
15:15 – 15:30	Discuss format/message of output i.e. report or paper, what should structure be, what's the overall message	Amrit Dencer-Brown, Jennifer Pannell, Kevin Collins
15:30 – 15:45	Afternoon tea	
	Discuss next steps	
15:45 – 16:15	Confirm next steps for reporting outcomes/writing paper/feedback surveys etc.	Amrit Dencer-Brown, Jennifer Pannell, Kevin Collins
16:15 – 16:30	End of workshop – Closing remarks	Amrit Dencer-Brown, Jennifer Pannell, Kevin Collins

Venue

Waikirikiri Seminar room, Manaaki Whenua Landcare Research, Lincoln



Landcare Research Lincoln



Landcare Research
Lincoln

Canterbury Agriculture & Science Centre
Gerald Street
Lincoln
New Zealand

Phone +64 3 321 9999

Travel time from airport = 25mins
Travel time from city centre = 30mins

Bus stop **B**

Parking **P**

Reception **R**

Entrance **E**

Christchurch International Airport

State Highway

Abstracts

Molecular tools for conservation

Using DNA meta-barcoding to analyse the biodiversity of (almost) everything in terrestrial ecosystems

Andrew Dopheide, Manaaki Whenua - Landcare Research

DNA meta-barcoding methods enable the analysis of multiple taxonomic groups simultaneously, from bacteria and fungi to invertebrates, but the interpretation and visualisation of these data can be challenging. Andrew has been using these techniques to investigate biodiversity patterns across different habitats and ecosystems.

Spatiotemporal variation of microscopic communities in New Zealand

Chloé Mathieu, Auckland University of Technology

My research aims to quantify the sources of uncertainty within eDNA surveys across multiple spatial and temporal scales to develop methods for obtaining better estimates of how biodiversity changes over space and time.

Characterising the microbial links between soil and freshwater

Syrie Hermans, University of Auckland

Through intensive sampling of a native forest catchment, we are investigating the degree to which bacterial communities in the stream are related to the bacterial communities found in the soil of the catchment. This will shed light on how bacterial communities within catchments are shaped, while also exploring the transport of eDNA through these environments, which can have important implications for how we monitor biodiversity for a wider range of organisms.

Characterising adaptive variation in kekewai (*Paranephrops zealandicus*), a mahinga kai species-at-risk

Aisling Rayne, University of Canterbury, @aisrayne

We have partnered with mana whenua, primary industry and conservation practitioners to address the benefits and risks of characterising adaptive variation in the declining mahinga kai species kekewai/freshwater crayfish (*Paranephrops zealandicus*). Between population genomic sampling and 'genetic rescue' experiments, we aim to enhance customary, commercial and conservation outcomes for this taonga species.

Genomic Epidemiology: a One Health tool with no boundaries

Sabrina Greening, Massey University, @SabrinaGreening

Pathogen genome data is increasingly being used as a tool in many epidemiological investigations, with many approaches working at the interface of human, animal and ecosystem health. This study aims to use genomic data to unravel the driving force behind the transmission of two important pathogens, *Campylobacter jejuni* and *Staphylococcus aureus*. Helping to understand, prevent and control infectious diseases at this interface.

The human dimension

Understanding public attitudes to new technologies to manage invasive species

Nicholas Kirk, Manaaki Whenua-Landcare Research, @nickakirk

The researchers conducted focus groups to understand stakeholder perception of the risks and benefits of three new pest control technologies – gene drives, the Trojan Female Technique, and pest-specific toxins – to manage two invasive species, wasps and rats. Following a thematic analysis of the focus group data, the researchers identified three themes: fears over unintended consequences of introducing new pest control technologies, the potential benefit of landscape scale control, as well as the risks and benefits of New Zealand being an early adopter of these technologies.

Assessing the social-ecological trade-offs of preserving and removing New Zealand's mangroves

Amrit Dencer-Brown, Auckland University of Technology @AmDencerB

What is the role of society in management decisions for the removal of temperate mangrove forests in New Zealand and how do these decisions affect the ecology of estuarine and coastal environments?

Kaitiakitanga for optimising cultural and ecological resilience in Aotearoa New Zealand: the role of multiple interest groups' attitudes

Corinne Bataille, University of Canterbury

Māori customary approaches to managing biodiversity are essential to sustainable environmental management, and it is crucial that the attitudes and beliefs of various interest group members are understood so that iwi can be responsive to them. This research on attitudes and beliefs towards Māori management of biodiversity is based on case studies around waterfowl, waterways and wetlands in Te Wai Pounamu the South Island of New Zealand, including Te Waihora Lake Ellesmere near Ōtautahi Christchurch

Does non-human charisma have an effect on conservation in New Zealand?

Sophie Fern, University of Otago, @SophieFern

The adjective charismatic is frequently used to describe organisms that get a disproportionate amount of attention. We assume that there is a correlation between the charisma of the organism and the wish to conserve it, even though an organism's charisma does not give it any special ecological value. But what is non-human charisma? Does everyone find the same organisms charismatic, and to the same degree? And, does non-human charisma actually have an effect on the organisms get conserved in New Zealand?

Developing methods to reduce uncertainty with citizen science data

Julie Mugford, University of Canterbury, @julie_mugford

Citizen scientists have the potential to contribute large amounts of data to scientists and decision makers. However, there is a perception that the data has more uncertainty than data collected using conventional data collection techniques. We are using Naturewatch NZ data as a case study to develop methods that can reduce the uncertainty of citizen science data.

Catchment citizens and agents of change

Amanda Valois, NIWA, @what_fish_eat

The scale and complexity of biodiversity declines in NZ poses serious challenges for scientists and conservation managers. Engaging and collaborating with the community offers a powerful tool in tackling these challenges. Citizens across NZ are already involved in collecting biodiversity data, documenting invasive species, restoring and monitoring ecosystems, and acting as advocates for the environment. Here I outline how NIWA is working with community groups and landowners across NZ to restore and monitor riparian habitats. This approach can serve as a model for greater collaboration in protecting and managing our biodiversity.

Threats to NZ's BioHeritage

Evaluating the implications of recent *Daphnia* invasions for Kākahi

Anita Pearson, University of Waikato, @pommyanita

What are the impacts of non-native *Daphnia*, among NZ's most recent and widespread freshwater invaders, on freshwater mussels/kākahi? Testing the hypothesis that competition for algae with non-native *Daphnia* will limit food availability for kākahi.

Glochidial development of the New Zealand freshwater mussel (*Echyridella menziesii*) on non-indigenous fish

Tom Moore, University of Waikato

Interactions between non-indigenous species and native freshwater mussels are likely to increase with the progression of global biotic homogenisation and climate change. Accordingly, with several relatively recent incursions of introduced fish species, New Zealand provides an opportunity to examine how non-indigenous fish may disrupt the obligate ectoparasitic life-stage of a native unionid mussel and host-generalist, *Echyridella menziesii*. Our findings indicate that non-indigenous fish species may impact freshwater mussel recruitment in New Zealand, which suggests that non-indigenous fish control may be one of the actions required for freshwater mussel conservation.

Harnessing the soil immune response: managing soil microbiology for sustainable pasture production

Bryony Dignam, AgResearch, @BryonyDignam

Greater understanding of diverse soil microbial communities under agricultural grasslands will provide opportunities to manage plant-beneficial microbes towards enhanced suppression of soil borne plant pathogens.

The role of soil fungal communities in kauri dieback forests

Alexa Kate Byers, Bio Protection Research Centre, @alexa_byers

The kauri forest ecosystem is under great threat from the spread of dieback disease. Our research aim is to explore the role soil fungal communities may play in tree forest health. By contrasting symptomatic versus asymptomatic trees, we aim to search for potential disease resistance and how soil fungal communities may contribute to this

Hi-tech Solutions to Invasive Mammal Pests**Zach Carter, University of Auckland**

In support of prioritising control efforts for the PFNZ 2050 programme, this project seeks to investigate factors that correlate to eradication success and time to successful eradication. The importance of such factors in explaining eradication success and eradication time will be tested using a semi-parametric hazards model. Given the historical record of past eradications, this research will predict how soon current control technologies can effectively target remaining invaded areas. Prioritisation and alternative control recommendations will be established based on the probability of complete elimination exceeding a target threshold.

Fatal attractions: Exploiting olfactory eavesdropping for wildlife conservation.**Patrick Garvey, Manaaki Whenua - Landcare Research**

The aim of my project is to synthesise a "superlure" for stoats, based on the recent discovery that ferret odour is a powerful attractant, while also testing the lures efficacy in established predator control operations. Reducing the olfactory signal to its minimum chemical, non-perishable components, will extend the longevity, availability, and effectiveness of this novel lure. Our research has applications for pest management in New Zealand and the technique of using predator odour to attract sympatric predators could have applications for conservation efforts worldwide.

Natural area visitor network**Rogini Runghen, University of Canterbury**

We assess the potential contribution of visitors to the spread of alien species within the natural areas of New Zealand. To understand this visitor-mediated dispersal, we consider places as hosts of the alien species and visitors as carriers. We use national-scale survey data to construct a visitation network and identify characteristic groups of visitors based on the similarities of their visitation patterns across places. These patterns enable us to identify the extent to which different types of visitors are expected to contribute to the dispersal of alien species.

How resilient are our native ecosystems?**Impacts of non-indigenous catfish on kōura, and a potential solution derived from Mātauranga Māori****Laura Francis, University of Waikato**

What are the consumptive impacts of non-indigenous catfish on kōura in Lake Rotoiti? And can whakaweku (bracken fern bundles) mitigate catfish-kōura interactions?

Critical first steps towards enhancing resilience in a threatened freshwater fish**Levi Collier-Robinson, University of Canterbury**

Characterising adaptive variation in the critically endangered Kōwaro to inform conservation management decisions and maximise their ability to adapt to future environmental change.

Understanding, protecting and managing New Zealand's freshwater fish – insights from their ear bones

Eimear Egan, NIWA, @eme_troutput

My research interests focus on inter-linking spatial and temporal processes with the life histories of freshwater fish. Currently, I am researching the effects of multi-decadal environmental variation on longfin and shortfin eels. To do this, I am examining variation in annual growth rates derived from eel ear bones (otoliths) that were collected over several decades (1970s – present). Elucidating the effects of past environmental variation on eel populations is key to understanding how they will respond to future climate change scenarios in freshwater.

Future forests

Cate Ryan, University of Auckland

Which tree species are vulnerable to mortality in increasingly intense drought conditions, and how will this change community assemblages and functions? Can we use remote sensing to monitor physiological parameters as an early warning system for forest mortality? This research will use plant traits to seek to understand plant-water relationships at species and ecosystem levels and find ways to help adapt to the impacts of climate change.

New Zealand kauri (*Agathis australis*) under artificial drought

Benjamin Cranston, University of Auckland

Climate models suggest more frequent and extreme drought events which can impact native forests' carbon and water budgets. A long-term drought experiment in West Auckland has been initiated to look at the effects of cutting rain through-fall on kauri.

Understanding the role and impact of honey bees in New Zealand forest

Rachel Nepia, University of Waikato, @mypollennation

On New Zealand conservation land the number of introduced honey bee hives has increased by 70% in the last 5 years. My research asks - what role honey bees are playing in native forest? How are they interacting with native flora and fauna? And are there enough resources to go around?

Predicting tipping points in freshwater ecosystems

Richard White, University of Canterbury

We aimed to synthesise information on non-linear environmental impacts in freshwater ecosystems and identify the key mechanisms that make different types of ecosystems vulnerable to environmental tipping points.

Facilitating positive change

What is delaying the recovery of our degraded streams and rivers?

Helen Warburton, University of Canterbury

The outcomes of this work will be to restore and future-proof indigenous biological heritage by overcoming negative resistance and resilience in degraded ecosystems. These degraded systems hold

high social, economic and cultural values yet are often seen as too difficult to restore using existing monitoring and management frameworks.

Carbon Quantities and Dynamics in New Zealand Beef and Sheep Agroecosystems under Different Scenarios of Farm Biodiversity Management

Feb yana Suryaningrum, Auckland University of Technology, @botanyindonesia

The research aims to quantify carbon from soil and woody vegetation on sheep and beef farms and develop a model of carbon dynamics on the farms based on a scenario of future land use and climate change.

Restoring both form and function

Elizabeth Graham, NIWA

My current research interest is to understand how community dynamics, such as trophic interactions, species turnover, and dispersal and recolonisation, respond to both degradation and restoration, thereby enabling us to restore community processes as well as structure.

Enhancing functional biodiversity in agroecosystems

Jennifer Pannell, Auckland University of Technology, @jennypannell

Production landscapes are a largely untapped resource for enhancing native biodiversity in New Zealand. This project aims to understand social, economic and ecological barriers to increasing biodiversity in sheep and beef farms, and model how these barriers might be overcome.

The straw that broke the camel's back

Ellen Hume, University of Waikato

Detecting temporal and spatial tipping points in New Zealand systems to enable better risk-based decision-making.

Key leverage points for avoiding or adapting to tipping points in social-ecological systems

Johanna Yletyinen, University of Canterbury, @j_yletyinen

Johanna's research focuses on building resilience and avoiding tipping points in Aotearoa New Zealand's ecosystems and natural resource management by modeling humans and ecosystems as interacting components of integrated social-ecological systems.

Resilience isn't always healthy: using stressors to overcome negative resistance and resilience in stream restoration

Isabelle Barrett, University of Canterbury

The ability to withstand and recover from disturbance is often associated with ecosystem health. However, degraded systems can also be resistant and resilient to disturbances making them restoration-resistant. Can stressors be used as agents for community change to overcome this?